AN ANALYSIS OF THE IMPACT OF THE RESPECTIVE ENVIRONMENTAL, SOCIAL AND GOVERNANCE PERFORMANCES ON FIRM VALUE IN SOUTH AFRICA

A research report submitted by

Saihil Rewachanda

Student number: 1847427

Cell: +27 76 067 0660

Email: saihilr@gmail.com

Date submitted: 22 March 2023

Supervisor: Associate Professor Avani Sebastian

in partial fulfilment of the requirements for the degree of

Master of Commerce in Accountancy

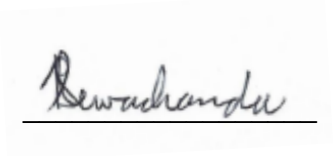
University of the Witwatersrand

Ethics clearance/waiver number: WSOA-2022-07-04W

WITS SCHOOL OF ACCOUNTANCY

DECLARATION

I, Saihil Rewachanda, declare that this research report is my own work, except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Commerce in Accountancy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other university.



Saihil Rewachanda

Signed at Eye of Africa, Eikenhof on the 22nd day of March 2023.

ACKNOWLEDGEMENTS

I thank Almighty God for the strength to persevere.

I wish to express my sincere gratitude to the following people:

My supervisor, Associate Professor Avani Sebastian, for her invaluable guidance and support;

Professor Sartorius, Professor Negash and Professor Maroun for their advice in the initial stages of this research;

Professor Padia and Professor Merino for the opportunity to pursue this degree;

Dr Lombardozzi for the professional editing of this research report;

Barbara Arnold at the Johannesburg Stock Exchange for providing the Financial Times Stock Exchange ESG ratings; and

My family, girlfriend and friends for their continued support.

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS AND ACRONYMS

BV	BOOK VALUE
COP26	26TH CONFERENCE OF THE PARTIES
CSR	CORPORATE SOCIAL RESPONSIBILITY
E	ENVIRONMENTAL
ESG	ENVIRONMENTAL, SOCIAL AND GOVERNANCE
FTSE	FINANCIAL TIMES STOCK EXCHANGE
G	GOVERNANCE
GDP	GROSS DOMESTIC PRODUCT
IFRS	INTERNATIONAL FINANCIAL REPORTING STANDARDS
IIRC	INTERNATIONAL INTEGRATED REPORTING COUNCIL
IISD	INTERNATIONAL INSTITUTE FOR SUSTAINABLE DEVELOPMENT
IOD	INSTITUTE OF DIRECTORS
ISSB	INTERNATIONAL SUSTAINABILITY STANDARDS BOARD
JSE	JOHANNESBURG STOCK EXCHANGE
MD	MAHALANOBIS DISTANCE
MV+DI	CUM-DIVIDEND ADJUSTED MARKET VALUE OF EQUITY
NAV	NET ASSET VALUE
NI	NET INCOME
RBV	RESOURCE-BASED THEORY
ROA	RETURN ON ASSETS
RQ	RESEARCH QUESTION

S	SOCIAL
SA	SOUTH AFRICA
UK	UNITED KINGDOM
UN	UNITED NATIONS
UNSDG	UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS
US	UNITED STATES
VIF	VARIANCE INFLATION FACTOR

ABSTRACT

Background: There is increasing pressure on South African firms to invest in sustainable initiatives. As a result, the impact of environmental, social and governance (ESG) performance on firm value has become a significant area for research. Notwithstanding the growing importance of ESG performance, the majority of prior research has focused largely on ESG disclosure.

From an integrated thinking perspective, firms are required to consider their impact on each of the E, S and G aspects of sustainable value creation. However, prior research has concentrated on combined ESG ratings, rather than disaggregating the ratings to analyse the impact of the respective environmental, social and governance pillars on firm value.

Purpose: The aim of this research report is to examine the relationship between firm value and respective environmental (E), social (S) and governance (G) performance ratings in South Africa.

Method: The study utilises ESG performance ratings from rating agencies, FTSE and Bloomberg, as well as internal and external perspectives of firm value. Data was analysed using descriptive statistics and regression analysis over the five-year period from 2018 to 2022.

Results: No relationship between E, S or G performance and firm value was statistically significant, irrespective of the measure of firm value used or the ESG rating used.

Implications: The results indicate that investors might not incorporate E, S and G performance ratings in their investment decisions. From an internal firm perspective, the results indicate that management might not incorporate E, S and G performances in their value creation decisions.

Significance: Due to the findings of the non-significant relationships between E, S and G performances and firm value, this study contributes to existing academic research as it foregrounds the need for further investigation into the value relevance of ESG performance ratings on firm value.

Keywords: Bloomberg ESG performance rating; environmental performance; firm value; FTSE ESG performance rating; governance performance; social performance; South Africa; value relevance

CHAPTER I
INTRODUCTION

Environmental (E), social (S) and governance (G) factors, collectively known as ESG, are a mechanism to measure management's sustainability practices and contribution to the welfare of society. These factors measure the impact of activities on stakeholders such as employees, communities, investors, suppliers and customers (Yoon, Lee, & Byun, 2018).

ESG performance ratings measure a firm's environmental, social and governance performances, rather than disclosures against a set of ESG evaluation criteria developed by ESG rating agencies (Yoon et al., 2018). ESG rating agencies generally measure environmental performance by quantifying factors such as a firm's attempt to reduce environmental pollution and resource consumption. ESG rating agencies typically measure social performance by quantifying factors such as a firm's effort to respect human rights and to provide high quality employment, alongside other factors such as community relations. ESG rating agencies commonly measure governance performance by quantifying factors such as a firm's endeavour to diversify the board's composition and promote board independence (Billio, Costola, Hristova, Latino & Pelizzon, 2021; Yoon et al., 2018).

Humanity inhabits a world where non-renewable resources are becoming increasingly scarce, where pollution and environmental harm are becoming more problematic, and where standards of living are deteriorating daily, partly exacerbated by the COVID-19 pandemic. The need for sustainability practices to secure the planet for future generations has never been more apparent. Notwithstanding the primary objective of profit-making entities to maximise firm value, Edelman (2020) argues that modern capitalism does more harm than good in the world. This suggests that ideologies which are more than purely capitalistic are needed in the modern world. Frameworks such as the United Nations Sustainable Development Goals (UNSDG) and the King Report, first published in 1994, the most recent version being King Code IV published in 2016, provided firms with guidance on how to create a positive economic, social and environmental impact.

Many South African firms have responded to sustainability concerns by improving their disclosures on their impact on the environment and society and their governance structures. Consequently, the majority of prior research has focused on the relationship between ESG disclosure and firm value. For example, Lee and Yeo (2016) found a positive correlation between integrated reporting disclosure scores and firm value for listed firms in South Africa (SA). Johnson, Erasmus and Mans-Kemp (2019) noted that no significant relationship existed

between composite ESG disclosure scores and corporate financial performance for listed firms in South Africa. However, the market's response to these disclosures has been varied and there is now a greater demand for improving ESG performance rather than improving ESG disclosure. Arvidsson and Dumay (2021) argue that the mitigation of the impacts of phenomena such as COVID-19 and climate crises requires improved ESG performance and not improved ESG reporting quality or quantity.

Further developments in ESG reporting, whether voluntary or mandatory, will likely not significantly improve ESG performance (Biondi, Dumay, & Monciardini, 2020; Cho, Laine, Roberts, & Rodrigue, 2015; Pitrakkos & Maroun, 2019). Dumay and Hossain (2019) support this argument by stressing that the more ESG regulations develop, the more the status quo is maintained. Arvidsson and Dumay (2021) claim that firms need to be asked to provide information that is more relevant, credible, timely, comparable and demonstrate the improvement in ESG performance, rather than focusing on ESG disclosure.

Du Toit and Lekoloane (2018) used listing on the Johannesburg Stock Exchange (JSE) Socially Responsible Investment Index as a proxy for superior corporate social responsibility (CSR), and found that there was no relationship between CSR and financial performance in South Africa. In comparison, ESG performance is considered to be more encompassing and quantifiable than CSR, which makes ESG performance a more significant and relevant area of research than CSR in South Africa (O'Neill, 2022).

Given the apparent disconnect between ESG performance and ESG disclosures of firms, this research focuses on ESG performance ratings provided by two prominent ESG rating agencies, Bloomberg and the Financial Times Stock Exchange (FTSE), rather than ESG disclosures.

1.1. Problem statement

Current valuation techniques are limited in the integration of non-financial factors. However, the impact of these factors may perhaps not be explicitly detailed in the computed firm value (Schramade, 2016). There is uncertainty regarding the impact that ESG performance has on firm value, specifically in a South African context. There may be a presumption that positive ESG performance has a positive impact on firm value, but this presumption is opposed by Davies (2022), who highlights how the share price of Thungela Resources, a South African coal miner, has increased exponentially since its listing in June 2021. This drastic increase in share price continued despite the severe spillage of toxic acid mine waste from one of

Thungela's poorly maintained mines in Mpumalanga in February 2022. The spill contaminated several bodies of water across the province and was detrimental to the lotic ecosystem, to such an extent that scientists argue that rehabilitation will take years (Davies, 2022). This incident depicts poor environmental performance without a corresponding negative impact on firm value, which demonstrates the uncertainty regarding the impact of ESG performance on firm value in a South African context.

It is in this context of apparent disregard of sustainability from investors (and company management) that the present research asks: Does ESG performance have an impact on firm value for companies in South Africa? This overarching research question is divided into three sub-research questions (RQ) as follows:

RQ_1 – Is there a significant relationship between environmental (E) performance and firm value for companies in South Africa?

RQ_2 – Is there a significant relationship between social (S) performance and firm value for companies in South Africa?

RQ_3 – Is there a significant relationship between governance (G) performance and firm value for companies in South Africa?

1.2. Purpose of the research

This research explores the value relevance of the respective environmental, social and governance (E, S and G) performances in a South African context. The research determines the relationship between E, S and G performances and firm value, whilst examining the relationship based on both internal performance measures of firm value as well as market measures of firm value. The research also scrutinises the relationship using E, S and G performance scores from two different rating agencies.

The relationship between ESG performance and firm value is relatively new compared to research on ESG reporting. There have been reports published analysing this relationship in recent times, however, the majority of the reports rely on data from advanced markets, with a paucity of research focusing on emerging markets (Alshehhi, Nobanee, & Khare, 2018). A lack of demand for measuring ESG performance in emerging markets hampers the establishing of reliable ESG measures, with limited quantitative data being available, but

conversely also makes the value relevance of ESG an intriguing study in the context of emerging markets.

In the South African context, from an environmental perspective, Girdwood (2013) argues that climate change will have a greater impact on the future operations of firms in terms of revenues and cost. This view resonates with the views of Hebb, Hawley, Hoepner, Neher and Wood (2016), who highlight the destruction of natural habitats as environmental concerns. Environmentally sensitive firms in developing nations such as South Africa, are not averse to overlooking legal and ethical duties to the environment and the welfare of communities in pursuit of value maximisation (Belal, Cooper, & Khan, 2015; Fig, 2005; Leonard, 2018). In South Africa, air pollution, which causes 89 per cent of premature deaths, coupled with water shortages and power outages, arguably increases the need for superior E performance to ensure sustainability and thus renders ESG a progressively more significant topic (Bauer, Im, Mezuman, & Gao, 2019).

The South African economy consists of numerous non-environmentally friendly industries, to such an extent that South Africa is regarded as the worst greenhouse gas emitter in Africa and ranks amongst the world's worst (Andreasson, 2017; Never, 2012). Negash and Lemma (2020) demonstrate South Africa's poor environmental performance by highlighting that South Africa was ranked 142nd out of 180 countries in 2018 regarding environmental performance. Environmental governance in South Africa is considered to be weak due to corruption, conflicting interests among politicians and lack of enforcement (Hönke & Kranz, 2013; Negash & Lemma, 2020). Furthermore, environmental considerations are especially important to the South African economy as the mineral sector contributes significantly to the country's gross domestic product (GDP), which further supports the need for superior E performance (Negash & Lemma, 2020).

In a South African context, from a social perspective, the need for ESG value relevance research is further vindicated by the legacy of social injustices in South Africa, exacerbated by historical systems of the past such as Apartheid, which have hampered socio-economic development (Handmaker & Berkhout, 2010). As discussed by Zuma, Shisana, Rehle, Simbayi, Jooste, Zungu, Labadarios, Onoya, Evans and Moyo (2016), South Africa has one of the highest occurrences of HIV/AIDS diagnoses. This contributes to social issues such as high employee absenteeism, decreased morale and productivity and loss of expertise. This further underscores the need for firms to intensify S performance to mitigate the aforementioned social issues.

To overcome ESG-related issues like the COVID-19 impact and climate crisis, the need for enhanced ESG performance must be met by entities whilst generating financial returns, which include educating employees, investing in natural capital and promoting clean research and development (de Villiers & Alexander, 2014; Hepburn, O'Callaghan, Stern, Stiglitz, & Zenghelis, 2020). Regulators also need to implement policies that favour trustworthy, comparable and value relevant ESG performance (Arvidsson, Arvidsson, & Harrison, 2019). Encouraging superior ESG performance allows entities to be held accountable for their actions or inactions relating to society and the environment (Biondi et al., 2020; La Torre, Sabelfeld, Blomkvist, & Dumay, 2020).

Dalal and Thaker (2019) and Billio et al. (2021) argue that the 2008 global financial crisis has increased public mindfulness of social responsibility and emphasised the need for strong governance practice. Increasing global warming concerns and activism on social issues have raised awareness regarding the need for environmental sustainability, impact investing and adherence to ethical standards, suggesting an increased demand for superior ESG performance (Dalal & Thaker, 2019; Wood, 2020). Billio et al. (2021) stresses the growing importance of positive ESG performance by pointing out that the three prominent credit rating agencies, namely Moody's, Fitch and S&P, have also begun to incorporate ESG evaluation in their own assessments.

It can be argued that the value relevance of ESG performance is affected by the perception of ESG considerations. If ESG is seen as an essential part of the business model, the signalling theory predicts that ESG performance becomes vital in preserving or increasing firm value and avoiding adverse selection (Akerlof, 1978; van Zijl, Maroun, & Wöstmann, 2017). As per the legitimacy theory, ESG performance would be vital in maintaining organisational legitimacy amongst stakeholders (Suchman, 1995; van Zijl et al., 2017). On the contrary, if ESG considerations are not viewed as an essential part of the business model, the value relevance of ESG is arguably diminished. Despite the legitimacy theory predicting that some ESG activities are required, it would no longer be considered as important in the context of accounting and firm value (Marcia, Maroun, & Callaghan, 2015; van Zijl et al., 2017).

As per Gillan, Koch and Starks (2021), ESG performance increases firm value through two main mechanisms. ESG performance may create value because ESG activities enhance shareholder wealth, which is achieved either by increasing cash flows or decreasing the discount rate. Alternatively, ESG performance may increase firm value through the maximisation of shareholder utility. If shareholders value the environmental or social goods produced by highly ESG-rated firms, they receive more utility, even if the cash flows are the

same as that of the lower ESG-rated firms. Either value creation channel suggests that ESG performance may be value relevant (Friede, Busch, & Bassen, 2015; Gillan et al., 2021).

Researchers such as Statman (2000) and Masulis and Reza (2015), found that ESG performance decreased firm value and this can be attributed to one main reason: ESG performance is perhaps not valued by investors and investment in ESG activities is viewed as redundant expenditure which destroys shareholder wealth (Masulis & Reza, 2015). The value destruction channel suggests that ESG performance may not be value-relevant.

In opposition to the above, Waddock and Graves (1997) found a non-existent relationship between ESG performance and firm value. Waddock and Graves (1997) argued that the environment that firms and society operate in was so convoluted that a clear, direct relationship between ESG performance and firm value could not exist. The uncertainty of the relationship between ESG performance and firm value could be attributed to the absence of a uniform method used by rating agencies to measure ESG performance (Waddock & Graves, 1997).

1.3. Significance of the research

This research places emphasis on the relationship between ESG performance ratings and firm value, as opposed to ESG disclosure scores, which has not been a priority topic of research in a South African context despite its growing importance. Furthermore, the research disaggregates the overall ESG performance into E, S and G performances and investigates their respective impacts on firm value in conjunction with the overall performance. This research has a significant contribution by examining the effects of each of the ESG elements on firm value, which has not been studied previously in a South African context. Due to the focus on individual E, S and G performances, this study is significant for researchers.

Attributable to varying results from internal and external measures of firm value, the research incorporates both perspectives of firm value to improve the strength of the study. The internal perspective of firm value is proxied by the internal performance measure of return on assets (ROA) and the external perspective of firm value is proxied by the market measure of market value of equity. The integration of two different measures of firm value is derived from the principles of integrated thinking and is especially noteworthy to researchers. This research also contains elements that are particularly significant to ESG rating agencies, corporate managers of South African firms, equity investors and the South African Government.

Due to the different ESG performance evaluation methods of different rating agencies, the research uses data from two agencies, namely Bloomberg and the FTSE to constitute a robust study. By using two rating agencies that prioritise different risk factors and utilise different sources of information in the computation of their ESG ratings, the research identifies the extent to which the main risk factors and sources of different agencies facilitate a positive relationship between E, S and G performance and firm value. Managers, investors and the government may place an emphasis on the main risk factors used by the rating agency whose ESG ratings provide a stronger positive relationship, in pursuit of their various goals. As a result of the identification of which key risk factors and sources enable a stronger positive relationship, other rating agencies can pivot to focus on these specific indicators and sources to improve their own ESG performance evaluation methods. The utilisation of data from two rating agencies is also important for researchers.

If positive E, S and/or G performance is found to increase the firm value of South African firms, corporate managers of the relevant firms may be incentivised to invest resources beyond the regulatory requirements, into ESG activities, knowing that it would result in the creation of a competitive advantage and enhance firm value. This also represents a shift from creating value for only shareholders towards value creation for all stakeholders. Managers may need to modify efforts to actively cater for the expectations of external stakeholders concerned with ESG performance, which would concurrently contribute to value maximisation. If a positive relationship is not found, corporate managers will limit ESG-related expenditure to the regulatory requirements.

As discussed by IRIS CARBON (2022), a recent study from Bloomberg predicts ESG investments to be valued at $53 trillion by 2025, which will constitute 37,7% of the global assets at that point, which is forecasted to be valued at $140,5 trillion. There is arguably a growing mindfulness and recognition from investors concerning the financial materiality of non-financial performance data such as ESG, and the impact it has on investment decisions. Equity investors may factor ESG performance into their investment decision-making, if they are aware that investment in ESG activities creates firm value. Investors may perceive superior ESG performance as a signal that a firm is less risky, more able to deal with uncertainty and more long-term orientated. The research would aid investors in structuring their portfolios in a manner that aligns with the required levels of E, S and G performance, allowing investors to maximise returns while engaging in impact investing.

At the 26th Conference of the Parties (COP26) annual summit, several countries vowed to engage in sustainable activities to strive towards net-zero economies. The South African

Government pledged to achieve a net-zero economy by 2050 (IRIS CARBON, 2022). To honour its pledge, the South African Government may consider further incentivising positive ESG performance. This research may provide the government with the detailed interaction between E, S and G performance and firm value to aid in understanding how the private sector can be incentivised to co-operate in the progression towards a net-zero economy.

If positive ESG performance increases firm performance, it may bolster tax revenue generation for the government alongside accelerating progression towards a net-zero economy. If a positive relationship is not found, the government may consider implementing regulations to change the status quo and allow for a positive relationship to be established, further incentivising the private sector to invest in ESG activities.

A positive relationship between E, S and/or G performance and firm value is also significant for credit rating agencies and non-profit organisations. It gives credit rating agencies another dimension on which to determine the credit worthiness of a firm. It also encourages non-profit organisations to align their objectives to counter ESG concerns, which may garner support from profit-making firms aiming to improve their own ESG performance.

In these ways, the current research may assist in the reduction of ESG-related issues in South Africa by encouraging management not to overlook ESG issues in pursuit of value maximisation.

1.4. Assumptions, limitations, delimitations and definitions of terms

This research relies on the secondary data of FTSE and Bloomberg ESG performance ratings. Despite the rigorous ratings processes followed by these financial research institutions, the subjectivity involved is acknowledged as a limitation of this research.

Sample limitations arise due to the non-existence of FTSE ESG ratings prior to 2018 and the non-existence of Bloomberg ESG ratings prior to 2015. The comparison of the FTSE ESG ratings with Bloomberg ESG ratings, which comprise different risk factors and weightings is an interesting aspect of this research. This comparison, however, is limited in that ESG data may not be available for all firms in the data set from both rating agencies, but rather, ESG data for specific firms may only be available from one rating agency.

The delimitations of the study include sourcing data from Bloomberg and the FTSE as opposed to other databases as well as restricting the study to South African markets.

Additional delimitations include utilising the Ohlson's valuation model as opposed to other models and using ROA and market value of equity as the dependent variables as opposed to other potential proxies for firm value.

Pertinent terms used throughout the dissertation are defined for the purpose of this research, accompanied by the sources of the definitions from relevant literature in Table 1:

Table 1: Definition of terms

Term	Definition	Source/s
ESG performance	The appropriateness of management's sustainability practices and how their activities positively and/or negatively affect society and the environment, measured by Bloomberg and the FTSE's ESG ratings.	Yoon et al. (2018) and Kotsantonis and Serafeim (2019).
Firm value	The value of a firm, measured internally by the return on assets (ROA) and externally by the cum-dividend adjusted market value of equity.	Dalal and Thaker (2019) and Mervelskemper and Streit (2017).
Value relevance	A significant positive relationship between ESG performance and firm value, in such a way that positive ESG performance results in an increase in firm value.	Miralles-Quirós, Miralles-Quirós and Valente Gonçalves (2018) and Yoon et al. (2018).
Firm performance	An internal performance measure of firm value, measured by a firm's ROA.	Dalal and Thaker (2019).

1.5. Chapter outline of the study

This study is organised into the following chapters:

Chapter 1 provides the introduction, problem statement, purpose, significance and limitations.
Chapter 2 contains a review of the relevant literature.
Chapter 3 describes the methodologies, data collecting, sampling and empirical data.
Chapter 4 presents the results and an analysis thereof.
Chapter 5 delivers the conclusion and areas for further research.

CHAPTER II
LITERATURE REVIEW

2.1. Theoretical Overview

In recent times, sustainability has been represented by ESG factors (Buallay, 2018). The acronym ESG was originated by the United Nations (UN) Global Council Initiative in 2004, with the publication of the report "Who Cares Wins" (UN, 2004). ESG focuses on how entities incorporate the three primary ethical finance pillars (environmental, social and governance) into their business models (Billio et al., 2021; Gillan et al., 2021). Whether an entity integrates its operating environment into strategies will depend on the theoretical framework adopted.

There are two primary opposing theories, namely the shareholder and stakeholder theories. The shareholder theory, developed by Friedman (1970), states that the sole purpose of an entity is to maximise shareholder wealth. An entity's involvement in social activities is considered to be value-destroying for shareholders as it violates the core responsibility (Jha & Rangarajan, 2020). Conversely, the stakeholder theory, developed by Freeman (1984), states that entities have a responsibility towards all their stakeholders. An entity's involvement in activities beyond profit maximisation results in creating sustainable value for both the firm and its stakeholders (Broadstock, Matousek, Meyer, & Tzeremes, 2020). Further guidelines were provided by the 'triple bottom line' concept, developed by Elkington (1994).

The shareholder theory opposes the value relevance of ESG, whereas the stakeholder theory supports the value relevance of ESG. The stakeholder theory and value relevance of ESG is further supported by the resource-based view theory (RBV), developed by Wernerfelt (1984), which states that efficient utilisation of an entity's resources contributes to its competitive advantage. Russo and Fouts (1997) found that the RBV played a pivotal role in the relationship between ESG performance and firm value, which was supported by McWilliams and Siegel (2000) and McWilliams, Siegel and Wright (2006). As per the RBV theory, an opportunity arises from employing the six capitals as per the International Integrated Reporting Framework (financial, human, intellectual, social and relationship, manufactured and natural capitals) to improve ESG performance (International Integrated Reporting Council (IIRC), 2021). Improved ESG performance creates the opportunity to further develop these capitals, which can be utilised to increase firm value (Branco & Rodrigues, 2008; Stefan & Paul, 2008).

Within the South African context, three corporate theoretical frameworks have existed. The shareholder-centric approach contained in the Companies Act No. 61 of 1973 stems from the principles underpinning the shareholder theory, but is now obsolete. The enlightened

shareholder value approach, developed by Jensen (2002), is contained in the Companies Act No. 71 of 2008 and builds on the shareholder theory by integrating principles from the stakeholder theory, stating that entities have the responsibility to maximise shareholder value whilst simultaneously considering the impact on stakeholders. The King Code IV, a JSE listing requirement, mandates the stakeholder-inclusivity approach, which echoes all the principles of the stakeholder theory and as a result the impact of ESG on firm value becomes even more relevant (Institute of Directors (IoD), 2016). Similarly, the recently released JSE Sustainability Disclosure Guidance is derived from the principles of the stakeholder theory and further bolsters the relevance of the impact of ESG on firm value (JSE, 2022).

2.2. Factors affecting the determination of ESG performance scores

Malik (2015) states that in determining whether ESG has an impact on firm value, uniform information must be used for comparison. Yoon et al. (2018), supporting research by Windolph (2011), depict that ESG scores may lack consistency and criteria for measurement due to its non-financial attributes. The ESG performance evaluation process is becoming increasingly complex due to ESG rating agencies continuously updating and changing their assessment criteria, particularly in response to global challenges such as COVID-19 (Escrig-Olmedo, Fernández-Izquierdo, Ferrero-Ferrero, Rivera-Lirio, & Muñoz-Torres, 2019). Billio et al. (2021) further argue that a lack of reporting standards, uniform definitions and shared characteristics among each ESG component and across rating providers hinder a transparent and objective rating. This has caused diverse results as evidenced in numerous studies.

Kotsantonis and Serafeim (2019) argue that the development of sustainability standards to address ESG issues and establishing predetermined ranges of performance for ESG scores will facilitate the assessment of the true impact of a company on the external world. This argument supports the reason for the recent establishment of the International Sustainability Standards Board (ISSB), tasked with the development of the International Financial Reporting Standards (IFRS) Sustainability Disclosure Standards, to potentially standardise ESG scores.

To demonstrate the aforementioned inconsistency, Billio et al. (2021) extract information from the ESG rating agencies' websites and contrast the different rating agencies; they also highlight the different methodologies and sources of information used to evaluate ESG performance. Furthermore, they also discuss that the different agencies assess a different number of indicators, with MSCI and the FTSE constituting the extreme case, assessing thirty-seven and 300 ESG criteria respectively. Based on their work, some key differences between the ESG scores of various rating agencies are portrayed as per Table 2 below.

Table 2: Contrasting ESG performance ratings of various rating agencies

	MSCI	**ISS-Oekom**	**Bloomberg**	**Sustainalytics**	**Refinitiv**	**FTSE**
Number of criteria	37	100	120	155	178	300
Rating score	CCC to AAA	D- to A+	0 to 10	0 to 100	D- to A+ and 0 to 100	0 to 5
Sources of information	Company disclosure, media sources and specialised data sets.	Publicly available information, stakeholder interviews, company policies and company	Publicly available information, direct contact with the companies and company reports.	Public disclosure, media sources and NGO reports.	Company reports and websites, media sources, NGO reports and securities exchange reports.	Publicly available information, direct contact with the companies, governments and NGOs.
Main indicators assessed	Environmental – Climate change, pollution, natural capital, management, environmental opportunities. Social – Product liability, human capital,	Environmental – Environmental and energy management, climate change, water security, eco-efficiency. Social – Equality, health and safety standards, human	Environmental – Carbon emissions, climate change, water security, renewable natural capital. Social – Equality, diversity, political and community interactions,	Industry-specific measures. Indicators vary based on the industry that a company operates in.	Environmental – Resource usage, carbon emissions, innovation. Social – Staff and community, human rights, product responsibility.	Environmental – Biodiversity, climate change, natural capital, water security, supply chain. Social – Labour and health and safety standards, human rights,

	MSCI	ISS-Oekom	Bloomberg	Sustainalytics	Refinitiv	FTSE
	stakeholder needs, social opportunities. Governance – Corporate behaviour and governance.	rights, product responsibility, supply chain. Governance – Ethics, compliance, board independence and policies, shareholder rights and structure.	human rights, supply chain. Governance – Takeover defence tactics, board independence, shareholder rights, cumulative voting, director remuneration.		Governance – Shareholders, management, social responsibility strategy.	customer responsibility. Governance – Tax transparency, risk management, corporate governance, anti-corruption.
Assessment and weighting	Ratings are calculated and weighted based on material risks and opportunities for the Global Industry Classification Standard (GICS) sectors.	Ratings are selected and weighted based on five key factors per sector and 800 industry-specific benchmarks.	Ratings are computed based on a materiality framework derived from sector-specific factors and principles from international associations.	Ratings are calculated and weighted based on the consideration of potentially significant forecasted issues.	Ratings are weighted based on a uniform apportionment for all categories, namely: E pillar = 34%, S pillar = 35,5%, G pillar = 30,5%.	Ratings are calculated using an exposure weighted average and alignment with the UNSDGs.

Note. Adapted from “Inside the ESG Ratings: (Dis)agreement and performance” by M. Billio, M. Costola, I. Hristova, C. Latino, and L. Pelizzon, 2021, *Corporate Social Responsibility and Environmental Management*, *28*(5), pp. 1430-1431.

Berg, Koelbel and Rigobon (2019) and Billio et al. (2021) conclude that there is significant evaluation disagreement between the rating agencies, which suggests that data from multiple agencies may be needed in order to perform a reliable study. If data from multiple rating agencies is required, it could be argued that a comparison between FTSE and Bloomberg ESG ratings would be the most productive. Both the FTSE and Bloomberg use numerical scoring systems and similar sources, including direct contact with firms, yet have different ESG criteria and main risk factors (Billio et al., 2021).

2.3. The value relevance of ESG performance

2.3.1. Overall ESG performance

From a theoretical perspective, there exists two schools of thought, namely the value creation school and the cost-concerned school (Mervelskemper & Streit, 2017). Several research reports support the value creation school and have found that ESG activities have a positive impact on firm value by generating competitive advantages and improving financial returns (Qureshi, Kirkerud, Theresa, & Ahsan, 2020). According to Margolis, Elfenbein and Walsh (2007), ESG performance has minimal positive effect on firm value which appears to be decreasing with the passage of time. There are also several reports that support the cost-concerned school and argue that ESG investment increases costs and leads to an economic disadvantage for firms, destroying value (Buchanan, Cao, & Chen, 2018; Di Giuli & Kostovetsky, 2014; Marsat & Williams, 2014). Masulis and Reza (2015) conclude that investors do not value ESG activity and Bénabou and Tirole (2010) argue that managers may utilise ESG activities to enhance their own welfare, not firm value.

Apart from these two schools of thought, other research has found that firm value is independent of ESG performance. An empirical analysis of United Kingdom (UK) firms from 2002 to 2010 by Humphrey, Lee, and Shen (2012a) revealed that there was no statistically significant relationship between ESG performance and firm value. Landi and Sciarelli (2018) found similar results in an empirical analysis of Italian firms from 2007 to 2015.

Prior research has presented mixed results across developed and developing markets based on internal performance measures (Lee, Seo, & Sharma, 2013; Tang, Hull, & Rothenberg, 2012) and market-related measures (Aboud & Diab, 2018; Lo & Sheu, 2007; Wahba & Elsayed, 2015). Dalal and Thaker (2019) suggested that a robust study should incorporate both internal firm measures (short-term, historical focus) and market measures (long-term, avantgarde focus) as dependent variables.

Huang (2021) methodically reviewed twenty-one meta-analysis studies and found a generally stronger positive correlation between ESG performance and internal performance measures of firm value, as opposed to the relationship between ESG performance and market measures. The declining correlation coefficients may be attributed to an increasing number of factors constituting the measure (Huang, 2021). Despite internal performance measures integrating various other firm activities alongside ESG, market measures incorporate substantially more factors aside from ESG. These factors include industry and macro-economic aspects such as the evaluation of a firm's present and forecasted earnings by shareholders, compared to other prospective investments. The several variables that constitute market measures may dilute the strength of the association between ESG performance and a market measure of firm value, in comparison to an internal performance measure of firm value (Huang, 2021).

In an emerging market context, from a South African perspective, Ball (2021) did not find statistically significant evidence of a relationship between the ESG performance and financial performance of firms. Nonetheless, Ball (2021) demonstrated varying results when utilising different measures of financial performance. However, he observed a statistically insignificant, positive relationship between the ESG performance of firms and their annual stock returns, a market measure. In addition, he also found a statistically insignificant, positive correlation between the ESG performance of firms and their ROA, an internal firm measure.

Akin to the research by Huang (2021), Ball (2021) noted a higher positive correlation between ESG performance and ROA, an internal performance measure, compared to annual stock returns, a market measure of financial performance. In contradiction to the results from annual stock returns and ROA, Ball (2021) found a statistically insignificant, negative relationship between the ESG performance of firms and their price-to-earnings ratio, a market measure. Due to the conflicting findings from different measures of financial performance, Ball (2021), similar to Du Toit and Lekoloane (2018), concluded that there was no relationship between ESG performance and corporate financial performance in South Africa.

Huang (2021) found that the relationship between environmental performance and internal performance measures of firm value was generally more positive than for market measures of firm value. Dissimilarly, Huang (2021) reported that there generally was a statistically insignificant difference between using internal performance measures or market measures to proxy firm value when assessing the relationship between social and governance performances and firm value. The utilisation of different measures of firm value in prior ESG value relevance research has yielded the observation of varying results. As a consequence, it can be argued that future ESG value relevance research must incorporate internal and

external perspectives of firm value to enhance the validity of the study (Dalal & Thaker, 2019; Huang, 2021).

Internal performance measures normally used in prior research include return on assets, return on equity, return on sales, return on investment and earnings per share (Albertini, 2013; Buallay, 2018; Endrikat, Guenther, & Hoppe, 2014; Lu & Taylor, 2016). Huang (2021) also noted that other financial measures, such as market shares had been used (Dixon-Fowler, Slater, Johnson, Ellstrand, & Romi, 2013). Market measures normally used in prior research include share price, price-to-earnings ratios and Tobin Q's (Alareeni & Hamdan, 2020; Ball, 2021; Miralles-Quirós, Miralles-Quirós, & Redondo-Hernández, 2019). According to Dalal and Thaker (2019), a suitable internal firm measure of firm value would be the ROA. Based on a study by Mervelskemper and Streit (2017), an appropriate market measure of firm value would be the cum-dividend adjusted market value of equity.

Busch and Friede (2018) examined the relationship between corporate social/environmental performance and corporate firm performance, but omitted governance performance. The findings of the study by Busch and Friede (2018) revealed a highly significant, robust, positive and bidirectional relationship between corporate social/environmental performance and corporate firm performance. Contrary to Busch and Friede (2018), the results from a study by Jha and Rangarajan (2020) indicated that there was no bidirectional causality between corporate social performance and corporate firm performance. Jha and Rangarajan (2020) concluded that further research into the potential bilateral causality was required as the findings were statistically insignificant.

Consequently, Behl, Kumari, Makhija and Sharma (2021) tested for bidirectional causality and autoregression effects between ESG performance and firm value. Behl et al. (2021) found that no bidirectional relationship existed between the total and individual components of ESG performance and firm value and found that autoregression effects were stable. Similar to the work by Behl et al. (2021), this research did not consider bidirectional causality or autoregression effects.

Bénabou and Tirole (2010) delivered three thorough approaches, namely win-win, delegated and insider-initiated, for interpreting the motive for engaging in ESG activity and understanding the relationship between ESG performance and firm value (Huang, 2021). The win-win approach focuses on curtailing contingent liabilities and enhancing consumer perceptions of the brand in relation to competitors. It suggests that firms invest in ESG to distinguish the firm's competitive position (Porter & Van der Linde, 1995) or participate in ESG activities in

pursuit of improving the bottom-line and other benefits contained within a positive business case (Carroll & Shabana, 2010; Kurucz, Colbert, & Wheeler, 2008). The win-win approach supports the value creation school of thought (Bénabou & Tirole, 2010; Mervelskemper & Streit, 2017).

The delegated approach is analogous to the stakeholder theory (Donaldson & Preston, 1995; Freeman, 1984; Sethi, 1979). It suggests that firms focus on ESG activities, which incorporate the ideals of stakeholders, with the intention of meeting the expectations of its consumers, staff, investors and surrounding community (Mitchell, Agle, & Wood, 1997). The intention reflects the legitimacy theory, which suggests that firms only act in pursuit of society's approval over its activities (Davis, 1973). Notwithstanding its connection to the legitimacy theory, by considering the demands and decision-making of all stakeholders, the delegated approach arguably still supports the value creation school of thought (Bénabou & Tirole, 2010; McWilliams & Siegel, 2011; Mervelskemper & Streit, 2017).

The insider-initiated approach is derived from the principles of agency theory (Jensen & Meckling, 1976). It suggests that involvement in ESG undertakings can be attributed to the personal interests of management, rather than the intention to increase shareholder wealth. The motive behind ESG performance as per the insider-initiated approach is more likely to support the cost-concerned school of thought due to governance issues and managerial conflicts of interest (Bénabou & Tirole, 2010; Ferrell, Liang, & Renneboog, 2016; Gillan et al., 2021).

According to Bénabou and Tirole (2010), the first two approaches support a positive correlation whereas the third approach supports a negative correlation. However, in reality, ESG activities are likely to be motivated by a mixture of all three approaches. As a result of the mixture of different approaches and various motivating factors in practice, Bénabou and Tirole (2010) argued that the relationship between ESG performance and firm value at some point rested between non-existent and marginally positive on the spectrum of correlation (Aguinis & Glavas, 2012; Huang, 2021).

Notwithstanding the conclusion by Bénabou and Tirole (2010), there is an increasing body of research in support of the value creation school compared to the cost-concerned school of thought (Egorova, Grishunin, & Karminsky, 2022). As per Ashwin Kumar, Smith, Badis, Wang, Ambrosy and Tavares (2016), firms incorporating ESG factors with superior ESG performance, have less volatile stock returns in comparison with other firms in their industry that exhibit lower ESG performance. The lower volatility may be attributed to the decreased

exposure to reputational, political and regulatory risks, which ensures superior ESG performance (Ashwin Kumar et al., 2016). Li, Gong, Zhang and Koh (2018) conducted a study on London markets and determined a positive impact of ESG performance on firm value. This is consistent with the empirical results from other developed markets as reflected by Peiris and Evans (2010) through their research on the US markets.

Alshehhi et al. (2018) found that there was insufficient research regarding the impact of ESG performance on firm value in emerging markets, hence the relevance to the South African context. Yoon et al. (2018) found a positive relationship between ESG performance and firm value in the Korean markets, concurred by Miralles-Quirós et al. (2018) in their study on the Brazilian market. Wong, Batten, Mohamed-Arshad, Nordin and Adzis (2021) found that investing in ESG lowered a firm's cost of capital and resulted in a significant increase in firm value on the Malaysian market. From the existing research on emerging markets, it appears that ESG performance maintains a positive impact on firm value. In contrast, Behl et al. (2021) argue that results from emerging markets may differ significantly, due to factors such as varying political instability, greenhouse gas emissions, pollution and social issues (Khanna & Palepu, 2000; Odell & Ali, 2016).

The positive relationship appears to be present worldwide, especially where weaker market-supporting institutions exist (El Ghoul, Guedhami, & Kim, 2017). Fatemi, Glaum and Kaiser (2018) separated ESG factors into ESG strengths and ESG concerns, concluding that they increased or decreased firm value, respectively.

The potentially positive impact on firm value may be attributed to several resulting benefits of a strong ESG performance, namely, increased non-owner stakeholder satisfaction, developing customer loyalty, developing brand reputation and improving public relations (Fatemi & Fooladi, 2013). As per Giese, Nagy and Lee (2021), firms with high ESG ratings are able to attract new talent, increase morale, develop incentive plans for management, decrease exposure to total risk, increase opportunities for growth and ultimately achieve lower costs of capital, which effectively increases firm value.

As discussed by Koller, Nuttall, and Henisz (2019), McKinsey conducted a study and found five avenues through which firms could generate value from ESG activities. The five avenues were an increase in revenue, a decline in costs, a decrease in government intervention, a rise in employee productivity and improved investment performance and asset utilisation (Koller et al., 2019). McKinsey found that firms generally experienced an increase in revenue when firms utilised their superior ESG performance to engage in market penetration or market development. Regulatory bodies were more willing to award approvals and licences to firms

that evinced exceptional ESG credentials, expediting the growth of the relevant firms as a result. Moreover, McKinsey argued that firms with strong ESG performance could benefit from improved valuations in the instance that an acquisition or merger was considered (Koller et al., 2019).

McKinsey, similar to Wong et al. (2021), found that costs, including a firm's cost of capital, were usually reduced when ESG activities were conducted efficiently (Koller et al., 2019). In a manufacturing context, this can be depicted through reduced resource costs when firms streamline processes to consume lower quantities of scarce resources. Another instance of diminished resource costs is when firms recycle wastage and reuse it as benefitting the production process. Recycling and reusing waste reduces the quantity of new materials required and ultimately reduces costs whilst improving ESG performance (Koller et al., 2019). Liu, Owens, Yang and Zhang (2020) argued that by modifying processes to mitigate pollution, using green technology, abatement costs could be reduced.

McKinsey observed that superior ESG performance positively impacted on employee productivity and morale (Koller et al., 2019). ESG activities result in employees perceiving that their efforts will lead to the fulfilment of a purpose beyond the firm's financial gain. The perception begets employee buy-in and loyalty to the firm and may increase the firm's appeal to talented, prospective employees who share the same ideals (Lins, Servaes, & Tamayo, 2019). An increase in revenue due to the increased productivity may further bolster productivity by allowing for greater incentives to be proposed (Koller et al., 2019).

McKinsey asserted that globally, firms with significant ESG strengths experienced a decline in regulatory pressure and unfavourable regulatory intervention (Koller et al., 2019). Conversely, statutory bodies may offer aid to firms engaging in ESG activities and sustainable value creation (Henisz & McGlinch, 2019). McKinsey also suggested that firms could improve investment performance by directing capital cash flows to projects that created sustainable value and enhanced ESG credentials. Additionally, ESG-orientated strategies could improve asset utilisation by deterring investments in assets that lead to environmental detriment in the long-term (Koller et al., 2019). Through the perceived benefits of strong ESG performance, at minimum, ESG performance has an indirect impact on firm value.

2.3.2. Environmental (E) performance and hypotheses development

The International Institute for Sustainable Development (IISD) (2022) appeals for a disaggregation of ESG and argues that the three individual pillars, namely environmental, social and governance, may have varying effects on other variables. This highlights the need to assess the relationship between each individual pillar and firm value, as the correlations may differ in terms of statistical significance, strength and direction.

There appears to be sufficient evidence of a positive association between environmental performance and firm value (Russo & Fouts, 1997; Waddock, 2004). Derwall, Guenster, Bauer and Koedijk (2005) and Manrique and Martí-Ballester (2017) support the value creation school of thought and found that the more eco-friendly firms were rewarded with higher stock returns in comparison to less eco-friendly firms in both developed and developing markets. Using pollution emission as a measure of environmental performance, Telle (2006) noted that firms emitting less pollution achieved a higher firm performance, which denoted a positive relationship between environmental performance and firm performance. Similarly, Sharfman and Fernando (2008) indicate that the mitigation of environmental concerns results in a reduced cost of debt, which consequently increases firm value.

Researchers, such as Stanwick and Stanwick (1998), found a positive correlation between the pollution emitted by the firm and its firm performance, proxied by ROA. This implies that there is a positive relationship between environmental performance and firm value, as environmental concerns significantly increase management costs and consequently reduce firm value. Conversely, the better the environmental performance, the lower the management and associated costs and the higher the firm value (Stanwick & Stanwick, 1998).

Earnhart and Lizal (2007) point out that superior environmental performance increases firm performance, primarily by reducing costs to a greater extent than it may reduce revenue. The significant reduction in cost improves profitability, which ultimately increases internal performance measures of firm value (Earnhart & Lizal, 2007; Feltham & Xie, 1994). Based on the RBV theory, the increase in firm value can be attributed to positive environmental performance creating an opportunity to develop resources in the form of advanced technology and expertise, mitigating regulatory costs and allowing for efficient operations, particularly in the manufacturing sector (Hart & Milstein, 2003; Stefan & Paul, 2008).

The empirical analysis of 3 237 Japanese firms by Nakamura (2011) assessed the impact of investment in environmental activities in the short- and long-term. In the short-term, environmental performance did not have a significant relationship with firm performance. In the long-term, however, the relationship between environmental performance and firm performance was found to be significantly positive (Nakamura, 2011). In the long-term, investment in environmental initiatives likely garners the trust of customers and shareholders, resulting in a positive impact on firm performance. Conversely, in the short-term, customers and shareholders are less trusting due to the perceived fleeting nature of environmental investments by the firm (Nakamura, 2011).

Comparable to Nakamura (2011), Iwata and Okada (2011) performed an empirical analysis of 268 Japanese manufacturing firms from 2004 to 2008, to analyse the impact of environmental

performance on firm value. Environmental performance was proxied by two different environmental issues, namely waste and greenhouse gas emissions, for the purpose of comparison (Iwata & Okada, 2011). The most substantial finding was that different elements of environmental performance may have had varying influences on firm value. The relationship between waste emissions and firm value was found to be insignificant. In contrast, the relationship between greenhouse gas discharges and firm value was found to be significantly negative for the entire sample and eco-friendly industries. This indicates that the reduction of greenhouse gases emitted contributed positively to firm value in the aforementioned industries. Nonetheless, the relationship between greenhouse gas emissions and firm value was found to be insignificant in environmentally harmful industries (Iwata & Okada, 2011).

Pekovic, Grolleau and Mzoughi (2018) used a sample of listed firms in France to analyse the relationship between environmental performance and firm performance. Firm performance was measured by the firms' net profits, which was a less common internal performance measure of firm value. The most significant finding was an optimal point for investment in environmental activities. Pekovic et al. (2018) suggested that the relationship between environmental performance and firm value followed an almost inverted U-shape curve.

Lahouel, Bruna and Zaied (2020) also conducted an empirical analysis in a French context and found that different proxies of different firm value resulted in different relationships with environmental performance. The relationship between environmental performance and Tobin's Q, a market measure of firm value, can be represented by an inverted U-shape curve. Conversely, the relationship between environmental performance and ROA, an internal performance measure of firm value, can be represented by an inverted V-shaped curve (Lahouel et al., 2020). Similar to work by Dalal and Thaker (2019), it can be observed that different measures of firm value can provide varying conclusions on the impact of environmental performance on firm value (Lahouel et al., 2020; Pekovic et al., 2018). The observation is not limited to the impact of total ESG performance on firm value. As argued by Dalal and Thaker (2019), internal and external perspectives of firm value needed to be considered to determine a valid relationship between environmental performance and firm value.

Irrespective of the measure used to represent firm value, insufficient or excess environmental investment can be pernicious to firm value. In other words, enhancing environmental performance to a certain degree can be deemed value creating, however, any enhancement beyond this threshold can be deemed value destroying (Pekovic et al., 2018). Beyond this threshold, controlling additional environmental effort to meet expectations of stakeholders can

become overly intricate and costly, contributing to the reduction in firm value (Pekovic et al., 2018).

In an analysis of prior research, Zhou, Liu and Luo (2022) identify several common factors that the positive relationship between environmental performance and firm value can be attributed to. Prior studies suggest that increased investment in environmental initiatives can bolster the public image of firms and attain improved validation from society. As a consequence, firms with superior environmental performance may gain the preference of both upstream and downstream companies in their supply chains, which provides the prospect of increased firm performance (Zhou et al., 2022).

On the other hand, several early studies align with the cost-concerned school of thought and claim that environmental performance and firm value are jointly incongruous (Zhou et al., 2022). Researchers such as Al-Tuwaijri, Christensen and Hughes (2004), demonstrated that investors' valuations of firms, and subsequently the firm value, was reduced by environmental performance. Similarly, Kim and Lyon (2015) identified that entities engaging in environmentally friendly activities experienced negative abnormal returns, which suggested that investors perceived this as redundant and costly expenditure.

Horváthová (2010) performed a meta-regression analysis of thirty-seven empirical studies and the results depicted that portfolio studies generally found a negative correlation between environmental performance and firm performance, and that positive correlations were most often observed in common law countries, instead of civil law countries. South Africa is considered to have a mixed legal system derived from various other legal systems, including Roman Dutch civil law and English common law (Van der Merwe, 2012). South Africa's mixed legal system makes the value relevance of environmental performance an interesting topic of research in a South African context. Horváthová (2010) notably argued that the probability of finding a negative relationship between environmental performance and firm performance was heightened when using straightforward correlation coefficients rather than sophisticated econometric assessment.

Apart from the value creating and value destroying arguments, some authors such as Elsayed and Paton (2005), Jacobs, Singhal and Subramanian (2010) and Endo (2019) argued that there was a neutral correlation between environmental performance and firm value. Elsayed and Paton (2005), Jacobs et al. (2010) and Endo (2019) concluded that there was no statistically significant relationship between environmental performance and firm value. Firms likely invest in environmental initiatives until the marginal benefit is equal to the marginal cost, resulting in an impartial impact on firm value (Elsayed & Paton, 2005).

Research question one (RQ_1) queries if there is a significant relationship between environmental performance and firm value for companies in South Africa. Based on the majority of prior studies, the following hypotheses are established:

$H_{1.1}$ – Environmental performance has a significant positive effect on the market value of equity of SA firms.

$H_{1.2}$ – Environmental performance has a significant positive effect on the firm performance of SA firms.

2.3.3. Social (S) performance and hypotheses development

Similar to environmental performance, there appears to be sufficient evidence of a positive association between social performance and firm value (Henriksson, Livnat, Pfeifer, Stumpp, & Zeng, 2018; Zhou et al., 2022). Orlitzky, Schmidt and Rynes (2003) performed a meta-analysis of fifty-two studies and argued that social performance had a stronger positive correlation with firm value than environmental performance. As observed in prior research relating to ESG performance, Orlitzky et al. (2003) highlighted that social performance appeared to be more strongly, positively related to internal performance proxies of firm value compared to market-related proxies of firm value. By virtue of the research by Orlitzky et al. (2003), internal and external measures of firm value need to be incorporated to ascertain a justifiable relationship between social performance and firm value (Dalal & Thaker, 2019).

Godfrey (2005) presents an intricate theoretical explanation of the relationship between social performance in the form of philanthropic activities and shareholder wealth and firm value, based on three claims. Firstly, an abundance of philanthropic investments may create positive moral capital between stakeholders and society. Secondly, this moral capital may offer shareholders security over the social and relationship capital of firms. Lastly, the security positively advances shareholder wealth and firm value (Godfrey, 2005). Based on the assertions of Godfrey (2005), superior social performance, at the very least, has an indirect, positive association with firm value.

The assertions of Godfrey (2005) can be partially rationalised by the work of Wang and Qian (2011). The aim of strengthening social performance, by means of corporate philanthropy, mirrors the legitimacy theory (Wang & Qian, 2011). Firms aim to address social concerns in an attempt to obtain socio-political legitimacy. Effectively, firms increase investment in social activities to achieve access to political prospects and stakeholder approval over firm operations (Wang & Qian, 2011). Notwithstanding the objective of socio-political legitimacy,

the greater the positive response from important stakeholders as a result of improved social performance, the greater the accompanying increase in firm value (Wang & Qian, 2011).

Inoue and Lee (2011) conducted an empirical analysis on 367 tourism firms within four tourism industries to determine the relationship between social performance and firm value. Social performance was divided into various factors, namely employee relations, community relations and diversity and the impact of each factor on firm value was studied. The findings depicted that all three proxies of social performance had a positive effect on firm value, however, the intensity of the effect differed per industry (Inoue & Lee, 2011).

Similar to Inoue and Lee (2011), El Ghoul, Guedhami, Kwok and Mishra (2011) conducted a study based on a sample of firms in the United States (US) and argued that improvements in social performance, in the form of better employee relations, resulted in a decrease in cost of equity. Socially responsible firms received better credit ratings, which provided access to cheaper sources of equity and debt funding. Access to cheaper sources of financing reduced the cost of equity, as determined by El Ghoul et al. (2011), and the cost of debt, which subsequently lowered the overall risk and cost of capital and significantly increased the firm value (Attig, El Ghoul, Guedhami, & Suh, 2013; Sharma, Bhattacharya, & Thukral, 2019).

Edmans (2011) found that favourable working conditions, which resulted in employee satisfaction and loyalty, led to a long-run stock return. According to Jayachandran, Kalaignanam and Eilert (2013), a study of 518 firms revealed that an increase in product social performance increased firm value. The findings depicted that the relationship was not equal in both directions. A decrease in product social performance had a greater negative impact on firm value than an equal but opposite increase in product social performance and its associated positive impact on firm value (Jayachandran et al., 2013).

Fatemi, Fooladi and Tehranian (2015) found that socially responsible behaviour had a net positive impact on financial performance and firm value. Based on research by Albuquerque, Koskinen and Zhang (2019), increased investment in socially responsible initiatives, as a result of product differentiation, lowered the risk of a firm-wide breakdown and ultimately increased firm value. Flammer and Kacperczyk (2019) concluded that the inclusion of incentives for superior social performance in the contracts of executives was used to minimise agency costs and significantly improved firm performance in the process (Li, Wang, Sueyoshi, & Wang, 2021).

Based on the RBV theory, positive social performance develops corporate culture, loyal employees and reputation in the market, which results in a competitive advantage. This allows the firm to charge more than competitors, increasing firm value in the process (Branco & Rodrigues, 2008; Fombrun & Shanley, 1990; Jo & Harjoto, 2011). As per Lu, Oh, Kleffner and

Chang (2021), under specific circumstances, there is a positive association between social performance and firm value in developed markets. Lu et al. (2021) suggest that social activities will not always positively impact on firm value, as a possible positive correlation is context-driven.

There are a limited number of studies that depart from the value creation notion of thinking. Baron, Harjoto and Jo (2011) analysed the relationship between social performance and firm value using a panel of 1 600 firms. For the overall panel, the findings depicted that social performance and firm value were uncorrelated. Nevertheless, upon disaggregation, Baron et al. (2011) indicated that social performance was positively associated with firm value in consumer markets and negatively associated in industrial markets. This may suggest that there are different correlations between the two variables in various industries, even if the entire sample reveals no relationship (Baron et al., 2011).

According to Barnett and Salomon (2012), there is a non-linear relationship between social performance and firm performance and the relationship follows a U-shaped curve. Barnett and Salomon (2012) found that firms with weak social performance had greater firm performance than firms with moderate social performance, however, firms with the strongest social performance also had the greatest firm performance. This implies that firms are incentivised to improve social performance, but it cannot be achieved by nonchalant and infrequent investment in social activities. Firms will likely experience an interval of diminishing performance and must remain committed to attain the final objective of increased firm performance through exemplary social credentials (Barnett & Salomon, 2012).

Zhao and Murrell (2016) deduced that social performance might not have had a positive effect on firm performance. They attributed this deduction to the argument that there existed a complex relationship between social performance and firm value and asserted that a basic, direct, positive association was unlikely. (Lu et al., 2021).

Research question two (RQ_2) queries if there is a significant relationship between social performance and firm value for companies in South Africa. Based on the majority of prior studies, the following hypotheses are established:

$\mathrm{H}_{2.1}$ – Social performance has a significant positive effect on the market value of equity of SA firms.

$\mathrm{H}_{2.2}$ – Social performance has a significant positive effect on the firm performance of SA firms.

2.3.4. Governance (G) performance and hypotheses development

Similar to environmental and social performance, there appears to be evidence of a positive association between governance performance and firm value, however, the extent of prior literature is extremely limited (Li et al., 2021). Gompers, Ishii and Metrick (2003) examine the impact of governance performance, proxied by shareholder rights, on firm performance. The results reveal that firms with greater shareholder rights have greater profits and greater firm performance than firms with poorer shareholder rights (Gompers et al., 2003).

Likewise, Lefort and Urzúa (2008) studied the connection between the two variables and used board independence as a measure of governance performance. The findings showed that the stronger the independence of the board, the higher the firm performance (Lefort & Urzúa, 2008). This implies that there is a positive correlation between governance performance, whether proxied by shareholder rights or board independence, and firm value (Gompers et al., 2003; Lefort & Urzúa, 2008).

Skaife, Collins and LaFond (2004) and Derwall and Verwijmeren (2007) found that firms with better governance performance generally had lower agency risks and associated agency costs and consequently, a lower cost of equity. As a result of the reduced cost of equity, better governed firms achieve higher firm valuation compared to firms that were poorly governed (Derwall & Verwijmeren, 2007; Skaife et al., 2004). Cremers and Nair (2005) also pointed out that governance performance and firm value were positively correlated. Cremers and Nair (2005) argued that to achieve superior governance performance and subsequently superior firm value, focus should be placed on both internal governance, such as corporate control, and external governance, such as shareholder activism.

Tarmuji, Maelah and Tarmuji (2016) and Velte (2017) showed that a positive relationship between governance performance and firm performance existed in both developed and developing markets. This view is echoed by Galbreath (2018), who argued that the relationship between governance performance and firm performance was positive but not direct. Galbreath (2018) provided evidence which portrayed an indirect, positive association between governance practices, namely board gender diversity, and firm performance, which was mediated by CSR.

Furthermore, Velte (2017) included two different proxies of firm value in the study, namely ROA, an internal performance measure, and Tobin's Q, a measure of market return. Velte (2017) found that governance performance had a statistically significant, positive effect on ROA but had no significant impact on Tobin's Q. As observed in prior research regarding total ESG performance and the performance of the other pillars, associations vary based on the measure of firm value used. It is arguably necessary to integrate two perspectives of firm

value, namely an internal performance measure and market measure, to ensure that a statistically definitive relationship can be established (Dalal & Thaker, 2019).

Velte (2017) also concluded that the governance component had the strongest impact on firm performance compared to the other ESG components. Ionescu, Firoiu, Pirvu and Vilag (2019) conducted an empirical analysis of seventy-three listed firms from the tourism and travel industry to determine the correlation between ESG performance and firm value. The seventy-three listed firms comprised firms from Europe, the US and Asia (Ionescu et al., 2019). Comparable to the assertions of Velte (2017), Ionescu et al. (2019) found that the governance pillar of ESG had the greatest value enhancing effect on firm value for US firms. Conversely, in accordance with the cost-concerned school of thinking, the governance pillar had the greatest value destroying effect on firm value for European and Asian firms (Ionescu et al., 2019). The governance factor had the most significant effect on firm value in all the geographic locations and markets where the firms were situated, albeit, the significant effect was not always positive (Ionescu et al., 2019). Arguments by Velte (2017) and Ionescu et al. (2019) regarding the significance of the governance component extends the research by Galbreath (2013). Galbreath (2013) described the improvement of ESG as a process that occurred over time and emphasised that governance performance improved at a faster rate than its environmental and social counterparts (Daugaard & Ding, 2022).

Behl et al. (2021) suggested that positive governance performance might not increase firm value by itself, but negative governance performance would incur additional legal costs and limit resource capabilities (Barney, Ketchen Jr, & Wright, 2011). In contrast, Giannarakis, Andronikidis and Sariannidis (2020) found that positive governance performance assisted in reducing agency costs and encouraged sustainable corporate transparency.

Apart from the value creation and cost-concerned school of thought, there are several studies that suggest governance performance and firm value are uncorrelated. Core, Guay and Rusticus (2006) opposed the findings of Gompers et al. (2003) and did not support the hypothesis that poor governance performance resulted in poor stock returns. Core et al. (2006) ascribed the verdicts of Gompers et al. (2003) to the sample period studied and to the association between governance performance and other factors, for instance, risk. The findings imply that there is no significant relation between governance performance and firm performance (Core et al., 2006). The results of the study by Statman and Glushkov (2009) are consistent with the findings of Core et al. (2006), in that the results do not indicate a significant relationship between the two variables.

Humphrey, Lee and Shen (2012b) conducted an empirical analysis of all the UK firms forming the FTSE All-Share Index, with the aim of studying the impact of ESG performance on firm

performance. These researchers deduced that there was no variation in the firm performance of firms with poor or strong governance performance, which signified that there was no significant relationship between governance factors and firm performance.

Research question three (RQ_3) queries if there is a significant relationship between governance performance and firm value for companies in South Africa. Most studies suggest that there is a positive correlation between governance performance and firm value. Based on the majority of prior studies, the following hypotheses are established:

$H_{3.1}$ – Governance performance has a significant positive effect on the market value of equity of SA firms.

$H_{3.2}$ – Governance performance has a significant positive effect on the firm performance of SA firms.

Due to the potential benefits of positive total ESG and individual E, S and G performance, the significant impact it may have on firm value and the paucity of comparable research in emerging markets, it is an important area for study within the South African context.

2.4. The relationships between the various components of ESG performance

2.4.1. The relationship between environmental and social performances

The IISD (2022) calls for caution when analysing ESG-related issues due to the potential presence of critical trade-offs between the individual ESG pillars. As a result, it is imperative that the relationships between the three pillars are acknowledged and discussed.

There are limited studies which examine the relationship between environmental performance and social performance, however, the prior research suggests that there is a positive association between the two variables. Poduska, Forbes and Bober (1992) studied the social performance at Eastman Kodak and found that Kodak made a deliberate effort to minimise pollution discharge through advancements in technology, accompanied by the additional effect of improving the firm's social initiatives. The finding implies a positive association between social and environmental performances (Poduska et al., 1992).

Reilly (1992) reinforces this association by observing the analogous commitment of Minnesota Mining and Manufacturing to reducing pollution emissions, with the simultaneous strengthening in the firm's social performance. The view is echoed by Stanwick and Stanwick (1998), who highlight through empirical analysis from 1987 to 1992, that social performance and environmental performance are positively correlated. Mervelskemper and Streit (2017) explain that there is a significant and strongly positive association between environmental and

social performance scores, and argue that it may engender multicollinearity issues, which need to be tested for to ensure a robust study is performed.

Rajesh and Rajendran (2020) argue that environmental performance has a significant and negative moderating influence on the impact of social performance on the calculation of the overall ESG performance rating. Essentially, a decrease in environmental performance strengthens the influence of social performance on the establishment of the total ESG performance rating, however, this interaction effect is less significant than the combination of the separate impacts of the environmental and social performances on the overall ESG performance rating (Rajesh & Rajendran, 2020). Similarly, social performance has a significant and negative moderating influence on the impact of environmental performance on the calculation of the overall ESG performance rating. Nevertheless, the interaction effect is still less significant than the aggregation of the effects of the individual performances in relation to the overall ESG performance (Rajesh & Rajendran, 2020).

2.4.2. The relationship between environmental and governance performances

There are select studies that support the notion that no relationship or a negative relationship exists between environmental and governance performances, however, there are numerous contemporary studies, such as Kassinis and Vafeas (2002), Mervelskemper and Streit (2017) and Haque and Ntim (2018), that support the argument of a positive association between the two variables. Kassinis and Vafeas (2002) found that board independence was negatively related to legal action due to subpar environmental performance. Mervelskemper and Streit (2017) illustrated that there was a significant and weakly positive relation between environmental and governance performance scores. Based on the results of a study by Haque and Ntim (2018), board independence is associated with higher investment in environmental initiatives, quantified by projects focused on carbon reduction. These findings suggest that there is a positive relationship between governance performance and environmental performance (Haque & Ntim, 2018; Kassinis & Vafeas, 2002).

Jacoby, Liu, Wang, Wu and Zhang (2019) showed that improved governance performance resulted in more responsible environmental activities in developing markets, implying that a positive relationship between governance performance and environmental performance exists. Lu and Wang (2021) conducted an empirical analysis of 1 870 firms and found that governance practices, proxied by aspects like CEO non-duality and board gender diversity, was positively associated with superior environmental performance (Horbach & Jacob, 2018; Lu & Herremans, 2019).

Walls, Berrone and Phan (2012) studied the interaction between different measures constituting governance performance and environmental strengths and environmental

weaknesses. Walls et al. (2012) found a weak and negative relationship between high board gender diversity and poor environmental performance, which may suggest that governance performance and environmental performance are positively correlated.

Conversely, according to Walls et al. (2012), exceptional internal governance mechanisms, namely corporate control, and external governance practices, namely stakeholder activism are weakly and negatively correlated with strong environmental practices. As per Walls et al. (2012), there was also a significant, negative relationship between positive governance performance, measured by board independence and positive environmental practices. There is a negative association between the majority of governance performance proxies analysed and environmental performance, which may imply that the relationship between the overall governance and environmental performances is negative (Walls et al., 2012).

Other studies, such as McKendall, Sánchez and Sicilian (1999), found no relationship between superior governance performance, in the form of board independence, and environmental destruction. Comparably, Berrone, Cruz, Gomez-Mejia and Larraza-Kintana (2010) indicated that there was no association between poor governance performance proxied by CEO duality, which is strongly discouraged by the King Code IV (IoD, 2016), and environmental harm. The findings reveal no significant correlation between certain aspects of governance performance and environmental performance (Berrone et al., 2010; McKendall et al., 1999).

Cong and Freedman (2011) argued that aspects of governance performance could not be utilised to ascertain the relationship between overall governance performance and environmental performance. As a result, they studied the relationship between overall governance performance and levels of pollution. They also revealed that there was no association between excellent governance practices in totality and low levels of pollution emission, only a positive association between good governance practices and disclosure on pollution levels. These results supported the conclusion that there was no relationship between total governance and environmental performance (Cong & Freedman, 2011).

Rajesh and Rajendran (2020) also suggested that environmental performance had a significantly negative moderating influence on the impact of governance performance on the establishment of the overall ESG performance rating. Effectively, an increase in environmental performance weakens the impact of governance performance on the determination of the whole ESG performance rating. However, this interaction effect is less significant than the total of the distinct influences of the environmental and governance performances on the overall ESG performance rating (Rajesh & Rajendran, 2020). Equally, governance performance has a significantly negative moderating influence on the impact of environmental performance on the establishment of the overall ESG performance rating.

However, the interaction effect is still less significant than the combination of the effects of the individual performances in relation to total ESG performance (Rajesh & Rajendran, 2020).

2.4.3. The relationship between social and governance performances

There appears to be sufficient evidence to support a positive relationship between social performance and governance performance. Coffey and Wang (1998) studied the interaction between governance mechanisms and corporate philanthropy, and argued that the more diverse the board, the more the firm allocated resources for charitable donation. Similarly, Johnson and Greening (1999) analysed the relationship between governance mechanisms and two dimensions of social performance, namely people relations and product quality. Johnson and Greening (1999) described the relationship between the two dimensions of social performance and board independence as positively correlated.

Webb (2004) performed a study incorporating 394 socially responsible firms and argued that firms with strong social performance are accompanied by strong governance mechanisms, namely high board independence, high board gender diversity and low CEO duality. The findings presented a positive association between governance and social performances (Coffey & Wang, 1998; Johnson & Greening, 1999; Webb, 2004).

Consistent with Johnson and Greening (1999), David, Bloom and Hillman (2007) found a positive relation between an internal governance practice, namely board independence, and social performance. Bear, Rahman and Post (2010) observed that social performance was significantly and positively connected to the level of board gender diversity. Harjoto and Jo (2011) claimed that firms utilised superior governance practices to strengthen product quality and relations between the firm and all non-owner stakeholders, whilst reducing any associated conflicts of interest, ultimately enhancing overall social performance (Jo & Harjoto, 2011, 2012). Mervelskemper and Streit (2017) demonstrated that there was a significant and weakly positive correlation between social and governance performance scores.

On the contrary, Brown, Helland and Smith (2006) showed that the relationship between poor governance performance, proxied by agency costs, and corporate philanthropy was positively correlated. This implies that there is a negative association between governance performance and social performance. David et al. (2007) found a negative relation between an external governance mechanism, namely shareholder activism, and social performance. They inferred that shareholder activism might divert investments away from social initiatives and redirect them towards political activities that could be used to mitigate external tensions and preserve a level of managerial autonomy. Ducassy and Montandrau (2015) deduced that there was a positive relationship between board independence and social performance, however, overall governance practices were negatively related to social performance.

Apart from the studies supporting a positive or negative relationship between the two variables, McGuire, Dow and Ibrahim (2012) arrived at a different judgement. McGuire et al. (2012) conducted an empirical analysis of 473 firms to identify the link between corporate governance and firm social performance and concluded that there was no relationship between governance performance and social performance.

Rajesh and Rajendran (2020) claimed that social performance had a significant, negative moderating influence on the effect of governance performance on the ascertainment of the overall ESG performance rating. In other words, a decrease in social performance increases the influence of governance performance on the calculation of the complete ESG performance rating, however, this interaction effect is less significant than the accumulation of the isolated impacts of the social and governance performances on the final ESG performance rating (Rajesh & Rajendran, 2020). Likewise, governance performance has a significant, negative moderating effect on the influence of social performance on the ascertainment of the overall ESG performance rating. The interaction effect is still less significant than the conglomeration of the effects of the different performances in relation to the overall ESG performance (Rajesh & Rajendran, 2020).

2.5. Control variables

Most of the prior ESG value relevance research allocates ESG performance as the independent variable and firm value as the dependent variable in a variety of models (Ball, 2021). The Ohlson valuation model is one of the most commonly utilised models and was incorporated for the purposes of this research (Ohlson, 1995). Consequently, control variables were selected for this study based on their ability to be appropriately incorporated into the Ohlson valuation model (Ohlson, 1995; Yoon et al., 2018).

McWilliams and Siegel (2000) asserted that the inconsistency in the results of prior ESG research was due to the incorporation of inappropriate control variables into the models. They claimed that the utilisation of appropriate control variables was equally as significant as integrating appropriate proxies of ESG performance and firm value.

Waddock and Graves (1997) emphasised three explicit control variables, namely firm size, proxied by the market capitalisation; risk, proxied by the debt ratio; and lastly, the industries in which specific firms in the sample operated in. Conversely, Michelon, Boesso and Kumar (2013) opposed the use of market capitalisation as a proxy for firm size and proposed that the number of employees was a more suitable measure. The number of employees was particularly appropriate if the sample comprised firms from various industries which were associated with different sales growth and trends (Michelon et al., 2013).

Nollet, Filis and Mitrokostas (2016) opted against incorporating firm size, proxied by market capitalisation and industry as control variables. Nollet et al. (2016) instead used total sales as a proxy of firm size. Furthermore Nollet et al. (2016) replaced the industry control variable with research and development expenditure. This decision was arguably derived from the work by McWilliams and Siegel (2000), who suggested that research and development expenditure and advertising expenditure should be considered, due to the positive relationship that the two variables shared with firm performance (Griliches, 1979).

Firm size is frequently observed as a control variable in prior studies, whether measured by market capitalisation, total sales or the number of employees. It is arguably an important control variable to include in any ESG research, irrespective of how it is measured (McWilliams & Siegel, 2000; Michelon et al., 2013; Nollet et al., 2016). Firm size appears to be consistently correlated with ESG performance, which may imply that as firms expand, they invest more resources into ESG initiatives because of stakeholder influence (McWilliams & Siegel, 2001). Alternatively, the cost of performing ESG activities decreases as firms expand due to mechanisms such as economies of scale (Roberts & Dowling, 2002). Similarly, firm size is positively corelated to firm performance (Du Toit & Lekoloane, 2018; Griliches, 1979; McWilliams & Siegel, 2000). Nollet et al. (2016) found that the positive relationship was statistically significant at the 10 % level of significance, while numerous prior studies, such as Michelon et al. (2013), Yoon et al. (2018) and Ball (2021), found that the correlation was significant at the 1% level of significance.

More contemporary research has placed significant focus on using firm size and firm profitability as control variables (Mervelskemper & Streit, 2017; Yoon et al., 2018). As mentioned above, firm size is a consistently agreed-upon control variable in ESG research. Yoon et al. (2018) highlight that there is a positive correlation between firm profitability and ESG performance. Additionally, Yoon et al. (2018) highlight that there is a positive relationship between firm profitability and firm value, measured by share price, at the 1% level of significance. This implies that as firms become more profitable, the pressure from stakeholders to engage in ESG activities also increases (Du Toit & Lekoloane, 2018).

Mervelskemper and Streit (2017) uses opening book value, measured by opening net asset value, as a proxy for firm size and net income, as a proxy for firm profitability. Yoon et al. (2018) employs similar proxies but focuses on measures on a per share basis. They specify book value per share, as a proxy for firm size, and earnings per share, as a proxy for firm profitability. For the purpose of this study, incorporating variables on a total basis, akin to Mervelskemper and Streit (2017), would be the most appropriate, as it allows for opening book value to be used as a deflator to alleviate potential heteroscedasticity.

CHAPTER III
METHODOLOGY

This research investigates the value relevance of the respective E, S and G performance ratings in a South African context. The rest of this section describes the data sample that was investigated and outlines the econometric methodology applied. This research follows a quantitative methodology because the effect of E, S and G performance on firm value was examined, using standardised E, S and G data from reputable external rating agencies to minimise measurement bias. The methodology of this research is primarily based on work by Mervelskemper and Streit (2017) and Behl et al. (2021), incorporating a seminal valuation model developed by Ohlson (1995).

3.1. Data collection and sampling

The research by Dalal and Thaker (2019) and Behl et al. (2021) shows that diverse results can be found, depending on the utilisation of internal performance measures or market-related measures as the dependent variables. To improve the robustness of the research, two broad data sets were used. One broad data set incorporated a measure of market return, namely the market value of equity as the dependent variable; the other broad data set incorporated the internal performance measure of ROA as the dependent variable.

In addition to the two separate dependent variables, this research also incorporated ratings of ESG performance from two different financial research houses. Different rating agencies use different ESG evaluation criteria to arrive at ESG scores (Billio et al., 2021). To further improve the robustness of this research, overall ESG and individual E, S and G performance data were collected from Bloomberg and the FTSE. Both the FTSE and Bloomberg ratings were included in each of the above-mentioned broad data sets.

The FTSE ESG ratings data were sourced directly from the FTSE, who evaluates the ESG performance of several South African firms. The FTSE assigns E, S and G ratings as well as overall ESG ratings from 0 to 5, with 0 and 5 representing the worst and best possible E, S and G and ESG performances respectively. The Bloomberg ESG sample data were extracted through the Bloomberg Terminal. Bloomberg assigns E, S and G ratings from 0 to 10, with 0 and 10 representing the worst and best performances respectively.

The fundamental accounting data, namely the opening book value, net income and ROA of each firm were extracted from IRESS Expert. The market value of equity of each firm was extracted from EquityRT.

The population for this research was the 343 firms listed on the Johannesburg Stock Exchange (JSE). The criteria used to collect the data was firstly, that the firms were listed on the JSE and secondly, that the firms were provided with ESG ratings for at least one year in the sample period. The sample period was the five-year period from 2018 to 2022. This sample timeframe was deliberately chosen as there were no ESG ratings for South African firms provided by the FTSE prior to 2018.

The selection of these firms was based primarily on data availability as E, S and G data was not available for all South African listed firms, but rather, only for firms contained within the FTSE/JSE Responsible Investment Index and for firms on the Bloomberg database which had been rated by Bloomberg. Therefore, a non-random, purposive sampling technique was used as firms were deliberately selected because they manifested the specific characteristics and measures to be analysed (Leedy & Ormrod, 2021).

With reference to the market return data set, there were ninety-nine firms in the FTSE sample data set, with 299 firm-year observations and sixty-three firms in the Bloomberg sample data set, with 381 firm-year observations.

Based on the data collected, the firms per industry in the respective FTSE and Bloomberg sample data sets within the market return and internal performance broad data sets, were as follows:

Table 3: Firms per industry in the FTSE and Bloomberg data set

Market return data set		
Industry	**FTSE**	**Bloomberg**
Financials	36	23
Consumer services	21	13
Basic materials	14	10
Industrials	11	5
Consumer goods	6	3
Healthcare	5	4
Telecom	3	3
Oil and gas	2	2
Technology	1	0
Total	**99**	**63**

Internal performance data set		
Industry	**FTSE**	**Bloomberg**
Financials	29	23
Consumer services	18	13
Basic materials	12	10
Industrials	8	5
Consumer goods	5	3
Healthcare	4	4
Telecom	3	3
Oil and gas	2	2
Technology	0	0
Total	**81**	**63**

3.2. The valuation model

For the empirical test of the aforementioned hypotheses, this research incorporated Ohlson's valuation model (Ohlson, 1995). The Ohlson valuation model states that firm value is a function of financial information, namely book value modified for present profitability, proxied by abnormal profit and other value-relevant information which can be non-financial in nature (Ohlson, 1995). The Ohlson valuation model is presented as follows (Ohlson, 1995):

$$P_t = Y_t + \propto_1 X^a{}_t + \propto_2 V_t$$

where:

$\propto_1 = \frac{\omega}{(R_f - \omega)} \geq 0$, and

$\propto_2 = \frac{R_f}{(R_f - \omega)(R_f - \gamma)} > 0$;

where:

P_t is the market value of the firm at time t;

Y_t is the book value of equity at time t;

$X^a{}_t$ is the abnormal profit or residual income at time t;

V_t refers to the value-relevant information other than abnormal profit or residual income, observed in the market, that alters the forecast of future profitability, but has not been captured by the accounting information, at time t (Ohlson, 1995; Schadewitz & Niskala, 2010);

R_f is the risk-free rate plus one;

ω is the abnormal profit persistence parameter, which is confined to be non-negative and less than one, a stipulation that infers that the unconditional mean of abnormal profit is zero (Fullana, González, & Toscano, 2021; Ohlson, 1995);

γ is the other, value-relevant information persistence parameter, which is confined to be non-negative and less than one, a stipulation inferring that the unconditional mean of the other, value-relevant information element is zero (Fullana et al., 2021; Ohlson, 1995).

The valuation model developed by Ohlson (1995) has been used extensively in numerous value relevance research, which supports the validity and reliability of the model (Hassel, Nilsson, & Nyquist, 2005; Semenova & Hassel, 2015). Due to the research by Behl et al. (2021), which found that there was no bidirectionality relationship between ESG performance and firm value and that autoregression effects were stable, the valuation model for this research did not consider bidirectional causality or autoregression effects.

Mervelskemper and Streit (2017) modified the Ohlson valuation model to establish a regression model that evaluates the impact of ESG performance on firm value (Ohlson, 1995). The regression model used by Mervelskemper and Streit (2017) is presented as follows:

$$\frac{MV_{i,t} + DI_{i,t}}{BV_{i,t-1}} = \beta_0 \frac{1}{BV_{i,t-1}} + \beta_1 + \beta_2 \frac{NI_{i,t}}{BV_{i,t-1}} + \beta_3 SCORE_{i,t} + \varepsilon_{i,t} \quad (1)$$

The Ohlson (1995) valuation model modified by Mervelskemper and Streit (2017) served as the basis for the initial regression model in this research. After preliminary testing, using the Mervelskemper and Streit (2017) regression model, this research removed the divisor of $BV_{i,t-1}$ from the regression model to ensure greater consistency with the original Ohlson valuation model (Ohlson, 1995).

The model also initially included the combined ESG performance score to test a hypothesis based on the combined score. However, that was not possible in the regression model, due to a high degree of multicollinearity evidenced by a variance inflation factor (VIF) of 9.222, as presented in Table A1 (see Appendix A). The combined ESG score was therefore removed from the regression model.

Hypotheses 1.1, 2.1 and 3.1, which propose that environmental, social and governance performances respectively, have a significant positive effect on the market value of equity of SA firms, were tested using the following regression model:

$$MV_{i,t} + DI_{i,t} = BV_{i,t-1} + \propto_1 NI_{i,t} + \propto_2 E_{i,t} + \propto_3 S_{i,t} + \propto_4 G_{i,t} \quad (2)$$

Table 4: Definition of the variables in model (2)

Variable	Type	Proxy variable	Description
Firm value	Dependent	$MV_{i,t} + DI_{i,t}$	Natural logarithm of cum-dividend adjusted market value of equity of firm *i* at time *t*. This variable was used as a measure of market return for the firm value.
Environmental rating	Independent	$E_{i,t}$	$E_{i,t}$ is the environmental performance rating of firm *i* at time *t,* expressed as a percentage.
Social rating	Independent	$S_{i,t}$	$S_{i,t}$ is the social performance rating of firm *i* at time *t,* expressed as a percentage.
Governance rating	Independent	$G_{i,t}$	$G_{i,t}$ is the governance performance rating of firm *i* at time *t*, expressed as a percentage.
Firm profitability	Control	$NI_{i,t}$	Natural logarithm of net income of firm *i* at time *t.*
Firm size	Control	$BV_{i,t-1}$	Natural logarithm of opening book value, measured by net asset value (NAV), of firm *i* at time *t-1.*

Model (2) used a panel data set, due to its multiple benefits over a cross-section. One major benefit was that it allowed control for unobserved cross-section heterogeneity (Gwatidzo & Ojah, 2009; Wooldridge, 2002). The accounting data to be collected was of annual frequency and was denominated in South African rands. The market value of equity and accounting data were collected one month after the E, S and G performance was measured and the scores were released to the public by the rating agencies. This accounted for the time lag between the release of the annual E, S and G scores and the time taken for the market to incorporate the impact of the annual scores.

The above-mentioned empirical test used a 5% level of significance and focused on whether the coefficients of the individual E, S and G ratings, $\propto_2, \propto_3$ and $\propto_4$, for the model were statistically significantly different from zero. If the results for all coefficients were significantly positive, that would support Hypotheses 1.1, 2.1 and 3.1, suggesting that the respective E, S and G performances have a significantly positive impact on firm value proxied by the market measure of the market value of equity.

As mentioned above, Dalal and Thaker (2019) and Behl et al. (2021) highlight that prior research has found mixed results based on the incorporation of internal performance measures or market-related measures as the dependent variables for regression analysis. To improve the internal validity of this research, an additional regression model that incorporated an internal performance measure of firm value was tested.

Hypotheses 1.2, 2.2 and 3.2, which propose that environmental, social and governance performances respectively, have a significant positive effect on the firm performance of SA firms and were tested using the following regression model:

$$ROA_{i,t} = BV_{i,t-1} + \propto_1 NI_{i,t} + \propto_2 E_{i,t-1} + \propto_2 S_{i,t-1} + \propto_2 G_{i,t-1} \quad (3)$$

Table 5: Definition of the variables in model (3)

Variable	Type	Proxy variable	Description
Firm value	Dependent	$ROA_{i,t}$	Natural logarithm of the return on assets ratio of firm *i* at time *t*. This variable was used as a measure of internal performance for the firm value.

The dependent variable of ROA was the only difference between model (2) and model (3). Model (3) used cross-lagged panel data to account for the time lag between the release of the annual E, S and G scores and the time taken for the firm performance to reflect the impact of the annual scores (Behl et al., 2021). For this reason, the ROA and accounting data were collected one year after the E, S and G scores were released to the public.

The above-mentioned empirical test used a 5% level of significance and focused on whether the coefficients of the individual E, S and G ratings, $\propto_2, \propto_3$ and $\propto_4$, for the model were statistically significantly different from zero. If the results for all coefficients were significantly positive, that would support Hypotheses 1.2, 2.2 and 3.2, suggesting that the respective E, S

and G performances have a significantly positive impact on firm value proxied by the internal performance measure of ROA.

Models (2) and (3) were run using the ordinary least-squares (OLS) model. The software employed was Microsoft Excel for data cleaning and ordering and IBM SPSS Statistics for modelling and analysis.

3.3. Validity and reliability

To ensure a reliable study and high internal validity, the assumptions of a regression must be tested. This research performed a robustness test for homoscedasticity, normality, serial correlation and multicollinearity (Osborne & Waters, 2002). VIFs were calculated to ensure that the degree of multicollinearity was sufficiently low to perform the regressions (Field, Miles, & Field, 2012). The Breusch-Pagan test was used to test for heteroscedasticity and confirm homoscedasticity to certify that accurate results were obtained (Field, 2017). The normal Q-Q plot, Kolmogorov-Smirnov test and Shapiro-Wilk test were employed to ensure that the data set followed a normal distribution to perform statistical tests (Field, 2017). To account for possible concerns regarding the homogeneity of residual variance and normality, standard errors were estimated based on research by White (1980).

The reliability of the results was ensured by using objective E, S and G ratings from recognised rating agencies. The Ohlson (1995) valuation model has been used in most of the journal articles, published in reputable journals, that examine the relationship between ESG performance and firm value, further supporting the reliability of the results. The research used data from many timeframes and from two rating agencies to support the reliability of the results and eliminate measurement bias. The external validity of the research was increased by using the largest sample of the population and longest period for which E, S and G performance data exists in the FTSE and Bloomberg databases. The construct validity of the research was high as the variables constituting the regression models have also commonly been used by many prior researchers, as identified by Gillan et al. (2021).

CHAPTER IV
DATA ANALYSIS AND PRESENTATION OF RESULTS

The results of this study will be presented as follows: A discussion of the choice of model will be provided. Thereafter, an evaluation of the distribution of the data will be detailed. Subsequently, the results of the study will be exhibited and analysed with the intention of answering the research aim and research questions, fulfilling the purpose of the research. The findings and ensuing discussion will be presented in a manner that reflects the process followed to ensure that a valid regression was performed. Finally, a summation of the key results and associated discourse will be provided alongside a conclusion.

4.1. Choice of model

The Mervelskemper and Streit (2017) model served as the initial regression model in this research and is presented as follows:

$$\frac{MV_{i,t} + DI_{i,t}}{BV_{i,t-1}} = \beta_0 \frac{1}{BV_{i,t-1}} + \beta_1 + \beta_2 \frac{NI_{i,t}}{BV_{i,t-1}} + \beta_3 SCORE_{i,t} + \varepsilon_{i,t} \quad (1)$$

$SCORE_{i,t}$ represents the variables of $ESG_{i,t}$, $E_{i,t}$, $S_{i,t}$ and $G_{i,t}$, which are the overall ESG and individual E, S and G ratings of firm *i* at time *t.*

Preliminary statistical analysis was conducted to evaluate the feasibility of model (1). VIFs were presented for model (1), excluding the firm size control variable proxied by opening book value, in Table A1 (see Appendix A). The main focus of the initial inferential statistics was on the VIFs, to ensure that the degree of multicollinearity between the independent variables was sufficiently low to provide valid and accurate findings (Field et al., 2012).

Most notably, a high VIF of 9.222 was observed for the ESG performance rating, in Table A1 (see Appendix A). As expected, this indicated a significant degree of collinearity between the ESG performance rating and other independent variables, such that ESG performance ratings are explained significantly by the E, S and G performance ratings. Since the VIF for the ESG performance rating was close to 10, the statistic implied that a potential issue existed (Menard, 1995; Myers, 1990). Since the average VIF for the model was substantially greater than 1, the finding revealed that the regression might be biased (Bowerman & O'connell, 1990).

To resolve the potential issue and bias, the ESG performance rating variable was removed from the statistical tests. The size control variable, BV, was added to model (1) and the regression analysis was performed to determine if more appropriate results would be obtained.

VIFs were presented for model (1), excluding overall ESG and now including the firm size control variable proxied by opening book value in Table A2 (see Appendix A).

According to Table A2 (see Appendix A), the highest VIF observed was 1.474, for the G performance rating, which was significantly lower than 10. The statistic implied that the potential issue was adequately resolved by removing the ESG performance rating variable (Menard, 1995; Myers, 1990). Since the average VIF for the model was not considerably greater than 1, the finding revealed that the regression would most likely be unbiased and further supported the notion of the resolution of the potential problem and bias (Bowerman & O'connell, 1990). This indicated that the degree of multicollinearity between the independent variables was sufficiently low to ensure that the results obtained were valid and accurate.

The preliminary statistics also indicated an anomalous statistically significant negative relationship between BV and $(\mathrm{MV} + \mathrm{DI})$, which may have been as a result of using BV as a deflator. The presence of this negative correlation opposes the findings of much prior research. According to prior research, firm size is generally positively associated with firm value (Du Toit & Lekoloane, 2018). Irrespective of how firm size is measured, whether it is proxied by the number of employees (Michelon et al., 2013), total sales (Nollet et al., 2016) or book value (Yoon et al., 2018), the positive correlation with firm value typically remains consistent. The relationship continues to be observed in the current South African context, when firm value is proxied by market capitalisation (Ball, 2021).

Due to the contradiction between the preliminary statistics and prior research, as noted above, the Mervelskemper and Streit (2017) model was deemed inappropriate for the purpose of this study and was subsequently discarded.

4.2. The market return valuation model

The researcher then reverted to basing the regression model on the original valuation model developed by Ohlson (1995) and removed BV as a deflator. Hypotheses were tested using the regression model as follows:

Hypotheses 1.1, 2.1 and 3.1, which propose that environmental, social and governance performances respectively, have a significant positive effect on the market value of equity of SA firms, were tested using the following regression model:

$$MV_{i,t} + DI_{i,t} = BV_{i,t-1} + \propto_1 NI_{i,t} + \propto_2 E_{i,t} + \propto_3 S_{i,t} + \propto_4 G_{i,t} \quad (2)$$

4.3. Discussion of the normality of the data for the market return model

To justifiably answer the research questions using the econometric methodology outlined above, the data needed to be normally distributed to ensure that it was suitable for the regression analysis (Osborne & Waters, 2002).

The Mahalanobis distance (MD) was used to identify outliers, extreme values that deviate from expectations, which were consequently removed to enhance the normality of the data for statistical testing (Mahalanobis, 1930; Rasmussen, 1988). The utilisation of the MD in this study, rather than other outlier removal statistics, was due to the research conducted by Rasmussen (1988). According to Rasmussen (1988), the MD was preferred to Dk, a statistic delivered by Comrey (1985), as an outlier removal statistic.

The following nine firm-year observations were identified as outliers and removed to normalise the data: Famous Brands 2022, JSE 2018, JSE 2019, JSE 2020, JSE 2021, Naspers 2020, Naspers 2021, Naspers 2022 and Steinhoff International Holdings N.V. 2017. The presence of outliers typically increase error variance, decrease statistical power and result in a skewed distribution of the data set, which may modify the probabilities of making Type I and Type II errors (Frecka & Hopwood, 1983; Zimmerman, 1994).

Before conducting tests for normality, the dependent variable, $\mathrm{MV} + \mathrm{DI}$, was transformed using logarithmic transformation to enhance the normality of the data set. The natural logarithm was used to transform the dependent variable. The natural logarithm reduces the variability by some factor (Field, 2017). To further augment the normality of the data set, the control variables, NI and BV, were also transformed using the natural logarithm. Variables transformed using the natural logarithm are presented by using the function 'ln' before the relevant variables.

The study used inferential statistics, most notably t-tests, p-values and regression analysis which relied on the normal distribution of a data set to provide accurate results. Therefore, the Kolmogorov-Smirnov test (Table 6), the Shapiro-Wilk test (Table 6), and a normal Q-Q plot (see Figure 1 below) were used to determine whether the assumption of a normal distribution had been met.

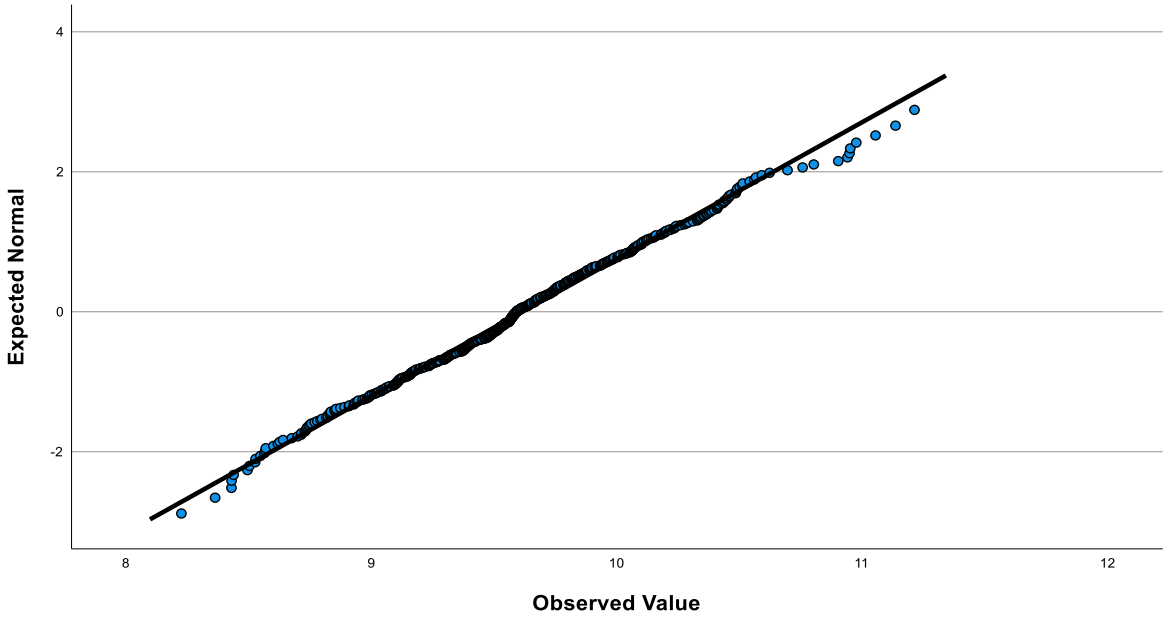
On the basis that at least one normality test provided evidence that the data was normally distributed, the data set was considered to follow a normal distribution and the inferential statistics would be appropriate for assessing the data collected.

Table 6: Tests of normality for model (2)

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	t-statistic	Df	p-value	t-statistic	df	p-value
ln (MV + DI)	0.035	508	0.170	0.995	508	0.147

a. Lilliefors Significance Correction

Figure 1: Normal Q-Q Plot for model (2)



The normal Q-Q plot in Figure 1, shows that the data sufficiently approximated a normal distribution (Field et al., 2012). According to the Shapiro-Wilk test as shown in Table 6, the test was non-significant, as the p-value of 0.147 was greater than 0.05, which suggests that the data was approximately normally distributed (Field et al., 2012). According to the Kolmogorov-Smirnov test as depicted in Table 6, since the p-value of 0.170 was greater than 0.05, the null hypothesis, which stated that the data set came from a normal distribution, failed to be rejected. Simply stated, the data set followed a normal distribution (Field, 2017). All three normality tests provided evidence that the data set was normally distributed. Consequently, the inferential statistics could be appropriately utilised to analyse the data.

4.4. Regression statistics for the market return model

The model summary and coefficients are presented for model (2) as shown below in Table 7 and Table 8 respectively. The regression model using the Bloomberg predictors excluded the ESG performance rating independent variable. The exclusion of the ESG performance rating was due to the high VIFs noted in Table A1 (see Appendix A). The ESG performance rating variable was excluded to ensure that there were no issues relating to multicollinearity.

Table 7: Model summary for model (2) using Bloomberg predictors[b]

R	R-Squared	Adjusted R-Squared
0.534[a]	0.285	0.258

a. Predictors: (Constant), $\ln(\mathrm{NI})$, $\ln(\mathrm{BV})$, E, S, G

b. Dependent Variable: $\ln(\mathrm{MV} + \mathrm{DI})$

Table 8: Coefficients for model (2) using Bloomberg predictors[a]

	Standardised Coefficients	t-statistic	p-value	Collinearity Statistics
	Beta			VIF
(Constant)		9.503***	<0.001	
$\ln(\mathrm{NI})$	0.148	1.982**	0.050	1.031
E	0.064	0.778	0.438	1.277
S	-0.113	-1.392	0.166	1.234
G	-0.049	-0.551	0.583	1.474
$\ln(\mathrm{BV})$	0.501	6.655***	<0.001	1.053

a. Dependent Variable: $\ln(\mathrm{MV} + \mathrm{DI})$

** Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level*

As shown in Table 8 above, the VIF statistics remained the same as those presented in Table A2 (see Appendix A). This indicated that the degree of multicollinearity between the independent variables was still sufficiently low to ensure that the results obtained were valid and accurate. The statistics supported the decision to continue to exclude ESG performance rating variable from the model.

The results indicated that the model had moderate predictive power, displayed by the R-squared of 0.285 and the adjusted R-squared of 0.258, as detailed in Table 7 above. This suggests that 28.5% of the variation in $\ln(\mathrm{MV} + \mathrm{DI})$ was predicted by the statistical model. Furthermore, 25.8% of the variation in $\ln(\mathrm{MV} + \mathrm{DI})$ would be accounted for if the statistical model had been derived from the population from which the sample was selected.

As shown in Table 8, $\ln(\mathrm{BV})$ had a more sensible, moderately positive relationship with $\ln(\mathrm{MV} + \mathrm{DI})$, represented by a moderately positive coefficient of 0.501. The statistic suggests that as firm size increases, firm value increases. The positive correlation was consistent with the findings of most prior research, as discussed above (Michelon et al., 2013;

Nollet et al., 2016; Yoon et al., 2018). The positive association also coincided with the findings of ESG value-relevance research conducted by Ball (2021) in South Africa.

$\ln(\mathrm{BV})$ had a statistically significant moderately positive association with $\ln(\mathrm{MV} + \mathrm{DI})$, at the 1% level of significance. This was depicted by a p-value of <0.001 for $\ln(\mathrm{BV})$ in Table 8, which was significantly less than the 0.05 threshold and was considered to be significant (Field, 2017). The statistical significance of the positive correlation between firm size and firm value at the 1% level of significance was consistent with the findings of prior research conducted in developed (Michelon et al., 2013) and emerging markets (Ball, 2021; Yoon et al., 2018).

Based on the findings shown in Table 8, $\ln(\mathrm{NI})$ had a weak positive correlation with $\ln(\mathrm{MV} + \mathrm{DI})$, depicted by a weak positive coefficient of 0.148. The positive association was consistent with observations in the Korean market (Yoon et al., 2018). $\ln(\mathrm{NI})$ had a statistically significant weak positive relationship with $\ln(\mathrm{MV} + \mathrm{DI})$, at the 5% level of significance. This was depicted by a p-value of 0.050 for $\ln(\mathrm{NI})$ in Table 8, which was equal to 0.05 and considered to be significant (Field, 2017). The statistical significance of the positive coefficient was congruent with the findings of Yoon et al. (2018), who found that the positive correlation was statistically significant at the 1% level of significance.

The ESG performance rating independent variable was excluded in the model using Bloomberg predictors due to the high VIF noted in Table A1 (see Appendix A). As a result, a conclusion could not be determined for a hypothesis based on ESG performance when using Bloomberg predictors. This inconclusive result was inconsistent with prior studies. There were prior studies, such as Mervelskemper and Streit (2017), that examined the value-relevance of the total ESG performance and individual E, S and G performances and found a high VIF for the total ESG performance rating. As a result, these specific studies did not interpret regression models in which all three individual performance ratings, along with the total ESG performance rating, were considered at once (Mervelskemper & Streit, 2017; Yoon et al., 2018).

According to Table 8, E performance ratings had a weak positive correlation with $\ln(\mathrm{MV} + \mathrm{DI})$, depicted by a weak positive coefficient of 0.064. The positive association between environmental performance and externally measured firm value is supported by the findings of most prior studies (Derwall et al., 2005; Manrique & Martí-Ballester, 2017; Telle, 2006). As demonstrated by Sharfman and Fernando (2008), the existence of the relationship may be attributed to the notion that alleviation of environmental issues decreases the cost of debt, subsequently increasing firm value as a result of a lower discount rate.

Based on the study by Iwata and Okada (2011), a positive association exists between greenhouse gas reduction and firm value, whereas no significant association exists between waste emissions and firm value. The positive association may be due to specific environmental elements, namely greenhouse gas reduction constituting the majority of E performance ratings (Iwata & Okada, 2011). Dissimilar to the findings of Pekovic et al. (2018) and Lahouel et al. (2020), this study revealed that the relationship between environmental performance and firm value does not follow an inverted U-shaped curve in the South African context.

Despite the correlation, E performance ratings had a statistically non-significant relationship with $\ln(\mathrm{MV} + \mathrm{DI})$, even at the 10% level of significance. The p-value of 0.438 for E performance ratings in Table 8 was significantly greater than the threshold of 0.05, rendering it not statistically significant for the purposes of this study (Field, 2017). To rephrase, despite the positive coefficient that these results shared with prior research, as discussed above, the relationship was not statistically significant, which indicated that no significant relationship exists.

This result reflects the findings of Elsayed and Paton (2005), Jacobs et al. (2010) and Endo (2019). Elsayed and Paton (2005) claim that the neutral relationship with firm value is due to the continuous investment in environmental activities, up to the point where marginal cost is equal to the marginal benefit. Similarly, Jacobs et al. (2010) and Endo (2019), assert that no significant association exists between environmental performance and firm value. Alternatively, as discussed by Iwata and Okada (2011), the E performance ratings may comprise specific environmental elements, namely wastage emissions, that result in the non-significant relationship with firm value. As a result, Hypothesis 1.1, which proposed that environmental performance had a significant positive effect on the market value of equity of SA firms, when tested using Bloomberg predictors, was rejected.

The S performance ratings had a weak negative association with $\ln(\mathrm{MV} + \mathrm{DI})$, portrayed by a weak negative coefficient of -0.113 in Table 8. This finding is supported by the exceptionally limited number of studies that depart from the value creation school of thought, such as Baron et al. (2011). Baron et al. (2011) argues that the relationship between social performance and firm value is not consistently positive. Unlike the findings of Barnett and Salomon (2012), the relationship between social performance and firm value observed in this current study does not follow an inverted U-shaped curve.

Despite the correlation, S performance ratings had a statistically non-significant relationship with $\ln(\mathrm{MV} + \mathrm{DI})$, even at the 10% level of significance. The p-value of 0.166 for S performance ratings in Table 8 was significantly greater than the threshold of 0.05, rendering

it not statistically significant for the purposes of this study (Field, 2017). To rephrase, despite the negative coefficient that these results shared with prior research, as discussed above, the relationship was not statistically significant, which indicates that no significant relationship exists.

When studying an aggregated data set, Baron et al. (2011) found that social performance shares no significant correlation with firm value. According to Zhao and Murrell (2016) and Lu et al. (2021), the correlation between social performance and firm value is complex and context-driven. As a result, it is unlikely that a positive correlation will always be observed (Lu et al., 2021; Zhao & Murrell, 2016).

Lu et al. (2021) found that under specific circumstances, a positive association between social performance and firm value can exist in developed markets. Studying the relationship in developing markets is marred by a dearth of literature, however, notwithstanding this lack, an argument could be made that the finding of no significant relationship could be due to the intricacy of the association and conducting the study in South Africa, a developing market. As a consequence, Hypothesis 2.1, which proposed that social performance had a significant positive effect on the market value of equity of SA firms, when tested using Bloomberg predictors, was rejected.

As shown in Table 8, the G performance ratings had a weak negative association with $\ln(\mathrm{MV} + \mathrm{DI})$, portrayed by a weak negative coefficient of -0.049. Despite the paucity of literature supporting this negative coefficient, Ionescu et al. (2019) found different results based on the geographical location of the firms, including a negative relationship between governance performance and firm value for firms situated in Europe and Asia. The only similarity that can be drawn from these scholars to explain this relationship in the South African context, is that South Africa is a developing market, similar to many countries in Asia, which has contributed to the negative association. Ionescu et al. (2019) argue that the governance pillar exerts the greatest influence on firm value. Contrary to their claims, however, this model highlighted that environmental performance had the greatest numerical value as a coefficient, and not governance performance.

Despite the correlation, G performance ratings had a statistically non-significant relationship with $\ln(\mathrm{MV} + \mathrm{DI})$, even at the 10% level of significance. The p-value of 0.583 for G performance ratings in Table 8 was significantly greater than the threshold of 0.05, rendering it not statistically significant for the purposes of this study (Field, 2017). To rephrase, despite the negative coefficient that these results shared with prior research, as discussed above, the relationship was not statistically significant, which indicates that no significant relationship exists.

Core et al. (2006) supports the finding of no significant relationship between governance performance and firm value. In critique of works by Gompers et al. (2003), Core et al. (2006) assert that the relationship observed is dependent on the sample period. Criticisms by Core et al. (2006) suggest that the lack of a relationship found in this study was due to the sample period assessed. Similarly, the result of no relationship also reflected the conclusions of studies such as Statman and Glushkov (2009) and Humphrey et al. (2012b). As a result, Hypothesis 3.1, which proposed that governance performance had a significant positive effect on the market value of equity of SA firms, when tested using Bloomberg predictors, was rejected.

The VIFs are presented for model (2), using FTSE predictors, including the ESG performance rating independent variable in Table A3 (see Appendix A). Since different predictors were used, the focus of the initial inferential statistics presented below was on the VIFs. This was to ensure that the degree of multicollinearity between the independent variables was sufficiently low to provide valid and accurate findings, while the ESG performance rating independent variable was still included in the model (Field et al., 2012).

A high VIF of 13.919 was noted for the ESG performance rating in Table A3 (see Appendix A), similar to the high VIF for ESG performance observed when the Bloomberg predictors were used in Table A1 (see Appendix A). The VIF of 13.919 suggested that a significant degree of collinearity between the ESG performance rating and other independent variables, such that ESG performance ratings are explained significantly by the E, S and G performance ratings. Since the VIF for the ESG performance rating was over 10, the statistic implied that a critical issue existed and that the results were therefore inaccurate (Menard, 1995; Myers, 1990). Since the average VIF for the model was substantially greater than 1, the finding revealed that the regression might be biased (Bowerman & O'connell, 1990).

To resolve the issue, the ESG performance rating variable was removed from the statistical tests. Regression analysis was re-performed to determine if more appropriate results could be obtained. The model summary and coefficients are presented for model (2), using FTSE predictors, in Table 9 and Table 10 respectively.

Table 9: Model summary for model (2) using FTSE predictors[b]

R	R-Squared	Adjusted R-Squared
0.731[a]	0.535	0.514

a. Predictors: (Constant), $\ln(\mathrm{NI})$, $\ln(\mathrm{BV})$, E, S, G

b. Dependent Variable: $\ln(\mathrm{MV} + \mathrm{DI})$

Table 10: Coefficients for model (2) using FTSE predictors[a]

	Standardised Coefficients	t-statistic	p-value	Collinearity Statistics
	Beta			VIF
(Constant)		6.833***	<0.001	
$\ln(\mathrm{BV})$	0.726	11.077***	<0.001	1.061
$\ln(\mathrm{NI})$	0.347	5.128***	<0.001	1.134
E	0.005	0.063	0.950	1.624
S	-0.141	-1.655	0.101	1.802
G	0.052	0.736	0.463	1.235

a. Dependent Variable: $\ln(\mathrm{MV} + \mathrm{DI})$

** Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level*

According to Table 10 above, the highest VIF observed was 1.802, for the S performance rating which was significantly lower than 10. The statistic indicates that the issue of multicollinearity was adequately resolved by removing the ESG performance rating variable (Menard, 1995; Myers, 1990). Since the average VIF for the model was not considerably greater than 1, the results revealed that the regression would most likely be unbiased and further supported the notion in resolving the said problem and bias (Bowerman & O'connell, 1990). This indicated that the degree of multicollinearity between the independent variables was sufficiently low to ensure that the results obtained were valid and accurate.

The findings revealed that the predictive power of the model using FTSE predictors was significantly greater than the model using Bloomberg predictors. This was displayed by the R-squared of 0.535 and the adjusted R-squared of 0.514 as depicted in Table 9 above, compared to the R-squared of 0.285 and the initial adjusted R-squared of 0.258, shown in Table 7 *supra*. The results indicate that 53.5% of the variation in $\ln(\mathrm{MV} + \mathrm{DI})$ was predicted by the statistical model. Furthermore, 51.4% of the variation in $\ln(\mathrm{MV} + \mathrm{DI})$ would be accounted for if the statistical model had been derived from the population from which the sample was selected. The statistics suggest that the model possessed strong predictive power.

The adjusted value of 51.4% revealed the reduction in predictive power or shrinkage (Field, 2017). If the model was derived from the population rather than from the sample selected, it would account for approximately 2.1% less variance in $\ln(\mathrm{MV} + \mathrm{DI})$, which is the difference between the R-squared and adjusted R-squared values. The difference of 2.1% between the R-squared and adjusted R-squared values is less than the difference of 2.7% noted between

the two values in the model using Bloomberg predictors. This suggests that the cross-validity of the model using FTSE predictors, was superior to that of the prior model using Bloomberg predictors (Field, 2017).

The variable $\ln(\mathrm{BV})$ had a strong positive relationship with $\ln(\mathrm{MV} + \mathrm{DI})$, represented by a strong positive coefficient of 0.726 (significant at the 1% level), in Table 10, compared to the moderately positive coefficient of 0.501, in Table 8 (significant at the 1% level). The findings suggest that the model using FTSE predictors provides a stronger association between firm size and firm value, compared to the model using Bloomberg predictors. The positive correlation was consistent with the findings of prior research, as discussed above (Ball, 2021; Michelon et al., 2013; Nollet et al., 2016; Yoon et al., 2018).

Furthermore, $\ln(\mathrm{BV})$ had a statistically significant strong positive association with $\ln(\mathrm{MV} + \mathrm{DI})$, at the 1% level of significance. This was depicted by a p-value of <0.001 for $\ln(\mathrm{BV})$ in Table 10, which mirrored the statistic as shown in Table 8. The p-value was significantly less than the 0.05 threshold and was considered to be significant (Field, 2017). The statistical significance of the positive correlation between firm size and firm value at the 1% level of significance was consistent with the findings of prior research as discussed above (Ball, 2021; Michelon et al., 2013; Yoon et al., 2018).

Based on the findings as per Table 10 above, $\ln(\mathrm{NI})$ had a positive correlation with $\ln(\mathrm{MV} + \mathrm{DI})$, depicted by a moderately positive coefficient of 0.347 (significant at the 1% level), compared to the positive relationship of 0.148, noted in Table 8 (significant at the 5% level). The statistics suggest that the model using FTSE predictors provided a stronger association between firm profitability and firm value, compared to the model using Bloomberg predictors. The positive association was consistent with observations in the Korean market (Yoon et al., 2018).

Unlike Table 8, $\ln(\mathrm{NI})$ had a statistically significant moderately positive relationship with $\ln(\mathrm{MV} + \mathrm{DI})$, at the 1% level of significance, rather than at the 5% level of significance noted when analysing the model using Bloomberg predictors. This was depicted by a p-value of <0.001 for $\ln(\mathrm{NI})$ in Table 10, which was significantly less than the 0.05 threshold and was considered to be significant (Field, 2017). Despite the significance noted at different levels, the relationship was statistically significant irrespective of the ESG predictors used. The statistical significance of the positive coefficient was consistent with the findings of Yoon et al. (2018).

Similar to the model solved using Bloomberg predictors, the ESG performance rating independent variable was excluded in the model using FTSE predictors due to the high VIF

noted in Table A3 (see Appendix A). As a result, a conclusion could not be reached for a hypothesis based on ESG performance, when using FTSE predictors. This inconclusive result was inconsistent with prior studies, as discussed above (Mervelskemper & Streit, 2017; Yoon et al., 2018).

E performance ratings had a weak positive correlation with $\ln(\mathrm{MV} + \mathrm{DI})$, depicted by a weak positive coefficient of 0.005 (not significant at any level), in Table 10, which was weaker than the positive coefficient of 0.064 noted in Table 8 (not significant at any level). The statistic suggests that the model using FTSE predictors provided a weaker association between environmental performance and firm value, compared to the model using Bloomberg predictors. This positive relationship is consistent with much prior research as discussed under the model using the Bloomberg predictors, and can be attributed to several reasons, whether it be the reduction in the cost of debt or specific environmental elements that initiate the increase in firm value (Derwall et al., 2005; Iwata & Okada, 2011; Manrique & Martí-Ballester, 2017; Sharfman & Fernando, 2008; Telle, 2006).

Similar to Table 8, despite the correlation, E performance ratings had a statistically non-significant relationship with $\ln(\mathrm{MV} + \mathrm{DI})$, even at the 10% level of significance. The p-value of 0.950 for E performance ratings was significantly greater than the threshold of 0.05, rendering it not statistically significant for the purposes of this study (Field, 2017). To rephrase, despite the positive coefficient that these results shared with prior research, as discussed above, the relationship was not statistically significant, which indicates that no significant relationship exists.

As aforementioned, the suggestion of no relationship is consistent with the findings of the study by Elsayed and Paton (2005), Jacobs et al. (2010) and Endo (2019). As a result, Hypothesis 1.1, which proposed that environmental performance had a significant positive effect on the market value of equity of SA firms, when tested using FTSE predictors, was rejected.

The S performance ratings had a weak negative association with $\ln(\mathrm{MV} + \mathrm{DI})$, portrayed by a weak negative coefficient of -0.141 (not significant at any level), in Table 10, which was slightly stronger than the negative coefficient of -0.113 (not significant at any level) observed in Table 8. The finding implies that the model using FTSE predictors provided a stronger negative association between social performance and firm value compared to the model using Bloomberg predictors. This result is consistent with the findings of Baron et al. (2011) as discussed above.

Similar to Table 8, despite the correlation, S performance ratings had a statistically non-significant relationship with $\ln(\mathrm{MV} + \mathrm{DI})$, even at the 10% level of significance. The p-value of 0.101 for S performance ratings was significantly greater than the threshold of 0.05, rendering it not statistically significant for the purposes of this study (Field, 2017). To rephrase, despite the negative coefficient that these results shared with prior research, as discussed above, the relationship was not statistically significant, which indicates that no significant relationship exists.

Similarly to Baron et al. (2011), when studying the overall sample and not disaggregating it into the different industries, a non-significant relationship was found. Similar to the model using the Bloomberg predictors, this may be due to the complex relationship between social performance and firm value, as well as conducting the study in South Africa, an emerging market. This deduction is supported by the findings of Zhao and Murrell (2016) and Lu et al. (2021), as previously reviewed. As a result, Hypothesis 2.1, which proposed that social performance had a significant positive effect on the market value of equity of SA firms, when tested using FTSE predictors, was rejected.

The G performance ratings had a weak positive association with $\ln(\mathrm{MV} + \mathrm{DI})$, portrayed by a weak positive coefficient of 0.052 (not significant at any level), as shown in Table 10, which was contrary to and slightly stronger than the negative coefficient of -0.049 (not significant at any level), in Table 8. The comparison indicates that the model using FTSE predictors provides a stronger positive association between governance performance and firm value compared to the weaker negative association provided by the model using Bloomberg predictors. This result is consistent with most prior research (Cremers & Nair, 2005; Li et al., 2021). Skaife et al. (2004), Derwall and Verwijmeren (2007) and Giannarakis et al. (2020) emphasise that the positive relationship exists because of lowered agency risks and associated costs, which subsequently decrease the cost of capital and increase the valuation of the firm. Tarmuji et al. (2016) and Velte (2017) argue that this positive relationship exists in both developed and developing markets, which may provide a reason for the positive coefficient observed in the findings of this South African study.

Ionescu et al. (2019) claim that a positive association was observed in the US and that governance performance had the greatest influence on firm value compared to the other ESG pillars. The findings from this model are inconsistent with Ionescu et al. (2019), as environmental performance had the greatest numerical value as a coefficient and not governance performance. Behl et al. (2021) suggest that the positive correlation cannot be attributed to the concept of superior governance performance increasing firm value by itself. To understand the relationship, an inverse perspective must be considered, in the sense that

poor governance performance may result in exorbitant legal costs and thus constrain resource utilisation to an extent that causes firm value decreases (Behl et al., 2021).

Comparable to Table 8, and despite the correlation, G performance ratings had a statistically non-significant relationship with $\ln(\mathrm{MV} + \mathrm{DI})$, even at the 10% level of significance. The p-value of 0.463 for G performance ratings was significantly greater than the threshold of 0.05, rendering it not statistically significant for the purposes of this study (Field, 2017). To rephrase, despite the positive coefficient that these results shared with prior research, as discussed above, the relationship was not statistically significant, which indicates that no significant relationship exists.

In spite of the FTSE data set using a smaller sample period than the Bloomberg data set, the result of a non-significant relationship remained. Based on the arguments made by Core et al. (2006), the lack of a relationship can still be attributed to the sample period selected. The result of no relationship mirrors the findings of Core et al. (2006), Statman and Glushkov (2009) and Humphrey et al. (2012b). Notably, Velte (2017) only found the positive relationship between governance performance and firm value, proxied by ROA, to be statistically significant. In contrast, Velte (2017) found that governance performance shared a non-significant correlation with Tobin's Q, a market return measure of firm value. The statistic from this model indicating that no relationship exists is consistent with the findings of Velte (2017) in relation to market return measures of firm value. As a result, Hypothesis 3.1, which proposed that governance performance had a significant positive effect on the market value of equity of SA firms, when tested, was rejected for the model that used FTSE scores.

4.5. The internal performance valuation model

Similarly, the regression model incorporating the internal performance measure of firm value was derived from the Ohlson (1995) model. Hypotheses were tested using the regression model as follows:

Hypotheses 1.2, 2.2 and 3.2, which proposed that environmental, social and governance performances respectively, had a significant positive effect on the firm performance of SA firms, were tested using the following regression model:

$$ROA_{i,t} = BV_{i,t-1} + \propto_1 NI_{i,t} + \propto_2 E_{i,t-1} + \propto_2 S_{i,t-1} + \propto_2 G_{i,t-1} \quad (3)$$

4.6. Regression statistics for the internal performance model

The ESG performance rating independent variable was excluded from the regression model incorporating the internal performance as the dependent variable, due to the high VIFs noted

in Table A1 (see Appendix A) and Table A3 (see Appendix A). This indicated that irrespective of the predictors used, whether it be the Bloomberg or FTSE predictors, the ESG performance rating independent variable had to be removed in order to keep the degree of collinearity sufficiently low to ensure that accurate results were obtained.

To further improve normality, the internal performance dependent variable of ROA was transformed using logarithmic transformation, similar to the market value of equity as above. The natural logarithm was used to transform the dependent variable. As mentioned previously, the natural logarithm reduces the variability by some factor (Field, 2017). The transformed versions of the control variables, BV and NI, were used to ensure that normality remained enhanced. Variables transformed using the natural logarithm are presented by using the function 'ln' before the relevant variables.

The model summary and coefficients are presented for model (3), using the Bloomberg predictors, as shown below in Table 11 and Table 12 respectively.

Table 11: Model summary for model (3) using Bloomberg predictors[b]

R	R-Squared	Adjusted R-Squared
0.704[a]	0.495	0.474

a. Predictors: (Constant), ln (NI), ln (BV), E, S, G

b. Dependent Variable: ln (ROA)

Table 12: Coefficients for model (3) using Bloomberg predictors[a]

	Standardised Coefficients	t-statistic	p-value	Collinearity Statistics
	Beta			VIF
(Constant)		-3.332***	0.001	
ln (BV)	0.021	0.308	0.759	1.040
ln (NI)	0.700	10.531***	<0.001	1.032
E	-0.045	-0.597	0.552	1.317
S	0.048	0.668	0.505	1.202
G	0.115	1.434	0.154	1.494

a. Dependent Variable: ln (ROA)

** Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level*

As per Table 12, the VIF statistics remained low, similar to those presented in Table 8. This indicated that the degree of multicollinearity between the independent variables remained sufficiently low to ensure that the results obtained were valid and accurate. The statistics supported the decision to continue to exclude ESG performance rating variable from the model.

Despite the differing dependent variables, the findings revealed that the predictive power of the internal performance model using Bloomberg predictors, was significantly greater than the market return model using Bloomberg predictors. This was displayed by the R-squared of 0.495 and the adjusted R-squared of 0.474, in Table 11, compared to the R-squared of 0.285 and the adjusted R-squared of 0.258, in Table 7. The results indicate that 49.5% of the variation in $\ln(\mathrm{ROA})$ was predicted by the statistical model. Furthermore, 47.4% of the variation in $\ln(\mathrm{ROA})$ would be accounted for if the statistical model had been derived from the population from which the sample was selected. The statistics suggest that the model showed strong predictive power.

The adjusted value of 47.4% revealed the reduction in predictive power or shrinkage (Field, 2017). If the model was derived from the population rather than the sample selected, it would account for approximately 2.1% less variance in $\ln(\mathrm{ROA})$, which is the difference between the R-squared and adjusted R-squared values. The difference of 2.1% between the R-squared and adjusted R-squared values is less than the difference of 2.7% between the two values in the market return model using Bloomberg predictors. This suggests that the cross-validity of the internal performance model using Bloomberg predictors was superior to that of the prior market return model using Bloomberg predictors (Field, 2017).

$\ln(\mathrm{BV})$ had a weak positive relationship with $\ln(\mathrm{ROA})$, represented by a positive coefficient of 0.021 (not significant at any level) as shown in Table 12, compared to the positive coefficient of 0.501 (significant at the 1% level), evident in Table 8. The findings indicated that the internal performance model using Bloomberg predictors provided a weaker association between firm size and firm value, compared to the market return model using Bloomberg predictors. The positive correlation was consistent with the findings of most prior research, as discussed above (Ball, 2021; Michelon et al., 2013; Nollet et al., 2016; Yoon et al., 2018).

Dissimilar to Table 8, which found the association to be significant at the 1% level of significance, Table 12 found that the strong positive association between $\ln(\mathrm{BV})$ and $\ln(\mathrm{ROA})$ was not statistically significant, even at the 10% level of significance. This was depicted by a p-value of 0.759 for $\ln(\mathrm{BV})$ in Table 12. The p-value was significantly greater than the 0.05 threshold and was considered to be non-significant (Field, 2017). The statistics imply that the relationship between firm size and firm value is only statistically significant when using

Bloomberg predictors in a market return model, and not for an internal performance model. The statistical non-significance of the positive correlation between firm size and firm value, even at the 10% level of significance was inconsistent with the findings of prior research (Ball, 2021; Michelon et al., 2013; Yoon et al., 2018).

Based on the findings in Table 12, $\ln(\mathrm{NI})$ had a strong positive correlation with $\ln(\mathrm{ROA})$, depicted by a strong positive coefficient of 0.700 (significant at the 1% level), compared to the weak positive relationship of 0.148 (significant at the 5% level), noted in Table 8. The results suggest that the internal performance model using Bloomberg predictors provided a stronger association between firm profitability and firm value, compared to the market return model using Bloomberg predictors, despite the weaker association between firm size and firm value noted above. The positive association was consistent with observations in the Korean market (Yoon et al., 2018).

As per Table 12, $\ln(\mathrm{NI})$ had a statistically significant strong positive relationship with $\ln(\mathrm{ROA})$, at the 1% level of significance, unlike the 5% level of significance noted in Table 8 when analysing the market return model using Bloomberg predictors. This was depicted by a p-value of <0.001 for $\ln(\mathrm{NI})$ in Table 12, which was significantly less than the 0.05 threshold and was considered to be significant (Field, 2017). Despite the significance noted at different levels, the relationship was statistically significant irrespective of the measure of firm value used. The statistical significance of the positive coefficient was consistent with the findings of Yoon et al. (2018).

The ESG performance rating independent variable was excluded in the model using Bloomberg predictors, due to the high VIF noted in Table A1 (see Appendix A). As a result, a conclusion could not be ascertained for a hypothesis based on ESG performance, when using Bloomberg predictors. This inconclusive result was inconsistent with prior studies, as discussed above (Mervelskemper & Streit, 2017; Yoon et al., 2018).

E performance ratings had a weak negative correlation with $\ln(\mathrm{ROA})$, depicted by a weak negative coefficient of -0.045 (not significant at any level), in Table 12, which was contrary to and marginally weaker than the positive coefficient of 0.064 (not significant at any level) observed in Table 8. The comparison indicated that the internal performance model using Bloomberg predictors provided a weaker negative association between environmental performance and firm performance, compared to the stronger positive association provided by the market return model. This finding supports the claims of Al-Tuwaijri et al. (2004), which suggest that improved environmental performance has an adverse effect on investors' valuations of firms, resulting in a decreased firm value. Kim and Lyon (2015) may explain this

result and credit this adverse effect on firm performance to negative investor perception, as investors view environmental initiatives as costly and redundant.

Similar to Table 8, despite the correlation, E performance ratings had a statistically non-significant relationship with $\ln(\mathrm{ROA})$, even at the 10% level of significance. The p-value of 0.552 for E performance ratings was significantly greater than the threshold of 0.05, rendering it not statistically significant for the purposes of this study (Field, 2017). To rephrase, despite the negative coefficient that these results shared with prior research, as discussed above, the relationship was not statistically significant, which indicates that no significant relationship exists.

The suggestion of no relationship is consistent with the findings of the study by Elsayed and Paton (2005), Jacobs et al. (2010) and Endo (2019), as aforementioned. As depicted by Horváthová (2010), most portfolio studies in civil law countries revealed a negative relationship, whilst most portfolio studies in common law countries revealed the converse. The existence of no significant relationship may be attributed to South Africa's mixed legal system (Horváthová, 2010; Van der Merwe, 2012). As a result, Hypothesis 1.2, which proposed that environmental performance had a significant positive effect on the firm performance of SA firms, when tested using Bloomberg predictors, was rejected.

S performance ratings had a weak positive correlation with $\ln(\mathrm{ROA})$, depicted by a weak positive coefficient of 0.048 (not significant at any level), in Table 12, which was opposite to and weaker than the negative coefficient of -0.113 (not significant at any level) noted in Table 8. The comparison indicated that the internal performance model using Bloomberg predictors provided a weaker positive relationship between social performance and firm performance, compared to the stronger negative relationship provided by the market return model. This was the only model that was consistent with the notions by Orlitzky et al. (2003). Orlitzky et al. (2003) claimed that social performance possessed a stronger positive association with firm performance than environmental performance, which held true in this model, since social performance had a positive association with firm performance, whilst environmental performance exhibited a negative association. Similarly, Orlitzky et al. (2003) claimed that social performance had stronger, positive correlations with internal performance measures of firm value compared to market return measures. This model supported the claim, as the coefficient was positive, compared to negative coefficients observed in the market return valuation models.

Nonetheless, the result of a positive relationship between social performance and firm value reflects the findings of most prior studies (Henriksson et al., 2018; Zhou et al., 2022). Godfrey (2005) and Wang and Qian (2011) explained the positive coefficient using legitimacy theory,

in the sense that increased investment in philanthropic activities garnered social validation, which in turn increased shareholder wealth and firm value. The most common reason for the positive relationship is that enhanced social performance leads to better credit ratings, which grants the prospect of lowered costs of funding, which subsequently decreases the cost of capital and increases the firm value (Attig et al., 2013; El Ghoul et al., 2011; Sharma et al., 2019).

Fatemi et al. (2015) and Albuquerque et al. (2019) attributed the positive relationship to a reduction in the risk of a firm-wide breakdown, due to superior social responsibility, which ultimately improved firm performance. Alternatively, according to Flammer and Kacperczyk (2019) and Li et al. (2021), the positive association can be described as a result of including social responsibility clauses in the contracts of executives, which mitigates agency costs and contributes to increased firm performance.

The final reason observed for the positive relationship is based on the RBV theory and suggests that investment in social initiatives develops an organisational culture that presents a competitive advantage and consequently allows firms to charge more than competitors, which potentially increases firm value (Branco & Rodrigues, 2008; Fombrun & Shanley, 1990; Jo & Harjoto, 2011). Similar to the market return valuation models, the relationship detected between social performance and firm performance does not follow an inverted U-shape curve, as asserted by Barnett and Salomon (2012).

As in Table 8, despite the correlation, S performance ratings had a statistically non-significant relationship with $\ln(\mathrm{ROA})$, even at the 10% level of significance. The p-value of 0.505 for S performance ratings was significantly greater than the threshold of 0.05, rendering it not statistically significant for the purposes of this study (Field, 2017). To rephrase, despite the positive coefficient that these results shared with prior research, as discussed above, the relationship was not statistically significant, which indicates that no significant relationship exists.

The finding is consistent with the results of Baron et al. (2011), when studying the entire sample as opposed to disaggregating the sample into different industries. Despite Zhao and Murrell (2016) and Lu et al. (2021) corroborating the result of no relationship, as discussed above, it is interesting that this model provided a different coefficient to other models analysed. Lu et al. (2021) suggest that the resulting relationship is based on specific circumstances. It could be argued that the utilisation of an internal performance model, combined with Bloomberg predictors, were the specific conditions necessary to yield a positive coefficient in a South African context, irrespective of its statistical non-significance. Despite this, Hypothesis 2.2, which proposed that social performance had a significant positive effect on the firm

performance of SA firms, when tested using Bloomberg predictors, was rejected due to its p-value.

G performance ratings had a weak positive correlation with $\ln(\mathrm{ROA})$, depicted by a weak positive coefficient of 0.115 (not significant at any level), as shown in Table 12, which was opposite to and stronger than the negative coefficient of -0.049 (not significant at any level) noted in Table 8. The comparison indicated that the internal performance model using Bloomberg predictors provided a stronger positive correlation between governance performance and firm performance, compared to the weaker negative correlation provided by the market return model. The result of a positive relationship between governance performance and firm performance is supported by prior literature examining internal performance measures of firm value (Galbreath, 2018). Similar to market return measures of firm value, Gompers et al. (2003) and Lefort and Urzúa (2008) argue that different elements of governance performance, such as superior shareholder rights or board independence, strengthen firm profitability and improve firm performance in the long run.

Comparable to Table 8, despite the correlation, G performance ratings had a statistically non-significant relationship with $\ln(\mathrm{ROA})$, even at the 10% level of significance. The p-value of 0.154 for G performance ratings was significantly greater than the threshold of 0.05, rendering it not statistically significant for the purposes of this study (Field, 2017). To rephrase, despite the positive coefficient that these results shared with prior research, as discussed above, the relationship was not statistically significant, therefore, no significant relationship exists.

The suggestion of no relationship is consistent with the findings of studies by Core et al. (2006), Statman and Glushkov (2009) and Humphrey et al. (2012b), as aforementioned. As discussed above, Velte (2017) only found the positive relationship between governance performance and firm value, proxied by ROA, an internal performance measure, to be statistically significant. The association was non-significant on the basis that firm value was proxied by market return measures of firm value (Velte, 2017). The statistic from this model suggesting that no relationship exists, is inconsistent with the findings of Velte (2017) in relation to internal performance measures of firm value. As a result, Hypothesis 3.2, which proposed that governance performance had a significant positive effect on the firm performance of SA firms, when tested using Bloomberg predictors, was rejected.

The model summary and coefficients are presented for model (3), using the FTSE predictors, as shown in Table 13 and Table 14 respectively.

Table 13: Model summary for model (3) using FTSE predictors[b]

R	R-Squared	Adjusted R-Squared
0.716[a]	0.512	0.480

a. Predictors: (Constant), ln (NI), ln (BV), E, S, G

b. Dependent Variable: ln (ROA)

Table 14: Coefficients for model (3) using FTSE predictors[a]

	Standardised Coefficients	t-statistic	p-value	Collinearity Statistics
	Beta			VIF
(Constant)		-4.307***	<0.001	
ln (BV)	0.150	1.826*	0.072	1.052
ln (NI)	0.742	8.705***	<0.001	1.132
E	0.049	0.494	0.622	1.534
S	-0.019	-0.182	0.856	1.615
G	0.003	0.041	0.968	1.139

a. Dependent Variable: ln (ROA)

** Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level*

As shown in Table 14 above, the VIF statistics remained low, similar to those presented in Table 10. This indicated that the degree of multicollinearity between the independent variables was still sufficiently low to ensure that the results obtained were valid and accurate. The statistics supported the decision to continue to exclude ESG performance rating variable from the model.

Despite the differing dependent variables, the results revealed that the predictive power of the internal performance model using FTSE predictors was slightly lower than that of the market return model using FTSE predictors. This was displayed by the R-squared of 0.512 and the adjusted R-squared of 0.480, in Table 13, compared to the R-squared of 0.535 and the adjusted R-squared of 0.514 shown in Table 9 *supra.*

Additionally, there was an R-squared of 0.495 and the adjusted R-squared of 0.474 in Table 11. In comparison, the findings revealed that the predictive power of the internal performance model using FTSE predictors was slightly higher than that of the internal performance model using Bloomberg predictors. The statistics indicated that 51.2% of the variation in ln (ROA) was predicted by the statistical model. Furthermore, 48.0% of the variation in ln (ROA) would

be accounted for if the statistical model had been derived from the population from which the sample was selected. Notwithstanding the decrease in predictive power due to the change in dependent variables, the findings imply that the model demonstrated strong predictive power.

The adjusted value of 48.0% revealed the reduction in predictive power or shrinkage (Field, 2017). If the model was derived from the population, rather than the sample selected, it would account for approximately 3.2% less variance in $\ln(\mathrm{ROA})$, which is the difference between the R-squared and adjusted R-squared values. The difference of 3.2% between the R-squared and adjusted R-squared values is greater than the difference of 2.1% between the two values in the market return model using FTSE predictors. The difference of 3.2% is also greater than the 2.1% between the two values in the internal performance model using Bloomberg predictors. This reveals that the cross-validity of the internal performance model using FTSE predictors was inferior to that of both the market return model using FTSE predictors and the internal performance model using Bloomberg predictors analysed (Field, 2017).

$\ln(\mathrm{BV})$ had a weak positive relationship with $\ln(\mathrm{ROA})$, represented by a positive coefficient of 0.150 (significant at the 10% level), in Table 14, compared to the positive coefficient of 0.726 (significant at the 1% level), in Table 10. Similar to the models using Bloomberg predictors, the findings indicate that the internal performance model using FTSE predictors provides a weaker association between firm size and firm value, compared to the market return model using FTSE. The coefficient in Table 12 was 0.021 (not significant at any level), which suggests that the model using FTSE predictors provides a stronger association between firm size and firm value, compared to the model using Bloomberg predictors. This finding was consistent with the observations noted when analysing the market return measure using different ESG predictors. The positive correlation was consistent with the findings of most prior research, as discussed above (Ball, 2021; Michelon et al., 2013; Nollet et al., 2016; Yoon et al., 2018).

Dissimilar to Table 10, which found the association to be significant at the 1% level of significance, Table 14 found that the strong positive association between $\ln(\mathrm{BV})$ and $\ln(\mathrm{ROA})$ was only statistically significant at the 10% level of significance. This was depicted by a p-value of 0.072 for $\ln(\mathrm{BV})$ in Table 14. The p-value was greater than the 0.05 threshold and was considered to be non-significant at the 5% level of significance for the purposes of this research (Field, 2017). The statistics imply that the relationship between firm size and firm value is only statistically significant when using FTSE predictors in a market return model and not for an internal performance model. The statistical significance of the positive correlation between firm size and firm value at the 10% level of significance was inconsistent with the

findings of prior research, which found the relationship to be significant at the 1% level of significance (Ball, 2021; Michelon et al., 2013; Yoon et al., 2018).

Based on the findings in Table 14, $\ln(\mathrm{NI})$ had a strong positive correlation with $\ln(\mathrm{ROA})$, depicted by a strong positive coefficient of 0.742 (significant at the 1% level), compared to the moderately positive relationship of 0.347 (significant at the 1% level), noted in Table 10. The results suggest that the internal performance model using FTSE predictors provides a stronger association between firm profitability and firm value, compared to the market return model using FTSE predictors, despite the weaker association between firm profitability and firm value noted above. The coefficient in Table 12 was 0.700 (significant at the 1% level), which suggests that the model using FTSE predictors provides a stronger association between firm profitability and firm value, compared to the model using Bloomberg predictors. This finding was consistent with the statistics noted when analysing the market return measure using different ESG predictors. The positive association was consistent with observations in the Korean market (Yoon et al., 2018).

Similar to Table 10, $\ln(\mathrm{NI})$ had a statistically significant strong positive relationship with $\ln(\mathrm{ROA})$ at the 1% level of significance. This was depicted by a p-value of <0.001 for $\ln(\mathrm{NI})$ in Table 14, which was significantly less than the 0.05 threshold and was considered to be significant (Field, 2017). The findings suggest that the relationship was statistically significant irrespective of the measure of firm value used. As per Table 12, the positive association when using Bloomberg predictors was also statistically significant at the 1% level of significance. The results further imply that the relationship was statistically significant irrespective of the ESG predictors used for the internal performance model. The statistical significance of the positive coefficient was consistent with the findings of Yoon et al. (2018).

The ESG performance rating independent variable was excluded in models using FTSE predictors, due to the high VIF noted in Table A3 (see Appendix A). As a result, a conclusion could not be ascertained for a hypothesis based on ESG performance, when using FTSE predictors. This inconclusive result was inconsistent with prior studies, as discussed above (Mervelskemper & Streit, 2017; Yoon et al., 2018).

E performance ratings had a weak positive correlation with $\ln(\mathrm{ROA})$, depicted by a weak positive coefficient of 0.049 (not significant at any level), in Table 14, which is stronger than the positive coefficient of 0.005 (not significant at any level) noted in Table 10. The finding implies that the internal performance model using FTSE predictors provides a stronger positive association between environmental performance and firm performance, compared to the market return model. The coefficient of 0.049 (not significant at any level), shown in Table 14 was also contrary to and slightly stronger than the negative coefficient of -0.045 (not significant

at any level) observed in Table 12. The comparison indicates that the model using FTSE predictors provides a stronger positive association between environmental performance and firm performance, compared to the weaker negative association provided by the model using Bloomberg predictors.

The positive relationship between environmental performance and internally measured firm performance is consistent with the findings of prior research, such as Stanwick and Stanwick (1998). Earnhart and Lizal (2007) argue that enhanced environmental performance may decrease revenue, but the decrease in costs is less than the potential decrease in revenue, contributing to an increase in profitability and ultimately increasing firm performance in the process. According to the RBV theory, superior environmental performance may offer the prospect to develop advanced resources which optimise operations and increase firm performance (Hart & Milstein, 2003; Stefan & Paul, 2008).

Nakamura (2011) attributes the positive relationship to the increase in customer and shareholder trust in the long-term, which has a positive impact on firm performance. Similarly, Zhou et al. (2022) suggest that attaining validation from society through environmental initiatives generates preference for the firm in comparison to less environmentally-conscious competitors, allowing for the potential increase in firm performance. Dissimilar to the findings of Lahouel et al. (2020), the relationship between environmental performance and firm performance does not follow an inverted V-shaped curve, in a South African context.

Similar to Table 10 and Table 12, despite the correlation, E performance ratings had a statistically non-significant relationship with $\ln(\mathrm{ROA})$, even at the 10% level of significance. The p-value of 0.622 for E performance ratings was significantly greater than the threshold of 0.05, rendering it not statistically significant for the purposes of this study (Field, 2017). To rephrase, despite the positive coefficient that these results shared with prior research, as discussed above, the relationship was not statistically significant, which indicates that no significant relationship exists.

The suggestion of no relationship is consistent with the findings of the study by Elsayed and Paton (2005), Jacobs et al. (2010) and Endo (2019), as aforementioned. As a result, Hypothesis 1.2, which proposed that environmental performance had a significant positive effect on the firm performance of SA firms, when tested using FTSE predictors, was rejected.

S performance ratings had a weak negative correlation with $\ln(\mathrm{ROA})$, depicted by a weak negative coefficient of -0.019 (not significant at any level), in Table 14, which was weaker than the negative coefficient of -0.141 (not significant at any level) observed in Table 10. The result indicates that the internal performance model using FTSE predictors provides a weaker

negative relationship between social performance and firm performance, compared to the market return model. The coefficient of -0.019 (not significant at any level), in Table 14 was also opposite to and slightly weaker than the positive coefficient of 0.048 (not significant at any level) as noted in Table 12. The comparison suggests that the model using FTSE predictors provides a weaker negative relationship between social performance and firm performance, compared to the stronger positive relationship provided by the model using Bloomberg predictors.

Baron et al. (2011) is the only study that can be used to support the negative correlation, due to the limited number of studies that agree with the cost-concerned school of thought, particularly in developing markets.

As per Table 10 and Table 12, despite the correlation, S performance ratings had a statistically non-significant relationship with $\ln(\mathrm{ROA})$, even at the 10% level of significance. The p-value of 0.856 for S performance ratings was significantly greater than the threshold of 0.05, rendering it not statistically significant for the purposes of this study (Field, 2017). To rephrase, despite the negative coefficient that these results shared with prior research, as discussed above, the relationship was not statistically significant, which indicates that no significant relationship exists.

Analogous to the significance observed in the market return valuation models, the determination of no relationship resembles the results of Baron et al. (2011), when studying the overall sample and not disaggregating it into the different industries. The finding is supported by the studies performed by Zhao and Murrell (2016) and Lu et al. (2021), in which the relationship is sophisticated and context-driven. The lack of a correlation may be attributed to studying the sample as a whole, the complexity of the relationship and performing the study in South Africa, an emerging market. As a result, Hypothesis 2.2, which proposed that social performance had a significant positive effect on the firm performance of SA firms, when tested using FTSE predictors, was rejected.

G performance ratings had a weak positive correlation with $\ln(\mathrm{ROA})$, depicted by a weak positive coefficient of 0.003 (not significant at any level), as shown in Table 14, which was weaker than the positive coefficient of 0.052 (not significant at any level) noted in Table 10. The statistic suggests that the internal performance model using FTSE predictors provides a weaker positive correlation between governance performance and firm performance, compared to the market return model. The coefficient of 0.003 (not significant at any level), in Table 14 was also weaker than the positive coefficient of 0.115 (not significant at any level) noted in Table 12. The finding implies that the model using FTSE predictors provides a weaker positive correlation between governance performance and firm performance, compared to the

model using Bloomberg predictors. The suggestion of a positive relationship between the two variables resonates with the conclusions of prior studies, such as Gompers et al. (2003), Lefort and Urzúa (2008) and Galbreath (2013), as portrayed in the discussion regarding the internal performance model using Bloomberg predictors.

Comparable to Table 10 and Table 12, despite the correlation, G performance ratings had a statistically non-significant relationship with $\ln(\mathrm{ROA})$, even at the 10% level of significance. The p-value of 0.968 for G performance ratings was significantly greater than the threshold of 0.05, rendering it not statistically significant for the purposes of this study (Field, 2017). To rephrase, despite the positive coefficient that these results shared with prior research, as discussed above, the relationship was not statistically significant, which indicates that no significant relationship exists.

As discussed above, the indication of no relationship is consistent with the findings of studies by Core et al. (2006), Statman and Glushkov (2009) and Humphrey et al. (2012b). As a result, Hypothesis 3.2, which proposed that governance performance had a significant positive effect on the firm performance of SA firms, when tested using FTSE predictors, was rejected.

4.7. Discussion of the descriptive statistics

The descriptive statistics for models (2) and (3) are presented in Table 15 and Table 16. The ESG performance rating independent variable remained excluded due to the high VIFs noted in Table A1 (see Appendix A) and Table A3 (see Appendix A), to ensure that the degree of collinearity remained sufficiently low to provide valid results.

Table 15: Descriptive statistics for the market return data set

Variable	Mean	Standard deviation	N
FTSE			
$\ln(\mathrm{MV} + \mathrm{DI})$	9.342	0.533	121
E	1.005	0.924	121
S	0.987	0.650	121
G	0.945	0.210	121
$\ln(\mathrm{NI})$	0.193	0.174	121
$\ln(\mathrm{BV})$	16.582	1.169	121
Bloomberg			
$\ln(\mathrm{MV} + \mathrm{DI})$	9.729	0.460	139
E	1.384	1.144	139
S	1.194	0.580	139

Variable	Mean	Standard deviation	N
Bloomberg			
G	1.044	0.170	139
ln (NI)	0.238	0.271	139
ln (BV)	17.009	1.020	139

In relation to the mean, the most noteworthy result was that the G performance rating had the lowest mean in both data sets, compared to the E and S pillars. Notwithstanding the lower mean, the G performance rating also consistently had the lowest standard deviation compared to the E and S pillars. The G performance rating exhibited standard deviations that were close to zero, suggesting that the G performance ratings of the various firms were clustered around the mean value in each respective data set. The statistics imply that the majority of the firms perform similarly in terms of their respective governance dimensions.

In contrast, the E and S performance ratings displayed standard deviations that were higher than that of the G performance rating. The greater standard deviations indicated that the E and S performance ratings of the numerous firms were more expansive and varied from the mean value than the G performance rating in each respective data set. The statistics imply that most firms perform very differently from one another in terms of their respective environmental and social dimensions.

Table 16: Descriptive statistics for the internal performance data set

Variable	Mean	Standard deviation	N
FTSE			
ln (ROA)	-1.365	0.575	82
E	1.068	0.994	82
S	1.082	0.682	82
G	0.973	0.186	82
ln (NI)	0.202	0.182	82
ln (BV)	16.779	1.198	82
Bloomberg			
ln (ROA)	-1.204	0.495	124
E	1.381	1.114	124
S	1.261	0.559	124
G	1.055	0.162	124
ln (NI)	0.243	0.284	124
ln (BV)	17.038	1.007	124

Similar to the findings noted in the market return data set, the G performance rating consistently had the lowest mean value and the lowest standard deviation in each data set, compared to the E and S pillars. Irrespective of the measure of firm value or ESG predictors used, the governance performance of the firms studied did not differ significantly from one another, whereas the environmental performance and social performance did.

Another notable result was that the mean of the market value of equity was positive in each data set, whereas the mean of the ROA was negative in each data set. The statistics imply that the measure of firm value used in analysis may significantly influence the results obtained, as observed in the evaluation of the various models tested above.

The correlation statistics and related statistical significance for models (2) and (3) are presented in Table 17 and Table 18 below and subsequently analysed and discussed thereafter.

Table 17: Correlations for the market return data set

FTSE							
		$\ln(MV + DI)$	$\ln(BV)$	$\ln(NI)$	E	S	G
Pearson Correlation	$\ln(MV + DI)$	1.000	0.640	0.188	-0.069	-0.035	.000
	$\ln(BV)$	0.640	1.000	-0.211	0.073	0.078	-0.037
	$\ln(NI)$	0.188	-0.211	1.000	-0.167	0.071	0.096
	E	-0.069	0.073	-0.167	1.000	0.583	0.257
	S	-0.035	0.078	0.071	0.583	1.000	0.426
	G	0.000	-0.037	0.096	0.257	0.426	1.000
Sig. (1-tailed)	$\ln(MV + DI)$	.	<0.001	0.019	0.226	0.353	0.499
	$\ln(BV)$	0.000	.	0.010	0.213	0.197	0.344
	$\ln(NI)$	0.019	0.010	.	0.033	0.219	0.148
	E	0.226	0.213	0.033	.	0.000	0.002
	S	0.353	0.197	0.219	0.000	.	0.000
	G	0.499	0.344	0.148	0.002	0.000	.
Bloomberg							
		$\ln(MV + DI)$	$\ln(NI)$	E	S	G	$\ln(BV)$
Pearson Correlation	$\ln(MV + DI)$	1.000	0.107	0.093	-0.095	-0.093	0.495
	$\ln(NI)$	0.107	1.000	-0.156	-0.009	-0.101	-0.073
	E	0.093	-0.156	1.000	0.141	0.413	0.176
	S	-0.095	-0.009	0.141	1.000	0.425	0.064

Bloomberg							
		ln (MV + DI)	ln (NI)	E	S	G	ln (BV)
Pearson Correlation	G	-0.093	-0.101	0.413	0.425	1.000	-0.015
	ln (BV)	0.495	-0.073	0.176	0.064	-0.015	1.000
Sig. (1-tailed)	ln (MV + DI)	.	0.105	0.137	0.134	0.138	<0.001
	ln (NI)	0.105	.	0.034	0.459	0.118	0.198
	E	0.137	0.034	.	0.049	0.000	0.019
	S	0.134	0.459	0.049	.	0.000	0.228
	G	0.138	0.118	0.000	0.000	.	0.429
	ln (BV)	0.000	0.198	0.019	0.228	0.429	.

Table 18: Correlations for the internal performance data set

FTSE							
		ln (ROA)	ln (BV)	ln (NI)	E	S	G
Pearson Correlation	ln (ROA)	1.000	-0.010	0.699	-0.105	0.033	0.065
	ln (BV)	-0.010	1.000	-0.217	0.011	-0.027	0.007
	ln (NI)	0.699	-0.217	1.000	-0.197	0.036	0.080
	E	-0.105	0.011	-0.197	1.000	0.548	0.157
	S	0.033	-0.027	0.036	0.548	1.000	0.341
	G	0.065	0.007	0.080	0.157	0.341	1.000
Sig. (1-tailed)	ln (ROA)	.	0.464	<0.001	0.173	0.386	0.281
	ln (BV)	0.464	.	0.025	0.462	0.405	0.475
	ln (NI)	0.000	0.025	.	0.038	0.373	0.238
	E	0.173	0.462	0.038	.	0.000	0.079
	S	0.386	0.405	0.373	0.000	.	0.001
	G	0.281	0.475	0.238	0.079	0.001	.
Bloomberg							
		ln (ROA)	ln (BV)	ln (NI)	E	S	G
Pearson Correlation	ln (ROA)	1.000	-0.021	0.692	-0.101	0.076	0.032
	ln (BV)	-0.021	1.000	-0.047	0.154	0.025	-0.026
	ln (NI)	0.692	-0.047	1.000	-0.167	-0.018	-0.117
	E	-0.101	0.154	-0.167	1.000	0.132	0.446
	S	0.076	0.025	-0.018	0.132	1.000	0.403
	G	0.032	-0.026	-0.117	0.446	0.403	1.000

Bloomberg							
		ln (ROA)	ln (BV)	ln (NI)	E	S	G
Sig. (1-tailed)	ln (ROA)	.	0.408	<0.001	0.133	0.202	0.363
	ln (BV)	0.408	.	0.302	0.044	0.390	0.385
	ln (NI)	0.000	0.302	.	0.032	0.419	0.099
	E	0.133	0.044	0.032	.	0.072	0.000
	S	0.202	0.390	0.419	0.072	.	0.000
	G	0.363	0.385	0.099	0.000	0.000	.

The most significant observation in relation to the correlations was regarding the relationships between the various components of ESG performance. Irrespective of the measure of firm value or ESG predictors used, the relationships between the different dimensions of ESG performance was consistently positive and was at least statistically significant at the 10% level of significance. The positive correlation noted between environmental and social performances was consistent with the limited studies that examined the relationship between the two variables (Mervelskemper & Streit, 2017). Poduska et al. (1992), Reilly (1992) and Stanwick and Stanwick (1998) described that a reduction in pollution emission was often observed alongside an improvement in the firm's social initiatives, which explained the existence of the positive relationship between environmental and social performances. Comparable to work by Mervelskemper and Streit (2017), a significant positive association was found; however, the association was not strongly positive but moderately positive in the FTSE data sets and weakly positive in the Bloomberg data sets.

The positive relationship observed between environmental and governance performances was supported by many modern studies (Lu & Herremans, 2019; Mervelskemper & Streit, 2017), including studies on developing markets (Jacoby et al., 2019). Haque and Ntim (2018) and Lu and Wang (2021) claimed that the positive relationship existed because superior governance performance in the form of board independence or board gender diversity encouraged additional investment in environmental initiatives. Similar to work by Mervelskemper and Streit (2017), a statistically significant weakly positive association was found in the FTSE data set, however, the association was not weakly positive but moderately positive in the Bloomberg data sets.

Walls et al. (2012) claimed that most proxies of enhanced governance performance, such as excellent internal governance mechanisms, were negatively correlated with environmental performance. On the contrary, the findings suggested that the dimensions of governance performance that constitute the G performance rating facilitated a positive correlation with environmental performance. The results are inconsistent with prior research that found no

relationship between environmental and governance performances (Berrone et al., 2010; Cong & Freedman, 2011; McKendall et al., 1999).

The positive relationship noted between social and governance performances was reinforced by several prior studies (David et al., 2007; Johnson & Greening, 1999). Coffey and Wang (1998) and Bear et al. (2010) justified the positive association by explaining that enhanced governance elements, such as board diversity, inspired firms to assign more resources towards philanthropic activities. Harjoto and Jo (2011) and Jo and Harjoto (2012) attributed the positive correlation to the notion that firms used improved governance mechanisms to enhance product quality and non-owner stakeholder relations.

Comparable to work by Mervelskemper and Streit (2017), a significant positive association was found, however, the association was not weakly positive but moderately positive in the FTSE and Bloomberg data sets. Conversely, the findings are inconsistent with prior literature that found a negative correlation (Brown et al.; David et al., 2007; Ducassy & Montandrau, 2015) and prior literature that found no relationship (McGuire et al., 2012) between the two variables.

4.8. Summary of the results

This chapter presented and analysed the statistical findings for ninety-nine firms in the FTSE sample data set and sixty-three firms in the Bloomberg sample data set, within the market return data set. This chapter also provided and evaluated the statistical results for eighty-one firms in the FTSE sample data set and sixty-three firms in the Bloomberg sample data set, within the internal performance data set.

The primary objective was to determine whether a significant relationship existed between the disaggregated E, S and G performances and firm value. The study incorporated ESG performance ratings from two different reputable rating agencies, the FTSE and Bloomberg, as well as two different measures of firm value, external and internal measures, to reinforce the validity of the study. After ensuring that the data was normally distributed and that the VIFs were sufficiently low to certify that the results were accurate and valid, several key findings were identified.

The correlations between E, S and G performances and firm value varied between the different models, dependant on the measure of firm value or ESG predictors used. Interestingly, in spite of the numerous conflicting correlations observed across the various models, no relationship between E, S or G performance and firm value was statistically significant from any model tested, even at the 10% level of significance. As a result, Hypotheses 1.1, 1.2, 2.1,

2.2, 3.1 and 3.2 were all rejected at the 5% level of significance. To rephrase, neither E, S nor G performance shared a statistically significant association with firm value irrespective of the direction of the association noted, the measure of firm value used or the ESG predictor used. The result of no relationship was consistent with a limited number of prior studies, namely Elsayed and Paton (2005); Core et al. (2006); Jacobs et al. (2010); Baron et al. (2011); Humphrey et al. (2012a, 2012b); Landi and Sciarelli (2018) and Endo (2019).

Regardless of the non-significant relationship observed between E, S and G performances and firm value, different models were found to have varying levels of predictive power. In isolating the firm value dependent variable utilised and with reference to the market return models, the model using FTSE predictors exhibited the greatest predictive power. Similarly, in relation to the internal performance models, the model using FTSE predictors also showed the strongest predictive power. In isolating the type of ESG predictor utilised and with reference to models using FTSE predictors, the market return measure had the greatest predictive power. Equally, in relation to the models using Bloomberg predictors, the market return model also evinced the strongest predictive power.

Ultimately, as observed, the model that incorporates the market return measure of firm value, namely the market value of equity, and incorporates the FTSE predictors, possesses the utmost predictive power in comparison to all models tested. The findings reinforce the argument made by Dalal and Thaker (2019), that different perspectives of firm value, namely internal and external measures, would provide different results. The results also support the claim by Berg et al. (2019) and Billio et al. (2021), that there is significant evaluation disagreement between rating agencies and that findings would vary based on the ESG predictor used.

The final major finding was that the relationships between the different components of ESG performance, specifically E, S and G, were all statistically significant and positive, at least at the 10% level of significance. The statistics were consistent with numerous prior research, such as Poduska et al. (1992); Coffey and Wang (1998); Stanwick and Stanwick (1998); Kassinis and Vafeas (2002); Webb (2004); Harjoto and Jo (2011); Mervelskemper and Streit (2017); Haque and Ntim, (2018) and Lu and Wang (2021). The statistics suggest that no critical trade-offs exist between the ESG pillars, contrary to cautioning by the IISD (2022). This finding should encourage management to invest in the respective E, S and G performances without concern for critical trade-offs.

CHAPTER V
CONCLUSIONS

5.1. Review of the study

The relationship between overall ESG performance and individual E, S and G performances and firm value to date remains a relatively new and unresolved matter in academic literature. However, there is an increasing number of studies indicating that ESG performance, along with E, S and G performances are indeed value relevant to firm value. As per Yoon et al. (2018), the value creation school of thought argues that ESG performance, directly and indirectly, increases firm value, however, tests on this school of thought have occurred mainly in developed markets.

Climate change, water shortages, electricity shortages due to reliance on non-renewable resources and air pollution experienced by South Africa, which could be addressed by superior ESG performance, were the significant motivating factors for this dissertation. This motivation was further strengthened by the lacuna evidenced in academic studies on the value relevance of ESG performance and E, S and G performance in emerging markets such as South Africa. The final motivating factor was the need to inform various parties on whether ESG performance and its respective pillars have a material impact on firm value, in an attempt to aid their decision-making.

The aim of this study was to determine if there was a significant relationship between the respective E, S and G performances and firm value. The study incorporated E, S and G performance ratings from two diverse and reputable rating agencies, the FTSE and Bloomberg, as well as two different measures of firm value, market value of equity (external measure) and ROA (internal measure), to strengthen the validity of the study.

By investigating the relationship between E, S and G performance ratings and the firm value of JSE-listed firms, the findings of this study have indicated that no significant relationship exists between the E, S or G performance and firm value. The relationships were statistically non-significant, despite numerous coefficients of differing magnitudes and directions observed in the models tested. The relationship was consistently non-significant, irrespective of the proxy of firm value incorporated or the type of ESG predictor utilised. As a consequence, all hypotheses were rejected. Ultimately, ESG performance and its individual pillars are not considered to be value relevant to the firm value of South African JSE-listed firms, which is contrary to recent empirical evidence on the value-adding capabilities of ESG and its disaggregated dimensions, but in line with studies by Elsayed and Paton (2005); Core et al.

(2006); Jacobs et al. (2010); Baron et al. (2011); Humphrey et al. (2012a, 2012b); Landi and Sciarelli (2018) and Endo (2019).

This study contributes to existing academic research and highlights the need for more intensive ESG value relevance testing. Based on the results, the significant and positive association between ESG performance and firm value in emerging markets as established by Miralles-Quirós et al. (2018) and Yoon et al. (2018) does not hold true for South Africa. This may be as a result of differing time periods and economic conditions, as South Africa is currently experiencing an economic recession, whereas Brazil and Korea were benefitting from their economic boom during the time of the respective studies.

Additionally, this study incorporated time periods during which COVID-19 was prevalent, whereas Miralles-Quirós et al. (2018) and Yoon et al. (2018) did not, presenting a potential reason for the differing results. The inclusion of these periods might have skewed the results of this study, particularly in 2020, 2021 and 2022. Thus, there might be value in replicating this study in a South African setting after a number of years, specifically when the effects of COVID-19 have diminished significantly.

In South Africa, sustainability and superior ESG performance for listed companies is mandated through King Code IV, hence there is little incentive to perform ESG activities beyond the scope of requirements imposed by the JSE. Despite E and S activities having the potential to resolve social and environmental issues, the management of firms and investors prefer to focus solely on profit maximisation. Perhaps associations between ESG performance and E, S and G performance and firm value can be made statistically significant if the government introduces incentives for ESG performance beyond the requirements of King Code IV. This may be in the best interest of Government, taking into account the pledge to achieve a net-zero economy by 2050 and considering the substantial potential of superior ESG performance and its elements, E, S and G performance (IRIS CARBON, 2022).

5.2. Areas for further research

The results indicate potential areas for further research. Despite the statistically non-significant relationships identified, the differing magnitudes and directions of the correlations suggest that the study of causation between ESG performance and its components, E, S and G performance, and firm value should become an important area for further research. In addition, since this research was limited in its ability to analyse the association between ESG performance and firm value per industry, investigating the relationship between ESG performance and its pillars and the firm value of environmentally sensitive industries compared to non-sensitive industries, may reveal statistically significant relationships.

This research focused on JSE-listed firms, for which King Code IV is mandatory, thus exploring the relationship between ESG performance and its dimensions and the firm value of private firms for which King Code IV is not mandatory, may yield different and significant results. Investigating if sustainability and superior ESG performance are mandated for listed companies in other developing markets as well, might be a valuable area for further research because the absence of such rules could act as a possible reason for the differences noted between this study compared to Miralles-Quirós et al. (2018) and Yoon et al. (2018). Furthermore, the majority of prior research, particularly in a South African context, has examined the correlation between ESG disclosure and firm value, which suggests the value relevance of ESG disclosure on firm value may be an interesting theme that requires additional research.

The correlations between E, S and G performance and firm value varied due to the different ESG predictors used from the different rating agencies. As a result, studies to determine which specific risk factors and sources used by rating agencies is positively correlated with firm value, may be a significant area for further research in an attempt to develop an appropriate and universal ESG predictor. Additionally, the critical examination of the relationships and trade-offs between the components of ESG should also become an important matter that requires more research, as perhaps not enough research has been conducted into the investigation of relationships and trade-offs.

The findings of this research should be validated in future by a larger data set, the incorporation of additional control variables, alternative ESG ratings when the concept is more mature and other proxies of firm value. Attributable to the potential benefits of positive total ESG and individual E, S and G performance, the impact that it may have on firm value and the paucity of comparable research in emerging markets, the relationship between ESG performance and its distinct elements and firm value continues to be an important area for extended study within the South African context. Moreover, research should be conducted to identify or develop a method to integrate ESG performance and its constituents into current firm valuation techniques, which may contribute towards making the associations between ESG performance and its pillars and firm value statistically significant in future.

Ultimately, the results have rejected all hypotheses, as ESG performance and E, S and G performances had no statistically significant relationship with both external and internal measures of firm value of South African JSE-listed firms, irrespective of the ratings (and evaluation criteria) used.

Hence, the report concludes that E, S and G performances are finally, not value relevant. Due to the mounting significance of ESG performance, the results of this research emphasise the

need for future researchers to examine why E, S and G performances are not value relevant in the South African context and additionally, to investigate and propose methods to make E, S and G performance more value relevant. In addition to this report, the proposed future research might assist in the reduction of ESG-related issues in South Africa by further encouraging management not to overlook ESG issues in pursuit of value maximisation.

REFERENCES

Aboud, A., & Diab, A. (2018). The impact of social, environmental and corporate governance disclosures on firm value: Evidence from Egypt. *Journal of Accounting in Emerging Economies*.

Aguinis, H., & Glavas, A. (2012). What we know and don't know about corporate social responsibility: A review and research agenda. *Journal of management*, *38*(4), 932-968.

Akerlof, G. A. (1978). The market for "lemons": Quality uncertainty and the market mechanism. In *Uncertainty in economics* (pp. 235-251). Elsevier.

Al-Tuwaijri, S. A., Christensen, T. E., & Hughes, K. E. (2004). The relations among environmental disclosure, environmental performance, and economic performance: a simultaneous equations approach. *Accounting, organizations and society*, *29*(5-6), 447-471.

Alareeni, B. A., & Hamdan, A. (2020). ESG impact on performance of US S&P 500-listed firms. *Corporate Governance: The International Journal of Business in Society*.

Albertini, E. (2013). Does environmental management improve financial performance? A meta-analytical review. *Organization & Environment*, *26*(4), 431-457.

Albuquerque, R., Koskinen, Y., & Zhang, C. (2019). Corporate social responsibility and firm risk: Theory and empirical evidence. *Management Science*, *65*(10), 4451-4469.

Alshehhi, A., Nobanee, H., & Khare, N. (2018). The impact of sustainability practices on corporate financial performance: Literature trends and future research potential. *Sustainability*, *10*(2), 494.

Andreasson, S. (2017). Fossil-fuelled development and the legacy of Post-Development theory in twenty-first century Africa. *Third World Quarterly*, *38*(12), 2634-2649.

Arvidsson, S., Arvidsson, S., & Harrison. (2019). *Challenges in managing sustainable business*. Springer.

Arvidsson, S., & Dumay, J. (2021). Corporate ESG reporting quantity, quality and performance: Where to now for environmental policy and practice? *Business Strategy and the Environment*.

Ashwin Kumar, N., Smith, C., Badis, L., Wang, N., Ambrosy, P., & Tavares, R. (2016). ESG factors and risk-adjusted performance: a new quantitative model. *Journal of Sustainable Finance & Investment*, *6*(4), 292-300.

Attig, N., El Ghoul, S., Guedhami, O., & Suh, J. (2013). Corporate social responsibility and credit ratings. *Journal of Business Ethics*, *117*(4), 679-694.

Ball, R. (2021). *Examining the relationship between ESG performance and financial performance of firms listed on the JSE* Faculty of Commerce].

Barnett, M. L., & Salomon, R. M. (2012). Does it pay to be really good? Addressing the shape of the relationship between social and financial performance. *Strategic management journal*, *33*(11), 1304-1320.

Barney, J. B., Ketchen Jr, D. J., & Wright, M. (2011). The future of resource-based theory: revitalization or decline? *Journal of management*, *37*(5), 1299-1315.

Baron, D. P., Harjoto, M. A., & Jo, H. (2011). The economics and politics of corporate social performance. *Business and Politics*, *13*(2), 1-46.

Bauer, S. E., Im, U., Mezuman, K., & Gao, C. Y. (2019). Desert dust, industrialization, and agricultural fires: Health impacts of outdoor air pollution in Africa. *Journal of Geophysical Research: Atmospheres*, *124*(7), 4104-4120.

Bear, S., Rahman, N., & Post, C. (2010). The impact of board diversity and gender composition on corporate social responsibility and firm reputation. *Journal of Business Ethics*, *97*(2), 207-221.

Behl, A., Kumari, P., Makhija, H., & Sharma, D. (2021). Exploring the relationship of ESG score and firm value using cross-lagged panel analyses: Case of the Indian energy sector. *Annals of Operations Research*, 1-26.

Belal, A. R., Cooper, S. M., & Khan, N. A. (2015). Corporate environmental responsibility and accountability: what chance in vulnerable Bangladesh? *Critical perspectives on accounting*, *33*, 44-58.

Bénabou, R., & Tirole, J. (2010). Individual and corporate social responsibility. *Economica*, *77*(305), 1-19.

Berg, F., Koelbel, J. F., & Rigobon, R. (2019). *Aggregate confusion: The divergence of ESG ratings*. MIT Sloan School of Management Cambridge, MA, USA.

Berrone, P., Cruz, C., Gomez-Mejia, L. R., & Larraza-Kintana, M. (2010). Socioemotional wealth and corporate responses to institutional pressures: Do family-controlled firms pollute less? *Administrative science quarterly*, *55*(1), 82-113.

Billio, M., Costola, M., Hristova, I., Latino, C., & Pelizzon, L. (2021). Inside the ESG Ratings: (Dis)agreement and performance. *Corporate Social Responsibility and Environmental Management*, *28*(5), 1426-1445.

Biondi, L., Dumay, J., & Monciardini, D. (2020). Using the international integrated reporting framework to comply with EU directive 2014/95/EU: can we afford another reporting façade? *Meditari Accountancy Research*.

Bowerman, B. L., & O'connell, R. T. (1990). *Linear statistical models: An applied approach* (2nd ed.). Duxbury.

Branco, M. C., & Rodrigues, L. L. (2008). Factors influencing social responsibility disclosure by Portuguese companies. *Journal of Business Ethics*, *83*(4), 685-701.

Broadstock, D. C., Matousek, R., Meyer, M., & Tzeremes, N. G. (2020). Does corporate social responsibility impact firms' innovation capacity? The indirect link between environmental & social governance implementation and innovation performance. *Journal of Business Research*, *119*, 99-110.

Brown, W. O., Helland, E., & Smith, J. K. (2006). Corporate philanthropic practices. *Journal of Corporate Finance*, *12*(5), 855-877.

Buallay, A. (2018). Is sustainability reporting (ESG) associated with performance? Evidence from the European banking sector. *Management of Environmental Quality: An International Journal*.

Buchanan, B., Cao, C. X., & Chen, C. (2018). Corporate social responsibility, firm value, and influential institutional ownership. *Journal of Corporate Finance*, *52*, 73-95.

Busch, T., & Friede, G. (2018). The robustness of the corporate social and financial performance relation: A second-order meta-analysis. *Corporate Social Responsibility and Environmental Management*, *25*(4), 583-608.

Carroll, A. B., & Shabana, K. M. (2010). The business case for corporate social responsibility: A review of concepts, research and practice. *International journal of management reviews*, *12*(1), 85-105.

Cho, C. H., Laine, M., Roberts, R. W., & Rodrigue, M. (2015). Organized hypocrisy, organizational façades, and sustainability reporting. *Accounting, organizations and society*, *40*, 78-94.

Coffey, B. S., & Wang, J. (1998). Board diversity and managerial control as predictors of corporate social performance. *Journal of Business Ethics*, *17*(14), 1595-1603.

Comrey, A. L. (1985). A method for removing outliers to improve factor analytic results. *Multivariate behavioral research*, *20*(3), 273-281.

Cong, Y., & Freedman, M. (2011). Corporate governance and environmental performance and disclosures. *Advances in Accounting*, *27*(2), 223-232.

Core, J. E., Guay, W. R., & Rusticus, T. O. (2006). Does weak governance cause weak stock returns? An examination of firm operating performance and investors' expectations. *The Journal of Finance*, *61*(2), 655-687.

Cremers, K. M., & Nair, V. B. (2005). Governance mechanisms and equity prices. *The Journal of Finance*, *60*(6), 2859-2894.

Dalal, K. K., & Thaker, N. (2019). ESG and corporate financial performance: A panel study of Indian companies. *IUP Journal of Corporate Governance*, *18*(1), 44-59.

Daugaard, D., & Ding, A. (2022). Global drivers for ESG performance: The body of knowledge. *Sustainability*, *14*(4), 2322.

David, P., Bloom, M., & Hillman, A. J. (2007). Investor activism, managerial responsiveness, and corporate social performance. *Strategic management journal*, *28*(1), 91-100.

Davies, T. (2022). Climate be damned when opportunity knocks. *Financial Mail*. Retrieved 19 May 2022, from https://www.businesslive.co.za/fm/opinion/on-my-mind/2022-04-14-tracey-davies-climate-be-damned-when-opportunity-knocks/

Davis, K. (1973). The case for and against business assumption of social responsibilities. *Academy of management Journal*, *16*(2), 312-322.

de Villiers, C., & Alexander, D. (2014). The institutionalisation of corporate social responsibility reporting. *The British Accounting Review*, *46*(2), 198-212.

Derwall, J., Guenster, N., Bauer, R., & Koedijk, K. (2005). The eco-efficiency premium puzzle. *Financial Analysts Journal*, *61*(2), 51-63.

Derwall, J., & Verwijmeren, P. (2007). Corporate governance and the cost of equity capital: Evidence from gmi's governance rating. *European Centre for Corporate Engagement Research Note*, *6*(1), 1-11.

Di Giuli, A., & Kostovetsky, L. (2014). Are red or blue companies more likely to go green? Politics and corporate social responsibility. *Journal of Financial Economics*, *111*(1), 158-180.

Dixon-Fowler, H. R., Slater, D. J., Johnson, J. L., Ellstrand, A. E., & Romi, A. M. (2013). Beyond “does it pay to be green?” A meta-analysis of moderators of the CEP–CFP relationship. *Journal of Business Ethics*, *112*(2), 353-366.

Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of management review*, *20*(1), 65-91.

Du Toit, E., & Lekoloane, K. (2018). Corporate social responsibility and financial performance: Evidence from the Johannesburg Stock Exchange, South Africa. *South African Journal of Economic and Management Sciences*, *21*(1), 1-11.

Ducassy, I., & Montandrau, S. (2015). Corporate social performance, ownership structure, and corporate governance in France. *Research in International Business and Finance*, *34*, 383-396.

Dumay, J., & Hossain, M. A. (2019). Sustainability risk disclosure practices of listed companies in Australia. *Australian Accounting Review*, *29*(2), 343-359.

Earnhart, D., & Lizal, L. (2007). Does better environmental performance affect revenues, cost, or both? Evidence from a transition economy.

Edelman, E. A. (2020). Washington, DC: Depicting trans spatialities. In *Trans Vitalities* (pp. 30-56). Routledge.

Edmans, A. (2011). Does the stock market fully value intangibles? Employee satisfaction and equity prices. *Journal of Financial Economics*, *101*(3), 621-640.

Egorova, A. A., Grishunin, S. V., & Karminsky, A. M. (2022). The Impact of ESG factors on the performance of Information Technology Companies. *Procedia Computer Science*, *199*, 339-345.

El Ghoul, S., Guedhami, O., & Kim, Y. (2017). Country-level institutions, firm value, and the role of corporate social responsibility initiatives. *Journal of international business studies*, *48*(3), 360-385.

El Ghoul, S., Guedhami, O., Kwok, C. C., & Mishra, D. R. (2011). Does corporate social responsibility affect the cost of capital? *Journal of Banking & Finance*, *35*(9), 2388-2406.

Elkington, J. (1994). Towards the sustainable corporation: Win-win-win business strategies for sustainable development. *California management review*, *36*(2), 90-100.

Elsayed, K., & Paton, D. (2005). The impact of environmental performance on firm performance: static and dynamic panel data evidence. *Structural change and economic dynamics*, *16*(3), 395-412.

Endo, K. (2019). Does the stock market value corporate environmental performance? Some perils of static regression models. *Corporate Social Responsibility and Environmental Management*, *26*(6), 1530-1538.

Endrikat, J., Guenther, E., & Hoppe, H. (2014). Making sense of conflicting empirical findings: A meta-analytic review of the relationship between corporate environmental and financial performance. *European Management Journal*, *32*(5), 735-751.

Escrig-Olmedo, E., Fernández-Izquierdo, M. Á., Ferrero-Ferrero, I., Rivera-Lirio, J. M., & Muñoz-Torres, M. J. (2019). Rating the raters: Evaluating how ESG rating agencies integrate sustainability principles. *Sustainability*, *11*(3), 915.

Fatemi, A., Fooladi, I., & Tehranian, H. (2015). Valuation effects of corporate social responsibility. *Journal of Banking & Finance*, *59*, 182-192.

Fatemi, A., Glaum, M., & Kaiser, S. (2018). ESG performance and firm value: The moderating role of disclosure. *Global Finance Journal*, *38*, 45-64.

Fatemi, A. M., & Fooladi, I. J. (2013). Sustainable finance: A new paradigm. *Global Finance Journal*, *24*(2), 101-113.

Feltham, G. A., & Xie, J. (1994). Performance measure congruity and diversity in multi-task principal/agent relations. *Accounting review*, 429-453.

Ferrell, A., Liang, H., & Renneboog, L. (2016). Socially responsible firms. *Journal of Financial Economics*, *122*(3), 585-606.

Field, A. (2017). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE Publications Ltd.

Field, A., Miles, J., & Field, Z. (2012). *Discovering statistics using R*. SAGE Publications Ltd.

Fig, D. (2005). Manufacturing amnesia: Corporate social responsibility in South Africa. *International Affairs*, *81*(3), 599-617.

Flammer, C., & Kacperczyk, A. (2019). Corporate social responsibility as a defense against knowledge spillovers: Evidence from the inevitable disclosure doctrine. *Strategic management journal*, *40*(8), 1243-1267.

Fombrun, C., & Shanley, M. (1990). What's in a name? Reputation building and corporate strategy. *Academy of management Journal*, *33*(2), 233-258.

Frecka, T. J., & Hopwood, W. S. (1983). The effects of outliers on the cross-sectional distributional properties of financial ratios. *Accounting review*, 115-128.

Freeman, E. (1984). Strategic Management: A Stakeholder Approach (Boston, MA.: Pitman Co.).

Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, *5*(4), 210-233.

Friedman, M. (1970). The social responsibility of business is to increase its profits. In *Corporate ethics and corporate governance* (pp. 173-178). Springer.

Fullana, O., González, M., & Toscano, D. (2021). The role of assumptions in Ohlson model performance: Lessons for improving equity-value modeling. *Mathematics*, *9*(5), 513.

Galbreath, J. (2013). ESG in focus: The Australian evidence. *Journal of Business Ethics*, *118*(3), 529-541.

Galbreath, J. (2018). Is board gender diversity linked to financial performance? The mediating mechanism of CSR. *Business & Society*, *57*(5), 863-889.

Giannarakis, G., Andronikidis, A., & Sariannidis, N. (2020). Determinants of environmental disclosure: investigating new and conventional corporate governance characteristics. *Annals of Operations Research*, *294*(1), 87-105.

Giese, G., Nagy, Z., & Lee, L.-E. (2021). Deconstructing esg ratings performance: Risk and return for e, s, and g by time horizon, sector, and weighting. *The Journal of Portfolio Management*, *47*(3), 94-111.

Gillan, S. L., Koch, A., & Starks, L. T. (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance*, *66*, 101889.

Girdwood, A. (2013). Responsible investment for pension fund trustees: A work in progress. *World Wide Fund for Nature South Africa*.

Godfrey, P. C. (2005). The relationship between corporate philanthropy and shareholder wealth: A risk management perspective. *Academy of management review*, *30*(4), 777-798.

Gompers, P., Ishii, J., & Metrick, A. (2003). Corporate governance and equity prices. *The quarterly journal of economics*, *118*(1), 107-156.

Griliches, Z. (1979). Issues in assessing the contribution of research and development to productivity growth. *The bell journal of economics*, 92-116.

Gwatidzo, T., & Ojah, K. (2009). Corporate capital structure determinants: evidence for five African countries. *African Finance Journal*, *11*(1), 1-23.

Handmaker, J., & Berkhout, R. (2010). *Mobilising social justice in South Africa: Perspectives from researchers and practitioners*. Pretoria University Law Press.

Haque, F., & Ntim, C. G. (2018). Environmental policy, sustainable development, governance mechanisms and environmental performance. *Business Strategy and the Environment*, *27*(3), 415-435.

Harjoto, M. A., & Jo, H. (2011). Corporate governance and CSR nexus. *Journal of Business Ethics*, *100*(1), 45-67.

Hart, S. L., & Milstein, M. B. (2003). Creating sustainable value. *Academy of Management Perspectives*, *17*(2), 56-67.

Hassel, L., Nilsson, H., & Nyquist, S. (2005). The value relevance of environmental performance. *European Accounting Review*, *14*(1), 41-61.

Hebb, T., Hawley, J. P., Hoepner, A. G., Neher, A. L., & Wood, D. (2016). *The Routledge handbook of responsible investment*. Routledge Oxon.

Henisz, W. J., & McGlinch, J. (2019). ESG, material credit events, and credit risk. *Journal of Applied Corporate Finance*, *31*(2), 105-117.

Henriksson, R., Livnat, J., Pfeifer, P., Stumpp, M., & Zeng, G. (2018). ESG literature review. *SSRN Electron J*, 1-14.

Hepburn, C., O'Callaghan, B., Stern, N., Stiglitz, J., & Zenghelis, D. (2020). Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change? *Oxford Review of Economic Policy*, *36*(Supplement_1), S359-S381.

Hönke, J., & Kranz, N. (2013). Cleaning up their act, or more? Mining companies and environmental protection in South Africa. In *Business and Governance in South Africa* (pp. 152-179). Springer.

Horbach, J., & Jacob, J. (2018). The relevance of personal characteristics and gender diversity for (eco-) innovation activities at the firm-level: Results from a linked employer–employee database in Germany. *Business Strategy and the Environment*, *27*(7), 924-934.

Horváthová, E. (2010). Does environmental performance affect financial performance? A meta-analysis. *Ecological economics*, *70*(1), 52-59.

Huang, D. Z. (2021). Environmental, social and governance (ESG) activity and firm performance: A review and consolidation. *Accounting & finance*, *61*(1), 335-360.

Humphrey, J. E., Lee, D. D., & Shen, Y. (2012a). Does it cost to be sustainable? *Journal of Corporate Finance*, *18*(3), 626-639.

Humphrey, J. E., Lee, D. D., & Shen, Y. (2012b). The independent effects of environmental, social and governance initiatives on the performance of UK firms. *Australian Journal of Management*, *37*(2), 135-151.

Inoue, Y., & Lee, S. (2011). Effects of different dimensions of corporate social responsibility on corporate financial performance in tourism-related industries. *Tourism management*, *32*(4), 790-804.

Institute of Directors [IoD]. (2016). *King IV Report*. Institute of Directors in Southern Africa.

International Institute for Sustainable Development [IISD]. (2022). *Report Calls for "Unbundling" ESG Metrics for Impactful Investment for SDGs*. Retrieved 14 November 2022 from https://sdg.iisd.org/news/report-calls-for-unbundling-esg-metrics-for-impactful-investment-for-sdgs/

International Integrated Reporting Council [IIRC]. (2021). *International <IR> Framework.* Retrieved 20 February 2023 from https://www.integratedreporting.org/

Ionescu, G. H., Firoiu, D., Pirvu, R., & Vilag, R. D. (2019). The impact of ESG factors on market value of companies from travel and tourism industry. *Technological and Economic Development of Economy*, *25*(5), 820-849.

IRIS CARBON. (2022). *ESG Reporting and Its Significance*. Retrieved 22 October 2022 from https://iriscarbon.com/esg-reporting-and-its-significance/

Iwata, H., & Okada, K. (2011). How does environmental performance affect financial performance? Evidence from Japanese manufacturing firms. *Ecological economics*, *70*(9), 1691-1700.

Jacobs, B. W., Singhal, V. R., & Subramanian, R. (2010). An empirical investigation of environmental performance and the market value of the firm. *Journal of Operations Management*, *28*(5), 430-441.

Jacoby, G., Liu, M., Wang, Y., Wu, Z., & Zhang, Y. (2019). Corporate governance, external control, and environmental information transparency: Evidence from emerging markets. *Journal of International Financial Markets, Institutions and Money*, *58*, 269-283.

Jayachandran, S., Kalaignanam, K., & Eilert, M. (2013). Product and environmental social performance: Varying effect on firm performance. *Strategic management journal*, *34*(10), 1255-1264.

Jensen, M. C. (2002). Value maximization, stakeholder theory, and the corporate objective function. *Business ethics quarterly*, 235-256.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. In *Corporate Governance* (pp. 77-132). Gower.

Jha, M. K., & Rangarajan, K. (2020). Analysis of corporate sustainability performance and corporate financial performance causal linkage in the Indian context. *Asian Journal of Sustainability and Social Responsibility*, *5*(1), 1-30.

Jo, H., & Harjoto, M. A. (2011). Corporate governance and firm value: The impact of corporate social responsibility. *Journal of Business Ethics*, *103*(3), 351-383.

Jo, H., & Harjoto, M. A. (2012). The causal effect of corporate governance on corporate social responsibility. *Journal of Business Ethics*, *106*(1), 53-72.

Johannesburg Stock Exchange [JSE] (2022). *JSE Sustainability Disclosure Guidance*. Retrieved 20 February 2023 from https://www.jse.co.za/our-business/sustainability/jses-sustainability-and-climate-disclosure-guidance

Johnson, R., Erasmus, P. D., & Mans-Kemp, N. (2019). Assessing the business case for environmental, social and corporate governance practices in South Africa. *South African Journal of Economic and Management Sciences*, *22*(1), 1-13.

Johnson, R. A., & Greening, D. W. (1999). The effects of corporate governance and institutional ownership types on corporate social performance. *Academy of management Journal*, *42*(5), 564-576.

Kassinis, G., & Vafeas, N. (2002). Corporate boards and outside stakeholders as determinants of environmental litigation. *Strategic management journal*, *23*(5), 399-415.

Khanna, T., & Palepu, K. (2000). The future of business groups in emerging markets: Long-run evidence from Chile. *Academy of management Journal*, *43*(3), 268-285.

Kim, E.-H., & Lyon, T. P. (2015). Greenwash vs. brownwash: Exaggeration and undue modesty in corporate sustainability disclosure. *Organization Science*, *26*(3), 705-723.

Koller, T., Nuttall, R., & Henisz, W. (2019). Five ways that ESG creates value. *The McKinsey Quarterly*.

Kotsantonis, S., & Serafeim, G. (2019). Four things no one will tell you about ESG data. *Journal of Applied Corporate Finance*, *31*(2), 50-58.

Kurucz, E. C., Colbert, B. A., & Wheeler, D. (2008). The business case for corporate social responsibility. *The Oxford handbook of corporate social responsibility*, 83-112.

La Torre, M., Sabelfeld, S., Blomkvist, M., & Dumay, J. (2020). Rebuilding trust: Sustainability and non-financial reporting and the European Union regulation. *Meditari Accountancy Research*.

Lahouel, B. B., Bruna, M.-G., & Zaied, Y. B. (2020). The curvilinear relationship between environmental performance and financial performance: An investigation of listed french firms using panel smooth transition model. *Finance Research Letters*, *35*, 101455.

Landi, G., & Sciarelli, M. (2018). Towards a more ethical market: the impact of ESG rating on corporate financial performance. *Social Responsibility Journal*.

Lee, K.-W., & Yeo, G. H.-H. (2016). The association between integrated reporting and firm valuation. *Review of Quantitative Finance and Accounting*, *47*(4), 1221-1250.

Lee, S., Seo, K., & Sharma, A. (2013). Corporate social responsibility and firm performance in the airline industry: The moderating role of oil prices. *Tourism management*, *38*, 20-30.

Leedy, P. D., & Ormrod, J. E. (2021). *Practical Research: Planning and Design* (12th ed.). Pearson Education.

Lefort, F., & Urzúa, F. (2008). Board independence, firm performance and ownership concentration: Evidence from Chile. *Journal of Business Research*, *61*(6), 615-622.

Leonard, L. (2018). Mining corporations, democratic meddling, and environmental justice in South Africa. *Social Sciences*, *7*(12), 259.

Li, T.-T., Wang, K., Sueyoshi, T., & Wang, D. D. (2021). ESG: Research progress and future prospects. *Sustainability*, *13*(21), 11663.

Li, Y., Gong, M., Zhang, X.-Y., & Koh, L. (2018). The impact of environmental, social, and governance disclosure on firm value: The role of CEO power. *The British Accounting Review*, *50*(1), 60-75.

Lins, K. V., Servaes, H., & Tamayo, A. (2019). Social capital, trust, and corporate performance: how CSR helped companies during the financial crisis (and why it can keep helping them). *Journal of Applied Corporate Finance*, *31*(2), 59-71.

Liu, H., Owens, K. A., Yang, K., & Zhang, C. (2020). Pollution abatement costs and technical changes under different environmental regulations. *China Economic Review*, *62*, 101497.

Lo, S. F., & Sheu, H. J. (2007). Is corporate sustainability a value-increasing strategy for business? *Corporate Governance: An International Review*, *15*(2), 345-358.

Lu, H., Oh, W.-Y., Kleffner, A., & Chang, Y. K. (2021). How do investors value corporate social responsibility? Market valuation and the firm specific contexts. *Journal of Business Research*, *125*, 14-25.

Lu, J., & Herremans, I. M. (2019). Board gender diversity and environmental performance: An industries perspective. *Business Strategy and the Environment*, *28*(7), 1449-1464.

Lu, J., & Wang, J. (2021). Corporate governance, law, culture, environmental performance and CSR disclosure: A global perspective. *Journal of International Financial Markets, Institutions and Money*, *70*, 101264.

Lu, W., & Taylor, M. E. (2016). Which factors moderate the relationship between sustainability performance and financial performance? A meta-analysis study. *Journal of International Accounting Research*, *15*(1), 1-15.

Mahalanobis, P. C. (1930). On test and measures of group divergence: theoretical formulae. *Journal of Asiatic Sociology of Bengal*, *26*, 541-588.

Malik, M. (2015). Value-enhancing capabilities of CSR: A brief review of contemporary literature. *Journal of Business Ethics*, *127*(2), 419-438.

Manrique, S., & Martí-Ballester, C.-P. (2017). Analyzing the effect of corporate environmental performance on corporate financial performance in developed and developing countries. *Sustainability*, *9*(11), 1957.

Marcia, A., Maroun, W., & Callaghan, C. (2015). Value relevance and corporate responsibility reporting in the South African context: An alternate view post King-III. *South African Journal of Economic and Management Sciences*, *18*(4), 500-518.

Margolis, J. D., Elfenbein, H. A., & Walsh, J. P. (2007). Does it pay to be good? A meta-analysis and redirection of research on the relationship between corporate social and financial performance. *Ann Arbor*, *1001*(48109-1234), 1-68.

Marsat, S., & Williams, B. (2014). Does the market value social pillar? *Available at SSRN 2419387*.

Masulis, R. W., & Reza, S. W. (2015). Agency problems of corporate philanthropy. *The Review of Financial Studies*, *28*(2), 592-636.

McGuire, J., Dow, S., & Ibrahim, B. (2012). All in the family? Social performance and corporate governance in the family firm. *Journal of Business Research*, *65*(11), 1643-1650.

McKendall, M., Sánchez, C., & Sicilian, P. (1999). Corporate governance and corporate illegality: The effects of board structure on environmental violations. *The International Journal of Organizational Analysis*.

McWilliams, A., & Siegel, D. (2000). Corporate social responsibility and financial performance: correlation or misspecification? *Strategic management journal*, *21*(5), 603-609.

McWilliams, A., & Siegel, D. (2001). Corporate social responsibility: A theory of the firm perspective. *Academy of management review*, *26*(1), 117-127.

McWilliams, A., & Siegel, D. S. (2011). Creating and capturing value: Strategic corporate social responsibility, resource-based theory, and sustainable competitive advantage. *Journal of management*, *37*(5), 1480-1495.

McWilliams, A., Siegel, D. S., & Wright, P. M. (2006). Corporate social responsibility: Strategic implications. *Journal of management studies*, *43*(1), 1-18.

Menard, S. (1995). *Applied Logistic Regression Analysis* (2nd ed.). Sage.

Mervelskemper, L., & Streit, D. (2017). Enhancing market valuation of ESG performance: is integrated reporting keeping its promise? *Business Strategy and the Environment*, *26*(4), 536-549.

Michelon, G., Boesso, G., & Kumar, K. (2013). Examining the link between strategic corporate social responsibility and company performance: An analysis of the best corporate citizens. *Corporate Social Responsibility and Environmental Management*, *20*(2), 81-94.

Miralles-Quirós, M. M., Miralles-Quirós, J. L., & Redondo-Hernández, J. (2019). The impact of environmental, social, and governance performance on stock prices: Evidence from the banking industry. *Corporate Social Responsibility and Environmental Management*, *26*(6), 1446-1456.

Miralles-Quirós, M. M., Miralles-Quirós, J. L., & Valente Gonçalves, L. M. (2018). The value relevance of environmental, social, and governance performance: The Brazilian case. *Sustainability*, *10*(3), 574.

Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Academy of management review*, *22*(4), 853-886.

Myers, R. H. (1990). *Classical and modern regression with applications* (2nd ed.). Duxbury.

Nakamura, E. (2011). Does environmental investment really contribute to firm performance? An empirical analysis using Japanese firms. *Eurasian Business Review*, *1*(2), 91-111.

Negash, M., & Lemma, T. T. (2020). Institutional pressures and the accounting and reporting of environmental liabilities. *Business Strategy and the Environment*, *29*(5), 1941-1960.

Never, B. (2012). Who drives change? Comparing the evolution of domestic climate governance in India and South Africa. *The Journal of Environment & Development*, *21*(3), 362-387.

Nollet, J., Filis, G., & Mitrokostas, E. (2016). Corporate social responsibility and financial performance: A non-linear and disaggregated approach. *Economic Modelling*, *52*, 400-407.

O'Neill, S. (2022). *What is the difference between CSR and ESG?* Retrieved 24 October 2022 from

Odell, J., & Ali, U. (2016). ESG investing in emerging and frontier markets. *Journal of Applied Corporate Finance*, *28*(2), 96-101.

Ohlson, J. A. (1995). Earnings, book values, and dividends in equity valuation. *Contemporary accounting research*, *11*(2), 661-687.

Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003). Corporate social and financial performance: A meta-analysis. *Organization studies*, *24*(3), 403-441.

Osborne, J. W., & Waters, E. (2002). Four assumptions of multiple regression that researchers should always test. *Practical assessment, research, and evaluation*, *8*(1), 2.

Peiris, D., & Evans, J. (2010). The relationship between environmental social governance factors and US stock performance. *The Journal of Investing*, *19*(3), 104-112.

Pekovic, S., Grolleau, G., & Mzoughi, N. (2018). Environmental investments: Too much of a good thing? *International Journal of Production Economics*, *197*, 297-302.

Pitrakkos, P., & Maroun, W. (2019). Evaluating the quality of carbon disclosures. *Sustainability Accounting, Management and Policy Journal*.

Poduska, R., Forbes, R., & Bober, M. (1992). The challenge of sustainable development. *Columbia Journal of World Business*, *27*, 286-286.

Porter, M. E., & Van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. *Journal of economic perspectives*, *9*(4), 97-118.

Qureshi, M. A., Kirkerud, S., Theresa, K., & Ahsan, T. (2020). The impact of sustainability (environmental, social, and governance) disclosure and board diversity on firm value: The moderating role of industry sensitivity. *Business Strategy and the Environment*, *29*(3), 1199-1214.

Rajesh, R., & Rajendran, C. (2020). Relating environmental, social, and governance scores and sustainability performances of firms: An empirical analysis. *Business Strategy and the Environment*, *29*(3), 1247-1267.

Rasmussen, J. L. (1988). Evaluating outlier identification tests: Mahalanobis D squared and Comrey Dk. *Multivariate behavioral research*, *23*(2), 189-202.

Reilly, W. K. (1992). Environment, inc. *Business Horizons*, *35*(2), 9-12.

Roberts, P. W., & Dowling, G. R. (2002). Corporate reputation and sustained superior financial performance. *Strategic management journal*, *23*(12), 1077-1093.

Russo, M. V., & Fouts, P. A. (1997). A resource-based perspective on corporate environmental performance and profitability. *Academy of management Journal*, *40*(3), 534-559.

Schadewitz, H., & Niskala, M. (2010). Communication via responsibility reporting and its effect on firm value in Finland. *Corporate Social Responsibility and Environmental Management*, *17*(2), 96-106.

Schramade, W. (2016). Integrating ESG into valuation models and investment decisions: the value-driver adjustment approach. *Journal of Sustainable Finance & Investment*, *6*(2), 95-111.

Semenova, N., & Hassel, L. G. (2015). On the validity of environmental performance metrics. *Journal of Business Ethics*, *132*(2), 249-258.

Sethi, S. P. (1979). A conceptual framework for environmental analysis of social issues and evaluation of business response patterns. *Academy of management review*, *4*(1), 63-74.

Sharfman, M. P., & Fernando, C. S. (2008). Environmental risk management and the cost of capital. *Strategic management journal*, *29*(6), 569-592.

Sharma, D., Bhattacharya, S., & Thukral, S. (2019). Resource-based view on corporate sustainable financial reporting and firm performance: evidences from emerging Indian economy. *International Journal of Business Governance and Ethics*, *13*(4), 323-344.

Skaife, H. A., Collins, D. W., & LaFond, R. (2004). Corporate governance and the cost of equity capital. *Available at SSRN 639681*.

Stanwick, P. A., & Stanwick, S. D. (1998). The relationship between corporate social performance, and organizational size, financial performance, and environmental performance: An empirical examination. *Journal of Business Ethics*, *17*(2), 195-204.

Statman, M. (2000). Socially responsible mutual funds (corrected). *Financial Analysts Journal*, *56*(3), 30-39.

Statman, M., & Glushkov, D. (2009). The wages of social responsibility. *Financial Analysts Journal*, *65*(4), 33-46.

Stefan, A., & Paul, L. (2008). Does it pay to be green? A systematic overview. *Academy of Management Perspectives*, *22*(4), 45-62.

Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of management review*, *20*(3), 571-610.

Tang, Z., Hull, C. E., & Rothenberg, S. (2012). How corporate social responsibility engagement strategy moderates the CSR–financial performance relationship. *Journal of management studies*, *49*(7), 1274-1303.

Tarmuji, I., Maelah, R., & Tarmuji, N. H. (2016). The impact of environmental, social and governance practices (ESG) on economic performance: Evidence from ESG score. *International Journal of Trade, Economics and Finance*, *7*(3), 67.

Telle, K. (2006). "It pays to be green"–a premature conclusion? *Environmental and Resource Economics*, *35*(3), 195-220.

UN. (2004). Who cares wins: Connecting financial markets to a changing world. *New York*.

Van der Merwe, V. (2012). The origin and characteristics of the mixed legal systems of South Africa and Scotland and their importance in globalisation. *Fundamina: A Journal of Legal History*, *18*(1), 91-114.

van Zijl, W., Maroun, W., & Wöstmann, C. (2017). Strategy disclosures by listed financial services companies: Signalling theory, legitimacy theory and South African integrated reporting practices. *South African Journal of Business Management*, *48*(3), 73-85.

Velte, P. (2017). Does ESG performance have an impact on financial performance? Evidence from Germany. *Journal of Global Responsibility*.

Waddock, S. (2004). Creating corporate accountability: Foundational principles to make corporate citizenship real. *Journal of Business Ethics*, *50*(4), 313-327.

Waddock, S. A., & Graves, S. B. (1997). The corporate social performance–financial performance link. *Strategic management journal*, *18*(4), 303-319.

Wahba, H., & Elsayed, K. (2015). The mediating effect of financial performance on the relationship between social responsibility and ownership structure. *Future Business Journal*, *1*(1-2), 1-12.

Walls, J. L., Berrone, P., & Phan, P. H. (2012). Corporate governance and environmental performance: Is there really a link? *Strategic management journal*, *33*(8), 885-913.

Wang, H., & Qian, C. (2011). Corporate philanthropy and corporate financial performance: The roles of stakeholder response and political access. *Academy of management Journal*, *54*(6), 1159-1181.

Webb, E. (2004). An examination of socially responsible firms' board structure. *Journal of Management and Governance*, *8*(3), 255-277.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic management journal*, *5*(2), 171-180.

White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica: journal of the Econometric Society*, 817-838.

Windolph, S. E. (2011). Assessing corporate sustainability through ratings: challenges and their causes. *Journal of Environmental sustainability*, *1*(1), 5.

Wong, W. C., Batten, J. A., Mohamed-Arshad, S. B., Nordin, S., & Adzis, A. A. (2021). Does ESG certification add firm value? *Finance Research Letters*, *39*, 101593.

Wood, J. (2020). Why this moment could be decisive for tackling climate change: Report. In.

Wooldridge, J. M. (2002). Econometric analysis of cross section and panel data MIT press. *Cambridge, MA*, *108*(2), 245-254.

Yoon, B., Lee, J. H., & Byun, R. (2018). Does ESG performance enhance firm value? Evidence from Korea. *Sustainability*, *10*(10), 3635.

Zhao, X., & Murrell, A. J. (2016). Revisiting the corporate social performance-financial performance link: A replication of Waddock and Graves. *Strategic management journal*, *37*(11), 2378-2388.

Zhou, G., Liu, L., & Luo, S. (2022). Sustainable development, ESG performance and company market value: Mediating effect of financial performance. *Business Strategy and the Environment*.

Zimmerman, D. W. (1994). A note on the influence of outliers on parametric and nonparametric tests. *The journal of general psychology*, *121*(4), 391-401.

Zuma, K., Shisana, O., Rehle, T. M., Simbayi, L. C., Jooste, S., Zungu, N., Labadarios, D., Onoya, D., Evans, M., & Moyo, S. (2016). New insights into HIV epidemic in South Africa: key findings from the National HIV Prevalence, Incidence and Behaviour Survey, 2012. *African Journal of AIDS Research*, *15*(1), 67-75.

APPENDIX A

SUPPLEMENTARY RESULTS

Table A1: VIFs for model (1) including overall ESG using Bloomberg predictors[a]

	Collinearity Statistics
	VIF
(Constant)	
NI	1.031
E	2.310
S	3.322
G	3.233
ESG	9.222

a. Dependent Variable: $(\mathrm{MV} + \mathrm{DI})$

Table A2: VIFs for model (1) excluding overall ESG using Bloomberg predictors[a]

	Collinearity Statistics
	VIF
(Constant)	
NI	1.031
E	1.277
S	1.234
G	1.474
BV	1.053

a. Dependent Variable: $(\mathrm{MV} + \mathrm{DI})$

Table A3: VIFs for model (2) using FTSE predictors[a]

	Collinearity Statistics
	VIF
(Constant)	
$\ln(\mathrm{BV})$	1.144
$\ln(\mathrm{NI})$	1.226
E	3.242
S	5.094
G	3.197
ESG	13.919

a. Dependent Variable: $\ln(\mathrm{MV} + \mathrm{DI})$