

The Impact of Environmental Performance on Corporate Profitability: Evidence from South African Publicly Listed Metal & Mining Companies

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I hereby declare that the Research Report submitted for the Bachelor of Commerce Honours in Management degree to The Independent Institute of Education is my own work and has not previously been submitted to another University or Higher Education Institution for degree purposes.

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Abstract

Empirical results of more than three decades of research concerning the link between environmental performance and firm financial performance remain inconclusive. Existing literature has so far neglected the multifaceted nature of both performance meta-constructs, giving rise to the prevailing fragmentation in contemporary findings. Using a sample of 12 large capitalization South African metal and mining firms listed on the Johannesburg Stock Exchange, this paper investigates the effect of environmental performance on firm financial performance. Panel data analysis – employing multi-regression techniques – was performed between the years 2015 and 2020 using secondary data obtained from publicly available ESG reports and audited financial statements concerning respective industrial metal and mining industry constituents. Firstly, a significant positive correlation was found to exist between ESG scores and Return on Assets. Secondly, a significant negative correlation was found to exist between ESG scores and Tobin's Q. Evidence of such financial gain with respect to environmental performance, provides impetus for firms and managers seeking to implement sustainable practices. These results demonstrate that it does pay to be green.

Keywords | environmental performance; financial performance; return on assets; Tobin's Q; sustainability

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Introduction

In the period following the publication of the Brundtland Report (Brundtland, 1987) and the successive Earth summits in Rio de Janeiro (1992) and Johannesburg (2002), sustainable development has matured into one of the more significant matters of contention, concerning the World. Society has become attentive to the vulnerability of natural systems and their progressive and significant demise. Furthermore, chronic smog signals – and ensuing acid rain – ozone layer depletion, global warming, deforestation, climate change and the loss of biodiversity are among the spreading evidence that such a catastrophe is conceivable – and materializing more rapidly than ever. Accordingly, the general population – and environmentalists in particular – believe that the consequences of ‘business-as-usual’ are troublesome. Companies alike accept the same conclusion; however, the environment is too often only an additional concerning business element – looming in the future at a time when perplexed with less immediate and urgent concerns. Thus, the integration of environmental interests amidst business strategy, remains a challenge.

Naturally, managers have long associated environmental protection with additional costs. As early as 1970, Friedman indicated that environmental concerns divert managers from their pivotal obligation, which should be to maximize profits. Along these lines, the conventional wisdom regarding environmental protection is that it comes at an additional cost imposed on firms; the prevailing view is that an inherent and fixed trade-off exists: ecology versus the economy. Still, what do we know about the impact of environmental performance (EP) on financial performance (FP)? The longstanding belief among scholars and researchers alike, has been that investments to protect the natural environment leave firms with insufficient financial gain (Friedman, 1970). In the last 20 years however, an expanding body of research has challenged this assumption, to suggest conflicting conclusions (Horváthová, 2010). This diverging sphere of research – analyzing the link between corporate environmental performance and corporate financial performance – encompasses various measures, data, theories, direction of causality, industry and country specific contexts. Given the diverse and inconclusive results from previous studies (Al-Najjar & Anfimiadou, 2012; Dangelico and Pontrandolfo, 2015; Jaggi & Freedman, 1992; Gallego-Álvarez, García-Sánchez, and Silva Vieira, 2014; Trumpp & Guenther, 2015; Wagner, Van Phu, Azomahou, and Wehrmeyer, 2002) it remains unclear as to whether firms who embrace measures to reduce their

environmental footprint, realize financial profit. Accordingly, the case for sustainable finance is inconsistent. Environmental issues and their implications for business performance thus present immense research opportunities to clarify the dynamic relationship between financial benefit and environmental concern.

A review of extant literature shows not only are the empirical findings contradictory, but the use of theories is also inconsistent. Furthermore, theories used in the existing environmental performance and financial performance nexus literature, are grounded in competing assumptions (Horváthová, 2010). Within this context, Stakeholder Theory (Freeman, 1984) – the overarching used philosophy – prevails as a capable organizational theory from which to theoretically view the dyadic relationship. Stakeholder Theory is considered the most applicable perspective because it promotes a practical, efficient, effective, ethical and comprehensive approach to managing organizations in highly complex and turbulent environments – suggesting that meeting the needs of various corporate stakeholders leads to favorable financial performance (Freeman, 1984; McWilliams & Siegel, 2001).

Against this backdrop, the research attempts to replete the empirical divergences in extant literature. As such, the purpose of this correlative study is to contribute significantly to the continued wave of empirical investigations related to the impact of environmental performance on corporate profitability. Thus, the objective is to assess the causal link between corporate environmental performance and corporate financial performance, by examining the financial returns of large capitalization South African metal and mining companies, listed on the Johannesburg Stock Exchange.

Research Question:

What is the relationship between environmental performance and financial performance among large capitalization South African metal and mining firms listed on the Johannesburg Stock exchange?

Research Hypothesis:

A positive correlation exists between environmental performance and financial performance.

Theoretical Foundation

Sustainability: The Overarching Agenda

In 1987, the Brundtland Commission published their report – *Our Common future* – in an effort to unite the inherent trade-offs between economic development and environmental stability. In doing so, the report articulated the oft-cited sustainable development definition: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987: 43). Albeit somewhat vague, the principal aspiration aims to maintain economic advancement whilst safeguarding the interests of long-term value sustaining environmental practices. As suggested by Dernbach (1998), the connections exhibited between the natural environment and economic development, represent a powerful rationale for environmental protection: enlightened self-interest. This intrinsic interdependence, constitutes the bedrock from which sustainable development transpires.

Sustainability today, however, is almost always viewed as encompassing three dimensions: economic, social and environmental (Kates, Paris & Leiserowitz, 2005). These extensions are exemplified in the sustainability definition endorsed by the United Nations (1997) in its Agenda for Development: “Development is a multidimensional undertaking to achieve a higher quality of life for all people; economic development, social development and environmental protection are interdependent and mutually reinforcing components of sustainable development”. As such, sustainability initiatives seek mitigating sources and symptoms of environmental degradation whilst concurrently forging incentives and opportunities for economic growth (Porter & Van der Linde, 1995). Sustainability can also be defined as: (I) an overarching conceptual framework that depicts a desirable, healthy and dynamic balance between human and natural systems; (II) a system of policies, beliefs and best practices that will protect the diversity and richness of the planet’s ecosystems, foster economic vitality and opportunity, and create a high quality of life for all; (III) a vision describing a future that anyone would want to inhabit (Brundtland, 1987).

Central to these definitions is sustainability’s applicability to three elements of life: economic and financial considerations, environmental protection and stewardship, and community and individual human well-being: the Triple Bottom Line of sustainability (Elkington, 1994). Elkington’s (1994) framework intended to go beyond previous constructions of sustainable development (SD) and corporate social responsibility (CSR) to encompass an approach that

emphasizes economic prosperity, social development and environmental quality as an integrated method for doing business. This perception signifies the displacement of organizational emphasis from short-term financial goals to long-term social, environmental and economic outcomes.

The concern with preserving environmental integrity is perennial: undeniably supported by our ancestral apprehension towards animal extinction and loss of biodiversity. As mentioned by Kuhlman and Farrington (2010), traditional beliefs advise reasoning in terms of stewardship and concern for future generations – as expressed in the recurrent citation of the Nigerian tribal chief who viewed the community as embodying “many dead, few living and countless unborn” (Ike, 1984: 471). Additionally, the authors speculate two conflicting perspectives regarding the relation between humankind and nature: the former emphasising adaption and harmony, and the latter considering the environment to be something conquerable (Kuhlman & Farrington, 2010).

The aforementioned thinking characterizes the two major theoretical approaches linking corporate social responsibility to financial performance. Friedman (1970) – and other neoclassical economists – suggest a negative relationship exists, arguing that the social responsibility of business is to inflate profits on account that firms incur costs when performing socially responsible conduct. These costs are believed to exceed any benefits that might result, which reduce profit and shareholder wealth – creating competitive disadvantage (Waddock & Graves, 1997). Adversely, Freeman’s (1984) stakeholder approach advocates positive linkage – a rationale supported by Stakeholder Theory – suggesting that the better a firm manages its relationships with the myriad groups whom occupy an interest or stake in the firm, the better the firm’s financial performance overtime.

Stakeholder Theory

One of the oldest inquiries in moral philosophy is whether it pays to be a morally good person (Gossling, 2003). Likewise, one of the earliest and most valuable questions in the corporate social responsibility context and Stakeholder Theory domain, can be construed as follows: “Social performance – with respect to corporate stakeholders – may be good for society, but does it pay?” (Brown, 1998: 271). Moral behaviour is not theoretically discernible as financially and economically beneficial (Gossling, 2003); however, Freeman

(1994) argued that social performance is necessary to realize business legitimacy. Stakeholder Theory attempts to harmonize economic and social facets into one cohesive framework that acknowledges co-dependence (Harrison & Freeman, 1999). Accordingly, stakeholders should be taken into consideration when they have an impactful presence. Stakeholder Theory thus defines firm performance from a sustainable vantage point inclusive not only of shareholders, but all stakeholders.

The advancement of organizational strategies depicts firms now considering the numerous internal and external stakeholders who diversely affect the achievement of organizational goals; accordingly, each stakeholder group occupies differing expectations with regards to prospective organisational objectives. Certain stakeholders hold power in influencing firm resources (Jawahar & McLaughlin, 2000), some deliver perceived strength to leverage firm success (Wood & Jones, 1995), whilst others are respected by managers by reason of moral accountability. An organization – according to Wood (1994) – is an intersection of assorted relationships of independency and expectation from disparate parties. Accordingly, stakeholder orientation by corporations is a fundamental determinant in strategic decision making, and consequently has been the subject matter of theoretical and empirical research in strategic management theory (Berman, Wicks, Kotha & Jones, 1999).

Studies exhibit a strong association between the aspirations of organizational goals and stakeholder power during the process of organizational learning (Roome & Wijen, 2006). Porter and Kramer (2011) additionally argue that charitable efforts to community can enhance competitive context. Sundaram and Inkpen (2004) argue that, despite shareholder value maximisation generally absorbing managerial orientation, the implicit objective is to enhance the outcomes for all stakeholders. Stakeholder Theory thus: explores the concept and purpose of the corporation as an intersection of ranging interests (Clarkson, 1995); as a node in an intricate network of dependency relationships between, and expectations of, various constituencies (Wood, 1994); or as an aggregation of constituencies pursuing the advancement of their self-interests, although respecting the interests of others (Wartick, 1988). Additionally, Post, Preston and Sachs (2002) identified stakeholder orientation as the continuation aid through which organizations create wealth.

Stakeholder Theory is an umbrella term; Freeman's (1984) pioneering work – even though it officially identifies the significance of corporate constituents in addition to solely

shareholders – leaves the cachet of stakeholder concept as Theory, unclear. Interpreted differently, Donaldson and Preston (1995) argued that Stakeholder Theory implicitly or explicitly constitutes theory of three differing typologies: descriptive (empirical), instrumental and normative (prescriptive). Along these lines, stakeholder relationships can be conceived of at different levels of abstraction (Bosse & Coughlan, 2016): between individuals, between the firm and a specific stakeholder group, or between the firm and all stakeholders simultaneously (Sluss & Ashforth, 2008). Relationships between individuals represent low levels of abstraction and are consequently more accurate predictors of individual behaviour but induce more complexity (Bosse & Coughlan, 2016). Adversely, relationships between the firm and all stakeholders represent high levels of abstraction and are consequently analytically simpler, however raise difficult methodological questions of how to empirically combine relationships across all stakeholders and are less inclined to be empirically predictive (Bosse & Coughlan, 2016).

Accordingly, when assessing environmental performance and the influence it has on financial performance, the level of abstraction most empirically and practically favourable, is that of the relationship between the firm and a stakeholder group. As such, that is the level of abstraction at which this study is grounded; that being, the relationship between the firm (financial performance) and the natural environment as a stakeholder (environmental performance). This perspective is supported by Starik (1995) who proclaimed that the non-human natural environment merits stakeholder status on the basis of three contentions: (I) the natural environment *affects* the firm and considering *affecting the firm is* – on some definitions – a sufficient condition for stakeholder status, the natural environment qualifies as a stakeholder on the premise of the *affect or affected by* criterion; (II) the environmental ethic of wise stewardship towards natural resources, implies that organizations are morally obligated to respect non-human nature's bounty and limits, and therefore, its function as a potential stakeholder of these organizations; (III) non-human nature already bears the existence of human beings as proxies on its behalf – such as the Environmental Protection Agency – whom advocate for the environment, rendering the stakeholder status for the natural environment redundant (Starik, 1995).

On the basis of these arguments, the usage of Instrumental Stakeholder Theory employed in this study, follows that used by Donaldson and Preston (1995:69), whom define Instrumental Stakeholder Theory as “a framework for examining the connections, if any, between the

practice of stakeholder management and the achievement of various financial performance goals. The authors additionally claim that the principal focus of interest in existing Instrumental Stakeholder Theory, has been the notion that “corporations practicing stakeholder management will – *ceteris paribus* – be relatively successful in conventional performance terms (Donaldson & Preston, 1995: 67). Instrumental Theory establishes theoretical connections between certain practices (environmental) and certain end states (financial), making no assumption that practices will be followed and that end states are desirable; rather, “if you want to achieve (avoid) results X,Y,Z, then adopt (don’t adopt) principles and practices A, B, C (Donaldson & Preston, 1995: 67).

The central and contentious debate in many scholarly contexts concerns the relationship between environmental performance and financial performance, where extant theoretical and empirical literature has supported both conflicting positions (Horváthová, 2010). Continuing with this approach of applying existing organizational theory to the phenomenon of firm-stakeholder relations, Stakeholder Theory – and more specifically Instrumental Stakeholder Theory – indeed serves as a rational bedrock from which to ground the research problem. The presented typology of Stakeholder Theory is appropriate to address the need for a clearly articulated empirical reasoning, concerning how firm-stakeholder relations (this case being

Literature Review: The Link Between Environmental Performance and Financial Performance

How does environmental performance affect financial performance? Following more than three decades of attentive empirical and theoretical academic research, the results remain inconsistent (Albertini, 2013). As previously mentioned, theoretical inquiries within the neoclassical school of thought, argue that environmental regulation promotes additional costs for firms; this perspective, is hinged on the assumption that pollution abatement and environmental improvements have diminishing net marginal benefits (Walley & Whitehead, 1994). To the contrary, Porter (1991) suggests that environmental regulation can induce win-win situations in which both social welfare and private benefits of firms heighten. Nonetheless, these two opposing viewpoints (a negative *traditionalist* philosophy versus a positive *revisionist* philosophy towards environmental performance and financial performance relations) are confronted with comparable logic that proposes an inverse U-shaped relationship – concluding a positive relationship between environmental performance and financial performance eligible only to the level of environmental performance where economic benefits are maximised (Wagner, 2001). Indifferently, McWilliams and Siegel (2001) advocate for a neutral relationship between environmental and financial performance, on account that firms who restrict investment in environmental practices will have lower costs and lower prices, while firms who permit investments in environmental practices will have higher costs although valued greater by customers, willing to pay higher prices.

Literature supporting the *revisionist* outlook recognizes overwhelming impetus for sustainability engagement. These benefits comprise bolstered competitiveness (Porter & Van der Linde, 1995); enhanced stakeholder relations and regulatory compliance, higher return on investments and lower financing costs (Derwall & Koedijk, 2009); higher shareholder value (Porter & Kramer, 2011) and superior share performance (Eccles, Ioannoe & Serafeim, 2014). Thus, succeeding Porter's (1991) win-win argument, various studies have suggested that the environmental performance financial performance nexus is positive (Al Tuwaijri, Christensen & Hughes, 2004; Hart & Ahuja, 1996; Judge & Douglas, 1998; Montabon, Sroufe & Narisimhan, 2007; Russo & Fouts, 1997; Sroufe, 2003; Stanwick & Stanwick, 1999) – that is, it pays to be green. Conversely, literature supporting the *traditionalist* viewpoint argues that sustainability engagement is detrimental to financial performance (Shane & Spicer, 1983; Preston & O'Bannon, 1997). This argument is supported by

Hamilton (1995) and Khanna and Damon (1999), who in their studies, assert a negative correlation between the Toxic Release Inventory on share price and return on investment, respectively. Prior equivocal studies however, report an insignificant relationship between the two variables (King & Lenox, 2001; Link & Naveh, 2006).

Similar controversy can be found among reported results in many other studies. Horváthová (2010) performed a meta-analysis on 64 outcomes from 37 empirical studies and concluded that the prevailing inconsistencies among previous studies is by reason of methodological inconsistencies. More recently, Wang, Dou and Jia (2016) scrutinized 119 outcomes from 42 empirical studies, discovering that measurement of the environmental construct creates variation in the results. Thus, review of extant literature shows that not only are empirical findings contradictory, but the use of underlying theoretical assumptions, sampling size across studies, industrial context, research methodologies, data collection methods and data analysis procedures, are inconsistent. The inconsistency of results in the *does it pay to be green* literature however, must most evidently be attributed to the diverging proxies used by researchers in their empirical studies to measure environmental performance and financial performance. The choice of different measures used throughout prior studies, is justified by the multidimensional nature of the constructs environmental performance and financial performance (Trumpp, Endrikat, Zopf & Guenther, 2015).

Financial performance is a meta-construct used as a fundamental indicator of organizational performance and long-term survival; a construct emphasizing the profitability of the firm (Hamann, Schiemann, Bellora, & Guenther, 2013). Pre-existing studies have adopted three broad subdivisions of *corporate financial performance* as measurable dependent variables, namely: accounting-based indicators (accounting returns), market-based indicators (investor returns) and particular organizational endowed measures (Albertini, 2013). According to Cochran and Wood (1984), accounting based indicators – most prominently, return on assets (ROA) and return on equity (ROE) – are subject to managers' discretionary fund allocation and as such, reflect the internal decision-making capabilities and managerial expertise, in lieu of external market responses to organizational actions.

Adversely, market-based indicators – those being earnings per share (EPS), price-to-earnings ratio and share price appreciation – are subject to forces beyond management's control and reflect underlying improvements of the firm's economic performance (Albertini, 2013). The triennial indicator represents organizational processes measured by indicators other than

those of accounting or market-based orientation (Albertini, 2013). Christmann (2000) demonstrates how cost advantages achieved through pollution-controlling equipment; or differentiation advantage achieved through green product sales; or how valuable environmental reputations can likewise be employed as measures of financial performance. Organizational measures are thus intangible in nature, rely on tacit managerial knowledge and are not valuable to stock market investors (Barney, Ketchen & Wright, 2011).

The multidimensional nature likewise holds true for the environmental performance construct. The construct validity study – conducted by Trumpp et al. (2015) – demonstrates that environmental performance manifests two dimensions, namely Environmental Operational Performance (EOP) and Environmental Management Performance (EMP). The latter performance dimension comprises five sub-dimensions each measured by several indicators: environmental policy, environmental objectives, environmental processes, organizational structure and environmental monitoring (Trumpp et al., 2015). These variables signify environmental strategy; the integration of environmental issues into strategic planning processes; environmental practices; product-driven management systems; ISO 14001 certification; and voluntary participation in environmental initiatives (Schultze & Trommer, 2012).

The former dimension appears most ubiquitous as the outcome dimension of environmental performance, used “to measure the actual results of environmental management and to avoid the subjectivity that is often associated with EMP valuation” (Trumpp & Guenther, 2015: 3). EOP’s – also referred to as Environmental Performance Variables (EVP’s) – evaluate the environmental impacts in physical and monetary terms, since company by-products’ affect the environment in varied manners (Molina-Azorín, Claver-Cortés, Lopez-Gamero & Tari (2009). These measures are mostly quantified in physical units {carbon dioxide emissions, physical waste, water consumption, toxic release} producing either positive or negative externalities (Molina-Azorín et al., 2009).

Additionally, Environmental Disclosure Variables (EDV’s), defined as descriptive disclosures outlining the impact company activities have on the natural environment in which they operate – those including toxic emission data releases (Hamilton, 1995), environmental awards (Klassen & McLaughlin, 1996) and environmental investment announcements (Gilley, Worrel & El Jelly, 2000) – are likewise used to observe their effects on financial performance (Molina-Azorín et al., 2009). It must also be emphasized that the extant body of literature is

predominantly devoted towards empirical studies in developed countries and markets – providing further impetus to conduct research in the less popular use of developing countries – as locations for inquiry.

To concisely illustrate the emergence of mixed contemporary results, Table 1 was constructed by including previous empirical literature from 2015 onwards. Table 1 demonstrates familiarity of key and authoritative scholarly works related to the impact of environmental performance on firm financial performance. Modern literature containing EP-FP variables relevant to the proposed study, were decisive criteria for dictating the choice of table inclusion.

Table 1. Review of contemporary empirical literature

Study	Environmental Variables	Financial Variables	Sample Size	Years of Coverage	Theory	Country	Results
Dangelico & Pontrandolfo (2015)	Environmental Performance	Market-based indicators	122	1	None	Italy	Positive
Trumpf & Guenther (2015)	Environmental Performance	Stock Price changes	696	5	Stakeholder Theory	US	U Shaped
Yadav, Han & Rho (2015)	Environmental Performance Disclosure	Abnormal Stock Returns	394	2	Efficient Market Theory	US	Positive
Gregory, Whittaker & Yan (2016)	CSR performance	Firm Value	48 {Industries}	18	None	US	Positive
Hoepner, Oikonomou, Scholtens & Schröder (2016)	Sustainability Performance	Cost of Debt	470	8	Stakeholder Theory	International Sample	Insignificant
Wiengarten, Lo & Lam (2017)	CSR Performance	ROA	123	9	Corporate Social responsibility	US	Positive
Oh, Bae & Kim (2017)	Environmental Management Performance {EMP's}	Stock Return	337	20	Corporate Social Responsibility	US	Negative

Goel & Misra (2017)	Environmental Disclosure Variables {EDV's}	ROE, ROS	120	1	None	India	Insignificant
Nuber, Velte & Hörisch (2018)	ESGEP {Proxy comprising Triple Bottom Line & Governance Performance}	ROA	110	10	Stakeholder-agency Theory	Germany	U Shaped
Gatimbu, Ogada, Budambula, Kariuki (2018)	Environmental Operational Performance	ROA, Leverage, Growth	54	5	None	Kenya	Negative
Ray & Mitra (2018)	Environmental Management Performance {EMP's}	ROA, ROE	100	2	None	India	Positive
Wasara & Ganda (2019)	Environmental Disclosure Variables {EDV's}	ROI	10	5	Stakeholder Theory	South Africa	Negative
Mendonca & Zhou (2019)	Environmental Management Performance {EMP's}	Profitability, Turnover, Debt	267	3	Signalling Theory	US	Positive
Li, Minor, Wang & Yu (2019)	CSR Environmental Disclosure Variables {EDV's}	Stock Return	75	5	Corporate Social Responsibility	International	Positive
Sroufe & Gopalakrishna-Remani (2019)	Sustainability Environmental Disclosure Variables {EDV's}	ROA, ROI	82	3	None	US	Insignificant

Furthermore, conclusive meta-analytical results presented by Horváthová (2010) and Wang et al. (2016), suggest that: the likelihood of discovering a negative association between environmental performance and financial performance, significantly increases when using statistical correlation coefficients; appropriate time coverage is decisive when establishing positive links between the EP-FP nexus; the positive association is found more frequently in common law countries; the financial metric used is trivial; however the environmental performance metric used bears significant consequential importance.

The literature review examined why the results of more than three decades of research concerning the link between environmental performance and financial performance remain inconclusive. Rooted in competing viewpoints, the traditionalist revisionist discordance has inaugurated conflicting sequential research. Friedman (1970) suggesting that sustainability initiatives are subversive doctrines, whereas Porter (1991) advocates beneficial outcomes of investments in sustainability towards all stakeholders. Existing literature has so far neglected the multifaceted nature, of both performance meta-constructs, giving rise to the prevailing fragmentation in contemporary empirical results. Endorsing Stakeholder Theory as a relevant theoretical lens aids validating theoretical claims and corroborating empirical findings.

Research Methodology

Paradigmatic Assumptions and Perspectives

Paradigms inherently reflect the researcher's worldly beliefs and perspectives, providing the conceptual lenses through which methodological aspects and philosophical orientations are defined (Guba & Lincoln, 1994). Locating research in particular paradigms thus guide intended conceptual approaches and the construction of meaning from data (Guba & Lincoln, 1994). This research follows a *positivist* approach, maintaining that science can be conducted in an *objective* manner; hence, knowledge is the result of empirical observation only – designed to yield explanations and deduce predictions from measurable outcomes (Bryman, 2004). Four assumptions uphold these measurable outcomes, namely: determinism, empiricism, parsimony and generalizability (Cohen, Manion & Morrison, 2001).

The assumption of determinism refers to the manner in which observable events are provoked by measurable factors (Cohen, Manion & Morrison, 2001); thus understanding causal relations among the study variables (EP-FP), aids predicting and controlling the effects of explanatory factors on the dependent variable. The assumption of empiricism is upheld as the study intends investigating the research problem by collecting verifiable empirical data – supportive of the chosen theoretical framework (Cohen, Manion & Morrison, 2001).

Parsimony is demonstrated by presenting the research phenomenon in the most prudent and viable manner (Cohen, Manion & Morrison, 2001). Lastly, results obtained – conducted within positivist paradigm – should be applicable to alternative settings through inductive inferences (Cohen, Manion & Morrison, 2001); observing occurrences within the South African metal and mining industry, should thus be relevant to analogous firms in different locale.

Additionally, this approach assumes that social reality can be understood from an external point of view – the realist position – where abstract objects have an objective existence governed by unchangeable natural cause-effect laws (Cohen, Manion & Morrison, 2001). In positivism, existing theory is used to develop hypotheses that will be tested and confirmed – in whole or part, or refuted. Furthermore, it is essential to consider the relationship between theory and research; thus this research will follow a mainly deductive approach. In terms of methodology, positivism is often associated with quantitative methods (Crotty, 1998); as such, concepts will be examined and tested through observable, tangible and clearly defined

variables. The four foundational elements embodying a positivist paradigm are therefore represented in this study as: *objectivist* (epistemology), *naive realism* (ontology), *non-experimental* (methodology) and *beneficence* (axiology).

The choice of such paradigmatic perspective is ideal to explore and investigate the link between corporate environmental performance and corporate financial performance – of which require objective quantitative research, truth and reason. Moreover, such positivist paradigm lends itself to clarifying causal relationships between independent and dependent variables, which necessitate objectifiable and measurable constructs.

Research Design

As previously suggested, this study is defined as explanatory, as the nature of the study aims to provide greater familiarity with the research problem – the impact of environmental performance on corporate profitability. Accordingly, the study is grounded in quantitative methodology; this conceptual approach is most applicable to address the purpose of this research, which attempted to replete the empirical divergences in extant EP-FP literature. The research approach enforced, coordinates harmoniously with the paradigmatic assumptions held – as positivists consider knowledge to be hard, objective and tangible, where reality can be observed directly and accurately. For this reason, it is assumed that by adhering to nomothetic research (research that prescribes law-like actions and generality) (Bryman, 2012) and deriving knowledge from empirical testing, there is greater opportunity to assess the casual link between corporate environmental performance and corporate financial performance.

The study is further characterized by the deductive nature in which existing theory was used to develop the hypothesis. This logical inference navigates from existing Stakeholder Theory towards confirming or refuting the study's hypothesis: *a positive correlation exists between environmental performance and financial performance*. The study's aforementioned explanatory and empirical attributes were further aided by administering non-experimental research to achieve the research objective. To assess the casual link, correlational research (a non-experimental design) – was applied initially as the appropriate instrument for measuring the relationship between two variables without controlling and manipulating extraneous variables; subsequently – with the addition of control variables – empirical research qualities

materialized to mitigate the possibility of existing spurious relations among environmental performance measures and financial performance measures. Additionally, the study is classified as a longitudinal design; this is consistent with previous studies (Earnhart & Lizal, 2007; Hart & Ahuja, 1996) whom likewise – subsequent to environmental performance – capture and test for lag structures in the returns data.

Population and Sampling

The purpose of this study is to examine the effects of environmental performance on financial performance; accordingly – to validate previous theoretical claims and corroborate empirical findings – an adequate sample drawn from clearly designated population parameters was paramount. For this study, the nature and size of the population constituted every metal and mining firm listed on the Johannesburg Stock Exchange. The extent to which findings are representative of the total population however, is dependent on the study's sampling frame – to which the unique characteristics belonging to the populace become imperative.

Accordingly, the total group of entities had to satisfy the fundamental criteria characterizing the population: (I) The firm must be listed on the Johannesburg Stock Exchange; (II) The firm must be registered in South Africa; (III) The firm must be located within the metals and mining sector; (IV) The firm's market capitalization must be large (a spectrum between \$10 billion and \$200 billion). To that end, the population was limited to contextual industry-specific conditions and the aforementioned specifications that define the unit of analysis: the organization.

The strategy of sample selection in quantitative research rests on the multiple purposes of illuminating and resembling the studies population (Bryman, 2012). Considering the heterogeneity among industry divisions within the Johannesburg Stock Exchange, a non-probability, purposive sampling technique was the sampling procedure used for entity selection throughout this study. The commonality throughout purposive sampling typologies, is that entities are selected according to predetermined criteria – relevant to particular research objectives (Bryman, 2012). The objectives for the study are to replete the empirical divergences in extant literature and to assess the casual link between corporate environmental performance and corporate financial performance by examining the market returns of large capitalization South African metal and mining companies, listed on the Johannesburg Stock Exchange. Thus, in order to elicit data required to meet the objectives of the study,

homogenous samples – those satisfying the population parameters – were chosen to provide rich and contextual data of the particular phenomenon. The selection of homogenous samples directs the study towards answering the research question; subsequently, industry-based variations among listed firms were voided to comply with nomothetic research concerning metal and mining entities only.

A concern for generalization dominates quantitative inquiry; for generalizability and repeatability to materialize, identifying sample size and composition is essential (Bryman, 2012). Given the purposes of practicality, quantitative research designs should specify minimum samples based on expected reasonable coverage of the particular phenomenon; accordingly, the target population consisted of 28 industrial metal and mining companies listed on the Johannesburg Stock Exchange, of which every firm is eligible for sample inclusion. Given the nature and objectives of the study, the intended sample size of 12 firms was fully justified to capture accurate statistical inferences representative of the entire industrial metal and mining sector in South Africa.

Data-collection Method and Conceptualization

As previously mentioned, the inconsistency in the *does it pay to be green* literature must be without doubt, ascribed to the diverging proxies used by researchers in their empirical studies to measure environmental performance and financial performance – constructs of which constitute important sources of inclusiveness among former empirical findings and subsequently, account for the failure to establish consensus (Horváthová, 2010). Accordingly, each performance construct used bears significant conclusive importance and requires the inclusion of exhaustive and systemic dimensions to account for previous contradicting outcomes.

Dependent Variable

Pre-existing studies have adopted three broad subdivisions of *corporate financial performance* (Albertini, 2013); this study employed both accounting-based indicators and market-based indicators as measurable dependent variables in the analysis of financial performance. More specifically, return on assets (ROA) and Tobin's Q (TBQ) were adopted as proxies for accounting-based and market-based measures respectively.

ROA measures a firm's profitability relative to funds invested by common stockholders, preferred stockholders and suppliers of debt financing; this ratio reflects short-term corporate financial performance (Earnhart & Lizal, 2007). From an accounting perspective, ROA is measured as the ratio between the firm's net income and average book value of total assets (Elsayed & Paton, 2005). TBQ measures the market value of a firm relative to the replacement cost of its assets; this ratio reflects long-term corporate financial performance (King & Lenox, 2001). From a market-based perspective, TBQ is measured as the ratio between the firm's market value (expressed as the total number of outstanding shares multiplied by the current market price) and the book value of total assets (King & Lenox, 2001).

Adopting both indicators manifested an unbiased financial perspective that reflects internal managerial decision-making capabilities and external market responses to organizational activities (Albertini, 2013). Financial data was collected from the distinguished analytics firm – ShareData – whom are a leading provider of financial data feeds and analysis tools in Africa.

Independent Variable

Corporate environmental performance measures used in previous studies differ considerably – demonstrating the multidimensional nature with which the construct can be defined (Horváthová, 2010). Attempting to overcome the limitations produced by the use of one-dimensional performance measures, the study embraced the ESG (environmental, social and corporate governance) framework to reflect the degree of environmental practices implemented by firms and the outcomes obtained. Based on publicly-reported data, ESG scores are designed to transparently and objectively measure a company's relative ESG performance, commitment and effectiveness across 10 respective themes; these scores are data-driven – accounting for the most material industry metrics without company size and transparency biases (Clark, Feiner & Viehs, 2015).

The behavior of an ESG dedicated company reflects environmental consciousness (preservation of natural environments and biodiversity, reduced ecological impact, lower harmful carbon emissions, reduced water usage); social awareness (promotion of diversity and human rights, workplace health and safety, ethical behavior); and best practices in corporate governance (accountability and transparency, eradication of corporate corruption

and unfair practices) (Clark, Feiner & Viehs, 2015). Thus, integrated ESG reporting accurately presents the firm's health and its long-term performance in the context of sustainable development (Roman, Mocanu & Hoinaru, 2019).

More specifically, the environmental performance variable used in this study, is greatly influenced by the environmental pillar that constitutes the ESG structure. The environmental pillar reflects the extent to which a firm utilizes best management practices to avoid environmental risks and to capitalize on environmental opportunities, in furtherance of long-term stakeholder value (Roman, Mocanu & Hoinaru, 2019). The environmental score is an aggregation matrix of three underlying categories tallying 10 central themes (Clark, Feiner & Viehs, 2015):

1. **Emission Reduction:** measures the firm's effectiveness and commitment towards reducing environmental emissions during production and operational processes; this reflects the organizations capacity to mitigate air emissions, reduce hazardous waste, lessen water discharge and subsequent biodiversity repercussions, and apply environmental management systems.
2. **Product Innovation:** measures the firm's effectiveness and commitment towards supporting research and development of eco-efficient products and services; this reflects the organizations capacity to mitigate environmental costs for consumers, design eco-products with extended durability, and generate green revenues conceived through contemporary environmental technology.
3. **Resource Reduction:** measures the firm's effectiveness and commitment towards achieving the complete and efficient use of natural resources during production and operational processes; it reflects the organizations capacity to mitigate the use of detrimental materials and promote the use of sustainable packaging, reduce water and energy misuse, and streamline supply chain management by applying eco-efficient solutions.

Therefore, the corporate environmental performance measure used in this study exhibits an integrated multidimensional complexion, embodying dimensions of both Environmental Operational Performance (EOP) and Environmental Management Performance (EMP) as identified in the literature (Trumpp et al., 2015). These Environmental Disclosure Variables (EDV's) were used to observe their effects on financial performance within the South African

industrial metals and mining industry. To capture the required environmental data, this study retrieved information from the FTSE/JSE Responsible Investment Index (RI Index) and Morgan Stanley Capital International (MSCI). As of 2015, the JSE partnered with FTSE Russell – a leading global benchmark, analytics and data solutions provider – to offer an objective methodology that further promotes the aims of stimulating greater transparency by corporates on environmental, social and governance (ESG) considerations.

Control Variables

To mitigate the possibility of existing spurious relations among environmental performance measures and financial performance measures, three control variables were admitted during the data analysis procedure, namely: sales growth, financial leverage and capital intensity. Accounting for the aforementioned variables minimizes the influences of inherent firm characteristics. Sales turnover is a metric measured by the difference between current and prior period sales figures; financial leverage – measured as the ratio of total long-term debt-to-total assets – simply indicates the presence of debt within the capital structure of a firm; and capital intensity – measured as the ratio of total assets-to-sales revenue – refers to the extent to which fixed capital is present in relation to alternative factors of production.

The process of collecting secondary data is a retrospective data collection technique; the approach supports the aims of this longitudinal study and provides a wealth of purely statistical data unattainable by alternative data-collection methods. Additional time-saving and cost-efficiency benefits; the difficulty of directly contacting the study's unit of analysis; and the prospective industry case analysis, reinforced the application of secondary data collection.

Data Analysis Method

The model used to investigate the impact of corporate environmental performance on firm financial performance was grounded in panel data methodology. Panel data – sometimes referred to as longitudinal data – refers to a dataset constructed from reiterating cross-sections and longitudinal sections over time (Hsiao, 2014). Analogous to time-series data, panel data contains observations collected at regular chronological frequency, providing robust analysis opportunities for assessing trends and relationships over time (Hsiao, 2014). Accordingly,

panel data analysis was performed between the years 2015 and 2020 using data obtained from previously mentioned ESG reports and audited annual financial statements concerning respective industrial mining and metal industry constituents. Fixed effects or random effects models are two commonly adopted estimation models used within panel data analysis. The two-dimensional nature of panel data gives rise to opposing estimation models; the former assumes that variation between individuals/entities is fixed with respect to time – possessing time-invariant factors; the latter assumes that variation between individuals/entities is random with respect to time – possessing time-variant factors (Hsiao, 2014).

The Hausman test – described as a measure of model misspecification (models that possess biased coefficients, biased parameter estimations and error terms) – is used widely in panel data analysis for detecting endogenous regressors (predictor variables) within regression models; the test explicitly determines the estimation model of best fit (Hausman, 1978). Accordingly, a random effects model is appropriate if the level of significance is large (p-value greater than 0.05), whilst a fixed effects model is applicable if the level of significance is small (p-value less than 0.05). Implementing panel data analysis allowed the study to consider entity-specific heterogeneity; enhanced data collinearity; provided additional degrees of freedom; accounted for heteroskedasticity and controlled for endogeneity complications (Hsiao, 2014). Thus, from a methodological standpoint, panel data was advantageous for controlling firm-specific unobserved time-invariant factors – resulting in the alleviation of *omitted variable problem* – likely to arise when studying the impact of environmental performance on firm financial performance (Horváthová, 2010).

Subsequent to data collection, descriptive statistics regarding all variables used in the study were tabulated to provide a coherent and meaningful analysis. Furthermore, to empirically test the relationship between environmental performance and firm financial performance, simple linear regression and multiple regression models were adopted to account for all predictor (control) variables. Regression analysis is a powerful statistical method used to determine the degree to which particular independent variables are influencing the dependent variable (Jensen & Ramirez, 2012); thus, applying both models accounted for the inherent realities present in firm and industry dynamics. The following simple linear regression and multiple regression equations are respectively stated below:

1. Corporate Financial Performance_{i,t} = $\alpha + \beta_1(\text{Corporate Environmental Performance}_{i,t}) + \epsilon_{i,t}$
2. Corporate Financial Performance_{i,t} = $\alpha + \beta_1(\text{Corporate Environmental Performance}_{i,t}) + \beta_2(\text{Sales Turnover}_{i,t}) + \beta_3(\text{Leverage Factor}_{i,t}) + \beta_4(\text{Capital Intensity}_{i,t}) + \epsilon_{i,t}$

where CFP is represented by ROA and TBQ; α represents the unknown intercept; β represents each independent variable with i individuals and t periods; CEP is represented by respective ESG environmental scores; and ϵ represents the random error term. A summary of the study's research variables and their respective measurements are provided in Table 2 below.

Table 2. Overview of principal research variables and measurement instruments.

Research Variable	Measurement
Return on Assets	Net Income $\div$ Average Total Assets
Tobin's Q	Total Market Value $\div$ Total Asset Replacement Value
Environmental Performance	Environmental Score of ESG Structure
Sales Turnover	(Current Year Sales - Previous Year Sales) $\div$ Previous Year Sales
Financial Leverage	Total Long-Term Debt $\div$ Total Assets
Capital Intensity	Total Assets $\div$ Sales Revenue

Empirical Results

This section illustrates the results and discussion of findings. The IBM SPSS statistical software platform, which offers advanced statistical analysis and robust machine learning algorithms, was used to analyze every essential variable within the study. Table 3 presents the study's descriptive statistics for the dependent, independent and control variables used – summarizing 60 specific variable observations captured between the years 2015 and 2020 with reference to 12 metal and mining firms listed on the Johannesburg Stock Exchange.

Table 3. Overview of descriptive statistics for the period 2015-2020.

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Return on Assets	60	7.06	11.43	-18.07	43.70
Tobin's Q	60	0.55	0.74	-2.01	3.24
ESG Score	60	3.56	1.01	2	5
Sales Turnover	60	10.49%	18.98	-36%	73.10%
Financial Leverage	60	0.60	0.44	0.01	1.76
Capital Intensity	60	1.94	0.89	0.54	4.26

In Table 4, the correlation matrix for dependent and independent variables are presented. The correlation coefficients between the set of dependent and independent (predictor) variables – used within the regression models presented below – are less than 0.80, indicating that the threat of multicollinearity is limited (Surroca, Tribo & Waddock, 2010). Table 4 depicts a weak positive correlation between ROA and ESG scores of 0.2940; likewise, a weak negative correlation exists between Tobin's Q and ESG scores of -0.0225. The analysis of variance inflation factors (VIF) for all predictor variables – as shown in Table 5 – confirms the absence of multicollinearity within the study, given that all VIF values are less than 10 (Surroca, Tribo & Waddock, 2010).

Table 4. Correlation coefficients matrix among study variables.

Variables	Return on Assets	Tobin's Q	ESG Score	Sales Turnover	Financial Leverage	Capital Intensity
Return on Assets	1					
Tobin's Q	0.5739	1				
ESG Score	0.2940	-0.0225	1			
Sales Turnover	0.2248	0.4187	-0.2068	1		
Financial Leverage	-0.1623	-0.3838	-0.3228	-0.0935	1	
Capital Intensity	-0.0760	-0.001	0.3235	-0.1415	-0.3505	1

Table 5. Variance inflation factor (VIF).

ROA and Tobin's Q		
Variable	VIF	1/VIF
ESG Score	1.215	0.823045
Sales Turnover	1.030	0.970874
Financial Leverage	1.209	0.827130
Capital Intensity	1.208	0.827815

Table 6 presents an overview of the simple linear regression model, in which ROA, Tobin's Q and ESG scores, were entered as dependent and predictor model inputs respectively. The R Square value indicates the proportion of variation in the outcome variable that can be explained by the model (predictor variable); accordingly, 0.086 and 0.001 of the variability in yearly ROA's and Tobin's Q respectively, can be accounted for by yearly ESG score variance.

To test whether the model is a significant predictor of the outcome variable, an ANOVA (Analysis of Variance) table was constructed. The correlation between ROA and ESG scores, represented by R, is statistically significant; thus, the regression model significantly predicts ROA as a financial performance metric. This significance is represented by the formula:

$$F(1,58) = 5.487, p < 0.05.$$

The correlation between Tobin's Q and ESG scores, represented by R, is not statistically significant; thus, the regression model does not significantly predict Tobin's Q as a financial performance metric. This insignificance is represented by the formula:

$$F(1,58) = 0.029, p > 0.05.$$

The coefficients table suggests that on average, an additional yearly ESG score yields an increase of 3.312 and decrease of 0.017 for ROA and Tobin's Q respectively; however, this yield increase and decrease is – with 95% confidence – between 0.482 and 6.143 for ROA, and between -0.210 and 0.177 for Tobin's Q. The statistical significance between ROA and ESG scores produces a final predictive model represented as:

$$\text{Return on Assets} = -4.749 + 3.312$$

Table 6. Simple linear regression model summary.

Model Summary	ROA	Tobin's Q
R	0.294	0.023
R Square	0.086	0.001
Adjusted R Square	0.071	-0.017
Std. Error of Estimate	11.01976	0.75441
ANOVA (Regression)		
Sum of Squares	666.297	0.017
Degrees of Freedom	1	1
Residual	58	58
F	5.487	0.029

Sig.	0.023	0.864
Coefficients		
Constant	-4.749	0.615
Unstandardized Beta	3.312	-0.017
Coefficients Std. Error	1.414	0.097
t	2.342	-0.172
Sig.	0.023	0.864
95% Confidence Interval Lower Bound	0.482	-0.210
95% Confidence Interval Upper Bound	6.143	0.177
Dependent variables: ROA and Tobin's Q		
Predictor variable: ESG Score		

Table 7 presents an overview of the multiple regression model, in which dependent variables – represented by ROA and Tobin's Q – and predictor variables – represented by ESG scores, sales turnover, financial leverage and capital intensity – were used as model inputs. As previously mentioned, the R Square value indicates the proportion of variation in the outcome variable that can be explained by the model (predictor variable); accordingly, 0.201 and 0.303 of the variability in yearly ROA's and Tobin's Q respectively, can be accounted for by yearly variance in the four predictor variable inputs.

The Durbin-Watson test statistic was used to detect the presence of autocorrelation at lag 1 within the residuals (prediction errors) of the regression model. The Durbin-Watson test statistic of 1.268 and 1.495 for ROA and Tobin's Q respectively, is indicative of positive serial autocorrelation – a data characteristic in which consecutive errors have the same sign: positive residuals are almost always followed by positive residuals. To test whether the model is a significant predictor of the outcome variable, an ANOVA (Analysis of Variance) table was constructed. The correlation between ROA and all predictor variables, represented by R, is statistically significant; thus, the multiple regression model significantly predicts ROA as a financial performance metric. This significance is represented by the formula:

$$F(4,55) = 3.470, p < 0.05.$$

The correlation between Tobin's Q and ESG scores, represented by R, is also statistically significant; thus, the regression model does significantly predict Tobin's Q as a financial performance metric. This insignificance is represented by the formula:

$$F(4,55) = 5.970, p < 0.05.$$

The coefficients table illustrates the contribution of every variable as a predictor of the dependent variable; thus, each unstandardized coefficient is indicative of the influence the independent variables assume on the dependent variable. The findings of this research suggest that on average, an additional yearly ESG score, yields an increase of 4.347 and decrease of 0.038 for ROA and Tobin's Q respectively; additionally, ESG scores ($\beta = 4.347$, $p < 0.05$) have the biggest predictive influence on ROA, whereas financial leverage ($\beta = 4.347$, $p < 0.05$) assumes the largest predictive influence on Tobin's Q.

Table 7. Multiple regression model summary.

Model Summary	ROA	Tobin's Q
R	0.449	0.550
R Square	0.201	0.303
Adjusted R Square	0.143	0.252
Std. Error of Estimate	10.57965	0.64706
Durbin-Watson	1.268	1.495
ANOVA (Regression)		
Sum of Squares	1553.439	9.999
Degrees of Freedom	4	4
Residual	55	55
F	3.470	5.970

	Sig.		0.013		0.000
Coefficients	Unstandardized Beta	Coefficients Std. Error	t	Sig.	
ESG Score	4.347	1.513	2.874	0.006	
	-0.038*	0.093*	-0.408*	0.685*	
Sales Turnover	0.163	0.076	2.141	0.037	
	0.014*	0.005*	3.066*	0.003*	
Financial Leverage	-2.040	3.484	-0.586	0.561	
	-0.660*	0.213*	-3.095*	0.003*	
Capital Intensity	-2.443	1.716	-1.424	0.160	
	-0.059 *	0.105*	-0.563*	0.575*	

Dependent variables: ROA and Tobin's Q*

Predictor variables: ESG Score, Sales turnover, Financial Leverage, Capital Intensity

Selecting the most suitable panel data regression model is vital in empirical studies. According to Baltagi (2005:12), "The fixed effects model is an appropriate specification if we are focusing on a specific set of N firms and our inference is restricted to the behavior of this set of firms". This study specifically focuses on the behavior of South African metal and mining firms listed on the JSE. On the other hand, performing the Hausman test ($p > 0.05$) strongly suggested the adoption of the random effects estimation model. For these reasons, a multi-regression approach employing both fixed and random effect estimations was most suitable.

Random Effect Model for ESG Score and Return on Assets

Table 8 illustrates compelling statistics where the confidence interval was set at 95% with p values less than 5% regarded to be significant. The findings depict a positive predictor relationship between ESG scores, sales turnover and ROA; this suggests that an increase in ESG scores and sales turnover, is accompanied by an increase in ROA of 0.868542 and 0.020049 respectively. The findings additionally illustrate a meaningful negative association between financial leverage, capital intensity and ROA at the 5% significance level; this suggests that an increase in financial leverage and capital intensity, is accompanied by a decrease in ROA of 11.817211 and 5.044356 respectively. Therefore, highly geared and

capital-intensive firms – distinctive to the metal and mining industry – experience reductions in ROA as a metric of financial performance.

Fixed Effect Model for ESG Score and Return on Assets

Table 8 depicts a negative predictor relationship between ESG score and ROA, and a positive predictor relationship between sales turnover and ROA; this implies that an increase in ESG score is accompanied by a reduction in ROA by 1.142, and an increase in sales turnover is accompanied by an increase in ROA by 0.008. The findings additionally illustrate a meaningful negative association between financial leverage, capital intensity and ROA at the 5% significance level; this suggests that an increase in financial leverage and capital intensity, is accompanied by a decrease in ROA of 14.218 and 5.849 respectively. This further supports the assertion that highly geared and capital-intensive firms – distinctive to the metal and mining industry – experience reductions in ROA as a metric of financial performance.

Table 8. ESG score and return on assets.

Variables	Random Effect Model		Fixed Effect Model	
	Coefficient	Standard Error	Coefficient	Standard Error
ESG Score	0.868542	1.837094	-1.142	2.289
Sales Turnover	0.020049	0.024039	0.008	0.026
Financial Leverage	-11.817211**	3.285611	-14.218**	3.755
Capital Intensity	-5.044356**	1.816524	-5.849**	2.194
Constant	20.57334	8.608943	45.681	12.708
Sigma_u	9.4507			
Sigma_e	6.0042			
Rho	0.7124			

Notes: ** represents statistical significance at 5% level

Random Effect Model for ESG Score and Tobin's Q

Table 9 illustrates compelling statistics where the confidence interval was set at 95% with p values less than 5% regarded to be significant. The findings depict a negative predictor relationship between ESG score and Tobin's Q, and a meaningful positive predictor relationship between sales turnover and Tobin's Q at the 5% significance level; this implies that an increase in ESG score is accompanied by a reduction in Tobin's Q by 0.078075, and an increase in sales turnover is accompanied by an increase in Tobin's Q by 0.004864. The findings additionally illustrate a meaningful negative association between financial leverage and Tobin's Q at the 5% significance level, and a negative predictor relationship between capital intensity and Tobin's Q; this suggests that an increase in financial leverage and capital intensity, is accompanied by a decrease in Tobin's Q of 0.774918 and 0.103710 respectively. Therefore, highly geared and capital-intensive firms – distinctive to the metal and mining industry – experience reductions in Tobin's Q as a metric of financial performance.

Fixed Effect Model for ESG Score and Tobin's Q

Table 9 depicts a negative predictor relationship between ESG score and Tobin's Q, and a positive predictor relationship between sales turnover and Tobin's Q; this implies that an increase in ESG score is accompanied by a reduction in Tobin's Q by 0.333, and an increase in sales turnover is accompanied by an increase in Tobin's Q by 0.003. The findings additionally illustrate a meaningful negative association between financial leverage and Tobin's Q at the 5% significance level and a negative predictor relationship between capital intensity and Tobin's Q; this suggests that an increase in financial leverage and capital intensity, is accompanied by a decrease in Tobin's Q of 0.793 and 0.231 respectively. This further supports the assertion that highly geared and capital-intensive firms – distinctive to the metal and mining industry – experience reductions in Tobin's Q as a metric of financial performance.

Table 9. ESG score and Tobin's Q.

Variables	Random Effect Model		Fixed Effect Model	
	Coefficient	Standard Error	Coefficient	Standard Error
ESG Score	-0.078075	0.099434	-0.333	0.237
Sales Turnover	0.004864**	0.002289	0.003	0.003

Financial Leverage	-0.774918**	0.221186	-0.793**	0.389
Capital Intensity	-0.103710	0.110988	-0.231	0.228
Constant	1.431699	0.456740	3.100	1.318
Sigma_u	0.5064			
Sigma_e	0.6259			
Rho	0.06144			

Notes: ** represents statistical significance at 5% level

Discussion

This study has attempted to address what has become a perennial question: whether corporate environmental performance is associated with corporate financial performance. In undertaking this research, the study explored whether or not causal linkages exist between CEP behaviors and CFP. By employing comprehensive multidimensional metrics as constructs for environmental performance and financial performance, the study evaluated the association between said independent and dependent variables during the fiscal period of 2015-2020, using data obtained from industry-specific firms. Seeking to replete the empirical divergences in extant literature, this study employed a multi-regression technique to establish the relationship between environmental performance and corporate performance, by examining the financial returns of large capitalization South African metal and mining firms listed on the Johannesburg Stock Exchange.

In support of those studies that have suggested the environmental performance financial performance nexus is positive (Al Tuwaijri, Christensen & Hughes, 2004; Dangelico & Pontrandolfo, 2015; Gregory, Whittaker & Yan, 2016; Hart & Ahuja, 1996; Judge & Douglas, 1998; Li, Minor, Wang & Yu, 2019; Mendonca & Zhou, 2019; Montabon, Sroufe & Narisimhan, 2007; Ray & Mitra, 2018; Russo & Fouts, 1997; Sroufe, 2003; Stanwick & Stanwick, 1999; Wiengarten, Lo & Lam, 2017; Yadav, Han & Rho, 2015) – that is, it pays to be green – this study asserts that a significant positive relationship exists between environmental performance and financial performance (ROA); thus, adopting ROA as an accounting based financial performance proxy, resulted in reaffirming conclusive findings. As such, the research hypothesis must be accepted. This proposition is supported by Instrumental Stakeholder Theory, as a framework for establishing theoretical connections between certain practices (environmental) and certain end states (financial). These results further uphold the notion that “corporations practicing stakeholder management will – *ceteris paribus* – be relatively successful in conventional performance terms (Donaldson & Preston, 1995: 67).

Nonetheless, adopting Tobin’s Q as a market-based financial performance proxy, resulted in contradicting statistical findings. In support of those studies that have suggested the environmental performance financial performance nexus is negative (Gatimbu, Ogada, Budambula & Kariuki, 2018; Hamilton, 1995; Khanna & Damon, 1999; Oh, Bae & Kim,

2017; Preston & O'Bannon, 1997; Shane & Spicer, 1983; Wasara & Ganda, 2019) – that is, it does not pay to be green – this study asserts a significant negative relationship exists between environmental performance and financial performance (Tobin's Q). The statistical divergence in results, can be attributed to the multidimensional nature with which financial performance has been defined within this study. The reliability of Tobin's Q – as a proxy for financial performance – confides notably in the firms market value, which is heavily influenced by the current share price. Accordingly, the degree of share price volatility rests upon investor sentiment, which is an untenable assumption in the financial markets of developing countries.

Corruption, poverty, political instability, sluggish unemployment levels, violent crime, ineffective state-owned enterprises (SOE's) and uncertain economic conditions, have fuelled enduring market turbulence and volatility – shaping greater share price fluctuation among South African JSE listed firms. The South African mining industry in particular, has experienced routine labour strikes that have shocked investors for the last decade. Recurrent mining strikes have stimulated downgrades to South Africa's credit ratings – provoking further loss of investor risk appetite. These macroeconomic factors may explain the aforementioned negative association between environmental performance and financial performance (Tobin's Q). Because Tobin's Q reflects market sentiment and future financial biases, the hypothesis remains valid.

Evidence of validity and reliability are prerequisites to assure both integrity and quality of research findings, and consistency and rigor of measurement instruments used. Content validity – the extent to which a research instrument accurately measures all aspects of a construct (Collis & Hussey, 2003) – and construct validity – the extent to which a research instrument measures the intended construct (Collis & Hussey, 2003) – were greatly enhanced by using metrics that captured both internal and external financial performance, and metrics that encompassed a multidimensional composite of environmental performance. Predictive validity – the extent to which an instrument used possesses high correlations with future criteria (Collis & Hussey, 2003) – was aided by the use of both regression models to empirically test the relations that hold between environmental performance and financial performance. Accordingly, the study's internal validity is supported by the proposed research design, which manifested non-experimental qualities – required to answer the research question. Furthermore, the study's external validity was reinforced by the industry-specific

firms used as data-collection entities, empowering the ability to generalize findings to the entire South African industrial metals and mining sector.

The second measure of quality in quantitative research is reliability; this refers to accuracy, credibility and consistency of the measurement instruments used (Mouton, 1996). To confirm the absence of multicollinearity – a state of data disturbance characterized by high intercorrelations or inter-associations among independent variables (Jensen & Ramirez, 2012) – a variance inflation factor (VIF) and correlation coefficient for all predictor variables were measured. Subsequently, homogeneity (internal consistency) – a reliability attribute gauging the consistency with which each entity measures the same construct (Collis & Hussey, 2003) – was assessed using split-half reliability, suggesting that both halves are equally correlated. Furthermore, the sourcing of data from reputable analytics providers governed the foundation for reliable generalizations.

Conclusion

This paper investigated the effect of environmental performance on firm financial performance. Using a sample of 12 large capitalization South African metal and mining firms listed on the JSE, a retrospective data collection technique was implemented to collect both ESG data and firm financial data for the fiscal period 2015-2020. Multiple regression approaches were deployed to analyze the data and mixed results were produced. Firstly, a significant positive correlation exists between environmental performance and ROA, among large capitalization South African metal and mining firms listed on the JSE. Secondly, a significant negative correlation exists between environmental performance and Tobin's Q, among large capitalization South African metal and mining firms listed on the JSE.

Because the case for sustainable finance is inconsistent, environmental issues and their implications for firm financial performance have presented immense research opportunities to clarify the dynamic relations that hold between financial benefit and environmental concern. The implementation of environmental practices have important effects on firm financial performance; by using ROA as a proxy with which to define the financial performance construct – Instrumental Stakeholder Theory was corroborated – indicating that the adoption of environmental practices leaves firms experiencing greater competitive advantages and enhanced stakeholder relations. This paper recommends that firms should emphasize stakeholder engagement as a means for enhancing financial performance.

More specifically, industrial metal and mining companies in South Africa are facing increasing pressure from varying stakeholders to report on activities that concern their endeavours to mitigate harmful environmental externalities; as such, providing evidence of financial gain with respect to environmental performance, is certainly of interest to firms and managers seeking to implement sustainable practices. Subsequently, the correlation between environmental performance and Tobin's Q, may prospectively produce positive associations as market sentiment adjusts to stable market conditions.

This research endeavour was successful in answering the research question and accepting the research hypothesis. Further inquiry into developing markets and the association between environmental performance and firm financial performance, is required to provide validation; additionally, conducting studies outside the confines of metal and mining firms within South

Africa, are promising avenues for investigating empirical sustainability. Research does not always involve collection of data from participants; however, ethical concerns regarding data confidentiality and security remain omnipresent. As such, firm confidentiality was assured and preserved by not revealing identifying names in the data collection, data analysis and reporting of the study findings. Additionally – as a researcher – falsifying information, distorting research findings and allowing bias to influence the interpretation of results was avoided, as to produce valid, reliable and credible conclusive evidence.

The study has several limitations. Firstly, the study sample consists of firms solely located within the industrial metal and mining industry – prohibiting the generalization of findings to firms outside the research scope. Moreover, the proxy for firm size limits generalization of findings towards small and medium enterprises. Secondly, the results obtained may have been contrived by potential endogeneity influences; thus, introducing one-year lagged explanatory variables mitigated the likelihood of correlations between predictor variables and the error term. Thirdly, the study's approach to measuring both environmental performance and financial performance constructs, are grounded in robust environmental scores and audited financial statements respectively; however, possible limiting influences in scope and measurement methodology may exist in archival records.

Reference List

- Al Tuwaijri, S., Christensen, T. and Hughes, K. 2004. The relations among environmental disclosure, environmental performance, and the economic performance: A simultaneous equations approach. *Accounting Organizations and Society*, 29(5-6): 447-471.
- Al-Najjar, B. and Anfimiadou, A. 2012. Environmental policies and firm value. *Business Strategy and the Environment*, 21(1): 49–59.
- Albertini, E. 2013. Does Environmental Management Improve Financial Performance? A Meta-Analytical Review. *Organization and Environment*, 26(4): 431-457.
- Baltagi, B. 2005. *Econometric Analysis of Panel Data*. New York: John Wiley and Sons.
- Barney, J., Ketchen, D. and Wright, M. 2011. The future of resource-based theory: Revitalization or decline? *Journal of Management*, 37(5): 1299-1315.
- Berman, S., Wicks, A., Kotha, S. and Jones, T. 1999. Does Stakeholder Orientation Matter? The Relationship between Stakeholder Management Models and Firm Financial Performance. *The Academy of Management Journal*, 42(5): 488-506.
- Bosse, D. and Coughlan, R. 2016. Stakeholder relationship bonds. *Journal of Management Studies*, 53(7): 1197–1222.
- Brown, B. 1998. Do Stock Market Investors Reward Companies with Reputations for Social Performance? *Corporate Reputation Review*, 1(3): 271–280.
- Brundtland, G. 1987. Report of the World Commission on Environment and Development: Our Common Future.
- Bryman, A. 2004. *Social research methods*. 2nd ed. Oxford: Oxford University Press.
- Bryman, A. 2012. *Social Research Methods*. New York: Oxford University Press.
- Christmann, P. 2000. Effects of “best practices” of environmental management on cost advantage: The role of complementary assets. *Academy of Management Journal*, 43(4): 663-680.

- Clark, G., Feiner, A. and Viehs, M. 2015. From the Stockholder to the Stakeholder: How Sustainability Can Drive Financial Outperformance, 5 March 2015. {Online}. Available at: <https://dx.doi.org/10.2139/ssrn.2508281> {Accessed 18 May 2020}.
- Clarkson, M. 1995. A stakeholder framework for analysing and evaluating corporate social performance. *Academy of Management Review*, 20(1): 92-117.
- Cochran, P. and Wood, R. 1984. Corporate social responsibility and financial performance. *Academy of Management Journal*, 27(1): 42-56.
- Cohen, L., Manion, L. & Morrison, K. 2001. *Research methods in education*. 2nd ed. London: RoutledgeFalmer.
- Collis, J. and Hussey, R. 2003. *Business research: A practical guide for undergraduate and postgraduate students*. New York: MacMillan.
- Crotty, M. 1998. *The foundations of social research. Meaning and perspective in the research process*. Thousand Oaks, CA: SAGE Publications.
- Dangelico, R. and Pontrandolfo, P. 2015. Being ‘green and competitive’: The impact of environmental actions and collaborations on firm performance. *Business Strategy and the Environment*, 24(6): 413–430.
- De Mendonca, T. and Zhou, Y. 2019. What does targeting ecological sustainability mean for company financial performance? *Business Strategy and the Environment*, 28(8): 1583–1593.
- Dernbach, J. 1998. Sustainable Development as a Framework for National Governance. *Case Western Reserve Law Review*, 49(1): 1-103.
- Derwall, J. and Koedijk, K. 2009. Socially responsible fixed-income funds. *Journal of Business Finance and Accounting*, 36(1-2): 210–229.
- Donaldson, T. and Preston, L. 1995. Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications. *Academy of Management Review*, 20(1): 65-91.
- Earnhart, D. and Lizal, L. 2007. Effect of pollution control on corporate performance in a transition economy. *European Environment*, 17(4): 247-266.

- Eccles, R., Ioannou, I. and Serafeim, G. 2014. The impact of corporate sustainability on organizational processes and performance. *Management Science*, 60(11): 2835–2857.
- Elkington, J. 1994. Towards the sustainable corporation: Win-win-win business strategies for sustainable development. *California Management Review*, 36(2): 90-100.
- Elsayed, K. and 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.
- Freeman, R. 1984. *Strategic Management: A Stakeholder Approach*. Boston: Pitman.
- Freeman, R. 1994. The politics of stakeholder theory: Some future directions. *Business Ethics Quarterly*, 4: 409-422
- Friedman, M. 1970. The Social Responsibility of Business is to Increase its Profits. *The New York Times Magazine*, 13 September, 1970.
- Gallego-Álvarez, I., García-Sánchez, I. and Silva Vieira, C. 2014. Climate change and financial performance in times of crisis. *Business Strategy and the Environment*, 23(6): 361–374.
- Gatimbu, K., Ogada, M., Budambula, N. and Kariuki, S. 2018. Environmental sustainability and financial performance of the small-scale tea processors in Kenya. *Business Strategy and the Environment*, 27(8): 1765–1771.
- Gilley, K., Worrel, D. and El Jelly, A. 2000. Corporate environmental initiatives and anticipated firm performance: The differential effects of process-driven versus product-driven greening initiatives. *Journal of Management*, 26(6): 1199-1216.
- Goel, P. and Misra, R. 2017. Sustainability Reporting in India: Exploring Sectoral Differences and Linkages with Financial Performance. *Vision*, 21(2): 214–224.
- Gossling, T. 2003. The Price of Morality. An Analysis of Personality, Moral Behaviour, and Social Rules in Economic Terms. *Journal of Business Ethics*, 45(1–2): 121–131.

- Gregory, A., Whittaker, J. and Yan, X. 2016. Corporate social performance, competitive advantage, earnings persistence and firm value. *Journal of Business Finance and Accounting*, 43(1-2): 3–30.
- Guba, E. and Lincoln, Y. 1994. *Competing paradigms in qualitative research*. In: Denzin, N and Lincoln, Y. eds. 1994. *Handbook of Qualitative Research*. Thousand Oaks: Sage Publications, Chapter 6: 105-117
- Hamann, P., Schiemann, F., Bellora, L. and Guenther, T. 2013. Exploring the Dimensions of Organizational Performance: A Construct Validity Study. *Organizational Research Methods*, 16(1): 67–87.
- Hamilton, J. 1995. Pollution as news: Media and stock market reactions to the Toxics Release Inventory data. *Journal of Environmental Economics and Management*, 28(1): 98–113.
- Harrison, J. and Freeman, R. 1999. Stakeholders, social responsibility, and performance: empirical evidence and theoretical perspectives. *Academy of Management Journal*, 42(5): 479–485.
- Hart, S. and Ahuja, G. 1996. Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance. *Business Strategy and the Environment*, 5(1): 30-37.
- Hausman, J. 1978. Specification tests in econometrics. *Econometrica*, 46(6): 1251-1271.
- Hoepner, A., Oikonomou, I., Scholtens, B. and Schröder, M. 2016. The effects of corporate and country sustainability characteristics on the cost of debt: An international investigation. *Journal of Business Finance and Accounting*, 43(1-2): 158–190.
- Horváthová, E. 2010. Does environmental performance affect financial performance? A meta-analysis. *Ecological Economics*, 70(1): 52-59.
- Hsiao, C. 2014. *Analysis of Panel Data*. 3rd ed. Cambridge: Cambridge University Press.
- Ike, D. 1984. The System of Land Rights in Nigerian Agriculture. *American Journal of Economics and Sociology*, 43(4): 469-480.

- Jaggi, B. and Freedman, M. 1992. An examination of the impact of pollution performance on economic and market performance: pulp and paper firms. *Journal of Business Finance and Accounting*, 19(5): 697–713.
- Jawahar, L. and McLaughlin, G. 2000. Toward A Descriptive Stakeholder Theory: An Organizational Life Cycle Approach. *Academy of Management Review*, 26(3): 397-414.
- Jensen, D. and Ramirez, D. 2012. Variance Inflation in Regression. *Advances in Decision Sciences*, 1-15.
- Judge, W. and Douglas, T. 1998. Performance implications of incorporating natural environmental issues into strategic planning process: An empirical assessment. *Journal of Management Studies*, 35(2): 241-262.
- Kates, R., Parris, T. and Leiserowitz, A. 2005. What is sustainable development? Goals, indicators, values, and practice. *Environment: Science and Policy for Sustainable Development*, 47(3): 8-21.
- Khanna, M. and Damon, L. 1999. EPA's voluntary 33/50 program: Impact on toxic releases and economic performance of firms. *Journal of Environmental Economics and Management*, 37(1): 1–25.
- King, A. and Lenox, M. 2001. Does it really pay to be green? An empirical study of firm environmental and financial performance. *Journal of Industrial Ecology*, 5(1): 105–116.
- Klassen, R. and McLaughlin, C. 1996. The impact of environmental management on firm performance. *Management Science*, 42(8): 1199-1214.
- Kuhlman, T. and Farrington, J. 2010. What is Sustainability? *Sustainability*, 2(11): 3436-3448.
- Li, Z., Minor, D., Wang, J. and Yu, C. 2019. Learning Curve of the Market: Chasing Alpha of Socially Responsible Firms. *Journal of Economic Dynamics and Control*, 109: 103772.
- Link, S. and Naveh, E. 2006. Standardization and discretion: Does the environmental standard ISO 14001 lead to performance benefits? *IEEE Transactions on Engineering Management*, 53(4): 508–519.

McWilliams, A. and Siegel, D. 2001. Corporate social responsibility: A theory of the firm perspective. *Academy of Management Review*, 26(1): 117–127.

Molina-Azorín, J., Claver-Cortés, E., Lopez-Gamero, M. and Tari, J. 2009. Green management and financial performance: A literature review. *Management Decision*, 47(7): 1080-1100.

Montabon, F., Sroufe, R. and Narisimhan, R. 2007. An examination of corporate reporting, environmental management practices and firm performance. *Journal of Operations Management*, 25(5): 998-1014.

Mouton, J. 1996. *Understanding social research*. Pretoria: Van Schaik.

Nuber, C., Velte, P. and Hörisch, J. 2018. The curvilinear and time-lagging impact of sustainability performance on financial performance: Evidence from Germany. *Corporate Social Responsibility and Environmental Management*, 27(1): 232–243.

Oh, H., Bae, J. and Kim, S. 2017. Can Sinful Firms Benefit from Advertising Their CSR Efforts? Adverse Effect of Advertising Sinful Firms' CSR Engagements on Firm Performance. *Journal of Business Ethics*, 143(4): 643–663.

Porter, M. 1991. America's green strategy. *Scientific American*, 264(4): 96-168.

Porter, M. and Kramer, M. 2011. Creating shared value. *Harvard Business Review*, 89(1-2): 62–77.

Porter, M. and van der Linde, C. 1995. Toward a new conception of the environment-competitiveness relationship. *Journal of Economic Perspectives*, 9(4): 97-118.

Post, J., Preston, L. and Sachs, S. 2002. *Redefining the Corporation, Stakeholder Management and Organizational Wealth*. USA: Stanford University Press.

Preston, L. and O'Bannon, D. 1997. The corporate social–financial performance relationship. *Business and Society*, 36(4): 419–429.

Ray, K. and Mitra, S. 2018. Firm's Financial Performance and Sustainability Efforts: Application of Classifier Models. *Global Business Review*, 19(3): 722–736.

- Roman, A., Mocanu, M. and Hoinaru, R. 2019. Disclosure style and its determinants in integrated reports. *Sustainability*, 11(7): 1960.
- Roome, N. and Wijen, F. 2006. Stakeholder Power and Organizational Learning in Corporate Environmental Management. *Organization Studies*, 27(2): 235-263.
- Russo, M. and Fouts, P. 1997. A resource-based perspective on corporate environmental performance and profitability. *Academy of Management Journal*, 40(3): 534-559.
- Schultze, W. and Trommer, R. 2012. The concept of environmental performance and its measurement in empirical studies. *Journal of Management Control*, 22(4): 375-412.
- Shane, P. and Spicer, B. 1983. Market response to environmental information produced outside the firm. *Accounting Review*, 58(3): 521–538.
- Sluss, D. and Ashforth, B. 2008. How relational and organizational identification converge: Processes and conditions. *Organization Science*, 19(6): 807–823.
- Sroufe, R. 2003. Effects of environmental management systems on environmental management practices and operations. *Production and Operations Management*, 12(3): 416-431.
- Sroufe, R. and Gopalakrishna-Remani, V. 2019. Management, social sustainability, reputation, and financial performance relationships: An empirical examination of U.S. firms. *Organization and Environment*, 32(3): 331–362.
- Stanwick, S. and Stanwick, P. 1999. Exploring voluntary environmental partnerships. *Journal of Corporate Accounting & Finance*, 10(3): 111-125.
- Starik, M. 1995. Should Trees Have Managerial Standing? Toward Stakeholder Status for Non-Human Nature. *Journal of Business Ethics*, 14(3): 207-217
- Sundaram, A. and Inkpen, A. 2004. Stakeholder theory and the corporate objective revisited: A Reply. *Organization Science*, 15(3): 370-371.

Surroca, J., Tribó, J. and Waddock, S. 2010. Corporate responsibility and financial performance: The role of intangible resources. *Strategic Management Journal*, 31(5) 463–490.

Trumpp, C. and Guenther, T. 2015. Too little or too much? Exploring U- shaped relationships between corporate environmental performance and corporate financial performance. *Business Strategy and the Environment*, 26(1): 49-68.

Trumpp, C., Endrikat, J., Zopf, C. and Guenther, E. 2015. Definition, conceptualization, and measurement of corporate environmental performance: A critical examination of a multidimensional construct. *Journal of Business Ethics*, 126(2): 185–204.

United Nations: *Agenda for Development*. New York, USA, 1997.

Waddock, S. and Graves, S. 1997. The Corporate Social Performance – Financial Performance Link. *Strategic Management Journal*. 19(4): 303–319.

Wagner, M. 2001. *A review of empirical studies concerning the relationship between environmental and financial performance. What Does the Evidence Tell Us?* Luneburg, Germany: Centre for Sustainability Management.

Wagner, M., Van Phu, N., Azomahou, T. and Wehrmeyer, W. 2002. The relationship between the environmental and economic performance of firms: An empirical analysis of the European paper industry. *Corporate Social Responsibility and Environmental Management*, 9(3): 133–146.

Walley, N. and Whitehead, B. 1994. *It's not easy being green. The Earth scan reader in business and the environment*. London: Earthscan.

Wang, Q., Dou, J. and Jia, S. 2016. A meta-analytic review of corporate social responsibility and corporate financial performance: The moderating effect of contextual factors. *Business and Society*, 55(8): 1083–1121.

Wartick, S. 1988. How Issues Management Contributes to Corporate Management. *Business Forum*, 13(2): 16-22.

Wasara, T. and Ganda, F. 2019. The relationship between corporate sustainability disclosure and firm financial performance in Johannesburg Stock Exchange (JSE) listed mining companies. *Sustainability*, 11: 4496.

Wiengarten, F., Chris, K., Lo, Y., Jessie, Y. and Lam, K. 2017. How does Sustainability Leadership Affect Firm Performance? The Choices Associated with Appointing a Chief Officer of Corporate Social Responsibility. *Journal of Business Ethics*, 140(3): 477–493.

Wiersum, K. 1995. 200 Years of Sustainability in Forestry: Lessons from History. *Environmental Management*, 19(3): 321-329.

Wood, D. 1994. Essay: Reflections on Stakeholder Theory. *Toronto Conference, Business and Society*, 33(1): 101-105.

Wood, D. and Jones, R. 1995. Stakeholder Mismatching: A Theoretical Problem in Empirical Research on Corporate Social Performance. *The International Journal of Organizational Analysis*, 3(3): 229-267.

Yadav, P., Han, S. and Rho, J. 2015. Impact of environmental performance on firm value for sustainable investment: Evidence from large US firms. *Business Strategy and the Environment*, 25(6): 402-420.

Appendices

Annexure A: Ethics Clearance Letter



3rd June 2020

Student name: Kyle Tattersall

Student number: 16004487

Campus: Varsity College Cape Town

Re: Approval of IIE BACHELOR OF COMMERCE HONOURS: MANAGEMENT Proposal and Ethics Clearance

HONOURS ETHICAL CLEARANCE LETTER

Your research proposal and the ethical implications of your proposed research topic were reviewed by your supervisor and the campus research panel, a subcommittee of The Independent Institute of Education's Research and Postgraduate Studies Committee.

Your research proposal posed no significant ethical concerns and your supporting documents and instruments are in order to proceed. We hereby provide you with permission to proceed with your research.

In the event of you deciding to change your research methodology in any way, kindly consult your supervisor to ensure all ethical considerations are adhered to and pose no risk to any participant or party involved. A revised ethical clearance letter will be issued.

We wish you all the best with your research!

Annexure B: Example of Measurement Instruments

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
ROA	7.0643	11.43110	60
ESG Score	3.5667	1.01458	60

Correlations

		ROA	ESG Score
Pearson Correlation	ROA	1.000	.294
	ESG Score	.294	1.000
Sig. (1-tailed)	ROA	.	.011
	ESG Score	.011	.
N	ROA	60	60
	ESG Score	60	60

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	ESG Score ^b	.	Enter

a. Dependent Variable: ROA

b. All requested variables entered.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.294 ^a	.086	.071	11.01976

a. Predictors: (Constant), ESG Score

b. Dependent Variable: ROA

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	666.297	1	666.297	5.487	.023 ^b
	Residual	7043.234	58	121.435		
	Total	7709.530	59			

a. Dependent Variable: ROA

b. Predictors: (Constant), ESG Score

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-4.749	5.240		-.906	.369	-15.239	5.740
	ESG Score	3.312	1.414	.294	2.342	.023	.482	6.143

a. Dependent Variable: ROA

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.8752	11.8119	7.0643	3.36053	60
Residual	-26.56963	31.88814	.00000	10.92597	60
Std. Predicted Value	-1.544	1.413	.000	1.000	60
Std. Residual	-2.411	2.894	.000	.991	60

a. Dependent Variable: ROA