


The link between environmental, social and corporate governance disclosure and the cost of capital in South Africa

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Orientation: Ignoring environmental, social and corporate governance (ESG) aspects exposes firms to risks that diminish value, shrink returns and even lead to failure. Firms considering ESG aspects are perceived as less risky by capital providers. Such capital suppliers accept lower returns and lending rates when providing capital to firms with superior ESG practices and disclosure.

Research purpose: To investigate the link between ESG disclosure and the cost of capital.

Motivation for the study: Although there has been a growing interest in responsible corporate practices in emerging markets, limited research on ESG has been conducted in South Africa.

Research approach/design and method: A positivistic paradigm was employed. A sample of 68 firms from six Johannesburg Stock Exchange sectors over the period 2011–2018 (478 firm-year observations) was examined using panel regression analyses.

Main findings: A significant negative relationship was observed between composite ESG disclosure scores and weighted average cost of capital (WACC) for both consumer goods and consumer services sectors. In addition, a significant positive regression coefficient was obtained between composite ESG disclosure scores and WACC for firms from the industrials sector.

Practical/managerial implications: A growing number of capital providers consider a firm's ESG practices and disclosures which could offer a firm the opportunity to raise additional sources of capital.

Contribution/value-add: Local firms that had improved ESG disclosure seemed to benefit from a lower overall WACC and cost of debt. Equity capital providers, however, seem to perceive increased ESG disclosure as additional risk and require a higher return from such firms in South Africa.

Keywords: environmental; social and corporate governance; ESG; cost of capital; WACC; cost of equity; cost of debt.

Introduction

Four of the top five global risks in 2019 were related to environmental, social and corporate governance (ESG) aspects (World Economic Forum 2019). These risks relate to several sustainability-related challenges, such as climate change, waste management, water and energy security, diversity and corruption. Such risks cannot be ignored if corporate managers and directors aim to create sustainable businesses. As such, a growing number of stakeholders around the world are urging firms to identify, manage and report on ESG-related risks. Sassen, Hinze and Hardeck (2016) assert that firms that actively manage and disclose ESG risks are often in a better position to create shareholder wealth as a result of lower risk exposure and consequently a lower cost of capital.

The cost of capital represents the rate of return that capital providers require from a firm, and it is important to corporate leaders for various reasons. A firm's cost of capital is the minimum acceptable rate of return that any investment must yield and is regarded as a long-term opportunity cost of the financing employed by the firm (Fernandes 2014). Furthermore, the cost of capital is essential in capital budgeting decisions, valuation, and mergers and acquisitions (Fernandes 2014). Capital providers look for enhanced transparency from firms pertaining to the disclosure of ESG-related information (Global Reporting Initiative 2016). Firms that focus on the management

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and reporting of ESG policies and practices are often perceived as less risky by the providers of equity and debt capital. These capital providers adjust their expectations about risks and returns accordingly and are often willing to accept lower returns and lending rates in case of providing capital to firms with superior ESG performance (Kölbel & Busch 2017). It has therefore been argued that the improved disclosure of ESG-related risks can reduce a firm's cost of capital (Atan et al. 2018).

Previous research conducted on the association between ESG aspects and cost of capital yielded divergent results, and it was mainly carried out in developed economies (e.g. Atan et al. 2018; Cantino, Devalle & Fiandrino 2017; Kölbel & Busch 2017; Limkriangkrai, Koh & Durand 2017). Although there has been an increasing interest in responsible corporate policies and practices in emerging markets, limited ESG research has been conducted in South Africa. Local researchers have mainly focused on corporate social responsibility (CSR) and corporate governance (Jordaan, De Klerk & De Villiers 2018; Mans-Kemp, Erasmus & Viviers 2017; Marcia, Maroun & Callaghan 2015; Tshipa et al. 2018). The key motivation for firms to engage in CSR, however, is to improve society. Corporate social responsibility mainly focuses on environmental and social considerations, excluding the important aspects of corporate governance (Carroll & Shabana 2010; Dahlsrud 2008). The application of corporate governance policies and practices is often the first stage of ESG consideration in local firms, given South Africa's well-developed framework provided by the King reports. To ensure the creation of sustainable firms, however, it is important for corporate leaders to consider all three ESG aspects (Linnenluecke & Griffiths 2010).

The link between ESG disclosure and the cost of capital of South African listed firms over the period 2011–2018 has been investigated in this study. The relationship between ESG disclosure and weighted average cost of capital (WACC) was examined for selected companies listed on Johannesburg Stock Exchange (JSE). It has been argued that the impact of ESG on WACC depends on a firm's consideration of individual ESG aspects (Limkriangkrai et al. 2017). Furthermore, firms operating in different sectors are likely to experience varying types and degrees of ESG risks (Bassen & Kovács 2008). As such, attention was also given to the relationship between the composite ESG and individual E-, S- and G-disclosure scores and the components of WACC by conducting panel regression analyses at sector level over the period 2011–2018.

Understanding the link between ESG disclosure and WACC could provide insight into pertinent ESG aspects and in so doing corporate managers and directors can address pressing global challenges whilst pursuing and improving long-term sustainable corporate financial performance.

The remainder of this article is structured as follows: relevant literature on ESG issues is provided, including the consideration of ESG aspects in South Africa. An overview of previous research conducted on the topic is also outlined. Thereafter, the collection of secondary quantitative ESG disclosure and WACC data for 68 JSE-listed companies is explained. The panel dataset was analysed by means of panel regression analyses. Based on the reported results of the study, suggestions for future research are provided and recommendations are offered to stakeholders.

Literature review

A brief overview of sustainability and responsible investing (RI) provides the background for local ESG context. The components of the WACC are then outlined, followed by an overview of previous research conducted on various aspects of the topic.

Environmental, social and corporate governance

Sustainability involves meeting the needs of the present generation without compromising the ability of future generations to meet their own needs (Bruntland Commission 1987). As such, sustainability emphasises that firms should give sufficient attention to the current and future needs of their relevant stakeholders. A firm that focuses on its stakeholders' interests is likely to deliberately avoid making decisions which could have a negative impact on stakeholders. The notion that firms should function in a responsible manner is highlighted by the stakeholder theory. This theory encourages the consideration of a broader range of aspects, such as ESG concerns, which are likely to impact on long-term performance (Bavoso 2012).

Corporate leaders in the 21st century are faced with various sustainability-related challenges which require a fundamental change in the manner in which they operate (Institute for Directors in Southern Africa [IoDSA] 2016). Sustainability is of particular importance to investors who engage in RI or sustainable investing. In addition to focusing on financial performance, these investors also aim to improve long-term sustainability by incorporating ESG aspects into their investment decision-making and ownership practices (Mutezo 2014).

Responsible investing is distinguished from traditional investment practices in two ways. Firstly, RI requires a longer-term perspective. Responsible investors aim to obtain sustainable gains over a long term. Secondly, RI requires investors to be mindful of factors other than mere financial performance (Principles for Responsible Investment [PRI] 2019). The financial community is gradually realising that topical research, analysis and evaluation of ESG aspects are fundamental when assessing the value and performance of investments over the medium to long term (PRI 2019). In addition, corporate managers are also becoming more aware that the efficient implementation of responsible practices

could result in long-term value creation and reputation benefits (Turk, Shackleton & Whittington-Jones 2013).

Responsible investing combines fundamental analysis with an evaluation of ESG aspects in an attempt to more effectively capture long-term returns for investors and to advance society by influencing firm behaviour (European Sustainable Investment Forum 2019). Responsible investing is essentially premised on the belief that ESG risks have the ability to adversely affect corporate financial performance and as a result should be managed accordingly (Sustainable Returns for Pensions & Society 2013). The effective consideration and disclosure of ESG risks provide firms with multiple investment opportunities and the prospect of obtaining additional sources of capital (Sustainable Returns for Pensions & Society 2013). In addition, the consideration and reporting of ESG issues by corporate leaders is likely to bring about additional benefits to firms such as stronger brand recognition, better access to markets, better resource efficiency, stronger innovation, increased valuation in the market, and, most importantly, lower cost of capital (Isa 2019).

There are several ESG issues that can be considered by responsible investors and corporate leaders. Some of the most prominent ESG risks include climate change, alternative energy, waste and water management, unemployment, health and safety, diversity, executive remuneration, board composition and performance of the board (Kocmanová & Dočekalová 2012; Mans-Kemp & Viviers 2016). Environmental, social and corporate governance concerns can, however, vary considerably across countries, sectors and companies, given that these issues depend on local conditions, pressures and national priorities (Sustainable Returns for Pensions & Society 2013). As such, it is important to consider the ESG concerns pertinent to the context being investigated.

South Africa has been recognised to be on the forefront of RI and ESG developments globally (Viviers & Els 2017). In the local context, a lack of water, the destruction of natural habitats, overfishing, the introduction of exotic species and pollution have been highlighted as the severest environmental risks (Mans-Kemp & Viviers 2016). These risks should be taken into account as part of an environmental screening criterion (Mans-Kemp & Viviers 2016). In addition, a prominent environmental concern for organisations globally and locally is climate change (Bassen & Kovács 2008; Herringer, Firer & Viviers 2009). Girdwood (2013) highlighted that a better understanding of climate change could enable firms to address the effects thereof more effectively in South Africa.

Pertaining to social challenges, South Africa differs substantially from developed economies (Mans-Kemp & Viviers 2016). The country has a legacy of social injustices that have hindered socio-economic development (Herringer et al. 2009). Prominent local social concerns include unemployment, poverty and inequality, and human immunodeficiency virus (HIV)/acquired immune deficiency

syndrome (AIDS) (Mans-Kemp & Viviers 2016). South Africa has one of the highest unemployment rates in the world (29.1% in the third quarter of 2019) (Statistics South Africa 2019). The country is said to be having maximum inequality in the world, with a Gini coefficient of 0.63 in 2015 (World Bank 2019). The high inequality is preserved by a legacy of exclusion and dismal economic growth that is not pro-poor and does not create enough jobs for the citizens (World Bank 2019). The overall HIV prevalence rate in the country is approximately 13.1% of the population, which amounts to 7.52 million people. For the individuals aged between 15 and 49 years, the prevalence rate increases to 19% (Statistics South Africa 2018). Local firms should therefore be encouraged to implement initiatives such as HIV/AIDS-related policies, counselling and awareness training (Mans-Kemp & Viviers 2016).

From a corporate governance perspective, the country has a well-developed framework for corporate governance provided by the King reports. The most recent King report (King IV) stresses upon sustainable value creation (IoDSA 2016). King IV report highlights the need for firms to move from siloed reporting to integrated reporting. Since the advent of integrated reporting in 2011, JSE-listed firms have been encouraged to disclose pertinent non-financial (ESG) information alongside traditional financial statements (Integrated Reporting Committee of South Africa 2018). As such, corporate governance includes the meaningful and transparent reporting of financial and non-financial information (IoDSA 2016).

For local firms, interest in their ESG issues mainly stem from institutional investors. Given their size and influence, institutional investors have a pertinent role in influencing corporate behaviour. The importance of the role of institutional investors was further highlighted in 2011 with the release of the Code for Responsible Investing in South Africa (CRISA). This code was developed to specifically guide institutional investors on how to effectively perform investment analysis and activities and to encourage good governance in firms. Institutional investors have a strategic ability to influence investee firms to improve their ESG practices and disclosure (IoDSA 2011). The Code for Responsible Investing in South Africa highlights that attention should also be given to ESG aspects which could have an impact on long-term sustainability and value creation (IoDSA 2011). Corporate leaders should therefore be cognisant of the increased awareness of ESG considerations in the institutional investor community. Not only could the consideration and reporting of ESG risks have an impact on a firm's financial performance, it could also provide access to additional capital sources (Sustainable Returns for Pensions & Society 2013).

Cost of capital

The WACC refers to the cost that a firm incurs when acquiring debt and equity capital to fund its operations (Els, Erasmus & Viviers 2014). The WACC of a firm is determined by considering the contribution and the cost of each long-term

capital component, given that each source of capital has a different risk level. Generally, the WACC increases when investors and creditors require a higher reward for the increased risk undertaken (Atan et al. 2018). To maximise shareholders' wealth, a firm should generate a sufficient return to pay capital providers (lenders and preferential and ordinary shareholders). Once the WACC is determined, a firm should aim to achieve returns in excess of this cost (Els et al. 2014).

The cost of debt capital refers to the effective rate that a firm pays on all its bank loans, bonds and other forms of interest-bearing debt capital. An increasing number of financial institutions are evaluating a firm's ESG practices before providing debt financing. The majority of global banks, including a few South African banks, are signatories to voluntary principles such as the Equator Principles that require them to assess and manage environmental and social risks in project financing (Equator Principles 2019). Furthermore, the prime lending rate could have a considerable influence on the WACC, especially for those firms that used a large portion of debt capital. Mohohlo and Hall (2018) reported that South African firms employ a much higher portion of debt in comparison to firms in other developing economies, in which a large portion is long-term debt. Over the research period, the prime lending rate in South Africa increased from 9% in 2011 to 10.25% in 2018 (South African Reserve Bank 2019).

The cost of equity is the shareholders' expected return and reflects the shareholders' perception of the riskiness of a firm's free cash flows. A single-factor asset pricing model, such as the capital asset pricing model (CAPM), can be employed to calculate a firm's cost of equity. According to the CAPM, a share's expected return is estimated by considering the risk-free rate, its beta and the market risk premium (Megginson, Smart & Graham 2010). The model commences by considering the risk-free rate. The yield on long-term government bonds is typically used as a proxy for the risk-free rate (Brigham & Daves 2010). Long-term government bonds, such as the R186 in South Africa, are considered to have virtually no default risk (Els et al. 2014).

The market risk premium is the difference between expected market return and risk-free rate (Brigham & Daves 2010). In South Africa, the Financial Times Stock Exchange (FTSE)/JSE All Share Index is frequently used as a proxy for the return on the market. The beta (β) considered in the CAPM is a measure of return volatility for a share. The riskier an investment in comparison to the market in general, the higher its beta (Els et al. 2014). The CAPM reflects the return that an investor requires from a risky asset, assuming that the investor is exposed only to systematic risk (Fabozzi & Drake 2009). This risk is inherent to the market and is captured by beta. Systematic risk occurs mainly because of macroeconomic interruptions affecting the economy. This risk cannot be avoided by diversification but is mitigated by means of hedging (Dash 2009). The CAPM hence allows risk to be

incorporated into the cost of equity component of a firm's WACC (Els et al. 2014).

It can be argued that if a firm's WACC increases, whilst returns earned on capital decreases, they may become less likely to address ESG risks, which might, in some cases, require additional capital investment. As indicated by Waddock and Graves (1997), management's level of risk tolerance has an impact on their attitude towards actions. Such actions can either build an environment-friendly firm or destroy a business if it is perceived as environment-unfriendly. Furthermore, these actions can produce savings (e.g. waste reduction efforts, which initially could be costly but results in long-term savings) or result in a firm incurring the future or present costs (e.g. equipment that controls emissions resulting in decreased fines).

Overview of previous studies on various aspects of environmental, social and corporate governance and the cost of capital

The impact of ESG issues on firm's performance in Malaysia over the period 2010–2013 was investigated by Atan et al. (2018). When using a composite ESG disclosure score, a significant positive relationship was found with WACC. For the individual E-, S- and G-disclosure scores and WACC, however, the researchers found no significant relationships. In contrast, Kölbl and Busch (2017) conducted an analysis of previous studies carried out on the relationship between ESG and the cost of capital in the United States of America and Europe from 2010 to 2015. These scholars reported that of the considered studies, almost all found that superior ESG performance is associated with a significantly lower cost of capital. The authors furthermore posit that investors consider ESG information and accept lower returns from those firms with good ESG performance. Given the differing results obtained by these authors for the relationship between ESG disclosure and the cost of capital, the following null hypotheses were formulated:

H_1 : There is no relationship between the composite ESG disclosure scores and WACC of JSE-listed companies.

H_2 : There is no relationship between the individual E-disclosure scores and WACC of JSE-listed companies.

H_3 : There is no relationship between the individual S-disclosure scores and WACC of JSE-listed companies.

H_4 : There is no relationship between the individual G-disclosure scores and WACC of JSE-listed companies.

Limkriangkrai et al. (2017) reported that Australian firms with high composite ESG ratings increased their leverage from 2009 to 2014. For the individual ratings, it was found that companies with low E-ratings and high G-ratings tend to raise less debt. In contrast, the S-rating appeared to have no impact on corporate financial decision-making. The association between CSR and the cost of debt was investigated by Cooper and Uzun (2015) over the period 2006–2013 for US-listed firms. The scholars reported that firms with high

CSR performance have a lower cost of debt, particularly for the manufacturing and financial industries. To examine the relationship between ESG disclosure and cost of debt within the South African context, the researcher formulated the following hypotheses:

H₅: There is no relationship between the composite ESG disclosure scores and the cost of debt of JSE-listed companies.

H₆: There is no relationship between the individual E-disclosure scores and the cost of debt of JSE-listed companies.

H₇: There is no relationship between the individual S-disclosure scores and the cost of debt of JSE-listed companies.

H₈: There is no relationship between the individual G-disclosure scores and the cost of debt of JSE-listed companies.

For the association between ESG and the cost of equity, Ng and Rezaee (2015) reported a significant negative relationship when considering the E- and G-performance scores for more than 3000 firms from 1990 to 2013. For the S-performance score, the relationship was not significant. Xu, Liu and Huang (2015) investigated the relationship between CSR and the cost of equity for Chinese listed firms from 2009 to 2011. These researchers found that firms with higher CSR scores had a significantly lower cost of equity capital. Similarly, El Ghoul et al. (2011) found that for US firms over the period 1992–2007, those with better CSR scores were able to acquire cheaper equity financing. The authors posit that those firms that invest in improving responsible employee relations, environmental policies and product strategies are able to benefit substantially from a reduced cost of equity. To investigate the association between ESG disclosure and the cost of equity financing of listed South African firms, the following hypotheses were developed:

H₉: There is no relationship between the composite ESG disclosure scores and the cost of equity of JSE-listed companies.

H₁₀: There is no relationship between the individual E-disclosure scores and the cost of equity of JSE-listed companies.

H₁₁: There is no relationship between the individual S-disclosure scores and the cost of equity of JSE-listed companies.

H₁₂: There is no relationship between the individual G-disclosure scores and the cost of equity of JSE-listed companies.

Research design and methodology

By employing a positivistic paradigm, secondary quantitative data were collected and analysed to investigate the relationship between ESG disclosure and WACC.

Sample

The study population comprised all JSE-listed firms over the period 2011–2018. Convenience and judgement sampling techniques were employed to draw a sample of 68 firms from six JSE sectors. The judgement criteria included that a firm's ESG disclosure score had to be available on the Bloomberg (2019) database and its WACC data had to be available on Identification of Requirements for Enterprise Social Software (IRESS 2019) website.

Environmental, social and corporate governance disclosure data were available for 478 firm-year observations. No delisted firms were considered in the sample, as Bloomberg (2019) did not compute ESG disclosure scores for such companies. Firms operating in consumer goods, consumer services, healthcare, technology, telecommunications and industrials sectors (henceforth referred to as the 'considered sectors') were examined. Companies listed in the basic materials and financial sectors were excluded from the sample, given that their annual financial statements, the nature of their activities and the level of regulation differ from those firms listed in the considered sectors. No companies were listed in the utilities sector during the study period.

Environmental, social and corporate governance disclosure scores

In line with international researchers (notably Atan et al. 2018; Fatemi, Glaum & Kaiser 2017; Limkriangkrai et al. 2017; Xu et al. 2015), ESG disclosure was considered as an independent variable in this study. Environmental, social and corporate governance disclosure scores were obtained from the Bloomberg (2019) database. The database provided standardised ESG disclosure scores gathered from publically disclosed corporate sources such as CSR reports, integrated reports and the firms' websites. In some cases, Bloomberg also conducts proprietary surveys to request specific information from firms. Bloomberg collects ESG data for over 10 000 publically listed firms globally. Overall, the ESG disclosure scores comprised 120 different ESG indicators (Polk 2017). It should, however, be noted that these ESG disclosure scores might not reveal the actual ESG performance of firms, given that the scores being predominantly based on reporting by firms. As such, the actual ESG performance by firms could differ from the disclosed information.

For environmental concerns, the database considers a firm's disclosure regarding aspects such as carbon emissions, climate change, pollution, waste disposal, renewable energy and resource depletion (Bloomberg 2014). Social issues are determined by examining a firm's disclosure of considerations, such as supply chains, discrimination, political contributions, diversity, human rights and community relations. For corporate governance, the database calculates G-disclosure scores by considering aspects related to voting practices, executive compensation, shareholders' rights, takeover defences and independent directors (Bloomberg 2014). Firms are evaluated on an annual basis on the available ESG disclosure information and are assigned a score out of 100 for the composite ESG disclosure score and each individual E-, S-, and G-disclosure scores. For both the composite ESG and individual E-, S- and G-disclosure scores, the lowest possible score was zero and the highest possible score was 100.

International researchers have predominantly used a composite ESG disclosure score that consolidates a firm's performance on the individual E, S and G aspects. It is

possible, however, that a composite ESG disclosure score can 'conceal different levels of uniformity in the ESG dimensions' (Ferrero-Ferrero, Fernández-Izquierdo & Muñoz-Torres 2014). Furthermore, the impact of ESG consideration and disclosure on the cost of capital depends on a firm's choice amongst the individual ESG aspects (Limkiangkrai et al. 2017). As such, the relationships between individual E-, S- and G-disclosure scores and WACC were also considered.

Weighted average cost of capital

Weighted average cost of capital was considered as a dependent variable in the current study. The WACC for each of the sampled firms was obtained from the IRESS (2019) database. The IRESS (2019) database uses two components for the calculation of WACC, namely the cost of equity and the after-tax cost of debt. As per the IRESS (2019) database, the cost of equity was estimated by employing the CAPM. The cost of debt is calculated considering the interest paid during a given financial year and expressing this value as a percentage of the total of the interest-bearing debt (IRESS 2019). In 2011 and 2012, the corporate tax rate in South Africa was 34.55%, decreasing to 28% over the remaining years of the research period (South African Revenue Services 2019). Weighted average cost of capital is, therefore, the overall cost of capital of a firm in which each component is weighed proportionately. All sources of financing, ordinary shares, preference shares, debentures and any other long-term debt are included in the calculation (IRESS 2019).

In line with previous authors, the researcher controlled for firm size, risk tolerance and sector classification. Owing to financial reasons, it is possible that smaller firms will not have the same level of ESG consideration and disclosure than bigger firms. As firms become larger, it is also likely that such firms will receive more attention from several stakeholders. As such, large firms will have a propensity to respond to diverse stakeholders' demands (Breuer & Nau 2014; Waddock & Graves 1997). To control for firm size, the researcher employed market capitalisation as a proxy, and the data were sourced from IRESS (2019). According to Breuer and Nau (2014), management's risk tolerance is measured by employing the debt-to-assets leverage ratio, which was sourced from IRESS (2019). Atan et al. (2018) posit that managers tend to disclose more ESG information as leverage increases. This is because of increased scrutiny from financial institutions (Atan et al. 2018). The researcher also controlled for sector classification, given that firms from six JSE sectors were considered.

Data analysis

Descriptive statistics were conducted to describe, summarise and evaluate trends in the dataset. Ordinary least squares (OLS), fixed effects and random effects panel regressions were conducted. To select the appropriate regression models, the *F*-test for fixed effects and Hausman test were utilised. Panel regressions were conducted on the composite ESG and individual E-, S- and G-disclosure scores.

Given that specification errors, such as heteroscedasticity and multicollinearity, may occur when conducting regression analyses, the researcher ensured that acceptable tolerance values were reported and the results were adjusted for heteroscedasticity where required. The Breusch-Pagan test was employed to test for heteroscedasticity. As the WACC and cost of debt data contained a number of outliers, these were winsorised before proceeding with the inferential analysis. Winsorisation involves replacing extreme values with values closer to the mean value (Vinzi et al. 2010). This technique improved the deviation from the normality assumption observed for initial dataset. Concerning the reliability of the study, the observations that are reported are not generalisable to all JSE-listed companies, given that some sectors were excluded. The study can, however, be reproduced in the future by employing a similar methodology. Pertaining to the validity of the study, it should be noted that the ESG disclosure scores as reported by the Bloomberg (2019) database were employed. The actual ESG performance by firms, however, could deviate from the disclosed information.

Ethical consideration

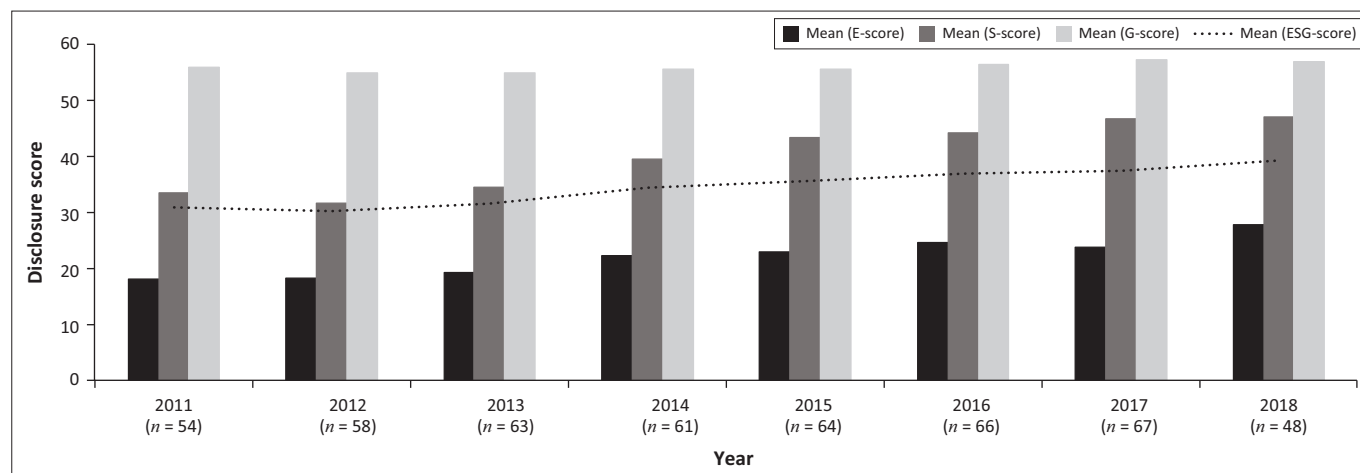
Ethical clearance was granted by the Humanities Research Ethics Committee at the researcher's university, reference number ONB-2019-10004.

Empirical results and discussion

Figure 1 compares the trends identified in the annual mean values of the composite ESG and individual E-, S- and G-disclosure scores. Furthermore, the figure demonstrates how the changes in the individual aspects contributed to the overall change observed in the composite ESG disclosure score over the study period.

As seen in Figure 1, environmental policies and practices were the least disclosed ESG risks over the study period, with the annual mean values reaching the highest level of 28% in 2018. Although more firms were giving attention to environmental risks and disclosing the details thereof over the study period, it appears to be progressing at a slow pace. The disclosure of social aspects depicted an increasing trend since 2012 with the annual mean S-disclosure scores increasing to 47% in 2017 and 2018. Given the socio-economic context of South Africa, it was expected that local firms would place increased attention on social risks. The disclosure of governance aspects was the highest disclosed ESG aspect over the entire research period. This trend could be attributed to the country's advanced corporate governance framework provided by the King reports. Another contributing factor to the increased level of G-disclosure could be because corporate governance aspects are easier to measure.

When considering the individual E-, S- and G-disclosure scores, it is evident that the disclosure of environmental and social risks has mainly contributed to the overall increase in ESG disclosure over the study period. The disclosure of governance aspects remained fairly stable over the research



E, environmental; S, social; G, corporate governance

FIGURE 1: Annual mean values for the composite and individual environmental, social and corporate governance disclosure scores.

period and as such having a lesser contribution to the overall increasing trend displayed in the composite ESG disclosure scores. Despite the encouraging increase in the overall disclosure of ESG aspects, particularly for E- and S-disclosure, the overall ESG disclosure of sampled firms stayed below 40 (out of 100). Since the advent of integrated reporting in South Africa in 2011, it is evident that JSE-listed firms have been making slow progress towards the consideration and disclosure of ESG risks over the 8-year period.

Regression analysis results for the sample

The results depicted in Table 1 suggest that there is no significant association between composite ESG disclosure scores and WACC. Similarly, when considering the disaggregated WACC components, it is evident that no significant associations were observed.

As mentioned previously, a composite ESG disclosure score could conceal varying levels of reporting on individual ESG aspects. Limkriangkrai et al. (2017) further argue that firms often engage with the individual ESG aspects to differing degrees. As such, the individual impact of each aspect should be evaluated. By conducting such an in-depth analysis, the researcher was able to gain greater insight into the association between the individual E-, S- and G-disclosure scores and WACC.

When considering the individual E-, S- and G-disclosure scores and the overall WACC, no significant associations were observed as shown in Table 2. This finding is in line with Atan et al. (2018), who found no significant relationships between the individual ESG disclosure scores and WACC.

For the disaggregated WACC components, a significant negative relationship was reported between S-disclosure scores and the cost of debt. It can therefore be inferred that firms that better manage social risks and disclose information relating to such risks benefit from a lower cost of debt. Cooper and Uzun (2015) noted that US firms with

TABLE 1: Composite environmental, social and corporate governance disclosure regression results for sampled firms.

Preferred model†	Weighted average cost of capital	Cost of debt		Cost of equity	
		Two-way random effects	One-way random effects	Two-way random effects	Two-way random effects
ESG	0.011		-0.072		0.085
Leverage	-0.273***		0.009		-0.058
Size	-0.000		-0.165**		0.182**

ESG, environmental, social and corporate governance.

†, The quality of fit for the preferred regression models was significant.

*, Significant at 0.1 level; **, significant at 0.05 level; ***, significant at 0.01 level.

TABLE 2: Individual environmental, social and corporate governance disclosure regression results for sampled firms.

Preferred model†	Weighted average cost of capital	Cost of debt		Cost of equity	
		Two-way random effects	One-way fixed effects	Two-way random effects	Two-way random effects
E	-0.101		-0.024		-0.016
S	0.099		-0.129*		0.080
G	0.023		0.113*		0.038
Leverage	-0.264***		0.003		-0.053
Size	0.006		-0.176**		0.174**

E, environmental; S, social; G, corporate governance.

†, The quality of fit for preferred regression models was significant.

*, Significant at 0.1 level; **, significant at 0.05 level; ***, significant at 0.01 level.

high CSR performance had a lower cost of debt. As highlighted in the introduction, CSR primarily focuses on the E- and S-aspect of ESG. Furthermore, Limkriangkrai et al. (2017) reported that Australian firms with higher ESG ratings tended to employ more debt capital. The increase in the use of debt for such firms could be a result of the lower cost of debt experienced. Sustainability-linked financing (also known as ESG-linked loans) is becoming a growing trend which links loan pricing to a firm's ESG consideration and disclosure. Firms are offered a discount when they outperform on the ESG criteria (Responsible Business 2018).

Furthermore, as shown in Table 2, a positive significant relationship is observed between G-disclosure scores and the cost of debt. This result suggests that firms with higher

G-disclosure scores have a higher cost of debt. For the individual E-, S- and G-disclosure scores, there are no significant associations with the cost of equity reported for the sampled firms.

Attention was also given to the relationship between both composite ESG and individual E-, S- and G-disclosure scores and the WACC at sector level. Only three of the considered sectors, namely consumer goods, consumer services and industrials sectors had sufficient data to conduct regression analyses. For the consumer services sector, no significant relationships were identified for the individual E-, S- and G-disclosure scores and as such the researcher decided to not report these findings.

The consumer goods sector includes firms that produce and sell tangible products. These firms are generally involved with, amongst others, food production, packaged goods, clothing, beverages and electronic products. The regression results for the consumer goods sector are reported in Tables 3 and 4.

As shown in Table 3, a significant negative relationship was observed between composite ESG disclosure scores and WACC. This finding highlights that consumer goods firms that have more transparent ESG reporting in place tend to benefit from a lower cost of capital. This finding is in line with Kölbl and Busch (2017), who found a significantly negative association between ESG performance and the cost of capital. Similarly, a significant negative relationship is observed between composite ESG disclosure scores and the cost of debt for consumer goods firms.

Given the extensive production processes employed in this sector, it is understandable that the consideration of sustainable practices is an important part of this sector's business operations. In addition, both consumers and investors increasingly expect that consumer-focused firms should conduct their business in a manner that is considered to be green and ethical (Battle 2012). Consumers are also becoming more firm in their demand for greener and more responsibly manufactured products. As a result, firms will need to respond to these changing patterns in consumer behaviour. These firms should incorporate sustainable practices into their business activities, and disclose the aspects that are being addressed in their integrated reports for various stakeholder groups (Battle 2012).

TABLE 3: Regression results for the composite environmental, social and corporate governance disclosure scores for the consumer goods sector.

Preferred model†	Weighted average cost of capital		Cost of debt		Cost of equity	
	Ordinary least squares	One-way random effects	One-way random effects	Two-way random effects	Two-way random effects	Two-way random effects
ESG	-0.279***		-0.357***		-0.195	
Leverage	-0.461***		-0.003		-0.192**	
Size	0.076		-0.123		0.335**	

ESG, environmental, social and corporate governance.

†, The quality of fit for preferred regression models was significant.

*, Significant at 0.1 level; **, significant at 0.05 level; ***, significant at 0.01 level.

In addition, given that ESG-linked loans are a growing phenomenon in capital financing, firms that are better at considering ESG risks and disclosing the details thereof are likely to be experiencing discounted lending rates. Furthermore, credit rating agencies are increasingly considering ESG risks in their evaluation of organisations (Isa 2019). As such, the more institutions consider and report on ESG risks in investment analysis and decision-making, the better would be their credit rating, and by implication access to additional debt capital is likely to increase (Isa 2019).

When considering the individual E-, S- and G-disclosure scores, a significant negative relationship was observed between E-disclosure scores and WACC for firms in the consumer goods sector. It could be inferred that firms in this sector that are better at disclosing environmental aspects tend to benefit from a lower cost of capital. As a result of the considerable production processes utilised in this sector, it is understandable that inclusion of sustainable environmental practices is an important part of this sector's business operations. Environmental initiatives are, however, often expensive to implement. As such, it should be encouraging to consumer goods firms that capital raised for such initiatives could be obtained at a lower capital cost.

In line with the results shown in Table 2 for the overall sample, a significant negative relationship was reported between S-disclosure scores and cost of debt for consumer goods firms. As such, firms in this sector that had better social disclosures tended to benefit from a decreased cost of debt. Through the Banking Association of South Africa (2015), all local major banks are to adhere to the principles for managing environmental and social risk which requires banks to ensure that through their credit and risk management policies they will give due recognition to environmental and social risks when making lending decisions.

Whereas consumer goods firms are involved in the production of tangible products for public consumption, the consumer services sector includes firms that provide various intangible services to the public and other firms. These services include, amongst others, private education, publishing and hospitality. The regression results for the consumer services sector are provided in Table 5.

In line with the results obtained in Table 3 for consumer goods firms, Table 5 reveals a significant negative relationship

TABLE 4: Regression results for the individual environmental, social and corporate governance disclosure scores for the consumer goods sector.

Preferred model†	Weighted average cost of capital		Cost of debt		Cost of equity	
	Ordinary least squares	One-way random effects	One-way random effects	Two-way random effects	Two-way random effects	Two-way random effects
E	-0.363***		-0.003		-0.232	
S	0.024		-0.497**		-0.051	
G	0.051		0.111		0.174	
Leverage	-0.388***		-0.038		-0.204	
Size	0.022		-0.201		0.322	

E, environmental; S, social; G, corporate governance.

†, The quality of fit for preferred regression models was significant.

*, Significant at 0.1 level; **, significant at 0.05 level; ***, significant at 0.01 level.

between composite ESG disclosure scores and WACC. As such, firms operating in the consumer services and consumer goods sectors in South Africa that are better at disclosing ESG information tend to benefit from a lower capital cost.

The industrials sector includes firms that produce and distribute capital goods for industries, such as the aerospace, defence, construction, engineering, manufacturing, electrical equipment and machinery. The regression results for the industrials sector are provided in Tables 6 and 7.

In contrast with the findings for the consumer goods and consumer services sectors revealed in Tables 3 and 5, a significant positive relationship was reported between composite ESG disclosure scores and WACC for the industrials sector in Table 6. As such, it can be concluded that for industrials firms, the higher the ESG disclosure scores, the higher the cost of capital. Given that firms in this sector have many ESG risks, such as being considered big polluters, it could be that more transparent disclosure of such risks could open them up to more criticism from capital providers resulting in the increased cost of capital.

Similarly, a significant positive relationship is reflected between composite ESG disclosure scores and the cost of equity. It, hence, seems as if firms in this sector with higher composite ESG disclosure scores have more expensive equity financing. It can, therefore, be inferred that industrials firms with strong ESG disclosure are perceived to be more risky, resulting in investors increasing their required rates of return. Furthermore, market participants could perceive spending on ESG risks as superfluous if they have a short-term investment horizon. This result is in contrast to the findings of Xu et al. (2015), who found that higher CSR scores led to lower cost of equity capital for Chinese firms.

TABLE 5: Regression results for the composite environmental, social and corporate governance disclosure scores for the consumer services sector.

Preferred model†	Weighted average cost of capital	Cost of debt	Cost of equity
	Two-way fixed effects	One-way random effects	Two-way random effects
ESG	-0.376***	-0.043	0.020
Leverage	-0.570***	0.150	-0.106
Size	0.200	-0.094	0.455***

ESG, environmental, social and corporate governance.

†, The quality of fit for preferred regression models was significant.

*, Significant at 0.1 level; **, significant at 0.05 level; ***, significant at 0.01 level.

TABLE 6: Regression results for the composite environmental, social and corporate governance disclosure scores for the industrials sector.

Preferred model†	Weighted average cost of capital	Cost of debt	Cost of equity
	Two-way random effects	One-way random effects	Two-way random effects
ESG	0.272*	0.076	0.174**
Leverage	-0.198*	-0.080	-0.104
Size	-0.237**	-0.303***	0.113

ESG, environmental, social and corporate governance.

†, The quality of fit for preferred regression models was significant.

*, Significant at 0.1 level; **, significant at 0.05 level; ***, significant at 0.01 level.

A positive significant association was observed between S-disclosure and the cost of equity for industrials firms. This result suggests that firms with improved social risks disclosure tend to have a higher cost of equity. Based on this finding it can, hence, be inferred that industrial firms that are better at disclosing information relating to social risks are experiencing a higher cost of equity. Richardson and Welker (2001) similarly reported that higher social disclosures resulted in higher cost of equity for Canadian firms. Furthermore, Chen, Feldmann and Tang (2015) found a significant positive correlation between social disclosure aspects and the cost of equity for manufacturing industry in Sweden. In contrast, Ng and Rezaee (2015) found no significant relationship between S-disclosure scores and the cost of equity.

Given the nature of this sector, it is expected that the sector can be classified as much riskier because of the nature of its activities. Furthermore, the industry has a large human capital component which could increase social risks. Given the overall increased risks experienced in the sector, it can be expected that investors would require an increased return on investment, given the higher risk undertaken.

Table 8 presents a summary of the most significant outcomes of the statistical analyses linked to the research hypotheses.

Based on the empirical findings of the study, only seven of the 12 null hypotheses tested could be rejected as shown in Table 8.

Conclusion, limitations and suggestions for future research

An increasing number of stakeholders around the world are encouraging firms to actively identify and manage ESG issues and disclose the details thereof in corporate reports. Such firms are likely to experience lower risk and resultantly a lower cost of capital. Capital suppliers, such as debt and equity providers, perceive firms that disclose ESG risks as less risky and resultantly adjust their expectations about risk and return. This study investigated the linkage between ESG disclosure and the cost of capital of South African-listed firms over the period 2011–2018. This study is novel as it investigated the relationship between composite ESG and individual E-, S- and G-disclosure scores and WACC components in the local

TABLE 7: Regression results for the individual environmental, social and corporate governance disclosure scores for industrials sector.

Preferred model†	Weighted average cost of capital	Cost of debt	Cost of equity
	Two-way random effects	One-way random effects	Two-way random effects
E	0.063	0.014	0.092
S	0.232	-0.010	0.184*
G	0.017	0.091	-0.105
Leverage	-0.220*	-0.070	-0.103
Size	-0.233**	-0.296***	0.122

ESG, environmental, social and corporate governance.

†, The quality of fit for preferred regression models was significant.

*, Significant at 0.1 level; **, significant at 0.05 level; ***, significant at 0.01 level.

TABLE 8: Summary of the significant results of statistical analyses.

Hypotheses	Outcome
H_1 : There is no relationship between composite ESG disclosure scores and WACC of JSE-listed companies	Reject H_1 A significant negative relationship was reported between composite ESG disclosure scores and WACC for both consumer goods and consumer services sectors. Furthermore, a significant positive regression coefficient was found between composite ESG disclosure scores and WACC for firms from industrial sector
H_2 : There is no relationship between the individual environmental E-disclosure scores and WACC of JSE-listed companies	Reject H_2 A significant negative association was also observed between the individual environmental E-disclosure scores and WACC for consumer goods sector
H_3 : There is no relationship between the individual social S-disclosure scores and WACC of JSE-listed companies	Do not reject H_3 No significant associations were found between the individual social S-disclosure scores and WACC for the entire sample
H_4 : There is no relationship between the individual corporate governance G-disclosure scores and WACC of JSE-listed companies	Do not reject H_4 No significant relationships were observed between the individual corporate governance G-disclosure scores and WACC for the overall sample
H_5 : There is no relationship between composite ESG disclosure scores and the cost of debt of JSE-listed companies	Reject H_5 For the considered consumer goods firms, a significant negative regression coefficient was observed between composite ESG disclosure scores and the cost of debt
H_6 : There is no relationship between the individual environmental E-disclosure scores and the cost of debt of JSE-listed companies	Do not reject H_6 No significant associations were obtained between the individual environmental E-disclosure scores and the cost of debt for the whole sample
H_7 : There is no relationship between the individual social S-disclosure scores and the cost of debt of JSE-listed companies	Reject H_7 A significant negative relationship was reported between the individual social S-disclosure scores and the cost of debt for the overall sample
H_8 : There is no relationship between the individual corporate governance G-disclosure scores and the cost of debt of JSE-listed companies	Reject H_8 A significant positive association was observed between the individual corporate governance G-disclosure scores and the cost of debt for sampled firms
H_9 : There is no relationship between composite ESG disclosure scores and the cost of equity of JSE-listed companies	Reject H_9 A significant positive regression coefficient was reported for composite ESG disclosure scores and the cost of equity for industrial firms
H_{10} : There is no relationship between the individual environmental E-disclosure scores and the cost of equity of JSE-listed companies	Do not reject H_{10} No significant associations were observed between the individual environmental E-disclosure scores and the cost of equity for sampled firms
H_{11} : There is no relationship between the individual social S-disclosure scores and the cost of equity of JSE-listed companies	Reject H_{11} A significant positive relationship was reported between the individual social S-disclosure scores and the cost of equity for industrial firms
H_{12} : There is no relationship between the individual corporate governance G-disclosure scores and the cost of equity of JSE-listed companies	Do not reject H_{12} No significant regression coefficients were observed between the individual corporate governance G-disclosure scores and the cost of equity for the whole sample

ESG, environmental, social and corporate governance; WACC, weighted average cost of capital; JSE, Johannesburg Stock Exchange.

context. South Africa has unique ESG challenges that require specific attention. The research considered both individual and composite ESG disclosure scores. Previous research has been mainly conducted in developed market context, with reported divergent results. The inclusion of comprehensive ESG disclosure scores and the various components of WACC address a gap in the body of knowledge of ESG disclosure and WACC in the South African context.

Based on the reported results, it is evident that improved ESG disclosure of a firm's ESG issues does have an impact on a firm's cost of capital. Corporate leaders as such can no longer ignore pertinent ESG risks if they aim to improve financial performance and create sustainable firms. Given that a growing number of debt and equity providers are considering a firm's ESG practices and disclosure, it could offer a firm the opportunity to raise additional sources of capital. Based on the reported results, it seems as if debt providers are more deliberate in acknowledging that the disclosure of ESG aspects is important for firms to consider and, as such, offer firms discounted lending rates. On the contrary, however, the findings suggest that equity providers see the consideration and disclosure of ESG risks as a negative aspect and, as a result, require a higher rate of return. As such, shareholders should engage with firms on ESG aspects and adopt a longer investment horizon when considering ESG.

The study's sample excluded two sectors of the JSE, namely, the financials and basic materials sectors. This was because their annual financial statements, the nature of their

activities and the level of regulation differ from those of the firms listed in the considered sectors. These sectors, however, play an important role and contribution to the local economy. As such, future researchers could examine the relationship between ESG disclosure and WACC in these sectors.

The considered ESG disclosure scores might not reflect the actual ESG performance of firms because of the scores being mainly based on corporate reporting. Although firms are required to disclose positive and negative aspects, given the possible consequences, it is questionable whether they will do so. Corporate leaders should make an improved effort to disclose a firm's actual ESG performance. Future researchers could therefore consider different techniques to measure a firm's actual ESG performance.

Given the insight provided in this study into the link between ESG disclosure and WACC, local corporate managers and directors should be aware that actively managing ESG risks and disclosing the details thereof in corporate reports provide an opportunity to address pressing global issues whilst simultaneously pursuing improved sustainable financial performance.

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