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The relationship between corporate governance and firm profitability among JSE-listed basic materials sector firms

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ABSTRACT

The spate of failures and scandals in the basic materials sector in South Africa and globally bring into question not only the ethics of business leaders but primarily corporate governance and the role of boards in safeguarding the shareholders' wealth. The aim of the study was to ascertain the relationship between corporate governance and firm profitability of firms in the basic materials sector listed on the Johannesburg Stock Exchange. Five corporate governance characteristics are observed on two profitability measures, return on assets and return on equity and Tobin's Q as the market indicator using a cross-sectional time-series panel data method of 54 firms in the basic materials sector listed on the JSE from 2017 to 2021. A regression analysis model is used to ascertain whether and to what degree a relationship exists between corporate governance and firm profitability within JSE-listed basic materials sector firms. The results show that corporate governance characteristics have a mixed impact on firm profitability, with some indicating a negative or no significant relationship, highlighting the complexity of this association. This study proves that if a firm chooses suitable corporate governance characteristics, the profitability of a firm can be enhanced. The outcome of this study should have implications for academic thoughts for further research on this subject and calls for a more concerted effort for boards to implement more prudent corporate governance mechanisms to future-proof the business of the basic materials sector.

Introduction

The significance of corporate governance in ensuring the long-term sustainability and profitability of firms has become increasingly recognised globally (OECD, 2019). Effective corporate governance practices promote ethical leadership, transparency and accountability, ultimately contributing to firm performance (Jensen & Meckling, 1976). In the context of South Africa, the King IV Report on Corporate Governance (2016) emphasizes the importance of governance in promoting economic growth and development. The basic materials sector, which includes companies involved in mining, forestry and paper products is a significant contributor to South Africa's economy (Stats SA, 2020). In 2020, the basic materials sector, which employs more than 450 000 people, contributed 8.2% of the South African Gross Domestic Product (GDP). However, firms in this sector face unique challenges such as fluctuating commodity prices (World Bank, 2020), regulatory requirements (DPE, 2019) and environmental concerns (DEFF, 2020). Despite these challenges, effective corporate governance practices can help firms in this sector to mitigate risks and capitalize on opportunities. Over the years, the basic materials sector in South Africa has experienced corporate failures and scandals. Consequently, corporate misconduct and unethical behaviour by the directors of firms in the basic materials sector have repercussions for a wide range of stakeholders (Luthili & Moloi, 2024). Furthermore, it has been in the spotlight for strikes resulting from workforce dissatisfaction about pay disparities, unsafe working conditions and high executive remunerations.

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The sector witnessed several corporate failures and scandals. Dating as far back as 1997 is the case of Bre-X's insider trading that resulted in the stock price that skyrocketed to around $209 per share because of a fabricated discovery of 200 million ounces of gold reserves is an indication of an agency cost resulting from management's self-serving behaviour and the ineffectiveness of corporate governance structures (Fernando, 2023). This resulted in significant losses to the investors when the shares crashed, and the company eventually liquidated in 2003 (Hayes, 2021).

When executive decision-making authority diminishes shareholders' level of control, it leads to agency costs in the form of the movement of shareholder wealth to the managers (Panda & Leepsa, 2017). Hence the 2017 case of fraud by Rio Tinto's then CEO and CFO for failing to disclose the negative valuation of the Benga Coal Mine in Mozambique that the company purchased in the earlier years (Reuters, 2017). Notably, the pair's decision to fabricate the profitability of the mine was not to the benefit of the shareholders but a promotion of the executives' self-serving behaviour. Such scandals, which often involve unethical or illegal activities by company executives or employees, shake investor confidence and erode trust in the affected organisation (Finance Magnates, 2024). When a company is associated with unethical practices or illegal behaviour, consumers may lose trust in its products or services (Kumar, 2024). This loss of trust can lead to decreased sales and revenue, further affecting the company's financial performance and ultimately its stock price. Investors perceive a tarnished reputation as a red flag and often avoid investing in such companies, putting additional downward pressure on their stock prices (Finance Magnates, 2024).

Effective corporate governance practices enhance investor trust by promoting transparency, accountability and fairness in decision-making, which fosters trust among investors (Bushman & Smith, 2001). Good governance practices also improve company survival by reducing the risk of bankruptcy and financial distress (Larcker & Tayan, 2015). Furthermore, governance mechanisms align management's interests with those of shareholders, mitigating agency costs (Jensen & Meckling, 1976). Transparency and disclosure reduce information gaps between management and investors, promoting trust (Healy & Palepu, 2001). Good governance practices contribute to a positive corporate reputation, attracting investors and enhancing survival prospects (Fombrun, 1996).

The failure of corporate governance structures is further demonstrated in the 2022 case of JSE Listed Glencore for foreign bribery and market manipulation schemes through "Project Caesar", resulting in a fine of over R1.1 billion (Stoddard, 2022). Stewardship theory encourages the allocation of control from principals to agents to enhance company performance for the benefit of the stakeholders (Chrisman, 2019). However, as much as the actions of Glencoe's management benefitted the stakeholders, the board of directors failed to exercise its duty of ensuring ethical behaviour by management.

On CEO pay disparity, the mining sector has experienced its fair share of negative responses within its internal environment, specifically the employees and, effectively, the communities within which the companies operate (Bao et al., 2020). First, the Marikana massacre resulted in the death of dozens of mineworkers protesting over a minimum wage of R12 500 (Magaziner & Jacobs, 2013). Second, the R300 million bonus was paid to the Sibanye-Stillwater CEO amid a three-month mineworker protest for better salaries. Many failures and scandals remain unresolved, and some stakeholders that suffered losses due to those have still not been compensated.

Corporate scandals have forced various countries to realise and recognise the significance of corporate governance systems in firms (Wang et al., 2020). The 2008 worldwide financial crunch and the 2022 Glencore market manipulation schemes can be ascribed to vulnerabilities and failures in corporate governance compositions on a more recent front. This is a research problem because, due to these failures, stakeholders and society are losing confidence in the accounting profession and business due to losses suffered by various stakeholders invested in these firms. There have been ongoing corporate governance reforms for decades, but corporate failures are still prevalent. Studies on agency theory have shown that management has and always ends up with significant control rights, leaving shareholders with no control and boards with limited control (Panda & Leepsa, 2017).

Pay disparity in the mining industry of South Africa has been of paramount significance over the years, effectively leading to social unrest. Notwithstanding the unrest, some of which have led to a loss of lives, the pay disparity continues to exist and studies have not proven the link between executive remuneration and firm profitability (van-Wyk & Wesson, 2021). Though the King Code on Corporate Governance requires that firms ensure that the remuneration of executives follows the recommended guidelines, boards of directors continue to fail to effect these recommendations, and there have not been significant ramifications for these failures (Madlela & Lehloenya, 2016). The role of corporate governance through the board of directors is to facilitate effective and judicious management and ensure that companies are directed and controlled in a manner that ensures the security of shareholder wealth. In light of the aforementioned corporate governance problems in South African mining industry, this study aims to establish a solid and detectable link between corporate governance and firm profitability. There is a paucity of research exploring the relationship between corporate governance and firm profitability in the basic materials sector. This study aims to address this knowledge gap by investigating the relationship between corporate governance and firm profitability among JSE-listed basic materials sector firms.

Literature Review

Theoretical Review

Agency theory

Jensen and Meckling (1976) describe an agency connection as an agreement amongst two parties (agent and principal) where the principal authorises the agent to make some decisions during the performance of their duties. Shareholders delegate to management authority to make decision, effectively diminishing shareholders' level of control (Cooray & Senaratne, 2020). The agency problem is an age-old problem dating back to the evolution of joint-stock companies when human beings conducted business to maximise their benefit (Panda & Leepsa, 2017). In Cooray and Senaratne (2020), the positivist agency theory relates to the contradictory goals of principals and agents where executives tend to possess self-serving behaviour. Corporate governance structures' role is to manage behaviour, effectively reducing the agency problem.

The result of the delegation of authority to management is a loss of control by shareholders and limited control allocated to the board of directors. Bae et al. (2018) suggest that agency theory is measured by how it emphasises the principals' and agents' appetite for risk. Principals are deemed risk-neutral in their flexibility in diversifying their shareholdings across multiple firms. On the contrary, agents are risk-averse to lower risk to their wealth due to the nature of the guarantee of their employment and revenue bound to one firm (Williamson, 1963). However, risk-neutral principals who prefer that agents improve the growth of firm profitability incur opportunity costs from risk-averse agents (Elsayed & Elbardan, 2018).

A “moral hazard” problem arises due to this risk gap in the principal-agent relationship, and the Glencore case presents an excellent example. Corporate governance should offer supervisory mechanisms and incentives to alter agents' risk orientation, effectively aligning them with the principals’ interests (Cooray & Senaratne, 2020). The risk gap in the principal-agent relationship leads to lower reliability of financial reports created by management due to their personal stake in increasing their wealth than maximising shareholder value.

Stakeholder theory

For its continued survival, stakeholder sees a firm as a centre for various stakeholders with various needs and concerns that need to be understood and addressed by it (Freeman, 1984). These stakeholders have various levels of power and capability that can impact a firm's activities (Chen & Roberts, 2010, Mitchell et al., 1997, Deegan, 2002). This effectively leads to a firm facing many differing stakeholders' pressures and demands, and management attempts to balance those contrasting expectations to achieve the firm's strategic objectives (Naciti et al., 2022).

For a firm to involve stakeholders positively in its activities, it has to recognize stakeholders’ needs and expectations and engage with stakeholders to address them. Greenwood (2007) undertakes that organisations that are more accountable and responsible towards their stakeholders are the ones that engage more often with their stakeholders. O’Dwyer (2003) study finds that when a firm acts responsibly towards stakeholders by engaging with them, it presents a sense of assuming responsibility for its actions and therefore delivers some benefit. O’Dwyer (2003) further expresses concern over management’s defining corporate social responsibility (CSR), which they do to capture the social accounting and the broader social agenda in their pursuit of corporate goals of shareholder wealth maximisation. Once again, the case of Glencoe presents a good case of stakeholder theory, where the firm engages various stakeholders in bribery activities to legitimise its role in the negative impact on society and the environment.

Empirical Review

Relationship between board characteristics and firm profitability

According to a research carried out by Farooq and Ahmad (2023) in Pakistan, the board’s gender diversity and duality have a significant inverse relationship with profitability. The study by Farooq and Ahmad (2023) was mainly targeting non-financial firms listed on the Pakistan Stock Exchange (PSX) from 2010 to 2019. Despite its methodological strength, the study by Farooq and Ahmad (2023) was carried out in Pakistan making it difficult to generalise it to the South African context and this justifies the significance of the current study.

In another study by Ng et al (2016), the results demonstrate that board size, board tenure were significant to Return on Equity (ROE) and Return on Assets (ROA). However, firm size has no significant relationship with firm financial performance. The study by Ng et al (2016) was carried out in Malaysia using a total of 100 public listed companies randomly selected from Bursa Malaysia for the year 2009 to 2013. Random effect panel data regression was obtained by using Stata. Although the study by Ng et al. (2016) is comprehensive in scope, its generalizability to the South African context is limited by the fact that it was conducted in a different jurisdiction with distinct economic and regulatory environments, which may not be directly applicable to South Africa.

A study carried out by Javed et al (2013) in order to investigate the effected of board size and structure on firm financial performance in Pakistan revealed a positive relationship between number of directors, inclusion of non-executive directors, presence of women directors, CEO duality and firm financial performance. However, the number of board committees adversely affected the firm financial performance. The study by Javed et al (2013) was based on information gathered from 30 banks selected through

convenience sampling. Data gathered was analysed using regression analysis taking into consideration a period from 2007 to 2011. In a research by Lipton and Lorsch (1992), board size was found out to be an essential characteristic that can influence the success of corporate governance.

In a study by Harris and Raviv (2008), it was found out that a larger board provides the best level of observation of managers who have opportunities to utilise company resources for the managers' benefit. In addition, Boone et al. (2007) agree that large boards are helpful in companies where management engages in fraud, aiming to fulfil personal needs at the shareholders' expense. Coles et al. (2008) find inconsistencies in the relationship between firm profitability and board size. Coles et al. (2008) contested the claim of ineffectiveness of the boards with more than seven members. The differing views indicate that the best boards are either exceedingly small or huge. Kyere and Ausloos (2021) argue against a large board, suggesting that large boards are expensive, thus affecting a firm's profitability.

Nguyen and Huynh (2023) established through their research that board size, female board members, meeting frequency and board members' education have a positive influence on financial performance. Moreover, as the independence of the Board of Directors increases, the business efficiency decreases. The study by Nguyen and Huynh (2023) was based on sample data from 52 construction and real estate enterprises listed on the Vietnam stock exchange in the period 2006–2020. Despite its methodological strength, the study by Nguyen and Huynh (2023) cannot be generalised to the South Africa context since it was carried out in a different geographic and economic context.

Yermack (1996), in a model of US companies, and Eisenberg et al. (1998), in a model of non-listed small Finnish companies, found a negative association between firm profitability and board size. Conyon and Peck (1998) evaluate the impacts of the size of the board on firm profitability in several countries in European and establish that the board's size is negatively connected with firm profitability. Shaddady and Alnori (2020) did not find a strong relationship between board size and firm profitability of Sri Lankan firms. Guest (2009) and Paniagua (2018) observe that board size strongly impacts a firm's profitability, and Tobin's Q. Guest (2009) further refers to the inadequate transmission of information and decision-making problems as the primary causes of the large board's ineffectiveness. Mak and Kusnadi (2005), in their study of companies in Singapore and Malaysia, also found an inverse link linking board size and company financial success.

Findings on the effect of board characteristics on firm profitability are inconsistent (Almashhadani and Almashhadani, 2022, Kyere and Ausloos, 2021, Fernández-Temprano and Tejerina-Gaite, 2020, Danoshana and Ravivathani, 2019, Khan et al., 2018, Paniagua, 2018). Literature indicates positive and negative effects of a large board as it carries a conflict between more excellent observing versus strict decision-making (Harford et al., 2008). The inconsistent findings in existing literature underscore the necessity of this research, which aims to investigate and clarify the relationship between corporate governance and firm profitability within the South African materials sector, thereby addressing the knowledge gap and providing a clearer understanding of this complex dynamic.

Research and Methodology

This study employs a mixed-methods approach, combining secondary research through the analysis of documents and statistical analysis of freely available and open-source data obtained from organizations' online platforms, including firms' financial statements and Environmental, Social, and Governance (ESG) reports. The research sample for this study consists of 56 JSE-listed firms in the basic materials sector and is selected from a population of 301 JSE-listed firms from five sectors. A listing of firms in the JSE and grouped by sector as of 2022 will be obtained online from listcorp.com. The list of firms by sector grouped by sector, and the financial and governance information is obtained from individual firms' annual and ESG reports. Data on corporate governance characteristics used in this study is obtained from the Institute of Directors South Africa All data is available and freely accessible online from the firms' annual reports section of their websites. This study focuses only on accounting performance. To measure profitability, the company's balance sheets will be used to obtain ROA, ROE, Operating Margin and Tobin's Q, as these are the measures used in this study for financial performance. To ensure validity and reliability of the study, accounting-based and corporate governance structures data are obtained from published, audited annual reports of the firms under research. Data are presumed valid and dependable because JSE-listed firms must comply with IFRS, IAASB, King IV, JSE listing requirements, and the Companies Act of 2008 requirements when presenting their annual reports.

Model Specification

Wintoki et al. (2012) recommend that an appropriate corporate governance and profitability relationship model should be active, not static, in which the independent variable is historical profitability. Therefore, this study assumes a cross-sectional time-series panel data method to explore the relationship between corporate governance characteristics and firm profitability. A descriptive correlational design is followed to ascertain whether there is an association between corporate governance and firm profitability within JSE-listed basic materials sector firms and, if it does exist, to what degree. According to Apuke (2017), the degree is relationships as expressed by correlation coefficients, where coefficients range from +1.00 to -1.00. Higher correlations (coefficients closer to +1.00 or -1.00) indicate more robust relationships. To emphasise this, Leedy and Ormrod (2001) mention that in research, correlation analysis aims to establish an association between multiple variables in the same population. To establish the relationship between corporate governance characteristics and firm profitability, this study uses a regression analysis model for dependent variables ROA and Tobin's Q. The two model equations are:

Model 1: $ROA = \beta_0 + \beta_1 \cdot BS + \beta_2.IB + \beta_3.CD + \beta_4.RC + \beta_5.CP + \beta_6.FS + \beta_7.LG + \varepsilon_i$

For the above model, to measure a firm's profitability ROA will be substituted for ROE for robustness check (Fernández-Temprano & Tejerina-Gaite, 2020), Kyere & Ausloos, 2021)).

Model 2: $Q\ Ratio = y_0 + y_1.BS + y_2.IB + y_3.CD + y_4.RC + y_5.CP + y_6.FS + y_7.LG$

The above model for Tobin's Q will be used to measure a firm's market value (Kyere & Ausloos, 2021).

Justification of variables

The aim is to ascertain the association between corporate governance characteristics and a firm's profitability for firms in the basic materials sector listed in the JSE. A selection of dependent variables relating to firm profitability and independent variables relating to corporate governance was used. To ascertain the relationship between corporate governance and the profitability of a firm, the researchers used accounting-based measures generally applied (Danoshana & Ravivathani, 2019) to measure the profitability of a firm and they include: Return on Assets, Return on Equity, Operating Margin and Tobin's Q. For independent variables, the existing literature (Tshipa (2017), Danoshana and Ravivathani (2019); Dzingai and Fakoya (2017)) inspires talks of six board attributes: board size, board independence, chairperson-CEO duality, remuneration committee and CEO pay disparity. The six aforementioned independent variables are taken into consideration in the current study.

Results and Discussions

Descriptive Statistics

Table 1 summarizes key descriptive statistics (mean, median, range, standard deviation, skewness, and kurtosis) for 56 JSE-listed basic material sector firms, covering dependent, independent, and control variables.

Table 1: Summary of the descriptive statistics

Variable	Mean	Median	Min	Max	Std. Dev.	Skewness	Kurtosis
ROA	0,022	0,006	-0,200	0,238	0,108	-0,026	3,049
ROE	0,036	0,015	-0,424	0,410	0,188	-0,346	3,579
OPMARGIN	7,638	2,540	-32,050	42,440	17,633	0,045	3,084
TOBIN'S Q	4,527	0,976	0,000	66,130	8,543	3,301	17,797
BS	9,354	9,000	3,000	20,000	3,349	0,623	3,782
CD	0,071	0,000	0,000	1,000	0,258	3,328	12,077
CP	0,967	0,980	0,673	1,000	0,047	-3,794	21,629
IB	0,551	0,556	0,050	0,917	0,199	-0,247	2,306
RC	0,807	1,000	0,000	1,000	0,243	-1,286	4,361
FS	1227,095	1192,200	773,500	1653,570	233,830	0,250	2,168
LG	0,365	0,568	-9,633	2,990	1,440	-5,734	37,182

Source: E-Views

The average value of ROA, ROE and operating margin over the five years 2017 to 2021 are 2.20%, 3.60% and 7.638%, respectively. This represents a not-so-favourable performance of basic materials sector firms listed on the JSE under the period of this study because the minimum ROA, ROE and operating margin are -20%, -42.40% and -32.05%, respectively. The mean value of board size (BS) is 9.354, indicating that most of the firms in the basic materials sectors have a moderate board size of 9 to 10 board members. The average board independence (IB) percentage is 55%, indicating that more than half of the board is independent. Like Kyere and Ausloos' (2021) findings, these results indicate that the boards of directors of most JSE-listed firms in the basic materials sector are independent. The independence of the remuneration committee (RC) averages 80.7%, which indicates that most firms comply with the King IV requirements, and most of the remuneration committee members are independent, which is in line with the King IV recommendations. The mean for CEO duality is 0.071, indicating that most of the firms in the basic materials sector have a separation of the CEO and board chairperson roles, which is in line with the King IV recommendations.

Correlation Between Variables

This section attempts to ascertain whether there is collinearity among any variables. Gujarati and Porter (2009) suggest that a correlation above 0.8 demonstrates the collinearity in the variables. Following the approach of Kabir and Thai (2017) and Kyere and Ausloos (2021), Table 2 displays the correlation matrix for the dependent variables (Return on Assets (ROA) and Tobin's Q), independent variables, and control variables, highlighting the relationships between these key factors. The results in Table 2 indicate no likelihood of a multi-collinearity problem in this sample. Nonetheless, there are mixed results: some variables are negatively

correlated, while others positively correlate to ROA and Tobin's Q. The correlation is negative for CP=-0.046, IB=-0.028, and FS=-0.044 with ROA. The rest of the variables positively correlate with ROA: BS=0.447, CD=0.100, RC=0.119, and LG=0.403, suggesting that an increase in any of these variables will increase ROA, whereas variables CP, IB and FS decrease ROA. In relation to Tobin's Q and corporate governance mechanisms: variables BS (-0.107), CD (-0.071) and LG (0.053) have a weak correlation with Tobin's Q indicating that these variables decline with Tobin's Q. Whereas variables CP (0.093), IB (0.292), RC (0.146) and FS (0.102) have a positive correlation with Tobin's Q indicating that when corporate governance characteristics increase, Tobin's Q also increases.

Table 2: Correlation analysis

Variable	ROA	Tobin's Q	BS	CD	CP	IB	RC	FS	LG
ROA	1,000								
Tobin's Q	0,074	1,000							
BS	0,447	-0,107	1,000						
CD	0,100	-0,071	0,176	1,000					
CP	-0,046	0,093	-0,221	0,052	1,000				
IB	-0,028	0,292	0,138	-0,296	0,025	1,000			
RC	0,119	0,146	0,261	-0,284	-0,204	0,556	1,000		
FS	-0,044	0,102	-0,383	0,034	0,351	-0,398	-0,473	1,000	
LG	0,403	-0,053	0,232	0,205	-0,105	-0,174	-0,106	-0,109	1,000

Source: E-views

Assessment of Regression Model Accuracy

This section assesses the model accuracy using the goodness-of-fit measure for linear models used in this research. The adjusted R squared presented in Table 5 is 0.352, indicating that the regression model used perfectly predicts values for the variables. For Tobin's Q, the adjusted R squared value of -0.044 indicates that the model has no predictive value.

Relationship between board characteristics and firm profitability

Hausman test for ROA and Tobin's Q

The study uses the Hausman test to decide whether to apply a fixed or a random effects model. As a rule of thumb, if the p-value is less than 0.05, the fixed effects model is viable; otherwise, a random effects model is more suitable. The probability is significant at 5%. Tables 3 and Table 4 reflects the ROA and Tobin's Q and shows that Hausman test of p-values 0.0003 < 0.05 and 0.8728 > 0.05, respectively. Based on these results, the study uses a fixed effects model to assess the relationship between ROA and board characteristics and random effects model for Tobin's Q.

Table 3: Hausman Test for ROA

Test Summary		Chi-Sq. Statistic	Chi-Sq. D.f.	Prob.
Cross-section random		25,41667	6,00000	0,00030
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var (Diff.)	Prob.
BS	-0,00665	0,01343	0,00047	0,35300
CP	0,01924	0,00538	0,00002	0,00230
IB	0,00015	-0,00018	0,00000	0,70150
RC	0,00809	0,00102	0,00013	0,54120
FS	0,00114	0,00011	0,00000	0,00090

Source: E-Views

Table 4: Hausman Test Model for Tobin's Q

Test Summary		**Chi-Sq. Statistic**	**Chi-Sq. D.f.**	**Prob.**
Cross-section random		2,4609	6	0,8728
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var (Diff.)	Prob.
BS	0,215	-0,417	1,162	0,557
CP	5,550	-0,850	324,856	0,723
IB	0,031	4,366	12,330	0,217
RC	-1,507	2,045	3562,049	0,953
FS	-0,408	-0,162	2,397	0,874
LG	-0,187	-0,789	6,754	0,817

Source: E-views

Regression results of fixed effects model for ROA

Following Fernández-Temprano and Tejerina-Gaite (2020) and Kyere and Ausloos (2021), this study applies regression analysis to explore the link between corporate governance and ROA, yielding mixed results (Table 5) that highlight complex relationships between independent variables and firm profitability. There is a variation of high and low independent variables. The p-values of CP (0.667), CD (0.872), and IB (0.585) are high since the significance level is 0.00, suggesting they have no predictive power on ROA. Therefore, changes in CEO pay disparity, CEO-chairperson duality, and board independence will not affect firm profitability. However, independent and control variables BS (0.0131), RC (0.0013), FS (0.0001) and LG (0.0020) have p-values close to zero, indicating a predictive power on the ROA. Hence regression model 1 could be reduced to:

$$ROA = 0.013BS + 0.00131RC + 0.0001FS + 0.0020LG + \varepsilon_i$$

The intercept value $\beta_0 = 0$ means that if the p-value is insignificant, the intercept is not significantly different from 0. From the reduced model 1 equation, it can be predicted that ROA will increase by 1.31% each time the size of the board increases by one member and increase by 0.13% as the percentage of independence of the remuneration committee increases by 1%. Additionally, adjusted R-squared = 0.35 implies that 35% of all the independent and control variables interpret the outcomes on the dependent variable, whilst other variables explain 65% of any movements in ROA.

Table 5: Fixed effects model for ROA

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
BS	0,0131	0,0033	4,0312	0,0001
CP	0,0013	0,0030	0,4297	0,6685
CD	-0,0056	0,0345	-0,1613	0,8723
IB	-0,0003	0,0005	-0,5476	0,5854
RC	0,0013	0,0006	2,0998	0,0387
FS	0,0001	0,0000	1,8348	0,0700
LG	0,0020	0,0005	3,9894	0,0001
C	-0,5147	0,2936	-1,7533	0,0832
Adjusted R-squared	0,352			
Observations	97			

Source: E-views

Fixed effects model for ROA and board size

Tables 2 and Table 5 show a solid positive correlation between board size and ROA, indicating that a large board size could improve a firm's profitability. This finding is consistent with Kyere and Ausloos (2021). The average board size for firms in the basic materials sector is nine. The minimum of three is consistent with the Companies Act requirements and in proximity with the JSE listings requirements of a minimum of four board members. However, none of the guidelines gives a maximum number and King IV suggests that a board should have a balance of skills, knowledge, experience, diversity and independence. According to Christensen et al.

(2010), the size of the board is linked to its ability to affect its role of monitoring and controlling managers. Therefore, a bigger board will be more equipped as it possesses a balance of skills and experience required to conduct this role. On the contrary, smaller boards are believed to improve a firm's profitability as larger boards may lack cohesiveness and hence take longer to make decisions (Dzingai & Fakoya, 2017). Based on the findings of this research on firms in the basic materials sector listed on the JSE, the average profitability is significantly low (2.17% ROA and 7.6% operating profit), while board size is larger than the guidelines of the Companies Act and JSE Listing requirements. However, results further indicate that an increase in board size leads to a firm's profitability. These results indicate that larger boards harvest what the guidelines of the King IV aim to achieve in recommending a good balance of skills, experience, independence, knowledge and diversity, ensuring the board is well equipped with the skills to affect its monitoring role and controlling managers.

Fixed effects model for ROA and board independence

Board independence means a board with a higher percentage of independent non-executive directors than executive and non-executive directors. Boards of directors of firms in the basic materials sector listed on the JSE consist of an average of 55%, indicating at least an equal split between independent and non-independent board members. Tables 2 and Table 5 indicate a negative and statistically insignificant relationship between ROA and board independence. Corporate scandals such as Glencoe resulted from a failure of corporate governance structures in exercising their role of monitoring management. Further research is required to establish whether this resulted from a lack of independence within the board, effectively resulting in complacency by the board of directors. Nichols et al. (2008) mention corporate scandals highlighting cosy relationships between non-executive and executive directors. Such boards act more as "rubber stamping" structures and less as control mechanisms for strategies and plans decided by the executive. Therefore, to ensure the effectiveness of the board of directors, board selection should follow the King IV guidelines of balancing skills, knowledge, independence, experience and diversity. Based on these results that point to a negative and statistically insignificant association between board independence and ROA, board independence is time-limited (Nichols et al., 2008), and so is its effectiveness on firm profitability.

Fixed effects model for ROA and CEO duality

The segregation of the positions of the CEO and the board chairperson is a measure to prevent board capture and abuse of power by executive managers (Nichols et al., 2008). Therefore, an independent non-executive chairperson is an important part of the corporate governance structure and another characteristic of board independence. Agency theory relates to the division of ownership and control and suggests that principals and agents (chairperson and CEO) have different objectives in a firm. The principal maximises wealth for the shareholder, and the agent maximises income (Freire, 2019). Panda and Leepsa (2017) suggested that one of the solutions to the principal-agent problem is that a board that consists of a majority of outside and independent directors may be more effective in monitoring the actions of management and aligning the interests of shareholders and managers. Essentially, having a CEO as a chairperson of the board will not achieve that. The results indicate that CEO duality is negatively significant, meaning that ROA is higher when the CEO and chairperson positions are separated. These results are consistent with Christensen et al. (2010) and agency theory that separating power and control maximises shareholder returns.

Fixed effects model for ROA and remuneration committee

The remuneration committee is a monitoring mechanism that provides executive remuneration transparency, as King IV recommended. The committee will determine and review the remunerations of executive directors of a firm, effectively improving the agency problem (Christensen et al., 2010). The results in Tables 4.2 and 4.5 indicate a positive statistically significant relationship between ROA and the remuneration committee, suggesting that the existence of a remuneration committee leads to firm profitability. These results are consistent with Christensen et al. (2010), who suggest that firms should ensure that their boards consist of sub-committees. Moreover, on the remuneration committee is the percentage of independent members; 66% of firms in the basic materials sector have remuneration committees, consisting of an average of 81% independent members, including the chairperson. Therefore, the existence and composition of the remuneration committee in the basic materials firms listed on the JSE is in line with the King IV.

Regression results for random effects model for Tobin's Q

Table 6 results indicate that all variables are statistically insignificant. The p-values of all independent variables BS (-41.73), CD (269.14), CP (-0.83), IB (4.36), RC (2.04), FS (-0.16), and LG (-0.79) are significantly high considering a significance level of 0.00, meaning they have no predictive power on Tobin's Q. Therefore, the study cannot conclude a relationship between Tobin's Q and all independent variables.

Table 6: Random effects model for Tobin's Q

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BS	-41.72641	37.25980	-1.119878	0.2658
CD	269.1395	407.1233	0.661076	0.5103
CP	-0.830401	23.60086	-0.035185	0.9720
IB	4.364870	4.310166	1.012692	0.3140
RC	2.044518	6.276291	0.325753	0.7454
FS	-0.162552	0.536644	-0.302905	0.7627
LG	-0.790049	3.383121	-0.233527	0.8159
C	685.2539	2450.061	0.279689	0.7804
Adjusted R-squared	-0,044			
Observations	97			

Source: E-views

A negative Adjusted R-squared = -0.044 means an insignificant relationship exists between Tobin's Q and corporate governance characteristics board size, board independence, CEO duality, and remuneration committee. An insignificant negative relationship exists between Tobin's Q and board size (t=-1.12, p>0.05). Board independence and Tobin's Q have an insignificant positive relationship (t=1.01, p>0.05), and so does the CEO duality and Tobin's Q (t=0.66, p>0.05). The remuneration committee has an insignificant negative relationship with Tobin's Q (t=-.030, p>0.05). These results indicate that the markets do not value any of the corporate governance characteristics evaluated in this study as good corporate governance mechanisms.

Conclusions

The study focused on a sample of fifty-six firms in the basic materials sector listed on the JSE that operate in South Africa and globally using data obtained from the firms' annual reports for 2017 to 2021. Based on the results of the study, the conclusion reached is that corporate governance characteristics have a different or no relationship with the firm's profitability. For a board of directors to effectively exercise oversight, it must comprise a balance of skills and experience and be independent. The boards of directors in the basic materials firms are well diverse and this diversity is demonstrated by the range of profitability of these firms, which is between a ROA of -20% to 23.8%. Firms with larger (>10) boards are more profitable than firms with smaller (<6) boards. Further, firms with a higher percentage of independent board members and a higher percentage of independent remuneration committees are more profitable. Therefore, larger boards reduce the agency cost, effectively ensuring efficient utilisation of the firm's capital, thus leading to the firm's profitability. Based on this study's results and conclusion, firms should follow the guidelines of the King IV Code on corporate governance when forming their boards of directors. Ensuring compliance with King IV Code will safeguard the firm from the risk of agency cost that may lead to loss of shareholder wealth.

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