



# Investigating the Relationship between ESG Performance and Financial Performance: Evidence from Mining Companies in Zimbabwe

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## Abstract

In Zimbabwe, mining companies pose significant environmental, social and governance impacts. This paper investigates the nexus between ESG performance and financial performance of Zimbabwean mining companies. The mode of investigation is to establish whether the ESG systems affect the companies' investment decision-making. This article used a quantitative research design. Zimbabwe has a total of 5 mining companies that are nationally recognized and monitored in the Zimbabwe Stock Exchange (ZSE). A sample of 25 mining companies was selected from the smaller section of mines. The results show that there is a positive co-relationship between ESG performance and investment decisions by companies. This study contributes to the emerging literature on corporate ESG by highlighting the relationship between ESG performance and investment decisions in the mining sector in Zimbabwe.

## Subject Areas

Business Management

## Keywords

Environmental, Social, and Governance (ESG), Investment Decision, Zimbabwe, Sustainable Development, Mining Industry, Financial Performance

## 1. Introduction

Worldwide, there has been increased importance of Environmental, Social, and Government (ESG) related uncertainties in companies. Shareholders and financiers of mining companies are aware that ESG failures can lead to major disrup-

tions and significant losses as a result [1]. There is increased demand for transparency and reporting on mining companies' ESG performance by shareholders and investors demanding a greater degree of transparency and reporting of mining companies' ESG performance [2]. These research results will inform future decision-making by both mining companies and institutional investors. Investors question whether much of today's ESG reporting gives them the relevant, reliable, timely, complete, and comparable information they need for effective decision-making [3]. In a global survey of ESG performance, PWC [3] found out that nearly 80% of institutional investors interviewed said that ESG was an important factor in their investment decision-making.

Large institutional investors are now increasingly challenging management decisions and even limiting investments in companies based on ESG practices [4]. They limit investments based on ESG performance because investors seek to protect their investments, and get good returns on investments. These actions are taken both because they believe weak ESG systems lead to greater uncertainty and added exposure to potential liabilities, but also because they believe ethical investing is morally correct and encourages mining firms to improve their behavior. In general, ESG risk management frameworks in the mining industry are nascent, but have made a great deal of progress. Unfortunately, their performance is still lacking, as ESG cannot be separated from various organizational problems that must be overcome (Hill, 2021) [5]. Unlike technical risks, which are reasonably well managed, significantly, more work is needed before ESG risks can be properly understood and effectively managed [4]. The general productiveness of ESG management in the mining sector has been poor of late, hence the rationale for investigating the relationship between ESG performance and investment decision-making by either the company or institutional investors in the mining sector.

## **2. Problem Statement**

ESG performance and investment decisions in the mining industry are an intertwined phenomenon that has varying outcomes. Some authors have propagated this notion [1] [2] [4] [6] [7]. ESG performance is an area of study that has not been extensively explored in Zimbabwe. The increasing demand for ESG performance in industries with high negative environmental impact is a cause for concern. The mining industry is among the main contributors to negative environmental effects, yet in Zimbabwe, there is no documented information regarding their ESG systems despite it being a strategic sector. There is limited information about the implementation and impact of ESG in Zimbabwe's mining sector. Hence, this study sought to fill this research gap on the relationship between ESG performance and investment decisions in the mining industry in Zimbabwe.

## **3. Literature Review**

### **3.1. ESG: An Overview**

The study of ESG performance in the mining industry has gained currency within

the academic community during the last few years [8] [9]. Several studies have investigated the relationship between ESG performance issues and investment decision-making [10] [11]. Mining activities mainly consist of the extraction, processing, and transportation of minerals from mining sites to the marketplace.

ESG criteria represent the three key elements used to evaluate and quantify a company's sustainability effort and societal impact. The three pillars of ESG cover a broad variety of factors that can be measured to give companies a sustainability score [10]. The environmental criteria evaluate the impact of a firm's operations on natural resources such as air, land, water, and other ecosystems. Social criteria measure the extent to which a company is able to maintain healthy relationships with its various stakeholders, including suppliers, customers, employees, and societies, and the governance criteria examines corporate policies and how the company is governed, including management and the board of directors [10]. Kell *et al.*'s [12] successful investment depends on a vibrant economy, and in the long-term, therefore, investment markets have a clear self-interest in contributing to better management of environmental and social impacts in a way that contributes to the sustainable development of a global society. A better inclusion of ESG factors in investment decisions will ultimately contribute to more stable and predictable markets, which is in the interest of all market actors [13]. According to Compact [14], ESG investing is a modified version of traditional Socially Responsible Investment (SRI). Traditionally, SRI investing would entail portfolio construction through positive screening, negative screening, or a best-in-class approach [14]. Negative screening involves the exclusion of certain companies or even industries that do not live up to an investor's sustainability criteria [14]. This is the strategy used by investors who, for example, avoid "sin stocks" such as those in the Alcohol and Tobacco industries. Depending on the individual investor, negative screenings can tolerate some degree of such bad behavior, while others have zero-tolerance. Hence, some negative screenings only exclude stocks once a vice represents more than a given percentage of a company's revenues, while other screenings disqualify companies with even the smallest affiliation to the vice [15].

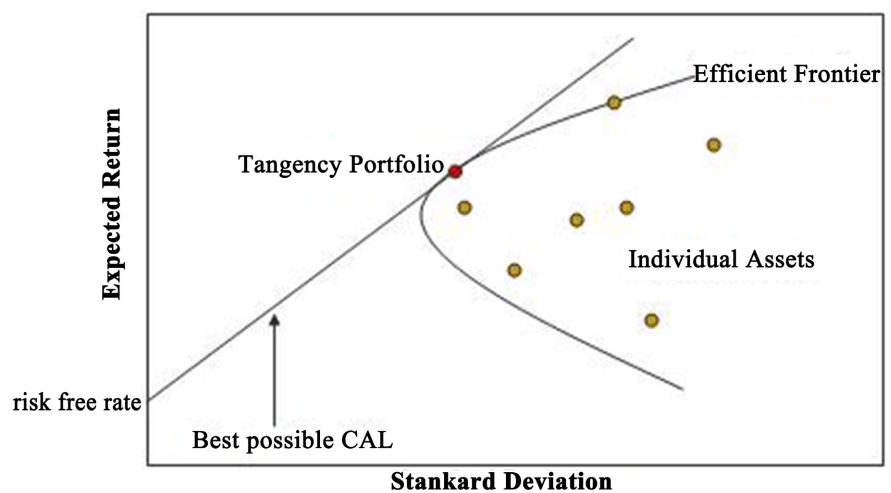
In contrast to negative screening, the concept of positive screening includes favoring companies that demonstrate certain characteristics that are in line with the values of the investor [15]. As is the case with negative screening, the exact criteria for the screening depend on the investor's preferences, but conventionally positive screening includes anti-pollution efforts, the promotion of minorities, and the relationship with employees [16]. The best-in-class approach entails investing in companies that are leaders in a chosen category, like a certain industry [15]. This approach involves the selection or weighting of the best performing companies or assets within the chosen category in terms of sustainability. More recently, ESG criteria are being used to identify the best performing companies. Unlike negative screening, ESG investing does not exclude whole industries but instead encourages investing in companies that are relatively bet-

ter than other industry players. In this way, ESG investing rewards firms that take the most initiative to meet the ESG criteria that are of highest relevance in their respective industry [15].

### 3.2. Theoretical Perspective: Modern Portfolio Theory

In 1952, Markowitz introduced the Modern Portfolio Theory (MPT), which enables investors to create an investment portfolio that maximizes their expected return while accounting for the investor's risk tolerance. Risk, as defined by Markowitz [17], can be split up into systematic and unsystematic risk. MPT strives to eliminate the unsystematic risk, which is the risk that can directly be connected with the specific investment due to its characteristics [17]. Systematic risk, also called market risk, cannot be eliminated by diversification as all stocks are exposed to it. MPT further assumes that investors are risk-averse, meaning that there is a tradeoff between risk and return in the security market as investors expect a premium when being exposed to increased volatility. Hence, a higher risk (standard deviation) is directly associated with increased expected returns [17], as shown in **Figure 1**. According to MPT, for every possible level of risk, an optimal portfolio exists, which can be illustrated by the efficient frontier shown in **Figure 1**. The optimal portfolio offers the highest possible expected return for a given risk level [17]. Any portfolio that lies under the efficient frontier represents a sub-optimal investment, as by investing in a different mix of assets, a greater return could be achieved while keeping the risk steady. For an individual investor, the optimal portfolio and thus the portfolio's position on the efficient frontier depends on the investor's risk tolerance [17].

*The efficient frontier is the set of optimal portfolios that offer the highest expected return for a defined level of risk or the lowest risk for a given level of expected return. Every point on this curve corresponds to a particular portfolio of weights between the assets. We can call a point on this curve X, which refers to an allocation of capital across A and B. We can call the portfolio with a third asset*



**Figure 1.** Markowitz efficient frontier (adapted from Markowitz, 1952 [17]).

*Y. If we think about X and Y as assets themselves, we can now build a portfolio that consists of some weight of X and some weight Y. In other words, we can define a new curve that represents all the portfolios we can build by allocating to X and Y. If we keep going with this, we can draw new curves from any point on the first curve to any point on the second curve. This means that by introducing a third asset, we now have an entire region of possible portfolios. Each portfolio that we can build out of the three assets is a point within this region. If we take a random portfolio P within the region but below the curved line, this means that we should not invest in this portfolio. The reason is that by simply choosing a portfolio straight up on the edge of the curve, call it Q, we can have a higher return for the same level of volatility. Similarly, we can also have a portfolio R that has the same return with a lower volatility by going left to the edge of the curve. The point is that you would never want to hold a portfolio within the interior region, as there would always exist at least two portfolios with a better risk/return. In short, the only portfolios that a rational investor would want to choose are those that are on the edge of this frontier. This is known as the efficient frontier.*

### 3.3. Empirical Literature Review

Studies found out that good ESG performance by firms can improve their financial performance [18] [19]. Financing efficiency by institutional investors is positively related to ESG performances of firms [20] [21] [22] [23] [24]. Institutional investors who invest with their own funds and funds raised from the public, have a greater ability to gather and analyze information and focus more on the safety of their assets. After entering the market, institutional investors can significantly reduce volatility in the capital market [25], because institutional investors with a price prediction advantage act as an investment vehicle in the capital market, which can reduce capital market distortions.

Good ESG performance conveys to the market a company's willingness to operate steadily and pursue long-term development and gain the trust and recognition of the capital market [26]. On the other hand, good ESG performance can attract institutional investors who pay attention to asset safety and stable operating capital [27]. It increases the shareholding ratio of institutional investors and, through the influence of the role of institutional investors, builds a reputation for the company, and enhances public trust in the company [28]. Song *et al.*'s [28] study shows that there is a positive relationship between good ESG performance that encourages institutional investors to increase their shares, convey positive signals to the market, enhance the confidence of the capital market in enterprises, and thus reduce their financing constraints. This in the long term affects the financial performance of companies. Institutional investors tend to hold stocks of companies with higher information transparency, higher corporate governance, and relatively low risk, [29] [30] argue that companies with good ESG performance tend to disclose more comprehensive information and

more transparent information. Firms that have good ESG performance are willing to fulfill social responsibilities by contributing through corporate social responsibility, which not only avoids environmental and other kinds of government policy risks but also reduces their inefficient investment [31]. Kao *et al.* [32] carried out a study of the US stock market. Kao *et al.* [32] found out that when the ESG factor is added, although the excess stock returns are negative, it is still favored by institutional investors, indicating that institutional investors focus on the intrinsic value and sustainable returns of a company with a higher tolerance for lower ESG short-term returns. Globally there has been increasing interest of investors and awareness on risks associated with the environment and non-financial factors, such as social responsibility and good corporate governance. This has put pressure on firms to increase their efforts and focus on non-financial aspects of their business operations and accounting practices. According to Refinitiv [33], firms report their performance on these risks broadly through three categories namely Environment, Social, and Governance (ESG). From the firm perspective, taking action means investment.

According to Jinn [34], few studies have evaluated the relationship between ESG performance, and institutional investors' ESG investment preferences. Moreover, research on the ESG investment preference of institutional investors simply considers the positive correlation between ESG and the institutional investors' shareholding as ESG investment preference of institutional investors [6] [34]. ESG initiatives also affect the stock value of listed companies [35]. Billio *et al.*'s [36] study showed that there was a positive relationship between ESG rating and asset prices, and financial performance. On the contrary, in an investigation by Landin and Scarelli [37] on the role of ESG performance on corporate returns on the Italian Stock Exchange, it was found out that there was no significant relationship between ESG performance and corporate return. In the Indian context, Bhattacharyya and Shamar [38] investigated the impact of ESG activities on credit ratings of companies in the S&P BSE 500. Bhattacharyya and Shamar [38] concluded that ESG activities contribute to firm creditworthiness. However, Zhu *et al.*'s [39] and Huang *et al.*'s [1] studies revealed that the relationship between ESG performance and investment decision by firms in sectors such as the mining industry, remain inconclusive and insufficient. Giannopoulos *et al.* [40] examined the impact of ESG scores on financial performance of Norwegian listed firms. Giannopoulos *et al.*'s [40] study revealed mixed results, indicating a positive relation between ESG scores and firm value (Tobin's Q), and negative relation between ESG scores and profitability (ROA). Buhl *et al.* [7] explored the relationship between ESG reporting and value of Indian energy sector firms and found mixed results. Lopez-de-Silencus *et al.* [41], in their multi-country study, investigated the relationship between ESG reporting quality and firm financial performance and found out that ESG scores had no impact on firm financial performance. ESG scores have a bearing on the level of disclosure by companies, and this also affects investments by institutional investors. Companies with high

ESG scores tend to be more transparent and therefore may attract more investors. ESG performance did not have an effect on investment decisions by institutional investors [41].

ESG is not only important from an ethical point of view, it is also argued to be important from an investment perspective as well. According to OECD [42], the ESG factors have shown to be essential drivers for the risk and return on investment portfolios. This is confirmed in a report by Bloomberg [2]. The Bloomberg Report [2] states that ESG performance has a material effect on industries and impacts the value of the investment portfolios by companies. Companies and investors are increasingly factoring in ESG issues in their own investment decision-making [43]. Researchers report a positive link between ESG performance and firm value and profitability. In his Germany study, Velte [44] concluded that ESG has a positive effect on firm value (Tobin's Q) and profitability (Return on Assets, ROA) for firms. Velte [44] found out that governance has a significant effect on financial performance. Yoon *et al.* [45] examine the link between ESG ratings and market value in Korea. They show that CSR initiatives have a favorable and considerable effect on market value of the firm, but the effect may vary depending on the characteristics of the firm. To explore the association between ESG performance and energy market financial indicators, Zhao *et al.* [46] review China's listed energy enterprises and find that higher ESG performance may actually have an impact on boosting their financial performance. Xie *et al.* [47] carried out an examination of the relationship between ESG initiatives and financial performance of worldwide large sample of firms and found out that majority of ESG initiatives had a positive association with financial performance. Bhaskaran *et al.* [48] reviewed the impact of ESG on financial performance using firm value (Tobin's Q) and operational performance (ROE and ROA) as dependent variables. Bhaskaran *et al.* [48] concluded that firms with high performance on environment, governance, and social pillars tend to create more value in the market.

Similarly, De Lucia *et al.* [49] investigated a sample of 1038 public companies of 22 European countries, and found out a positive association between ESG variables and the financial performance (ROE and ROA). Using 1042 companies from emerging markets, Naeem *et al.* [50] investigated the effects of ESG performance on financial performance. Naeem *et al.* [50] found out that both individual and combined ESG scores had positive and significant association with firm value (Tobin's Q) and profitability (ROA). Moreover, Ahmad *et al.* [51] explore the effect of ESG on financial performance of 351 FTSE350 companies for the period of 2002-2018 and find that overall ESG score significantly and positively affects financial performance of companies, but individual ESG performances have mixed results.

Other researchers found mixed relationship between ESG performance and financial return of the firm. Han *et al.* [52] examined listed companies on Korea Stock Exchange, and found no relationship for social score, positive relationship



for governance score, and negative relationship for environment score. Attan *et al.* [53] assessed how ESG scores affect profitability, firm value, and cost of capital of listed companies in Malaysia. Attan *et al.* [53] found no evidence of relationship with firm value or profitability. Firm value may not necessarily mean it is bound to perform well financially. There are other intervening factors that affect the profitability of a company. Saygili *et al.* [19] carried out a study on the effect of ESG performance on the financial performance of listed companies in Türkiye. Saygili *et al.* [19] found out that reporting on environment had a negative relationship with firm financial performance, stakeholder participation in management had a positive relationship with social dimension, and governance had a positive relationship with financial performance. Recently, numerous studies have examined the relationship between ESG activities and financial performance. Most studies in the ESG literature report a positive and significant relationship between ESG activities and operations with corporate financial performance. ESG performance had favorable effects on corporate investments by firms [48] [49] [54]. Conversely, studies by Duque-Grisales and Aguilera-Caracuel [55] and Landin and Scarelli [37] found a negative relationship for ESG performance with the corporate financial performance of companies. The societal method to ESG suggests that because companies obtain their license to operate from society, they are more likely to constructively serve society's needs. Therefore, if serving society's needs imply environmental protection, there are very high chances that the corporates guided by the societal philosophy will be environmentally responsible [56]. Recent environmental protection calls mean that corporates with international linkages, such as companies listed on stock exchanges, are likely to be more environmentally responsible than non-listed firms [57].

#### **The shareholder view**

In applying the shareholder approach, shareholders are the most important participants, because they provide the means of production [58]. This approach emphasizes the shareholder's pursuit of profit maximization as its focal point and places socially responsible activities or initiatives within the governments' domain [59]. According to Hubbard and Bhagat [59], companies should engage in corporate social activities if a more favorable trade-off between profit and social good will result. The shareholder approach seems to imply that the more a corporation is oriented towards profit, the less likely it will be environmentally responsible, as any ESG is viewed as an expense [60], although Unerman, Bebbington and O'Dwyer [61] posit that firms rarely internalize all socio-environmental costs related to production.

#### **Stakeholder Approach**

Probably in criticism of the preceding approach, Freeman [62] advanced the stakeholder approach to corporate governance. This approach emphasizes that business organizations are not only accountable to their shareholders, but they should also consider the contrasting interests of all other stakeholders that can affect or are affected by the achievement of business objectives [62]. This implies



that the stakeholders affected by the mining operation's environmental damage can demand corporates to be environmentally responsible. According to stakeholder theory, the survival and development of an enterprise depends on the effective response of the enterprise to the interests of its stakeholders and not only on the shareholders [63]. Because of rising attention to sustainability issues, financial disclosure no longer meets the information needs of stakeholders [24]. ESG disclosure, as a supplement to nonfinancial information disclosure, reflects the true development status of enterprises more comprehensively, and market players, such as governments, regulators, financial institutions, investors, and the public, are increasingly concerned about it. ESG has gradually become an important window for interaction and communication between enterprises and stakeholders, and its influence on the business performance and sustainable development ability of enterprises has been continuously highlighted, which also makes it possible to reduce financing constraints through ESG practices [39]. On the one hand, good ESG performance by firms implies better information disclosure, which reduces the information asymmetry and investment risk for investors, thus reducing the required necessary rate of return and easing financing constraints on firms [39].

According to Cerioni *et al.* [64], the concept of legitimacy should seek the approval of local stakeholders and recognize the importance of addressing global norms of social and environmental governance that include diverse values, needs and interests. Legitimacy entails an element of acceptance by the stakeholders who may be affected by the company operations. For example, mining, by and large, damages the environment, therefore local stakeholders have to be seen to accept the benefit of the mining venture. Moreover, local stakeholders also have to accept the sustainability of company operations. Based on the structure conduct, performance paradigm and the shareholder stakeholder and legitimacy perspectives, there are predictions about the likely ESG performance [65]. Sharfman [66] argues that shareholders invest capital and resources, while managers are stewards of resources. The duty of the managers is to make labor transform resources into acceptable products legally. The predicted performance is thus that products produced must be sold at a profit, where after the profit is distributed to shareholders; socially responsible activities are the domain of governments. Therefore, the shareholder stance is predicted to have poor ESG performance. In Zimbabwe, the local private limited, government-owned and multinational companies with parent companies abroad but not listed on any stock exchange are predicted to conform to the shareholder approach [65]. According to Sharfman [66] companies with private shareholder's priorities the interests of the shareholders'. In Zimbabwe, large-scale gold mining companies predicted to conform to the stakeholder structure are those listed on the Zimbabwe Stock Exchange because of their ownership structure. Clarke and Crane [67], in support of Van Zanten and Tulder [57], postulate that the predicted conduct of companies conforming to the legitimacy approach strategically involves other stakeholders.

They also pay attention to the global needs for global stakeholders and the environment. The predicted performance is good ESG practices.

The companies listed on the stock exchange conform to the stakeholder structure, as they have other stakeholders to consider [68]. The companies listed on the foreign stock exchanges have a legitimacy approach. They have the international community as the additional stakeholder [67], and as suggested by Van Zanten and Tulder [57], stakeholders across sectors jointly try to address global sustainability issues.

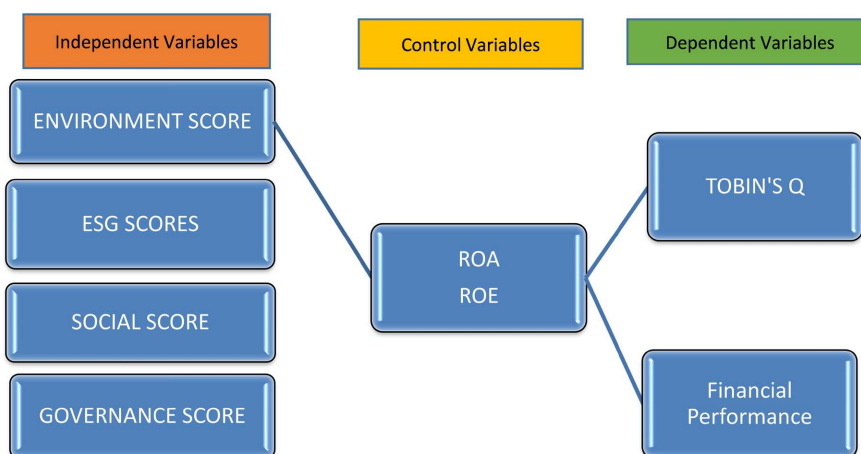
### 3.4. Summary and Evaluation

This section discussed the obtaining research trends in the ESG domain. From the literature review, evidence shows that there is, by and large, a positive co-relationship between ESG performance and financial performance by industrial companies. Companies make investment decisions based on the Return on Investment, and the risks associated with that decision [48] [49] [54]. Conversely, studies by found a negative relationship for ESG performance with the corporate financial performance of companies. ESG performance affects the attraction of institutional investors which have a knock-on effect on financial performance. Evidence from previous studies revealed mixed results, indicating a positive relation between ESG scores and firm value (Tobin's Q), and negative relation between ESG scores and profitability (ROA) [7] [37] [55]. Evidence from literature also shows that there is a positive relationship between ESG performance and financial performance of companies.

## 4. Methodology and Data

### 4.1. Research Variables

To investigate the relationship between ESG performance scores and investment decision of the mining companies, a regression analysis is carried out. This study used ESG performance scores as independent variables in the regression analysis to observe how it affects the dependent variable, that is, the investment decision of the firms as shown in **Figure 2**. According to Refinitiv [33], the overall ESG Score (100%) is calculated using a weighted average of 34%, 42%, and 24% for environmental, social, and governance performance based on the latest ESG score calculation methodology. In this study, we used the use ESG scores (aggregate) to indicate the overall ESG performance of companies operating in the mining industry. The environmental score reflects a corporation's commitment toward environmental and ecological stability and sustainability. It divides environmental scores into three major themes that are resource use, emissions, and innovation. The social score measures and describes how successful the corporation is in maintaining good relations and obtaining loyalty and trust from its employees, suppliers, consumers, and overall local community. Refinitiv [33] divides the social score into four different main groups: workforce, human rights, community, and product responsibility.



**Figure 2.** The research variables (adapted from Bhaskaran *et al.*, 2020 [48]).

The ESG governance seeks to ensure that corporations act in accordance with the best interests of its owners and ensure reporting transparency. For data collection and the scoring process, Refinitiv [33] divided governance performance into three sub-themes, that is, management, shareholders, and CSR strategy score. To this day, a majority of studies on CSR evaluate the profitability of CSR firms and do not consider the problems with the relationship between CSR performance and liquidity [69]. In keeping with preceding studies, this study has the control variables as Return on Assets (ROA), Return on Equity (ROE), and Tobin's Q as dependent variable and proxies for the financial performance of corporations [48] [49] [70]. Return on Assets (ROA) is an accounting-based measurement that can be used to describe a corporation's financial performance. Moreover, it indicates how successfully and efficiently a business utilizes its total assets in production and operation processes to produce profit and, hence, reflects business' operational performance [50]. Return on Equity (ROE) is an accounting-based measure that reflects a firm's profitability ratio that represents the financial performance and revenue-producing capability of the corporation [50].

Tobin's Q is a market-based measure for evaluating a corporation's financial performance and market value, and evaluates a corporation's financial performance by comparing its present market value to its book value or replacement value of total assets. Alongside market performance, Tobin's Q considers the long-term replacement cost of the corporation's total assets, which is important in sustainable investment practices [50].

## 4.2. Hypotheses

The Efficient Market Hypothesis (EMH) generally suggests that share prices reflect the information in the market [2] [4]. There are three forms of EMH including the strong form, semi-strong form, and weak form. According to the strong form, stocks are traded at their fair value because prices reflect all available information in the market, including both privately and publicly available infor-

mation [4]. Therefore, if an asset's value is expected to increase, the demand for the stock increases, which results in an immediate price increase instead of an increase of the price in the future. In this way, according to the strong form of EMH, stocks can never be over or underpriced because stock prices consistently reflect their fair value. Since stocks are already accurately priced, it is theoretically impossible to beat the market or make a profit through arbitrage strategies [4]. Thus, investing in riskier stocks is the only way higher returns can be achieved by an investor, as higher risk is directly associated with higher returns [17]. Unlike the strong form of the EMH, the semi-strong form of EMH argues that only publicly available information is reflected in stock prices [4].

Therefore, according to the semi-strong form of EMH, investors can beat the market and generate abnormal returns by using privately held information. Lastly, the weak form of EMH claims that all past information is reflected in current stock prices but that no "patterns" exist, and therefore, future stock prices are random and unaffected by the past [4]. In reality, efficient markets are not just difficult to achieve but also very hard to sustain [4]. One way of understanding how EMH fails to hold true is through market anomalies. A market anomaly occurs when a stock price deviates from how a model predicts it will behave [71]. This can be observed when new information in the market is not immediately reflected in the stock prices. Thus, in practice, markets are not efficient, making it possible for stocks to outperform or underperform [71]. Based on the EMH, this paper tests whether ESG scores are one of the factors which create market anomalies, making stocks deviate from their fair value, and the following hypotheses were tested:

H1. Mining companies have ESG investment preferences.

H2. Good ESG performance has a positive effect on financial performance.

### Capital Asset Pricing Model

In the early 1960s, Sharpe, Treynor, Lintner, and Mossin introduced the standard Capital Asset Pricing Model (CAPM) [4]. CAPM strives to describe the relationship between systematic risk and expected returns. According to CAPM, the expected return of an asset solely depends on one single factor, namely the market risk premium [4]. The model is expressed in the following way:

$$r_t - r_{ft} = \alpha + \beta(r_{mt} - r_{ft}) + e_t$$

where:

$\alpha$	Jensen's alpha;
$r_t$	Average return on the stock in time $t$ ;
$r_t - r_{ft}$	Average excess return on the stock in time $t$ ;
$r_{ft}$	Risk-free rate in time $t$ ;
$\beta$	Sensitivity to the market;
$r_{mt} - r_{ft}$	Market risk premium in time $t$ ;
$e_t$	Error-term in time $t$ , which captures the diversifiable risk.

The beta in the CAPM accounts for the covariance between the stock and the market. In other words, the beta expresses how much of the stock or portfolio's

movement is dependent on the movement of the market, and beta can be calculated in the following way [4]:

$$\beta_{i, m} = \frac{Cov(r, rm)}{Var(rm)}$$

where:

$Cov(r, rm)$  Covariance of the assets returns with the market return;  
 $Var(rm)$  Variance of the market return.

A beta coefficient of 1 signals that the portfolio movement follows the market volatility perfectly [4]. Hence, when the market returns increase or decrease by 1%, so does the stock or portfolio. A beta greater than one demonstrates that the stock or portfolio returns are more volatile than the market returns. Contrarily, a beta lower than one indicates that the market returns are more volatile than the stock or portfolio returns. Finally, a negative beta indicates a countermovement meaning that the stock or portfolio volatility is inversely correlated to the market volatility [4]. Beta can be used to reflect the sensitivity of a stock or portfolio not only towards the market but also towards other factors.

### 4.3. Sampling

This study selected a sample that consists of small mining companies operating in the informal mining sector and a few listed on the Zimbabwe Stock Exchanges as shown in **Table 1**. A sample data for 25 mining companies in Zimbabwe was used in this study as shown in **Table 2** with the initial sample being 33 mines. The reason for the small sample is that there are few mining companies listed on the Zimbabwe Stock Exchange while also having most of the smaller mines operating informally in the mining sector, which therefore makes it hard to track their activities and make sure that they are operating safely and in an environmentally responsible manner. 4 independent variables, that is, ESG combined score, Environment score, Social score, and Governance score were used. All ESG scores were obtained from Refinitiv. Many researchers prefer to use Refinitiv ESG scores in examining ESG performance [50]. Refinitiv provides one of the most extensive ESG datasets that assesses ESG performance of the firms across 10 themes and 3 pillars with more than 600 criteria [72]. Tobin's Q was used to measure firm value [50]. Similarly, this study used Return on Assets (ROA) as a proxy for profitability [19] [50]. Both variables were extracted from Bloomberg. Tobin's Q is the market value of the firm divided by the replacement cost of its assets

**Table 1.** List of mines studied.

Item	Mineral
<b>Number of Companies Listed on ZSE</b>	
Bindura Nickel Corporation (BNC)	
Falgold (FAL)	
Great Dyke Investments (GDI)	

**Continued**

Hwange Colliery Company (HCCL)		
Zimplats Holdings (ZIM)		
RioZim (RIO)		
<b>Number of Smaller Mines Studied</b>		
Arcturus Mine		Gold
Battlefields Mine		Gold
Bubi Mine		Gold
Chegututu Mine		Gold
Chimanimani Mine		Gold
Chipinge Mine		Gold
Chinhoyi Mine		Gold
Darwendale Mine		Gold
Dessa Mine		Gold
Eureka Mine		Gold
Falcon Mine		Gold
Gaika Mine		Gold
Golden Kopje Mine		Gold
Gokwe Mine		Gold
Guruve Mine		Gold
Inyati Mine		Gold
Kadoma Mine		Gold
Kamativi Mine		Tin
Kanyemba Mine		Gold
Karoi Mine		Gold
Kwekwe Mine		Gold
Lalapanzi Mine		Gold
Makwiro Mine		Gold
Mazowe Mine		Gold
<b>Total Observations</b>		
Zimbabwean Companies		33

**Table 2.** Sample data.

Item	Initial Sample Universe from Bloomberg	Companies with an ESG Score in Refinitiv
Sample Period	2017-2021	2017-2021
Number of Companies Listed on ZSE	5	5
<b>Total Observations</b>		
Zimbabwean Companies	33	25

Source: Bloomberg [2] and Refinitiv (2022) [33].

[72]. According to Aydogmus *et al.* [72], Tobin's Q determines whether a company is overpriced or underpriced, and is critical in investment decision.

## 5. Study Results

As shown in **Table 3**, the mean scores are as follows: ESG Combined Score 38.256, Environment Score 34.285, Social Score 40.454 and Governance Score 43.008. Governance and Social averages are higher than Environment. In terms of control variables, the mean is 10.230 for Size and 24.6% for Leverage respectively. It is worth mentioning that leverage ratio seems reasonable for most of the companies with the exception of a few cases where a company has considerably more debt than its assets. Additionally, it is noted that the standard deviation for each variable is within the predicted range.

**Table 4** highlights the regression results of the mediating effects model. Column (1) lists the results on the impact of ESG performance by listed mining companies on their financing constraints. The estimated coefficient of the variable  $\ln\text{ESG}$  is significantly negative at the 1 percent level, indicating that good ESG performance by listed companies can significantly reduce their financing constraints. Hypothesis 2 is confirmed. H2 hypothesis is that institutional investors have ESG investment preferences. Good ESG performance by listed companies can significantly reduce their financing constraints thereby influencing investment decision by institutional investors. Column (2) lists the results on the impact of listed companies' ESG performance on the shareholding ratio of institutional investors. The estimated results show that the estimated coefficient of the variable  $\ln\text{ESG}$  is significantly positive at the 1 percent level, indicating that good ESG performance by listed mining companies can drive an increase in the shareholding ratio of institutional investors. The mediating variable  $\text{Hold}$  is added to Model (3), and the estimated results are listed in Column (3). The estimated

**Table 3.** Descriptive statistics.

	N	Mean	St. Dev	Min	Median	Max
<b>Dependent Variables</b>						
TQ 14043	14043	2.567	2.963	0.263	1.64	80.938
ROA 14018	14018	5.313	11.413	-167.531	4.527	236.781
<b>Independent Variables</b>						
ESG_CS 14043	14043	38.256	25.855	0	40.104	94.506
ENV 14043	14043	34.285	31.715	0	28.02	99.211
SOC 14043	14043	40.454	29.756	0	40.201	98.628
GOV 14043	14043	43.008	29.035	0	46.315	99.376
<b>Control Variables</b>						
<b>These were selected since control variables have a leveraging effect on both the independent and dependent variable</b>						
Log_TASST 14043	14043	10.23	2.626	1.55	9.723	21.269
TDTA 14043	14043	0.246	0.203	0	0.221	3.892



**Table 4.** Regression results.

Variables	1	2	3
	KZ	Hold	KZ
LnESG	-0.4127***	0.8238***	-0.4050***
	-0.0362	-0.1251	-0.0356
Hold			-0.0095***
			-0.0019
lnAge	2.7096***	-11.7822***	2.6158***
	-0.303	-2.3009	-0.3016
lnSize	-0.1479***	5.2462***	-0.0995*
	-0.0558	-0.4145	-0.0569
LEV	-(0.0538)	0.3461***	-0.0013
	0.0047	-0.0789	-0.053
ROA	-(0.6733)	2.2317**	-0.9418
	0.9641	-1.0886	-0.6645
EM	0.0076*	-0.0093**	0.0076*
	-0.0041	-0.0046	-0.004
lnEx	0.2689**	2.5695**	0.2851**
	-0.1251	-1.0371	-0.1252
Growth	-0.0101	-0.0460	-0.0103
	-0.0095	-0.0472	-0.0098
N	22,183	22,808	22,157
Firm Effect	YES	YES	YES
Year Effect	YES	YES	YES

Notes: Robust t-statistics adjusted for clustering at the firm level are reported in parentheses. \*p < 0.10; \*\*p < 0.05; \*\*\*p < 0.01.

coefficients of LnESG and Hold are both significantly negative at the 1 percent level, indicating a partial mediating effect of the shareholding ratio of institutional investors, Hold. That is, financing constraints on informal companies can be reduced not only by formalizing the companies but also by good ESG performance and also by increases in shareholding by institutional investors.

### Test of ESG Investment Preferences by Mining Companies

The estimated results of the Test of Investment Preferences are in highlighted in **Table 5**, Columns (1) and (2). The estimated coefficient of the variable ROA is significantly positive at the 1 percent level, indicating that good operating performance can increase the likelihood of increased ownership behavior by institutional investors. The estimated results of Model (7) are in Columns (3) and (4), and the estimated coefficient of LnESG is positive, indicating that the decision of

**Table 5.** ESG investment preference test of mining companies.

Variable	1	2	3	4
	H1	H2	I	I
LnESG			0.1033*** -0.0274	0.1033*** -0.0334
ROA	1.0657*** -0.2208	1.0657*** -0.2776	0.342 -0.2132	0.342 -0.4798
lnAge	-0.3394 -0.3597	-(0.3842) 0.3394	1.2507*** -0.3713	1.2507*** -0.3632
lnSize	0.0379 -0.0417	0.0379 -0.0331	-0.0403 -0.0428	-0.0403 -0.0408
LEV	-0.3565** -0.1453	-0.3565** -0.1522	-0.0249 -0.0614	-0.0249 -0.0761
EM	-0.0017 -0.002	-(0.0020) 0.0017	-0.0001 -0.0011	-0.0001 -0.0057
lnEx	-0.1670 -0.1612	-(0.1801) 0.1670	-0.3374** -0.1676	-0.3374** -0.1571
Growth	0.0037 -0.0105	0.0037 -0.0132	0.0101 -0.0114	0.0101 -0.0191
N	21,203	21,203	21,902	21,902
Firm effect	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes
Pseudo_R <sup>2</sup>	2.60%	2.60%	13.84%	13.84%

Notes: The numbers in parentheses in Columns (2) and (4) are robust t-statistics adjusted. Therefore, Columns (1) and (3) show t-statistics without robust estimation. \*p < 0.10; \*\*p < 0.05; \*\*\*p < 0.01.

institutional investors changes after they consider ESG factors, and good ESG performance can increase the potential of institutional investors to engage in abnormal investment behavior, as seen in the previous section, so it can be inferred that companies have ESG performance preference that has a bearing on financial performances. Institutional investors have ESG investment preferences and play an active role in the process in which ESG reduces the financing constraints of listed companies, which helps to improve the quality of not only Zimbabwean listed companies but also Zimbabwe's capital market. Institutional investors with ESG preferences pay more attention to stable and long-term investment benefits, which is a positive medium- and long-term financial performance by the company management.

## 6. Conclusion

This paper studied the relationship between Zimbabwean mining companies' ESG performance and financial performance. The correlation analysis showed that

good ESG performance by listed mining companies was positively related to good financial performance. Good ESG performance by listed companies can not only encourage institutional investors to increase their shares, thereby sending positive signals to the market but also encourage the informal mining companies to formalize. It was revealed that institutional investors have a preference for ESG investment and that good ESG performance by listed companies can increase institutional investors' tolerance for poor current financial performance. Mining companies in the Zimbabwean capital market have gradually made ESG an important factor in their financial performance. This is evidenced by the inclusion of ESG performance in their financial reporting. The Zimbabwe Stock Exchange has also made it a statutory requirement for firms to include ESG performance in the company's financial reports as they are in the formal mining sector. When the listed mining companies' active engagement in ESG practices is more likely to reduce their financing constraints by attracting institutional investors with a preference for ESG performance. These findings support the positive view of corporate ESG practices [20]. This paper confirms the positive relationship between ESG performance and financial performance of listed companies, but also the existence of ESG investment preferences among the mining companies. As stated by Cai *et al.* [73] showed that ESG investment can improve financial performance by enhancing reputation and resource recruitment, but its impact depends on regional economic growth and ROA.

## 7. Limitations of the Study

As with any research undertaking this study has some limitations. The study examined a sample of Zimbabwean listed mining companies, so non-listed mining companies were not included in the study owing to lack of access to data on Parastatals [73]. It showed that a single ESG investment doesn't significantly improve financial performance, and overemphasis on ESG can hinder long-term financial success. Secondly, although the data on ESG performance in this paper have been widely used in other research, their evaluation systems are not exactly the same as those of other international institutions, so it is necessary to verify our results using relevant data from other evaluation institutions. Thirdly, the test methods and conclusions of this paper on the relationship between ESG performance need to be confirmed using other statistical methods. This study focused on mining companies that are listed on the Stock Exchange and Informal Mines, and this cannot be generalized to other industries. It is recommended that future studies should focus on cross-sectional studies that incorporate a wide range of industrial sectors.

## Conflicts of Interest

The authors declare no conflicts of interest.

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