

The Impact of ESG Performance over Financial Performance: A Study on Global Energy and Power Generation Companies

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Abstract

This study aims to analyze the impact of environmental, social and governance (ESG) performance of global energy and power generation corporations over their corporate financial performance. The study explores the impact of the environmental, social and governance (ESG) operations and performance over profitability and market value of the corporations operating business in sensitive industries such as energy and power generation corporations using panel data regression. The ESG performance data and financial data of 192 energy and power generation firms from 2008 to 2019 were collected from the Thomson Reuters Eikon database for the statistical analyses. According to the results, ESG performance is correlated in a significant way with the financial performance of the energy and power generation corporations. The findings suggest that ESG performance has both positive and significant impacts over the profitability of the corporations but a negative impact over the market value of the corporations. This study adds value and importance to the ESG literature, sustainable business practice and sustainability reporting for the energy and power generation companies worldwide. Moreover, the findings of the study would assist the relevant investors, business analysts, industry regulators, policymakers, and decision-makers all other stakeholders who are interested in ESG and sustainability to take noteworthy decisions.

Keywords: ESG performance, energy & power generation industry, financial performance, corporate social responsibility.

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1. Introduction

Environmental, social and governance, broadly familiar as ESG factors are one of the fastest-growing trends and most discussed among investors, creditors, SRI analysts and managers over the last few years. Nowadays, sustainable, and responsible investments are one of the major concerns of investors and creditors recognizing the significance of environmental sustainability and socio-economic stability of countries. Corporations around the world are focusing more long-term sustainability goals such as ESG goals now rather than just profit maximization or the traditional short-term goals. Studies have demonstrated that ESG performance can mitigate risks and generate sustainable returns for investors by strengthening the financial performance of the firm, which may vary from industries to countries. Corporations from around the globe are also giving more priority to the ESG strategies and investments because of the rising demand of transparency and sustainability in the business world. ESG practices have become popular after the formation of Principles for Responsible Investing (PRI) in 2006 by UN where the necessity and significance of activities related to environmental, social and governance were emphasized by the reports. ESG operation and reporting is getting popularity day by day as it is believed that these operations can foster the value and financial performance of the corporations. ESG activities are carried out by the companies not only to maximize the value of the financial stakeholders but also for wellbeing of all the stakeholders of a particular corporation. As the global moto suggests sustainability in every aspect, the practice of environmental, social and governance (ESG) efficiently and effectively became so important to the investors, policy makers and to the general public as well.

The growing threat of global warming and climate change is one of the major threats in the 21st century. Business organizations are expected to retain the ecological balance as well as the common socio-cultural balance. Governments and regulators from different parts of the have imposed laws and regulations to ensure the environmental sustainability. Companies from environmentally sensitive industries such energy and power generation companies plan and implement various environmental where most of the environmental strategies aims to reduce the ecological cost made by the business operation of energy and power generation companies. The growing concern on the sustainability of climate worldwide has put pressure on the energy and power generation corporations to operate their business by including the sustainability and social responsibility related operations beside their regular operations. Nevertheless, the energy and power generation corporations also report their socially responsible initiatives and sustainability strategies according to the laws and regulation in order to legitimate their

presence in the market and to gain more acceptance from the investors and creditors. The corporations including the ESG report in their annual financial report as a tool of reporting their operations and strategies regarding sustainability and social responsibilities. From the owner's or shareholders point of view, it is essential to know whether investment in expenditure in operations like environmental, social and governance (ESG) can bring any financial benefit for the shareholders of corporation as well as for all the stakeholders of the corporation. This study aims to examine how the ESG strategies and activities of the energy and power generation corporations from around the world affect their corporate financial performance.

There are a good number of studies on the effect of ESG activities on the financial performances of the companies from different industries which report both negative, positive and insignificant results. It would be a value-adding analysis to find the financial value and effects of the ESG activities and strategies of the companies which belong to environmentally sensitive industries specially the companies in energy and power generation industry. Therefore, the purpose of the study is to examine how the ESG performances and initiatives of the energy and power generation companies affect their market valuation and financial performances. The ESG performance scores of listed energy and power generation companies from around the world has been collected from the Thomson Reuters database and the financial and market data have also been collected from the Thomson Reuters database in order to examine the interrelation of ESG operation and financial performance. According to the findings, ESG performance is correlated in a significant way with the financial performance of the energy and power generation corporations. The results of the regression analysis shows that the ESG performance has both positive and significant impacts over the profitability of the firms but negative impact over the market value of the firms.

The paper has been designed as follows, a brief introduction and discussion on ESG and theoretical background, followed by literature review on the relationship of ESG performance with the corporate financial performance, the gap in the literature and hypothesis development, data and methodology, empirical tests and regression analysis results with discussion followed and concluded with conclusion.

2. Literature Review

ESG indicates the environmental, social, and governance activities of corporations. Basically, ESG is the set of environmental, social, and governance related operations by any corporation with the purpose of ensuring the sustainability of the corporation as well as to serve all the stakeholders by maintaining and increasing the financial value of the firm. Each pillar of ESG practices has different types of operations and criteria accordingly. The practices and operations of environment pillar of ESG explains how responsible the firm is while running the production and business activities by protecting the environment and sustainability of natural resources at the same time. The criteria and operations under environment pillar include CO_2 and other toxic emissions to the environment by the company, how efficiently the firm uses the natural resources, waste management by the company, policies and innovations made by the company to fight global warming and to save the environment from pollutions, etc. The social pillar of the ESG activities represent the relationship between the firm and the society as a whole. Business firms have certain responsibilities towards both internal stakeholders (employees, suppliers, customers) and external stakeholders (society, government), hence all the activities to fulfil these responsibilities are considered as the social performance of the corporation. The operations included under the social pillar are often known as the CSR activities as well. The criteria and operations of the social pillar of the ESG are mostly activities of a corporation related to labor management and workforce welfare, human rights activities, serving and fulfilling the responsibility to the local community and to the overall society, product responsibility and so on. The governance pillar of the ESG activities is about decision making as well as leadership structure of the company, internal and external audit, and overall governance of the company. Generally, investors are more interested to learn the issues regarding governance of a company. The criteria and of operations of the governance pillar includes information related to the governing and management board of the company, structure and decision-making process of the board members, accounting and audit strategies, shareholders rights and responsibilities, other CSR strategies, etc.

ESG practices are increasing worldwide along with ESG minded businesses. A large number of stock markets from different parts of the world have introduced regulations and guidelines for company ESG disclosure such as USA, Germany, United Kingdom, Canada, Norway, Malaysia, Turkey, South Africa, Brazil, Singapore, Sri Lanka, the Philippines, Poland, Thailand, India, and some others more (China ESG development Index).

The term ESG can be better understood by stakeholder theory (Freeman et al., 2010) that summarizes, the corporation does not belong to one party (owner or stockholder) alone, but must be considered taking into account the diversity of entities involved in it and, thus, those make it possible. The company's goal therefore should not only be to maximize financial gain for the shareholder, but rather to generate value for all stakeholders like workers, customers, surrounding societies, and all other resources. The main principal of the ESG activities is to ensure sustainability of the firm. Investors are more interested in the sustainability of the business and how responsible the firm is to the society is important factor to the young investors now. Stakeholder theory states that a firm is driven by its ties with its various stakeholders to create sustainable wealth. In this line of thought, the organization would publish information on financial and non-financial activities publicly. The disclosure of such information reduces the stakeholder's information asymmetry leading to greater investors' confidence. Additionally, higher transparency levels reduce the crookedness of information among the company and investors, thereby decreasing realized risks (Cheng et al., 2014). The non-commercial activities like environmental, social and governance related activities is carried out by the firm to maximize the value of both company and all stakeholders. (Fatemi et al., 2018) reported in the support statement that ESG activities and reports improves the value of the firms positively when other factors stay constant.

Despite of being a comparatively new concept of ESG, there are lots of studies focusing the relations between ESG or CSR and firm value or performance (Malik, 2015). Earlier research works have been carried out mostly on the impact of corporate social responsibility also known as CSR activities over financial performances of corporations as CSR activities are known and more widely practiced by corporations all over the world. The association between CSR and environmental activities of the firms had been investigated in abundant academic works quantitatively, where there is proof of significantly positive, negative as well as insignificant, neutral relationship, many of these are because of different empirical methodology being used (Chang & Kuo, 2008). For instance, (S. Lo et al., 2007), studied the US market to explore the correlation among corporate sustainability as well as the market value of firms by taking Tobin's Q as a measurement of corporation's market value where authors reported that sustainability driven firms show positive relationship with making market value of the firm. (Margolis & Walsh, 2003) studied the studies carried out from 1972 to 2002 which investigated the association between CSR initiatives of corporations and their effects financial performance quantitatively and reported a positive linkage between corporation's social and the financial

performance parameters whereas there are not so many studies yet showed of a negative association. Among some more empirical which studied the effect of overall CSR performances over the performance of the companies. The findings of the study of (S. Lo et al., 2007) and (Artiach & Walker, 2010) showed positive relationship as well. Similarly, (Ashraf et al., 2017), (Laskar et al., 2017), (Dincel & Gungor, 2018), (Lourenço et al., 2012) in their respective studies found positive correlation with significance among CSR activities and financial performance of the companies. Whereas, (López et al., 2007), (Ho & Taylor, 2007) reported negative relationship among them. Interestingly, (TASKIN, 2015) and (Akben Selcuk & Kiymaz, 2017) both studies from Turkey reported that in their empirical studies they could not find any positive or significant relation between the corporate financial performance and disclosure or performances related to CSR. Besides that, (Ullmann, 1985), (McWilliams & Siegel, 2000), and (Wagner & Wehrmeyer, 2002) have reported insignificant relationship in their studies.

In the current business world researchers are evaluating and focusing more on firm's ESG value and performance than of CSR performances alone as ESG reflects the environmental, social, and corporate governance activities together to achieve more accurate evaluation of the activities of a company. Moreover, ESG reports shows the sustainability trend of the firm's operation which attracts the investors who focus on socially responsible investment (SRI) and (Yu & Zhao, 2015) found that firms practicing sustainability gets better shareholder and market valuation. Researchers analyzed not only CSR but also how ESG performances are affecting financial achievement and market value of the corporations. (Dalal & Thaker, 2019) investigated the impact of ESG factors on the profitability as well as the firm valuation of Indian public limited companies indexed in the NSE 100 ESG database and found that higher ESG performances are associated with better financial performance. (Velte, 2017) analyzed the association of ESG performance and financial performance of selected corporations from Germany which concludes that ESG performances have significantly positive relation with profitability of the German firms, but ESG performances do that affect the market of value of the companies. Similarly, (Rami & Andr, 2019) in their study, examined the relationship of ESG performance and financial performance of selected corporations worldwide and found that ESG performances have significantly positive impact over the profitability of the firms but no significant impact over creating market value. Contrarily, (Atan et al., 2018) studied the linkage of ESG performances and financial performances of the Malaysian firms where they found that ESG performances have no significant relationship with the financial performance of Malaysian

firms. Likewise, (Landi & Sciarelli, 2019) investigated the relationship of ESG performance and market return of listed companies from Italian stock exchange market and found no positive and significant impact of ESG performances over the market return of the companies in Italy. In same line, (Aouadi & Marsat, 2018), (Chelawat & Trivedi, 2016a), (K. Y. Lo & Kwan, 2017) in their study also examined and reported significantly positive relation of ESG performance with profitability as well as market value of the firm. (Buallay, 2019) analyzed the correlation of financial performance and ESG operations of banks and found that ESG performances affect the financial and operational performances of banks positively and significantly. (Card & Krueger, 2018) studied the effect of ESG performance of the corporations on the month-based stock market return in the USA, UK and Switzerland market where they found that ESG scores of the companies only have significant impact on the UK market. Some studies have inconclusive results like (Ionescu et al., 2019) examined the association of ESG performance and market valuation of the corporations operating business in travel and tourism industry and reported that there is a frail link between the ESG performance and corporation's financial performance except for the corporations in the USA. Some researchers argue that not all the initiatives have impact of the financial performance of the firm while some of activities influences financial and market value of the company such as (Miralles-Quirós et al., 2019) in their research work distinguished the relationship between ESG initiatives and creation of market value of 166 banks from different countries and found a positive significant association of the environmental and corporate governance initiative with maximizing financial value for shareholders but a reverse relation among value creation of banks and their social performances. Nevertheless, (Siew & Balatbat, 2013) who investigated the Australian constructions did not found any close relation of financial performance and ESG operations of the firms. The relationship between firm's risk and ESG performances have also been examined. (Sassen et al., 2016) investigated the statistical relation among ESG performance and different types of risks faced by companies in different situation. They analyzed a 12-year data set having financial data of 8752 listed companies in European market and concluded that company's risk could be minimized significantly by improving the environmental performances, whereas corporate governance performances do not affect these kinds of risks significantly.

Nevertheless, ESG performance and sustainability in now one of the topmost priorities for the energy or power generation industries. Specially the environmental aspect is very important for the sensitive industries like energy or power generation industry. (Garcia et al., 2017a) studied the relationship of ESG performance and company's performance for the companies listed

within the BRIC countries and found that environmentally sensitive firms have better environmental performance and the relation between firm's systematic risk and ESG performance shows maximization of value for ESG performance. Likewise, (Yoon et al., 2018) the value creation of ESG performance depends and varies on environmentally sensitive industries. (Kengkathran, 2018) did a conceptual study to examine and investigate the long-term effect ESG reports over the financial performance of the energy sector corporations in Asian countries and reported that ESG information effects firm's financial performance both positively and negatively. In a same way, (Zhao et al., 2018a) studied power energy market of China and examined the relationship of ESG performance with related corporation's financial performance and reported that satisfactory ESG performances help to achieve greater corporate financial benefits as its positively related and ESG performance is also helpful to get positive recognition and profitability for longer period of time. In addition, (Pätäri et al., 2012) studied the relationship of sustainable development initiatives with financial performance of corporations in the energy sector worldwide. They have compared the listed companies in Dow Jones Sustainability Indexes (DJSI) with other renowned companies operating in the energy sector and found that sustainable development positively related with creating market value of the corporation. Furthermore, the corporations driven by sustainability has faster growth rate, better profitability and cost controlling as well.

2.1 Hypotheses

As discussed earlier, ESG performance and practices in the power generation and energy sector and how it creates value to firm and to the stakeholder is very important question to be answered as the investor are looking forward more to socially responsible investment (SRI) with the world looking forward to sustainability in every sector. Mostly, research findings indicated a positively significant association of ESG and CFP (Friede et al., 2015). Whereas, some researchers claim that there are not enough studies on sustainable performances of firm focusing on particular industries (Barnett, 2007). Additionally, there is lack of consensus that sensitive industries (e.g. environmentally sensitive) have always had comparatively low ESG performance scores (Statman, M., Glushkov, D., 2009), (Hong et al., 2009). Besides, there are insufficient studies on ESG issues and their impact over the financial performance in the emerging economics (Yoon et al., 2018). Although there are studies conducted regarding the association of ESG and financial performance of energy and power generation company in some different economies, despite of huge investments prevailed, there is inadequacy of evidence of such kind of research work just for global energy and power generation companies

whereas environmental issue and sustainability, social responsibilities and controversial corporate governance are prominent issues throughout the world. Therefore, the objective of this study is how ESG activities and ESG performance of a firm effect the profitability and the value of firm specially the firms operating business in energy and power sectors. A firm with better ESG performance specially in the energy and power generation sector has more acceptance in the society with a positive impact but how these ESG activities affect the financial gains of corporations has been analyzed in this study. With a view to analyzing the effect of ESG performances over the financial performances of energy and power generation firms this study has been hypothesized in the following way in the light of precious studies:

Hypothesis₁: ESG performances have positive impact with significance on the profitability of the energy and power generation companies.

Hypothesis₂: ESG performances have positive impact with significance on the operational profitability of the energy and power generation companies.

Hypothesis₃: ESG performances have positive impact with significance on company market value of the energy and power generation companies.

3. Data and Methodology

3.1 Data

In this study, the data of ESG performance of energy and power generation companies has been extracted and downloaded from Thomson Reuters Eikon's Asset4 database. ESG scores of total 192 firms operating business in energy and power generation sector have been taken from the Thomson Reuters as ESG performance data of the companies. The sample companies include oil, natural gas, renewable energy, electricity generation companies and oil, natural gas, electric, water and other regulated utility related equipment and service providing companies. ESG score by Thomson Reuters (also known Asset4 ESG data) is a combined score according to the statements of the corporations regarding the environmental, social and governance activities of a corporation. For analyzing financial performance of the energy and power generation corporations, financial data such as related company balance sheet, different ratios were extracted from the Thomson Reuters Eikon's financial fundamental section. Panel data of the companies have been used for analyzing the relation among the ESG performances and firm's financial performances under this study. The combined ESG scores of 192 different companies

ranged from 2008 to 2018 have been used as ESG performance data in the panel data. However, as the ESG performances might not affect the financial value of performances right way in the same year (Choi and Wang, 2009), to analyze the actual effect of ESG performances over the financial performance, one-year lagged variables of financial performance measurements and one-year lagged control variables have been applied in the regression calculation in the light of previous studies (Saleh et al., 2011), (Velte, 2017). Therefore, financial performance data from 2009 to 2019 of 192 companies have been used in the data panel for the analysis.

3.2 Dependent variables

In the previous studies, different kinds of variables such as ROA, ROE, EPS, ROIC, ROCE, EPS, RONA etc. had been used to analyze the impact of ESG performance over the financial gain or loss of the firm. In this study ROE, Pretax ROA and Tobin's Q are used as dependent variable to find out the relationship of profitability or firm performance with ESG performance of the firm.

3.2.1 Return on Equity (ROE)

Return on equity of ROE is a widely used accounting-based method to find out the financial performances of the corporations as well as managerial performance (Griffin & Mahon, 1997). ROE had been used by (Atan, Alam, Said, & Zamri, 2018), (Zhao et al., 2018), (Rami & Andr, 2019) to investigate how ESG performance affects firm's financial performance. ROE is calculated as:

$$\text{ROE} = (\text{Net Income available for common stockholders}) / (\text{Total common Equity}) \times 100$$

3.2.2 Return on Assets (ROA)

Another dependent variable we used is pretax Return of Assets (ROA) which is one of the most popular and widely used measurements which is based on accounting basics and broadly used to report corporation's operating performance and operational profitability. Many researchers have used ROA in similar kinds of studies such as (Aouadi & Marsat, 2018), (Ionescu, Firoiu, Pirvu, & Vilag, 2019), (Velte, 2017), (Dalal & Thaker, 2019), Xie et al., 2018). As the sample of the energy and power generation companies are from different part of the world in this study, pretax ROA will be used considering the different tax structure of different countries. Pretax ROA is calculated as:

Pretax ROA= (EBT (Earnings before Taxes)) / (Total assets) ×100

3.2.3 Tobin's Q

Tobin's Q is widely used and popular market-based measurement which is used to find out the current market value of the firm which will be used as a dependent variable in this study. Generally, Tobin's Q is expressed as the ratio of the market capitalization of the corporation over the total physical asset value of that corporation (Kim et al., 2013). It shows financial position of the physical assets of the corporation in today's market. Tobin's Q had been used in similar studies by (Velte, 2017), (Atan, Alam, Said, & Zamri, 2018), (Zhao et al., 2018), (Rami & Andr, 2019) with a view to studying how ESG performances are affecting firm's market value creation. Tobin's Q has been calculated as below:

$$\text{Tobin's Q} = (\text{Total Market Capitalization of the firm}) / (\text{Total Assets of the firm})$$

In our study, we will use Tobin's Q of the corporations as the representative of the market value of those corporations.

3.3 Independent Variable

Combined ESG score has been taken from the Thomson Reuters (Asset4) ESG database which will be used as independent variable. The breakdown of Thomson Reuters ESG score (100%) is as following:

- Environmental score (34%), emissions (12%), resource use (11%), and innovation (11%)
- Social score (35.5%): workforce (16%), community (8%), product responsibility (7%) and human rights (4.5%).
- Governance score (30.5%): management (19%), CSR strategy (8%) and shareholders (7%).

It should be noted that the range of the ESG scores is from 0 to 100, where 0 is the lowest possible and 100 is the highest achievable score (Refinitiv, 2019, p. 8).

3.4 Control variables

Two control variables will be used in the study as encountered in the literature. Control variables have been taken from the financial statements of the energy and power generation companies.

3.4.1 Leverage

Leverage is calculated as total debt by total equity. It has been used as a control variable, as managers usually provide more information about ESG when leverage rises because of extra monitoring from auditing institutions (Lanis & Richardson, 2013).

Also, the debt ratio might affect the results positively since debt must be refunded at regular intervals, it becomes a useful way for maintaining the executives disciplined (Rami & Andr, 2019). The leverage of the corporations is calculated as:

$$\text{Leverage} = (\text{Total Debt}) / (\text{Total Equity})$$

3.4.2 Size

As per the previous studies, firm size influences financial returns. Larger firms might achieve higher returns because of having the advantage of economies of scale. Natural Log of total assets of firm is used as a measurement for size of the firm in this study. The size of the corporations is calculated as:

$$\text{Size} = \text{Ln} (\text{Total assets})$$

The methodology followed in this study is as discussed in the next section.

3.5 Methodology

The study follows the stakeholder theory which says that ESG activities of a firm are considered as the firm's efforts to satisfy both interior and exterior demands of the stakeholders as well as to attain better firm performance.

This study investigates the relationship of the financial performance with ESG performance of energy and power generation firms from around the world. The regression analysis and all other statistical analysis under this study has been carried out using the statistical software "STATA 13".

Regression Model: Regression model adopted and modified consistent with other studies of (Atan, Alam, Said, & Zamri, 2018), (Chelawat & Trivedi, 2016), (Dalal & Thaker, 2019), (Saleh et al., 2011) has been used in the study.

$$ROE_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 Size_{it} + \beta_3 LEV_{it} + \varepsilon_{it} \dots \dots \dots (1)$$

$$ROA_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 Size_{it} + \beta_3 LEV_{it} + \varepsilon_{it} \dots \dots \dots (2)$$

$$TobinsQ_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 Size_{it} + \beta_3 LEV_{it} + \varepsilon_{it} \dots \dots \dots (3)$$

Where;

ROE_{it} is Return on Equity of firm i during period t ;

ROA_{it} is Pretax Return on Asset of firm i during period t ;

$TobinsQ_{it}$ is Tobin's Q of firm i during period t ;

ESG_{it} is ESG score of firms i during period t ;

$Size_{it}$ is log of total assets for firm i during period t ; (control variable)

LEV_{it} is leverage for firm i during period t ; (control variable)

ε_{it} is error term.

Following section of the study discusses the empirical findings of the study.

4. Empirical Findings and Discussion

The empirical analyses and the findings are discussed below with necessary explanations. The overview of the descriptive statistics of data is as presented in the table below.

4.1 Descriptive Statistics

Following Table 1 presents the descriptive statistics of the panel data.

Table 1: Descriptive Statistics

Variable	No. of Observations	Mean	Median	Stan. Deviation	Minimum	Maximum
Independent Variable						
ESG Score	2112	53.29588	55.65131	20.43624	4.064902	91.83833
Dependent Variables						
Tobin's Q	2112	0.682222	0.538616	0.678257	0.000117	9.431718
ROE	2112	0.097206	0.096	0.461422	-1.652	19.42
Pretax ROA	2112	0.052178	0.047	0.07172	-0.604	0.506
Control Variables						
Leverage (Debt/Equity)	2112	1.232525	0.895	1.755014	0.01	50.02
Size (Log_Total Assets)	2112	10.39319	10.33778	0.555827	8.518514	14.13177

As the descriptive statistics results suggests, the ESG score in the panel range from 4.064 to 91.838 with mean of 53.296 and 55.651 median. For the dependent variables, the means and medians are 0.682 and 0.538, 0.0972 and 0.096, 0.0522 and 0.047 of Tobin's Q, ROE and Pretax ROA sequentially. The means and medians for the control variables are 1.233 and 0.895 and 10.393 and 10.338 respectively for leverage and size (Log of assets) of the companies. The debt-to-equity ratio or the leverage if the companies range from 0.01 to 50.02.

4.2 Correlation Results

Table 2. below represents the Pearson correlation matrix for the independent, dependent and control variables of this study. Firstly, it can be noted that, ESG score is correlated with Tobin's Q in a negative way (-0.229^{***}) and Pretax ROA (-0.0444^{*}) with different level of significance whereas ROE has insignificant correlation with ESG scores. Tobin's Q referring to the market value of the corporations has strongly positive correlation with ROE (0.0649^{**}) and Pretax ROA (0.282^{***}).

Table 2: Pearson Correlation Results

	ESG Score	Tobin's Q	ROE	Pretax ROA	Leverage (Debt/Equity)	Size (Total Assets)
ESG Score	1					
Tobin's Q	-0.229***	1				
ROE	0.0212	0.0649**	1			
Pretax ROA	-0.0444*	0.282***	0.263** *	1		
Leverage (Debt/Equity)	-0.0527*	-0.158***	0.0275	-0.204***	1	
Size (LogTotalAsset)	0.376***	-0.264***	-0.0135	0.0288	0.00705	1

Note: * Indicates correlation significance at the 5% level ($p < 0.05$), ** shows correlation significance at the 1% level ($p < 0.01$), *** shows correlation significance at the 0.1% level ($p < 0.001$).

It is not surprising that the accounting measurement indicators ROE and Pretax ROA are strongly correlated with significance level at 0.1%. Interestingly, leverage has significantly negative correlation with the ESG score which means indebted firms have lower ESG score. The higher the firms are indebted with corporate debts the lower the ESG scores. Leverage is negatively correlated with Tobin's Q in a significant way (-0.158***) and with Pretax ROA (-0.204***) not surprisingly but it is noteworthy that leverage does not show any significant correlation with ROE. It is also interesting that, variable expressing size of the firms are strongly and positively correlated with ESG score (0.376***) which represents that bigger firms have higher ESG score. Surprisingly, size of the firms is negatively correlated with Tobin's Q with significance (-0.264***) which suggest that in the market, smaller companies are valued better than the larger companies.

4.3 Variance Inflation Factor (VIF)

Variance inflation factors (VIF) has been calculated next to test for multicollinearity in the correlation of the variables. Variance inflation factor quantifies the effect of collinearity between multiple regression model's predictor variables. The minimum possible VIF should be 1 and VIF more 10 suggests that serious multicollinearity might happen. In the case of this study, there is no VIF value less than 1 or higher than 10. Thus, multicollinearity is not supposed to affect our analysis. The results of the VIF test is presented in the Table 3 below.

Table 3: Variance Inflation Factor (VIF) Test Score

TEST	ESG Score	Leverage (Debt/Equity)	Size (LogTotalAsset)
Variance Inflation Factor	1.18	1.17	1.00

Note: Minimum possible value = 1.0. If values are greater than 10.0 then multicollinearity problems might occur.

4.4 Hausman Test

Hausman test is used to select effective regression model for panel data regression. Mainly, three types of regression model namely random effect model, fixed effect model and pooled OLS model are used in panel data regression. At this stage, Hausman test has been done to choose whether random effect model or fixed effect model is applicable for the regression analysis. According to Hausman test, if the $P > 5\%$ we cannot reject null hypothesis which says random effect model is appropriate and if the $P < 5\%$ we need to reject the null hypothesis and accept alternative hypothesis which explains that fixed effect model is appropriate for the panel data regression. The following Table 4 represents the results of the Hausman test performed.

Table 4: Hausman Test

Variable	Chi-Squared Statistics	<i>p</i> value
Tobin's Q	88.96	0.0000
ROE	20.22	0.0002
Pretax ROA	25.25	0.0000

So, here as the *p* values suggest we must reject the null hypothesis and accept alternative hypothesis which is fixed effect model is applicable and appropriate for the panel data regression of this study.

4.5 Regression Results and Discussion

Results of the regression analysis are shown in the following table. The Table 5 below represents the effect of ESG as an independent variable on the dependent variables ROE, Pretax ROA, and Tobin's Q respectively as measurement of the financial performances of global energy and power generation companies.

Table 5: Results of the Regression Analysis

Dependent Variable	ROE			ROA			Tobin's Q		
	Coef.	Std. Err	p value	Coef.	Std. Err.	p value	Coef.	Std. Err.	p value
ESG Score	0.00314 53	0.00130 39	0.016* *	- .000899 7	0.00017 5	0.000** *	- 0.00368 83	0.00104 03	0.000* **
Leverage (Debt/Equity)	0.00314 53	0.00782 98	0.498	- .005194 3	0.00104 89	0.000* **	- 0.02174 23	0.00621 43	0.000* **
Size (LogofTotalAsset)	- 0.44646 29	0.09727 71	0.000* **	- .012736 1	0.01303 33	0.329	- 0.98563 1	0.07740 11	0.000* **
Constant	4.56366 1	0.99330 91	0.000* **	0.23885 96	0.13305 72	0.073* *	11.1502 5	0.79008	0.000* **
R squared value	0.012			0.031			0.113		
F statistics	7.63			19.19			77.16		
Model used	Fixed effect regression model.			Fixed effect regression model.			Fixed effect regression model.		

Note: * Represents significance at the 10% level ($p < 0.1$), ** Represents significance at the 5% level ($p < 0.05$), *** Represents significance at the 1% level ($p < 0.01$).

ESG score has a positive impact over ROE. It explains that ESG scores have positive influence on the overall profitability of energy and power generation firms specially ESG scores have positive influence over ROE. Besides, the effect of leverage or corporate debt on the profitability of the firm is insignificant here. It is striking that the size of the firms has negative impact over profitability of the firms with significance which is very surprising as it goes against the theory of economies of scale. As the economies of scale theory suggests that larger and bigger corporations usually attain more profitability than comparatively small corporations as the achieve economies of scale earlier but results here are opposite of the theory.

ESG score has a negative impact over pretax ROA in a significant way. It explains that ESG performances affect how firm use or manage its assets to get profit or higher returns from it in

a negative way. It is also notable that, the variable leverage has significantly negative effect on pretax ROA, which suggest that firms with higher debt will not record greater profitability. However, interestingly here the effect of the size of the firms on the pretax ROA is insignificant.

The ESG effect has negative impact over Tobin's Q in a significant way and it suggests, firms with better ESG scores do not have greater market valuation and it rejects the hypothesis that ESG performance has positive association with Tobin's Q of firm which reflect market valuation of the firm. Additionally, leverage which describes the corporate debt of firm also significantly effect on Tobin's Q in a negative way which explains that indebted firms are not rated good by the market. This result explains that firms with larger leverage may fail to get better market valuation. It is surprising that variable representing the size of the corporations has significantly negative impact on the market valuation of corporations which contradicts the theory of economies of scale. Bigger firms are supposed to get greater returns and benefits as are much likely to achieve economies of scale.

As discussed above the ESG performance of the energy and power generation corporations has mixed impact over their financial performance. The findings of this study are in line with the previous study of (Dufwa & Hammarström, 2015; Duque-Grisales, 2019; Garcia et al., 2017; Langeland & Ugland, 2019; Marsat & Williams, 2011) who found negative association of ESG performance with the return on assets (ROA) and Tobin's Q or market valuation of corporations from different industries and regions. However, the findings of the study also partially supports the findings of (Chelawat & Trivedi, 2016; Ramić, 2019; Shakil et al., 2019; Ting et al., 2019; Zhao et al., 2018) who also reported positive interrelation of corporation's ESG performance with their return on equity (ROE).

5. Conclusion

According to the stakeholder theory, strategies, and operations like ESG are supposed to bring competitive advantages for the companies. For industries like energy and power generation whose nature of businesses are environmentally sensitive, ESG performances and activities might play an important role in the financial performance and valuation. In this study, the impact of ESG performance over the valuation and corporate financial performance of the global power and energy companies has been analyzed. The ESG scores provided by Thomson Reuters (Asset4) have been taken as sample for the ESG performance of the listed energy and power generation companies from the different markets of the world. For, perceiving the long-

term impact of ESG performances over the corporate financial performance measurements from the view of both accounting and market oriented have been implemented. The findings explain that ESG performances only have significantly positive impact on the ROE which reflects the overall profitability of the firms. On the other hand, ESG performances affect Pretax ROA or operational profitability of the corporations negatively with significance. The results explain that the ESG expenditures and operation could contribute to the return of the shareholders in a positive way, but the ESG expenses could not save the production or operational cost of these energy and power generation companies. Furthermore, the market values of the corporations which is expressed as Tobin's are also correlated negatively with the ESG performances in significant way. This could be because the ESG strategies and initiatives taken by the energy and power generation companies could not attract the investors as being sustainable or socially responsible investments. The outcomes of the study suggest that the companies operating business in energy and power generation industry should review and restructure their ESG operation plans and procedure more carefully to make the ESG performances effective and efficient much to be beneficial for all stakeholders. The corporate managerial bodies should adopt and implement necessary ESG strategies as per the requirements by keeping in mind ESG operations not only as expenditures but also as sustainable investment for ecological and socio-cultural sustainability. The findings and outcomes of this study have practical implications and relevant to the researchers who are working on ESG or stakeholder management, to decision makers of the sensitive industries, to investors specially SRI investors, to policy makers, to government regulation authorities and to the energy and power generation companies.

This study has some limitations such as the locations and market of the energy and power generation companies have not taken into consideration for the analysis which can dominate the relationship of the ESG and financial performances. Further, ESG performance scores of these companies from any other data provider other than Thomson Reuters and more extended period of sample time can be taken into consideration in further study for more biasness free result. Future studies could also be done on how the performances of every particular pillar of the ESG which are environmental, social and governance affect the corporate financial gains and loss of the global energy and power generation companies. Furthermore, why ESG performances of the energy and power generation corporations could not affect the financial performance and market returns of the corporations positively would also be an interesting question to be investigated.

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