

The relationship between CSR and Performance and Value in the US Energy Industry: A Study of Data 2011-17

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Abstract: This research studies the relationship between corporate social responsibility (CSR) and corporate financial performance (CFP) of the energy industry in the United States from 2011 to 2017. The sample includes the 29 companies that belong to the S&P 500 Energy Index. The model specification of this research uses both accounting and market metrics of performance for measuring the relationship between ESG indicators and performance.(return on equity, price earnings ratio and share price). Corporate social responsibility is measured by using ESG scores published by Bloomberg. Other independent variables include earnings per share and size. Statistical techniques are applied in order to determine the characteristics of the sample. Using the Generalized Method of Moments method, dynamic panel models were estimated. The findings obtained show that ESG is a significant variable to determine financial and market performance. The conclusion is that companies which have higher ESG expenditure in the US energy industry are associated with higher profitability and market price.

Keywords: Financial performance, ESG performance, Sustainability

JEL classification: M14, G39, G34, G31

1. Introduction

1.1. Background

Over the recent years, the implementation of Corporate Social Responsibility (CSR) has become crucial in the design of business strategies. Firms, governments and other stakeholders view CSR as an element of value rather than a marketing tool. Therefore, traditional businesses are now evolving to include sustainability in their priorities. In fact, the CEO of Mountain Equipment Co-op, Peter Robinson, once said "Ethics is the new competitive environment" (CSR Company International, 2009). Nevertheless, investors might not support CSR expenditure because it can increase cost of production. Authors such as Milton Friedman, referred to this issue on this

subversive doctrine. He said that “in a free society, the only social responsibility of business is to use its sources to engage in activities designed to increase its profits so long as it engages in open and free competition, without deception or fraud” (Friedman, 1970). Furthermore, in his piece at the New York Times Magazine, he mentioned further examples that support this doctrine. Friedman developed the concept of “social conscience” which sustains that firms should foment a mutually beneficial relationship with communities in order to achieve lucrative business. Furthermore, he believes that social responsibility should be incorporated as long as it represents a benefit to firms. Overall, the ultimate goal of business is to find the equilibrium of CSR implementation and profit generation.

On a more global context, firms and society have a constant interaction as a significant part of the economy. In one hand, firms contribute to the development of society. They require personnel to carry their regular activities, generating employment opportunities for individuals. Furthermore, revenues obtained by the sale of products and services trigger tax liabilities that represent cash inflows for governments. Additionally, the existence of diverse firms stimulates competitiveness, innovation and development of related industries connected to the final product. On the other hand, society provides the resources necessary for the production process. For instance, elements such as infrastructure, demand of the product and legal frameworks, to protect a firm’s rights, are provided by communities and governmental organizations. For this reason, the implementation of corporate sustainability is a crucial part of a successful long-term relationship between firms and society.

The study of corporate social responsibility and its influence on financial performance has been conducted in a variety of countries and markets. Authors such as Chung-Hua & Yuan analyzed this relationship on Taiwanese firms. Their results suggested that financial performance and CSR are positively correlated (2009). Also, Zhang, Lian, Bock & Lu (2011) studied this topic on a sample of 180 firms that belonged to the Information and Communication Technology industry. Their research suggested that corporate social responsibility depends on firm size. Moreover, in his study, Campbell (2007) included factors such as financial health, general firm conditions and industry competitiveness to analyze the level of CSR implementation in the sample. Even though, his research was quantitative, he was able to conclude that firms experiencing economic hardship do not engage in extensive CSR implementation (2007). Similarly, authors supporting this view include Chan, *et al.*, 2017. Their research considered the extent of CSR practices in regards to financial performance of firms belonging to the MSCI KLD 400 index, which only includes firms with

positive social, governmental and environmental scores. Their results suggest that there is a significant negative relationship between CSR implementation and financial performance. They concluded that firms under financial distress do not prioritize CSR practices (Chan, *et al.*, 2017). Even though, previous studies have researched the relationship of corporate social responsibility and financial performance, only a few have studied industry specific samples in the US economy. This could be caused by the researcher's desire to study bigger data samples. However, corporate social responsibility affects each industry in various ways. For instance, the energy industry has a huge impact on communities. In fact, these corporations have to engage in enormous projects for oil extraction that typically involve infrastructure development for surrounding communities. The impact of these firms, in the overall society is significant and worthy of study. Nevertheless, research on this topic has been neglected. For this reason, this research aims to study financial performance and the implementation of corporate social responsibility in the energy industry in the United States.

1.2. Research aim

The aim of this study is to analyze the relationship between corporate financial performance and value and corporate social responsibility in the energy sector of firms listed in the S&P 500 index and consequently to determine if companies that invest significant funds on CSR practices also obtain superior accounting returns and market value.

1.3. Research Contribution

Profitability and market value in an industry are of interest to all participants in the stock market. CSR is a dimension which, in recent times has been a major area of concern for market participants and all stakeholders. In currently available literature there are no studies on the relationship between CSR and company performance and value in the US energy industry. This research will thus fill a gap and enable stakeholders to assess the operation of the US energy industry in the context of CSR.

1.4. Structure of the paper

In the first section, the aim and overview of the research were provided. Section Two covers the background of the topic. Section Three is a review of relevant literature. This part presents a critical review of the most relevant articles on the subject of this research. Section Four explains the design of the research, methodological choices made and data sources. Section Five presents the results of the analysis conducted with interpretations. The findings from the analysis are discussed in Section Six while the conclusions of the research and recommendations for future research are presented in Section Seven.

2. Industry Overview

This section provides background information about the macroeconomic environment that the energy companies were facing during 2011 to 2017. The purpose of this section is to provide a context of the American economy and the energy industry conditions, so that further analysis of statistical tests can be conducted and interpreted accordingly.

Over the past several years the American energy sector has felt the effects of fluctuations in the oil prices due to many factors. Prior to 2014, oil prices oscillated between \$147 per barrel (in 2008) to \$84.00 per barrel during 2012 (Gold, 2014). This can be attributed to the effects of the levels of supply and demand in the global economy. For instance, after 2008, emerging countries, such as China, had an increased demand of oil putting an upwards pressure in prices (Siegel, 2011). Moreover, tensions in the Middle East raised concerns about the stability of future oil supply, which consequently, increased the oil demand even further. For this reason, projections on oil demand for the following years were promising. Organizations such as the International Energy Agency (IEA) forecasted, in 2008, an increase in demand of 2.2% by 2012 (Siegel, 2011). Hence, the combination of these factors and the optimistic outlook of increased demand and oil prices, represented an attractive investment for many firms.

As for the United States, the oil demand was covered by imports from Nigeria, Algeria, Angola, Colombia and Brazil. However, After the economic crisis of 2008, the United States economy started to recover and investors saw an opportunity to benefit from oil prices in the energy sector

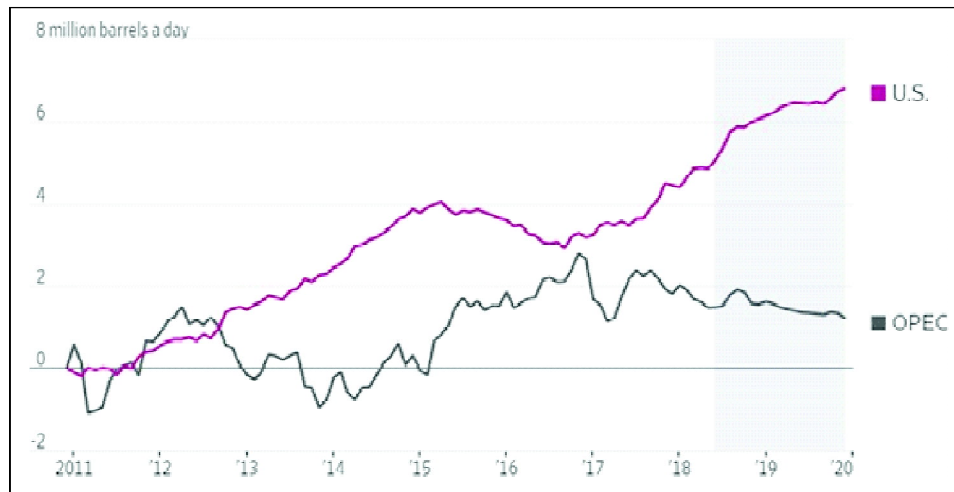


Figure 1: Change in Crude-Oil Production Since 2010.

Source: Energy Information Administration

(Gold, 2014). Finding new supplies of oil was the key to secure significant revenues. Nevertheless, the conventional drilling methods did not produce enough oil to supply the whole demand (Gold, 2014). For this reason, new technologies were developed, and fracking was born. This technique uses chemical procedures to hydraulically extract high quality petroleum from hard to reach areas. The technique was so successful that, by 2011, drillings extended to Texas, New Mexico, North Dakota and even Canada. As a result, oil imports were drastically reduced and supply increased.

By 2014 the United States had surpassed the production of the OPEC nations (McFarlane & Minczeski, 2018). This is shown on figure 1. Moreover, new market entrants, such as Iran, and countries that used to export oil to the USA were forced to find new customers who could buy their product. Between 2014 and 2015, the market was over-supplied driving a decline in oil prices (McFarlane & Minczeski, 2018). In subsequent years, the over-production of oil has been a constant. The OPEC, which usually controls oil production, has not reduced output to regulate prices. Therefore, oil prices continue to fall.

Summary

This section has provided with two significant contextual aspects for this study. First, that the energy industry is experiencing the tensions of over-supply in the market, which affect revenue. Second, the development of fracking was a crucial determinant of increased capital investments in the industry. Overall, since 2014, oil prices have not reached the levels they used to. Thus, the energy industry is struggling to generate profits due to external factors and, therefore, investors have been receiving lower returns than expected on previous years.

3. Literature Review

The main two approaches to corporate social responsibility comprehend the free market approach and the socioeconomic approach. These opposite views not only redefine the concept of CSR, but also, they are supported by secondary theories. Figure 2 shows the different perspectives that can be taken in order to discuss this topic.

Free Market View

First developed by Milton Friedman, the free market view argues that corporate social responsibility is only concerned with business practices in the active pursuit of profit as long as they abide by the laws (Friedman, 1970). For Friedman, the primary objective of corporate social responsibility is to engage in activities that increase revenue (Friedman, 1970). His view

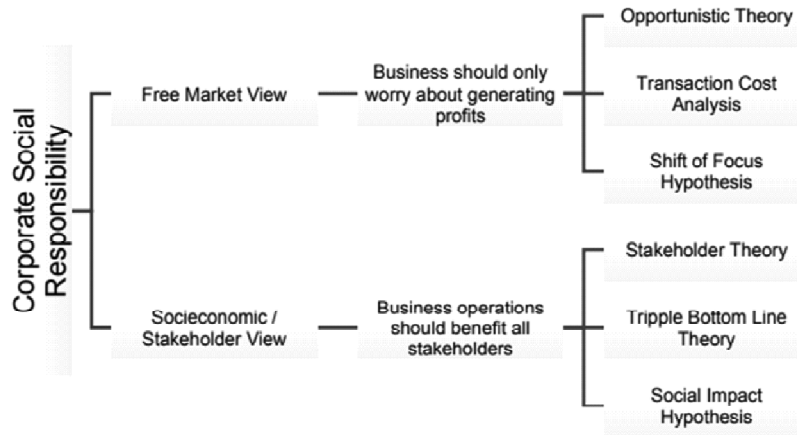


Figure 2: Corporate Social Responsibility Framework Source: Author's Work

has also been shared by other academics such as Theodor Levitt, former editor of the Harvard Business Review, who wrote that CSR should have a “shareholder value orientation remaining in the economic paradigm” (Levitt, 1958). Like them, many others agree with this approach because business directors hold an agent relationship with investors who trust them with their capital in order to increase it. For this reason, business decisions should be aimed to fulfil this purpose while respecting the corresponding laws and moral customs of the host country. In fact, in his book “Capitalism and Freedom” Friedman argued that social responsibility should be the main purpose of governments, non-profit organizations, public educational institutions and other entities with a mission intended to the greater good in society instead of profit generation (Friedman, 1962). Moreover, Friedman’s view considers that prioritizing social issues over the generation of income is an inequitable way to deviate funds into activities that will not increase capital. In other words, from his perspective, firms meet their obligation with society by paying taxes which are the state’s source of funding for programs, infrastructure, etc. designed to benefit the general public.

Supporting the market view are the opportunistic theory, the shift focus hypothesis and the Transaction-cost analysis. For instance, the opportunistic theory sustains that opportunism is not an exclusive aspect of business behavior, instead, any stakeholder can and will act opportunistically whenever is convenient (Werder, 2011). In effect, stakeholders will “deliberately generate and exploit incompleteness of their contracts with other stakeholders to unfairly increase their benefits at the expense of others” (Werder, 2011, p. 1345). Second, the shift of focus hypothesis states that

excessive attention on corporate social responsibility switches the firm's mission from earning revenue to more philanthropic activities (Brammer, *et al.*, 2005). Finally, the transaction-cost theory, formulated by Oliver E. Williamson, revolves about the costs incurred when carrying out for-profit businesses (Williamson, 1993). For example, in a more practical context, manufacture businesses have to study the costs around production methods, such as in-house production or outsourcing, in order to maintain profit margins. These types of decisions are determined opportunistically because they can be biased by information asymmetry, uncertainty and others that, ultimately, are part of complex business strategies.

Socioeconomic model and stakeholder point of view

The socioeconomic model sustains that a firm's purposes should include aiding the communities to improve their social conditions. In fact, Keith Davis, management scholar, defined CSR as "business decisions and actions taken beyond the firm's direct economic or technical interest" (Davis, 1960). Similarly, Carroll (1979), concurred with Davis by writing that CSR should "encompass the economic, legal, ethical and discretionary expectations of society." In essence, this view defines CSR as the group of practices that combine business operations with communities' values. Lastly, Carroll (1991) outlined the types of corporate responsibility and their hierarchy in four categories shown on Figure 3.

The stakeholder view promotes the idea of implementing activities in the business process that intend to benefit only shareholders and society as a whole (Freeman, *et al.*, 2010). In fact, according to this approach,



Figure 3: Pyramid of Corporate Social Responsibility, Carroll 1991

implementation of CSR allows firms to meet the necessities of stakeholders, which consequently, will result in stakeholder loyalty. For this reason, the socioeconomic model indicates that investing on CSR will result in competitive advantages and firm differentiation increasing market share (Donaldson & Preston, 1995). Additionally, Edward Freeman, classified stakeholders into groups of customers, employees, suppliers, shareholders, government and the community in which the business operates (Freeman & Mc Vea, 2001). Secondary stakeholder groups such as interest groups and trade organizations are included, but differentiated because they are not directly related to the business operations (Freeman, *et al.*, 2007) (Phillips, 2003). Figure 4 illustrates these groups in relation to the firm.



Figure 4: Freeman's Stakeholder Groups. Source: Freeman, *et al.*, 2010

The socioeconomic view is supported by the triple bottom line theory and the social impact hypothesis. First introduced in 1994 by the British consultant John Elkington, the triple bottom line theory focuses on three key aspects: profit, people and planet (The Economist, 2009). Its main objective is to measure a firm's value by assessing its financial performance, and its social and environmental impact over a period of time (The Economist, 2009). In fact, the triple bottom line has now been adopted to assess corporate sustainability disclosed on the firm's performance reports. Lastly, the social impact hypothesis, developed by Bradford & Shapiro (1987) and O'Bannon & Preston (1997), sustains that the relationship CSR

implementation and profitability exists and that this relationship is positive. Therefore, the social impact hypothesis views superior financial performance as a consequence of CSR implementation because it involves practices that enhance aspects such as production procedures and working conditions.

Empirical Research

Existent literature has obtained mixed results when analyzing the relationship of CSR and CFP. Even though, previous studies are supported by diverse theories and approaches, these have not reached consensus on their results. For instance, a negative relationship between corporate financial performance and CSR has been found by Brammer *et al.* (2005) who analyzed stock returns, as a measure of financial performance, and CSR scores of firms belonging to diverse industries in the United Kingdom. This study suggested that firms with high CSR scores obtained lower returns when compared to firms with low CSR scores that outperformed the market. Similarly, Cochran and Wood (1984) analyzed American firms classified in two groups: the first group comprised thirty-nine firms for the period of 1970 to 1974; the second group contained data from thirty-six firms from 1975 to 1979. Their dependent variable was the excess value as a measure of financial performance, while their independent variables included CSR scores, asset turnover and industry classification. The results of this study showed that firms with older assets usually have lower CSR scores and that there is a “weak evidence of positive correlation between CSR and financial performance” (Cochran & Wood, 1984).

On the other hand, numerous studies have also found a positive relationship between CSR and CFP. For instance, Bird *et al.* (2007) analyzed the CFP and CSR scores of companies in the S&P 500 index of the American market from 1991 to 2003. In their study, CSR was measured by using ratings issued by KLD Research & Analysis, Inc while financial performance was measured by the market-to-book ratio and price-to-earnings ratio (Bird, *et al.*, 2007). Their model included industry classification as a dummy variable, which proved to be not significant in the regression. In summary, their study showed that firms utilizing significant funds in CSR also had better reputation and public image than their competitors (Bird, *et al.*, 2007, p. 204). Likewise, Waddock and Graves (1997) analyzed 469 firms of the S&P 500 index and their CSR scores measured by KLD rates. Their model considered size, risk and industry classification as dummy variables; financial performance was measured by ROA, ROE and return of sales. Their findings showed a positive relationship between financial performance and CSR but did not include industry specific analysis. Other

authors who obtained positive results between CSR and CFP include Simpson and Kohers (2002), Martinez-Ferrero and Valeriano (2015) and Brammer & Millington (2008).

Lastly, an insignificant relationship between corporate financial performance and CSR has been found as well. A survey performed by Aupperle *et al.* (1985) on CEOs in 1985 showed that firms did not obtain positive nor negative effects resulting from CSR implementation. Likewise, Arlow and Gannon (1984) concluded the same after including variables such as size, relevance of social issues and industry on their regression model. They found that “the relationship between social responsiveness and economic performance is inconclusive.” Finally, Blomgren (2011) interviewed numerous executives from Norway in regards of the effects of CSR on CFP and on analysis of these interviews suggested that the effects CSR implementation are inconclusive when analyzing financial performance.

Summary

Multiple studies found opposing conclusions in regards to the relationship of CSR and corporate financial performance. Results have suggested a positive negative or inconclusive relationship. For this reason, authors such as Pelozo (2009) have gathered previous studies to quantify their results. The sample analyzed by Pelozo consisted of 128 previous studies of which 59% resulted in a positive relationship of financial performance and CSR, 14% showed a negative relationship and 27% of the studies had non-conclusive results. For instance, Pelozo’s work only shows that this topic is still subject to diverse studies, and that there is room available for related topics to research. For this reason, an industry specific study on the relationship between financial performance and CSR contributes to the development of this field in one of the many areas that can be studied.

4. Research Design and data

4.1. Style of research

There are different traditions in research, positivism at one end and interpretivism at the other. This study is based on positivism, as there is already a sufficient amount of literature on the topic. The deductive approach involves theory testing processes by using quantitative data in order to analyze their application to diverse situations (Hyde, 2000). Because financial performance requires the utilization of quantitative data, this approach remains the most popular. Studies using this method include Bradford & Shapiro (1987), Arlow & Gannon, (1984) and Chan, et al (2017).

Data is accessed from several companies over numerous years, and such data is classified as panel data. Panel data regression analysis allows for the simultaneous analysis of specific variables over a period of time (Gasbarro, Sadguna and Zumwalt, 2002). To cope with the problems of heterogeneity and endogeneity in such data, several techniques have been developed.

4.2. Methodology

This research studies if firms that have high expenditure in CSR, also have better financial performance in the American energy industry. CSR can be measured in different ways that value the amount of disclosure rather than the effectiveness of CSR practices. Likewise, CFP can be measured either by using accounting measures or market valuation methods. For this reason, the second section of this section will analyze CFP and CSR measurement in order to build the model. This section also describes the process to be followed in order to study whether CSR stimulates CFP or not. In further sections, the independent variables and the regression model will be introduced. Finally, the last sections include the data collection and statistical tests description to establish the path to be followed in order to obtain meaningful findings.

Corporate Social Responsibility measurement (CSR)

There are many ways to measure corporate social responsibility. For instance, authors such as P. Cochran and R. Wood used the reputation index to measure CSR (Cochran & Wood, 1984). This index included an evaluation of the extend of CSR practices according to the four dimensions of social responsibility previously defined by Carrol (Cochran & Wood, 1984). Nevertheless, the reputation index is not a robust measure because it does not estate concrete objectives which result on unreliable CSR ratings (Cochran & Wood, 1984, p. 43). For this reason, the reputation index will not be used on this research. Corporate social responsibility can be measured by using content analysis. This method utilizes a firm's annual report to analyze the extent of disclosures concerning CSR (Cochran & Wood, 1984, p. 43). Content analysis quantifies CSR by the number of key topics included on these disclosures. However, this criterion is not standardized, and it can be very subjective. On the other hand, content analysis had been a widely used method by researchers because it allows to study large data samples (Cochran & Wood, 1984).

In recent years, corporate social responsibility disclosures are more standardized due to the development of new rules. For instance, CSR now has to adopt the GRI standards issued by the Global Reporting Initiative

on 1997 (Global Reporting Initiative, 2019). Other agencies such as the International Organization of Standardization have issued rules such as ISO2600 to homogenize the reporting of corporate social responsibility (ISO, 2010). The purpose to these rules is to allow users to easily compare and read information regarding the implementation of CSR to make informed decisions. As a result, agencies rate firms by issuing an ESG score that measures the three main areas of CSR: Environment, Social and Governance shown on Figure 5 (Thomson Reuters, 2017). ESG scores comprehend a wide range of activities involving corporate social responsibility and consider not only disclosure, but also, the extent of CSR practices, ESG scores will be used in this research.



Figure 5: ESG Categories and Subcategories.

Source: Thomson Reuters, 2017

Corporate Financial Performance measurement (CFP)

Financial performance is traditionally measured through market indicators and accounting ratios. In one hand, market indicators measure performance from the investor's perspective. Authors such as Moskowitz (1972) and Vance (1975) included the return index as a tool to measure performance on their respective studies. In their studies, Moskowitz concluded that firms with high implementation of CSR had higher returns, while Vance had opposite results. Nevertheless, it is important to point out that these studies ignored significant factors such as dividends and risk that are not accounted for in the return index. For this reason, financial performance should also include accounting ratios.

Accounting ratios are commonly used to value financial performance. In fact, they can reflect the effectiveness of management in the allocation of resources to activities that generate revenue. Among the most popular

accounting measures are earnings per share (EPS), return on equity (ROE), return on assets (ROA), price-to-earnings ratio and others. Authors using these measures as part of their models include Cochran and R. Wood (1984), Brammer, Brooks and Pavelin (2005), Bird et.al. (2007), Gabriel et. al. (2017) and Fisman *et al.* (2005).

Variables

For the purpose of this research, accounting ratios and company characteristics are going to be used for the measurement of CFP. These are Return on Equity (ROE), Price earnings ration (PER), Share price (SHAREP), Revenue (LOG_REV), Total assets (LOG_TA), book value per share (bvps), earnings per share (eps), Leverage (LEVERAGE). CSR is measured by the ESG score that was previously mentioned.

Table 1: Research data variables Source: Authors’ work

<i>Dependent Variables</i>	<i>Formula</i>	<i>Source</i>
ROE	Net income/Shareholders equity	Bloomberg
PER	Share Price/Earnings per share	Bloomberg
SHAREP	Share Price	Bloomberg
<i>Independent Variables</i>		
eps	Earnings per share	Bloomberg
bvps	Book value per share	Bloomberg
LOG_REV	Log of Revenue	Bloomberg
LOG_TA	Log of total assets	Bloomberg
LEVERAGE	Debt/Equity	Bloomberg
ESG	ESG Score	Bloomberg

Specification of the regression model

The purpose of this research is to ascertain the relationship between ESG expenditure incurred by companies in the US energy industry and their financial performance and market value. In order to estimate relevant equations the following are postulated:

(i) *Accounting Profitability*

$$ROE=f(ESG, \text{other company specific and accounting ratios})$$

(ii) *Market Value*

$$PER=f(ROE, ESG)$$

(iii) $SHAREP = f(ESG, \text{other company specific and accounting ratios})$

Where:

ROE = return on equity;

PER= price earnings ratio;

SHARE PRICE= share price of the company at the end of the relevant financial year;

ESG = ESG score *representing its expenditure and attention to CSR matters*;

Other company specific and accounting ratios are-

Size represented by Total assets or Total Revenue, Leverage, bvps, eps,

Data collection and sample selection

The data gathered to perform this study was obtained by using Bloomberg terminals. Furthermore, the population of the sample is constituted by 29 firms that belong to the energy sector of the S&P 500 index. Financial information was accessed through firm's websites, annual reports and Bloomberg data which combined they represent reliable sources for this study. The data gathered comprehends financial information from 2011 to 2017. One company, Baker Hughes, had to be removed from the sample because it did not have enough historical data to perform the analysis. Therefore, the final sample contains 140 observations and 28 companies.

Panel Data regression

Considering that the sample contains data of 28 companies during different periods of time, it is possible to obtain information about the behavior of the firms, both across companies and over time. Therefore, the sample is said to have cross-sectional and time-series dimensions which are a characteristic of panel data models. Furthermore, panel data allows the researcher to manipulate variables that are consistent over the time but not across all entities, as well as, controlling variables that are consistent over entities but not over all the time periods (Chelawat & Trivedi, 2016). According to Greene (2003), panel data models follow the form $y_{it} = \alpha_i + \beta_1 x_{it} + \epsilon_{it}$, where y_{it} represents each observation of subject at a time t . Therefore, α_i represents each firm and represents each year. Moreover, a panel data model is balanced when all the subjects, or firms in this case, have all the information per period t . However, when this condition is not satisfied, the panel data is said to be unbalanced (Ajmani, 2009).

The Generalized Method of Moments (GMM) is an estimation method, to overcome endogeneity problems. Dynamic panel estimation has one or more lagged dependent variables. However, the lagged dependent variable may correlate with the error term. When N is larger than T , the Generalized method of Moments (GMM) using the Arellano Bond (1991) method gives

consistent estimators. The moment conditions use the properties of instruments to be uncorrelated with future errors. Data is transformed and an instrument weighting matrix is used in the estimations. The Arellano Bond serial correlation test is applied on the residuals and the Sargan (1988) test for overidentifying restrictions is applied to test of the validity of instrumental variables.

5. Analysis and Findings

The nature of the data being analyzed has a panel structure. In this section the methodology discussed in the previous section is followed to estimate equations. First the descriptive statistics of variables is generated; then correlation is examined.

Descriptive statistics

Table 2: Descriptive statistics of variables

Measure	BVPS	EPS	ESG	LEVERAGE	LOG_REV	LOG_TA	PER	ROE	SHAREP
Mean	33.4015	3.2216	33.1456	57.4507	9.6049	4.4770	47.2948	7.3639	65.8476
Median	29.9304	2.8414	29.6681	42.2672	9.5474	4.4969	21.1005	10.4532	65.7550
Maximum	84.3817	11.1553	72.6141	275.3327	12.8745	5.5434	1140.1930	134.2269	150.2200
Minimum	0.8959	0.0621	11.1570	1.6357	5.3022	3.1823	8.3526	-101.1543	14.9200
Std. Dev.	19.5065	2.3231	15.1681	47.4146	1.4887	0.4862	115.6111	21.5407	29.4913
Skewness	0.6085	0.8062	0.6192	2.0723	-0.0129	0.1089	7.8580	0.2892	0.5227
Kurtosis	3.0822	3.2226	2.2779	7.9923	2.8557	3.0055	71.7459	17.5892	2.6877
Jarque-Bera	7.1911	12.8067	9.9330	203.4866	0.1038	0.2293	24036.1500	1030.3670	5.7535
Probability	0.0274	0.0017	0.0070	0.0000	0.9494	0.8917	0.0000	0.0000	0.0563
Observations	116	116	116	116	116	116	116	116	116

Source: Authors' work

Within the data: ROE has a mean of 7.36% and a range of -101.15% to 134.22%; PER has a mean of 47.29 and a range of 8.35 to 1140.19; ESG has a mean of 33.15 and a range of 11.16 to 72.61; LEVERAGE has a mean of 57.45 and a range of 1.64 to 275.33; LOG_REV has a mean of 9.60 and a range of 5.30 to 12.87; LOG_TA has a mean of 4.47 and a range of 3.18 to 5.54; EPS has a mean of 3.22 and a range of 0.06 to 11.16; BVPS has a mean of 33.40 and a range of 0.90 to 84.38; SHAREP has a mean of 65.85 and a range of 14.92 to 150.22. It is important to note that normality is not an assumption of panel data models (Chelawat & Trivedi, 2016).

Correlation

Covariance Analysis: Ordinary

Sample: 2011 to 2017

Included observations: 138

Balanced sample (listwise missing value deletion)

Correlation

Table 3
Correlation between independent variables

<i>Variables</i>	<i>BVPS</i>	<i>EPS</i>	<i>ESG</i>	<i>LEVERAGE</i>	<i>LOG_REV</i>	<i>LOG_TA</i>
BVPS	1.0000	0.4423	0.1956	-0.6329	0.2856	0.3547
EPS	0.4423	1.0000	-0.1322	-0.3260	0.4306	0.2257
ESG	0.1956	-0.1322	1.0000	0.0014	0.4035	0.5971
LEVERAGE	-0.6329	-0.3260	0.0014	1.0000	-0.1614	-0.0744
LOG_REV	0.2856	0.4306	0.4035	-0.1614	1.0000	0.8381
LOG_TA	0.3547	0.2257	0.5971	-0.0744	0.8381	1.0000

Source: Authors' work

Upon inspection of the potential independent variables, for multicollinearity issues, EPS, Log-Rev, ESG are selected for further estimations.

Estimation of equations for ROE, PER and SHAREP

The equation estimated for ROE is given in Table 4 below

Table 4
Estimated regression for ROE

Dependent Variable: ROE
Method: Panel Generalized Method of Moments
Transformation: First Differences
Sample (adjusted): 2013 2017
Periods included: 3
Cross-sections included: 28
Total panel (unbalanced) observations: 82
White period instrument weighting matrix
White period standard errors & covariance (d.f. corrected)
Instrument specification: @DYN(ROE,-2)
Constant added to instrument list

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
ROE(-1)	0.187665	0.272398	0.688939	0.4929
ESG	3.475882	1.802790	1.928057	0.0574
LOG_REV	49.85729	16.78421	2.970489	0.0039

Effects Specification

Cross-section fixed (first differences)

Root MSE	40.38093	Mean dependent var	-2.131373
S.D. dependent var	37.70108	S.E. of regression	41.14051
Sum squared resid	133710.8	J-statistic	3.467069
Instrument rank	6	Prob(J-statistic)	0.325058

Arellano-Bond Serial Correlation Test

Equation: Untitled

Date: 06/15/20 Time: 11:09

Sample: 2013 2017

Included observations: 82

Test order	m-Statistic	rho	SE(rho)	Prob.
AR(2)	-1.954296	-14368.795	7352.415	0.0507

Source: Authors' work

The equation is well specified: The J statistic shows that the null hypothesis of the over-identifying restrictions are valid. The instrumental variable is uncorrelated to some set of residuals. The null of no serial correlation at the second lag is accepted through the Arellano-Bond Serial Correlation test.

The estimated equation for ROE shows that LOG_REV (a measure of size) influences it strongly and positively at the 1% level, ESG influences it positively at the 10% level. The inference is that the ROE is higher in companies for higher ESG scores.

The equation estimated for PER is given in Table 5 below

Table 5
Estimated regression for PER

Dependent Variable: PER

Method: Panel Generalized Method of Moments

Transformation: First Differences

Sample (adjusted): 2013 2017

Periods included: 3

Cross-sections included: 23

Total panel (unbalanced) observations: 53

White period instrument weighting matrix

White period standard errors & covariance (d.f. corrected)

Instrument specification: @DYN(PER,-2)

Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PER(-1)	-0.202858	0.267031	-0.759680	0.4510
ROE	-1.293307	0.692911	-1.866484	0.0678
ESG	7.028378	3.555824	1.976582	0.0536

Effects Specification

Cross-section fixed (first differences)

Root MSE	165.2013	Mean dependent var	35.52205
S.D. dependent var	167.8457	S.E. of regression	170.0851
Sum squared resid	1446447.	J-statistic	5.451132
Instrument rank	6	Prob(J-statistic)	0.141591

Arellano-Bond Serial Correlation Test

Equation: EQ04

Date: 06/15/20 Time: 12:39

Sample: 2013 2017

Included observations: 53

<i>Test order</i>	<i>m-Statistic</i>	<i>rho</i>	<i>SE(rho)</i>	<i>Prob.</i>
AR(2)	-1.847334	-20037.249	10846.579	0.0647

Source: Authors' work

The equation is well specified: The J statistic shows that the null hypothesis of the over-identifying restrictions are valid. The instrumental variable is uncorrelated to some set of residuals. The null of no serial correlation at the second lag is accepted through the Arellano-Bond Serial Correlation test.

The estimated equation for PER shows that ROE influences it negatively and ESG influences it positively at the 10% level. The inference is that the market rewards companies for higher ESG scores.

The equation estimated for SHAREP is given in Table 6 below

Table 6
Estimated regression for Share Price

Dependent Variable: SHAREP

Method: Panel Generalized Method of Moments

Transformation: First Differences

Sample (adjusted): 2013 to 2017

Periods included: 3

Cross-sections included: 28

Total panel (unbalanced) observations: 82

White period instrument weighting matrix

White period standard errors & covariance (d.f. corrected)

Instrument specification: @DYN(SHAREP,-2)

Constant added to instrument list

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
SHAREP(-1)	-2.443756	0.893060	-2.736386	0.0077
EPS	15.80625	5.961657	2.651318	0.0097
ESG	9.415302	5.619144	1.675576	0.0978

Effects Specification

Cross-section fixed (first differences)

Root MSE	46.19279	Mean dependent var	0.220032
S.D. dependent var	18.08720	S.E. of regression	47.06170
Sum squared resid	174969.5	J-statistic	1.145601
Instrument rank	6	Prob(J-statistic)	0.766079

Arellano-Bond Serial Correlation Test

Equation: Untitled

Sample: 2013 2017

Included observations: 82

Test order	m-Statistic	rho	SE(rho)	Prob.
AR(2)	0.370012	2917.255	7884.21	0.7114

Source: Authors' work

The equation is well specified: The J statistic shows that the null hypothesis of the over-identifying restrictions are valid. The instrumental variable is uncorrelated to some set of residuals. The null of no serial correlation at the second lag is accepted through the Arellano-Bond Serial Correlation test.

The estimated equation for SHAREP shows that EPS and ESG influence it strongly and positively at the 1% level, while the ESG score influences it positively at the 10% level. The inference again is that the market rewards companies for higher ESG scores.

Causality tests

Table 7: Causality tests

Pairwise Granger Causality Tests

Sample: 2013 to 2017

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
PER does not Granger Cause ESG	50	0.24389	0.7846
ESG does not Granger Cause PER		0.11090	0.8953
SHAREP does not Granger Cause ESG	80	1.60691	0.2073
ESG does not Granger Cause SHAREP		1.67563	0.1941
ROE does not Granger Cause ESG	80	0.90640	0.4084
ESG does not Granger Cause ROE		0.37796	0.6866
ROE does not Granger Cause LOG_REV	84	3.67405	0.0298
LOG_REV does not Granger Cause ROE		2.55804	0.0839
SHAREP does not Granger Cause PER	54	1.64046	0.2044
PER does not Granger Cause SHAREP		2.63461	0.0819
ROE does not Granger Cause PER	54	0.00845	0.9916
PER does not Granger Cause ROE		0.27934	0.7575
EPS does not Granger Cause SHAREP	84	1.67008	0.1948
SHAREP does not Granger Cause EPS		4.99789	0.0090
ESG does not Granger Cause LOG_REV	80	0.10207	0.9031
LOG_REV does not Granger Cause ESG		0.09777	0.9070

Source: Authors' work

Table 8: Summary of causality tests

<i>Summary of results from causality tests</i>	
<i>Pair of Variables</i>	<i>Causality</i>
ROE and Log_Rev	Bi-directional causality **
ROE and ESG	No causality
PER and ROE	No causality
PER and ESG	No causality
SHAREP and EPS	Causality from SHAREP to EPS***
SHAREP and ESG	No causality
Log_Rev and ESG	No causality

Significance levels: 1% ***, 5% **, 10% *

The causality tests in Table 8 show that companies with higher Revenues are more profitable and vice versa; higher Share prices are also drive company profits towards higher eps. There is an association between ESG scores and the key variables in this research (ROE, PER and Share Price) though there is no evidence of causality. Furthermore, there is also no evidence of a causal relationship between Size and ESG scores.

6. Discussions

In the previous section, results of the analysis were presented. This study researched whether corporate social responsibility improves corporate financial performance. The study was performed on companies belonging to the energy sector of the S&P 500 index in the United States from 2011 to 2017. The explanatory variables used in the model specification included ESG scores, the logarithm of revenue (as a measure of size), earnings per share. In this section, the findings are discussed and compared with previous research.

The estimated equation for ROE shows that LOG_REV (a measure of size) influences it strongly and positively at the 1% level, ESG influences it positively at the 10% level. The inference is that the ROE is higher in companies with higher ESG scores. The estimated equation for PER shows that ROE influences it negatively and ESG influences it positively at the 10% level. The inference is that the market rewards companies for higher ESG scores. The estimated equation for SHAREP shows that EPS influences it strongly and positively at the 1% level, while the ESG score influences it positively at the 10% level. The inference again is that the market rewards companies for higher ESG scores.

The causality tests show that companies with higher Revenues are more profitable and vice versa;

Higher Share prices are also drive company profits towards higher eps. There is an association between ESG and the key variables in this research (ROE, PER and Share Price) though there is no evidence of causality. The causality tests also showed that larger companies by revenue have no causal relationship with ESG scores.

The results are clear; ESG has a positive correlation with all the three variables examined in this research. A higher ESG score is associated with a higher ROE, PER and Share price.

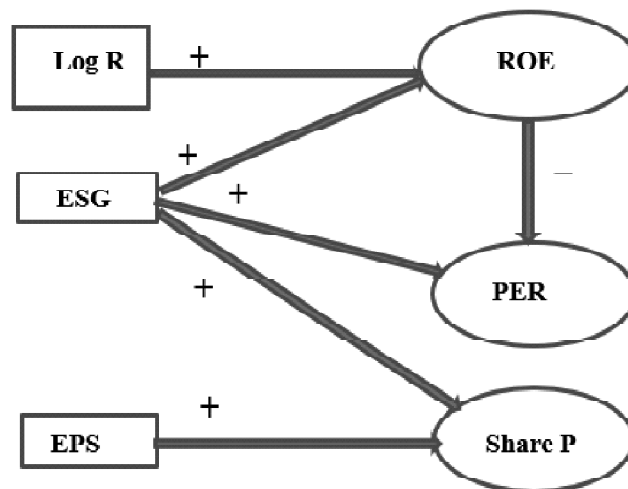


Figure 7: Diagrammatic representation of the influence of ESG on profitability and market value

Source: Authors' work

Findings of the panel data models of this study, showed that more profitable companies (higher ROE) are associated with higher ESG scores. This finding is opposite to that of Brammer *et al.* (2005), who based their study on industries within the economy of the United Kingdom, and Cochran and Wood (1984) who studied this topic on American companies from 1970 to 1979; but in agreement with that of Bird *et al.* (2007).where they analyzed the CFP and CSR scores of companies in the S&P 500 index of the American market from 1991 to 2003.

Therefore, it appears that companies with higher ROE in the US energy industry invest more in the implementation of CSR activities. As for PER, a market indicator, once again there is a significant positive relationship with ESG expenditure, indicating that the market rewards such expenditure. The relationship with ROE is significantly negative, meaning that the market

does not reward companies with higher profits alone, unless they are compensated with higher ESG expenditure.

Similarly, share prices not only depend on the earnings per share but also the level of ESG expenditure. The overall results of the statistical tests performed in this study show that corporate social responsibility is higher in more profitable companies and is rewarded by the market through a higher PER and Share price.

7. Conclusion

The relationship of corporate social responsibility and financial performance continues to be a topic of controversy. While there are many theories that support the implementation of CSR and its long-term benefits, the rivalry between financial objectives and social responsibility still exists. However, investors and stakeholders should understand that corporate social responsibility complements business performance and can reflect good business management. For this reason, this research studied the relationship between CSR and CFP in order to determine if companies that invest funds in socially responsible practices also show superior performance.

The results of this research show that CSR and financial performance do have a positive relationship; corporate social responsibility should be a crucial part of business because it aims to increase a firm's value in the long-term. For instance, authors such as Ragan, Chase and Karim (2015) advice that CSR activities should be in accordance with the organization's purpose and values. By doing so, "CSR activities mitigate risks, enhance reputation and contribute to business overall results" (Rangan, *et al.*, 2015). Even though, there is not a specific requirement in the percentage of funds that should be dedicated to corporate social responsibility, members of the Chief Executives for Corporate Purpose (CECP) recommended to invest about 10% of the average revenue of the last three years as part of the CSR budget. This view is also supported by others (O'Keefe Novick, 2017). By implementing such strategies, firms should be able to benefit the stakeholders and the community as a whole.

The availability of ESG scores only goes back to 2011 meaning that this disclosure is still fairly new and is still developing. Therefore, future research should analyze the effectiveness of ESG scores and their impact in the energy industry. This research also suggests that longer periods of time be studied when data becomes available. Lastly, future research can include more market valuation ratios and other variables to evaluate their relationship with CSR. This can present a deeper analysis of the relationship of corporate social responsibility and financial performance.

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