ESG impact on performance of US S&P 500-listed firms

Bahaaeddin Ahmed Alareeni and Allam Hamdan

Abstract

Purpose – *This paper aims to investigate whether there are relationships among corporate disclosure of environmental, social and governance (ESG) and firms' operational (ROA), financial (ROE) and market performance (Tobin's Q), and if these relationships are positives or negatives or even neutral.*

Design/methodology/approach – *The study sample covers US S&P 500-listed companies during the period 2009 to 2018. Panel regression analysis was used to examine the study hypotheses and achieve the study aims.*

Findings – *The results showed that ESG disclosure positively affects a firms' performance measures. However, measuring ESG sub-components separately showed that environmental (EVN) and corporate social responsibility (CSR) disclosure is negatively associated with ROA and ROE. EVN and CSR disclosure is positively related to Tobin's Q. Further, corporate governance (CG) disclosure is positively related to ROA and Tobin's Q, and negatively related to ROE. More importantly, ESG, CSR, EVN and CG tend to be higher with firms that have high assets and high financial leverage. Furthermore, the higher level of ESG, EVN, CSR and CG disclosure, the higher the ROA and ROE.*

Originality/value – *The study limns a vision of the role of ESG on firm performance. This study tries to determine whether there are relationships among all ESG disclosure and FP, and if they are positive, negative or even neutral.*

Keywords *Governance, Social, Performance, Environmental, ESG disclosure, US S&P 500*

Paper type *Research paper*

Bahaaeddin Ahmed Alareeni is based at Business Administration Program, Middle East Technical University, Northern Cyprus Campus, Kalkanli, Mersin, Turkey. Allam Hamdan is based at the College of Business and Finance, Ahlia University, Manama, Bahrain.

1. Introduction

Early in the 21st century, well-known cases of financial failures in the USA had a severe negative impact on the US and global economy, raising the emergence of the 2008 global financial crisis. The global financial crisis shook markets international causing an economic problems requiring a high level of intervention by authorities and causing a wide range of social concerns (Nicholson *et al.*, 2011). The financial crisis raised concern regarding farms' ethical behaviour, accountability risk oversight and capability to strategically attract a wide range of investors (Galbreath, 2013). In addition, it cast doubt on corporate reporting and disclosure as a credible source of information on firms' going-concern (Alqallaf and Alareeni, 2018).

Issues of disclosure have long been an inherent part of the life of firms. Disclosure is a crucial link in our economies, and the availability of information about companies is essential for investors and other stakeholders to make proper capital allocation choices and avoid any imminent danger. A higher level of disclosure can help attract capital and maintain confidence in stock markets. In contrast, a lower level of disclosure and an unclear picture of firms can lead to manipulation, unethical behaviour and damage of market integrity at a high cost to firms, stakeholders and the economy (OECD, 2004).

Given frequent financial scandals, as part of firms' strategy and in response to pressure from authorities, NGOs and stakeholders, more firms now strictly comply with

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environmental, social and other local regulations. Firms want to provide all stakeholders with a clear picture of their corporate responsibility practices and efforts. Consequently, corporate disclosure of environmental, social and governance (ESG) aspects has developed in a variety of dimensions over more than two decades. In addition, a growing number of firms are now engaged in a broad set of ESG disclosure activities, and this important issue has become a topic of much attention.

Meanwhile, the crucial question firms and shareholders must answer is whether ESG disclosure practices can be turned into positive firm performance (FP). Prior research has tried to test the effect of ESG disclosure practices on FP. Most of these studies focus on a single dimension of ESG such as environmental or social disclosure (Smith *et al.*, 2007; Ponnu, 2008; Barnett and Salomon, 2012a, 2012b; Han et al., 2016a, 2016b). However, ESG disclosure issues are interconnected; therefore, considering only one dimension could be problematic. A limited number of ESG studies focus on all three dimensions of ESG and their impact on FP in a single setting (Gillan *et al.*, 2011; Yeom, 2012; Balatbat *et al.*, 2012; Galbreath, 2013; Pasquini-Descomps and Sahut, 2014a, 2014b; Sahut and Pasquini-Descomps, 2015; Sharma and Thukral, 2015; Tarmuji *et al.*, 2016a, 2016b; Nollet *et al.*, 2016b). More important, the findings of these studies include conflicting perspectives and inconclusive findings on whether ESG and its dimensions have a positive, negative or neutral impact on FP. Therefore, it is essential to focus on all dimensions of ESG when testing their impact on FP. Further, research beyond ESG's direct link to FP is desired.

The study contributes to ESG prior literature in six different dimensions. First, we selected data from a large time span, the period from 2009 to 2018. To the best of our knowledge, this is the first study to examine the impact of all ESG Bloomberg scores on FP for S&P 500 firms from 2008 until 2017. Second, a small number of studies systemically tested changes over time within and among all Bloomberg ESG scores of S&P 500 firms. Thus, this study is interested in exploring improvements and developments in ESG disclosure practices by S&P 500 companies. This is a crucial point of investigation, as de Lange *et al.* (2012) reported that tangible improvements could be observed in corporate ESG performance over time. Third, we tested the impact of the ESG score and its three sub-components (EVN, CSR and CG scores) on FP to identify the main driver affecting S&P 500 firms' performance. Many research studies consider only a single subcomponent of ESG, not all. Fourth, the study evaluated firms' performance based on three dimensions: the firm's financial, operational and market performance indicators [return on equity (ROE), return on assets (ROA) and Tobin's Q] and robustness purposes. Also, the study incorporated firm size, financial leverage, assets turnover and assets growth as essential control variables. Fifth, the results are expected to be generalized to other developed countries, such as in the EU. Lastly, the outcomes will help scholars, firms' shareholders, decision makers, regulators, policymakers improve their consciousness of ESG disclosure scores and the significance of incorporating ESG disclosure scores in all aspects.

With the first section being an introduction, the remainder of the paper is divided into six sections. Section 2 argues the literature review and overview of ESG scores. Section 3 shows the data description and methodology. Section 4 shows the study results. Section 5 presents the study's conclusion, limitations and the scope for further research.

2. Literature review and overview of environmental, social and governance scores

Prior studies have examined the association between ESG practices and FP. Most studies focus on a single dimension/subcomponent of ESG (Smith *et al.*, 2007; Ponnu, 2008; Barnett and Salomon, 2012; Kim *et al.*, 2013; Han *et al.*, 2016a, 2016b). As discussed above, ESG issues are interconnected; therefore, concentrating on a single dimension could be problematical (Galbreath, 2013). Some studies have argued that focusing on the association between ESG dimensions and FP could weaken the moral aspects necessary for society and future investments needed to maintain social and environmental practices (Richardson, 2009; Hahn

et al., 2010). Therefore, it is important to focus on all ESG dimensions when testing their impact on FP.

However, a limited number of ESG studies focus on all three dimensions of ESG and their impact on firms' performance in a single setting (Gillan *et al.*, 2011; Yeom, 2012; Balatbat *et al.*, 2012; Galbreath, 2013; Pasquini-Descomps and Sahut, 2014a, 2014b; Sahut and Pasquini-Descomps, 2015; Sharma and Thukral, 2015; Tarmuji *et al.*, 2016a, 2016b; Nassar, 2018; Ali *et al.*, 2018). The findings of these studies include conflicting perspectives and inconclusive findings as to whether ESG and their dimensions have a positive, negative or neutral association with FP.

This section divides ESG studies, FP-related, into four categories:

1. studies focusing on environmental disclosure (EVN);
2. studies addressing corporate social responsibility disclosure (CSR);
3. studies exploring the relationship between the corporate governance disclosure (CG); and
4. studies focusing on the overall ESG.

2.1 Environmental disclosure and firms' performance

There is debate regarding the relationship between environmental problems and FP (Elsayed and Paton, 2005). For example, the environmental problem of climate change and global warming is one of the most challenging problems in the world. This problem may influence firms' future performance, even the planet as a whole. Public awareness of this global issue has required firms to establish environmental regulations and disclose information regarding their commitments towards this vital issue (Nor *et al.*, 2016; Buallay et al., 2020a, 2020b).

The literature has discussed environmental problem impacts from different aspects. For example, Al-Tuwaijri *et al.* (2004) analysed impact of environmental problems such as hazardous wastes, recycled toxic release. Wagner and Schaltegger (2004) discussed the moderating role of corporate environmental strategy choice on the relationship between environmental and economic performance in the European industrial companies. They concluded that for firms with shareholders' value-oriented strategies, the association between the environmental and economic performance is more positive than for firms without such a strategy.

Another line of research has considered the relationship between environmental regulations and disclosure and FP, with contradictory results. One line of research, Porter and Van der Linde (1995) debate that severe environmental regulations can often give a long-run improvement to companies' revenue by encouraging them to concentration on decreasing cost of production and increasing consumer satisfaction and sales. Accordingly, firms' environmental regulations may be a "win-win" solution for both firms and society. Studies have shown that strict environmental regulations result in more competition and motivate efficiency and innovation. Through its environmental regulations and commitments to environmental problems, a firm can enhance its profitability (Hart, 1995; Karagozoglu and Lindell, 2000). In addition, Majumdar and Marcus (2001) argued that environmental regulations can drive increases in productivity. It is a defensive technique to protect firms from international competition (Cairncross, 1994). In a similar vein, Dowell *et al.* (2000) found that the association between commitment to stringent environmental disclosure and FP is positive. This is in line with Saleh *et al.* (2011), who have shown a positive relationship between EVN and FP.

A magnitude of prior studies has supported the win-win argument and found indication that the association between firms' financial performance and firm environmental performance is positive (Murray *et al.*, 2006; San Ong *et al.*, 2014).

In the second line of studies, Chiong (2010) provided evidence that association between the environmental disclosure level and FP measured by ROE, growth of revenue and debt

to equity is negative. This follows Smith *et al.* (2007), who found that EVN is negatively related with FP. A significant negative relationship among the EVN level and ROA is evident.

Other lines of study have showed evidence that the relationship between EVN and regulations and FP is low in practice. For example, Elsayed and Paton (2005) measured FP using ROA, return on sales and Tobin's Q. They evidenced that environmental disclosure and regulations had less impact on FP; this evidence is weak.

On top of that, other studies have shown a neutral relationship between FP and environmental disclosures that do not seem to be connected to profitability (Cowen *et al.*, 1987; Sarumpaet, 2006; bin Abd. Rahman *et al.*, 2009). Accordingly, we can suggest the following hypothesis:

H1. EVN affects firms' performance.

2.2 Corporate social responsibility disclosure and firms' performance

Turban and Greening (1997) defined CSR as a construct that emphasizes a company's responsibilities to shareholders such as employees and society as a whole. Accordingly, firms with high levels of social responsibility have an easier time attracting qualified employees. Therefore, to increase trust and expectations of related parties and society, firms should be socially responsible. In this regard, Carroll (1979) reported some indicators of adapting socially responsible practices such as a product responsibility, employment quality, diversity and opportunity, community, human rights, health and safety and training and development.

CSR has been a subject of great interest in prior studies worldwide and from multiple perspectives, including cost perspectives, agency theory and other fields (Friedman, 1970; Bragdon and Marlin, 1972; Margolis *et al.*, 2003; Godfrey *et al.*, 2009). Some studies have concentrated attention on the relationship between CSR and FP. This research gap has long been a source of debate in the literature.

Studies addressing this vital relationship have provided contradictory or inconclusive results in answering the question as to whether FP, regarding its CSR, can be considered as positive FP. One line of studies has suggested that being socially responsible increases FP, suggesting a positive impact of CSR on FP (Edward, 1984; Freedman and Jaggi, 1988; Donaldson and Preston, 1995; Verrecchia, 2001; Lev *et al.*, 2010; Surroca *et al.*, 2010; Dhaliwal *et al.*, 2011; Kim *et al.*, 2013). With increased social spending comes developed stakeholder relationships that reduce firms' activities costs and increase market opportunities (Jones, 1995; Fombrun *et al.*, 2000), resulting in higher FP. In the same vein, Taneja *et al.* (2011) found that CSR practices can be used as corporate strategies to enhance FP. They reported that CSR practices can provide various benefits to firms. For example, CSR can impact firm reputation, customer satisfaction and then FP. In addition, a firm can raise its value by practicing CSR (Donaldson and Preston, 1995). These results are consistent with Kim *et al.* (2013), who investigated the association between CSR of Korean firms and their FP. They proved that CSR increases firms' values in the Korean stock market. Verrecchia (2001) and Dhaliwal *et al.* (2011) found that greater disclosure of firms' CSR practices increases their value and then FP.

Several CSR studies have found that CSR practices enhance FP in the debt market (Menz, 2010); and socially responsible firms work better in emerging markets (Zhang and Rezaee, 2009), and CSR decreases firms' risk (Kim *et al.*, 2013). Adopting socially responsible activities is one of the main techniques through which a firm may raise and sustain stakeholders' trust and confidence (Barnett and Salomon, 2012a). Moreover, socially responsible behaviours can be transformed into profit. Hence, Barnett and Salomon (2012a, 2012b) found that companies with higher CSR have the highest FP. Margolis *et al.* (2007) showed that CSR practices help firms earn and increase competitive advantage. They confirmed a positive relationship between CSR and FP. This is supported by Baird *et al.* (2012), who showed that the relationship between firms' CSR and FP is a significant positive relationship.

Many other CSR studies have supported this positive relationship (Barnett and Salomon, 2006, 2012b; Margolis *et al.*, 2007; Wu, 2006).

On the contrary, other lines of studies, for example, Fisher-Vanden and Thorburn (2011), have provided evidence that CSR and FP have a negative relationship. When the expected relationship among CSR and FP is U-shaped, the negative relationship could be detected at an earlier stage of CSR practices, as CSR cost caused the initial downward slope of the U-curve.

Other lines of studies have shown that the relationship between CSR and FP will be neutral; firms that do have social responsibility practices will have lower cost and then lower price, while those firms take into consideration social responsibility practices in their production will suffer from higher costs and, as a result, their prices will be higher (McWilliams and Siegel, 2001). Accordingly, studies have suggested that CSR does not have an impact on FP (Patten, 1991; Waddock and Graves, 2000).

To conclude, the above discussion shows that studies' conclusions have been mixed. Therefore, the results should be examined from time to time, and further research is needed. In addition, limitations in these studies open a research gap to be considered, especially for S&P 500-listed firms. Hence, the following hypothesis is proposed to test the impact of CSR disclosure on firms' performance:

H2. CSR disclosure affects firms' performance.

2.3 Corporate governance disclosure and firms' performance

Due to the financial crisis of 2007–2009, most companies sought to strengthen their CG, transparency and disclosure levels. Governance's role has become an important issue, and poor CG is significantly regarded as one of the main sources of the financial crisis (Nollet *et al.*, 2016c). Therefore, good CG is a significant factor in improving FP in the best interests of stockholders and other interested parties, limiting agency costs and enabling firms to continue as a going-concern (Fama and Jensen, 1983). Firms which adapt good CG mechanisms provide more useful information to investors and other financial statement users to decrease information asymmetry and help firms enhance operations (Ponnu, 2008; Merza Radhi and Sarea, 2019).

However, CG is concerned with methods of bringing managers' and investors' interests into line and making sure that firms' activities are carried out for investors' interests (Ponnu, 2008). CG is procedures used to coordinate firms' activities towards improving business and corporate responsibility to acknowledge long-term shareholder value while considering other stakeholders' interests (Tarmuji *et al.*, 2016b).

Many studies have looked at the implications of CG structures on FP. So far, studies on the relationship between CG mechanisms and FP have mixed results. For example, Weisbach (1988) reported on the relationship between CEO turnover and CG structure, such as inside or outside executives and resulting FP. Klapper and Love (2004) concluded that good CG increases FP. Bauer *et al.* (2010) also found that CG positively impacts FP of real estate investment trust firms in the USA. Hussein and Kamardin (2016) examined the impact of CG practices on the FP of Fortune 500 global companies (US and non-US) and concluded a strong positive relationship between CG and FP. Smaller board sizes generate better FP in Fortune Global 500 companies. The number of board meetings and CEO compensation have also been concluded to have a negative relationship with FP.

Other studies such as Bhagat and Bolton (2009) investigated pre-SOX (Sarbanes–Oxley Act, 2002) and post-SOX relationships among CG and FP. A negative relation was shown between both variables in the period pre-2002, when SOX was not prevalent and a positive relationship among both variables in the period post-2002, when SOX was launched. In Ireland, O'connell and Cramer (2010) deduced that board size has a significant negative impact on FP. In addition, they found less negative relationship for smaller firms between board size and FP and

a significant positive relationship between FP and the ratio of non-executives on the board. To test the relationship between CG and FP, we formulate the following hypothesis:

H3. CG disclosure affects firms' performance.

2.4 Overall environmental, social and governance disclosure and firms' performance

ESG has become more accessible and standardized, and effective methods have been identified. Consequently, many prior studies, mainly focused on the USA, were conducted, offering a sound theoretical framework. Most of these studies focused on a single dimension of ESG, and a limited number considered all three dimensions, environmental, social and governance, in a single setting.

However, Bassen and Kovács (2008) argued that ESG indicators aim to capture additional scopes of FP not raised in accounting data. They reported that firms' financial reports do not provide information on firms' reputation, quality, brand equity and safety. Thus, ESG measures include an extensive scope of information on environmental social performance and CG. Therefore, the overall ESG disclosure information is essential, mainly for management purposes and other interested parties.

There are substantial differences in prior results on the relationship between ESG and FP. Studies showed there is no definite evidence on the relationship between ESG and FP (Eccles *et al.*, 2012; Orlitzky, 2013).

A line of studies has found positive relationships between ESG and FP. The higher the level of ESG, the higher FP (Tarmuji *et al.*, 2016). For example, Pasquini-Descomps and Sahut (2013) investigated how news-based ESG scores influence yearly FP as measured by ROA. They showed that the yearly variation of ESG activities enhances a firm's image and then FP. In addition, Waddock and Graves (1997) proved a strong association between a firm's reputation and its ratings in social responsibility. Moreover, the impact of ESG disclosure appears more significant for firms in which customers are individuals, rather than firms. Furthermore, Albuquerque *et al.* (2012) confirmed that ESG is a strategic product sold to customers by a firm, and this product brings more positive revenues. This viewpoint is supported by Sharfman and Fernando (2008), who argued that a firm's ratings on non-accounting indicators such as ESG provide a clear picture of how the firm controls risks it faces.

The other line of studies has found that the relationship between ESG and FP is negative. High ESG practices could negatively affect FP. As the purpose of a business is solely to increase shareholders' wealth (Friedman, 2009), any other purpose turning the firm from its purpose will minimize its effectiveness.

Finally, Han *et al.* (2016a, 2016b) found that ESG disclosure in Korean firms showed different results. EVN presented a negative/U-curve relationship with FP, whereas CG presented a positive or inverse U-curve relationship with FP. The authors did not show any significant relationship between CSR and FP. Then, we posit the following hypothesis:

H4. Overall ESG disclosure affects firms' performance.

2.5 Overview of environmental, social and governance scores

The term "environmental, social and governance" first emerged in the United Nations Principles of Responsible Investment and then in a number of firms' CSR reports (Davis and Stephenson, 2006). Then, it appeared as a result of collaboration among the United Nations Environmental Program, and the Coalition for Environmentally Responsible Economies, Global Reporting Initiative was established in 2001 (Galbreath, 2013).

The ESG scores rating market has developed considerably in recent years and is used by major business consulting firms worldwide. ESG scores are used as major indexes and overall

indicators to identify EVN, CSR and CG practices. Bassen and Kovács (2008) argued that ESG scores are significant in delivering ESG information used by investors and other interested parties in evaluating a corporation's risks and opportunities. Han *et al.* (2016b) reported that scoring indicators of the environment activity, social responsibility and governance mechanisms are crucial for business and interested parties (Abughniem *et al.*, 2019).

Today, there are three leading international providers of financial and non-financial data services: Bloomberg, MSCI and Thomson Reuters. Bloomberg is progressively developing in-house ESG expertise. It enables investors to access raw data and link easily to financial data.

This study uses data from ESG scores provided by Bloomberg, that collects accurate data and cares about its reputation for accumulating. The Bloomberg ESG valuation tool rates and classifies companies' performance or portfolios. It materializes ESG performance and categorizes the best and worst companies' reactions regarding these issues (Han *et al.*, 2016b).

However, the Environmental Score (EVN) addresses many issues related to the business environment and the association between business and society (e.g. CO_2 emissions, energy consumption, energy efficiency policy, total waste and emissions reduction policy). The Social Score (CSR) measures the firm's social disclosure information (e.g. fair-trade principles, gender equality, number of employees, employee turnover ratio, human rights, product safety, ratio of women in management, ratio of women employees). The CG score reflects issues related to the CG structure (e.g. board independence, corruption, bribery, reporting and disclosure, shareholder protection).

As we presented in the literature review, the results are inconsistent regarding the relationship between ESG practices and FP. We suppose that using the overall ESG score only may lead to mixed results. Thus, this study considers the impacts of the three ESG scores (CSR, EVN and CG) on FP individually as well as the overall ESG score.

3. Study methodology

3.1 Study sample

The study sample comprises annual data for all firms listed in the S&P 500 during the period 2009 to 2018. This selection resulted in 4,869 observations derived from 505 listed firms. All the data used were collected from the Bloomberg. Bloomberg's ESG disclosure scores are considered major indices to identify EVN, CSR and CG disclosures S&P 500-listed firms. Bloomberg's scoring scale ranges from null disclosure with a score of zero to full disclosure with a score of 100.

3.2 Study variables

Given that an ESG score is a multidimensional index built on the outputs of environmental, social and governance disclosures, and the impact of one dimension may sometimes eliminate opposing effects of another dimension, it is useful to have separate data available (Brammer *et al.*, 2009; Margolis *et al.*, 2009; Buallay *et al.*, 2020c). Thus, we considered the overall ESG score in addition to the three separate sub-ESG scores: ENV, CSR and CG. This classification enabled us to assess which dimension of the ESG score is the key driver for increasing FP and what variable is most influential on FP.

The study evaluated firms' performance based on three dimensions, namely, the firm's operational, financial and market performance, using ROA, ROE and Tobin's Q, respectively. These dimensions were used as dependent variables to state the best regression model in evaluating the relationship between the study variables.

We also considered firm size, financial leverage, assets turnovers and assets growth as control variables. The choice of these control variables can be justified by studies that found firm size, financial leverage, assets turnover and assets growth to be essential control variables when

testing the impact of ESG scores on FP (Andersen and Dejoy, 2011; Han *et al.*, 2016b; Margolis *et al.*, 2009; Pasquini-Descomps and Sahut, 2014a; Hamdan *et al.*, 2017; Hamdan, 2018).

3.3 Study model

To measure ESG impact on FP, the study estimates a linear regression model as follows:

$$Perf_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 EVN_{it} + \beta_3 CSR_{it} + \beta_4 CG_{it} + \beta_5 FS_{it} + \beta_6 FL_{it} + \beta_7 AT_{it} + \beta_8 AG_{it} + \varepsilon_{it}$$

The variables of the study model are measured as shown in Table 1.

4. Analysis and results

4.1 Descriptive analysis

In this section, we present the means, standard deviation, maximum and minimum of the variables used in this study. In addition, skewness to assess the lack of symmetry and kurtosis and Jarque–Bera tests are presented to assess whether the data are normally distributed. As shown in Table 2, the data is not normally distributed; Jarque–Bera was lower than (0.05) for all study variables; Skewness is not around (0), and kurtosis is not around (2) for all variables. To overcome this problem, we took the natural algorithm for all study variables. Table 2 shows that the mean of ESG disclosure of US companies is 33.166%. In Table 3, we observe that during the study period (2008–2017), an upward trend is observed in the ESG score (improving from 25.412 to 31.019%) and in all its sub-components. This showed that the companies tried to increase ESG disclosure and all its sub-components, but it still needs to be enhanced, and the companies should take actions to increase this level. Furthermore, in Table 2, the results reveal that the ESG sub-components have some distinction. The mean of GC disclosure has the highest value (57.921%) followed by CSR disclosure (27.440%), while EVN disclosure has the lowest disclosure among the companies (24.784%). This indicates again that US companies positively practiced CG disclosure and sought to increase this level of disclosure due to its impact on companies in many aspects. For the EVN and CSR disclosures, the means are slightly weak, so there is still a gap to be filled to gain the benefits of EVN and CSR disclosures. This weakness is also supported by the results presented in Table 3, as EVN and CSR indices

Table 1 Description of the study variables

Variable	*Definition*	*Description*
Perf	Firm's performance	Measured by ROA, ROE and Tobin's Q ROA equals net income divided by total assets (TA) of the firm (i), in the period (t) ROE equals net income divided by equity of firm (i), in the period (t) Tobin's Q equals current liabilities plus the market value of share capital divided by TA of the firm (i), in the period (t)
ESG	Firm disclosure of its environmental, social and governance	The ESG Bloomberg index includes all the disclosure of EVN, CSR, CG indices of firm (i), in the period(t)
EVN	Environmental disclosure	The EVN Bloomberg index measures the disclosure of energy use, waste, pollution, natural resource conservation and animal treatment of firm (i), in the period (t)
CSR	Social responsibility disclosure	The CSR Bloomberg index measures disclosure of business relationships, donation, volunteer work, employees' health and safety of firm (i), in the period (t)
CG	Governance disclosure	The CG Bloomberg index measures the disclosure of corporate governance code of firm (i), in the period (t)
FS	Firm size	A control variable measured by the total assets of the firm (i), in the period (t)
FL	Financial leverage	A control variable measured by total debt to total assets of the firm (i), in the period (t) (Hamdan, 2020)
AT	Asset turnover	Measured by net sales as a percentage of total assets
AG	Assets growth	Measured by the annual change in total assets

Table 2 Descriptive statistics and normality tests of the study variables

	Descriptive statistics				Normality tests		
Variables	*Mean*	*SD*	*Max*	*Min*	*Skewness*	*Kurtosis*	*Jarque–Bera*
Independent variables:							
ESG Index	33.166	13.415	76.349	12.397	0.507	2.494	0.000
EVN Index	24.784	17.507	82.171	0.775	0.517	2.419	0.000
CSR Index	27.440	16.631	86.667	3.125	0.586	2.667	0.000
CG Index	57.921	6.619	85.714	21.429	0.778	3.676	0.000
Dependent variables:							
ROA	6.523	6.561	46.841	−47.240	−0.066	10.983	0.000
ROE	18.816	28.160	527.885	−221.090	6.223	98.625	0.000
Tobin's Q	1.900	1.060	9.697	0.615	2.479	11.937	0.000
Control variables:							
Firm size (million $)	74,887	236,102	2,572,274	1,012	6.890	56.006	0.000
Financial leverage	3.994	4.370	79.422	1.046	6.636	85.761	0.000
Assets turnover	0.783	0.677	4.792	0.029	2.002	8.291	0.000
Growth	8.489	25.740	654.406	−60.660	9.134	164.566	0.000

Source: Bloomberg

did not exceed more than 28.154 and 28.030%, respectively, through the study period. It is worth mentioning that although the ESG score and the ENV and CSR sub-components showed a relatively high variance as presented by the standard deviation, this does not hold for the CG disclosure. This may be because firms differ in their priorities to commit to EVN and CSR disclosures, while sharing similar governance performance. For the performance measures, the mean average of ROA has a positive value within the sample used in the analysis (mean = 6.523) (Table 2). A similar positive pattern was observed for Tobin's Q and ROE (mean = 1.90%; 18.816%, respectively). Note: ROA, ROE and Tobin's Q were not changed significantly during the study period (Table 3). In addition, during the study period, ROA, ROE and Tobin's Q reached their lowest values from 2007 to 2009, and lowest values were in the year 2008, 4.481, 10.834 and 1.639%, respectively. This is due Great Recession period (i.e. 2007–2009).

4.2 Path analysis

In this section, path analysis is used to identify the variance between the means of the sub-samples. We used *t*-test and *z*-test to assess significance of differences in mean values.

Table 4 shows the ESG disclosure divided into two sub-samples, one with high ESG, EVN, CSR, CG indices and the second with low ESG, EVN, CSR, CG indices. The difference between the two sub-samples was highly significant according to both the *t*-test and *z*-test for ESG, EVN, CSR, CG indices. Therefore, it can be concluded that companies with high ESG, EVN and CSR, CG have higher operational and financial performance (ROA and

Table 3 ESG and Performance through the years 2009–2018

	Years									
Mean of variables	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*
Independent variables:										
ESG Index	25.412	22.078	23.222	25.075	26.676	28.211	29.654	31.223	31.232	31.019
EVN Index	19.808	19.727	21.060	23.188	23.674	25.084	25.725	26.991	27.211	28.154
CSR Index	19.250	15.221	16.432	18.259	20.764	22.587	24.858	26.956	27.350	28.030
CG Index	55.099	53.889	54.298	54.897	55.923	56.298	56.326	57.432	57.139	57.121
Dependent variables:										
ROA	7.334	6.990	4.481	5.306	6.919	6.960	6.657	6.922	6.832	5.782
ROE	19.009	17.942	10.834	12.382	17.927	19.700	17.493	19.647	19.455	19.722
Tobin's Q	2.320	2.224	1.639	1.827	1.967	1.907	1.978	2.222	2.325	2.268

ROE). However, the results detected that companies with low ESG, EVN, CSR, CG have higher market performance (Tobin's Q), as the *p*-values were significant at 5%.

Table 5 shows the study sample is divided into large firms and small firms according to the median. The difference between big and small firms was highly significant based on both the *t*-test and *z*-test. One can infer that larger firms had better ESG, CG, EVN, CSR disclosure than did small firms, with a high statistical significance level at 5%. Also, path analysis was used based on the financial leverage; findings showed that firms with higher financial leverage had better ESG, CG, EVN, CSR than did firms with lower financial leverage with high statistical significance as well at 5%.

To summarize, it can be concluded that for big firms, the higher ESG disclosure, the higher operational and financial performance (ROA and ROE). Further, companies with a high level of financial leverage have higher ESG disclosure and then higher operational and financial performance.

5. Empirical analysis

5.1 Pearson correlation analysis

Table 6 presents the correlation outputs, with a focus on testing the relationships between the study variables (dependent and independent variables) and among the independent variables. The results show that there is a significant positive relationship between ESG index as well as its components (EVN, CSR and CG) indices and ROA, ROE and a negative relationship with Tobin's Q. This indicates that firms with high level of ESG have a high level of operational and financial performance and lower market performance. However, CG is negatively correlated with Tobin's Q and positively correlated with ROE. This means that the higher level of CG, the lower the market and financial performance. Also, EVN and CSR have a positive correlation with ROA and ROE, which indicates that the higher level of the EVN disclosure, the higher the operational and financial performance.

To summarize, ESG and its sub-components are highly associated with the study dependent variables, which could support our study's hypothesis. The result indicates that firms with higher level of ESG disclosure have better performance.

Table 4 Path analysis for ESG, EVN, CSR and CG levels and performance

Performance and difference tests	*ESG Index*		*EVN Index*		*CSR Index*		*CG Index*	
	High ESG	*Low ESG*	*High EVN*	*Low EVN*	*High CSR*	*Low CSR*	*High CG*	*Low CG*
ROA	6.624	6.211	6.598	6.423	6.759	6.078	6.824	6.707
t-statistic	1.777*		0.711**		2.993***		−2.416**	
p-value	(0.076)		(0.047)		(0.003)		(0.016)	
z-statistic	−2.501**		−2.135**		−4.609***		−2.571**	
p-value	(0.012)		(0.033)		(0.000)		(0.010)	
ROE	20.089	14.665	20.013	17.014	20.017	14.688	18.773	15.957
t-statistic	6.355***		2.926***		6.124***		3.287***	
p-value	(0.000)		(0.003)		(0.000)		(0.001)	
z-statistic	−7.176***		−3.573***		−7.033***		−2.702***	
p-value	(0.000)		(0.000)		(0.000)		(0.007)	
Tobin's Q	1.891	2.199	1.888	1.938	1.984	2.014	1.845	2.252
t-statistic	−7.406***		−1.320		−0.791		−9.826***	
p-value	(0.000)		(0.187)		(0.429)		(0.000)	
z-statistic	−2.824***		−1.216		−2.604***		−7.399***	
p-value	(0.005)		(0.224)		(0.009)		(0.000)	

Note: The difference significance at: *10%; **5% and ***1% levels
Source: Bloomberg

Table 5 Path analysis for ESG based on firm size and financial leverage

Variables	Firm size				Firm financial leverage			
	Mean difference by firm size		Difference tests		Mean difference by firm FL		Difference tests	
	Big firms	Small firms	t-Statistic	Z-statistic	High FL	Low FL	t-Statistic	Z-statistic
ESG	32.209	22.711	23.280***	−23.431***	28.860	26.605	5.183***	−5.369***
Obs.	2,281	2,092	(0.000)	(0.000)	2,157	2,125	(0.000)	(0.000)
CG	57.860	53.863	20.972***	−21.084***	56.686	55.334	6.705***	−7.039***
Obs.	2,281	2,092	(0.000)	(0.000)	2,157	2,125	(0.000)	(0.000)
EVN	27.862	19.759	13.268***	−13.085***	25.686	23.554	3.393***	−3.857***
Obs.	1,929	1,205	(0.000)	(0.000)	1,613	1,481	(0.000)	(0.000)**
CSR	26.223	17.882	16.937***	−15.311***	23.294	21.353	3.750***	−2.388
Obs.	2,271	1,992	(0.000)	(0.000)	2,119	2,063	(0.000)	(0.017)

Note: The difference significance at: *10%; **5% and ***1% levels
Source: Bloomberg

Table 6 Correlations matrix

	ESG	*CG*	*EVN*	*CSR*	*ROA*	*ROE*	*TQ*	*Size*	*FL*	*Turnover*	*Growth*
ESG		0.784**	0.966**	0.882**	0.026**	0.091**	−0.108**	0.204**	0.020	−0.040**	−0.108**
CG	0.786**		0.652**	0.674**	−0.006	0.083**	−0.126**	0.257**	0.028	−0.099**	−0.093**
EVN	0.967**	0.667**		0.696**	0.024	0.068**	−0.022	0.182**	0.037*	−0.035*	−0.086*
CSR	0.883**	0.665**	0.704**		0.018	0.082**	−0.065**	0.100**	0.021	−0.001	−0.088**
ROA	0.037*	−0.015	0.060**	0.070**		0.604**	0.450**	−0.127**	−0.050**	0.319**	0.039**
ROE	0.097**	0.047**	0.083**	0.115**	0.819**		0.268**	−0.061**	0.138**	0.196**	0.001
TQ	−0.056**	−0.100**	0.025	0.030	0.714**	0.572**		−0.156**	−0.021	0.257**	0.074**
Size	0.424**	0.393**	0.273**	0.271**	−0.354**	−0.163**	−0.534**		0.071**	−0.179**	−0.026
FL	0.107**	0.140**	0.064**	0.049**	−0.492**	−0.013	−0.424**	0.424**		−0.035*	−0.010
Turnover	0.037**	−0.057**	0.024	0.117**	0.574**	0.496**	0.501**	−0.396**	−0.317**		−0.018
Growth	−0.158**	−0.159**	−0.118**	−0.114**	0.235**	0.158**	0.224**	−0.155**	−0.191**	0.079**	

Note: The difference significance at: *10%; **5%; ***1% levels
Source: Bloomberg

5.2 Regression findings

After conducting the descriptive analysis of the variables and testing the regression analysis assumptions, we apply regression analysis to test the impact of ESG and its sub-components [CG, EVN and CSR (independent variables)] on firms' performance measures [ROA, ROE and Tobin's Q (dependent variables)]. The Hausman test was used to select between the fixed effects model and the random effects model. Results obtained from the Hausman test (*p*-value = 0.178, 0.457 and 0.157, respectively) led to choosing random effects model (REM) instead of the fixed effects model (FEM). In other words, the fixed effects model is inconsistent and that the random effects model is more suitable for this study. Therefore, this research applied the random effects model, which allows for controlling unobserved heterogeneity across countries that is fixed over time.

We developed three models to determine whether there are relationships among ESG and its sub-components' disclosure and firms' operational, financial and market performance and if they are positive, negative or even neutral. Therefore, to test the study hypotheses and achieve the study aims, Table 7 shows the results of the regression analysis using panel data. The relationships between the dependent variables and independent and control variables are shown.

The regression analysis results showed that ROA, ROE and Tobin's Q models are statistically significant. Table 7 shows that the *p*-values of the F-test of all the three models are less than 5% (0.000), which evidences that the explanatory power of the ROA, ROE and Tobin's Q models is

Table 7 Panel regression models

Variables	ROA model β	ROA model t-Statistic	ROE model β	ROE model t-Statistic	Tobin's Q model β	Tobin's Q model t-Statistic
Constant	3.009	2.420*** (0.016)	2.130	13.997*** (0.000)	1.760	8.681*** (0.000)
Independent variables						
ESG Index	1.137	4.551*** (0.000)	0.067	2.274** (0.023)	0.245	6.203*** (0.000)
EVN Index	−0.560	−4.271*** (0.000)	−0.030	−1.945* (0.0518)	0.124	5.978*** (0.000)
CSR Index	−0.292	−4.787*** (0.000)	−0.015	−2.160** (0.0308)	0.063	6.558*** (0.000)
CG Index	0.252	4.002*** (0.000)	−0.015	−2.024** (0.0430)	0.059	5.925*** (0.000)
Control variables						
Firm size	0.003	6.583*** (0.000)	0.070	11.49*** (0.000)	0.001	8.099*** (0.000)
Leverage	0.009	1.482 (0.138)	0.045	12.373*** (0.000)	0.002	0.237 (0.813)
Assets turnover	2.937	16.459*** (0.000)	0.384	17.982*** (0.000)	0.348	12.315*** (0.000)
Growth	0.030	7.167*** (0.000)	0.003	0.503 (0.6147)	0.003	4.911*** (0.000)
R^2		0.140		0.179		0.112
Adjusted R^2		0.138		0.176		0.110
F-Statistic		62.707***		78.130***		48.344***
Hausman test						
Chi-Sq.		1.062		0.765		1.109
p-value		0.178		0.457		0.157

Note: Symbols mean significance at: *10%; **5% and ***1% levels
Source: Bloomberg

high. As shown in Table 7, the results show that the ESG index has a significant positive relationship with ROA, ROE and Tobin's Q, as *p*-values of all the three models are less than 5% (0.000). This indicates that the impact of ESG is significant and has a positive impact on the firm's ROA, ROE and Tobin's Q. Thus, *H4* that suggests that overall ESG disclosure affects firms' performance is supported. This reflects that a greater level of ESG disclosure has a positive impact on the firm's operational, financial and market performance. The higher disclosure of ESG enhances the firm's operational, financial and market performance. This may be because the yearly variation of the ESG disclosure enhances the positive image of firms and then performance. This result is in line with some prior research showing that ESG disclosure is positively related to companies' performance (Waddock and Graves, 1997; Sharfman and Fernando, 2008; Albuquerque *et al.*, 2012; Pasquini-Descomps and Sahut, 2013). This result contradicts other studies suggesting that there is no conclusive evidence on the relationship between ESG and performance (Eccles *et al.*, 2012; Orlitzky, 2013; Alareeni, 2018a, 2018b).

Notably, although the results of testing the impact of ESG on firm's performance showed a significant positive impact on the firm's operational, financial and market performance, dividing the ESG index provided different results in the relationship with the firm's operational, financial and market performance. First, regression analysis found that EVN disclosure is negatively associated with the firm's operational and financial performance (ROE and ROE). A significant inverse relationship among the EVN disclosure level and ROA and ROE is evident for US S&P 500 companies. These results are in line with Chiong (2010), who provided evidence that the association between EVN disclosure and firms' financial performance measured by ROE is negative. This also follows Smith *et al.* (2007), who found that EVN disclosure is negatively related to performance measured by ROA. However, this result contradicts many other studies suggesting that the relationship between EVN disclosure, ROA and ROE is positive (Karagozoglu and Lindell, 2000; Majumdar and Marcus, 2001; Saleh *et al.*, 2011).

It is worthy to note that this result may be because, firms with EVN disclosure practices will incur higher costs followed by higher prices. This indicates that firm operational and financial performance has been affected more by EVN disclosure. Also, the results indicated that EVN disclosure is positively related to firm market performance measured by Tobin's Q. This indicates that EVN disclosure is significant for firms listed in US S&P 500 market performance.

Second, the result indicated a significant negative relationship between CSR disclosure and firm operational and financial performance (ROA and ROE). This may be because firms engaged in socially responsible practices suffer from more financial costs and have lower operational and financial performance. This result is in line with studies done by Friedman (1970), Nollet *et al.* (2016a) and Buallay (2018), who provided evidence that CSR and firms' operational and financial performance have a negative relationship. However, the results showed that the relationship between CSR and firms' market performance measured by Tobin's Q is a significant positive relationship. This indicates that S&P 500 firms are aware of and consider CSR practices a main driver for market performance. Accordingly, it can be said that CSR disclosure has a significance and usefulness for market value of S&P 500-listed firms.

Third, CG disclosure was found to positively affect ROA and Tobin's Q. A higher level of CG disclosure practices improves and positively affects operational and market performance. This means that CG disclosure increases asset efficiency (ROA) and firms' assets market value (Tobin's Q). Of course, this may be due to the fact that a good level of CG is a significant factor in improving FP in the best interests of stockholders and other interested parties, limiting agency costs and enabling firms to continue as going-concerns (Fama and Jensen, 1983). In addition, firms that adapt good CG mechanisms provide more useful information to investors and other financial statement users to decrease information asymmetry and help firms enhance operations. This result is in line with some studies suggesting a positive relationship between CG disclosure and firms' performance (Bauer *et al.*, 2010; Hussein and Kamardin, 2016). This result is also supported by Bhagat and Bolton (2009), who investigated pre-SOX and post-SOX relationships among CG practices and FP. A negative relation was shown between both variables pre-2002 when SOX was not prevalent, and a positive relationship was found among both variables in post-2002, when SOX was launched.

Regarding the relationship between CG practices and ROE, the results showed a significant negative relationship. This means that CG disclosure decreases financial performance (ROE). This may be due to the cost of practising and publishing CG disclosure. This result is in consistent with another study done by Core *et al.* (2006).

Finally, when it comes to control variables, firm size was found to be positively significant with ROA, ROE and Tobin's Q. Large firms have more assets, high-qualified employees and higher efficiency. Therefore, it is expected their performance will be higher.

For financial leverage, it has a positive and significant relationship with the firm's financial performance (ROE). However, the other measures of performance (ROE and Tobin's Q) were not found to be significantly associated with financial leverage. This indicates that the more financial leverage, the higher level of financial performance. This result is in line with Popli *et al.* (2017), who reported that leverage can be used as an indication to gain higher long-term performance.

The results showed that assets turnover is significantly correlated positively with all performance measures (ROA, ROE and Tobin's Q). This means the higher assets turnover in firms, the higher market value of assets (Tobin's Q), the higher asset efficiency (ROA) and the higher return on equity (ROE). Moreover, growth was found to be positively significant with ROA and Tobin's Q, and not significant with ROE. This means that growth enhances firms' operational performance and market value. The results failed to find any relationship between growth and firms' ROE.

6. Conclusion

This study aims to determine the impact of ESG on firm performance using data of US S&P 500-listed firms over the period that extends from 2009 to 2018. The study sample includes 4869 observations derived from 505 listed firms.

The independent variables used are the overall ESG, CSR, EVN and GC indices. The dependent variables are the firms' operational, financial, performance and market

performance measures (ROA, ROE and Tobin's Q). The study also used four control variables such as firm size, leverage, growth and assets turnover.

The descriptive analysis results show that the overall ESG, CSR, EVN and CG tend to be higher with firms that have high assets and high financial leverage. Further, results showed that firms with high disclosure levels of ESG, EVN and CSR have higher operational and financial performance (ROA and ROE). A low level of GC disclosure has a higher level of operational performance (ROA). However, firms' market performance (Tobin's Q) is better in firms that have a low level of ESG, CSR, EVN and CG disclosure.

Results from the regression models suggest that ESG disclosure had a significant positive impact on the all firms' operational, financial, market performance (ROA, ROE and Tobin's Q). Considering the sub-components of ESG (e.g. CSR, EVN, CR) provided us different directions. EVN and CSR disclosure were found to be negatively associated with firms' operational, financial performance (ROE and ROA) for S&P 500 firms. This may be because firms engaged in more socially responsible practices suffer from more financial costs and thus have lower operational and financial performance. However, EVN and CSR disclosure are positively related to firms' market performance measured by Tobin's Q. This evidences that EVN and CSR disclosure has a significance and usefulness for market performance of S&P 500-listed firms. Companies use EVN and CSR disclosure as a part of their strategic planning to create additional value for their product. Effective EVN and CSR disclosure can attract investors, to increase their willingness to buy and invest, respectively.

Further, CG disclosure was found to positively affect firms' operational and market performance (ROA and Tobin's Q). This indicates that CG disclosure increases the asset efficiency (ROA) and the firm's assets market value (Tobin's Q). This suggests that a higher level of CG is an important factor in enhancing firms' performance in the best interests of stockholders and other interested parties and to enable firms to continue as a going-concern. Finally, the results show a significant negative relationship between CG practices and firms' financial performance (ROE).

The study's results have important implications for researchers and regulators in the USA and other developed countries. ESG serves shareholders' interests in long-run planning, and considerable resources should be dedicated in this direction, given that ESG expenditure does not pay off immediately but after a threshold of ESG has been achieved. Further, it is suggested that regulators such as central banks, auditors and stock market organizers consider ESG to provide reliable financial information. Added to that, the stakeholders such as investors recommended increasing their knowledge about the term of ESG and its importance in the business to make better investment choices (Alareeni, 2019).

Regulators of CG codes can use this study's results as empirical support for developing new regulations and amendments and implementing necessary corrective decisions regarding the effectiveness of applying CG codes in the USA and other developed countries.

One of the key study limitations is that the ESG scores do not consider the kinds of ESG disclosure a firm uses. Hillman and Keim (2001) showed that different types of ESG can have different effects on firms' performance. Further, when different kinds of ESG disclosure are combined into only one score, the related effects might cancel each other out by determining the real effect.

It is suggested that further research examine the effects of ESG disclosure for other listed firms, such those listed in developing countries or for different industries in the USA, which will provide productive and fruitful comparisons. Further, it would be interesting to examine the moderating role of some factors on the relationship between ESG and firms' performance.

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Corresponding authors

Bahaaeddin Ahmed Alareeni can be contacted at: alareeni@metu.edu.tr and Allam Hamdan can be contacted at: allamh3@hotmail.com