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Corporate governance, product market competition, and corporate social responsibility performance in the US energy industry

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Abstract: Corporate social responsibility (CSR) has increasingly become an essential issue for corporations. Extensive research has investigated how corporate governance (CG) mechanisms affect CSR with mixed results. Specifically, the existing literature concerning this link in the important energy industry is too sparse to provide meaningful insights. This study contributes to CG and CSR literature by investigating the effects of the two major types of corporate ownership [institutional blockholder ownership (IBO) and managerial ownership] on a firm's CSR performance in the US energy industry and exploring the moderating role of product market competition in various segments of this industry. The results show that both ownership types influence a firm's CSR performance but differently; and product market competition moderates the relationship between IBO and CSR. This paper advances theoretical understanding as well as provides practical implications for corporate ownership structure design for the energy industry.

Keywords: corporate governance; institutional blockholder ownership; IBO; managerial ownership; corporate social responsibility; CSR; product market competition.

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1 Introduction

Over the last several decades, the expectations of what business should be responsible for have changed substantially along with the growing awareness of customers and consumers regarding the adverse effects some corporations produced on the environment and society. One that particularly faces this challenge is the energy industry due to its sensitivity to the environment (Aggerholm and Trapp, 2014) and certain unethical practices revealed in this sector (Lu et al., 2019). Furthermore, the recent significant growth of the energy industry due to the continuously rising electricity demand has linked this industry to the primary sources of air and water pollution. Facing these increased challenges, several international agencies and regulatory bodies have requested corporations for a new approach to business (Baghuis, 2018). This phenomenon spawned the growing alertness to enforce the environmentally challenged energy firms to practice in socially responsible ways (Broker et al., 2019; Shahbaz et al., 2020; Szczepankiewicz and Mucko, 2016). Furthermore, the role of energy firms and their approach to energy transformation as defined by the International Renewable Energy Agency (IRENA) in the context of geopolitics placed this industry at the forefront of today's corporate social responsibility (CSR) discussions.

To maintain the social license to operate, to safeguard the corporate reputation, and remain competitive, many energy firms have adopted the CSR framework to comply with the local and international regulations. CSR is defined as "the social responsibility of business encompasses the economic, legal, ethical, and philanthropic expectations that society has of organisations at a given point in time" [Carroll, (1991), p.283]. Thus, the adoption of CSR by various corporations, including energy firms, is a way to respond to the growing social expectation, improve ethical standards and accountability, mitigate potential risks, and pursue positive social impact (Pegg, 2012).

Extensive academic studies have explored the determinants behind CSR implementation in industries (Arena et al., 2018), including those in the energy industry, such as the mining, oil and utility firms (Agudelo et al., 2020; Stjepcevic and Siksnelyte, 2017). One of the areas that have attracted academics' attention is the role of the corporate governance (CG) mechanisms in improving a firm's CSR performance (Chan et al., 2014; Del Mar Miras-Rodríguez et al., 2018; Sanan, 2018; Shin et al., 2012). CG is vital in creating a system of policies and procedures that guide how a firm operates (e.g., establishing effective control, maintaining accountability, and aligning the interest of all its stakeholders) to set and achieve business objectives. Among the CG mechanisms, firm ownership is regarded as an increasingly influential form, essential to govern the actions of managers and constitutes both the internal and external control mechanism (Connelly et al., 2010; Edmans and Manso, 2011).

Prior research shows the ownership structures have a significant impact on organisational decisions (Connelly et al., 2010; Shi et al., 2017) and major shareholders, such as insider or outside major institutional owners have been suggested to affect the firm's social engagement (Arora and Dharwadkar, 2011; Oh et al., 2017). It is expected that different owners have different attitudes towards CSR engagement because of their different motivations and time horizons for corporate decisions (Dakhli, 2021). For example, unlike managerial ownership (MO), institutional owners are dominant market players, and they are known to improve resource allocation efficiency, promote management accountability, and aid decision-making that can be justified to the shareholders (Aguilar, 2013). Nevertheless, the empirical evidence on the extent to which

the ownership structure affect CSR is not only mixed but also not sufficiently explored (Chen et al., 2019; Dam and Scholtens, 2012; Oh et al., 2017; Zaid et al., 2020).

So far, the extant research assumes a simplified view of governance mechanisms across industries; the current knowledge is somewhat limited towards intervening variables (e.g., economic situation, environment, etc.) that weaken or strengthen the potential effects (Miras-Rodríguez et al., 2019; Endrikat et al., 2020). It is also surprising to see that the literature concerning the impact of the CG mechanisms on a firm's CSR performance in the energy sector is sparse, given the occurrence of several large-scale energy industry scandals in recent years (Shahbaz et al., 2020). During a virtual roundtable hosted by the Energy Council and attended by leading figures across the energy, finance and investment sectors in the summer of 2021, a discussion was conducted on how CSR goals can be achieved in the energy sector; the investors continued to criticise the energy companies' pervasive use of 'greenwashing' strategy without being progressive in the real action (DWF LLP, 2021). Due to the energy industry's substantial and lasting impact on economics, environment, society and the current ongoing energy crisis, a better understanding of the relationship between CG and energy firms' CSR performance has become more critical. Effective internal and external governance mechanisms can help energy firms formulate the important CSR policies and strategies while genuinely monitoring their implementations (Grougiou et al., 2016; Rekker et al., 2014).

This research aims to investigate not only the direct effects of ownership structure on CSR performance in the context of the US energy industry but also advances the theoretical explanation by proposing the link between the ownership structure and firm CSR performance with product market competition of the industry segments (ISs) as the moderator. A higher level of marketplace competitive intensity can contribute to environmental hostility and substantially influence a firm's behaviour by the actions and contingencies undertaken by its competitors (Dess and Beard, 1984; Zahra and Covin, 1995).

This study investigates the relationship between the ownership structure and a firm's CSR performance in the energy sector; specifically, the institutional blockholder, is used as the proxy representing the outside monitoring mechanism, while the MO is used as the proxy as the insider incentive alignment mechanism (Choi et al., 2020; Oh et al., 2016). More importantly, these effects are further examined in the context of product market competition in the various segments of the energy industry based on their different products or services. This helps us understand the market competition as the contingency that may weaken or strengthen the potential effects of the ownership structure on a firm's CSR performance. Prior research has demonstrated that product market competition can affect the relationship between CG and the firm financial performance (Ammann and Oesch, 2013; Giroud and Mueller, 2010; Singla and Singh, 2019).

This study contributes to the general CG and CSR literature by not only demonstrating the positive linear relationship between the institutional blockholders ownership and CSR, but also revealing a novel curvilinear relationship between MO and CSR performance, which is in contrast to the existing literature. Further, this paper also makes a novel contribution to the literature that it explores importance of market competition's impact on ownership and CSR. Overall, the findings provide insights for the policy makers and energy industry regarding the design of ownership structure in order to improve a firm's CSR and long-term sustainability.

The rest of this paper is organised as follows. Section 2 reviews the related literature, underlines the theoretical approach, and presents the hypotheses formulation. The research methodology is presented in Section 3, followed by the findings and discussions, and then the paper concludes with implications, limitations, and future studies.

2 Literature review and hypotheses development

2.1 CG and CSR in the energy industry

The energy industry is vital to economic and social development and environmental sustainability. Prior research has investigated key determinants that drive CSR in this sector (Agudelo et al., 2020; Hughey and Sulkowski, 2012). These determinants include corporate culture, business strategy, profit-seeking, risk prevention of financial liability, reputation management (De Roeck and Delobbe, 2012; Kucharska and Kowalczyk, 2019; Özcüre et al., 2015; Sepúlveda and Mendizabal, 2011) as well as competition, regulatory compliance, environmental impact, and social engagement (Bashtovaya, 2014; Lu et al., 2019). Studies found that the energy companies that genuinely understand CSR and fully exploit its potential benefits tend to have successful CSR implementation. They believe that meeting society's expectations may reap benefits for long-term success (Arena et al., 2018; Heard et al., 2017). These important determinants suggest that energy firms have the moral responsibility and business interests to rise to the CSR challenges when engaging with multiple stakeholders (Stjepcevic and Siksnelyte, 2017).

The CG mechanisms are the very foundation affecting how a firm operates; they drive the above-mentioned key aspects of a firm, such as the formulation and implementation of the corporate culture, business strategy, risk management, regulatory compliance, etc. In recent years, examining the effect of the CG mechanisms on a firm's CSR practices in the energy sector has attracted the growing attention of academics (Chan et al., 2014; Del Mar Miras-Rodríguez et al., 2018). However, the empirical evidence is limited to address the energy sector's CSR performance beyond the CSR reporting from the CG perspective (Shahbaz et al., 2020). Although disclosing a firm's social and environmental data is a critical move towards the right direction, examining how the governance mechanism impacts firms' eventual CSR performance has become more significant.

The CG system constitutes various mechanisms, including oversight in areas where there are conflicts of interest among major stakeholders, such as the election of the directors, the supervision of CEO pays, and the overall firm structure and strategies. Three categories of CG variables have been found to impact firm performance in US corporations: the ownership structure, the board of directors' characteristics, and the executives' compensation (Hu et al., 2018). Therefore, establishing an effective CG framework is the foundation for a firm to properly formulate the CSR policies and monitor the subsequent implementations (Block and Wagner, 2014; Brammer and Pavelin, 2004).

2.2 Ownership structure and CSR

Every business organisation may suffer from agency problems in the relationship between the business principals and the managers in various shapes and forms. Berle and

Means (1932) provided the foundation to study the issues associated with the separation of the ownership and the management and demonstrated that the ownership structure of the US-listed firms was dispersed already at the dawn of the 20th century. In addition, recent studies also showed the listed companies in non-Anglo-American countries were usually controlled by large shareholders (Aslan and Kumar, 2014). The understanding of this phenomenon is the basis of Jensen and Meckling's (1976) development of agency theory, which suggested that the business owners and the managers often had a conflict of interests. Thus, establishing and applying CG mechanism, including the monitoring role of major shareholders, independent board of directors and appropriately incentivising management with stock ownership and compensation structure, are all essential to help minimise the principal-agent problem and ensure the alignment of interests between the two sides.

The ownership structure determines which party has the ultimate decision-making power in the firm (Zattoni, 2011). The dominant shareholders have the power to address opportunistic behaviour by the firm's top management and expropriate minority shareholders (Kumar and Zattoni, 2015). Firm ownership structure associates closely with the decisions made by managers regarding the operations practices and the corporate strategies such as information disclosure, foreign direct investment, technology innovation or R&D investment, etc. (Bushee, 2004; Bhaumik et al., 2010; Gu et al., 2019; Shin and Park, 2020).

Various investors own firms, and large shareholders of listed companies may vary across countries (Zattoni and Judge, 2012). If the ownership concentration decides the power of the shareholders vs. the managers, then these shareholders' identities affect the interest and the decision-making pertaining to the firm's operations practices and corporate strategies. Hence, both the shareholders' concentration and identity play a relevant role in CG studies (Connelly et al., 2010; Dam and Scholtens, 2012, Kumar and Zattoni, 2015; Oh et al., 2017). The governance scholars have studied both the effects of the ownership concentration and the identity of large shareholders on firm performance (Carney et al., 2019; Lin and Fu, 2017; Mallin, 2008; Zhang et al., 2014). Despite this large number of studies, not only the debate on the relationship between the ownership concentration and firm performance is still open (Kumar and Zattoni, 2019), the relationship between the types of major shareholders and firm performance is complex and depends on the context (Jin and Park, 2015).

On the one hand, the top management team's decision-making needs to consider the impact of these decisions on the corporation's financial performance. On the other hand, a firms' long-term ability to face various challenges and manage its standing in the global environment is an essential part of this decision-making as well. In recent years, a vital aspect of its management concerns the stakeholders' perception of whether an organisation cares for social and environmental values other than its financial profit. The CSR rating has become an essential measure for assessing a firm's long-term success.

The agency theory indicates that main shareholders have both the incentive and the power to monitor the firm's top management team concerning the operations to maximise their financial outcomes while incurring the agency cost (Eisenhardt, 1989; Jensen and Meckling, 1976). It was reported that institutional ownership, defined as the amount of a company's available stock owned by mutual or pension funds, insurance companies, investment firms, private foundations, endowments, or other large entities that manage funds on behalf of others, is the largest category of shareholders in most countries (Dam

and Scholterns, 2012). It is measured by the number of shares held by the active institutional investors divided by the total number of shares outstanding in the firm. Thus, the level of monitoring in a firm could be driven by how much each institution owns. The extent of institutional ownership has grown substantially in recent years; According to Blume and Keim (2012), institutional ownership in equities has reached 67% by the end of 2010 in the US financial markets, yet this number has increased to 80% in 2017 (Pensions & Investment, 2017). Although major outsiders such as institutional blockholders have their representatives on the board, extant research demonstrates that directors' long tenure or their social ties developed with the top management likely impact their independency in decision-making (Cullinan et al., 2019; Kramarz and Thesmar, 2013). Therefore, vigilant monitoring by large shareholders such as these institutional blockholders on management is still important to effectively rein in the managerial self-interested actions, and promote long-term CSR performance. Nowadays, these large institutional shareholders have become increasingly vocal and more actively involved in the firms' major decision-making process. They present shareholder proposals and negotiate with the top management team, directly affecting the corporate strategic and operational directions leading to better financial outcomes (Chen et al., 2020; Del Guercio and Hawkinds, 1999).

Benamraoui et al. (2019) indicated that the outside blockholders, such as those major institutional blockholders, were key determinants in explaining future firm performance. However, the question about whether the enhanced financial performance has led to better CSR performance lacks a conclusive answer (Saeidi et al., 2015). Moreover, the relationship between the CG mechanisms and CSR performance lacks clarity (Oh et al., 2018). The empirical results regarding the influence of the institutional shareholders on a firm's CSR performance are inconclusive (Oh et al., 2017; Choi et al., 2020). Some found a positive effect, including some of the most recent published studies, suggesting a high level of monitoring by the major shareholders may lead to a better CSR performance (Chen et al., 2020; Erhemjamts and Huang, 2019; Kim et al., 2019; Oh et al., 2011; Sethi, 2005). However, others have found no systematic impact (Barnea and Rubin, 2010; Brown et al., 2006; Dam and Scholtens, 2012); or a negative effect (Arora and Dharwadkar, 2011; Ducassy and Montandrau, 2015; Walls et al., 2012).

According to Bushee et al. (2014), the institutional investors should not be viewed as a homogenous group since some may hold a long-term perspective while others have a short-term view, they may exert different kinds of impact on a firm's CSR performance (Erhemjamts and Huang, 2019; Kim et al., 2019). Thus, this study goes beyond using the focal point of institutional ownership in general and focuses on the group of institutional investors who hold at least 5% of the ownership, a.k.a., the institutional blockholder, to represent the key monitoring role of the outside ownership due to its apparent importance to the firms (Dam and Scholterns, 2012, Choi et al., 2020). The institutional blockholders in firms would find it costly to quickly liquidate their positions during any corporate scandal. In fact, according to De Jong et al. (2017), about 50% of the large shareholders of firms have established and maintained block holding positions for more than a decade. These blockholders operate as the stakeholders with a long-term strategic interest in a company and have the voting power to look beyond quick returns and stimulate firms to value financial stability and are primarily motivated to create long-term value. These long-term investors are more likely to participate and monitor a firm's decision-making on formulating and implementing CSR strategies (Erhemjamts and Huang, 2019). Shu and Chiang (2020) suggested that institutional blockholders enhanced the monitoring

effectiveness and encourage firms to engage in CSR. Thus, it is to conjecture that in the US energy sector, the institutional blockholders may hold a long-term view and either actively or passively promote an energy firms' strategic CSR policies formulation and implementation. The institutional investors who are easily trigged to short-term thinking by periodic benchmarking of a company's financial performance will likely hold back from establishing a block holding position in the energy companies. Admati and Pfleiderer (2009) and Edmans (2009) both pointed out that even if a small blockholder could not exercise successful intervention even with their expertise, the management understands that the last resort the small blockholders can do is to sell their shares and drive down the stock price to punish the manager ex-post; thus, overall the institutional blockhoders would encourage the management to invest in long-term projects whether through active monitoring or with the possibility of using the alternative channel of exit mechanism which inducing management to maximise value ex-ante (Edmans and Holderness, 2017), leading managers to be more engaged in CSR, to mitigate risks, and maintain a firm's long-term reputation and survival (Chen et al., 2007; Kim et al., 2019).

Based on the agency theory, when the top management is given the ownership, they are incentivised to align their interest with other owners since they too become the firm's shareholders. A firm then could maximise its value via this alignment between the interest of the agent and the interest of the principals (Eisenhardt, 1989; Jensen and Meckling, 1976), and subsequently, to reduce the risk of short-term profit chasing, and improve long-term CSR investment. Interestingly, much of the empirical findings do not offer conclusive results regarding the relationship between MO and CSR. Some have suggested a positive effect (Johnson and Greening, 1999; Kock et al., 2012), while many other studies demonstrated a negative association between MO and CSR performance (Barnea and Rubin, 2010; Arora and Dharwadkar, 2011; Oh et al., 2011; Dam and Scholtens, 2012; Ongsakul et al., 2021). Some scholars argued that high-level MO might cause a 'management entrenchment' problem and led to self-interest-seeking behaviour and avoiding large investment in CSR (Shleifer and Vishney, 1997). A recent investigation of institutional and insider ownership using a sample of US Fortune 1000 firms presented a complex picture with the across industries data. It showed that MO has a U-shaped relationship with CSR stating that when the extent of MO increased from a low to a moderate level, the managers are likely to become entrenched in self-seeking behaviour; However, as the managers started to own substantially more shares, they were more incentivised to align their interests with shareholders' long-term perspective (Oh et al., 2017).

Such inconsistencies are possibly resulted from the failure to account for various heterogeneity issues in studying CSR, as different factors can affect this relationship between the ownership structure and CSR in various organisations and industries. As Ongsakul et al. (2021) suggested the presence of economic policy uncertainty may impact the owner's influence on CSR performance. Firms in different countries and industries may encounter different economic and social policies at different periods. In recent decades, organisations have faced more pressure and have substantially increased the number of resources allocations to CSR activities (Barnea and Rubin, 2010; Aguilera et al., 2007; Ducassy and Montandrau, 2015). The existing literature also suggests that the companies from the industries considered to have more significant impact/risk tend to have higher CSR scores than those from other industries. Firms with the most increased environmental hazards, such as in mining, oil and gas, tobacco and electricity, forestry

and paper sectors, tend to show their preferences for environmental policies and reports, human rights, and stakeholder participation to demonstrate good faith in social responsibility and environmental sustainability (Amor-Esteban et al., 2019). In this study, based on the pronounced environmental and social impacts from the energy industry, it is hypothesised that the relationship between the institutional blockholder ownership (IBO) and a firm's CSR performance is long-term and a positive one given the nature of the blockholders' investment perspective being different from the rest of the institutional ownership. On the other hand, based on the findings from the literature, it is suspected that the relationship between the MO and a firm's CSR performance in the energy industry might be more complex. Given the tenure of the executive management team are more impacted by the financial performance than the long-term CSR performance in general under the close watch of Wall Street, the management ownership may align with the blockholders' perspective and possibly be positively related to a firm's CSR performance when their ownership stake is low. Still, when the management ownership stake grows higher with increased power and influence, the firms could experience management entrenchment issues. The overall decision making may sway towards less substantive investment in CSR, including developing new technologies for further waste minimisation, toxic chemicals emission reduction, or clean energy development, while leaning more on making symbolic CSR policies and achieving the short-term financial performance with a 'greenwashing' attitude (Yu, 2020).

Drawing on both the agency theory and prior literature, the current study attempts first to examine the influence of institutional blockholder and MOs on CSR performance in the context of the US energy industry. Specifically, the following hypotheses are put forth:

H1 The extent of IBO is positively associated with a firm's CSR performance in the energy industry.

H2 The extent of MO has a curvilinear relationship with a firm's CSR performance in the energy industry. The association goes from positive to negative as the MO stake grows.

2.3 Product market competitions and CSR

Nowadays, CSR has become an increasingly prominent element of any social contract between business and society. Corporate executives are mindful that the government regulations, industry standards, and business stakeholders have different demands for CSR in different industry sectors, and some are more stringent than others. The energy industry in the US has various segments based on their different products or services, ranging from electric power generation and distribution to natural gas extraction and distribution, crude petroleum extraction to mining, etc. The firms in the various segments of the US energy industry can be generally categorised into three large groups that face competitions of different nature, hence, have different motivations to care for their CSR performance.

2.3.1 The mining companies

The firms in this group began to realign themselves through a series of global initiatives since 1992 to contribute to sustainable development under the United Nations Conference

on Environment and Development in Rio (Dashwood, 2012) and have been adopting the global standards of CSR. They compete for capital, and capital access is critical for their survival and continued success. Moreover, they also need to address the recent changes in the legal environment regarding the industry's CSR engagement and are under tremendous pressure to keep costs down (Frederiksen, 2018). Therefore, the competition among these firms may compel them to allocate resources on promoting CSR and adopting advanced green-mining technology to minimise mine waste to alleviate the environmental concerns and help secure any new or maintain continued capital access.

2.3.2 The oil and gas companies

The oil and gas companies' competition is not only based on their capabilities and the intellectual properties of certain proprietary technologies for finding oil and gas and extracting them, but also on their reputations (Garcia et al., 2014). These firms are often painted as the dirtiest group within the energy industry; they face ever-growing stringent government regulations worldwide and the lingering social stigma stemming from the infamous social and environmental scandals in recent history. The oil and gas companies have to face the sustainability challenge and be socially mindful. Thus, the competition pushes these firms to step up their environmental and social commitments. The industry report from the year 2018 suggests that the US top oil and gas companies only spent 1% of their combined budget on green energy schemes and were vastly outpaced by their European counterparts (Bousso, 2018). However, following the recent Paris Agreement, the growing concerns about climate change may provide more reasons for these companies to invest in renewable technologies while adapting to the newly emerging realities of the global energy landscape to preserve its legitimacy and improve social standing (Murray, 2018).

2.3.3 The utilities companies

The utility business companies that provide electricity transmission and energy distribution to cities and towns encounter the government clean air acts mandate to reduce carbon emissions. They are under pressure from the shareholders and consumers to focus on sustainable practices and renewable energy sources. In addition, the emergence of Prosumers of energy, i.e., the people and the business installing solar arrays or wind turbines, create a massive global shift and continues to put tremendous pressure on these companies. While renewable energy is becoming cheaper, more demand for cleaner energy needs to be met. Thus, the competition urges these firms to engage in enhanced sustainable practices and invest in developing renewable energy sources to meet the increased demand for alternative energy resources (Forbes, 2021).

Overall, whether these companies are engaged in mining, oil and gas, or in the utility business, the competitions would undeniably prompt a more heightened awareness of the CSR issues whether to acquire any new or maintain the continued capital access or improve the legitimacy of the business or for meeting the growing demand for renewable resources due to the increased consumer demand.

Today's firms are more interested in adopting a CSR strategy and willing to make CSR-favourable investment decisions. A firm with a good CSR strategy can also make firms' valuation more favourable in the long run in the investors' stock assessments (Park et al., 2017). As Fernandez-Kranz and Santaló (2010) discovered that product market

competition has a positive relationship with the widely-used CSR measures based on the strategic view of CSR, competitions lead to value-enhancing ESG, and this insertion is supported by many other researchers (Friede et al., 2015; Long et al., 2020; Platonova et al., 2018). Dupire and M'Zali (2018) indicated that this positive impact varies with industry specificities: The effect is more pronounced in business to consumer (B2C) industries than in other sectors. On the other hand, product market competition is a double-edged sword on CSR performance; some prior research suggests the altruistic view of CSR, indicating that socially responsible firms are guided by their ethical principles and willing to sacrifice profits for social interest (Elhauge, 2005). This strand of research argues that intense competition deters firms from focusing on CSR (Baron, 2001; Gupta and Krishnamurti, 2018). By analysing data from 37 countries across the industries, Muhmad et al. (2021) show that the companies with higher product competition have lowers ESG scores. However, other studies suggest that the impact of product market competition on corporate CSR varies depending on the different countries' economic status and environmental standards (Flammer, 2015; Lee et al., 2018; Meng et al., 2016).

Economists believe in competition, as competition incentivises more innovation and more efficient business operations (Nickell, 1996). Although pursuing socially responsible behaviour incurs substantial costs for the firms, in a market like the USA or other well-developed economies where social responsibility measures and the extent of government intervention are different from many developing economies, the 'invisible hand' has a prominent role affecting business and on the CSR issues (Kramer, 2007). The negative exogenous events reported that associated with certain firms in recent history cause considerable awareness among stakeholders about CSR issues and can become the forces driving firms to realise that adopting a socially responsible act pays off in the US market, as the investment in CSR is a trade-off between incurring higher operations cost and long-term wise accumulating ethical capital for the firms (Leong and Yang, 2020). Given that the US energy sector data contains firms in seven segments, and in recent years are facing increased pressure from their stakeholders and regulators to improve their act on the CSR issues, it is to conjecture that the competition would lead to the increased strategic importance of having a better CSR performance. Thus, the following hypothesis is put forward:

H3 The level of product market competition has a positive relationship with a firm's CSR performance in the US energy sector.

Moreover, drawing upon the impact of product market competition on a firm's strategy formulation (Porter and Van der Linde, 1995), researchers have demonstrated its moderating effect on the relationship between CG and firm performance. Using an international sample of 14 EU countries, the impact of CG on firm value was demonstrated to be significantly increased in non-competitive industries only (Ammann and Oesch, 2013) due to non-competitive market leading to more capital expenditures and less diversification; A recent study specifically investigated the moderating effect of product market competition on board monitoring, and firm value found that the effectiveness of the board monitoring is weakened by the increased level of product market competition (Singla and Singh, 2019). The institutional blockholders carry out their monitoring role through direct intervention in a firm's operations, as well as having their representing board of directors to protect their interest. In an intensively competitive market, not only the board monitoring effectiveness is weakened as suggested by Singla

and Singh (2019), outsider owners would be more replying on the management in terms of their industry expertise in managing operations to combat the competition. Therefore, institutional blockholders' 'voice' in intervening a firm's operations would be less strong comparing to in a less competitive market, where management has stronger voice in firm's decision making in an increased competitive product market. As prior studies found that firms in competitive industries benefit less from good CG, while firms in non-competitive industries benefit more (Giroud and Mueller, 2011; Mnasri and Ellouze, 2015).

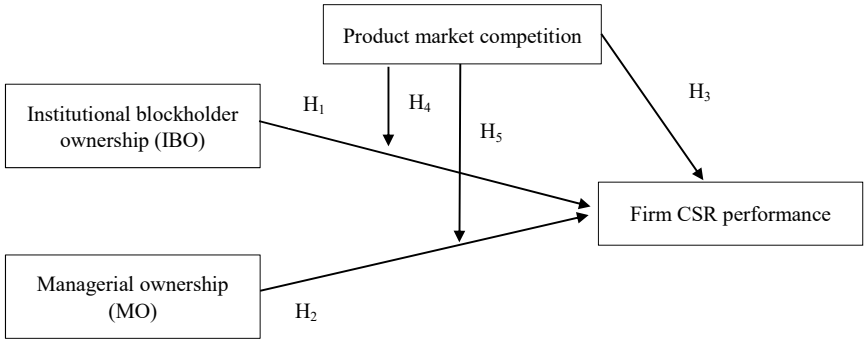
In this study Herfindahl-Hirschman index (HHI) proposed by Giroud and Mueller (2010) is adopted to depict the market competition of the various segments in the energy industry based on the different products and services those firms provided. HHI is well-grounded in industrial organisation theory. A higher HHI value suggests weaker competition. It is calculated by summing up the squares of market share of each company in each of the segment in the energy industry. Conceptually, the value of the index ranges from 1 (least concentrated) to 10,000 (most concentrated). Theoretically when HHI is 10,000 suggesting there is only one company operating in the industry, a monopolistic situation. Hence, a low HHI value specifies more market competition while a higher HHI value indicates less competition and an increase in market power (Nasdaq Financial Terms, n.d.). It is theorised that product market competition can affect both the relationships; one is the relationship between IBO and a firm's CSR performance. The second is the relationship between MO and CSR performance. Specifically, the following hypotheses can be put forth:

H4 Product market competition moderates the relationship between IBO and a firm's CSR performance. The effect of IBO on the firm's CSR performance is lessened as product market competition increases (i.e., when HHI decreases).

H5 Product market competition moderates the relationship between MO and CSR performance. The effect of MO on the firm's CSR performance is strengthened as product market competition increases (i.e., when HHI decreases).

The research model is presented in Figure 1.

Figure 1 Research model



3 Research methodology

3.1 Data collection

The sample was gathered based on two criteria in this study. First, the US energy industry is examined using NAICS Code 2211 for Electric Power Generation, Transmission and Distribution, NAICS Code 2212 for Natural Gas Distribution and NAICS Code 2121 for Coal Mining containing seven market segments. Second, the energy firms selected reported the environmental, social, and governance (ESG) data during the 2015–2018 period from the Refinitiv ESG database, leading to a panel data of 119 firms and 476 observations. The demographic information is listed in Table 1. There are seven segments of energy firms included in the sample data. Table 1 also shows that most firms (53%) have more than 10,000 employees, while less than 21% have 5,000 or fewer employees. The 2019 ESG data was also gathered due to the lag 1 ($t - 1$) effects of the independent, moderating variables and control variables.

Table 1 Demographic information ($n = 119$)

	# of firms	% of firms
Type of energy firms (NASIC Code)		
Other electric power generation (221,118)	25	21%
Electric power distribution (221,122)	11	9%
Natural gas distribution (221,210)	13	11%
Crude petroleum extraction (211,120)	41	34%
Natural gas extraction (211,130)	9	8%
Bituminous coal and lignite surface mining (212,111)	15	13%
Bituminous coal underground mining (212,112)	5	4%
Number of employees		
Less than 5,000	21	18%
> 5,000–10,000	35	29%
More than 10,000	63	53%

3.2 Variables

3.2.1 Dependent variable

ESG is the dependent variable in this study. Although CSR and ESG are different frameworks; CSR is used as an internal framework in companies to convey the values and goals of the business concerning sustainability while ESG is used to measure of assessment of sustainability quantitatively (O'Neill, 2022). Currently investors increasingly use the ESG data in their portfolio analysis to identify financial risks and growth opportunities (Limkriangkrai et al., 2017; Amel-Zadeh and Serafeim, 2018; Duque-Grisales and Aguilera-Caracuel, 2019). In short, ESG is a collection of corporate performance evaluation criteria that assess the robustness of a company's governance mechanisms and its ability to effectively manage its environmental and social impacts (Gartner, 2023).

The ESG data was collected from Refinitiv.[1] The composite ESG score is regarded as an added value of CSR consisting of ESG aspects and is designed to measure a company's relative ESG performance, commitment, and effectiveness across ten main themes (emissions, environmental product innovation, human rights, shareholders, etc.) based on publicly reported data. Specifically, the governance pillar contains three categories:

1 CSR strategy – measured by CSR strategy and ESG reporting and transparency.

2 Management – measured by structure (independence, diversity, committees) and compensation.

3 Shareholders – measured by share rights and takeover defences.

Owner structure was not directly measured in deriving the governance pillar score or overall ESG score. Overall, the value of the composite ESG index is between 0 and 100 generated from a weighted score of a firm's strengths and weaknesses on both CG and CSR strategies.

3.2.2 Independent variables

In this study, two aspects of the CG mechanisms (IBO and MO) were explored. Following both Laidroo (2009) and Arora and Dharwadkar (2011), the IBO is derived from the sum of the institution ownerships, with each owning larger than 5% shares in a firm as they are more incentivised to pay attention to the firm's business activities. According to Arora and Dharwadkar (2011), MO promotes value-creating rather than value-destroying behaviours for executives in a general sense (varies depending on the short-term vs. the long-term value-seeking orientations). As such, MO is included as the second independent variable. The percentage of stock owned by managers for the sample (119 observations) was collected from the SEC's annual proxy statements, which provided the percentage of total shares outstanding held by the firm's executives. Then the firm-specific financial data was collected from the Compustat (Chen, 2008).

3.2.3 Moderating variable

Product market competition is the moderator in the research model. This is measured using the HHI formula proposed by Giroud and Mueller (2010):

$$HHI_{jt} = \sum_{i=1}^{j} s_{ijt}^{t2} \tag{1}$$

where s_{ijt} is the market share of firm i in the IS j, (i.e., the total number of firms) in year t.

The market share is measured based on a firms' annual sales from the COMPUSTAT database. As a rule of thumb, a higher HHI implied weaker competition in that IS.

3.2.4 Control variables

IS (dummy variables), firm size (FS), (i.e., the number of employees) and leverage, (i.e., the ratio of the long-term debts to total equity) are employed as the control variables in this study. As stated before, although the sample consists of firms in the energy sector as a whole, there are seven different market segments where these firms compete depending

on their different NASIC codes. As such, the market (IS) needs to be controlled in the current study. While the FS is indicative of economic scale impacting both social and environmental investments for the firm, leverage (LEV) is associated with unsystematic risk (e.g., environmental regulatory changes). We used the logarithm of the number of employees to avoid possible skewness and normality issues.

Table 2 Variable descriptions

Variable	*Type*	*Descriptions*
Industry segment (IS)	Control variable	Dummy variables, ranging from 1–7, represent seven different segments of the US energy industry.
Firm size (FS)	Control variable	FS is the natural log of the number of employees.
Leverage (LEV)	Control variable	Leverage refers to the ratio of a company's debts to the value of its equity.
Institutional blockholder (IBO)	Independent variable	Institutional blockholder is a major aspect of the CG mechanisms. The IBO is derived from the sum of the institution ownerships.
Managerial blockholder (MO)	Independent variable	Managerial blockholder is a major aspect of the CG mechanisms. MO is the percentage of shares held by the management who actively participate in corporate decisions.
HHI index	Moderating variable	HHI Index stands for the Herfindahl-Hirschman index, a commonly accepted measure of market concentration. The HHI is calculated by squaring the market share of each firm competing in the market and then summing the resulting numbers. A higher HHI implied weaker competition in that IS.
		According to the US Department of Justice, any industry with an HHI below 1,500 is considered a competitive industry. Similarly, an HHI value between 1,500 and 2,500 denotes a moderately concentrated industry. Finally, an industry with an HHI of 2,500 or more is designated a highly concentrated industry.
IBOxHHI	Interaction term	IBOxHHI is an interaction term between IBO (an independent variable) and HHI (a moderating variable).
MOxHHI	Interaction term	MOxHHI is an interaction term between MO (an independent variable) and HHI (a moderating variable).
IBO^2	Quadric term	IBO^2 is the quadric term of the independent variable (IBO) for examining the curvilinearity.
MO^2	Quadric term	MO^2 is the quadric term of the independent variable (IBO) for examining the curvilinearity.
ESGScore	Dependent variable	ESG refers to a collection of corporate performance evaluation criteria that assess the robustness of a company's governance mechanisms and its ability to effectively manage its environmental and social impacts. The ESG data in this study was collected from Refinitiv.

3.3 Statistical analysis

Panel data analysis (Stata 15) was employed to test the hypotheses. For the panel analyses method selection, the fixed effect model was employed in the study as the fixed-effects estimator uses within variation (within the same firm, overtime) by using time demeaned variables. The general panel data models can be rewritten as follows:

$$ESG_{it} = \beta_0 + \beta_1 IBO_{it} + \beta_2 MO_{it} + \beta_3 FS_{it} + \beta_4 LEV_{it} + \beta_5 IS_{it} + \alpha_i + u_{it} \quad (2)$$

$$ESG_{it} = \beta_0 + \beta_1 IBO_{it} + \beta_2 MO_{it} + \beta_3 HHI_{it} + \beta_4 FS_{it} + \beta_5 LEV_{it} + \beta_6 IS_{it} + \alpha_i + u_{it} \quad (3)$$

$$ESG_{it} = \beta_0 + \beta_1 IBO_{it} + \beta_2 MO_{it} + \beta_3 HHI_{it} + \beta_4 IBO \times HHI_{it} + \beta_5 MO \times HHI_{it} + \beta_6 FS_{it} + \beta_7 LEV_{it} + \beta_8 IS_{it} + \alpha_i + u_{it} \quad (4)$$

$$ESG_{it} = \beta_0 + \beta_1 IBO_{it} + \beta_2 MO_{it} + \beta_3 IBO_{it}^2 + \beta_4 HHI_{it} + \beta_5 IBO \times HHI_{it} + \beta_6 MO \times HHI_{it} + \beta_7 \beta_5 FS_{it} + \beta_8 LEV_{it} + \beta_9 IS_{it} + \alpha_i + u_{it} \quad (5)$$

$$ESG_{it} = \beta_0 + \beta_1 IBO_{it} + \beta_2 MO_{it} + \beta_3 MO_{it}^2 + \beta_4 HHI_{it} + \beta_5 IBO \times HHI_{it} + \beta_6 MO \times HHI_{it} + \beta_7 FS_{it} + \beta_8 LEV_{it} + \beta_9 IS_{it} + \alpha_i + u_{it} \quad (6)$$

where $i = 1 \ldots N$, $t = 1 \ldots T$, β_0 is the constance, α_i is the individual specific effect, and u_{it} is error terms.

While equation (2) represents the panel model containing two independent variables, (i.e., IBO and MO), equation (3) is the panel model adding HHI as the third independent variable (moderator). Equation (4) introduces the interaction terms between the two independent variables and the moderator into the panel model. According to Oh et al. (2017), the association between the IBO or MO with CSR tend to be curvilinear, a quadric term of institutional block ownership (IBO^2) in equation (5) or a quadric term of MO (MO2) in equation (6) is added respectively to detect if these independent variables are curvilinear.

Table 3 Descriptive statistics, normality and multicollinearity tests

	Min.	*Max.*	*Mean*	*Median*	*Standard deviation*	*Skewness*	*Kurtosis*	*VIF*	*Tolerance*
IS+	1	7	3.597	4	1.818	0.038	–0.925	3.103	0.322
FS	6.906	10.247	9.102	9.25	0.804	–0.872	0.176	2.683	0.373
LEV	3.250	4.650	3.911	3.750	0.423	0.035	–1.009	1.205	0.830
IBO	7.02%	48.49%	21.02%	18.16%	9.36%	1.114	0.456	3.033	0.330
MO	0.40%	10.31%	2.73%	2.65%	1.54%	0.561	0.957	2.703	0.370
HHI	665	5,633	2,459	1,320	1,742.285	0.838	–0.787	3.167	0.316
ESG score	13	90	44.019	42	19.850	0.321	–0.941		

Notes: IS – Dummy variables (1–7) are assigned based on seven NASIC codes; FS – natural log of numbers of employee; LEV – leverage ratio; IBO – percentage of ownership of institutional blockholder; MO – percentage of ownership of insider blockholder; HHI – Herfindahl-Hirschman index (integer); ESG score is between 1–100 (integer).

3.4 Results

Table 3 shows the descriptive statistics, (i.e., minimum, maximum, mean, median, and standard deviation) as well as normality and multicollinearity tests (i.e., skewness, kurtosis, VIF, and tolerance). Results show that the average IBO in the energy industry is 21.02%, while MO represents an average of 2.73%. The mean ESG score is 44.02 with a standard deviation of 19.85. The normality test results show that the values of skewness range from –0.872 to 1.114 while values of kurtosis range from –1.009 to 0.957. Both values are well within threshold range of between –2 and +2 for skewness and between –7 and +7 (Hair et al., 2010). As such, the sample data of the current study is regarded as normally distributed.

Table 4 Correlations ($N = 476$)

	IS	*FS*	*LEV*	*IBO*	*MO*	*HHI*	*ESG score*
IS	1						
FS	–0.537**	1					
LEV	–0.464**	0.583**	1				
IBO	–0.007	–0.027	–0.035	1			
MO	–0.045	–0.033	0.032	–0.063	1		
HHI	0.153**	0.291**	0.237**	–0.003	–0.107*	1	
ESG score	–0.016	–0.021	–0.033	0.387**	–0.002	–0.080	1

Notes: **Correlation is significant at the 0.01 level (two-tailed). *Correlation is signification at the 0.05 level (two-tailed).

Table 5 Fixed-effects panel data analysis results – ESG

DV: ESG score	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*
Constant	3.136**	3.512**	2.831**	3.917**	3.740**
Firm size	0.215*	0.202*	0.201*	0.190*	0.196*
Leverage	–0.127	–0.115	–0.133	–0.124	–0.102
Industry	–0.093	–0.075	–0.092	–0.107	–0.091
Institutional blockholder ownership (IBO)	0.258**	0.217*	0.239**	0.211*	0.237**
Managerial ownership (MO)	0.053	0.068	0.083	0.101	0.181*
Herfindahl-Hirschman index (HHI)		–0.229**	–0.191*	–0.181*	–0.183*
IBO × HHI			0.202*	0.198*	0.223*
MO × HHI			0.104	0.129	0.074
IBO^2				0.187*	
MO^2					–0.201*
F	54.68	54.40	54.15	54.18	55.74
Prob. > F	0.0000	0.0000	0.0000	0.0000	0.0000
N	476	476	476	476	476

Notes: **Correlation is significant at the 0.01 level (two-tailed). *Correlation is signification at the 0.05 level (two-tailed).

Table 6 Fixed-effects panel data analysis results – three pillars of ESG

	Model 2			*Model 3*			*Model 4*			*Model 5*			*Model 6*		
DV	*ENV*	*Social*	*GOV*	*ENV*	*Social*	*GOV*	*ENV*	*Social*	*GOV*	*ENV*	*Social*	*GOV*	*ENV*	*Social*	*GOV*
Constant	3.335**	3.276**	3.445**	3.584**	3.496**	3.690**	2.915**	2.873**	3.045**	4.16**	4.13**	4.276**	3.78**	3.644**	3.813**
FS	0.209	0.194	0.237	0.188	0.176	0.221	0.186	0.179	0.229	0.179	0.176	0.204	0.229	0.184	0.217
LEV	–0.115	–0.141	–0.115	–0.101	–0.129	–0.100	–0.119	–0.144	–0.119	–0.110	–0.138	–0.111	–0.089	–0.114	–0.091
IS	–0.162	–0.078	–0.104	–0.116	–0.063	–0.087	–0.157	–0.078	–0.106	–0.190	–0.093	–0.122	–0.104	–0.079	–0.102
IBO	0.246**	0.179*	0.335**	0.200*	0.148	0.258**	0.227**	0.156	0.280**	0.183*	0.149	0.247**	0.282**	0.138	0.316**
MO	0.068	0.037	0.063	0.083	0.056	0.079	0.095	0.065	0.100	0.112	0.088	0.119	0.196*	0.166*	0.192*
HHI				–0.240**	–0.214*	–0.243**	–0.205*	–0.180*	–0.206*	–0.195*	–0.169*	–0.195*	–0.197*	–0.171*	–0.195*
IBO × HHI							0.19*	0.188*	0.213*	0.187*	0.184*	0.212*	0.223**	0.192*	0.234**
MO × HHI							0.092	0.090	0.118	0.115	0.118	0.140	0.089	0.063	0.087
IBO^2										0.209*	0.178*	0.227**			
MO^2													–0.197*	–0.18*	–0.213*
F	49.61	23.99	45.34	49.41	23.94	45.14	49.2	23.8	45.16	48.97	23.78	44.93	49.63	23.87	45.53
Prob. > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N	476	476	476	476	476	476	476	476	476	476	476	476	476	476	476

Notes: **Correlation is significant at the 0.01 level (two-tailed). *Correlation is signification at the 0.05 level (two-tailed).

Table 7 Fixed-effects panel data analysis results – two industries

DV ESG	*Model 2*		*Model 3*		*Model 4*		*Model 5*		*Model 6*	
	Industry 1	*Industry 4*	*Industry 1*	*Industry 4*	*Industry 1*	*Industry 4*	*Industry 1*	*Industry 4*	*Industry 1*	*Industry 4*
Constant	3.359**	3.505**	3.572**	3.662**	2.958**	3.065**	4.224**	4.268**	3.795**	3.756**
FS	0.234**	0.206*	0.199*	0.195*	0.183*	0.241**	0.176*	0.184*	0.239**	0.219*
LEV	–0.111	–0.105	–0.115	–0.107	–0.133	–0.105	–0.119	–0.112	–0.094	–0.104
IBO	0.245**	0.336*8	0.230**	0.282**	0.245**	0.29**	0.204*	0.276**	0.284**	0.318**
MO	0.059	0.057	0.094	0.070	0.088	0.108	0.116	0.132	0.2*	0.181*
HHI			–0.267**	–0.227**	–0.207*	–0.235**	–0.223**	–0.169*	–0.216**	–0.198*
IBO × HHI					0.176*	0.194*	0.223**	0.209*	0.215*	0.232**
MO × HHI					0.098	0.124	0.120	0.147	0.099	0.095
IBO^2							0.223**	0.253**		
MO^2									–0.173*	–0.201*
F	44.91	39.43	44.61	38.95	44.27	38.42	41.34	38.06	41.11	37.76
Prob. > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N	100	164	100	164	100	164	100	164	100	164

Notes: **Correlation is significant at the 0.01 level (two-tailed). *Correlation is signification at the 0.05 level (two-tailed). Industry 1: other electric power generation (221,118); Industry 4: crude petroleum extraction (211,120).

VIF factors were used for testing the multicollinearity. The values of VIF ranges from 1.205 to 3.167 below the default VIF cut-off value of 5 and as such there is no indication of any multicollinearity issue. Table 4 present correlations of the independent variables (i.e., the IBO and the MO), the moderating variable (HHI), the dependent variable (ESG score), and the control variables (IS, FS, and leverage). The low correlation coefficients among two independent variables and one moderating variable shown in the correlation matrix (Table 4) also indicate no multicollinearity issue in the sample data since none of these coefficients has exceeded 0.7 (Farrar and Glauber, 1967; Stewart, 1987).

As mentioned, the fixed-effects panel models were employed in the study. The results are presented in Table 5, including five fixed-effects panel models. Model 2 shows the results for the longitudinal regression with the two independent variables along with three control variables, while in model 3, an additional variable (moderator) is included, and in model 4, two interaction terms are added. To detect curvilinearity, in model 5 and model 6, the quadratic terms for IBO and MO were added, respectively. Results of model 5 show the coefficients of the linear term (IBO) and the quadratic term (IBO^2) are both positive and significant (0.211* and 0.187* respectively). Additionally, it is noticed that the F-value difference between model 5 and model 4 is a mere 0.03. Therefore, it can be concluded that model 5 is not significantly fitter than model 4. This indicates that adding a quadratic term (IBO^2) in model 5 does not result in a better fitted model than the linear term (IBO) without the IBO^2 term in model 4. However, results of model 6 show the coefficient of the linear term (MO) in the quadratic regression model is positive and significant ($\beta_{MO} = 0.181$, $p < 0.05$); while the coefficient of the quadratic term (MO^2) is negative and significant ($\beta_{MO}^2 = -0.201$, $p < 0.05$). Also, it is noticed that a drastic improvement of fitness of model 6 as compared with model 4 pertaining to F-value (difference between model 6 and model 4 is 1.59).

The results show that larger firms in the energy industry tend to have higher ESG scores ($\beta_{FS} = 0.196$, $p < 0.05$) while there is no significant association between IS or leverage, and the ESG scores. Table 6 (model 6) also provides hypotheses testing results. The panel analysis results show that the coefficient of IBO is positive and significant ($\beta_{IBO} = 0.237$, $p < 0.01$) providing the support for Hypothesis 1 that 'the extent of the IBO is positively associated with the firm's CSR performance in the energy industry' (model 5 shown no curvilinear relationship as the coefficient of the IBO is positive and significant $\beta_{IBO} = 0.211$*, $p < 0.05$; and the coefficient of the quadratic term of IBO is also positive and significant $\beta_{IBO}^2 = 0.187$, $p < 0.05$); For the H2, while the coefficient of the MO is positive and significant ($\beta_{MO} = 0.181$, $p < 0.05$) and the coefficient of the quadratic term of MO is negative and significant ($\beta_{MO} = -0.201$, $p < 0.05$), indicating that, Hypothesis 2 is supported suggesting that in the energy industry, the extent of the MO has a curvilinear relationship rather than a linear relationship with the firm's CSR performance. The results also indicate the coefficient of HHI is negative and significant ($\beta_{HHI} = -0.183$, $p < 0.05$), indicating that the lower the product market competition (i.e., the higher the HHI value) leads to the weaker CSR performance providing the support for Hypothesis 3 that 'the level of product market competition has a positive relationship with a firm's CSR performance in the US energy sector'. Interestingly, while one of the interaction terms (IBO × HHI) is positive and significant with ($\beta_{IO \times HHI} = 0.223$, $p < 0.05$), the other interaction term (MO × HHI) is positive ($\beta_{MO \times HHI} = 0.074$) but not significant ($p > 0.05$). These results show that first, Hypothesis 4 is supported, i.e., the relationship between the IBO and the firm's CSR performance is moderated by product market

competition such that the effect of the IBO on firm's CSR performance is increased as the HHI value increases/product market competition decreases (i.e., the effect of the IBO on firm's CSR performance is weakened when the HHI value decreases/product market competition increases). Second, the results also show that Hypothesis 5, 'the relationship between the MO and the firm's CSR performance is moderated by product market competition such that the effect of the MO on firm's CSR performance is strengthened as product market competition increases' is not supported.

3.5 Robust tests

Various robust tests (the panel data analysis for three pillars of ESG in Table 6; two industries in Table 7 and two tails in Table 8) using dimensions of the dependent variable (i.e., ESG) and two subsamples were conducted to ensure the robustness of this study, while providing more insights.

The fixed-effect panel analysis was conducted for the three respective dimensions of ESG (i.e., environment, social, and governance) and results are included in Table 6. Results are consistent with environmental and governance dimensions although there are some discrepancies noted in social dimension pertaining to IBO.

According to Baldwin (1989), the panel data should contain at least between 100–200 observations (cases) to be analysed effectively. As a result, two subsectors (i.e., other electric power generation (221,118) with sample size of 100 and crude petroleum extraction (211,120) with sample size of 164 were analysed (see Table 7). Results of both subsamples show consistency between these two subsamples and the full sample.

Table 8 Fixed-effects panel data analysis results – two tails

DV: ESG score	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*
Constant	3.396**	3.831**	3.087**	4.271**	4.071**
Firm size	0.299**	0.280**	0.312**	0.277**	0.305**
Leverage	–0.144	–0.128	–0.145	–0.135	–0.121
Industry	–0.108	–0.087	–0.104	–0.117	–0.106
Institutional blockholder ownership (IBO)	0.279**	0.238**	0.268**	0.227**	0.281**
Managerial ownership (MO)	0.084	0.104	0.108	0.135	0.202*
Herfindahl-Hirschman Index (HHI)		–0.286**	–0.229**	–0.236**	–0.236**
IBO × HHI			0.225**	0.218**	0.251**
MO × HHI			0.122	0.146	0.086
IBO^2				0.252**	
MO^2					–0.255**
F	232.58	225.86	232.37	246.71	228.98
Prob. > F	0.0000	0.0000	0.0000	0.0000	0.0000
N	104	104	104	104	104

Notes: **Correlation is significant at the 0.01 level (two-tailed). *Correlation is signification at the 0.05 level (two-tailed). Two-tail subsample based on highest and lowest average four-year ESG score of firms, 13 firms respectively, total 26 firms with four years, resulting in 104 samples.

Additionally, the converged fixed panel model, that is, the two-tail subsample based on highest and lowest average four-year ESG score of firms (i.e., 13 firms respectively, total 26 firms with four years, resulting in 104 samples) was analysed (shown in Table 8) and results show consistency across the board and increased significance levels of the results.

4 Discussion

Numerous studies have investigated the effect of CG on corporate social responsibilities, much of the research anchored on firms' CSR reporting. Recently some researchers have made further inquiries concerning the relationship between the CG mechanisms and firms' CSR performance with mixed results. In addition, the literature on CG mechanisms and CSR in the economic and environmentally sensitive energy industry is too sparse to provide any meaningful insights. Facing the current ongoing energy crisis, and due to industry's substantial and lasting impact on economics, environment and society, a better understanding of the relationship between the key component of CG of energy firms such as the ownership structure, and firms' CSR performance has become more significant. By examining various segments of this industry and introducing the contingent factor, product market competition, this study makes several theoretical contributions to the CG literature in CSR research and advances the existing body of knowledge concerning the effect of competition on CSR issue.

First, the results show the institutional blockholders ownership has a positive association with a firm's CSR performance, indicating that when IBO increases, an increased positive effect leads to enhanced CSR performance (particularly effective on the environment and governance pillars of ESG). This further provides empirical evidence to what agency theory argues, i.e., the value of a firm cannot be maximised if appropriate incentives or adequate monitoring are not effective enough to restrain firm managers from using their own discretions to maximise their own benefit. Due to the current unprecedented client demand, fund flow benefits, and risk reduction arising from compliance with sustainable goals, institutional investors have higher expectations relating to engagement with the board and management nowadays. They seek a greater voice in a firm's strategic decision-making, capital allocation and overall CSR. The institutional investors, especially those who are holding a large quantity of shares (i.e., the institutional blockholders), are interested in inducing better overall CSR ratings and more CSR-related investments (although possibly prioritising issues related to environment as well as board and executive conducts rather than social issues in the energy sector (Chen et al., 2020, Harvard Law School Forum on Corporate Governance, 2016). Prior research suggests that the institutional blockholders tend to hold a long-term perspective of a firm's business; Hence, the increased positive impact of institutional blockholders on a firm's CSR performance can force management to be more engaged in CSR and consequently improve overall long-term firm value. The finding is consistent with the recent literature (Chen et al., 2020; Erhemjamts and Huang, 2019; Kim et al., 2019) regarding the influence of long-term institutional investors on CSR across the industries.

Second, this study discovered the effect of the MO on energy firms' CSR performance is curvilinear relationship (across all three dimensions of ESG), suggesting there exists a positive impact through the incentive alignment as well as a negative

impact due to the management entrenchment behaviour depending on the different extent of MO. Although the stock options awarded to the top management have the origin in agency theory, it has been shown to only support part of the empirical result of this study when the MO is low. When the percentage of MO changes from low to high, this effect on CSR performance wanes and turns to negative (the MO in this dataset ranges from 0.005% to 10.3%). MO, even though widely used, has actually been widely questioned for decades (Greiner and Julian, 2021; Shleifer and Vishny, 1997), and the agency theory's limitation is once again reflected in this study concerning firm's CSR performance. Specifically, the result indicates that the positive effect on CSR performance exists when the extent of the MO is low, and the management bears little costs for substantially investing in CSR-related projects. The lower MO leads to weaker management decision-making power, allowing more effective monitoring by the major outside ownership. Hence, management is more inclined to stay aligned with the major institutional blockholders' long-term interest. This initial part of the result is consistent with the empirical findings by Eisenhardt (1989), Johnson and Greening (1999) and Kock et al. (2012). However, when the extent of MO continues to rise to become one of the important or even major shareholders, the effect on a firm's CSR performance turns negative. At this point, the organisational power of stockholdings managers has substantially increased, and this can cause management entrenchment. Managers may look for a more cash-based reward through short-term profit-seeking strategies to boost financial performance in order to mitigate future earning uncertainty and avoid making strategic decision on substantial investment on CSR due to their increased equity ownership (Karim et al., 2018).

In fact, the majority of the empirical findings in the literature supports this second part of the result, i.e., there is a negative association between MO and CSR (Barnea and Rubin, 2010; Arora and Dharwadkar, 2011; Oh et al., 2011; Dam and Scholtens, 2012; Ongsakul et al., 2021). Thus, the overall curvilinear relationship representing how MO affects CSR performance in the US energy industry differs from the existing literature and seems to contradict the suggested U-shaped relationship by Oh et al. (2017). The possible explanations for this new finding are two folds; First of all, the US energy industry is one of the environmentally most sensitive industries having substantial and lasting impact on economics, environment, and society; this industry faces enormous economic, social challenges, and pressure comparing to some other industries. The data in this study covers the most recent four years (2015-2018) ESG scores reflecting the current CSR status specific to this industry compared to those referenced from the literature. For example, among the most recent published studies, the one by Oh et al. (2017) uses the ESG scores in a single year, 2005, for companies on the 2004 US Fortune 1000 list; while the panel data from Ongsakul et al. (2021) contains the sample period from 1995 to 2012 on all US corporations reported in the same database. There seem to be progressive economic, social and organisational paradigm shifts in the past decade in the energy industry, particularly regarding the climate change and renewable energy challenges. This shift may have a distinctive and prominent impact on the energy firms more than other industries, and it would be more accurately reflected from a sample covering multiple recent years focusing specifically on this industry. In addition, the average MO level in the US firms in this study is substantially lower at 2.73% than the average level in the Fortune 1000 firms' data used by Oh et al. (2017) (at around 9%), or not reported by Ongsakul et al. (2021). Thus, the energy sector's effect may not be clearly reflected in the previous cross-industry research since some exogenous factors

may not be observed and controlled in cross-sectional studies (Himmelberg et al., 1999). Also, there is no demographic information in either of these prior studies regarding the percentage of energy firms in the sample data. It is reasonable to assume that a meaningful alignment effect could have again emerged if MO had substantially increased to and surpassed a certain high percentage in the US energy firms, which gives managers incentive to maximise company value since they already bear a large proportion of the costs (Mueller and Spitz-Oener, 2006).

Third, this study demonstrates the role of product market competition in the mix, exhibiting both the contingent and direct effects. These are also important findings. The results indicate that product market competition moderates the relationship between IBO and CSR performance. Specifically, the impact of IBO on CSR performance is weakened as a firm faces a more competitive market, i.e., competition weakens the institutional blockholders' monitoring role. The result supports the empirical findings by other researchers concerning the role of CG (Ammann and Oesch, 2013; Singla and Singh, 2019) and demonstrates that the enhanced board monitoring effect on business performance could be observed when firms face less competition; When competition is fierce, the hostile takeover threat can increase, which may lessen the outsider blockholders' influence on investing in long-term CSR-related initiatives.

Moreover, the results also show that product market competition does not significantly affect the relationship between MO and firm CSR performance. It indicates that regardless of the level of product market competition, top management would act accordingly based on their incentive schemes and their decision-making power. It is not surprising, since prior literature has shown changes in executive pay are driven by changes in the structure of product market competition (Cuñat and Guadalupe, 2009; Fernandes et al., 2018; Liu et al., 2014); thus, the market competition's effect has already been accounted for in the MO changes.

A direct effect of product market competition on the firm's CSR performance is also observed in this study. It is noted that a more competitive marketplace (i.e., a lower HHI value) in the US energy sector results in the overall higher CSR performance of firms. This finding further supports the notion that there is a positive relationship between competition and CSR in developed economies (Flamm, 2015; Declerck and M'Zali, 2012; Fernandez-Kranz and Santalo, 2010; Leong and Yang, 2020). More competition fosters increased corporate CSR practices, demonstrating that CSR would become an additional strategic differentiator. Thus, competition is a motivator for firms to do better on CSR.

5 Conclusions, implications, and limitations

This study investigates the effects of CG mechanisms on CSR performance in the US energy industry. Mainly, some new and important findings have been derived from this study. It demonstrates the direct impacts on a firm's CSR performance from both IBO and MO. The link between the monitoring mechanism represented by the IBO and a firm's CSR rating supports the current literature suggesting that in a long-term perspective, it is in the interest of the firms' major shareholders to act proactively and innovatively instead of merely responding to the existing pressure or social expectations. However, the association of the alignment mechanism represented by MO with a firm's

CSR rating does not fully support the current literature. The curvilinear relationship suggests that it would be preferable to control MO at low levels to avoid the management entrenchment tendency in energy firms. The findings suggest that MO may be motivated by keeping the business running at whatever cost, resulting in refraining from making decisions after meeting the necessary government requirement in further investing in CSR initiatives. For instance, investing in more resource-efficient technologies for production requires substantial capital investment, and the investment will not translate into immediate benefits.

The moderating role of product market competition is explored in this study. Specifically, the competition affects the relationship between IBO and a firm's CSR performance while it does not influence the effect of the ownership of management on CSR performance. In addition, this study also identified a direct positive association between product market competition and CSR rating, which shows that among these different ISs, a more intense competition leads to better CSR performance with a different segment became the most competitive in this industry in different years during the span of four years from 2015 to 2018. For instance, the most competitive was electric power distribution market in 2015, it changed to natural gas extraction market in 2016, to underground mining in 2017; the most competitive market in 2018 was the natural gas distribution market. This result supports the notion that in today's economic and social environment in the US when firms face more intense competition in the marketplace, firms will be more interested in improving their CSR performance through increased investment in CSR-related initiatives.

The practical implication of this study is to demonstrate that institutional blockholder owners are a significant driver of CSR. At the same time, a greater expectation on CSR from government bodies and society overall nowadays forces these public energy firms to care about their CSR performance instead of only focusing on short-term corporate financial performance, but a higher level of MO could be detrimental to the extent and the speed of a firm's CSR progress in US energy industry. In addition, by examining the effect of CG mechanism on CSR in the context of product market competition, this study reveals that the level of competition affects the degree of the institutional blockholders' influence on a firm's CSR investment but does not alter management's level of aspiration towards CSR. For firms with a prominent market position, the institutional blockholder owners can induce the firms to invest in more capital-intensive CSR initiatives, such as making investments in renewable energy, innovative production technology, etc. Moreover, the results further support the notion that a more competitive market is a stimulus to motivate energy companies to engage in CSR, whether responsively or proactively, to compete and survive.

This study improved our understanding of the association between the CG mechanisms and firms' CSR performance in the energy industry and the effect of market competition on these relationships. The empirical findings provide insights for energy firms that wish to enhance their CSR ratings by adequately designing the external and the internal governance mechanisms in terms of ownership structure when facing different levels of product market competition. Furthermore, the findings indicate that policymakers may enact and revise ownership regulations. Specifically, it would be beneficial to refrain from awarding large quantity of stock shares to top management in order to mitigate entrenchment, thus strengthen the monitoring function to advance the industry in CSR.

This study is not without limitations. First of all, the study sample is publicly traded energy companies in the USA, the results may not be generalised to all the countries since countries are different in governmental, legal, cultural and education aspects. The results may also be different for non-listed firms in the energy industry. Second, it would have been helpful to analyse data covering more than four years, but due to the many missing data points in early years as well as concerning the pandemic effect, the current study only used the most recent four years of data prior to the outbreak of COVID-19. It would be interesting to conduct future research comparing pre-pandemic, during-pandemic, after-pandemic periods. Third, due to the time and resource limitation, this study did not investigate the different categories of institutional blockholders ownerships such as pension funds, hedge funds, etc. rather to focus on the institutional blockholders ownership as a whole and MO, future studies can take a deep dive into the different institutional shareholders as well as to investigate the effect of other CG mechanisms such as the various board of directors' characteristics and other types of ownerships that may affect CSR performance. Future studies can examine the effect of these factors from the CG structure. Finally, the impact of market competition on the different dimensions of CSR is worthwhile to investigate since firms' interests in addressing the multidimensional challenges of CSR performance can be different.

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Notes

1 Refinitiv is Thomson Reuter's former financial and risk business, now a part of LSEG.