

RESEARCH ARTICLE

ESG controversies and corporate governance: Evidence from board size

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Funding information

National Research Council of Thailand (NRCT), Grant/Award Number: N42A640326

Abstract

We show the influence the size of a corporate board has on firms' ESG controversies. Our analysis suggests that businesses with larger boards are more effective in mitigating ESG controversies. Specifically, a rise in board size by one standard deviation results in a decline in ESG controversies by 4.30%. Our findings corroborate the anticipation that businesses need the board's advice to prevent ESG controversies. Thus, larger boards, with more human capital and more interactions with stakeholders, promote sustainability more effectively. Moreover, we find that the effect of board size is less pronounced during a stressful time but is more evident in companies with more agency problems. Further analysis validates the findings, that is, propensity score matching, entropy balancing, an instrumental-variable analysis, and GMM dynamic panel data analysis.

KEYWORDS

board of directors, controversial activities board size, corporate governance, corporate social responsibility, ESG, ESG controversies

JEL CLASSIFICATION

M14, G32, G34

1 | INTRODUCTION

Sustainability in recent years has taken an increasingly prominent role in the formulation of business strategies. The ever-growing literature shows endless positive benefits businesses may enjoy from addressing environmental, social, and governance (ESG) aspects. The legitimacy theory, stakeholder theory, and agency theory advocate that businesses address ESG (Suchman, 1995; Donaldson & Preston, 1995;

Godfrey et al., 2009; Kacperczyk, 2009; Aouadi & Marsat, 2018; Jensen & Meckling, 1976). Empirical studies find that ESG performance is positively associated with improved financial performance and firm valuation, building customer loyalty, promoting employee engagements, improving risk management, and developing competitive advantage (Broadstock et al., 2019; Galletta & Mazzu, 2023; Kumar et al., 2016; Nakao et al., 2007; Waddock & Graves, 1997).

In the literature, however, relatively very few studies emphasize the situation surrounding ESG controversies (Galletta & Mazzu, 2023; Issa, 2023; Treepongkaruna et al., 2022). Firms' reputation is a critical driver of shareholder value (Frooman, 1997; Klassen & McLaughlin, 1996). ESG controversies shake a firm's sustainability as it impairs firms' present and future economic viability. This is reflected

Abbreviations: CSR, Corporate Social Responsibility; EBIT, Earnings before interests and taxes; ESG, Environmental, Social, and Governance; FCF, Free Cash Flows; GMM, Generalised Method of Moments; ISS, Institutional Shareholder Services; IV, Instrumental Variable; Ln, Natural Logarithm; R&D, Research and Development; U.S., United States.

This project is funded by the National Research Council of Thailand (NRCT): N42A640326.

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in firms' financial performance (DasGupta, 2022; De Franco, 2020; Aouadi & Marsat, 2018) and analysts' forecast accuracy (Schiemann & Tietmeyer, 2022). Moreover, the impaired economic situation following ESG controversies inhibits firms from engaging in other sustainability measures. For instance, financial costs associated with ESG controversies divert financial resources away from investing in research and development activities that could eventually promote environmental innovations or engaging in social activities. Thus, ESG controversies can disrupt the firms' on their path for a better sustainable firm. Hence, it is imperative that firms are proactive and prevent potential ESG controversies.

With ESG controversies being a relatively understudied area, we focus on one of the most important organs in a corporation – the corporate board. In addition to monitoring the management (Jensen & Meckling, 1976), a corporate board takes on advisory role (Daily & Dalton, 1994). To drive a firm on the path for sustainability and to prevent it from being embroiled in ESG controversies, the firm needs a resourceful board that can advise the firm on complex and unprecedented issues. With ESG controversies, the board's functions as an advisor and a monitor are especially called for. A board feature that is directly associated with the advisory function of the board is the size. Dalton et al. (1999) argue that larger boards function better in their advisory role (see also Huang & Wang, 2015). Coles et al. (2008) show that the appropriate size of the board depends on the level of complexity of the firm: larger boards are more appropriate for firms that require greater advisory inputs from the board. This suggests that larger boards are more likely to be conducive to enhancing shareholder value and avoiding ESG controversies. Yet, larger boards are susceptible to social loafing and/or demand higher coordination efforts (Jensen, 1993). Thus, larger boards are less effective in reaching a cohesive decision.

We find in a large sample of U.S. firms that ESG controversies are less prevalent in firms with relatively large boards. The result suggests that larger boards function better in their advisory role as the resource dependence theory has predicted. The theory argues that larger boards perform more effectively (Johnson et al., 1996; Zahra & Pearce, 1989). Our findings also support the stakeholder theory that posits that bigger boards encourage stakeholder engagement in corporate decision-making processes, while motivating corporations to promote sustainability and avoid contentious activities (Hillman et al., 2001; Zubeltzu-Jaka et al., 2019; de Villiers et al., 2011). In terms of economic significance, we find that, as board size increases by one standard deviation, there is a drop in ESG controversies by 4.30%. So, the effect of board size on controversial activities is not only statistically significant, but it is also economically palpable.

Crucially, we control for firm fixed effects in the analyses. The fixed effects account for any time-invariant characteristics, thereby mitigating the omitted-variable bias considerably. In any case, we also perform a variety of robustness checks, namely, propensity score matching, entropy balancing, an instrumental-variable analysis, and GMM dynamic panel data analysis. All the robustness checks corroborate the findings. Because endogeneity is unlikely, our conclusion probably reflects a causal influence, rather than merely an association.

Moreover, we explore the effect of board size during the financial crisis of 2008. At the time of crisis, firms typically experience financial constraints and a reduction in available resources. Under these circumstances, firms are under stress and face challenges on multiple fronts, such as along the supply chain all the way through to the customers. This is critical as prior research documents that the role of board governance is different during a stressful time than it is during normal times (Jenwittayaroje & Jiraporn, 2018; Withisuphakorn & Jiraporn, 2018). Further analysis reveals that the effect of board size on ESG controversies is less evident during the financial crisis. We argue that, during the crisis, companies are more cautious, realizing that getting embroiled in a controversy in the middle of the crisis would be especially problematic. That is why the role of board governance in mitigating ESG controversies is less important during the crisis. Also, consistent with this argument, we find that companies are involved in significantly fewer ESG controversies during the crisis period.

In addition, we explore the cross-sectional variation in the effect of board size, according to the extent of agency problems. Using the free cash flow ratio as our proxy for the extent of agency problems, we find that the effect of board size is significantly more pronounced when agency conflicts are more serious, corroborating the prediction of agency theory (Blanchard et al., 1994; Shin & Stulz, 1998; Opler et al., 2001).

Our study contributes to the next to non-existent literature on ESG controversies. Businesses are well informed of the benefits of ESG engagements, but not on when things go wrong. As far as we are aware, our study is the first to look into how ESG controversies are affected by board governance. Second, our findings contribute to the body of knowledge in corporate governance. We contribute to the debate over the costs and advantages of big vs. small boards by focusing on a corporate outcome that has received less attention, namely, ESG controversies (Coles et al., 2008; Dalton et al., 1999; Huang & Wang, 2015; JENSEN, M. C., 1993; Lipton & Lorsch, 1992). Our results are particularly noteworthy because prior research, which focuses on financial performance, finds that small boards are more advantageous (Eisenberg et al., 1998; Yermack, 1996). However, in terms of social performance, such as ESG controversies, larger boards appear to be more effective. So, the conclusion based on financial performance cannot be readily extended to social performance.

Furthermore, we contribute to an area of the literature that examines the effects of financial crises and how governance mechanisms function differently during stressful times than during normal times (Jenwittayaroje & Jiraporn, 2018; Withisuphakorn & Jiraporn, 2018; Ivashina & Scharfstein, 2010; Erkens et al., 2012; Feldkircher, 2014; Munir, 2011; Goodhart, 2008). We extend the literature in this area by showing that, during a crisis, the effect of board size on ESG controversies is more muted. Additionally, companies engage in significantly fewer ESG controversies during a stressful time.

Our findings highlight the critical role of a resourceful governing body for firms' sustainability. They are of relevance for the academic literature, as well as the practitioners. The results highlight that large boards offer comprehensive advice that helps minimize potential

negative consequences. Thus, firms with large boards may experience a smoother progress in achieving sustainability goals by preventing potential setbacks. The findings here offer recommendations to both businesses and regulators.

2 | RELATED RESEARCH AND HYPOTHESIS DEVELOPMENT

2.1 | ESG controversies

In theory, ESG controversies can be viewed through the lenses of the legitimacy theory, stakeholder theory, and agency theory. First, according to the legitimacy theory, ESG scandals matter a great deal. Corporate legitimacy is crucial for a business's long-term existence. According to Suchman (1995), legitimacy refers to a generally held belief or assumption that an entity's actions are desirable, legitimate, or appropriate within a socially constructed system of norms, values, beliefs, and definitions (Aouadi & Marsat, 2018). When businesses become embroiled in contentious activities, their legitimacy is compromised, and their organizational legitimacy is brought into doubt (Aouadi & Marsat, 2018; Palazzo & Scherer, 2006). Allegations of dubious activities have a damaging effect on the brand and reputation of a business (Aouadi & Marsat, 2018; Donaldson & Preston, 1995).¹

Furthermore, socially responsible practices, according to the stakeholder theory, boost a company's value by promoting beneficial relationships with stakeholders (Aouadi & Marsat, 2018; Donaldson & Preston, 1995; Godfrey et al., 2009; Kacperczyk, 2009). By contrast, contentious activities aggravate stakeholder skepticism and perceptions of corporate dishonesty (Aouadi & Marsat, 2018; Du et al., 2010; Maignan & Ralston, 2002), ultimately leading to lower credibility (Godfrey et al., 2009; Aouadi & Marsat, 2018).²

Finally, agency theory argues that managers, acting as representatives for shareholders, may not always behave in their best interests due to agency conflicts (Jensen & Meckling, 1976). When managers' incentives do not line up with those of shareholders, agency problems emerge. It is possible that self-interested managers have the company participate in contentious activities in order to boost their own gains at the expense of shareholders. However, corporate governance exists to reduce agency conflicts and better match the interests of shareholders and management. Previous research has employed agency theory to investigate the consequences of corporate governance on ESG/CSR performance (Chintrakarn et al., 2016; Chintrakarn et al., 2020; Chintrakarn et al., 2021; Jain & Jamali, 2016; Jo & Harjoto, 2012).³

Although the literature is replete with studies focusing on socially responsible behaviors, research on ESG controversies is limited. ESG

scandals are predicted to have a negative impact on business value (Orlitzky, 2013; Fombrun & Shanley, 1990; Aouadi & Marsat, 2018). According to Frooman (1997), when a firm participates in socially irresponsible or questionable social behavior, the stock market reacts negatively. Similarly, Klassen and McLaughlin (1996) claim that unfavorable ESG news articles have a detrimental impact on market returns (Aouadi & Marsat, 2018).⁴

2.2 | Board size

From the theoretical perspective, raising the number of directors has both costs and benefits (Raheja, 2005; Harris and Raviv, 2008). On the one hand, the resource dependence theory views directors as valuable resources for the firm (Johnson et al., 1996; Zahra & Pearce, 1989). As the size of the board increases, the ability of the board to monitor and advise increases proportionately, since there are more members to rely on. Additionally, a bigger group shares information and allows a broader diversity of experiences and opinions. By contrast, large boards may perform worse as a result of conflicts in collective decision-making (JENSEN, M. C., 1993). Additional directors' benefits are eventually outweighed by free riding, inefficient decision-making, and coordination and procedural difficulties (Huang & Wang, 2015).

When a board expands in size, it becomes inefficient due to poor decision-making and the free rider problem. As a result, corporations should embrace small boards of directors (Huang & Wang, 2015; JENSEN, M. C., 1993). A larger board, on the other hand, may be able to offer more guidance (Coles et al., 2008; Dalton et al., 1999; Huang & Wang, 2015). While there is no perfect board size for every corporation, board size appears to affect corporate value, firm policy choices, and risk-taking (Coles et al., 2008; Eisenberg et al., 1998; Huang & Wang, 2015; Uchida, 2011).

2.3 | Hypothesis development

Based on the literature, two hypotheses can be advanced with respect to the impact of board size on ESG controversies. First, it can be argued that larger board size makes it less likely for firms to participate in controversial activities. According to the stakeholder theory, a larger and more diverse board of directors creates more opportunities for developing connections with other stakeholders by incorporating social welfare objectives, environmental issues and commitments, moral standards, and ethical approaches in addition to purely financial objectives (Hillman et al., 2001; Zubeltzu-Jaka et al., 2019). Larger boards encourage stakeholder engagement in companies' decision-making processes, motivating firms to contribute to sustainability. According to de Villiers et al. (2011), corporations with larger boards of directors are more likely to expand the breadth of skills necessary to improve corporate social performance (Zubeltzu-Jaka et al., 2019).

¹More research related to the legitimacy theory includes Guthrie and Parker (1989), Wilmshurst and Frost (2000), and Deegan (2019).

²Additional research on the stakeholder theory can be found in Friedman and Miles (2002), Freeman (1999), Jones and Wicks (1999), and Sternberg (1997).

³Agency theory is also explored in the following studies: Bosse and Phillips (2016), and Pepper and Gore (2012).

⁴Additional research on ESG controversies can be found in Shakil (2021), and DasGupta (2022).

This view therefore suggests that larger boards bring about fewer ESG controversies.

On the contrary, larger boards are plagued by difficulties in collective judgment (JENSEN, M. C., 1993), the free-rider problem, less efficient decision-making, and communication and operational challenges (Huang & Wang, 2015). These problems render large boards less efficient and provide weak managerial oversight. Smaller boards suffer less from these challenges and are more effective in monitoring management. According to agency theory, self-interested managers may engage in controversial activities that boost their private benefits at the expense of shareholders. To the extent that larger boards are less effective, opportunistic managers are subject to poorer monitoring and may get the firm involved in more contentious activities. This hypothesis thus predicts that larger boards result in more ESG controversies.

2.4 | The effect of board size on ESG controversies during a stressful time

The role of the board of directors might be different during a stressful time, like when the firm is navigating a financial crisis. For instance, Jenwittayaroje and Jiraporn (2018) report that independent directors improved firm performance substantially during the Great Recession of 2008. A rise in board independence by one standard deviation raised firm performance by 4.29% during the crisis. This is not the case outside the crisis period, however. Similarly, Papangkorn, Chatchuthamard, Jiraporn, and Chueykamhang (2019) show that female directors were particularly helpful during the Great Recession of 2008, improving the return on assets (ROA) by 8.41%. Finally, Withsuphakorn and Jiraporn (2018) document that busy directors or those who hold multiple board seats played a beneficial role on firm value during the crisis of 2008, although the effect of busy directors is negative during normal times.

All of the above findings in the literature imply that the effect of board size may be distinct during a stressful time. In theory, the resource dependence theory suggests that firms tend to lose resources during difficult times. Therefore, larger boards with more human capital can be especially helpful during tough economic times (Cameron et al., 1987; Daily & Dalton, 1994). This view suggests that the effect of board size is more pronounced during a crisis. On the contrary, it can be argued that, during a crisis, firms tend to be more careful not to be involved in ESG controversies, making the effect of board size more muted. This hypothesis implies that the effect of board size is less evident during a stressful time.

3 | SAMPLE FORMATION, DATA DESCRIPTION, AND METHODOLOGY

3.1 | Sample selection and data description

Refinitiv provides the data on ESG controversies. The information on board attributes comes from the Institutional Shareholder Services

(ISS). COMPUSTAT provides firm-specific characteristics. Outliers are deleted at the 1% and 99% levels as necessary. The resulting sample is an unbalanced panel data set with 8,321 firm-year observations from 2002 to 2019 (U.S. firms).

To capture the extent of ESG controversies for each firm, we employ the ESG controversies score provided by Refinitiv. The ESG controversies score is based on 23 ESG controversial issues, with current controversies represented in the most recent complete period. Within each industry group, a percentile rank algorithm is used. As a result, the score shows the extent to which a given business engages in ESG controversies in comparison to its industry counterparts. Refinitiv provides more specific information regarding the construction of the ESG controversies score.⁵ Our primary independent variable of interest is board size, which is the number of directors on the board. Board independence is also a crucial attribute of the board and is included in our analysis as a control variable. Board independence is represented by the percentage of independent outside directors on the board.

3.2 | Empirical modeling

Basically, we estimate the following regression analysis:

$$\text{ESG Controversies Score}_{it} = a + b (\text{Board Size})_{it} + c (\text{Controls})_{it}$$

where i indexes firms and t indexes years.

Based on prior research (Haque & Ntim, 2020; Jiraporn, Jo & Harjoto, 2012; Chintrakarn, Jiraporn, Kim, Kim, 2016), we add many variables to account for other factors that may influence ESG controversies, namely firm size (natural logarithm of total assets), profitability (EBIT/total assets), leverage (total debt/total assets), investments (capital expenditures/total assets), intangible assets (R&D/total assets and advertising expense/total assets), cash holdings (cash holdings/total assets), dividend payouts (dividends/total assets), and asset tangibility (fixed assets/total assets). We also include board independence, which is the proportion of independent directors on the board.

We include year-fixed effects to control for possible variations over time. Crucially, we include firm fixed effects, which are important because they account for any unobservable characteristics that remain constant across time. Finally, companies that are more socially responsible may be less prone to engage in contentious activities. We thus include Refinitiv's ESG score to account for the level of ESG engagement. The variable definitions are summarized in the Appendix. Table 1 displays the summary statistics for the ESG controversies score, board characteristics, and firm-specific attributes.

⁵More information about the construction of the ESG controversies score is available here: https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf. Additional research that employs the ESG data from Refinitiv includes.

TABLE 1 Summary statistics.

	Mean	S.D.	0.250	Median	0.750
ESG-related metrics					
ESG controversies score	83.612	28.841	78.570	100.000	100.000
ESG score	44.565	20.335	28.050	42.870	60.700
Board attributes					
Board size	10.137	2.041	9.000	10.000	11.000
% independent directors	79.779	11.717	75.000	81.818	88.889
Firm-specific characteristics					
Total assets	20000.000	47000.000	3195.600	7040.192	19000.000
Total debt/total assets	0.267	0.167	0.149	0.258	0.367
EBIT/total assets	0.109	0.075	0.062	0.100	0.149
Capital expenditures/total assets	0.049	0.044	0.020	0.036	0.063
Advertising expense/total assets	0.013	0.027	0.000	0.000	0.012
R&D expense/total assets	0.024	0.042	0.000	0.000	0.028
Cash holdings/total assets	0.126	0.130	0.030	0.082	0.179
Dividends/total assets	0.019	0.022	0.000	0.014	0.027
Fixed assets/total assets	0.558	0.395	0.227	0.455	0.852

The ESG controversies score is based on 23 ESG controversial issues, with current controversies represented in the most recent complete period. Within each industry group, a percentile rank algorithm is used. As a result, the score shows the extent to which a given business engages in ESG controversies in comparison to its industry counterparts. Refinitiv provides more specific information regarding the construction of the ESG controversies score. Board size is the number of directors on the board.

4 | RESULTS

4.1 | Baseline regression analysis

Table 2 displays the firm-fixed-effects regression result where the dependent variable is the ESG controversies score (the higher the score, the fewer ESG controversies). Board size carries a positive and significant coefficient, suggesting that, as board size increases, there are significantly fewer ESG controversies. Our findings support the prediction of the resource dependence theory, which argues that larger boards are more effective (Daily & Dalton, 1994). In addition, our results are consistent with the prediction of the stakeholder theory, which posits that larger boards foster stakeholder participation in businesses' decision-making processes, incentivizing businesses to promote sustainability and avoid controversial activities (Hillman et al., 2001; Zubeltzu-Jaka et al., 2019; de Villiers et al., 2011).

To estimate the economic magnitude of the effect of board size, we make the following calculations. The coefficient of board size in Table 2 is 6.670. The standard deviation of Ln (board size) is 0.186. Therefore, as board size rises by one standard deviation, the ESG controversies score increases (fewer controversies) by 6.670 times 0.186, which is 1.241. Because the standard deviation of the ESG controversies score is 28.841, a rise by 1.241 is equivalent to a decline in ESG controversies by 4.30%. Hence, not only is the effect of board size on ESG controversies statistically significant, but it is also economically meaningful.

4.2 | Propensity score matching

It is important to note that our regression analysis includes firm fixed effects, which control for any time-invariant characteristics. So, it is unlikely that our findings are driven by the omitted-variable bias. In any event, to mitigate endogeneity further, we execute propensity score matching (Lennox et al., 2011; Rosenbaum & Rubin, 1983). Based on board size, the sample is split into quartiles. The treatment group consists of observations from the top quartile of the distribution (largest board size). Then, for each observation in the treatment group, we choose the most similar observation from the rest of the sample using 11 company characteristics (i.e., the 11 control variables included in the regression analysis). As a result, with the exception of board size, our treatment and control groups are essentially comparable in every observable manner.

We perform diagnostic testing to ensure that our matching is accurate. Table 3 Panel A summarizes the findings. Model 1 is a logistic regression with a binary dependent variable equal to one if the company is in the treatment group (larger board size), and zero if it is not. Model 1 encompasses the whole sample (pre-match). The finding implies that the treatment firms are significantly different in a number of respects from the rest of the sample. Specifically, the treatment firms have less board independence, are larger in size, hold less cash, and pay larger dividends. These significant differences have to be accounted for so they do not distort our analysis.

Model 2 is a logistic regression that is constructed for the propensity-score-matched sample (post-match). In Model 2, none of

TABLE 2 The effect of board size on ESG controversies.

	(1) ESG controversies score
Ln (board size)	6.670** (2.105)
% independent directors	-0.021 (-0.455)
Ln (total assets)	-2.774** (-2.017)
Leverage	0.954 (0.258)
Profitability	27.514*** (3.465)
Capital investments	-11.305 (-0.716)
Advertising intensity	-80.622* (-1.716)
R&D intensity	8.836 (0.267)
Cash holdings	3.722 (0.714)
Dividends	-41.899 (-1.353)
Asset tangibility	-3.954 (-1.062)
ESG score	-0.100** (-2.499)
Constant	99.383*** (6.795)
Firm fixed effects	Yes
Year fixed effects	Yes
Observations	8,303
Adjusted R-squared	0.366

The ESG controversies score is based on 23 ESG controversial issues, with current controversies represented in the most recent complete period. Within each industry group, a percentile rank algorithm is used. As a result, the score shows the extent to which a given business engages in ESG controversies in comparison to its industry counterparts. Refinitiv provides more specific information regarding the construction of the ESG controversies score. Board size is the number of directors on the board. Robust *t*-statistics in parentheses.

****p* < 0.01. ***p* < 0.05. **p* < 0.1.

the coefficients are significant. As a consequence, our treatment and control firms are statistically equivalent in every observable way. To the degree that board size is irrelevant, our treatment and control firms should have similar ESG controversies. Table 3 Panel B illustrates the regression result for the propensity-score matched sample. The coefficient of board size remains significantly positive. Due to the

TABLE 3 Propensity score matching.

Panel A: diagnostic testing.		
	(1) Pre-match Treatment	(2) Post-match Treatment
% independent directors	-0.012* (-1.897)	-0.001 (-0.087)
Ln (total assets)	0.758*** (10.312)	-0.036 (-0.417)
Leverage	0.295 (0.690)	0.275 (0.514)
Profitability	0.344 (0.321)	-1.463 (-1.141)
Capital investments	-2.150 (-1.148)	4.581 (1.643)
Advertising intensity	2.068 (0.617)	0.292 (0.087)
R&D intensity	-3.012 (-0.976)	1.425 (0.395)
Cash holdings	-1.121* (-1.698)	0.499 (0.562)
Dividends	7.152** (2.260)	4.093 (1.143)
Asset tangibility	0.213 (0.718)	-0.474 (-1.394)
ESG score	0.005 (1.242)	-0.000 (-0.045)
Constant	-6.464*** (-7.461)	1.089 (1.077)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Pseudo R-squared	0.207	0.021
Observations	8,286	3,989
Panel B: the effect of board size on ESG controversies.		
	(1) ESG controversies score	
Ln (board size)	14.234** (2.107)	
% independent directors	-0.006 (-0.070)	
Ln (total assets)	-4.272* (-1.653)	
Leverage	-2.438 (-0.284)	
Profitability	46.202** (2.354)	
Capital investments	-19.236 (-0.570)	

(Continues)

TABLE 3 (Continued)

Panel B: the effect of board size on ESG controversies.	
	(1) ESG controversies score
Advertising intensity	-24.688 (-0.330)
R&D intensity	-70.886 (-0.596)
Cash holdings	8.186 (0.639)
Dividends	-63.576 (-1.175)
Asset tangibility	-1.304 (-0.172)
ESG score	-0.136* (-1.815)
Constant	88.427*** (3.148)
Firm fixed effects	Yes
Year fixed effects	Yes
Observations	3,898
Adjusted R-squared	0.472

The ESG controversies score is based on 23 ESG controversial issues, with current controversies represented in the most recent complete period. Within each industry group, a percentile rank algorithm is used. As a result, the score shows the extent to which a given business engages in ESG controversies in comparison to its industry counterparts. Refinitiv provides more specific information regarding the construction of the ESG controversies score. Board size is the number of directors on the board. Robust *t*-statistics in parentheses.

*** $p < 0.01$. ** $p < 0.05$. * $p < 0.1$.

consistency of our PSM findings, our conclusion does not appear to be principally driven by endogeneity.

4.3 | Entropy balancing

Previous research has relied heavily on the premise of observable selection. To avoid this assumption, we employ Hainmueller's (2012) entropy balancing approach, which is a variant on traditional matching algorithms. Entropy balancing, in particular, provides a high degree of covariate balance by directly including covariate balance into the weight function applied to sample units (Hainmueller, 2012; Balima, 2020). Hainmueller (2012) discusses entropy balancing in great depth. This unique method of matching has been extensively utilized in the recent literature (McMullin & Schonberger, 2020; Wilde, 2017; Freier et al., 2015).⁶

⁶More studies that employ entropy balancing are Bol et al., 2020; Neuenkirch & Neumeier, 2016; Glendening et al., 2019; TRUEX, R., 2014; Marcus, 2013).

This is how entropy balancing is achieved. As our treatment group, we select companies with boards of directors that are in the top quartile in terms of size. The remaining sample is referred to as the control group. Then, we utilize entropy balancing on all of the control variables to make sure that the mean, variance, and skewness of the observations in the two groups are similar. The regression result for the entropy-balanced sample is shown in Table 4. The coefficient of board size remains significantly positive. Firms with a larger board of directors face much fewer ESG controversies. Our conclusion remains valid.

4.4 | Instrumental-variable analysis (IV)

We use an instrumental variable (IV) analysis to alleviate endogeneity even more. We make use of a geography-based instrumental variable. We draw on the conclusions from Knyazeva et al. (2013), who document that the local supply of directors has a significant effect on corporate boards. Companies look for directors locally. Directors tend to be recruited from the same local pool of potential directors. Firms near one another have access to the same pool of prospective directors and, consequently, should have comparable board sizes. As an instrumental variable, we utilize the average board size for all companies within a three-digit zip code.

Furthermore, the location of a company's headquarters is normally decided far in advance, early in the company's existence, and seldom changes over time (Pirinsky & Wang, 2006). Hence, the firm's headquarters location is most likely exogenous to its current characteristics. Additionally, zip codes are assigned to improve mail delivery efficiency. Zip code allocations are thus unlikely correlated with corporate policies or outcomes, making them plausibly exogenous. The literature has recently recognized this strategy, which is based on geographic identification (Chintrakarn et al., 2017; Chintrakarn, Jiraporn, Tong, and Chatjuthamard, 2015 2).

The IV results are shown in Table 5. Model 1 is a first-stage regression in which the dependent variable is board size. As expected, the coefficient of the average board size of all companies in the same three-digit zip code is significantly positive. Model 2 is a second-stage regression with the ESG controversies score as the dependent variable. The instrumented coefficient of board size from the first stage is significantly positive, implying that larger boards lead to fewer controversial activities. As a robustness check, we additionally use an instrumental variable based on the city, rather than the zip code, where the headquarters is situated. Table 6 shows consistent findings obtained with this alternative instrument. Because an IV analysis is less susceptible to endogeneity, our conclusion is more likely to represent a causal influence than a simple association.

4.5 | GMM dynamic panel data analysis

To corroborate the findings, we use a dynamic GMM panel estimator to investigate the influence of board size on ESG controversies. This

TABLE 4 Entropy balancing.

	(1) ESG controversies score
Ln (board size)	9.009* (1.657)
% independent directors	-0.017 (-0.186)
Ln (total assets)	-2.610 (-1.224)
Leverage	2.928 (0.362)
Profitability	29.781* (1.907)
Capital investments	-27.309 (-0.986)
Advertising intensity	-42.684 (-0.605)
R&D intensity	51.711 (0.567)
Cash holdings	4.556 (0.447)
Dividends	-20.286 (-0.418)
Asset tangibility	-3.542 (-0.543)
ESG score	-0.138* (-1.910)
Constant	85.818*** (3.277)
Firm fixed effects	Yes
Year fixed effects	Yes
Observations	8,303
Adjusted R-squared	0.445

The ESG controversies score is based on 23 ESG controversial issues, with current controversies represented in the most recent complete period. Within each industry group, a percentile rank algorithm is used. As a result, the score shows the extent to which a given business engages in ESG controversies in comparison to its industry counterparts. Refinitiv provides more specific information regarding the construction of the ESG controversies score. Board size is the number of directors on the board. Robust *t*-statistics in parentheses.

****p* < 0.01. ***p* < 0.05. **p* < 0.1.

method makes use of the dynamic relationships inherent in the explanatory variables. To avoid any possible bias caused by time-invariant unobserved heterogeneity, the variables are first-differenced. We assess the influence of board size on ESG controversies via GMM after first-differencing, employing lagged

TABLE 5 Instrumental-variable analysis using zip codes.

	(1) Ln (board size)	(2) ESG controversies score
Ln (board size) (zip code-average)	0.838*** (44.752)	
Ln (board size) (instrumented)		38.648*** (2.636)
% independent directors	0.000 (1.245)	0.028 (0.437)
Ln (total assets)	0.058*** (14.576)	-6.515*** (-3.471)
Leverage	0.030** (2.475)	5.598 (1.233)
Profitability	0.030 (1.173)	9.208 (0.969)
Capital investments	-0.006 (-0.118)	7.057 (0.362)
Advertising intensity	0.393*** (2.593)	-69.083 (-1.292)
R&D intensity	0.085 (0.855)	-77.128** (-2.092)
Cash holdings	0.025 (1.412)	11.748* (1.716)
Dividends	0.436*** (4.271)	-34.843 (-0.908)
Asset tangibility	0.009 (0.641)	0.519 (0.125)
ESG score	-0.000 (-0.562)	-0.095** (-1.995)
Constant	-0.132** (-2.410)	56.061** (2.070)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	8,321	3,487
Adjusted R-squared	0.783	0.126

The ESG controversies score is based on 23 ESG controversial issues, with current controversies represented in the most recent complete period. Within each industry group, a percentile rank algorithm is used. As a result, the score shows the extent to which a given business engages in ESG controversies in comparison to its industry counterparts. Refinitiv provides more specific information regarding the construction of the ESG controversies score. Board size is the number of directors on the board. Robust *t*-statistics in parentheses.

****p* < 0.01. ***p* < 0.05. **p* < 0.1.

values of the explanatory variables as instruments for the current explanatory variables. This technique is far less susceptible to the omitted-variable bias. This method, however, is subject to a number

TABLE 6 Instrumental-variable analysis using city locations.

	(1) Ln (board size)	(2) ESG controversies score
Ln (board size) (city-average)	0.905*** (80.187)	
Ln (board size) (instrumented)		41.299** (2.423)
% independent directors	0.000 (0.356)	-0.042 (-0.566)
Ln (total assets)	0.046*** (12.397)	-6.421*** (-2.981)
Leverage	0.007 (0.607)	1.151 (0.199)
Profitability	0.019 (0.796)	8.650 (0.752)
Capital investments	-0.018 (-0.370)	-12.987 (-0.582)
Advertising intensity	0.257* (1.898)	-75.926 (-1.065)
R&D intensity	0.134 (1.490)	-62.778 (-1.336)
Cash holdings	0.021 (1.318)	3.269 (0.365)
Dividends	0.402*** (4.190)	-82.775* (-1.886)
Asset tangibility	-0.003 (-0.222)	0.060 (0.013)
ESG score	0.000 (0.673)	-0.096* (-1.758)
Constant	-0.166*** (-4.059)	58.191* (1.802)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	8,321	2,509
Adjusted R-squared	0.823	0.102

The ESG controversies score is based on 23 ESG controversial issues, with current controversies represented in the most recent complete period. Within each industry group, a percentile rank algorithm is used. As a result, the score shows the extent to which a given business engages in ESG controversies in comparison to its industry counterparts. Refinitiv provides more specific information regarding the construction of the ESG controversies score. Board size is the number of directors on the board. Robust t-statistics in parentheses.

*** $p < 0.01$. ** $p < 0.05$. * $p < 0.1$.

of strict assumptions. As a result, it is only used as a robustness check. Table 7 displays the regression result with GMM. Board size carries a positive and significant coefficient, again supporting our conclusion.

TABLE 7 GMM dynamic panel analysis.

	(1) ESG controversies score
Ln (board size)	16.586* (1.901)
% independent directors	0.143* (1.811)
Ln (total assets)	0.261 (0.109)
Leverage	6.458 (1.135)
Profitability	37.341*** (3.368)
Capital investments	7.095 (0.337)
Advertising intensity	-124.012* (-1.880)
R&D intensity	-60.081 (-1.167)
Cash holdings	8.800 (1.106)
Dividends	-47.310 (-1.066)
Asset tangibility	9.139 (1.473)
ESG score	-0.106** (-1.963)
ESG controversies score (t-1)	0.106*** (6.014)
ESG controversies score (t-2)	0.029* (1.869)
Constant	19.959 (0.725)
Year fixed effects	Yes
Observations	6,175

The ESG controversies score is based on 23 ESG controversial issues, with current controversies represented in the most recent complete period. Within each industry group, a percentile rank algorithm is used. As a result, the score shows the extent to which a given business engages in ESG controversies in comparison to its industry counterparts. Refinitiv provides more specific information regarding the construction of the ESG controversies score. Board size is the number of directors on the board. z-statistics in parentheses.

*** $p < 0.01$. ** $p < 0.05$. * $p < 0.1$.

4.6 | The effect of board size during a stressful time

Several studies demonstrate that corporate governance does not function the same way during stressful times as it does during normal

times (Jenwittayaroje & Jiraporn, 2018; Papangkorn, Chatjuthamard, Jiraporn, and Chueykamhang, 2019; Withisuphakorn & Jiraporn, 2018). Therefore, to gain further insights, we examine the effect of board size on ESG controversies during the Great Recession of 2008. A great deal of research in the literature is focused on the financial crisis of 2008, which was one of the most severe financial crises up to that point (Erkens et al., 2012; Feldkircher, 2014; Goodhart, 2008; Ivashina & Scharfstein, 2010; Munir, 2011).

The Great Recession started in 2008 and lasted until 2009. So, we construct a binary variable equal to one for the crisis period of 2008 and 2009, and zero otherwise. Then, we interact this binary variable with board size. The coefficient of this interaction term should reveal the effect of board size on ESG controversies during the financial crisis relative to the effect outside the crisis period. The regression result is shown in Table 8. The coefficient of the interaction term is significantly negative, suggesting that the effect of board size is less pronounced during the crisis. The coefficient of the Great Recession variable by itself is significantly positive, indicating that, during the crisis, companies are involved in significantly fewer ESG controversies. These findings are consistent with the argument that, during the crisis, companies exercise more caution as they navigate the crisis. Knowing that getting embroiled in an ESG controversy during the crisis would be particularly harmful, companies are more circumspect and make greater efforts to avoid ESG controversies. As a result, the role of board size in mitigating ESG controversies is less necessary during the crisis than it is during normal times. Our study is the first to link a financial crisis to the effect of corporate governance on ESG controversies.

4.7 | The extent of agency problems

To shed further light, we also investigate the effect of board size on ESG controversies conditional on the extent of agency problems. It has been shown in the literature that firms with more free cash flows (FCF) tend to be plagued by more agency problems as the free cash flows can be exploited by opportunistic managers. Jensen (1986) contends that FCF creates agency problems because of the increased likelihood of value-destroying investments. He also suggests that the conflicts of interest between shareholders and managers may be more severe for a company with high FCF and low growth prospects. Many studies have investigated the implications of FCF for investment and financing activities (Blanchard et al., 1994; Shin & Stulz, 1998; Opler et al., 2001), and most support Jensen's hypothesis and confirm that the costly agency problems occur in companies with high FCF and poor investment opportunities.

We estimate the amount of free cash flows as net income plus depreciation and amortization less capital expenditures, all divided by total assets. When this ratio is higher, potential agency problems are more likely. We then interact this variable with board size. The

TABLE 8 The effect of board size on ESG controversies during a stressful time.

	(1) ESG controversies score
Ln (board size) × great recession	−10.101^{***} (−2.239)
Ln (board size)	6.204 [*] (1.880)
% independent directors	−0.079 [*] (−1.672)
Ln (total assets)	−1.777 (−1.422)
Leverage	8.935 ^{**} (2.382)
Profitability	24.186 ^{***} (3.103)
Capital investments	−16.212 (−1.025)
Advertising intensity	−76.696 (−1.613)
R&D intensity	9.361 (0.288)
Cash holdings	−3.194 (−0.635)
Dividends	−17.440 (−0.563)
Asset tangibility	−2.024 (−0.548)
ESG score	−0.111 ^{***} (−3.266)
Great recession	22.843 ^{**} (2.128)
Constant	94.498 ^{***} (7.104)
Firm fixed effects	Yes
Year fixed effects	Yes
Observations	8,303
R-squared	0.399

The ESG controversies score is based on 23 ESG controversial issues, with current controversies represented in the most recent complete period. Within each industry group, a percentile rank algorithm is used. As a result, the score shows the extent to which a given business engages in ESG controversies in comparison to its industry counterparts. Refinitiv provides more specific information regarding the construction of the ESG controversies score. Board size is the number of directors on the board. Great Recession is equal to one for 2008 and 2009 and zero otherwise.

Robust *t*-statistics in parentheses.

****p* < 0.01. ***p* < 0.05. **p* < 0.1.

TABLE 9 Cross-sectional analysis with free cash flows.

	(1) ESG controversies score
Ln (board size) × free cash flow	67.521*** (2.947)
Ln (board size)	3.633 (1.101)
% independent directors	-0.021 (-0.464)
Ln (total assets)	-2.714** (-1.967)
Leverage	1.954 (0.532)
Profitability	12.090 (1.249)
Capital investments	3.485 (0.215)
Advertising intensity	-79.442* (-1.689)
R&D intensity	15.260 (0.469)
Cash holdings	3.703 (0.719)
Dividends	-46.077 (-1.482)
Asset tangibility	-4.436 (-1.199)
ESG score	-0.100** (-2.525)
Free cash flow	-137.702** (-2.565)
Constant	105.840*** (7.218)
Firm fixed effects	Yes
Year fixed effects	Yes
Observations	8,303
Adjusted R-squared	0.368

The ESG controversies score is based on 23 ESG controversial issues, with current controversies represented in the most recent complete period. Within each industry group, a percentile rank algorithm is used. As a result, the score shows the extent to which a given business engages in ESG controversies in comparison to its industry counterparts. Refinitiv provides more specific information regarding the construction of the ESG controversies score. Board size is the number of directors on the board. The free cash flow ratio is net income plus depreciation and amortization less capital expenditures, all divided by total assets.

Robust *t*-statistics in parentheses.

****p* < 0.01. ***p* < 0.05. **p* < 0.1.

coefficient of this interaction variable represents the effect of board size on ESG controversies conditional on the extent of agency problems. The regression result is shown in Table 9. The coefficient of the interaction variable is significantly positive. Therefore, the effect of board size is significantly more pronounced when potential agency problems are more serious. This is consistent with the prediction of agency theory where a governance mechanism is expected to work harder with more agency conflicts. Finally, the coefficient of the free cash flow ratio by itself is significantly negative, suggesting that companies with more serious agency problems are embroiled in more ESG controversies, again consistent with the prediction of agency theory where self-interested managers may take controversial actions that enhance their own private benefits at the expense of shareholders.

5 | CONCLUSIONS

Studies in sustainability focus on the benefits firms enjoy from engaging in ESG. However, it is relatively little known as to what firms can do to mitigate situations where things go wrong. Business strategies are formulated based on advice from the board of directors. For a business to be able to minimize potential controversies, it requires complex perspectives and advice. For this purpose, the firm requires a large board that can undertake the complex advisory function. Our study shows just that: firms with large boards experience fewer ESG controversies.

From a large sample of U.S. firms, we find that board size is negatively associated with ESG controversies; that is, firms with large boards exhibit fewer ESG controversies. In particular, a one standard deviation increase in the board size is associated with a 4.30% drop in ESG controversies. This result is in line with the exposition from the resource dependence theory and the stakeholder theory that larger boards advise better on complex issues such as ESG controversies.

In our analyses, we have controlled for firm fixed effects, which considerably mitigate the omitted-variable bias. Further, we execute a variety of robustness checks, that is, propensity score matching, entropy balancing, an instrumental-variable analysis, and GMM dynamic panel data analysis. All the robustness checks validate the conclusion. Hence, our findings are unlikely to be tainted by endogeneity and probably represent a causal influence, rather than merely a correlation. Finally, additional analysis suggests that the effect of board size is less evident during the crisis period of 2008, but the effect is more pronounced in firms where agency conflicts are more severe.

In addition to enhancing the academic literature, our findings have several important practical implications. First, a resourceful governing body is crucial for firms' sustainability. Second, large boards are better equipped to address complex problems – to minimize potential negative externalities businesses need complex advice. Furthermore, our results are useful to regulators, who may consider regulations that

would help reduce ESG controversies. Regulators should take into consideration the role of internal governance before any external regulation is imposed. The results from this study suggest that firms should nurture large boards. This is recommended as a means to facilitate a gradual and steady improvement in the sustainability performance of the firms. Moreover, larger boards can contribute to a smoother progress in achieving sustainability goals and thwart potential setbacks on their path to sustainability.

We have focused here on the advisory function of a corporate board as measured by the size of the board. The resourcefulness of a corporate board can emanate from board structure other than its size. Future research could delve into other features of corporate boards, such as the presence of independent directors or the prior experience of the directors, that are associated with the advisory power of a corporate board.

ACKNOWLEDGEMENTS

Open access publishing facilitated by The University of Western Australia, as part of the Wiley - The University of Western Australia agreement via the Council of Australian University Librarians.

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How to cite this article: Treepongkaruna, S., Kyaw, K., & Jiraporn, P. (2024). ESG controversies and corporate governance: Evidence from board size. *Business Strategy and the Environment*, 33(5), 4218–4232. <https://doi.org/10.1002/bse.3697>

APPENDIX A: VARIABLE DEFINITIONS

Variable	Definition
ESG-related metrics	
ESG controversies score	The ESG controversies score from Refinitiv indicates the percentile rank score of a firm's engagement in ESG controversial activities relative to its industry peers. The higher the score, the fewer ESG controversies the firm engages in
ESG score	The ESG score from Refinitiv indicates the percentile rank score of a firm's engagement in ESG activities relative to its industry peers. The higher the score, the more ESG activities the firm engages in
Board attributes	
Board size	The number of directors on the board
% independent directors	Percentage of outside independent directors on the board
Firm-specific characteristics	
Firm size	Total assets
Leverage	Total debt/total assets
Profitability	EBIT/total assets
Capital investments	Capital expenditures/total assets
Advertising intensity	Advertising expense/total assets
R&D intensity	R&D expense/total assets
Dividend payouts	Dividends/total assets
Cash holdings	Cash holdings/total assets
Asset tangibility	Fixed assets/total assets