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Published in:
British Journal of Management

DOI:
10.1111/1467-8551.12695

BJM BRITISH JOURNAL of MANAGEMENT
BRITISH ACADEMY OF MANAGEMENT

British Journal of Management, Vol. 34, 2186–2211 (2023)
DOI: 10.1111/1467-8551.12695

Walking the Talk? A Corporate Governance Perspective on Corporate Social Responsibility Decoupling

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Information asymmetry and the pressure to conform to stakeholders' expectations cause firms to engage in corporate social responsibility (CSR) decoupling – a practice that has severe socioeconomic consequences for firms. Adopting a corporate governance perspective, this paper answers a novel question: whether board gender diversity (BGD) curbs CSR decoupling. Using a battery of sophisticated analyses and robustness tests on 9276 firm-year observations for the period 2002–2017, our results confirm that BGD is negatively associated with CSR decoupling. Analysis of the composition of gender-diverse boards further reveals that this effect is stronger for balanced boards than for skewed and tilted boards. Furthermore, we note that independent female directors are more effective monitors of decoupling than executive female directors. We also document that the relationship between BGD and CSR decoupling is stronger when the overall governance is weak. This implies that gender-diverse boards could act as a substitute mechanism for corporate governance that would otherwise be weak. Our study offers important theoretical and policy implications for the field of corporate governance and CSR.

Introduction

Firms are increasingly undertaking corporate social responsibility (hereafter CSR) activities, be they internal actions such as enacting sustainability initiatives or external actions such as sustainability disclosure (Hawn and Ioannou, 2016), to respond to stakeholders' demands that firms be environmentally and socially responsible. In practice, however, managers often decouple these actions. CSR decoupling – the gap between firms' CSR claims and actual CSR performance – is the topic of much scholarly debate (Gull *et al.*, 2022; Sauerwald and Su, 2019; Tashman, Marano and Kostova, 2019). Extant research demonstrates that firms deviate from their CSR targets to influence stakeholders' perceptions (e.g. Bromley and Powell, 2012; García-Sánchez *et al.*, 2022; Graafland and Smid, 2019).

CSR decoupling allows executives to deceive stakeholders about organizational practices, thereby enabling the company to gain stakeholder legitimacy, at least temporarily (e.g. Crilly, Zollo and Hansen, 2012). Faced with rising stakeholder demands for fuel-efficient and green cars, Volkswagen (VW) promoted its Jetta TDI with a 'Clean Diesel' label. However, in 2015, VW was found guilty of installing defeat devices to cheat on emission tests. By misaligning its CSR actions, VW created the temporary impression of a green company: the Jetta TDI won the prestigious Green Car of the Year award (Krall and Peng, 2012). Such examples are not outliers. British Petroleum (BP) spent millions of dollars promoting its 'Beyond Petroleum' rebrand while investing significantly less money in improving its renewable energy strategy (Hawn and Ioannou, 2016).

In the long run, false claims have high costs for firms: they damage public reputations (Du, 2015), undermine stakeholder relationships (Doh *et al.*, 2010), challenge the license to operate (Zhang, Zhu and Ding, 2013), and increase regulatory oversights (Gelles, 2015) and regulatory penalties (MacLean and Behnam, 2010). Recent research provides compelling evidence that CSR decoupling negatively impacts firm performance (Hawn and Ioannou, 2016) and limits firms' ability to access finance (García-Sánchez *et al.*, 2021). Scholars agree that CSR decoupling is harmful for firms and must be avoided for normative and instrumental reasons.

What should be done to curb such practices? The corporate governance (hereafter CG) literature suggests that boards of directors can monitor firms' activities and it identifies the characteristics of strong monitoring boards. It is generally advocated that female directors are more effective monitors of managerial behaviour (Adams and Ferreira, 2009; Buse, Bernstein and Bilimoria, 2016; Hussain *et al.*, 2021; Nielsen and Huse, 2010) and more likely to detect financial frauds (Cumming, Leung and Rui, 2015) and improve financial performance (Ararat and Yurtoglu, 2021; Brahma, Nwafor and Boateng, 2021; Đăng *et al.*, 2020). Evidence shows that firms with female directors on boards enjoy superior CSR performance (e.g. Atif *et al.*, 2020; Jain and Zaman, 2020; Post, Rahman and Rubow, 2011) and higher CSR reporting quality (Al-Shaer and Zaman, 2016). However, very little is known about whether female directors also curb CSR decoupling by aligning internal CSR activities with external CSR communications. This is an important gap in the board gender diversity (hereafter BGD) and CSR literature. A positive relationship between BGD and CSR disclosure (Liao, Luo and Tang, 2015; Rupley, Brown and Marshall, 2012; Zaman *et al.*, 2020) is well established. BGD also increases financial performance and the transparency of financial performance information (Krishnan and Parsons, 2008). However, there is limited evidence concerning BGD's effect on the transparency of CSR information.

The information asymmetry between executives and stakeholders provides managers with an opportunity to intentionally fake CSR actions (Crilly, Zollo and Hansen, 2012; Marquis, Toffel and Zhou, 2016). Female directors reduce information asymmetry, monitor executives effectively, and are more likely to question and report incidents of fraudulent reporting (Kaplan *et al.*, 2009); thus, we argue that they are likely to improve CSR information transparency and reduce the gap between CSR disclosure and performance. CSR decoupling research is still emerging and has so far focused on its antecedents at the firm level (Delmas and Burbano, 2011; Sauerwald and Su, 2019), market level (García-Sánchez *et al.*, 2021), and institutional level (Jain, 2017; Luo, Wang and Zhang, 2017; Marquis and Qian, 2014; Tashman, Marano and Kostova, 2018). The CG determinants of CSR decoupling are scantly explored – recent exceptions being Gull *et al.* (2022) and García-Sánchez *et al.* (2022). Gull *et al.* (2022) note a significant negative relationship between the existence of a CSR committee on the corporate board and a CSR gap. Their findings also reveal that the structure of such committees plays a significant role in curbing decoupling practices. García-Sánchez *et al.* (2022) use women on the board as one of their control variables and seek to examine the impact on CSR decoupling of two credibility-enhancing mechanisms, that is, symbolic versus substantive use of external CSR assurance, and compliance with global reporting initiative's guidelines. They find that women's presence on boards increases the CSR gap, which contrasts with the dominant belief that female directors improve CSR-related corporate transparency. In the presence of such contrasting evidence related to BGD and CSR decoupling, it is pertinent to examine this relationship further.

We adopt a CG perspective to examine the association between BGD and CSR decoupling. We assembled data for non-financial US firms for the period 2002–2017 and tested the association between BGD and CSR decoupling using a battery of sophisticated analyses. The results confirm that BGD is significantly and negatively associated with CSR decoupling, with independent female directors being more effective monitors than executive directors. The relationship between BGD and CSR decoupling is stronger when overall governance is weak. Thus, gender-diverse boards can act as a substitute mechanism for weak governance.

Our findings contribute to the extant literature in several ways. First, while extant CG and gender studies suggest that female directors play a key role in protecting shareholders from managerial opportunism (i.e. Cumming, Leung and Rui, 2015; Lara *et al.*, 2017), our study shows that female directors minimize the gap between CSR talk and walk, thereby avoiding the risks of decoupling (García-Sánchez *et al.*, 2021). Thus, our findings fill the literature void and confirm that board monitoring dynamics impact firms' ability to engage in symbolic CSR actions. A handful of recent studies have provided empirical evidence for the relationship between BGD and CSR decoupling, with contrasting results. Gull *et al.* (2022) note an insignificant relationship between the presence of female directors on the CSR committee and CSR decoupling; García-Sánchez *et al.* (2022) note a positive relationship between BGD and CSR decoupling. We therefore provide a more nuanced understanding of the underlying relationship between BGD and CSR decoupling. Second, we support and add to critical mass theory by examining the effect of skewed, tilted, and balanced boards. Our findings reveal the effect of a differential increase in the proportion of female directors on the CSR gap. Third, the in-depth investigation of BGD–CSR decoupling shows that female directors are more effective in reducing decoupling when firms have low CG quality. We therefore expand existing empirical evidence on the subject (e.g. Adams and Ferreira, 2009; Wahid, 2019). These results contribute to the literature arguing that gender-diverse boards could act as a substitute mechanism for effective CG that would be weak otherwise (Gul, Srinidhi and Ng, 2011). Finally, our results concerning the negative association between the independence of female directors and CSR decoupling offer important practical implications for policy makers. We demonstrate that beyond a blanket gender quota for boards, emphasis needs to be accorded to the monitoring role played by female directors.

Theory, literature and hypotheses

CSR decoupling

The European Commission (2011, p. 6) defines CSR as 'the responsibility of enterprises for their impacts on society', implying that firms' responsibilities lie not only towards stockholders but also towards a wide range of internal and external stakeholders. As also advocated by stakeholder theorists, the survival of firms depends on their management of stakeholder relationships (Branco and Rodriguez, 2008; Freeman, 1984). CSR activities are often associated with improved financial performance (Friede, Busch and Bassen, 2015; Waddock and Graves, 1997) and legitimacy (Hussain, Rigoni and Orij, 2018). Therefore, stakeholders are interested in knowing about firms' CSR engagements (Sauerwald and Su, 2019), and so firms issue reports informing them about such activities (Prado-Lorenzo, Gallego-Álvarez and García-Sánchez, 2009). While CSR reports should ideally be based on reliable and accurate information, managers often misinform stakeholders by distorting or hiding actual information (Tata and Prasad, 2014), generally for symbolic or opportunistic reasons. Furthermore, firms can accumulate the benefits of legitimacy relatively more quickly in the case of external CSR actions (Hawn and Ioannou, 2016), hence creating a gap between reported sustainability information and actual performance, referred to as a CSR gap or decoupling (Sauerwald and Su, 2019; Tashman, Marano and Kostova, 2019).

Prior studies argue that firms facing stakeholder pressures may disconnect policy from actual practice (e.g. Crilly, Zollo and Hansen, 2012). For example, firms deceive their stakeholders by faking their practices when there is information asymmetry between the management and stakeholders. This stream of the literature suggests that managers opportunistically engage in calculated deception to pursue their own interests because stakeholders have limited knowledge of a firm's internal operations. An existing concept similar to faking as a function of information asymmetry is greenwashing, which focuses on the environmental aspects of CSR and is the result of an descrepancy between positive communication about environmental performance and poor environmental performance (Delmas and Burbano, 2011). An increased gap could also be the result of unrealized greening, which happens when the top management shows a high level of commitment to environmental policies while internally the firm lacks a proactive approach to implementation (Winn and Angell, 2000). Firms may also decouple by muddling through CSR practices to satisfy contrasting stakeholder demands (Crilly, Zollo and Hansen, 2012).

Decoupling is typically divided into two types (Graafland and Smid, 2019): policy-practice and mean-ends decoupling (Bromley and Powell, 2012). The former occurs when the relationship between corporate policies and practice is non-existent or inconsistent; the latter occurs when a policy is implemented with an uncertain relationship to its impacts (Bromley and Powell, 2012). CSR decoupling can have severe economic, social, and environmental consequences. For instance, the Kia and Hyundai auto manufacturers were fined US$300 million by the US Justice Department and Environmental Protection Agency for overstating their fuel efficiency (Gelles, 2015). Companies can also face negative outcomes in the form of low CSR ratings (Doh *et al.*, 2010). By extension, decoupling can result in a legitimacy façade, whereby a firm may lose external legitimacy in the eyes of stakeholders for not being honest and committed to stated ethical standards (MacLean and Behnam, 2010). Finally, empirical evidence suggests that CSR decoupling results in increased analyst forecast error, greater cost of capital, and reduced access to finance (García-Sánchez et al., 2021). Collectively, CSR decoupling is value destroying for firms and stakeholders.

BGD and CSR decoupling

Recent legislative initiatives have attracted enormous academic attention towards investigating the business case for BGD; that is, whether or not BGD is value relevant (Nadeem, 2020). Existing studies can be divided into two broad categories: studies examining (a) the risk and return implications, and (b) the non-financial implications of BGD. Whilst inconclusive evidence exists regarding the association between BGD and a firm's financial performance and risk (e.g. Lara *et al.*, 2017; Levi, Li and Zhang, 2014; Sila, Gonzalez and Hagendorff, 2016), the majority of studies on non-financial implications concur that BGD is positively associated with CSR performance (e.g. Atif *et al.*, 2020; Post, Rahman and Rubow, 2011) and CSR disclosures (e.g. Hussain, Rigoni and Orij, 2018; Liao, Luo and Tang, 2015; Rupley, Brown and Marshall, 2012; Zaman *et al.*, 2020).

Research on the CSR implications of BGD is often built on the premise that men and women differ because of their early gender socialization, that is, because of a different orientation towards moral and ethical values resulting from social interactions during their early experiences and upbringing (Gilligan, 1977, 1982; Post, Rahman and Rubow, 2011). This research suggests that daintiness, affection, and expressive language are appropriated for females, who are socialized into communal values embedded in selflessness, concern for others, and ethical sensitivity during their formative years (Mason and Mudrack, 1996), while males exhibit agentic goals and seek competition and hierarchy (Eagly, 2005). Therefore, female directors show more sensitivity to societal welfare (Atif *et al.*, 2020) and are better at managing stakeholder relationships (McGuinness, Vieito and Wang, 2017).

Female directors' attention is not limited to business ethics ; their monitoring role is also crucial. Boards of directors perform two main functions, namely advising and monitoring. A corporate board, through its monitoring function, is one of the most important internal CG mechanisms for aligning managerial interests with the interests of stakeholders. This is in line with agency theory (Jensen and Meckling, 1976), which postulates that shareholders appoint boards to monitor managers who behave opportunistically against the economic interests of shareholders (Beetsma and Peters, 2000; Fama and Jensen, 1983). Studies confirm that female directors are more active in oversight activities such as asking for managerial accountability and audits (e.g. Adams and Ferreira, 2009; Gul, Srinidhi and Tsui, 2008).

The role played by gender-diverse boards in enabling firms to assume responsibility beyond securing stakeholder value creation is much emphasized (Williams, 2003). Ibrahim, Angelidis and Tomic (2009) found that female directors demonstrate a code of ethics that is superior to that of their male counterparts. Meta-analyses confirm that female directors are more likely to use care reasoning, feel a sense of responsibility (Jaffee and Hyde, 2000), identify situations needing ethical judgement, and behave more ethically (Albaum and Peterson, 2006; Burton and Hegarty, 1999; Forte, 2004). Recent empirical studies reveal that BGD is negatively associated with securities fraud (Cumming, Leung and Rui, 2015), environmental violations (Liu, 2018), earnings management (Gull *et al.*, 2018), and corporate irresponsibility (Jain and Zaman, 2020).

We contend that female representation on boards has implications for CSR decoupling. CSR decoupling is value destroying for firms (Hawn and Ioannou, 2016), as it results in monetary costs in the form of fines and penalties (García-Sánchez *et al.*, 2021). Hence, female directors might find it risky to circulate corporate CSR claims that are inconsistent with actions and might increase the risk of public scrutiny, litigation, or regulatory oversights. Owing to their higher risk aversion (Gull *et al.*, 2018) and ability to detect fraud (Cumming, Leung and Rui, 2015), female directors are more likely to diligently perform their monitoring duties (Post and Byron, 2015), ask stricter questions, and identify and restrict incidences of irresponsible management behaviour (Jain and Zaman, 2020). We argue that a higher representation of women on a board will result in increased transparency of CSR information and reduced information asymmetry, which will eventually close the gap between firms' CSR talk and walk. Accordingly, we hypothesize:

H1: BGD is negatively associated with CSR decoupling.

Independent female directors and CSR decoupling

The literature suggests that a corporate board's monitoring function is more effective when its advice is impartial; this is more likely when the majority of board members are independent (Gul, Srinidhi and Ng, 2011; Hussain, Rigoni and Orij, 2018). Independent directors are more concerned about their reputation, face less pressure from the management, and are more likely to take actions to promote corporate transparency. Indeed, empirical evidence demonstrates that board independence enhances transparency through increased disclosures (Cerbioni and Parbonetti, 2007). A recent meta-analysis of 135 studies shows that the independence of directors reduces the likelihood of corporate misconduct (Neville *et al.*, 2019).

Independent female directors are found to bring diverse experience and problem-solving skills to the board, which are necessary for the resolution of complex issues (Broadbridge and Hearn, 2006). As non-members of 'old boys clubs' (Adams and Ferreira, 2009), they increase boards' oversight ability by increasing board independence (Carter, Simkins and Simpson, 2003) and promoting independent thinking. They wield greater monitoring efforts in their board roles compared with men (Adams and Ferreira, 2009) by attending more committee meetings (Jain and Zaman, 2020). Indeed, independent female directors are linked to fewer occurrences of corporate fraud, to increased transparency, and to reduced agency costs (Cumming, Leung and Rui, 2015; Nadeem, 2020; Wahid, 2019).

Conversely, female executive directors are members of old boys clubs. They have greater influence over corporate policies through their executive roles (Atif *et al.*, 2020; Liu, 2018; Zalata *et al.*, 2019). Liu, Wei and Xie (2014) argue that they use executive channels, thanks to their executive power and skills, to impact firm performance. This is mainly due to their involvement in the management of and close proximity to business operations. Being part of top management itself, however, weakens their ability to perform oversight activities and to curb self-serving managerial behaviour (Arun, Almahrog and Aribi, 2015). Indeed, stringent oversight is needed to reduce CSR decoupling.

We argue that independent female directors ensure the transparency of CSR information through intensive monitoring because independence allows them to simultaneously reduce information asymmetry between the firm and its stakeholders and align managerial actions with stakeholder interests. Accordingly, we posit that:

H2: The presence of independent female directors on boards is negatively associated with CSR decoupling.

Critical mass of female directors and CSR decoupling

Based on our main argument that female directors reduce CSR decoupling, the critical mass of this link also warrants investigation. Critical mass theory argues that a lone female director on the board may be reduced to *tokenism*, thereby negatively affecting the impact of such a minority group on board-level decision making (Goldenhar *et al.*, 1998; Maass and Clark, 1984). This indicates that women's voices are not heard if there are only a few female directors, which is in line with Kristie's (2011, p. 22) statement: 'one is token, two is a presence, and three is a voice'. Kanter (1977) argues that the image of the female '*token*' leader is often twisted to be closely linked to femininity rather than to leadership qualities. Therefore, a lone female director may have a limited impact on corporate decisions (Liu, Wei and Xie, 2014). Although emerging scholarship questions interpreting the numerical under-representation of female directors as an implicit signal of tokenism (Nielsen and Huse, 2010), empirical evidence largely shows that female directors have optimal effects on corporate decision making when critical mass is achieved (e.g. Cook and Glass, 2018; Dahlerup, 2006; King *et al.*, 2010; Seebeck and Vetter, 2021).

CSR programmes require huge investments and, therefore, remain an important discussion point during board meetings (Hussain, Rigoni and Orij, 2018). Owing to women's prosocial nature and effective monitoring role, higher female representation on boards is more likely to favour CSR-related decision making and improved CSR engagement compared with minority female representation (Byron and Post, 2016). Existing studies confirm this: Atif *et al.* (2020) report that the presence of two or more female directors on the board has a strong effect on sustainable investment, while Post, Rahman and Rubow (2011) show that firms with three or more female directors exhibit better environmental performance. Similarly, higher female representation is positively associated with sustainability disclosure (Liao, Luo and Tang, 2015) and the quality of such disclosure (Al-Shaer and Zaman, 2016). Because CSR decoupling affects firm outcomes negatively, we assume that the critical mass of female directors on a board may effectively reduce managerial misbehaviour and ensure transparent CSR information. We also argue that the proportion of female directors is more relevant than the actual size of the female (minority) group for clarifying the actual role of critical female mass on CSR-related decisions. Thus, we hypothesize the following:

H3: The critical mass of female directors on boards is negatively associated with CSR decoupling.

Methodology

Data and sample

We collected data on US firms from 2002 to 2017. CSR decoupling was calculated using data from Asset4, while other CG and financial data were collected from BoardEx and Worldscope, respectively. We then merged data from different sources and eliminated firm-years with missing information. Consistent with prior studies (e.g. Atif *et al.*, 2020; Liu, Wei and Xie, 2014), we excluded financial firms (SIC codes 6000−6999) from our sample because of their unique regulatory environment. Our final sample consisted of an unbalanced panel of 9,276 firm-year observations.

Measurement of the main variables

CSR decoupling. Our dependent variable, CSR decoupling (GAP),[1] is measured as the difference between current external CSR actions and lagged internal CSR actions scaled by the logged value of total assets (Hawn and Ioannou, 2016).

BGD. To test H1, we measure the participation of female directors as the proportion of FPRO. Following Atif, Liu and Huang (2019), Gull, Atif and Hussain. (2022) and Nekhili, Bennouri and Nagati (2022), we further split the proportion of female directors into the proportion of executive and independent female directors (FNEDPRO and FEDPRO, respectively) to test H2. Finally, to test H3, we focus on three different board types as proposed by prior studies (see Kanter, 1977; Seebeck and Vetter, 2021). These board types comprise skewed boards – typically male-dominated and therefore likely to place female directors in a position where they are unable to play an active role in the decision-making process; tilted boards – where female directors can form in-groups and are likely to have a greater impact on decision making compared with skewed boards; and balanced boards – where the gender effect on participation fades because gender differences are evened out. We argue that this categorization better captures the expected positive effect of female direc-

[1]Hawn and Ioannou (2016) constructed the CSR gap as the absolute gap between the standardized score of 24 external and 21 internal actions. The data on these items were extracted from Asset4. The authors selected 120 data points from the 'Strategic Framework', which represents the entirety of the firm's CSR orientation.

tors on board-level decision making as their proportion (FPRO) on the board increases. To operationalize these measures, we follow Seebeck and Vetter (2021) and create three dummy variables, namely SKEWED, TILTED, and BALANCED. SKEWED is coded 1 if FPRO is up to 20% and 0 otherwise. TILTED is coded 1 if FPRO is more than 20% but less than or equal to 40% and 0 otherwise. BALANCED is coded 1 if FPRO is more than 40% but less than or equal to 60% and 0 otherwise.

Estimation techniques. To investigate the impact of BGD on CSR decoupling, we ran regression models as specified below.

$$GAP_{i,t} = \beta_0 + \beta_1(FPRO)_{i,t} + \beta_2(board\ characteristics)_{i,t} + \beta_3(firm\ characteristics)_{i,t} + \beta_4 \sum (industry)_i + \beta_5 \sum (year)_t + \varepsilon_{i,t} \quad (1)$$

$$GAP_{i,t} = \beta_0 + \beta_1(FNEDPRO)_{i,t} + \beta_2(FEDPRO)_{i,t} + \beta_3(board\ characteristics)_{i,t} + \beta_4(firm\ characteristics)_{i,t} + \beta_5 \sum (industry)_i + \beta_6 \sum (year)_t + \varepsilon_{i,t} \quad (2)$$

$$GAP_{i,t} = \beta_0 + \beta_1(SKEWED)_{i,t} + \beta_2(TILTED)_{i,t} + \beta_3(BALANCED)_{i,t} + \beta_4(board\ characteristics)_{i,t} + \beta_5(firm\ characteristics)_{i,t} + \beta_6 \sum (industry)_i + \beta_7 \sum (year)_t + \varepsilon_{i,t} \quad (3)$$

To test H3, we focus on the coefficients. Consistent with the predictions of critical mass theory (Seebeck and Vetter, 2021), if the influence of female directors on CSR decoupling increases with an increase in their representation on the board, then the coefficients on SKEWED ($\beta 1$), TILTED ($\beta 2$), and BALANCED ($\beta 3$) should also increase. We control for board- and firm-level variables that may impact CSR decoupling, as highlighted in the prior literature (e.g. García-Sánchez *et al.*, 2021; Jain and Zaman, 2020; Sauerwald and Su, 2019; Tashman, Marano and Kostova, 2019). These variables are board size (BSIZE), board independence (BIND), board meetings (BMEET), CEO duality (DUAL), profitability (ROA), profit margin (PM), capital intensity (CI), research and development (R&D), analyst forecast error (AFE), organizational slack (SLACK), cost of debt (COD), institutional ownership (INST), state ownership (STATE), and firm size (SIZE). Finally, we control for year and industry effects (using four-digit SIC codes). All variables are defined in Table 1.

Results

Univariate analysis

Table 2 presents the summary statistics of our full sample. Among the main variables, the mean value of CSR decoupling (*GAP*) is −0.021, demonstrating a considerable gap between internal and external CSR actions. Regarding BGD, we find that the mean proportion of female directors (*FPRO*) is 15.5%. The mean values of the Blau and Shannon indices (*BLAU & SHANNON*) are 0.242 and 0.199, respectively. The average proportions of independent (*FNEDPRO*) and executive (*FEDPRO*) female directors are 14.9% and 0.6%, suggesting that US firms are more likely to appoint women as independent directors. Concerning the gender balance of the board of directors, we find that on average 53.3%, 24.1%, and 1.6% of the sample firms have skewed (*SKEWED*), tilted (*TILTED*), and balanced (*BALANCED*) boards, respectively. Overall, these statistics are comparable to US sample-based studies, such as Atif, Liu and Huang (2019) and Atif *et al.* (2020) and demonstrate that female directors still constitute a minority group in the United States.

Table 2 reports the mean comparison for the subsamples of firms with and without female directors. It shows that 84.8% of our sample comprises firm-years with at least one female director. As expected, firms without female directors on boards are more likely to engage in CSR decoupling (*GAP*) than firms with female directors (−0.023 versus −0.021); this difference is significant at the 1% level. The table also shows that both subsamples differ across the board- and firm-level variables.

Table 3 shows the correlations between all the variables to examine the potential multicollinearity issue. The correlation among all the variables is less than the threshold of 0.7 (Atif, Liu and Huang, 2019; Liu, Wei and Xie, 2014), except for

Table 1. Definition of variables

Variable name	Symbol	Definition	Source
CSR gap	*GAP*	Difference between current external CSR actions and lagged internal CSR actions scaled by the logged value of total assets.	Thomson Reuters' Refinitiv
Proportion of female directors	*FPRO*	The proportion of female directors on the board.	BoardEx
Blau diversity index	*BLAU*	$= 1 - \sum_{i=1}^{n} p_i^2$, where p_i is the percentage of board members in each category (two: male/female) and n is the number of categories.	BoardEx
Shannon diversity index	*SHANNON*	$= -\sum_{i=1}^{n} p_i \text{ In}(\text{P}_i)$, where p_i is the percentage of board members in each category (two: male/female) and n is the number of categories.	BoardEx
Female independent directors	*FNEDPRO*		BoardEx
Female executive directors	*FEDPRO*		BoardEx
Skewed board	*SKEWED*		BoardEx
Tilted board	*TILTED*		BoardEx
Balanced board	*BALANCED*		BoardEx
Board size	*BSIZE*		BoardEx
Board independence	*BIND*	The proportion of independent directors on the board.	BoardEx
Board meetings	*BMEET*	Natural log of the number of board meetings.	BoardEx
CEO duality	*DUAL*	Dummy variable coded 1 if different individuals hold the CEO and board chair position and 0 otherwise.	BoardEx
Analyst forecast error	*AFE*	The absolute difference between actual and forecasted earnings.	I/B/E/S
Profitability	*ROA*	Net profit/loss divided by total assets.	Worldscope
Profit margin	*PM*	The ratio of net income to sales.	Worldscope
Capital intensity	*CI*	The ratio of total assets to sales.	Worldscope
Research and development	*R&D*	The ratio of research and development expenditures to net sales.	Worldscope
Organizational slack	*SLACK*	The ratio of current assets to current liabilities.	Worldscope
Cost of debt	*COD*	Interest expenses divided by total debt, which is the sum of long-term and short-term debt.	Worldscope
Institutionally owned	*INST*	Dummy variable coded 1 if institutions hold more than 5% equity, and 0 otherwise.	Worldscope
State owned	*STATE*	Dummy variable coded 1 if state owns more than 5% equity and 0 otherwise.	Worldscope
Firm size	*SIZE*	Natural logarithm of total sales.	Worldscope

Note: All continuous variables are winsorized at the bottom 1% and top 99% levels.
Following extant literature, we used board-level controls to control for their confounding effects on CSR-related firm policies. Hussain, Rigoni and Orij (2018) recently showed that board structure, including size, independence, and CEO duality and board activity (i.e. number of board meetings), are significantly linked to CSR-related issues. Similarly, García-Sánchez *et al.* (2021) note a positive link between CSR decoupling and analysts' forecast error. Moreover, analysts' information environment affects the level of decoupling. We use firm-level financial controls such as size, profitability, level of capital expenditure, cost of debt, and research and development expenses to control for a firm's opportunities and challenges regarding truly engaging in CSR (Friede, Busche and Bassen, 2015). Prominent CSR literature shows that ownership structure significantly affects the level of CSR activities (McGuinness, Vieito and Wang, 2017). Therefore, we use ownership structure as a control in our regression models.

some BGD variables. We therefore refrain from using these variables in the same equation; thus, strong correlations between these variables do not affect our results. We also calculate the variance inflation factors (VIFs) to further check the multicollinearity issue. The un-tabulated VIF value for all variables is less than 3, well below the threshold of 10, suggesting that multicollinearity is not an issue (Neter, Johnson and Leitch, 1985).

Multivariate analysis

To empirically test our hypotheses, we rely mainly on two econometric techniques commonly used in CG studies, namely ordinary least squares (OLS)

Table 2. Descriptive statistics

Variable	Mean	SD	Mean	Mean	Mean Diff.
GAP	−0.021	0.008	−0.023	−0.021	−0.002***
FPRO	0.155	0.097	–	–	–
BLAU	0.242	0.129	–	–	–
SHANNON	0.199	0.097	–	–	–
FNEDPRO	0.149	0.096	–	–	–
FEDPRO	0.006	0.023	–	–	–
SKEWED	0.533	0.499	–	–	–
TILTED	0.241	0.428	–	–	–
BALANCED	0.016	0.125	–	–	–
BSIZE (logged value)	2.291	0.215	2.100	2.322	−0.222***
BIND	0.862	0.071	0.827	0.867	−0.040***
BMEET (logged value)	2.007	0.374	2.006	2.007	−0.001
DUAL	0.699	0.459	0.648	0.707	−0.058***
PM	0.053	0.225	0.043	0.055	−0.012*
ROA	0.053	0.102	0.047	0.053	−0.006**
CI	1.898	3.108	2.341	1.828	0.513***
R&D	0.048	0.118	0.064	0.046	0.018***
AFE	1.297	21.730	0.889	1.362	−0.473
SLACK	0.952	1.233	1.327	0.892	0.434***
COD	0.071	0.050	0.072	0.070	0.002
INST	0.736	0.441	0.771	0.730	0.041***
STATE	0.005	0.072	0.004	0.006	−0.002
SIZE	15.344	1.338	14.511	15.476	−0.965***

Note: This table presents the summary statistics for all variables based on the whole sample and mean differences for the subsample of firms with and without female directors.
*, **, and *** represent significance at the 0.1, 0.05, and 0.01 levels, respectively.
All variables are as defined in Table 1.

regression and controlling for industry and firm fixed effects (FE), which allow us to overcome the issue of omitted variable bias and variations over time (Atif, Liu and Huang, 2019; Liu, Wei and Xie, 2014).[2] Endogeneity is a potential issue in our setting because female directors may not be randomly appointed to the board of directors; therefore, female directors may join firms that are less likely to engage in CSR decoupling, which might result in the problem of reverse causality. Prior studies have suggested the use of a lagged board variables approach to correct potential reverse causality (Atif *et al.*, 2020). Along with OLS and FE, we therefore use one-year lagged board variables to replace the contemporary variables.

[2]We rely mainly on the FE estimates to interpret our results because FE provide more consistent results after controlling for omitted variable bias and variations over time than does OLS.

BGD and CSR decoupling

Table 4 reports our analysis of whether BGD influences CSR decoupling based on using FE, lagged board FE, OLS, and lagged board OLS. The FE and OLS regressions use contemporary board-level variables. In the lagged board models, we replace contemporary board-level variables with one-year-lagged board-level variables including the proportion of female directors. The results, based on all specifications reported in Table 4, suggest that female directors have a negative and statistically significant impact on CSR decoupling, demonstrating that BGD is associated with better alignment between internal and external CSR actions. Specifically, a one-percentage-point increase in the proportion of female directors is associated with 0.451, 0.648, 0.202, and 0.202 percentage-point decreases in CSR decoupling, as demonstrated by the results of the FE, lagged-FE, OLS, and lagged-OLS estimations, respectively. The economic significance of female directors for CSR decoupling is imperative too. For instance, an increase in the proportion of FPRO by

Table 3. Correlation matrix

Variable		*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
1.	*GAP*	1.000															
2.	*FPRO*	0.094*	1.000														
3.	*BSIZE*	0.281*	0.211*	1.000													
4.	*BIND*	0.061*	0.173*	0.270*	1.000												
5.	*BMEET*	0.030*	0.021*	0.031*	0.095*	1.000											
6.	*DUAL*	0.066*	0.049*	0.084*	−0.033*	−0.090*	1.000										
7.	*PM*	0.019	0.007	0.015	−0.004	−0.006	0.027*	1.000									
8.	*ROA*	0.056*	0.041*	0.030*	−0.045*	−0.145*	0.093*	0.134*	1.000								
9.	*CI*	−0.019	−0.060*	−0.041*	0.021*	0.065*	−0.071*	−0.324*	−0.342*	1.000							
10.	*R&D*	−0.087*	−0.049*	−0.167*	−0.059*	0.031*	−0.114*	−0.146*	−0.351*	0.418*	1.000						
11.	*AFE*	0.044*	0.003	0.031*	−0.015	−0.049*	0.019	−0.001	−0.011	0.013	−0.016	1.000					
12.	*SLACK*	−0.126*	−0.096*	−0.244*	−0.206*	−0.087*	−0.073*	−0.056*	0.053*	0.092*	0.363*	−0.017	1.000				
13.	*COD*	0.015	−0.023*	−0.036*	−0.040*	0.007	0.005	−0.002	0.011	0.052*	0.003	0.043*	0.220*	1.000			
14.	*INST*	−0.203*	−0.029*	−0.197*	−0.038*	−0.023*	−0.036*	−0.010	−0.049*	−0.008	0.059*	−0.055*	0.070*	0.006	1.000		
15.	*STATE*	0.030*	0.005	0.024*	0.026*	0.014	−0.046*	0.001	−0.035*	−0.003	0.009	−0.003	−0.012	−0.009	−0.037*	1.000	
16.	*SIZE*	0.420*	0.211*	0.496*	0.169*	0.045*	0.172*	0.134*	0.220*	−0.359*	−0.411*	0.085*	−0.310*	−0.093*	−0.278*	0.034*	1.000

Note: All variables are as defined in Table 1.
The asterisk (*) shows significance at the 0.05 level.

Table 4. Female directors and CSR gap

Variable	FE	Lagged FE	OLS	Lagged OLS
	GAP			
FPRO	−0.451***	−0.648***	−0.202**	−0.202**
	(−3.73)	(−4.86)	(−2.35)	(−2.10)
BSIZE	−0.073	0.041	0.128***	0.216***
	(−1.24)	(0.64)	(3.05)	(4.71)
BIND	−0.261*	−0.512***	−0.215*	−0.313***
	(−1.68)	(−3.07)	(−1.93)	(−2.61)
BMEET	−0.062***	−0.047*	−0.057***	−0.059***
	(−2.72)	(−1.88)	(−2.84)	(−2.61)
DUAL	−0.023	0.003	−0.019	−0.003
	(−1.02)	(0.14)	(−1.18)	(−0.18)
PM	−0.063	−0.002	0.184***	0.208***
	(−0.79)	(−0.03)	(2.80)	(2.70)
ROA	0.057	0.004	−0.129	−0.173
	(0.38)	(0.03)	(−0.97)	(−1.12)
CI	0.014***	0.023***	0.015***	0.020***
	(3.15)	(3.05)	(5.30)	(5.22)
R&D	0.422*	0.299	0.270***	0.322***
	(1.93)	(1.05)	(2.67)	(2.75)
AFE	0.000	0.000	0.000	−0.000
	(0.04)	(0.07)	(0.14)	(−0.29)
SLACK	0.021**	0.025**	−0.001	0.005
	(2.02)	(2.08)	(−0.11)	(0.61)
COD	−0.040	0.066	0.097	0.133
	(−0.21)	(0.32)	(0.59)	(0.74)
INST	−0.032*	−0.016	−0.087***	−0.077***
	(−1.87)	(−0.88)	(−5.04)	(−4.13)
STATE	0.109	0.129	0.180*	0.161
	(1.01)	(1.09)	(1.83)	(1.54)
SIZE	0.185***	0.205***	0.261***	0.280***
	(8.18)	(8.06)	(31.61)	(30.39)
Intercept	−4.069***	−4.901***	−5.692***	−6.642***
	(−11.37)	(−12.03)	(−28.46)	(−29.58)
N	9,276	7,801	9,276	7,801
Firm & Year	Yes	Yes	–	–
Industry & Year	–	–	Yes	Yes
Adj. R^2	0.184	0.189	0.315	0.326
F-stat	16.39	12.38	25.71	23.05

Note: *, **, and *** represent significance at the 0.1, 0.05, and 0.01 levels, respectively. T statistics are given in parentheses. All variables are as defined in Table 1.

one (sample) standard deviation (as shown in Table 2) reduces CSR decoupling by approximately 3.32% in the FE method. Overall, these findings strongly support H1.

Female independent versus executive directors and CSR decoupling

In Table 5, we report our analysis exploring the channel through which female directors influence CSR decoupling. We try to disentangle the monitoring effect of independent directors from the executive ones on CSR decoupling. To do so, and consistent with H2, our results show that independent female directors significantly reduce CSR decoupling, while executive female directors have no significant influence on CSR decoupling. These results imply that it is the role of female directors that matters: firms with more independent female directors can benefit more from BGD. A one-percentage-point increase in the proportion of independent female directors is associated with 0.434, 0.615, 0.214, and 0.202 percentage-point decreases in CSR decoupling, as demonstrated by the results of the

Table 5. Non-executive vs. executive female directors and CSR gap

	GAP			
Variable	**FE**	**Lagged FE**	**OLS**	**Lagged OLS**
FNEDPRO	−0.434***	−0.615***	−0.214**	−0.202**
	(−3.49)	(−3.15)	(−2.41)	(−2.05)
FEDPRO	−0.741	−1.279	−0.254	−0.320
	(−1.55)	(−1.47)	(−0.74)	(−0.83)
BSIZE	−0.072	0.043	0.140***	0.234***
	(−1.23)	(0.49)	(3.34)	(5.10)
BIND	−0.253	−0.515**	−0.191*	−0.299**
	(−1.60)	(−2.06)	(−1.68)	(−2.43)
BMEET	−0.062***	−0.046*	−0.055***	−0.054**
	(−2.71)	(−1.66)	(−2.71)	(−2.42)
DUAL	−0.022	0.004	−0.018	−0.001
	(−1.01)	(0.11)	(−1.10)	(−0.05)
PM	−0.063	−0.003	0.121*	0.172**
	(−0.79)	(−0.02)	(1.87)	(2.24)
ROA	0.056	0.007	−0.098	−0.185
	(0.37)	(0.03)	(−0.74)	(−1.19)
CI	0.014***	0.023*	0.000	0.001*
	(3.15)	(1.88)	(0.09)	(1.72)
R&D	0.423*	0.297	0.383***	0.417***
	(1.94)	(0.65)	(3.85)	(3.58)
AFE	0.000	0.000	0.000	−0.000
	(0.03)	(0.48)	(0.31)	(−0.10)
SLACK	0.021**	0.025	0.001	0.006
	(2.02)	(1.03)	(0.09)	(0.70)
COD	−0.033	0.072	0.082	0.110
	(−0.17)	(0.24)	(0.50)	(0.61)
INST	−0.032*	−0.016	−0.093***	−0.083***
	(−1.89)	(−0.64)	(−5.40)	(−4.41)
STATE	0.109	0.126	0.176*	0.153
	(1.02)	(0.86)	(1.79)	(1.46)
SIZE	0.185***	0.204***	0.256***	0.274***
	(8.14)	(4.88)	(31.16)	(29.88)
Intercept	−4.069***	−4.895***	−5.655***	−6.580***
	(−11.34)	(−7.51)	(−28.10)	(−29.13)
N	9,276	7,801	9,276	7,801
Firm & Year	Yes	Yes	–	–
Industry & Year	–	–	Yes	Yes
Adj. R^2	0.184	0.189	0.313	0.324
F-stat	15.86	13.35	25.32	22.69

Note: *, **, and *** represent significance at the 0.1, 0.05, and 0.01 levels, respectively. T statistics are given in parentheses. All variables are as defined in Table 1.

FE, lagged-FE, OLS, and lagged-OLS estimations, respectively.

Critical mass of female directors and CSR decoupling

To examine the impact of the critical mass of female directors on CSR decoupling, we follow Seebeck and Vetter (2021) and use three dummy variables, namely *SKEWED*, *TILTED*, and *BALANCED*, representing different types of boards based on differential gender balance. The results in Table 6 show that *SKEWED*, *TILTED*, and *BALANCED* are negatively and significantly associated with CSR decoupling in all specifications (i.e. FE, lagged-FE, OLS, and lagged-OLS), except for the lagged-FE model, where *SKEWED* is negatively but insignificantly associated with CSR decoupling. This demonstrates that while the impact of female directors becomes more salient and prominent with an increase in their representation on boards, consistent with critical mass

Table 6. Critical mass of female directors and CSR gap

	GAP			
Variable	**FE**	**Lagged FE**	**OLS**	**Lagged OLS**
SKEWED	−0.035*	−0.009	−0.056***	−0.049**
	(−1.72)	(−0.41)	(−2.89)	(−2.33)
TILTED	−0.076***	−0.083***	−0.058**	−0.053**
	(−3.02)	(−3.01)	(−2.53)	(−2.06)
BALANCED	−0.156**	−0.142*	−0.184***	−0.195***
	(−2.29)	(−1.82)	(−3.04)	(−2.75)
BSIZE	−0.063	0.038	0.158***	0.249***
	(−1.05)	(0.58)	(3.68)	(5.31)
BIND	−0.274*	−0.536***	−0.208*	−0.310***
	(−1.76)	(−3.20)	(−1.88)	(−2.60)
BMEET	−0.062***	−0.047*	−0.056***	−0.056**
	(−2.74)	(−1.88)	(−2.77)	(−2.47)
DUAL	−0.021	0.006	−0.020	−0.002
	(−0.94)	(0.26)	(−1.19)	(−0.10)
PM	−0.064	0.001	0.119*	0.172**
	(−0.81)	(0.01)	(1.84)	(2.23)
ROA	0.058	0.000	−0.100	−0.189
	(0.38)	(0.00)	(−0.75)	(−1.22)
CI	0.014***	0.023***	0.000	0.001*
	(3.14)	(3.07)	(0.09)	(1.73)
R&D	0.430**	0.310	0.377***	0.412***
	(1.97)	(1.09)	(3.80)	(3.55)
AFE	0.000	0.000	0.000	−0.000
	(0.05)	(0.03)	(0.33)	(−0.09)
SLACK	0.020*	0.024**	0.001	0.006
	(1.94)	(2.01)	(0.08)	(0.72)
COD	−0.031	0.054	0.083	0.111
	(−0.16)	(0.26)	(0.51)	(0.62)
INST	−0.034*	−0.018	−0.093***	−0.081***
	(−1.95)	(−0.96)	(−5.36)	(−4.34)
STATE	0.103	0.122	0.171*	0.152
	(0.96)	(1.02)	(1.74)	(1.45)
SIZE	0.185***	0.203***	0.255***	0.273***
	(8.14)	(7.97)	(31.20)	(29.97)
Intercept	−4.085***	−4.897***	−5.642***	−6.571***
	(−11.39)	(−11.99)	(−28.39)	(−29.46)
N	9,276	7,801	9,276	7,801
Firm & Year	Yes	Yes	–	–
Industry & Year	–	–	Yes	Yes
Adj. R^2	0.192	0.201	0.314	0.324
F-stat	15.23	11.16	25.24	22.61

Note: *, **, and *** represent significance at the 0.1, 0.05, and 0.01 levels, respectively. T statistics are given in parentheses. All variables are as defined in Table 1.

theory, even when female directors are in a minority the benefits of BGD for CSR decoupling hold. It is noteworthy that a one-point increase in *SKEWED*, *TILTED*, and *BALANCED* boards is likely to result in 0.035-, 0.076- and 0.156-point reductions in CSR decoupling (FE method), respectively. Collectively, these results indicate that the negative impact of BGD on CSR decoupling increases as the representation of females increases. We also test for differences in the coefficients, and the result of an unreported Wald test shows that the coefficient on *SKEWED* is significantly different from the coefficient on *TILTED*, while the coefficient on *TILTED* is significantly different from the coefficient on *BALANCED* in all specifications. Taken together, our results support H3 regarding the economic significance of more women on the board.

Female directors, information asymmetry, and CSR decoupling

So far, our findings show that female directors reduce CSR decoupling. Here, we further examine whether female directors reduce CSR decoupling by reducing information asymmetry. Following related literature (Ball and Shivakumar, 2008; Kim, Park and Wier, 2012), we use earnings management (i.e. discretionary accruals)[3] as a valid proxy for the information environment.[4] We first run regressions using *AEM* as a dependent variable and *FPRO* as an independent variable along with all the controls. The results reported under Columns 1, 3, 5, and 7 of Table 7 show that the coefficient on *FPRO* is negative and statistically significant, suggesting that firms with female directors are more likely to reduce information asymmetry. Then, we examine whether female directors reduce CSR decoupling through the information asymmetry channel. To perform this analysis, we create a new variable, *FPRO*AEM*, which is the interaction term between the proportion of female directors and the level of information asymmetry. We then include *FPRO*AEM* and *AEM* along with *FPRO* and all the control variables in our model and re-estimate Equation (1). The coefficient on *FPRO*AEM* must be negatively significant if female directors influence CSR decoupling (*GAP*) through the information asymmetry channel. The results of this analysis, reported under Columns 2, 4, 6, and 8 of Table 7, demonstrate that the coefficient on *FPRO*AEM* is negatively significant, suggesting that female directors are likely to influence CSR decoupling by reducing information asymmetry.

Additional analysis

Controlling for governance quality. Existing studies suggest that the impact of BGD on firm outcomes is contingent on firms' governance quality (Zaman *et al.*, 2020); indeed, impact is more prominent in firms with weaker governance quality (Adams and Ferreira, 2009). We therefore investigate whether the nexus of BGD and CSR decoupling is impacted by firm-level CG quality because firms with better CG mechanisms in place are more transparent (Byard, Li and Weintrop, 2006). We create two subsamples, high-governance and low-governance firms, based on the industry-year average of the CG performance score from the Asset4 ESG database, and re-estimate Equation (1). The subsample of high-CG firms includes those firms in the top quartile based on the Asset4 CG performance score by industry-year average; the subsample of low-CG firms includes those in the bottom quartile based on the Asset4 CG performance score by industry-year average. As reported in Table 8, female directors appear to play a prominent and significant role in mitigating CSR decoupling only in the subsample of firms with low CG quality, hence complementing the findings of Adams and Ferreira (2009).

Robustness analysis

Alternate measure of CSR decoupling. Our measure of CSR decoupling is conceptually strong; however, some recent studies (e.g. García-Sánchez *et al.*, 2021; Sauerwald and Su, 2019; Tashman, Marano and Kostova, 2019) operationalize CSR decoupling as the difference between CSR reporting and performance. To ensure the robustness of our main findings, we calculate CSR decoupling (*GAP1*) as the difference between the current CSR disclosure score from Bloomberg and the lagged CSR performance score from Asset4 scaled by the logged value of total assets.[5] This allows us to capture the difference between the actual performance score of a firm on CSR and its corresponding CSR disclosures. Using this measure, our reported results in Table 9 are qualitatively similar to those reported under the main analysis in Table 4, suggesting that our main findings are robust with the use of an alternate measure of CSR decoupling.

[3]Discretionary accruals are estimated based on Kothari, Leone and Wasley's (2005) modified Jones model, as per the equation below. The absolute value of residuals from this equation is our measure of discretionary accruals. A higher value of discretionary accruals indicates greater amounts of accrual-based earnings management (*AEM*) and thus greater information asymmetry.

[4]We follow Fiechter, Hitz and Lehmann (2022) and use CSR controversies as a measure of the information asymmetry-related CSR practices of the firm. Using ESG controversies as a measure of information asymmetry yielded consistent results.

[5]To form the alternative measure of CSR decoupling (*GAP1*), we exclude the CG component and calculate CSR performance and the disclosure score as the average of the environmental and social performance and disclosure score.

Table 7. Female directors, information asymmetry, and CSR gap

	FE		Lagged FE		OLS		Lagged OLS	
Variable	*AEM*	*GAP*	*AEM*	*GAP*	*AEM*	*GAP*	*AEM*	*GAP*
FPRO	−0.029***	−0.034	−0.014**	−0.080	−0.023***	0.476***	−0.019***	0.534***
	(−3.55)	(−0.19)	(−2.08)	(−0.40)	(−4.57)	(3.17)	(−4.29)	(3.23)
AEM		0.519**		0.818***		0.425*		0.672***
		(2.48)		(3.84)		(1.82)		(2.73)
FPRO∗AEM		−4.502**		−6.475***		−4.436**		−4.804**
		(−2.32)		(−2.98)		(−2.38)		(−2.31)
BSIZE	0.005	−0.059	−0.006	0.025	0.004	0.211***	−0.000	0.262***
	(1.28)	(−0.93)	(−1.64)	(0.37)	(1.41)	(4.73)	(−0.08)	(5.41)
BIND	0.003	−0.202	−0.007	−0.452**	0.012*	−0.284**	0.007	−0.297**
	(0.30)	(−1.22)	(−0.82)	(−2.54)	(1.77)	(−2.41)	(1.12)	(−2.36)
BMEET	0.001	−0.071***	0.003**	−0.049*	0.002*	−0.038*	0.003***	−0.025
	(0.75)	(−2.92)	(2.28)	(−1.84)	(1.87)	(−1.76)	(2.96)	(−1.05)
DUAL	−0.002	−0.052**	−0.001	−0.009	−0.002	−0.051***	−0.002*	−0.038**
	(−1.36)	(−2.14)	(−0.76)	(−0.34)	(−1.51)	(−2.91)	(−1.75)	(−1.96)
PM	−0.037***	−0.034	−0.008	−0.018	−0.016***	0.466***	−0.004	0.303***
	(−6.28)	(−0.38)	(−1.57)	(−0.18)	(−3.90)	(6.32)	(−0.94)	(5.54)
ROA	0.030***	0.041	0.021**	0.041	−0.104***	−0.394***	−0.102***	0.206*
	(2.75)	(0.24)	(2.23)	(0.22)	(−12.45)	(−2.65)	(−13.00)	(1.86)
CI	0.000	0.017**	0.001	0.020*	0.002***	0.039***	0.003***	0.069***
	(0.97)	(2.15)	(1.51)	(1.69)	(7.28)	(8.65)	(10.05)	(10.33)
R&D	0.036**	0.129	−0.002	−0.247	−0.025***	0.411***	−0.022***	0.442***
	(2.22)	(0.51)	(−0.15)	(−0.80)	(−4.64)	(4.43)	(−4.46)	(4.11)
AFE	0.000	−0.006	−0.000	−0.009	0.000**	0.004	0.000	0.006
	(0.94)	(−1.02)	(−0.29)	(−1.09)	(2.01)	(1.37)	(1.50)	(1.46)
SLACK	0.001	0.017	−0.002***	0.019	−0.004***	−0.011	−0.005***	−0.009
	(1.23)	(1.57)	(−3.30)	(1.54)	(−8.36)	(−1.53)	(−12.16)	(−1.04)
COD	0.030**	−0.137	0.019*	−0.047	0.053***	0.505***	0.052***	0.547***
	(2.28)	(−0.68)	(1.75)	(−0.21)	(5.45)	(2.98)	(5.90)	(2.93)
INST	−0.003**	−0.018	−0.002*	0.000	−0.002**	−0.110***	−0.001	−0.101***
	(−2.38)	(−0.96)	(−1.94)	(0.01)	(−2.16)	(−5.88)	(−1.34)	(−4.98)
STATE	−0.009	0.088	−0.004	0.130	−0.000	0.158	0.002	0.200*
	(−1.15)	(0.75)	(−0.67)	(1.01)	(−0.01)	(1.46)	(0.34)	(1.76)
SIZE	−0.005***	0.176***	−0.007***	0.191***	−0.002***	0.249***	−0.002***	0.267***
	(−2.87)	(6.97)	(−5.32)	(6.74)	(−4.49)	(31.08)	(−3.92)	(30.03)
Intercept	0.143***	−3.983***	0.213***	−4.729***	0.107***	−5.655***	0.110***	−6.635***
	(5.60)	(−10.05)	(9.60)	(−10.43)	(11.45)	(−34.43)	(13.04)	(−36.96)
N	8,229	8,229	6,937	6,934	8,229	8,229	6,937	6,934
Firm & Year	Yes	Yes	Yes	Yes	–	–	–	–
Industry & Year	–	–	–	–	Yes	Yes	Yes	Yes
Adj. R^2	0.101	0.190	0.129	0.177	0.165	0.255	0.201	0.260
F-stat	13.08	13.21	10.40	9.893	40.57	66.48	44.52	58.97

Note: Absolute discretionary accruals (*AEM*) is our proxy of information asymmetry measured through the modified Jones model. *FPRO X AEM* is the interaction term between the proportion of female directors on the board and absolute discretionary accruals. *, **, and *** represent significance at the 0.1, 0.05, and 0.01 levels, respectively. T statistics are given in parentheses.
All variables are as defined in Table 1.

Alternate measures of BGD. We also ensure the robustness of our main findings against different measures of BGD. We replace our main proxy, *FPRO*, with alternate measures of BGD, namely the Blau (*BLAU*) and Shannon (*SHANNON*) diversity indices, as defined in Table 1. The results reported in Table 10 show that these alternate measures of BGD confirm our main findings reported in Table 4. [6]

[6]The unreported results also confirm our main finding using the number and presence of female directors on the board as alternate proxies. These results are available upon request.

Table 8. Results using high and low governance quality subsamples

	GAP							
	FE		Lagged FE		OLS		Lagged OLS	
Variable	*Low governance*	*High governance*	*Low governance*	*High governance*	*Low governance*	*High governance*	*Low governance*	*High governance*
FPRO	−0.530**	−0.224	−0.508**	−0.443	−0.291**	−0.150	−0.301*	−0.190
	(−2.43)	(−0.71)	(−1.98)	(−1.38)	(−2.11)	(−0.64)	(−1.80)	(−0.80)
BSIZE	−0.043	−0.048	0.220*	0.084	0.068	0.162	0.203***	0.310**
	(−0.43)	(−0.29)	(1.78)	(0.50)	(1.10)	(1.25)	(2.79)	(2.45)
BIND	−0.802***	−0.078	−0.828***	−0.379	−0.193	−0.280	−0.293	−0.430
	(−3.23)	(−0.17)	(−2.84)	(−0.80)	(−1.19)	(−0.81)	(−1.58)	(−1.26)
BMEET	−0.090**	−0.087	−0.094**	0.001	−0.077**	0.023	−0.120***	0.050
	(−2.31)	(−1.40)	(−1.98)	(0.02)	(−2.48)	(0.41)	(−3.20)	(0.87)
DUAL	−0.114***	0.077	−0.062	−0.018	−0.060**	−0.066	−0.042	−0.089**
	(−2.81)	(1.33)	(−1.31)	(−0.32)	(−2.23)	(−1.47)	(−1.32)	(−1.98)
PM	−0.045	−0.564**	0.169	−0.536**	0.087	−0.289	0.132	−0.369*
	(−0.33)	(−2.41)	(0.93)	(−2.31)	(0.89)	(−1.33)	(1.05)	(−1.70)
ROA	0.100	0.679	−0.086	0.738*	−0.305	0.917**	−0.440*	1.053**
	(0.39)	(1.58)	(−0.27)	(1.73)	(−1.51)	(2.16)	(−1.75)	(2.48)
CI	0.000	0.052*	0.014	0.055*	0.009**	0.073***	0.001	0.080***
	(0.04)	(1.85)	(0.67)	(1.85)	(2.49)	(3.48)	(0.90)	(3.80)
R&D	−0.143	2.636**	−0.045	3.502***	−0.171	1.283***	−0.063	1.193***
	(−0.31)	(2.34)	(−0.07)	(2.82)	(−1.09)	(3.18)	(−0.32)	(2.82)
AFE	0.000	0.000	0.000	−0.001	0.000	−0.003	0.000	−0.003
	(0.09)	(0.02)	(0.07)	(−0.07)	(1.42)	(−0.46)	(0.97)	(−0.52)
SLACK	0.013	0.064	0.020	0.074	0.002	−0.009	0.015	−0.011
	(0.80)	(1.36)	(1.00)	(1.40)	(0.18)	(−0.30)	(1.14)	(−0.36)
COD	0.328	0.875	0.500	0.713	0.744***	0.825*	0.822***	0.920*
	(1.01)	(1.60)	(1.28)	(1.27)	(2.91)	(1.79)	(2.80)	(1.93)
INST	−0.045	0.041	−0.057	0.030	−0.114***	−0.019	−0.109***	−0.020
	(−1.47)	(0.91)	(−1.60)	(0.67)	(−4.07)	(−0.45)	(−3.42)	(−0.45)
STATE	−0.231	0.427*	0.118	0.237	−0.181	0.367**	−0.201	0.310*
	(−1.09)	(1.96)	(0.39)	(1.05)	(−0.88)	(2.09)	(−0.84)	(1.74)
SIZE	0.152***	0.214***	0.173***	0.192***	0.183***	0.267***	0.197***	0.277***
	(3.46)	(3.13)	(3.25)	(2.70)	(12.48)	(11.82)	(11.34)	(11.98)
Intercept	−2.909***	−5.416***	−4.377***	−5.395***	−4.047***	−6.246***	−4.986***	−6.776***
	(−4.35)	(−4.84)	(−5.21)	(−4.62)	(−13.32)	(−9.09)	(−13.74)	(−8.10)
N	3,142	1,659	2,428	1,543	3,142	1,659	2,428	1,543
Firm & Year	Yes	Yes	Yes	Yes	–	–	–	–
Industry & Year	–	–	–	–	Yes	Yes	Yes	Yes
Adj. R^2	0.166	0.163	0.162	0.153	0.332	0.306	0.325	0.336
F-stat	8.447	5.536	4.346	5.052	10.09	7.638	7.957	8.237

Note: The *low-governance* subsample includes firms in the bottom quartile based on the Asset4 corporate governance performance score by industry-year, and the *high-governance* subsample includes firms in the top quartile based on the Asset4 corporate governance performance score by industry-year.

*, **, and *** represent significance at the 0.1, 0.05, and 0.01 levels, respectively. T statistics are given in parentheses.

All variables are as defined in Table 1.

Endogeneity tests. Although endogeneity is addressed in the main analysis by using multiple econometric specifications (i.e. the FE and lagged board approach), our results may still be subject to self-selection bias, sample-selection bias or unobservable heterogeneity. Consistent with the literature (e.g. Atif *et al.*, 2020; Gull *et al.*, 2018; Liu, 2018; Nekhili, Bennouri and Nagati, 2022; Sauerwald and Su, 2019; Shahab *et al.*, 2022; Usman *et al.*, 2022; Zalata *et al.*, 2019), we use propensity score matching (PSM), the Heckman selection model, and two-stage least squares (2SLS) with an instrumental variable approach to further address the issue of endogeneity.

Table 9. Results using an alternate measure of the CSR gap

	GAP1			
Variable	FE	Lagged FE	OLS	Lagged OLS
FPRO	−0.071*	−0.058	−0.203***	−0.180***
	(−1.85)	(−1.41)	(−6.99)	(−5.70)
BSIZE	−0.010	−0.066***	−0.087***	−0.098***
	(−0.50)	(−3.33)	(−5.99)	(−6.38)
BIND	−0.032	0.115**	−0.036	0.040
	(−0.60)	(2.11)	(−0.93)	(0.98)
BMEET	−0.001	0.006	−0.010	−0.004
	(−0.16)	(0.75)	(−1.37)	(−0.52)
DUAL	0.003	0.001	−0.002	0.003
	(0.48)	(0.14)	(−0.27)	(0.55)
PM	0.044*	0.041	0.055**	0.046*
	(1.71)	(1.45)	(2.49)	(1.81)
ROA	−0.081	−0.080	−0.115**	−0.090*
	(−1.62)	(−1.46)	(−2.51)	(−1.75)
CI	−0.001	0.001	0.001	0.003**
	(−0.67)	(0.31)	(1.39)	(2.27)
R&D	−0.065	−0.049	−0.059	−0.033
	(−0.85)	(−0.54)	(−1.64)	(−0.81)
AFE	0.000	0.000	0.001***	0.001***
	(0.42)	(0.36)	(8.00)	(7.51)
SLACK	−0.002	−0.001	−0.001	−0.002
	(−0.51)	(−0.22)	(−0.53)	(−0.54)
COD	0.091	0.118*	0.019	0.027
	(1.52)	(1.86)	(0.33)	(0.44)
INST	−0.000	0.000	0.006	0.004
	(−0.05)	(0.02)	(0.97)	(0.67)
STATE	0.031	0.013	0.053	0.052
	(0.85)	(0.34)	(1.60)	(1.52)
SIZE	−0.058***	−0.053***	−0.064***	−0.057***
	(−7.72)	(−6.59)	(−22.66)	(−18.52)
Intercept	0.722***	0.619***	1.097***	1.001***
	(5.92)	(4.73)	(13.54)	(9.38)
N	6,157	5,369	6,157	5,369
Firm & Year	Yes	Yes	–	–
Industry & Year	–	–	Yes	Yes
Adj. R^2	0.197	0.192	0.382	0.373
F-stat	111.6	88.63	24.50	21.47

Note: *, **, and *** represent significance at 0.1, 0.05, and 0.01 levels, respectively. T statistics are given in parentheses. All variables are as defined in Table 1.

PSM. Following extant studies (e.g. Gull *et al.*, 2018; Nekhili, Bennouri and Nagati, 2022; Usman *et al.*, 2022), we use PSM to control for self-selection bias, which refers to the possibility that the negative impact of female directors on CSR decoupling may be due to some unobservable factors that may simultaneously determine BGD and CSR decoupling. We therefore pair match firm-year observations from the subsamples with higher proportions of female directors with firms with lower proportions of female directors within each year by industry and other firm-level matching criteria, including all the control variables. We first run a probit model by regressing *FPRO_DUMMY*[7] on all the control variables, including year and industry effects, to estimate the predicted value of appointing FPRO.[8] Our matched sample consists of 7,042 firm-year observations and is identical based on firm-level variables but different based on BGD.

[7] *FPRO_DUMMY* is coded 1 if *FPRO* is higher than the industry-year average and 0 otherwise.

[8] We use the nearest-neighbour option and set the maximum PSM matching difference at 1%.

Table 10. *Results using alternate measures of female directors*

Variable	GAP							
	FE		**Lagged FE**		**OLS**		**Lagged OLS**	
BLAU	−0.328***	–	−0.461***	–	−0.158**	–	−0.151**	–
	(−3.63)		(−4.66)		(−2.43)		(−2.10)	
SHANNON	–	−0.412***	–	−0.572***	–	−0.227***	–	−0.216**
		(−3.47)		(−4.41)		(−2.62)		(−2.27)
BSIZE	−0.064	−0.058	0.053	0.061	0.132***	0.136***	0.219***	0.223***
	(−1.09)	(−0.99)	(0.83)	(0.96)	(3.13)	(3.21)	(4.76)	(4.83)
BIND	−0.261*	−0.262*	−0.514***	−0.516***	−0.212*	−0.210*	−0.311***	−0.309***
	(−1.68)	(−1.68)	(−3.08)	(−3.09)	(−1.91)	(−1.89)	(−2.60)	(−2.58)
BMEET	−0.062***	−0.061***	−0.047*	−0.046*	−0.058***	−0.058***	−0.059***	−0.059***
	(−2.71)	(−2.70)	(−1.85)	(−1.83)	(−2.86)	(−2.87)	(−2.63)	(−2.64)
DUAL	−0.022	−0.022	0.004	0.005	−0.019	−0.020	−0.004	−0.004
	(−1.00)	(−0.99)	(0.17)	(0.19)	(−1.18)	(−1.19)	(−0.19)	(−0.20)
PM	−0.064	−0.065	−0.003	−0.004	0.184***	0.183***	0.209***	0.209***
	(−0.80)	(−0.81)	(−0.04)	(−0.05)	(2.80)	(2.79)	(2.71)	(2.71)
ROA	0.056	0.056	0.004	0.005	−0.129	−0.129	−0.174	−0.174
	(0.37)	(0.37)	(0.02)	(0.03)	(−0.97)	(−0.97)	(−1.12)	(−1.13)
CI	0.014***	0.014***	0.023***	0.023***	0.015***	0.015***	0.020***	0.020***
	(3.14)	(3.13)	(3.03)	(3.02)	(5.29)	(5.28)	(5.21)	(5.20)
R&D	0.417*	0.417*	0.296	0.299	0.270***	0.271***	0.323***	0.324***
	(1.91)	(1.91)	(1.04)	(1.05)	(2.67)	(2.68)	(2.75)	(2.76)
AFE	0.000	0.000	0.000	0.000	0.000	0.000	−0.000	−0.000
	(0.03)	(0.02)	(0.07)	(0.06)	(0.14)	(0.14)	(−0.29)	(−0.28)
SLACK	0.021**	0.021**	0.025**	0.025**	−0.001	−0.001	0.005	0.005
	(2.02)	(2.01)	(2.08)	(2.08)	(−0.11)	(−0.12)	(0.60)	(0.60)
COD	−0.034	−0.030	0.073	0.077	0.098	0.100	0.135	0.137
	(−0.18)	(−0.16)	(0.35)	(0.37)	(0.60)	(0.61)	(0.75)	(0.76)
INST	−0.032*	−0.032*	−0.016	−0.016	−0.087***	−0.087***	−0.077***	−0.077***
	(−1.86)	(−1.85)	(−0.88)	(−0.87)	(−5.03)	(−5.01)	(−4.12)	(−4.11)
STATE	0.111	0.112	0.132	0.134	0.180*	0.181*	0.161	0.162
	(1.03)	(1.04)	(1.11)	(1.13)	(1.83)	(1.84)	(1.54)	(1.54)
SIZE	0.186***	0.186***	0.205***	0.205***	0.261***	0.261***	0.280***	0.280***
	(8.21)	(8.22)	(8.07)	(8.08)	(31.61)	(31.65)	(30.38)	(30.41)
Intercept	−4.091***	−4.105***	−4.922***	−4.939***	−5.700***	−5.708***	−6.647***	−6.655***
	(−11.43)	(−11.47)	(−12.08)	(−12.12)	(−28.45)	(−28.48)	(−29.55)	(−29.58)
N	9,276	9,276	7,801	7,801	9,276	9,276	7,801	7,801
Firm & Year	Yes	Yes	Yes	Yes	–	–	–	–
Industry & Year	–	–	–	–	Yes	Yes	Yes	Yes
Adj. R^2	0.186	0.188	0.191	0.194	0.315	0.316	0.325	0.326
F-stat	16.36	16.32	12.31	12.22	25.71	25.72	23.05	23.05

Note: *, **, and *** represent significance at the 0.1, 0.05, and 0.01 levels, respectively. T statistics are given in parentheses.
All variables are as defined in Table 1.
To further validate our main results, we used an alternate measure for BGD, namely the Blau (1977) diversification index that ranges between 0 and 0.5 for when there is no gender diversity at all and when there is an equal proportion of male and female members in each level, respectively. Proponents of the Blau index argue that it is superior at recording the diversity effect compared with the measure based on percentage. Another alternate measure we used was the Shannon (1948) diversification index. This metric takes values between 0 and 0.693, when there is no gender diversification and when there is an equal proportion of each gender category, respectively.

We perform two diagnostic tests to ensure that matching has been performed correctly. First, we re-estimate the probit regression using the post-match sample. The results (Column 2, Table 11) show that the coefficients on the explanatory variables are statistically insignificant, demonstrating that all the differences have been removed by PSM except the presence of FPRO. Second, we test the differences in the mean of each observable characteristic between the treatment and the control firm-year observations using a post-match sample. Table 12 shows no significant differences in the

Table 11. Endogeneity tests

	PSM			Two-step Heckman		2SLS	
	Pre-match probit	**Post-match probit**	**FE**	**Probit**	**FE**	**1st stage**	**2nd stage**
Variables	*FPRO_DUMMY*	*FPRO_DUMMY*	*GAP*	*FPRO_DUMMY*	*GAP*	*FPRO*	*GAP*
FPRO	–	–	−0.503***	–	−0.417***	–	−0.509***
			(−3.51)		(−2.71)		(−2.69)
MILLS	–	–	–	–	0.058	–	–
					(0.81)		
BOARD_CONNECT	–	–	–	0.914***	–	0.043***	–
				(12.28)		(15.73)	
FEM/MALE_HQ	–	–	–	–	–	0.409***	–
						(58.70)	
BSIZE	0.451***	−0.017	−0.056	−0.088	−0.017	−0.014***	0.196***
	(5.56)	(−0.11)	(−0.80)	(−0.85)	(−0.23)	(−3.23)	(3.86)
BIND	1.551***	0.190	−0.029	1.331***	−0.247	0.040***	−0.178
	(7.20)	(0.42)	(−0.15)	(4.99)	(−1.28)	(3.55)	(−1.32)
BMEET	0.081**	−0.046	−0.066**	0.112**	−0.056**	0.006***	−0.070***
	(2.09)	(−0.73)	(−2.45)	(2.39)	(−2.08)	(3.21)	(−2.95)
DUAL	0.086***	−0.007	0.003	0.073**	−0.051*	0.004**	−0.028
	(2.73)	(−0.12)	(0.13)	(1.96)	(−1.94)	(2.53)	(−1.48)
PM	−0.136	0.051	−0.042	0.034	−0.018	−0.002	0.272***
	(−1.07)	(0.24)	(−0.44)	(0.22)	(−0.18)	(−0.35)	(3.48)
ROA	0.529**	−0.118	0.011	0.570*	0.071	0.019	−0.114
	(2.04)	(−0.29)	(0.06)	(1.83)	(0.38)	(1.47)	(−0.72)
CI	−0.019***	−0.000	0.009	−0.013**	0.007	−0.001**	0.016***
	(−3.28)	(−0.04)	(1.41)	(−2.00)	(1.17)	(−2.06)	(4.73)
R&D	0.941***	−0.072	0.394	1.167***	0.093	0.029***	0.455***
	(4.85)	(−0.20)	(1.47)	(4.68)	(0.31)	(2.80)	(3.63)
AFE	−0.000	−0.000	−0.000	−0.001	0.001	−0.000	−0.000
	(−0.16)	(−0.22)	(−0.16)	(−0.48)	(0.41)	(−0.51)	(−0.20)
SLACK	−0.003	−0.006	0.038***	−0.032*	0.007	0.001	−0.021**
	(−0.22)	(−0.23)	(3.05)	(−1.72)	(0.49)	(1.39)	(−2.21)
COD	0.817***	0.021	−0.206	1.269***	0.275	0.016	0.402**
	(2.63)	(0.04)	(−0.93)	(3.31)	(1.17)	(1.01)	(2.09)
INST	0.014	0.027	−0.025	−0.023	−0.020	−0.001	−0.071***
	(0.40)	(0.52)	(−1.24)	(−0.59)	(−1.03)	(−0.46)	(−3.62)
STATE	−0.047	0.053	0.124	−0.160	0.089	−0.012	0.188*
	(−0.25)	(0.17)	(0.98)	(−0.76)	(0.74)	(−1.42)	(1.80)
SIZE	0.183***	−0.025	0.199***	0.152***	0.175***	0.009***	0.278***
	(11.58)	(−0.75)	(7.34)	(8.14)	(6.11)	(12.05)	(29.45)
Intercept	−5.995***	0.502	−4.495***	−3.743***	−4.220***	−0.148***	−6.233***
	(−15.39)	(0.66)	(−10.42)	(−7.42)	(−8.66)	(−7.00)	(−24.88)
N	9,048	7,042	7,042	6,931	6,931	7,147	7,147
Firm & Year	–	–	Yes	–	Yes	–	–
Industry & Year	Yes	Yes	–	Yes	–	Yes	Yes
R^2	–	–	0.173	–	0.210	0.358	
Pseudo R^2	0.053	0.003	–	0.087	–	–	
F-statistic	–	–	12.84	–	–	23.06	
Underidentification test:							
Kleibergen–Paap rk LM statistic	–	–	–	–	–	2,595.34***	
Weak identification test:							
Cragg–Donald Wald F statistic	–	–	–	–	–	1,988.56	
Stock–Yogo critical value at 10% IV size	–	–	–	–	–	19.93	
Overidentification test of instruments:							
Sargan (p-*value*)	–	–	–	–	–	0.21	

Note: *FPRO_DUMMY* in probit regressions of PSM and two-step Heckman is a dummy variable coded '1' if the proportion of female directors on the board is higher than the industry-year average and '0' otherwise. *MILLS* is the inverse of the Mills ratio to control for self-selection in the second stage of the Heckman selection model. *BOARD_CONNECT* in probit regression of two-step Heckman and first stage of 2SLS is used as an instrument. *BOARD_CONNECT* is measured as the number of male directors with board connections to women divided by the number of male directors on the board. Male directors are defined as having board connections to women when they sit on at least one other board on which there are female directors. *FEM/MALE_HQ* is our second instrument, defined as the female to male director ratio by headquarter location using city.

*, **, and *** represent significance at the 0.1, 0.05, and 0.01 levels, respectively. T statistics are given in parentheses.

All variables are as defined in Table 1.

Table 12. Post-matched sample analysis

	Treatment group (*FPRO_DUMMY = 1*) *N = 3521*	**Control group (*FPRO_DUMMY = 0*)** *N = 3521*	
Variable	**Mean**	**Mean**	**Mean difference**
BSIZE (logged value)	2.294	2.296	−0.002
BIND	0.864	0.863	0.001
BMEET (logged value)	2.009	2.017	−0.008
DUAL	0.692	0.696	−0.004
PM	0.054	0.053	0.001
ROA	0.052	0.052	0.000
CI	1.826	1.844	−0.018
R&D	0.047	0.047	0.000
AFE	1.238	1.391	−0.153
SLACK	0.933	0.935	−0.002
COD	0.072	0.072	0.000
INST	0.743	0.733	0.010
STATE	0.005	0.005	0.000
SIZE	15.318	15.349	−0.031

Note: This table presents the mean differences in firm-level variables for the treatment and group based on the original and propensity score-matched samples.
*, **, and *** denote statistical significance at the 1%, 5%, and 10% levels, respectively.
All variables are as defined in Table 1.

observable characteristics between the treatment and the control groups. Collectively, the results of our diagnostic tests confirm that PSM removes all the observable differences in the explanatory variables other than those related to BGD.

We then re-estimate Equation (1) on the matched sample using FE regression. The results (Table 11, PSM column) still show a negative association between BGD and CSR decoupling, confirming that our findings are free from self-selection bias.

Heckman selection model. Despite PSM, our reported findings may be subject to sample-selection bias, as our dependent variable (i.e. CSR decoupling) is unobservable (Sauerwald and Su, 2019). We therefore use the two-stage model introduced by Heckman (1976) to address the issue of sample-selection bias (see Sauerwald and Su, 2019). In the first stage, we run a probit model predicting the probability of hiring female directors. Following Adams and Ferreira (2009), we control for *BOARD_CONNECT* in the probit model, namely the number of male directors with board connections to women divided by the number of male directors on a board, because this is likely to affect the appointment of female directors while not necessarily affecting our dependent variable. We exclude *BOARD_CONNECT* from the second-stage model. In addition to *BOARD_CONNECT*, we also control for board- and firm-level variables including year and industry in the first-stage probit model. We then compute the inverse Mills ratio (*Mills*) and re-estimate Equation (1) using FE regression by including *Mills* as an additional control variable to tackle the issue of sample-selection bias. The results, reported in Table 11, continue to reflect that BGD is negatively and significantly associated with CSR decoupling, confirming that sample-selection bias does not drive our main findings.

2SLS

Finally, we use the 2SLS estimation approach, which is highly recommended for addressing the issue of endogeneity (see Adams and Ferreira, 2009; Atif *et al.*, 2020; Usman *et al.*, 2022; Zalata *et al.*, 2019). The main challenge is to find valid instruments that are neither directly nor indirectly associated with the dependent variable. Following extant literature (see Adams and Ferreira, 2009; Gull, Atif and Hussain, 2022; Usman *et al.*, 2022), we use board connections with female directors (*BOARD_CONNECT*) and the female-to-male-director ratio by headquarter city (*FEM/MALE_HQ*), which are likely to affect the level of BGD but unlikely to be associated with our dependent variable. As expected, the first-stage regression results reported in Table 11 under the 2SLS column show that the coefficient on *BOARD_CONNECT* and *FEM/MALE_HQ* is positive and highly significant. We test the validity of our instrument in several other ways. First, the *F-statistic* of the first-stage regression is 23.06, higher than the recommended value of 10. Second, the Kleibergen–Paap rk *LM-statistic* (under-identification test) is statistically significant, suggesting that the model is not under-identified. Third, the Cragg–Donald Wald *F-statistic* is higher than the Stock–Yogo weak ID test critical value at the 10% IV size (weak identification test), suggesting that our instrument is not weak. Finally, the over-identification test of instruments, that is, the insignificant Sargan (*p*-value), confirms that the instruments are not over-identified. The second-stage results are reported in Table 11 under the 2SLS column. These show that the coefficient on *FPRO* remains negative and statistically significant.

Discussion and conclusions

The main objective of this study was to examine the relationship between BGD and CSR decoupling. It is well documented that firms often experience misalignment between internal CSR activities and external CSR communication, which is value destroying for the firm and its stakeholders (Hawn and Ioannou, 2016; García-Sánchez *et al.*, 2020). CSR decoupling can be viewed as managerial opportunism that arises owing to the exploitation of information asymmetry between firms and stakeholders (Jain, 2017). Despite the harmful consequences of CSR decoupling, the role of internal CG monitoring in relation to CSR decoupling is still a black box. CG research suggests that female directors play a significant role in promoting firms' internal and external CSR activities. Based on a US sample of 9,276 firm-year observations for the period 2002−2017, our results support the main hypothesis that female directors are instrumental in reducing CSR decoupling.

Our study contributes to the CG and CSR research stream by investigating whether and to what extent board structures, particularly BGD, can limit CSR decoupling. Prior studies have revealed that women are less likely to accept opportunistic behaviour, which positively affects their oversight ability (Krishnan and Parsons, 2008; Thorne, Massey and Magnan, 2003). Based on the main premise of agency theory, we argue that monitoring would leave the management with fewer incentives to use decoupling as a convenient arrangement. Our argument strengthens the anecdotal evidence showing oversight improvements on CG boards with more female directors. Our results, in line with previous research, suggest that female directors curb managerial opportunism by reducing information asymmetry (Gull *et al.*, 2018; Zalata *et al.*, 2019) and effectively monitoring (Adams and Ferreira, 2009; Jain and Zaman, 2019) firms' CSR strategies. Our findings also support the gender socialization perspective, which suggests that females are ethically sensitive and care for stakeholders as a result of their upbringing (Atif *et al.*, 2020; Bear, Rahman and Post, 2010). Furthermore, these findings help overcome the existing fragmentation in the recent literature concerning the relationship between BGD and CSR decoupling. For instance, García-Sánchez *et al.* (2021) note that BGD has a positive relationship with CSR decoupling, while Gull *et al.* (2022) document no significant effect of females' presence on CSR committees on CSR decoupling. Our research provides a more nuanced understanding about the effect of BGD and CSR decoupling through an in-depth examination of the relationship between various BGD elements and CSR decoupling.

In line with the agency perspective, studies on the value relevance of BGD argue that female representation on corporate boards improves monitoring by changing group dynamics (Adams and Ferreira, 2009), bringing different viewpoints to board discussions (Lai *et al.*, 2017), and increasing the level of transparency (Gul, Srinidhi and Ng, 2011). Our study yields similar results and shows that an increased level of BGD significantly improves the oversight of CSR-related activities. To further contribute to the agency perspective, we tested the effect of different board monitoring dynamics, that is, the presence of independent versus executive female directors. Our findings suggest that non-executive directors use monitoring channels (Liu, Wei and Xie, 2014) to curb CSR faking.[9] They also suggest that independence results in impartial behaviour, hence strengthening the oversight activities of directors. Contrarily, ex-

[9]Additionally, we analysed the effect of male versus female independent directors on CSR decoupling. The female independent directors show a significantly stronger effect than their male counterparts. These results are available upon request.

ecutive directors play an insignificant role in limiting decoupling practices. The potential explanation for the insignificant relationship between executive female directors and CSR decoupling is the fact that they belong to old boys clubs and hence their monitoring intensity could be compromised.

Heeding the call of Rigolini and Huse (2019) to provide a more nuanced view of the impact of BGD, we go beyond a simple test of critical mass theory by capturing the effect of differential increases in the representation of female directors on CSR decoupling by studying skewed, tilted, and balanced boards. We note that while boards with a minority representation of female directors demonstrate reduced CSR decoupling, the presence of a larger proportion of female directors does so more prominently. This provides strong empirical support to critical mass theory in the context of CSR decoupling and contributes to studies on the relationship between critical masses and CSR (e.g. Atif *et al.*, 2020; Post, Rahman and Rubow, 2011). We also add to the findings of Seebeck and Vetter (2021) by showing that increased BGD improves firm transparency.

We further add new robust evidence to this literature strand by showing that while the number of female directors on a corporate board matters, their roles on boards are very important: well thought-through BGD can significantly curb CSR decoupling practices. Importantly, we find that the significantly negative impact of BGD on CSR decoupling holds only for firms with low CG quality, thereby expanding existing empirical evidence (e.g. Adams and Ferreira, 2009; Wahid, 2019). These results align with extant literature showing that gender-diverse boards could act as a substitute mechanism for CG that would otherwise be weak (Gul, Srinidhi and Ng, 2011). Additionally, our study contributes to the growing literature concerning the role of BGD in promoting *real* CSR engagement (Gull *et al.*, 2022).

Finally, our study has important policy implications regarding the benefits of BGD and the alignment of managerial and stakeholder interests. Given the mounting pressures faced by companies to increase women's representation on corporate boards viz-a-viz gender quotas and societal expectations, our study supports the business case for a higher representation of female directors on boards (Nadeem, 2020; Nekhili, Bennouri and Nagati, 2022; Torchia, Calabrò and Huse, 2011) and for a careful consideration of how such an increase can be executed (i.e. which role female directors should have in the boardroom). Our study shows that increasing female representation on boards is socially desirable. Recent sustainability-related scandals have pushed policy makers to formulate mandatory CSR reporting regulations. These mandatory regulations may result in a higher level of CSR decoupling. Our study provides important insights about the CG determinants of CSR decoupling.

We acknowledge that our study suffers from some limitations. First, this study considers a global measure of CSR decoupling, and we were unable to capture specific dimensional-level decoupling. CSR has a multifaceted nature that includes various aspects of social and environmental practices. Some recent studies argue that firms may decouple CSR practices at such dimensional levels (García-Sánchez *et al.*, 2021). Future research should delve deeper into whether and how BGD affects dimensional CSR decoupling. Marquis, Toffel and Zhou (2016) show that firms selectively disclose information about their environmental performance. We encourage future investigations of the association between BGD and such selective disclosures. Research has also suggested that directors' backgrounds could significantly affect CSR decoupling (Sauerwald and Su, 2019). Future research should investigate whether the background and specific functional capabilities of female directors moderate the BGD and CSR decoupling relationship.

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