Prioritizing Social Issues: The Role of Women on Corporate Boards*

Tinghua Duan, Siyue (Sarina) Guo, Oskar Kowalewski

Abstract

We examine whether the increase of female representative on boards local press is an effective monitor of corporate ESG misconduct. Specifically, using the natural experiment created by changes in board gender quota laws across different states in the United States (US), we find that the increased presence of women on boards decreases firms' environmental and social (E&S) misconduct, with the reduction primarily driven by corporate social misconduct. This negative effect is driven by female non-executive directors, especially non-busyness NED. We also find that the increase representative of female directors in E&S committees is associated with less social misconduct. Our findings highlight the emphasis women place on addressing social issues.

Keywords: gender diversity reforms, misconducts, law, enforcement *JEL Code:* G34, G38, J16, K00, K42

^{*}Tinghua Duan: EDHEC Business School, Nice, France. Emal: <u>tinghua.duan@edhec.edu</u>. Siyue (Sarina) Guo: IESEG School of Management, Univ. Lille, CNRS, UMR 9221 - LEM - Lille Economie Management, F-59000 Lille, France. Email: <u>s.guo@ieseg.fr.</u> Oskar Kowalewski: IESEG School of Management, Univ. Lille, CNRS, UMR 9221 - LEM - Lille Economie Management, F-59000 Lille, France. Email: <u>o.kowalewski@ieseg.fr</u>. We thank Ved Dilip Beloskar, John Kose, Marc Goergen, Iftekhar Hasan, Ben Sia and the participants of the Sustainable Finance Conference 2024 in Birmingham for helpful comments. All errors and omissions are ours.

1. Introduction

The growing emphasis on Corporate Social Responsibility (CSR) has intensified scrutiny of corporate behavior, particularly in the context of environmental, social, and governance (ESG) issues. Corporate misconduct in these areas not only undermines stakeholder trust (Shanthikumar and Tori, 2023) but also imposes significant reputational and financial costs, underscoring the importance of robust governance mechanisms. Among these, board gender diversity has emerged as a critical factor in enhancing corporate governance and promoting ethical behavior. Empirical evidence suggests that gender-diverse boards improve Corporate Social Performance (CSP), particularly by addressing harmful business practices through empathetic and socially attuned decision-making (Boulouta, 2013). Nonetheless, the literature offers limited insight into the specific impact of board gender diversity on corporate misconduct, leaving a critical gap to be addressed.

This role of gender diversity in governance extends to environmental and social (E&S) dimensions, where female directors demonstrate a distinct orientation toward sustainable and ethical practices. Women are more likely to advocate for environmentally sustainable practices, driven by heightened ethical sensitivity and a greater aversion to environmental risks (Liao et al., 2015; Ben-Amar et al., 2017). Gender diversity has been associated with reductions in corporate carbon emissions, enhanced environmental performance, and stronger social responsibility initiatives, as female directors prioritize long-term, sustainable decision-making (Liu, 2018; Barroso et al., 2024). Moreover, female directors demonstrate a pronounced commitment to addressing social risks, including

workplace equity, consumer protection, and community welfare, which reduces corporate violations and fosters stakeholder trust (Ding et al., 2022).

Additionally, gender socialization and professional experiences equip women to address equity and transparency issues effectively. Women are socialized to be empathetic and community-oriented (Carlson, 1972; Gilligan, 1977) and often face career challenges that heighten their commitment to ethical practices (Eagly and Karau, 2002; Konrad et al., 2010). These factors suggest that gender-diverse boards are uniquely positioned to comprehensively tackle ESG risks, encompassing both environmental and social dimensions, thereby enhancing corporate accountability and ethical governance (Boulouta, 2013).

To examine the causal relationship between board gender diversity and corporate misconduct, we employ a difference-in-differences-in-differences (DiDiD) estimation approach, leveraging the staggered enactment of board gender diversity reforms across U.S. states. Using hand-collected data on these reforms and corporate misconduct records from Violation Tracker, our sample comprises 72,944 firm-year observations from 7,348 unique firms across all 50 states between 2000 and 2021. Our findings indicate that the adoption of board gender diversity reforms increases female board representation, which subsequently reduces corporate misconduct.

We further analyze this relationship by categorizing misconduct into environmental, social, and governance dimensions. Consistent with prior studies (Liu, 2018; Ding et al., 2022; Ginglinger and Raskopf, 2023), we find that the reduction in corporate misconduct is concentrated in environmental and social (E&S) offenses, with no significant impact on governance-related violations. Notably, the results reveal a stronger effect on reducing

corporate social misconduct compared to environmental misconduct, suggesting that female directors prioritize social issues.

To explore heterogeneity in these effects, we differentiate between binding reforms (legislative mandates) and non-binding reforms (governance code recommendations). Our results confirm that the increase in female board representation associated with governance code-based reforms is linked to significant reductions in corporate social misconduct.

Additionally, we investigate the monitoring role of female non-executive directors, who exhibit greater diligence in oversight and significantly enhance the board's monitoring effectiveness (Adams and Ferreira, 2009). Our analysis shows that reductions in corporate E&S misconduct following board gender diversity reforms are primarily driven by female non-executive directors. Furthermore, we find that female representation in E&S committees is associated with fewer instances of corporate social misconduct, highlighting their unique contribution to enhancing governance.

Beyond misconduct reduction, we examine the broader influence of board gender diversity reforms on firm policies. Our findings reveal a positive association between increased female representation and improvements in stock valuation and R&D expenditure, underscoring additional benefits of gender-diverse boards.

To ensure the robustness of these findings, we conduct several tests, including dynamic analysis, placebo tests, stacked DiD regressions, and controls for state-by-year and industry-by-year fixed effects. The results remain consistent across these tests, reinforcing the validity of our conclusions.

This study makes a number of contributions to existing literature. First, we contribute to a growing literature that empirically examines the impacts of boardroom

gender diversity reforms. Prior research provides mixed evidence of gender quotas effects on firm valuation, earnings quality, corporate innovation, corporate governance, investment outcomes and monitoring role of institutional investors (Ahern and Dittmar, 2012; Matsa and Miller, 2013; Srinidhi, Gul and Tsui, 2011; Gul, Srinidhi and Ng, 2011; Griffin, Li and Xu, 2021; Adams and Ferreira, 2009; Baik, Chen and Godsell, 2024; Fauver et al., 2024). There are also studies document that boardroom gender diversity reform is related to more renewable energy consumption (Atif et al., 2021), less corporate carbon emissions (Barroso et al., 2024) and higher E&S performance (Ginglinger and Raskopf, 2023).

To this end, our paper aligns with Hsu, Li and Pan (2022) who find that the increase of female director representation is associated with more environmental-friendly business operations and lower environmental risk. We show that having more female directors on the board leads to a reduction in corporate environmental misconduct and, even more significantly, in corporate social misconduct, indicating that women place a higher priority on social issues than on environmental issues.

Second, our study adds to the rapidly growing body of firms' misconduct by examining the roles of corporate culture backgrounds, external monitoring, financial players and non-traditional players. Specifically, Bereskin, Campbell and Kedia (2014) find that firms with philanthropic culture exhibit less corporate misbehavior. Firms with assigned monitor (Gallo, Lynch and Tomy, 2023), following the mandate disclosure (She, 2022; Christensen et al., 2017) and subject to governmental intervention (Heese, Krishnan and Ramasubramanian, 2021) are facing less violations and lower future fraud risk. Moreover, prior research demonstrates the effect in reducing corporate misconduct through institutional ownership (Li and Raghunandan, 2021) and independent directors' connections (Kuang and Lee, 2017). Additionally, there are also evidence that less corporate misconduct is associated with coworker's influence (Dimmock, Gerken and Graham, 2018), concentrated customer (Chen et al., 2023), ethics exam passing (Kowaleski, Sutherland and Vetter, 2020), 3G access (Heese and Pacelli, 2023), local newspaper closures (Heese, Pérez-Cavazos and Peter, 2022) and officers' good mood (Heese, Pérez-Cavazos and Pérez-Silva, 2023). Our study complements these findings by presenting evidence that the corporate board gender diversity governance mechanisms play a crucial role in reducing corporate misconduct.

Our conclusions align with those of Liu (2018) who finds that greater female board representation is expected to reduce the frequency of corporate environmental litigation. However, our study differs in several aspects. First, we find that the increase of female board representation leads to a more significant reduction in corporate social misconduct compared to environmental misconduct, underscoring the greater importance women place on social issues. Second, Liu (2018) focuses on environmental lawsuits as a proxy for environmental misconduct. Differently, we use both penalties and violation number to proxy corporate misconduct. Third, while Liu (2018) uses the proportion of female directors on the board to measure board gender diversity, we employ a staggered difference-in-differences-in-differences (DiDiD) estimation method to establish the causal effect focusing on the increase of female representation on the board under the context of boardroom gender diversity reform.

The rest of the paper proceeds as follows. Section 2 introduces the research design; Section 3 presents and discusses the empirical results; and Section 4 concludes the study.

2. Research Design

2.1 Data and Sample

We first obtain corporate misconduct data from Violation Tracker which was produced by the Corporate Research Project of Good Jobs. This database covers civil and criminal cases brought against U.S. firms and resolved by more than 400 federal, state and local regulatory agencies since 2000. Violation Tracker removes violations in which the penalty is lower than \$5,000 and those brought against government agencies or publicly owned entities, and links 628,000 civil and criminal cases to more than 3,000 parent companies. To get firm-level misconduct measures, we link each individual violation that is reported at the facility level to the parent company. We keep all cases in which the parent company is a publicly traded firm. We keep violations where the agency imposing the penalty is federate and drop violations by financial institutions. For firms that do not report any offenses in a year, we follow the procedure of Heese, Pérez Cavazos and Peter (2020) and consider the firm to have zero violations and penalties for the year.

Violation Tracker provides the basic information on the company, value of the penalties and offense type for each violation case. We group offense cases into environmental, social and governmental misconduct and get firms' total value of penalties and violation numbers for each misconduct type. Environmental misconduct includes environment-related offenses. Social misconduct includes employment-related offenses, consumer-protection-related offenses, safety-related offenses, and healthcare-related offenses, competition-related offenses and miscellaneous offenses.

Second, we collect information on U.S. boardroom gender diversity reforms from several sources, including Landefeld et al. (2020), Harvard Law School Forum on Corporate Governance (2020)² and Executive Advisory Institute (2023)³, and further crosscheck reforms searching in Google. We obtain board director characteristics from BoardEx and firm-level fundamentals data from Compustat North America.

After merging the Violation Tracker, BoardEx and Compustat database, our final sample contains 72,944 firm-year observations on 7,348 unique firms across 50 states from 2000 to 2021.

2.2 Descriptive Statistics

Table 1 presents the effective year, reform type and name of the boardroom gender diversity reforms in the U.S. Table 2 Panel A presents the sample distribution by state. Column (1) reports the number of unique firms in each state. Column (2) reports the number of firm-years in each state. Column (3) to (4) reports the total amount of penalties and the number of violations in each state. California accounts for the largest percentage of firm-year observations (14.47%) and unique firms (1,306). The states with the highest penalties are New York, North Carolina and California which account for 50.12% of the total amount of penalties. Panel B of Table 2 presents the summary statistics of the main variables used in this study. The average Ln(ESG Penalties) and Ln(ESG Violation) in our sample are 1.620 and 0.167, respectively. The average Ln(E&S Penalties) and Ln(E&S Violation) in our sample are 1.536 and 0.162, respectively. The average *Female directors* is 0.972.

² <u>https://corpgov.law.harvard.edu/2020/05/12/states-are-leading-the-charge-to-corporate-boards-diversify/</u> ³ <u>http://executive-advisoryinstitute.com/2023/03/27/board-diversity-legislation/</u>

2.3 Models and Identification Strategy

To examine the effect of board gender diversity reforms on corporate misconduct, we adopt the staggered DiDiD approach, following He et al. (2022) and Potemkina (2022). The first difference allows for estimating the changes in corporate misconduct among firms with different numbers of female directors. The second difference involves the comparison of firms' misconduct before and after the implementation of board gender diversity reforms, where only firms with fewer female directors than the prescribed quota are affected (treated). The third difference compares the outcome between treated and non-treated firms. Our DiDiD strategy estimates the differential changes in corporate misconduct after board gender diversity reforms, comparing firms with higher and lower numbers of female directors.

We conduct the DiDiD estimates using the following model :

 $Misconducts_{i,s,t+1}$

$$= \beta_{0} + \beta_{1} Post_{s,t} * Female \ directors_{i,s,t} + \beta_{2} Female \ directors_{i,s,t}$$
$$+ \beta_{3} Post_{s,t} + Control_{i,s,t} + \lambda_{i} + \lambda_{t} + \varepsilon_{i,s,t} \ (1)$$

where the dependent variable *Misconducts*_{*i*,*s*,*t*+1} is proxied by *Ln*(*Penalties*) and *Ln*(*Violation*). *Ln*(*Penalties*) is the natural logarithm of 1 plus the dollar amount of penalties per firm and year. *Ln*(*Violation*) is the natural logarithm of 1 plus the number of violations per firm and year. The independent variable $Post_{s,t}$ is a dummy variable set to one for the years following the introduction of the boardroom gender diversity reform in state *s*, and zero otherwise (for years before the introduction of the boardroom gender

diversity reform and years in states that never introduced such reforms). *Female* $directors_{i,s,t}$ represents the number of female directors in a firm.

The control variables include firm characteristics such as *Ln(Total assets)*, *Leverage* and *ROA*, and governance characteristics such as *Ln(Board size)*, *Non-Executive Directors (NED) ratio* and *Avg. directors' tenure*. *Ln(Total assets)* is the natural log of total assets. *Leverage* is the book value of total debt divided by the book value of total assets. *ROA* is calculated by net income divided by the book value of total assets. *Ln(Board size)* is the natural log of the number of board directors. *Non-Executive Directors (NED) ratio* is the natural log of the number of board directors. *Non-Executive Directors (NED) ratio* is the number of non-executive directors divided by the number of board directors. *Avg. directors' tenure* is the average tenure of board directors on the board. All model specifications include firm and year fixed effects to control unobserved heterogeneity. Robust standard errors are clustered at the firm level. All independent variables in our sample are winsorized at the 1% level.

3. Results and Discussion

3.1 Baseline results

The focus of our study is to examine the impact of board gender diversity reform on corporate misconduct. Since the mandate and the voluntary gender quota set by the reform, there is an increase in the presence of female directors on the board (Ahern and Dittmar, 2012; Matsa and Miller, 2013). In terms of more prosocial and altruistic innate traits and higher moral standard demonstrated by women (Gilligan, 1977), we hypothesize that the increase of female directors after the adoption of boardroom gender diversity reform positively affects the reduction of corporate misconduct. Furthermore, given the existing evidence that a greater number of female directors on the board is associated with higher CSR performance (Ding et al., 2022) and improved E&S performance (Ginglinger and Raskopf, 2023), we expect the results to be driven by reductions in corporate E&S misconduct.

Table 3 presents the results of the initial analysis. Columns (1) to (3) report results on corporate ESG, E&S and G penalties. Columns (4) to (6) report results on corporate ESG, E&S and G violation number. We find negative and significant coefficients on the interaction term for both ESG misconduct and E&S misconduct across all specifications, but no significant coefficients for governmental misconduct. The results pointing a negative association between the female director presence after board gender diversity reform and corporate E&S misconduct. The coefficient between $Post_{s,t} \times Female$ *directors*_{*i,s,t} and <i>Ln*(*ESG Penalties*) is negative and significant at 5% level, which</sub> magnitude is -0.177 and t-statistics is -2.472. The coefficient between $Post_{s,t} \times Female$ *directors*_{*i*,*s*,*t*} and *Ln*(*ESG Violation*) is negative and significant at 1% level, which magnitude is -0.026 and t-statistics is -3.466. In terms of the economic magnitude, one female director increased in the corporate board after board gender diversity reforms, on average, leads to 17.7% and 2.6% reduction in total value of penalties and corporate violation number, respectively. Besides, the coefficient between $Post_{s,t} \times Female$ *directors*_{*i*,*s*,*t*} and *Ln*(*E*&S *Penalties*) is negative and significant at 5% level, which magnitude is -0.143 and t-statistics is -2.167. The coefficient between $Post_{s,t} \times Female$ *directors*_{*i,s,t} and <i>Ln*(*E*&*S Violation*) is negative and significant at 1% level, which</sub> magnitude is -0.024 and t-statistics is -3.318. In terms of the economic magnitude, one female director increased in the corporate board after board gender diversity reforms, on

average, leads to 14.3% and 2.4% reduction in corporate environmental and social value of penalties and violation number, respectively. The result indicates that the increased number of female directors after board gender diversity reform is associated with less corporate ESG penalties, as well as the number of violations. This effect is primarily driven by reductions in corporate E&S misconduct.

This results consistent with our prediction, suggesting that the adoption of board gender diversity reform brings an increase of female board representation, leading to a reduction in corporate E&S misconduct.

3.2 Dynamic effect analysis

To investigate the parallel trend assumption, that is, without the adoption of boardroom gender diversity reform, the misconduct of treated firms would have evolved in the same way as that of control firms. We conduct dynamic effect analysis with an event window that includes the periods before and after boardroom gender diversity reform. We construct time dummies identified the year relative to the adoption of reform and interact with the number of female directors. *Before*^{-t} is a time dummy that equals to one in the year t (t=1,2) before the implementation of the boardroom gender diversity reform and zero otherwise. *Current* is a time dummy that equals to one in the year of the boardroom gender diversity reform and zero otherwise. *After*⁺¹ is a time dummy that equals to one in one year after the implementation of the boardroom gender diversity reform and zero otherwise. *After*⁺¹ is a time dummy that equals to one if the firm-year observation is at least two years after the implementation of the boardroom gender diversity reform and zero otherwise.

Table 4 reports the results. The coefficients on the interaction term between number of female directors and the years before the adoption of board gender diversity reform are statistically insignificant across all specifications, indicating that prior to board gender diversity reforms, female directors did not significantly impact firms' misconduct. This supports the parallel trend assumption that firms with higher number of female directors exhibit trends in corporate misconduct similar to that with lower number of female directors before the enactment of boardroom gender diversity. Importantly, the coefficients of the interaction term become significant in the year of the introduction of board gender diversity reform across all specifications indicating an immediate effect of reform on corporate misconduct. Finally, the interaction terms between the number of female directors and years after the board gender diversity enactment are all negative and significant for firms' violation number, indicating an increase in the number of female directors following the reforms, which in turn reduces corporate E&S violation number.

3.3 Stacked regression

Baker, Larcker and Wang (2022) argues that staggered DiD estimates are likely biased when research settings combine staggered timing of treatment effects and treatment effect heterogeneity. An alternative approach is stacked regression, which involves creating event-specific datasets that include the treated cohort and all firms that were never treated within the treatment window, and then combining all these event-specific datasets together (Cengiz et al., 2019). Specifically, we first exclude all firms that were treated before the first year in our sample. For each treatment event, we then create a separate dataset that includes firms treated by the event and all firms that were never treated, restricting the sample period to four years before and after the event. Finally, we combine all these eventspecific datasets to obtain the stacked database.

We re-run the baseline regression with the stacked database and report the results in Table IA2. Columns (1) and (3) report results on corporate ESG misconduct, and columns (2) and (4) report results on corporate E&S misconduct. We include cohort*firm and cohort*year fixed effects in all specifications, and cluster standard errors at firm by cohort level. The coefficients of $Post_{s,t} \times Female \ directors_{i,s,t}$ are negative and significant across all specifications suggesting that the stacked regression partially mitigates the downward bias inherent in staggered DiD estimation.

3.4 Baseline results with E, S misconducts separately

Since we document a negative association between increased female representation following the reform and corporate E&S misconduct, we further investigate whether this is due to female directors placing more emphasis on environmental or social misconduct. Previous studies provide evidence that having more female directors on the board is related to fewer environmental lawsuits (Liu, 2018) and more environmental-friendly business operations (Hsu, Li and Pan, 2022). However, few studies have investigated this topic from the social perspective. We decompose E&S misconduct into environmental misconduct and social misconduct, and re-test the baseline regression separately for each. Table 5 reports the results.

Columns (1) and (3) represent the results on corporate environmental misconduct, and columns (2) and (4) represent the results on corporate social misconduct. The coefficients of the interaction term are negative and statistically significant for firms' environmental and social penalties and violation number. The coefficient between *Post*Female directors* and *Ln(E penalties)* is -0.077 (t=-2.086) while the coefficient between *Post*Female directors* and *Ln(S penalties)* is -0.128 (t=-2.063). Regarding the number of violations, the coefficient of *Post*Female directors* is -0.007 (t=-1.915) for corporate environmental violation number and -0.021 (t=-3.212) for corporate social violation number. The results indicate that following the implementation of boardroom gender diversity reform, an increase in female board directors leads to a more significant decrease in corporate social misconduct compared to corporate environmental misconduct. Our findings highlight that female directors focus more on addressing corporate social misbehavior.

3.5 Robustness tests

We conduct several additional analysis to assess the robustness of the results. First, we utilize more rigorous fixed effects to alleviate the endogeneity concern by rerun the baseline regression with firm and state-by-year fixed effects, and firm and industry-by-year fixed effects. We include state*year fixed effects to account for the heterogeneous impact of local economic conditions on corporate misconduct and industry*year fixed effects to address time-varying industry trends in corporate misconduct. Results are reported in Panel A and Panel B of Table 6. In Panel A, we include state*year fixed effects and find the coefficients of *Post*Female directors* remain negative and significant for all corporate penalties and violation number. In Panel B, we include industry*year fixed effects and find the coefficients of the interaction term remain negative and significant for all corporate penalties and violation number. Align with the baseline results, our findings highlight that

corporate environmental and social misconduct reduced significantly after the increase in female directors brought from board gender diversity form, and the results are driven by the reduction of corporate social misconduct.

Second, we examine the impact of California, Texas and New York states, which present over 30% of our sample. In Panel C of Table 6, we exclude firms headquartered in California, Texas and New York from our dataset and rerun the regression analysis. The coefficients of *Post*Female directors* remain negative and statistically significant at 1% level for corporate E&S misconduct and social misconduct, suggesting that the initial results are not influenced by the sample from California, Texas and New York.

We then further examine the impact of Delaware state where has the most liberal law and strongest shareholder protections. Panel D of Table 6 reports the baseline results without firms headquartered in Delaware and the coefficients of the interaction term remain negative and significant, indicating that the initial results are not influenced by the sample from Delaware.

Lastly, to ensure that our baseline results are not driven by chance, we conduct a placebo test to verify whether our results disappear when we randomly select an adoption year different from the actual year. Following Gao, Li and Ma (2021), we run an in-time placebo test for our main results. Specifically, for each state that adopted the boardroom gender diversity reform, we randomly select a pseudo-adoption year within the sample period 2000-2021. To avoid the overlap with the actual event year, we further require the pseudo-event year to be at least 3 years before the true event year. Then we re-estimate the baseline regression using these pseudo-event years and save the coefficient. We repeat the procedure 1000 times and find that the coefficient estimates of the true effect lies well to

the left of the distribution of coefficients estimates from the placebo test. These results suggest that the adoption of boardroom gender diversity reforms leads to our main findings.

3.6 Enforcement approaches to board gender diversity reforms and corporate misconduct

To test the impact of different reform approaches on corporate misconduct, we specify the enforcement approach with legislation-based and governance code-based diversity reform. The effectiveness of these two different approaches in fostering board gender diversity has been widely debated in the literature. On the one hand, governance code-based reforms are found to have a more significant impact on firm value than legislation-based reforms (Fauver et al., 2017). On the other hand, Ding et al. (2022) document that legislative-based reforms are more effective than governance-based reforms to positively influence corporate social responsibility (CSR) performance. To test this empirical question, we introduce two dummy variables which are *Post_legislation* and *Post_code*. *Post_legislation* is set to one for the years following the implementation of boardroom gender diversity legislation and zero otherwise. *Post_code* is set to one for the years following the implementation of boardroom gender diversity legislation of boardroom gender diversity legislation of boardroom gender diversity legislation of boardroom gender diversity approaches and zero otherwise. Then, we interact each of them with the number of female directors on the board.

The results presented in Table 7 show that the coefficients of the interaction terms between *Post_code* and *Female directors* are negative and statistically significant at 1% level for corporate E&S misconduct and social misconduct, suggesting that the negative association between the presence of female directors on the board after the reform and corporate social misconduct is driven by the governance code-based reform.

3.7 The effect of female non-executive directors

We further explore the role of female directors by classifying directorships into executive and non-executive positions. Though they have similar responsibilities, an executive director takes a more active role in running the company while a non-executive director is in charge of overseeing the board and remains at a distance from the company. On the one hand, according to the glass cliff theory, women are not often appointed to strategic positions even when they were able to break the glass ceiling barrier and reach top management positions (Ryan and Haslam 2007). On the other hand, women exhibit greater diligence in monitoring and have significant impact on board governance (Adams and Ferreira 2009). Prior research documents that females are better monitors than males, but women and men who perform the same organizational role tend to behave in a similar way (Eagly and Johnson, 1990; Lara et al., 2017). We assume that most of the appointed female directors after the adoption of boardroom gender diversity reform are non-executive directors, and the negative effect of female director presence after the reform on corporate misconduct is driven by non-executive female directors.

We re-run the baseline regression by interacting the number of female nonexecutive directors with *Post* dummy and report the results in Panel A Table 8. The coefficients of the interaction term are negative and significant across all specifications indicates that an increase in the presence of female non-executive directors on the board after a gender reform is associated with reductions in corporate misconduct. In terms of the economic magnitude for column (1) and column (4), one female non-executive director increased in the corporate board after board gender diversity reforms, on average, leads to a 19.4% reduction in environmental and social (E&S) penalties and a 2.8% reduction in corporate E&S violation number. The negative effect is stronger for corporate social misconduct than for corporate environmental misconduct. Consistent with our assumption, the main result is driven by female non-executive directors because of their better monitoring abilities.

We then test how busyness of female non-executive directors influences the results. Following Ferris, Jagannathan and Pritchard (2003) and Fich and Shivdasani (2006), we consider outside directors (NED) busy if they serve on three or more boards. There is evidence that firms with busy boards, where a majority of outside directors hold three or more directorships, are associated with weak corporate governance (Fich and Shivdasani, 2006). However, Ferris, Jagannathan and Pritchard (2003) find no evidence that multiple board appointments harm subsequent firm performance. To test this empirical question, we interact the number of busy female non-executive directors with *Post* dummy and re-test the baseline regression. The results are reported in Panel B Table 8. We find no evidence that the increase of busy female non-executive director is related with less corporate environmental and social misconduct.

3.8 The effect of female representative in E&S committees

Board committees, as a crucial part of corporate governance, comprehensively monitor company executives and contribute to firm outcomes. Apart from three main types of board-level committees, other committees that served on a continuous basis have emerged recently to give support to the board of directors on a variety of topics such as sustainability, environment, ethics and corporate social responsibility. The prior studies find a positive relationship between sustainability committee and corporate social performance (CSP) strengths and concerns (Burke, Hoitash and Hoitash, 2019). We hypothesis that the increased representation of female directors in E&S committees will enhance the focus of firms on E&S-related practices, consequently mitigating instances of corporate environmental and social misconduct. Therefore, we further examine the impact of adopting gender diversity reform on corporate environmental and social misconducts conditional on the number of female directors in E&S committees. We re-run the baseline regression by interacting the number of female directors in E&S committees with *Post* dummy and report the results in Table 9.

Column (1) show that the coefficient of *Post*Female directors in E&S committees* is negative and significant at 1% level for Ln(E&S Penalties), and column (4) show that the coefficient of *Post*Female directors in E&S committees* is negative and significant at 1% level for Ln(E&S Violation). Colum (3) and (6) show that the coefficients of the interaction term are negative and significant at 1% level for corporate social misconduct. The finding indicates that there is a negative relationship between the presence of female directors in E&S committees after the adoption of boardroom gender diversity and corporate E&S misconduct, and the result is driven by the reduction in corporate social misconduct.

3.9 Board gender diversity reform and firm policies

Our findings provide evidence that an increase in female directors on the board can reduce corporate environmental and social misconduct, leading to fewer fines and less reputational damage for companies. The risk of corporate misconduct revelation may affect firms' valuation. The existing studies demonstrates that companies involved in scandals experience negative abnormal returns with declines in equity value (Bernile and Jarrell, 2009) and allegations of misconduct leads to a decline in reported earnings and an increase in stock return variability (Murphy, Shrieves and Tibbs, 2009). We examine this empirical question through the lens of the increase in female representation on the board after the reform. We expect that the presence of more female influences some corporate policies to reduce the risk of misconduct revelation, thereby affecting the company's valuation.

To conduct the analysis, we examine the effect of board gender diversity reform on corporate *Tobin's Q* and *Excess R&D* and present the results in Table 10. *Tobin's Q* is measured by the book value of total assets divided by the market value of total assets. We follow Adhikari, Agrawal and Malm (2019) to estimate *Excess R&D* from the following firm-specific model of R&D investment as a function of growth opportunities, as measured by past sales growth:

$$R\&D_{i,s,t} = \beta_0 + \beta_1 * Sales \ Growth_{i,s,t-1} + \varepsilon_{i,s,t}$$

where *Sales Growth*_{*t*-1} is the percentage change in sales from *t*-2 to *t*-1. Then we estimate this equation for each Fama-French 48 industry-year. We estimate excess R&D investments as follows:

Excess
$$R\&D_{i,s,t} = Actual - Predicted(R\&D_{i,s,t})$$

Column (1) presents the results on corporate *Tobin's Q* and Column (2) presents the results on corporate *Excess R&D*. The coefficients of the interaction term between $Post_{s,t} \times Female \ directors_{i,s,t}$ are positive and significant across all specifications, indicating that with more female directors on the board following the adoption of board gender diversity reforms, there is an increase in firms' stock valuation and corporate R&D expenditure.

4. Conclusion

In this study, we examine the impact of increased female representation on corporate boards following gender diversity reforms on corporate misconduct. By analyzing corporate total penalties and violation number of U.S. listed firm over the period 2000-2021, we find a negative association between the increase of female directors after the adoption of board gender diversity reform and corporate environmental and social (E&S) misconduct.

We first classify the offense cases into different types of misconduct, and find the results are mainly coming from the reduction of social misconduct. Then, we distinguish the reform approach from legislative-based reform to governance code-based reform and we show that the effect of increasing board gender representation after board gender diversity reforms on reducing corporate social misconduct is driven by governance code-based reforms. Moreover, we document that the negative effect of increased female representation on the board after the introduction of board gender diversity reform is driven by female non-executive directors which is consistent with prior research showing that women are better monitors. We also analysis the effect of female representative in E&S committees and we find that with more female director presence in E&S committees, there is a significant reduction in corporate social misconduct. Lastly, we examine how board gender diversity reforms influence firm policies and document a positive relationship

between increased female representation after the reform and corporate stock valuation, as well as firms' R&D expenditure.

Overall, this study provides significant implications for managers and policymakers by documenting the importance of board gender diversity act as a governance mechanism in mitigating corporate social misconduct.

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Table 1 Boardroom gender diversity reforms in the U.S.

This table reports the effective year, reform type and name of the boardroom gender diversity reforms in the U.S..

State	Effective Year	Reform Type	Name
California	2018	Legislation	Senate Bill 826
Washington	2020	Legislation	Senate Bill 6037
Colorado	2020	Gov. code	House joint Resolution 17-1017
Illinois ⁴	2018	Gov. code	House Resolution 0439
Massachusetts	2018	Gov. code	Resolution S.1007
Pennsylvania	2020	Gov. code	House Resolution 273

⁴ In 2019 Illinois passed a bill required publicly held domestic or foreign corporation whose principal executive offices, according to the corporation's SEC 10-K form, are located in Illinois to have at least one female director and one African American director on its board of directors by the end of 2020. The version of the bill that passed the Senate dropped the diversity mandates in favor of requiring corporations report annually to the Secretary of State public disclosures regarding the racial, ethnic, and gender demographics of their board.

https://www.ilga.gov/legislation/BillStatus.asp?DocNum=3394&GAID=15&DocTypeID=HB&SessionID=108&GA =101#:~:text=Requires%20the%20establishment%20of%20a,directors%20and%20corporate%20executive%20offic ers.

Table 2 Descriptive statistics

This table reports the descriptive statistics. Panel A reports the sample distribution by state over the period 2000-2021. Panel B reports the mean, standard deviation, 25th, 50th and 75th percentile of main variables over the period 2000-2021. Variable definitions are provided in Appendix A.

State	# of Firms	# of Total Obs	ESG Penalties	# of ESG Violation	
	(1)	(2)	(3)	(4)	
Alaska	2	36	0	0	
Alabama	36	398	184,458,106	144	
Arkansas	21	313	1,078,328,793	689	
Arizona	106	1,049	372,395,613	555	
California	1,306	10,555	21,097,123,764	1,164	
Colorado	201	1,890	1,729,220,605	376	
Connecticut	143	1,571	790,101,833	419	
Delaware	29	332	1,360,838,577	182	
Florida	336	3,119	3,524,073,801	2,220	
Georgia	188	2,052	2,307,033,231	2,773	
Hawaii	12	186	58,034,986	60	
Iowa	26	362	22,595,854	29	
Idaho	17	153	351,793,927	80	
Illinois	341	3,756	4,139,665,562	1,600	
Indiana	82	1,003	5,070,889,238	318	
Kansas	35	342	13,875,339	95	
Kentucky	44	515	105,601,998	104	
Louisiana	38	443	328,166,042	90	
Massachusetts	524	4,449	2,568,361,237	535	
Maryland	180	1,764	531,453,620	236	
Maine	10	142	209,600	2	
Michigan	111	1,324	4,214,088,224	493	
Minnesota	150	1,597	947,792,897	578	
Missouri	76	996	1,223,273,687	2,378	
Mississippi	10	177	15,909,673	34	
Montana	9	98	0	0	
North Carolina	171	1,811	32,050,071,600	804	
North Dakota	7	71	1,535,381	63	
Nebraska	21	272	597,439,610	6,082	
New Hampshire	22	233	45,484,640	22	
New Jersey	286	2,819	15,420,854,896	386	
New Mexico	4	29	4,142,374	2	
Nevada	71	716	40,516,945	143	
New York	710	6,853	34,350,645,979	1,237	
Ohio	172	2,353	8,411,394,544	2,277	
Oklahoma	54	580	300,736,236	957	
Oregon	49	538	28,763,303	96	
Pennsylvania	316	3,222	1,637,518,128	1,434	

Panel A: Sample distribution by state

Rhode Island	17	207	1,022,271,818	264
South Carolina	29	330	26,844,121	56
South Dakota	8	111	1,953,934	16
Tennessee	113	1,154	2,295,038,124	1,035
Texas	735	7,538	15,186,538,101	3,795
Utah	75	618	28,273,455	79
Virginia	204	2,201	7,587,285,548	1,046
Vermont	8	76	106,330	8
Washington	146	1,414	1,165,380,316	615
Wisconsin	82	1,018	2,341,670,872	214
West Virginia	11	146	0	0
Wyoming	4	12	0	0

Panel B: Summary statistics

Variables	Ν	Mean	SD	P25	P50	P75
Ln(ESG Penalties)	54,724	1.620	4.147	0.000	0.000	0.000
Ln(ESG Violation)	54,724	0.167	0.492	0.000	0.000	0.000
Ln(E&S Penalties)	54,724	1.536	3.987	0.000	0.000	0.000
Ln(E&S Violation)	54,724	0.162	0.486	0.000	0.000	0.000
Ln(E Penalties)	54,724	0.322	1.958	0.000	0.000	0.000
Ln(E Violation)	54,724	0.025	0.162	0.000	0.000	0.000
Ln(S Penalties)	54,724	1.396	3.779	0.000	0.000	0.000
Ln(S Violation)	54,724	0.147	0.463	0.000	0.000	0.000
Ln(G Penalties)	54,724	0.158	1.573	0.000	0.000	0.000
Ln(G Violation)	54,724	0.008	0.083	0.000	0.000	0.000
Female directors	54,724	0.972	1.025	0.000	1.000	2.000
Female NED	54,724	0.898	0.987	0.000	1.000	1.000
Busy female NED	54,724	0.198	0.479	0.000	0.000	0.000
Female directors in E&S committees	54,592	0.051	0.282	0.000	0.000	0.000
Tobin's Q	54,441	2.149	1.669	1.157	1.565	2.425
Excess R&D	52,392	-34.401	219.541	-103.958	-16.738	-1.207
Ln(Firm size)	54,724	6.656	2.067	5.207	6.651	8.025
Leverage	54,724	0.223	0.225	0.011	0.172	0.359
ROA	54,724	-0.028	0.228	-0.023	0.030	0.072
Ln(Board size)	54,724	2.075	0.278	1.946	2.079	2.303
NED ratio	54,724	0.815	0.100	0.750	0.857	0.889
Avg. directors' tenure	54,724	7.598	4.587	4.175	7.080	10.288

Table 3 Board gender diversity reform, female directors, and corporate misconducts

This table reports results of the impact of adopting board gender diversity reform on corporate misconducts conditional on the number of female directors over the period 2000-2021 from the following regression:

 $Misconducts_{i,s,t+1}$

 $= \beta_0 + \beta_1 Post_{s,t} * Female \, directors_{i,s,t} + \beta_2 Female \, directors_{i,s,t} + \beta_3 Post_{s,t} + Control_{i,s,t} + \lambda_i + \lambda_t + \varepsilon_{i,s,t}$ The dependent variables are *Misconducts*_{i,s,t} which are proxied by *Ln*(*Penalties*) and *Ln*(*Violation*). *Ln*(*Penalties*) is the natural logarithm of 1 plus the dollar amount of ESG, ES, G penalties, separately, per firm and year. *Ln*(*Violation*) is the natural logarithm of 1 plus the number of ESG, ES, G violations, separately, per firm and year. The independent variables are *Post*_{s,t} and *Female directors*_{i,s,t}. *Post*_{s,t} is a dummy variable that equals to one for year t following the adoption of the boardroom gender diversity reform in state s, and zero otherwise. Female directors_{i,s,t} represents the number of female directors in a firm. λ_i , λ_t are firm and year fixed effects, respectively. Numbers in parentheses are t-statistics based on standard errors clustered at the firm level. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Variables	Ln(ESG	Ln(E&S	Ln(G	Ln(ESG	Ln(E&S	Ln(G
	Penalties)	Penalties)	Penalties)	Violation)	Violation)	Violation)
	(1)	(2)	(3)	(4)	(5)	(6)
Post*Female directors	-0.177**	-0.143**	-0.053	-0.026***	-0.024***	-0.003
	(-2.472)	(-2.167)	(-1.403)	(-3.466)	(-3.318)	(-1.595)
Female directors	0.023	0.011	-0.004	0.002	0.002	-0.001
	(0.702)	(0.350)	(-0.279)	(0.494)	(0.471)	(-0.936)
Post	0.396***	0.324***	0.155**	0.059***	0.055***	0.008***
	(3.363)	(3.035)	(2.511)	(4.992)	(4.810)	(2.675)
Ln(Total assets)	0.239***	0.215***	0.042***	0.032***	0.031***	0.003***
	(6.841)	(6.240)	(2.632)	(7.475)	(7.025)	(2.988)
Leverage	-0.051	-0.012	-0.030	-0.002	-0.000	-0.002
	(-0.458)	(-0.114)	(-0.541)	(-0.195)	(-0.013)	(-0.689)
ROA	-0.184***	-0.136**	-0.083**	-0.021***	-0.018***	-0.004**
	(-2.738)	(-2.150)	(-2.565)	(-3.044)	(-2.678)	(-2.279)
Ln(Board size)	-0.084	-0.071	-0.016	-0.007	-0.005	-0.002
	(-0.775)	(-0.683)	(-0.292)	(-0.546)	(-0.402)	(-0.728)
NED ratio	0.242	0.243	0.074	0.051*	0.051*	0.004

	(0.998)	(1.046)	(0.696)	(1.841)	(1.860)	(0.664)
Avg. directors' tenure	-0.001	-0.002	0.002	0.001	0.001	0.000
-	(-0.167)	(-0.287)	(0.523)	(1.209)	(1.195)	(0.083)
Firm FEs	YES	YES	YES	YES	YES	YES
Year FEs	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.546	0.550	0.126	0.699	0.700	0.123
Observations	54,724	54,724	54,724	54,724	54,724	54,724

Table 4 Dynamic effect analysis

This table reports the regression results for the dynamic effects of the adoption of boardroom gender diversity reform on corporate misconducts conditional on the number of female directors over the periods 2000-2021 from the following regression:

 $Misconducts_{i,s,t+1}$

 $= \beta_0 + \beta_1 Before^{-2} * Female directors_{i,s,t} + \beta_2 Before^{-1}$

* Female directors_{i,s,t}

+ β_3 Current * Female directors_{i.s.t} + β_4 After⁺¹

* Female directors_{*i*,*s*,*t*} + $\beta_5 A fter^{2+}$ * Female directors_{*i*,*s*,*t*}

+ $\beta_6 Post_{s,t} + \beta_7 Female \ directors_{i,s,t} + Control_{i,s,t} + \lambda_i + \lambda_t + \varepsilon_{i,s,t}$

The dependent variables are *Misconducts*_{*i*,*s*,*t*} which are proxied by *Ln*(*Penalties*) and *Ln*(*Violation*). *Before*^{-*t*} is a time dummy that equals to one in the year *t* (t=1,2) before the implementation of the boardroom gender diversity reform and zero otherwise. *Current* is a time dummy that equals to one in the year of the implementation of the boardroom gender diversity reform and zero otherwise. *After*⁺¹ is a time dummy that equals to one in one year after the implementation of the boardroom gender diversity reform and zero otherwise. *After*⁺¹ is a time dummy that equals to one in one year after the implementation of the boardroom gender diversity reform and zero otherwise. *After*²⁺ is a time dummy that equals to one if the firm-year observation is at least two years after the implementation of the boardroom gender diversity reform and zero otherwise. The independent variables are *Post*_{*s*,*t*} and *Female directors*_{*i*,*s*,*t*}. Control variables are the same as Table 3. λ_i , λ_t are firm and year fixed effects, respectively. Numbers in parentheses are t-statistics based on standard errors clustered at the firm level ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Variables	Ln(ESG	Ln(E&S	Ln(ESG	Ln(E&S
	Penalties)	Penalties)	Violation)	Violation)
	(1)	(2)	(3)	(4)
Before ⁻² *Female directors	-0.027	-0.016	-0.002	-0.002
	(-0.367)	(-0.241)	(-0.211)	(-0.222)
Before ⁻¹ *Female directors	0.006	-0.032	-0.004	-0.006
	(0.068)	(-0.438)	(-0.530)	(-0.766)
Current*Female directors	-0.327***	-0.296***	-0.039***	-0.037***
	(-3.566)	(-3.489)	(-3.706)	(-3.633)
After ⁺¹ *Female directors	-0.141	-0.140	-0.028***	-0.027***
	(-1.356)	(-1.520)	(-2.961)	(-3.004)
After ²⁺ *Female directors	-0.087	-0.036	-0.015**	-0.013*
	(-1.123)	(-0.481)	(-2.115)	(-1.851)
Post	0.436***	0.370***	0.063***	0.059***
	(3.608)	(3.378)	(5.200)	(5.032)
Female directors	0.023	0.013	0.002	0.002
	(0.720)	(0.405)	(0.545)	(0.539)
Controls	YES	YES	YES	YES
Firm FEs	YES	YES	YES	YES
Year FEs	YES	YES	YES	YES
Adjusted R^2	0.546	0.550	0.699	0.700
Observations	54,724	54,724	54,724	54,724

Table 5 Board gender diversity reform, female directors, and corporate E, S misconducts This table displays results of the impact of adopting board gender diversity reform on corporate environmental, social and governmental misconducts separately conditional on the number of female directors over the period 2000-2021 from the following regression:

 $Misconducts_{i,s,t+1}$

$$= \beta_0 + \beta_1 Post_{s,t} * Female \ directors_{i,s,t} + \beta_2 Female \ directors_{i,s,t} + \beta_3 Post_{s,t} + Control_{i,s,t} + \lambda_i + \lambda_t + \varepsilon_{i,s,t}$$

The dependent variables $Misconducts_{i,s,t}$ are proxied by the natural logarithm of 1 plus the dollar amount of E, S penalties, separately, per firm and year, and the natural logarithm of 1 plus the number of E, S violations, separately, per firm and year. The independent variables are $Post_{s,t}$ and *Female directors*_{*i,s,t*}. Control variables are the same as Table 3. λ_i , λ_t are firm and year fixed effects, respectively. Numbers in parentheses are t-statistics based on standard errors clustered at the firm level. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Variables	Ln(E Penalties)	Ln(S Penalties)	Ln(E Violation)	Ln(S Violation)
	(1)	(2)	(3)	(4)
Post*Female directors	-0.077**	-0.128**	-0.007*	-0.021***
	(-2.086)	(-2.063)	(-1.915)	(-3.212)
Female directors	-0.038**	0.022	-0.004***	0.004
	(-2.208)	(0.725)	(-2.586)	(0.991)
Post	0.293***	0.266***	0.026***	0.045***
	(5.137)	(2.608)	(5.136)	(4.082)
Controls	YES	YES	YES	YES
Firm FEs	YES	YES	YES	YES
Year FEs	YES	YES	YES	YES
Adjusted R^2	0.320	0.527	0.371	0.683
Observations	54,724	54,724	54,724	54,724

Table 6 Robustness tests

This table presents the results of robustness checks of the baseline in Table 3 while the dependent variables are logarithm of 1 plus the dollar amount of ES, E, S penalties, separately, per firm and year, and the natural logarithm of 1 plus the number of ES, E, S violations, separately, per firm and year. Panel A reports the baseline results with firm and state-by-year fixed effects and Panel B reports the baseline results with firm and industry-by-year fixed effects. Panel C reports the baseline results by excluding firms headquartered in California, Texas and New York. Panel D reports the baseline results by excluding firms headquartered in Delaware. The dependent variables, independent variable and control variables are the same as Table 3. The numbers in parentheses are t-statistics based on standard errors clustered at the firm level. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Panel A: State-by-year fixe	ed effects					
Variables	Ln(E&S	Ln(E	Ln(S	Ln(E&S	Ln(E	Ln(S
	Penalties)	Penalties)	Penalties)	Violation)	Violation)	Violation)
	(1)	(2)	(3)	(4)	(5)	(6)
Post*Female directors	-0.156**	-0.072*	-0.144**	-0.025***	-0.007*	-0.023***
	(-2.222)	(-1.812)	(-2.198)	(-3.343)	(-1.717)	(-3.304)
Female directors	0.007	-0.039**	0.018	0.001	-0.004***	0.003
	(0.214)	(-2.248)	(0.596)	(0.332)	(-2.686)	(0.888)
Controls	YES	YES	YES	YES	YES	YES
Firm FEs	YES	YES	YES	YES	YES	YES
State*Year FEs	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.551	0.326	0.529	0.704	0.376	0.687
Observations	54,724	54,724	54,724	54,724	54,724	54,724

Variables	Ln(E&S	Ln(E	Ln(S	Ln(E&S	Ln(E	Ln(S
	Penalties)	Penalties)	Penalties)	Violation)	Violation)	Violation)
	(1)	(2)	(3)	(4)	(5)	(6)
Post*Female directors	-0.154**	-0.073**	-0.138**	-0.026***	-0.006**	-0.024***
	(-2.312)	(-2.058)	(-2.220)	(-3.691)	(-1.976)	(-3.576)
Female directors	0.006	-0.043**	0.018	0.001	-0.004***	0.003
	(0.181)	(-2.530)	(0.614)	(0.245)	(-2.995)	(0.871)
Post	0.184	0.157***	0.175	0.036***	0.013***	0.033***
	(1.623)	(2.946)	(1.596)	(3.251)	(3.079)	(3.022)
Controls	YES	YES	YES	YES	YES	YES
Firm FEs	YES	YES	YES	YES	YES	YES
Industry*Year FEs	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.553	0.327	0.530	0.705	0.379	0.689
Observations	54,638	54,638	54,638	54,638	54,638	54,638

Panel B: Industry-by-year fixed effects

Panel C: Excluding firms headquartered in California, Texas and New York

Variables	Ln(E&S	Ln(E	Ln(S	Ln(E&S	Ln(E	Ln(S
	Penalties)	Penalties)	Penalties)	Violation)	Violation)	Violation)
	(1)	(2)	(3)	(4)	(5)	(6)
Post*Female directors	-0.269***	-0.088	-0.268***	-0.037***	-0.006	-0.035***
	(-2.739)	(-1.459)	(-2.921)	(-3.355)	(-1.617)	(-3.376)
Female directors	0.018	-0.044*	0.035	0.004	-0.004*	0.006
	(0.471)	(-1.916)	(0.917)	(0.789)	(-1.960)	(1.277)
Post	0.323**	0.208**	0.343**	0.058***	0.016***	0.055***
	(1.999)	(2.254)	(2.192)	(3.304)	(2.648)	(3.180)
Controls	YES	YES	YES	YES	YES	YES
Firm FEs	YES	YES	YES	YES	YES	YES
Year FEs	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.554	0.275	0.535	0.708	0.300	0.694
Observations	35,043	35,043	35,043	35,043	35,043	35,043

Variables	Ln(E&S	Ln(E	Ln(S	Ln(E&S	Ln(E	Ln(S
	Penalties)	Penalties)	Penalties)	Violation)	Violation)	Violation)
	(1)	(2)	(3)	(4)	(5)	(6)
Post*Female directors	-0.143**	-0.076**	-0.129**	-0.024***	-0.007*	-0.021***
	(-2.154)	(-2.053)	(-2.068)	(-3.302)	(-1.877)	(-3.208)
Female directors	0.010	-0.040**	0.021	0.001	-0.004***	0.003
	(0.338)	(-2.306)	(0.698)	(0.360)	(-2.929)	(0.924)
Post	0.323***	0.283***	0.266***	0.054***	0.025***	0.044***
	(3.021)	(4.992)	(2.605)	(4.727)	(4.984)	(4.021)
Controls	YES	YES	YES	YES	YES	YES
Firm FEs	YES	YES	YES	YES	YES	YES
Year FEs	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.547	0.309	0.527	0.699	0.361	0.684
Observations	54,486	54,486	54,486	54,486	54,486	54,486

Panel D: Excluding firms headquartered in Delaware

Table 7 Analysis conditional on reform approaches

This table reports results of the impact of adoption board gender diversity reform on firms' misconduct following different reform approaches over the period 2000-2021 from the following regression:

 $Misconducts_{i,s,t+1}$

$$= \beta_0 + \beta_1 Post_legislation_{s,t} * Female \ directors_{i,s,t} \\+ \beta_2 Post_code_{s,t} * Female \ directors_{i,s,t} + \beta_3 Post_legislation_{s,t} + \beta_4 Post_code_{s,t} + \beta_5 Female \ directors_{i,s,t} \\+ Control_{i,s,t} + \lambda_i + \lambda_t + \varepsilon_{i,s,t}$$

*Post_legislation*_{*s*,*t*} is a dummy variable equal to one for year *t* following the implementation of boardroom gender diversity legislation in state *s* and zero otherwise. *Post_code*_{*s*,*t*} is a dummy variable equal to one for year *t* following the adoption of a gender diversity governance code in state *s* and zero otherwise. The dependent variables are *Misconducts*_{*i*,*s*,*t*} which are proxied by *Ln*(*Penalties*) and *Ln*(*Violation*). The independent variables are *Post*_{*s*,*t*} and *Female directors*_{*i*,*s*,*t*}. Control variables are the same as Table 3. λ_i , λ_t are firm and year fixed effects, respectively. The numbers in parentheses are t-statistics based on standard errors clustered at the firm level. ***, ***, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Variables	Ln(E&S	Ln(E	Ln(S	Ln(E&S	Ln(E	Ln(S
	Penalties)	Penalties)	Penalties)	Violation)	Violation)	Violation)
	(1)	(2)	(3)	(4)	(5)	(6)
Post_legislation*Female directors	-0.028	-0.067*	-0.004	-0.012	-0.007	-0.010
	(-0.331)	(-1.848)	(-0.047)	(-1.356)	(-1.333)	(-1.139)
Post_code*Female directors	-0.263***	-0.084	-0.260***	-0.036***	-0.006	-0.034***
	(-2.619)	(-1.308)	(-2.805)	(-3.240)	(-1.421)	(-3.297)
Post_legislation	0.310**	0.380***	0.189	0.053***	0.035***	0.037***
	(2.516)	(6.938)	(1.609)	(4.023)	(4.889)	(3.020)
Post_code	0.338**	0.194**	0.352**	0.057***	0.016**	0.053***
	(2.062)	(2.018)	(2.241)	(3.350)	(2.508)	(3.217)
Female directors	0.008	-0.039**	0.020	0.001	-0.004***	0.003
	(0.271)	(-2.263)	(0.655)	(0.407)	(-2.633)	(0.940)
Controls	YES	YES	YES	YES	YES	YES
Firm FEs	YES	YES	YES	YES	YES	YES
Year FEs	YES	YES	YES	YES	YES	YES

Observations 54,724 54,724 54,724 54,724 54,724 54,724	Adjusted R^2	0.550	0.320	0.527	0.700	0.371	0.683
	Observations	54,724	54,724	54,724	54,724	54,724	54,724

Table 8 Female non-executive directors and busy female directors

This table displays results of the impact of adopting board gender diversity reform on corporate misconducts conditional on the number of female non-executive directors over the period 2000-2021. The dependent variables are *Ln(Penalties)* and *Ln(Violation)*. Panel A tests the effect of adopting board gender diversity reform on corporate misconducts conditional on the number of female non-executive directors. The independent variables are *Post_{s,t}* and *Female NED_{i,s,t}*. *Female NED_{i,s,t}* represents the number of female non-executive directors in a firm. Panel B tests the effect of adopting board gender variables are *Post_{s,t}* and *Female NED_{i,s,t}*. *Female NED_{i,s,t}* represents the number of female non-executive directors in a firm. Panel B tests the effect of adopting board gender variables are *Post_{s,t}*, *Female NED_{i,s,t}* and *Busy female NED_{i,s,t}*. *Busy female NED_{i,s,t}* represents the number of busy female *NED_{i,s,t}* represents the number of busy female *NED_{i,s,t}* represents the number of busy female *NED_{i,s,t}* represents the number of busy female non-executive directors that serve on three or more boards in year *t*. Control variables are the same as in Table 3. All regressions include firm and year fixed effects. The numbers in parentheses are t-statistics based on standard errors clustered at the firm level. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Variables	Ln(E&S	Ln(E	Ln(S	Ln(E&S	Ln(E	Ln(S
	Penalties)	Penalties)	Penalties)	Violation)	Violation)	Violation)
	(1)	(2)	(3)	(4)	(5)	(6)
Post*Female NED	-0.194***	-0.084**	-0.173***	-0.028***	-0.007*	-0.026***
	(-2.970)	(-2.269)	(-2.789)	(-3.890)	(-1.912)	(-3.804)
Female NED	-0.001	-0.053***	0.015	0.001	-0.005***	0.004
	(-0.026)	(-2.864)	(0.464)	(0.238)	(-3.412)	(0.981)
Post	0.394***	0.296***	0.327***	0.060***	0.025***	0.050***
	(3.872)	(5.623)	(3.341)	(5.504)	(5.354)	(4.753)
Controls	YES	YES	YES	YES	YES	YES
Firm FEs	YES	YES	YES	YES	YES	YES
Year FEs	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.550	0.320	0.527	0.700	0.371	0.683
Observations	54,724	54,724	54,724	54,724	54,724	54,724

Panel A: Female non-executive directors

Variables	Ln(E&S	Ln(E	Ln(S	Ln(E&S	Ln(E	Ln(S
	Penalties)	Penalties)	Penalties)	Violation)	Violation)	Violation)
	(1)	(2)	(3)	(4)	(5)	(6)
Post*Busy female NED	-0.035	0.050	-0.069	-0.010	0.004	-0.013
	(-0.238)	(0.625)	(-0.485)	(-0.656)	(0.865)	(-0.867)
Post*Female NED	-0.186***	-0.094**	-0.156**	-0.026***	-0.008**	-0.023***
	(-2.635)	(-2.500)	(-2.348)	(-3.689)	(-2.063)	(-3.540)
Busy female NED	-0.007	-0.084**	-0.009	-0.006	-0.008**	-0.004
	(-0.102)	(-2.314)	(-0.153)	(-0.787)	(-2.540)	(-0.464)
Female NED	0.000	-0.036*	0.016	0.002	-0.004**	0.004
	(0.010)	(-1.917)	(0.488)	(0.540)	(-2.398)	(1.135)
Post	0.393***	0.297***	0.326***	0.060***	0.026***	0.049***
	(3.883)	(5.651)	(3.343)	(5.518)	(5.369)	(4.757)
Controls	YES	YES	YES	YES	YES	YES
Firm FEs	YES	YES	YES	YES	YES	YES
Year FEs	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.550	0.321	0.527	0.700	0.372	0.683
Observations	54,724	54,724	54,724	54,724	54,724	54,724

Panel B: Busy female non-executive directors

Table 9 Female representative in E&S committees

This table displays results of the impact of adopting board gender diversity reform on corporate environmental and social misconducts conditional on the number of female directors in E&S committees over the period 2000-2021 from the following regression:

 $Misconducts_{i,s,t+1}$

 $= \beta_0 + \beta_1 Post_{s,t} * Female directors in E\&S committees_{i,s,t} + \beta_2 Post_{s,t} * Female directors_{i,s,t}$

 $+ \beta_3$ Female directors in E&S committees_{*i*,*s*,*t*} + β_4 Female directors_{*i*,*s*,*t*} + β_5 Post_{*s*,*t*} + Control_{*i*,*s*,*t*} + λ_i + λ_t

 $+ \varepsilon_{i,s,t}$

The dependent variables *Misconducts*_{*i,s,t*} are proxied by the natural logarithm of 1 plus the dollar amount of ES, E, S penalties, separately, per firm and year, and the natural logarithm of 1 plus the number of ES, E, S violations, separately, per firm and year. The independent variable *Female directors in E&S committees*_{*i,s,t*} represents the number of female directors in environmental and social committees in a firm. *Post*_{*s,t*} is a dummy variable that equals to one for year *t* following the adoption of the boardroom gender diversity reform in state *s*, and zero otherwise. *Female directors*_{*i,s,t*} represents the number of female directors in a firm. Control variables are the same as Table 3. λ_i , λ_t are firm and year fixed effects, respectively. The last row presents p-values from the F-test for differences in the coefficient between *Post*Female directors in E&S committees* and *Post*Female directors*. The numbers in parentheses are t-statistics based on standard errors clustered at the firm level. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Variables	Ln(E&S	Ln(E	Ln(S	Ln(E&S	Ln(E	Ln(S
	Penalties)	Penalties)	Penalties)	Violation)	Violation)	Violation)
	(1)	(2)	(3)	(4)	(5)	(6)
Post*Female directors in E&S committees	-1.271***	0.094	-1.415***	-0.155***	0.000	-0.161***
	(-3.520)	(0.365)	(-4.207)	(-3.818)	(0.007)	(-3.898)
Post*Female directors	-0.062	-0.081**	-0.039	-0.014**	-0.006*	-0.011**
	(-1.046)	(-2.317)	(-0.684)	(-2.242)	(-1.855)	(-1.997)
Female directors in E&S committees	0.069	-0.274***	0.185	0.002	-0.031***	0.020
	(0.472)	(-2.751)	(1.310)	(0.107)	(-3.201)	(0.967)
Female directors	0.008	-0.027*	0.014	0.002	-0.002*	0.003
	(0.260)	(-1.666)	(0.481)	(0.465)	(-1.850)	(0.796)
Post	0.281***	0.288***	0.222**	0.050***	0.025***	0.040***
	(2.706)	(5.049)	(2.216)	(4.501)	(4.928)	(3.764)
Controls	YES	YES	YES	YES	YES	YES
Firm FEs	YES	YES	YES	YES	YES	YES
Year FEs	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.550	0.321	0.527	0.700	0.373	0.684

Observations	54,592	54,592	54,592	54,592	54,592	54,592
F-test	0.001	0.505	0.000	0.001	0.681	0.000

Table 10 Board gender diversity reform, female directors, and firm policies

This table displays results of the impact of adopting board gender diversity reform on firm's policies conditional on the number of female directors over the period 2000-2021 from the following regression:

*Firm policies*_{*i*,*s*,*t*}

$= \beta_0 + \beta_1 Post_{s,t} * Female \ directors_{i,s,t} + \beta_2 Female \ directors_{i,s,t} + \beta_3 Post_{s,t} + Control_{i,s,t} + \lambda_i + \lambda_t + \varepsilon_{i,s,t}$

The dependent variables *Firm policies*_{*i,s,t*} are proxied by *Tobin's Q* and *Excess R&D*. Independent variables and control variables are the same as Table 3. All variables are defined in Appendix A. λ_i , λ_t are firm and year fixed effects, respectively. Numbers in parentheses are t-statistics based on standard errors clustered at the firm level. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Variables	Tobin's O	Excess R&D
v unuonos	(1)	(2)
Post*Female directors	0.100***	20.805***
	(2.670)	(4.567)
Female directors	0.030*	5.508***
	(1.915)	(3.050)
Post	0.024	-24.366***
	(0.269)	(-3.177)
Controls	YES	YES
Firm FEs	YES	YES
Year FEs	YES	YES
Adjusted R^2	0.611	0.862
Observations	60,606	57,946

Appendix A Variable definitions This table reports the definitions of all variables.

Variables	Definitions
In(ESG Densition)	Nature log of 1 plus the dollar amount of ESC popultios per firm
LII(LOU FEIIdIUES)	and year
In(FSG Violation)	and year. Nature log of 1 plus the number of ESG violations per firm and
	Nature log of 1 plus the number of ESO violations per firm and
$I_n(E\&S Densities)$	year. Nature log of 1 plus the dollar amount of environmental and social
Lin(Locs Tenantics)	negative region 1 plus the donar amount of chynolinichiar and social
In(F&S Violation)	Nature log of 1 plus the number of environmental and social
	violations per firm and year
I n(F Penalties)	Nature log of 1 plus the dollar amount of environmental penalties
Lift I chartes)	ner firm and year
In(F Violation)	Nature log of 1 plus the number of environmental violations per
	firm and year
I n(S Penalties)	Nature log of 1 plus the dollar amount of social penalties per firm
Lin(5 Tenanties)	and year
Ln(S Violation)	Nature log of 1 plus the number of social violations per firm and
	Vear
Ln(G Penalties)	Nature log of 1 plus the dollar amount of governmental penalties
	per firm and year.
Ln(G Violation)	Nature log of 1 plus the number of governmental violations per
	firm and year.
Post	A dummy variable that equals one for years following the
	adoption of a board gender diversity reform by a state (i.e., either
	the legislation-based or the governance code-based) and zero
	otherwise
Post legislation	A dummy variable that equals one for the years following
_ 6	boardroom gender diversity legislation applied and zero
	otherwise.
Post code	A dummy variable that equals one for the years following a
—	boardroom gender diversity governance code is applied and zero
	otherwise.
Female directors	Number of female directors.
Female NED	Number of female non-executive directors.
Busy female NED	Number of busy female non-executive directors that serve on
-	three or more boards.
Female directors in E&S	Number of female directors in E&S committees.
committees	
Ln(Total assets)	Natural log of total assets.
Leverage	Book value of total debt divided by the book value of total assets.
D o A	
KUA	Net income divided by the book value of total assets.
Ln(Board size)	Natural log of the number of board directors.
NED ratio	Number of non-executive directors divided by the number of
	board directors.

Avg. directors' tenure	Average tenure of board directors on the board.
Tobin's Q	Book value of total assets divided by the market value of total
	assets.
Excess R&D	<i>Excess</i> $R\&D_{i,s,t}$ = Actual – Predicted $R\&D_{i,s,t}$, where predicted value is obtained from the following equations estimated for each
	Fama-French 48 industry-year:
	$R\&D_{i,s,t} = \beta_0 + \beta_1 * Sales Growth_{i,s,t-1} + \varepsilon_{i,s,t}$
	· · ·

Appendix B Misconduct categories This table reports the classification of the offense group.

Offense group	Category
environment-related offenses	Е
employment-related offenses	S
consumer-protection-related offenses	S
safety-related offenses	S
healthcare-related offenses	S
government-contracting-related offenses	G
competition-related offenses	G
miscellaneous offenses	G

Internet Appendix

Table IA1 Board gender diversity reform and female directors

This table displays results of the impact of adopting board gender diversity reform on the number of female directors over the period 2000-2021 from the following regression:

Female directors_{*i*,*s*,*t*} = $\beta_1 Post_{s,t} + Control_{i,s,t} + \lambda_i + \lambda_t + \varepsilon_{i,s,t}$

The dependent variable *Female directors*_{*i*,*s*,*t*} represents the number of female directors in a firm. The independent variable *Post*_{*s*,*t*} is a dummy variable that equals to one for year *t* following the adoption of the boardroom gender diversity reform in state *s*, and zero otherwise. λ_i , λ_t are firm and year fixed effects, respectively. The numbers in parentheses are t-statistics based on standard errors clustered at the firm level. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Variables	Female directors
	(1)
Post	0.139***
	(5.291)
Ln(Total assets)	0.056***
	(5.015)
Leverage	-0.050
	(-1.417)
ROA	-0.006
	(-0.246)
Ln(Board size)	1.044***
	(30.973)
NED ratio	0.280***
	(3.587)
Avg. directors' tenure	-0.019***
	(-7.907)
Firm FEs	YES
Year FEs	YES
Adjusted R^2	0.758
Observations	60,919

Table IA2 Stacked regression

This table reports the baseline results estimated using the stacked regression approach. The dependent variables are $Ln(ESG \ Penalties)$, $Ln(E\&S \ Penalties)$, $Ln(ESG \ Violation)$ and $Ln(E\&S \ Violation)$. Ln(Penalties) is the natural logarithm of 1 plus the dollar amount of penalties per firm and year. Ln(Violation) is the natural logarithm of 1 plus the number of violations per firm and year. The independent variables are Post and Female directors. Post is a dummy variable that equals to one for year t following the adoption of the boardroom gender diversity reform in state s, and zero otherwise. Female directors represent the number of female directors in a firm. Control variables are the same as in Table 3. All regressions include Cohort*Firm fixed effects and Cohort*Year fixed effects. Numbers in parentheses are t-statistics based on standard errors clustered at firm by cohort level. ***, **, and * correspond to statistical significance at 1%, 5%, and 10% levels, respectively.

Variables	Ln(ESG	Ln(E&S	Ln(ESG	Ln(E&S
	Penalties)	Penalties)	Violation)	Violation)
	(1)	(2)	(3)	(4)
Post*Female directors	-0.176**	-0.123*	-0.022***	-0.020***
	(-2.286)	(-1.779)	(-3.398)	(-3.137)
Female directors	-0.026	-0.035	-0.001	-0.001
	(-0.562)	(-0.775)	(-0.184)	(-0.248)
Post	0.464***	0.381***	0.063***	0.060***
	(3.676)	(3.371)	(5.808)	(5.647)
Controls	YES	YES	YES	YES
Cohort*Firm FEs	YES	YES	YES	YES
Cohort*Year FEs	YES	YES	YES	YES
Adjusted R^2	0.549	0.560	0.703	0.704
Observations	28,829	28,829	28,829	28,829