



Board diversity and sustainability performance in Indonesia firms

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Article Info	ABSTRACT
Article history: Received Apr 28, 2026 Revised Jun 26, 2026 Accepted Sept 10, 2026 Keywords: Board gender diversity; ESG performance; Ownership concentration; Sustainability assurance.	This study examines the effect of board gender diversity (BDG) on sustainability performance and whether ownership concentration and sustainability assurance moderate this relationship. Although prior ESG research has examined board diversity, it provides limited explanation of why Board Gender Diversity may be more or less effective under different governance conditions, particularly in emerging markets. Indonesia offers a relevant setting because listed firms commonly exhibit concentrated ownership, while ESG reporting, assurance, and stakeholder accountability are still developing. Using a quantitative approach, this study analyzes 150 firm-year observations from firms listed in the IDX ESG Leaders Index during 2020-2024, selected through purposive sampling based on the availability of complete annual and sustainability reports. Panel regression with interaction terms shows that BGD improves sustainability performance. However, this effect weakens as ownership concentration increases and strengthens when sustainability assurance is present. The study's novelty lies in demonstrating that the effect of Board Gender Diversity is a conditional, internal ownership power constrains its effectiveness, whereas external assurance strengthens it. <i>This is an open access article under the CC BY-NC license.</i> 

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1. INTRODUCTION

The growing worldwide attention to Environmental, Social, and Governance (ESG) practices has reshaped the way companies embed sustainability into their strategic decisions. ESG considerations are no longer viewed as voluntary or symbolic initiatives, but rather as strategic instruments that influence firms' legitimacy, access to capital, and long-term competitiveness (Jung & Yoo, 2023; Zhou et al., 2022). Firms with stronger ESG performance tend to enjoy a lower cost of capital, enhanced reputational capital, and improved relationships with key stakeholders, particularly institutional investors and regulators (Shi & Zhang, 2023).

In Indonesia, however, sustainability practices are characterized by heterogeneous disclosure quality, limited regulatory enforcement, and weak monitoring mechanisms (Gunawan et al., 2021; KPMG, 2022). Although sustainability reporting has been formally encouraged through POJK No. 51/PJOK/03/2017, ESG disclosure remains largely principles-based and voluntary, leaving firms considerable discretion over the scope, depth, and credibility of ESG information and raising concerns about symbolic compliance and greenwashing (Ardi & Meiden, 2023). In this setting, corporate governance is a key driver of a firm's sustainability behavior, and board gender diversity (BGD) has

received increasing scholarly attention as one such mechanism. Amorelli & García Sánchez (2023) stated that female directors are generally associated with stronger commitment to transparency, accountability, and stakeholder-oriented decision-making, which theoretically positions gender diverse boards to support stronger ESG performance. Empirically, however, the relationship between BDG and ESG performance has not proven consistent, particularly in emerging markets. While several studies report that female board representation strengthens ESG disclosure and sustainability performance through improved monitoring and stakeholder sensitivity (Odriozola et al., 2024; Yadav & Prashar, 2022; Zharfpeykan & Bai, 2025), other studies find this effect to be weak, insignificant, or highly context-dependent. One explanation for these inconsistent findings is that prior studies have generally treated BGD as an isolated predictor, overlooking the governance conditions that determine whether female directors possess sufficient decision-making influence and whether their ESG initiatives receive credible external validation. Differences in ownership concentration and sustainability assurance across firms and institutional settings may therefore alter the strength of the board gender diversity-ESG relationship.

Boundary condition theory offers a useful lens for addressing this gap. It posits that the effect of an internal governance attribute, such as board composition, is not fixed but is amplified, constrained, or even neutralized by the broader governance context in which the board operates. Applied here, two contextual conditions are particularly relevant. First, ownership concentration shapes the board's actual autonomy. From an agency theory perspective, concentrated ownership can shift the governance problem from manager-shareholder conflict to agency conflict between controlling and minority shareholders. Dominant owners may influence board appointments and strategic priorities to protect their interests, thereby limiting the ability of board members, including female directors, to advance ESG-oriented values (Fatima & Elbanna, 2023). Second, sustainability assurance functions as an external validation mechanism. The perspective of stakeholder theory states that independent assurance strengthens accountability by reducing uncertainty and increasing stakeholder confidence in ESG information. It therefore helps distinguish substantive ESG initiatives from symbolic claims and reinforces the credibility of sustainability efforts promoted through internal governance (Delgado Sánchez et al., 2026; Obeng et al., 2025; Sneideriene & Legenzova, 2025).

Prior research, however, has largely examined board gender diversity, ownership concentration, and sustainability assurance in isolation from one another. Whether and how these two boundary conditions jointly shape the translation of BGD into ESG performance remains empirically underexplored, particularly in emerging markets with concentrated ownership structures such as in Indonesia.

Examining this interaction matters both theoretically and practically. Ownership concentration and sustainability assurance do not merely add explanatory power alongside BGD; they represent two distinct boundary conditions, one internal to the firm's power structure and one external and market-facing, that jointly determine whether stakeholder-oriented governance is enabled or constrained. Treating BGD as an isolated predictor risks overstating or understating its true effect, since its influence may only materialize, or may be actively suppressed, depending on these contextual conditions. A joint examination therefore offers a more complete and realistic account of how gender-diverse boards actually convert stakeholder awareness into verifiable ESG outcomes.

This study addresses this gap by examining whether board gender diversity influences ESG performance among firms listed in the IDX ESG Leaders Index, and whether this relationship is moderated by ownership concentration and sustainability assurance. Compared to prior research, this study offers three main contributions. First, rather than treating governance attributes as independent predictors, it develops an integrated framework, grounded in stakeholder theory and boundary condition theory, that explains why the BGD-ESG relationship is contingent rather than universal. Second, it provides new evidence on how two structurally different boundary conditions, one rooted in internal ownership power and one in external market monitoring, jointly shape this relationship, an interaction that has not been jointly tested in prior ESG governance research. Third, it contributes context-specific evidence from Indonesia, an emerging market marked by concentrated ownership and

developing sustainability practices, using a focused sample of ESG-recognized firms in the IDX ESG Leader Index, thereby adding nuance to a literature still dominated by developed-market evidence.

Stakeholder theory holds that corporate responsibility extends beyond shareholders to encompass the interests of employees, customers, government, communities, and the environment, and that sustainable firm success depends on the firm's capacity to accommodate these interests while preserving social legitimacy (Dewi et al., 2023; Zhu, 2024). Buchetti et al. (2025) and Handayati et al. (2025) state that the board of directors is central to this process, as it shapes strategic direction and determines how stakeholder concerns are incorporated into corporate policy; ESG performance can therefore be understood as the outcome of how effectively governance mechanisms translate stakeholder expectations into business strategy (Buchetti et al., 2025; Handayati et al., 2025).

Female directors are widely recognized for bringing distinct ethical perspectives, heightened sensitivity to social and environmental risk, and stronger commitment to transparency and accountability in board deliberations (Amorelli & García Sánchez, 2023). Gender-diverse boards are therefore expected to strengthen monitoring, improve stakeholder sensitivity, and support more transparent ESG practices, and recent empirical evidence links female board representation to stronger ESG performance and higher-quality sustainability disclosure (Odriozola et al., 2024; Tahat et al., 2024; Wasiuzzaman & Subramaniam, 2023; Zharfpeykan & Bai, 2025).

H1: Board gender diversity is positively associated with ESG performance.

Consistent with boundary condition theory, however, stakeholder theory also recognizes that a firm's capacity to address stakeholder interests is contingent on power dynamics within its governance structure. In firms with concentrated ownership, controlling shareholders can exert disproportionate influence over corporate priorities, potentially marginalizing non-shareholder stakeholders and constraining the board's role as a balancing mechanism (Fatima & Elbanna, 2023). Under such conditions, board independence and monitoring capacity may be limited, making it harder for female directors to advance stakeholder-oriented sustainability initiatives even when gender diversity is high (Eissa et al., 2024; Lozano & Martinez-Ferrero, 2022; Octavio et al., 2025; Wasiuzzaman & Subramaniam, 2023; Yadav & Prashar, 2022). This suggests that ownership concentration acts as a boundary condition that weakens the positive influence of board gender diversity on ESG performance. H2: Ownership concentration negatively moderates the relationship between board gender diversity and ESG performance.

Conversely, Obeng et al. (2025) explain that sustainability assurance functions as an external governance mechanism that strengthens stakeholder accountability by enhancing the credibility of ESG information, reducing the risk of symbolic disclosure and greenwashing. From a stakeholder perspective, assurance validates and reinforces the sustainability values championed by gender-diverse boards, increasing the likelihood that their initiatives are perceived as credible commitments rather than symbolic gestures. Evidence from Indonesia similarly shows that firms adopting sustainability assurance exhibit higher-quality ESG disclosure and greater stakeholder trust than non-assured firms (Ardi & Meiden, 2023; Gunawan et al., 2021). This suggests that sustainability assurance acts as a boundary condition that strengthens, rather than weakens, the positive influence of board gender diversity on ESG performance.

H3: Sustainability assurance positively moderates the relationship between board gender diversity and ESG performance.

2. RESEARCH METHOD

This study adopts a quantitative approach using 150 secondary observations obtained from the annual reports and sustainability reports of firms included in the IDX ESG Leaders Index during 2020-2024. Panel data are used because they combine firm-level observations with a time series period, allowing the analysis to capture variations across companies and over time. The sample was determined through purposive sampling to ensure that the selected firms provide relevant, consistent, and comparable governance data. Several criteria were applied in the selection process: first, the firms had to be consistently listed in the IDX ESG Leaders Index throughout the study; second, they were required to

publish annual reports; and third, they had to be listed on the Indonesia Stock Exchange for at least five consecutive years. These criteria were used to strengthen data stability, improve comparability across firms and years, and support the reliability of the empirical analysis.

In this study, we use one independent variable, two moderating variables, and one dependent variable. ESG performance, as the dependent variable, reflects the extent to which firms integrate environmental, social, and governance practices into their business activities, stakeholder accountability, and sustainability-oriented decision-making (Jung & Yoo, 2023; Shi & Zhang, 2023; Zhou et al., 2022). Board gender diversity as an independent variable is measured as the proportion of female directors on the board (Alodat et al., 2023; Buerthey, 2021; Eissa et al., 2024; Mallidis et al., 2024; Temiz & Acar, 2023; Yadav & Prashar, 2022; Yan et al., 2023; Zharfpeykan & Bai, 2025). Ownership concentration, as the first moderating variable, is measured by the percentage of shares held by the largest shareholder (Octavio et al., 2025; Yan et al., 2023). While the sustainability assurance, as the second moderating variable, is operationalized using a dummy variable, coded as one if the firm's sustainability report is assured by an independent third party and zero otherwise (Gunawan et al., 2021; Obeng et al., 2025). The data are analyzed using multiple regression analysis with moderation testing to examine both direct and interaction effects among the variables.

Based on stakeholder theory, this study develops a model to examine how board gender diversity affects ESG performance, with ownership concentration and sustainability assurance as moderating variables. It assumes that gender diversity improves firms' responsiveness to stakeholder demands, while ownership concentration may weaken this effect due to stronger control by dominant shareholders. In contrast, sustainability assurance is expected to strengthen the relationship by increasing the credibility of ESG disclosures. To test these relationships, the study uses moderated regression analysis with Pooled OLS, which combines all firm-year observations to examine both direct and interaction effects.

$$\begin{aligned}
 \text{ESGi,t} &= \alpha + \beta_1 \text{BGDi,t} \\
 &\quad + \varepsilon_{i,t} \\
 \text{ESGi,t} &= \alpha + \beta_1 \text{BGDi,t} + \beta_2 \text{OWNCi,t} \\
 &\quad + \beta_3 (\text{BGDi,t} \times \text{OWNCi,t}) \\
 &\quad + \beta_3 (\text{BGDi,t} \times \text{ASSURi,t}) + \varepsilon_{i,t}
 \end{aligned}
 \tag{1}$$

3. RESULTS AND DISCUSSIONS

The Descriptive Statistic

The descriptive statistics in Table 1 show that the mean value of ESGP is 0.3070, indicating that the average ESG performance of firms listed in the IDX ESG Leaders Index remains relatively low, suggesting that ESG practices in Indonesia are still largely compliance-driven rather than deeply embedded in corporate strategy. The average of Gender Diversity is 17.3267. The result shows that the underrepresentation of women in corporate leadership in Indonesia may limit boards' sensitivity to social and environmental stakeholder concerns. In contrast, the average of Ownership Concentration is 70.658. The high mean value of ownership concentration (BGD x OWNC) confirms the dominance of controlling shareholders in Indonesian firms, indicating an imbalance of stakeholder power that can constrain the effectiveness of gender-diverse boards in advancing sustainability agendas. Meanwhile, the sustainability assurance average is 12.153. The low average adoption of sustainability assurance reflects weak external monitoring mechanisms, which reduces the credibility of ESG disclosures and the pressure on stakeholders for accountability. This condition underscores the critical role of sustainability assurance in amplifying the impact of board gender diversity on ESG performance. Overall, these mean values depict a governance environment in which ESG outcomes depend on the interaction between internal board diversity and external governance mechanisms rather than on isolated governance attributes.

Table 1. The statistical descriptive results

Variable	Minimum	Maximum	Mean	N
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ESGP	0.000	2.66	0.3071	150
BGD	0.000	85	17.3267	150
OWNC	0.000	39.99	7.07	150
ASSUR	0.000	85	12.1533	150

The descriptive results show notable variation in ESG performance, board gender diversity, ownership concentration, and sustainability assurance across Indonesian firms, reflecting diverse governance conditions.

The Classical Assumption Tests

The classical assumption test results in Table 2 confirm that the regression model meets the required statistical criteria. The multicollinearity test shows that all independent and moderating variables have acceptable tolerance and VIF values below the critical level, confirming the absence of multicollinearity despite the inclusion of interaction terms.

Table 2. The classical assumption test results

Model	Collinearity Test		Decision
	Tolerance	VIF	
BGD	0.533	1.880	No multicollinearity
BDG x OWNC	0.532	1.875	
BDG x ASSUR	0.933	1.004	
Durbin Watson	1.872		No autocorrelation

Furthermore, Figure 1, the scatterplot analysis, demonstrates no systematic pattern, indicating that the model is free from heteroskedasticity. These results indicate that the regression model has adequate robustness and can be considered appropriate for subsequent hypothesis testing.

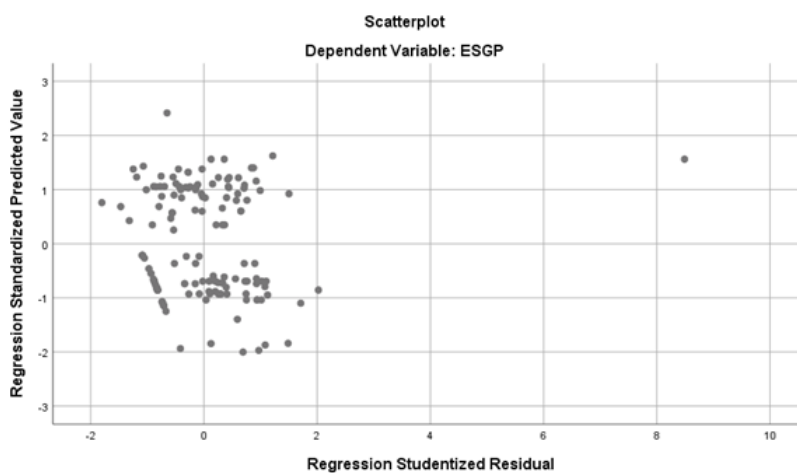


Figure 1. The scatterplot result

The Goodness of Fit Test and Regression Test Results

After verifying that the regression model meets all classical assumptions, the analysis proceeds to model feasibility tests to evaluate its explanatory power and statistical validity. As reported in Table 3, R^2 is 0.098, indicating that board gender diversity, ownership concentration, and sustainability assurance collectively explain 9.8% of the variation in ESG performance, with the remaining variance attributable to other factors outside the model. Although modest, this value is acceptable because ESG performance is a complex and multidimensional outcome shaped by many internal and external factors, including firm size, profitability, industry characteristics, regulations, stakeholder pressure, and corporate culture. Since this study focuses on testing specific governance relationships and

moderation effects rather than predicting ESG performance as a whole, a relatively low R^2 does not weaken the relevance of the model. Instead, it shows that the selected governance variables provide meaningful explanatory contribution within a broader ESG context. The F-test indicates that the model is feasible, with an F-value of 5.311 and significance level 0.02. This means that the variables jointly explain ESG performance. The t-test result further shows that board gender diversity has a positive and significant effect on ESG performance ($t = 2.762$; $p = 0.006$). Ownership concentration reduces this effect, as reflected in its negative and significant moderating role ($t = -2.740$; $p = 0.007$). In contrast, sustainability assurance strengthens the relationship between board gender diversity and ESG performance ($t = 2.773$; $p = 0.006$). Overall, these findings support the proposed hypotheses and suggest that the moderated regression model is relevant for explaining ESG performance in the Indonesian corporate context.

Table 3. The goodness of fit model tests results

Variables	Coefficient	t-statistic	Significant	Result
Constants	0.254	7.339	0.000	
BGD	0.005	2.762	0.006	Accepted
BGD x OWNC	-9.342	-2.740	0.007	Accepted with weak effect
BGD x ASSUR	0.003	2.773	0.006	Accepted with a strong effect
F-Test				5.311 (sig. 0.02)
R-Square				0.098

Based on the regression results, the moderated linear regression equation estimated in this study is expressed as follows:

$$ESGP = 0.254 + 0.005 BGD - 9.342 OWNC + 0.003 ASSUR + \varepsilon$$

The equation shows that board gender diversity has a positive effect on ESG performance. Ownership concentration weakens this relationship, while sustainability assurance makes it stronger. These results are in line with the coefficient of determination, F-test, and t-test presented earlier. Overall, the regression model can be considered statistically valid and provides a reliable basis for testing the proposed hypothesis.

Board Gender Diversity and ESG Performance

The findings indicate that board gender diversity improves ESG performance by increasing the board's responsiveness to stakeholder concerns. Female directors bring broader perspectives and greater attention to environmental and social issues, enabling sustainability considerations to be integrated more effectively into corporate decision-making and oversight. Recent studies also show that women on boards can improve ESG disclosure, better sustainability performance, and more effective governance monitoring (Alodat et al., 2023; Ma et al., 2024). Evidence from European and New Zealand firms also indicates that board gender diversity improves ESG performance by strengthening governance quality and stakeholder accountability (Odriozola et al., 2024; Zharfpeykan & Bai, 2025). Overall, these findings suggest that female directors contribute not only to board inclusiveness but also to more credible and substantive ESG outcomes.

The alignment of these findings with prior studies suggests that Indonesia's institutional setting supports the meaningful role of women in sustainability-focused governance. This is especially evident in firms listed in the IDX ESG Leaders Index, which already show strong commitments to transparency and modern governance. In these firms, female directors contribute beyond symbolic representation by improving decision-making quality, strengthening stakeholder engagement, and increasing responsiveness to social and environmental issues. From a policy perspective, these findings highlight the importance of promoting greater female participation on corporate boards as part of Indonesia's sustainable finance agenda, including POJK No. 51/POJK/03/2017. Integrating gender diversity into ESG frameworks can strengthen internal governance and improve the credibility of corporate ESG practices.

To realize the full governance value of gender diversity, management should empower female directors with meaningful decision rights and timely access to ESG information. Investors should look beyond numerical representation and consider women's actual involvement in sustainability oversight. ESG committees can reinforce this role by engaging female directors in setting targets, evaluating progress, and holding management accountable, while boards foster inclusive deliberation and equitable oversight. Together, these practices can transform gender diversity from formal representation into a substantive governance mechanism that strengthens ESG performance.

Ownership Concentration and ESG Performance

Ownership concentration weakens the positive contribution of board gender diversity to ESG performance by limiting board autonomy and the influence of female directors. From an agency theory perspective, concentrated ownership shifts the main governance problem from manager-shareholder conflict to conflict between controlling and minority shareholders. Dominant owners may influence board appointments, strategic agendas, and corporate policies to protect their interests, leaving female directors with limited decision-making authority to advance broader stakeholder and sustainability concerns. Consequently, gender diversity may become symbolic rather than substantive. This condition is particularly relevant in Indonesia, where family control and concentrated ownership are common. Thus, female board representation is more likely to improve ESG performance when decision-making power is balanced and the board can exercise effective independent oversight.

Recent studies show that board gender diversity is generally associated with stronger ESG performance, but its effectiveness depends on governance conditions, including ownership structure and board independence (Mehmood et al., 2023; Odriozola et al., 2024; Srivastava & Anand, 2023; Yadav & Prashar, 2022; Zharfpeykan & Bai, 2025). Therefore, in the IDX ESG Leaders Index context, gender diversity should be supported by balanced ownership, stronger board independence, and better protection for minority shareholders to ensure more substantive ESG outcomes.

These findings have important governance implications. Management should ensure that female directors have meaningful authority and access to ESG-related information rather than treating their appointment as symbolic compliance. Investors should evaluate board diversity together with ownership concentration and board independence when assessing ESG quality. ESG committees should establish clear decision rights, reporting responsibilities, and monitoring procedures that allow diverse board members to influence sustainability strategies. At the board level, transparent appointments, stronger independent oversight, and protection of minority shareholders are essential to prevent controlling owners from dominating ESG decisions and to translate gender diversity into substantive sustainability outcomes.

Sustainability Assurance and ESG Performance

Sustainability assurance provides external verification that enhances the credibility of ESG initiatives promoted by gender-diverse boards, helping translate stakeholder-oriented oversight into more substantive and accountable ESG practices. Based on stakeholder theory, external assurance improves the reliability of sustainability disclosure, builds stakeholder trust, and reinforces corporate accountability. A more credible reporting environment also helps boards, especially female directors, integrate ESG issues more effectively into strategic decision-making. Global evidence supports this view, showing that sustainability assurance enhances investor confidence in nonfinancial disclosures and signals stronger commitments to transparency and accountability (Buerter, 2021; Lavin & Montecinos-Pearce, 2021; Mallidis et al., 2024; Temiz & Acar, 2023). Moreover, Ardi & Meiden (2023) added that higher assurance quality reduces information uncertainty and mitigates greenwashing risks, thereby amplifying the effectiveness of governance mechanisms in driving sustainability outcomes. Overall, these results highlight the complementary role of sustainability assurance in turning board gender diversity into tangible ESG outcomes.

This study indicates that sustainability assurance strengthens the positive effect of board gender diversity on ESG performance. Assurance strengthens this relationship because it provides external

verification of sustainability information, reduces the risk of symbolic or selective ESG disclosure, and increases the reliability of reported ESG outcomes. Female directors may encourage stronger stakeholder orientation, ethical awareness, and sustainability related decision making, but these contributions become more visible and credible when ESG information is independently assured. In other words, assurance helps translate the sustainability-oriented role of female directors into ESG outcomes that can be trusted by investors, regulators, and other stakeholders. This finding is particularly relevant in the Indonesia context, where ESG reporting and assurance practices are still developing, while stakeholder expectations for transparency and accountability continue to increase. For firms in the IDX ESG Leaders Index, which are expected to demonstrate stronger ESG commitment, the combination of board gender diversity and sustainability assurance can serve as an important governance mechanism. Overall, this study suggests that female board representation is more effective in improving ESG performance when supported by external assurance that strengthens the credibility, transparency, and accountability of sustainability reporting.

4. CONCLUSION

Taken together, the evidence positions board gender diversity as a conditional rather than universally effective governance mechanism. Its capacity to translate diverse perspectives into stronger ESG outcomes depends on whether internal power structures provide female directors with meaningful influence and whether external assurance lends credibility to sustainability commitments. The study therefore shifts attention from the mere presence of women on boards to the governance conditions that enable their contributions to become substantive. Theoretically, this perspective extends stakeholder, agency, and boundary-condition arguments by linking stakeholder responsiveness to board autonomy, ownership power, and external accountability. Practically, firms should provide female directors with meaningful decision rights, reinforce independent oversight, and integrate assurance into ESG governance, while investors should evaluate substantive participation rather than numerical representation alone. For OJK and IDX, the results support policies that promote effective board diversity, protect minority shareholders, strengthen ESG disclosure requirements, and encourage credible independent sustainability assurance. Future research can expand this study through cross-country comparisons to see whether the effects of ownership concentration and sustainability assurance differ across institutional settings. Future studies can also examine mandatory sustainability assurance and other dimensions of board diversity, such as expertise, age, nationality, education, tenure, and independence. In addition, future research may include relevant control variables, such as firm size, profitability, leverage, industry type, and firm age, to improve the robustness of the empirical model.

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