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The Influence of Board Independence, Financial Expertise, and Gender on Financial Distress of SOEs and Infrastructure in Indonesia

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Abstract: The high risk of financial distress among state-owned enterprises in the infrastructure sector is primarily driven by the heavy financial burden of national strategic projects. This study focuses on examining how the characteristics of the board of commissioners influence the financial stability of companies facing financial pressure. The objective of this research is to analyze the effect of board independence, board expertise, and gender diversity on the level of financial distress. This study employs a quantitative method using panel data regression on infrastructure state-owned enterprises listed on the IDX during the period 2014 to 2023. The results show that board independence has a negative and significant effect on financial distress as measured by the Z Score and F Score models, no significant effect in the M Score model. Board expertise does not significantly affect financial distress in the Z Score and F Score models, but has a positive and significant effect in the M Score model. Gender diversity on the board does not show a significant impact in any of the three models. Findings suggest that the corporate governance mechanism, particularly through the independence, expertise, and diversity of the board of commissioners, can support more effective supervision and strategic decision-making.

Keywords: corporate governance, board independence, financial expertise, gender diversity, financial distress.

INTRODUCTION

Financial distress refers to a condition wherein a firm's operating cash flows become insufficient to satisfy short-term obligations, potentially leading to insolvency if corrective measures are not promptly implemented. This circumstance often arises from operational inefficiencies, strategies misaligned with market dynamics, or external shocks such as economic crises and regulatory changes (Altman & Hotchkiss, 2005; Ross et al., 2020). Ross et al. (2017) further categorize bankruptcy into three distinct forms: legal, technical, and accounting bankruptcy, each delineating specific levels and implications of corporate financial failure.

To mitigate these financial risks, corporate governance emerges as a critical mechanism that regulates interactions among management, supervisory boards, and shareholders within a framework emphasizing transparency and accountability (OECD, 2023). Central to effective corporate governance is the structure and composition of the supervisory board, encompassing independence, financial expertise, and gender diversity, which collectively contribute to preventing corporate failure (García & Herrero, 2021; Lagasio et al., 2023; Utama et al., 2022).

In Indonesia, state-owned enterprises (SOEs) in the infrastructure sector play a strategic role in accelerating national development through involvement in significant national strategic projects (PSN), as stipulated under Presidential Regulation No. 3 of 2016. However, the extensive involvement of SOEs in large-scale infrastructure projects introduces substantial long-term financial pressures, exemplified by financial strain observed in companies such as PT Waskita Karya, PT Hutama Karya, and PT Adhi Karya (Alberta & Dalimunthe, 2024). These financial challenges are compounded by governance issues within supervisory boards, characterized by prevalent political affiliations, limited financial expertise among board members, and low representation of women (Fisman & Werker, 2011; Purwanto, 2023).

Existing studies suggest that board independence can significantly reduce conflicts of interest and enhance monitoring effectiveness (Li et al., 2021). While the presence of board members with financial expertise is shown to improve the quality of strategic decision-making processes (Sadaa et al., 2023). Additionally, gender diversity within supervisory boards contributes positively to governance quality by providing diverse leadership perspectives and fostering transparency (Kamberidou, 2020; Lückerath-Rovers, 2013).

Nevertheless, previous research predominantly focuses on private enterprises or entities operating within developed economies, thus creating a notable research gap concerning the specific impact of supervisory board characteristics on financial distress among SOEs in the Indonesian infrastructure sector. Addressing this gap, this study aims to analyze the influence of board independence, financial expertise, and gender diversity on financial distress within Indonesian infrastructure SOEs listed on the Indonesia Stock Exchange (IDX) from 2014 to 2023. Financial distress is evaluated through three distinct measurement approaches: the Altman Z-Score, Piotroski F-Score, and Beneish M-Score, thereby providing comprehensive insights into corporate financial conditions.

METHODS

This study employs a quantitative research approach utilizing panel data regression analysis to examine the relationship between supervisory board characteristics, specifically board independence, financial expertise, and gender diversity, and financial distress within state-owned enterprises (SOEs) in Indonesia's infrastructure sector.

The population for this research comprises infrastructure sector SOEs listed on the Indonesia Stock Exchange (IDX) from 2014 to 2023. Purposive sampling was applied to select the research sample based on predetermined criteria: (1) entities must be state-owned enterprises operating within the infrastructure sector, (2) companies must have consistently published their financial statements and annual reports on the IDX, either due to their status as publicly listed companies or issuers of bonds, and (3) complete and accessible financial and corporate governance data must be available for the entire observation period.

Data utilized in this study were primarily obtained from secondary sources, specifically annual financial reports and corporate governance disclosures available through the IDX and Refinitiv Eikon database. The research timeframe spans ten years (2014–2023) to ensure comprehensive longitudinal analysis.

Financial distress is measured using three prominent models:

1. Altman Z-Score (Altman & Hotchkiss, 2005)

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1X_5 \quad (1)$$

Table 1. Interpretation Z Score

No	Range Z Score	Interpretation
1	> 2,99	Safe Zone
2	1,81 – 2,99	Grey Zone
3	< 1,81	Distress Zone

Source: Altman and Hotchkiss (2005)

2. Piotroski F-Score (Piotroski, 2000)

$$F_{Score} = F_{ROA} + F_{CFO} + F_{\Delta ROA} + F_{ACCRUAL} + F_{\Delta LEVER} + F_{\Delta LIQUID} + EQ_OFFER + F_\Delta MARGIN + F_\Delta TURN \text{ ---------- (2)}$$

Table 2. Interpretation F Score

No	Range F Score	Interpretation
1	1-3	Weak
2	4-6	Stable
3	7-9	Strong

Source: Piotroski (2000)

3. Beneish M-Score

$$M - Score = -4.84 + (0.92 \times DSRI) + (0.528 \times GMI) + (0.404 \times AQI) + (0.892 \times SGI) + (0.115 \times DEPI) + (-0.172 \times SGAI) + (4.679 \times TATA) + (-0.327 \times LVGI) \text{ ---- (3)}$$

Table 3. Interpretation M Score

No	Range M Score	Interpretation
1	< -2,22	Red Flag
2	-2,22 > M < -1,78	Yellow Flag
3	> -1,78	Green Flag

Source: Beneish (1997)

Board independence, financial expertise, and gender diversity were operationalized through clearly defined, established metrics from prior literature.

1. Board independence is calculated by the proportion of independent members on the supervisory board (Lagasio et al., 2023).

$$INDEPBOC = \frac{Komisaris\ Independent}{Jumlah\ Komisaris} \text{ ---------- (4)}$$

2. Financial expertise is determined by the proportion of board members possessing formal education or professional experience in finance, economics, or managerial positions directly related to financial oversight (Sadaa et al., 2023).

$$EXPERBOC = \frac{Jumlah\ Komisaris\ \ Financial\ Experts}{Jumlah\ Komisaris} \text{ ---------- (5)}$$

3. Gender diversity is assessed by the ratio of female members to total supervisory board members (Abdullah et al., 2022).

$$GENDIVBOC = \frac{Jumlah\ Komisaris\ Perempuan}{Jumlah\ Komisaris} \text{ ---------- (6)}$$

Additionally, several control variables are included to account for other potential influences on financial distress.

1. Company Size

   Company size, measured by the natural logarithm of total assets (Li et al., 2021).

   $Size = Ln\ (Total\ Asset)$ ---------- (7)

2. Leverage

   Leverage, calculated as the ratio of total debt to total assets (Eulerich & Velte, 2014)

   Covid – 19 = Variabel dummy ---------- (8)

   Where : (1 = 2020 – 2022; 0 = in addition to the year 2020-2022)

3. Debt to Asset Ratio

   Debt to asset ratio, calculated as total liabilities divided by total ekuity (Ross et al., 2020).

$$DER = \frac{Total\ Lialibilities}{Total\ Ekuity} \text{ ---------- (9)}$$

4. Real Interest Rate
   Real interest rate, measured as the nominal interest rate adjusted for inflation (Ross et al., 2020).

$$RIT = \frac{1+Nominal\ Interest\ Rate}{1+Inflation\ Rate} + 1 \text{ ---------- (10)}$$

The empirical model for this research is represented by the following regression equation:

$$Z_{i,t} = \beta_0 + \beta_1 \text{INDEPBOC}_{i,t} + \beta_2 \text{EXPERBOC}_{i,t} + \beta_3 \text{GENDERBOC}_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 COVID_{i,t} + \beta_6 DER_{i,t} + \beta_7 RIT_{i,t} + \varepsilon_{i,t} \text{ ---------- (11)}$$

$$F_{i,t} = \beta_0 + \beta_1 \text{INDEPBOC}_{i,t} + \beta_2 \text{EXPERBOC}_{i,t} + \beta_3 \text{GENDERBOC}_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 COVID_{i,t} + \beta_6 DER_{i,t} + \beta_7 RIT_{i,t} + \varepsilon_{i,t} \text{ ---------- (12)}$$

$$M_{i,t} = \beta_0 + \beta_1 \text{INDEPBOC}_{i,t} + \beta_2 \text{EXPERBOC}_{i,t} + \beta_3 \text{GENDERBOC}_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 COVID_{i,t} + \beta_6 DER_{i,t} + \beta_7 RIT_{i,t} + \varepsilon_{i,t} \text{ ---------- (13)}$$

Data analysis procedures involve preliminary descriptive statistical analysis, followed by rigorous model selection tests including Chow, Hausman, and Lagrange Multiplier tests to determine the appropriate panel regression model (Fixed Effect, Random Effect, or Common Effect). Classical assumption tests such as multicollinearity, heteroscedasticity, and autocorrelation are also conducted to ensure model robustness. Hypotheses testing utilizes statistical inference based on the significance of regression coefficients, employing a confidence level of 95% (Sugiyono, 2020).

RESULTS AND DISCUSSION

Result

Statistics Descriptive

Table 4. Statistics Descriptive

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
Z Score	1.118	0.959	4.349	-0.246	0.715
F Score	5.940	6	9	2	1.369
M Score	-0.198	-1.845	29.375	-5.898	6.527
IDEPBOC	0.315	0.310	0.800	0.000	0.177
EXPERBOC	0.199	0.200	0.500	0.000	0.136
GENDIVBOC	0.035	0.000	0.400	0.000	0.087
SIZE	31.293	31.610	33.291	28.123	1.224
COV	0.300	0.000	1.000	0.000	0.461
DER	2.958	2.592	21.122	0.373	2.432
RIT	6.503	7.037	9.986	-0.955	3.144

Source: Eviews 13 (2025)

Table 4 presents descriptive statistics relevant to the study's hypotheses. The mean Z Score of 1.118 suggests that companies are generally in adequate financial health; however, the minimum value of -0.246 indicates that some firms face severe financial distress. The substantial range between maximum and minimum values and a median below the mean highlight uneven data distribution, implying most firms are financially weaker than the mean suggests. This calls for deeper examination into governance variables, particularly the effectiveness of boards of commissioners.

The F Score averages 5.940, with a median of 6, reflecting moderate financial health among companies. Yet, the broad range from 2 to 9 signals significant variability. Given the strategic importance of state-owned enterprises (SOEs) managing substantial national projects, robust internal controls overseen by boards of commissioners become crucial to ensuring strong financial conditions.

The average M Score of -0.198 indicates minimal earnings manipulation overall, though a maximum value of 29.375 and a standard deviation of 6.527 reveal significant anomalies in reporting practices within certain firms. This highlights governance shortcomings in preventing reporting irregularities, underscoring the necessity of boards characterized by competence, independence, and integrity.

The average INDEPBOC value of 0.315 reveals that only around one-third of board members are independent, with a median of 0.310 suggesting inadequate representation. Independence is vital in SOEs due to potential external and political influences, indicating that weak governance could exacerbate performance disparities and financial risks.

Regarding expertise (EXPERBOC), only about 0,199 of commissioners have financial or managerial backgrounds. This suggests limited technical competence on boards, which could impair effective oversight, especially crucial in infrastructure SOEs managing large-scale financial risks.

Gender diversity (GENDIVBOC) is extremely low, with an average of just 0.035 and median of 0, signifying minimal female representation. Increased gender diversity is beneficial for enriched decision-making perspectives and stronger stakeholder relationships, reflecting corporate commitment to equality and inclusivity.

Firm size (SIZE), measured as the natural logarithm of total assets, has an average value of 31.293 with a median of 31.610, indicating that most sampled SOEs are large-scale enterprises with substantial asset bases. The relatively narrow dispersion, reflected in a standard deviation of 1.224, suggests moderate homogeneity in firm size across the sample. However, the range between the minimum value of 28.123 and the maximum of 33.291 reveals notable variation in organizational scale, implying differences in operational complexity and resource availability. Larger firms typically face higher agency problems and greater public scrutiny, making effective governance particularly through competent and independent boards of commissioners essential for ensuring accountability, strategic control, and risk management. In the context of infrastructure-oriented SOEs, firm size may amplify both financial resilience and exposure to systemic risks, reinforcing the importance of strong board oversight to align managerial decisions with long-term organizational sustainability.

The COV variable indicates about 0.300 companies were directly impacted by COVID-19. In such challenging conditions, effective oversight and adaptive governance by boards are essential for organizational resilience.

The average Debt-to-Equity Ratio (DER) of 2.958 and a maximum value of 21.122 indicate high reliance on debt financing, raising default and liquidity risks, particularly if projects funded through debt do not yield immediate returns. Effective monitoring and financial accountability are critical.

Lastly, the Real Interest Rate (RIT) averaging 6.503 with a standard deviation of 3.144 shows significant financial strain due to high capital costs, compounded by substantial leverage (DER). Boards' capability to guide prudent financial management becomes imperative.

Model Selection Test

Chow Test

Table 5. Chow Test

Dependent	Cross-section Chi-square	Information
Z Score	0.0001	FEM
F Score	0.2638	CEM
M Score	0.0016	FEM

Source: Eviews 13 (2025)

Based on Table 5, model selection was conducted by examining Cross-section Chi-square values. For the Z score (0.0001 < 0.05), the FEM was chosen. For the F score (0.2638 > 0.05), the CEM was selected. Meanwhile, the M score (0.0016 < 0.05) utilized the FEM.

Hausman Test

Table 6. Hausman Test

Dependent	Cross-section random	Information
Z Score	1.0000	REM
F Score	1.0000	REM
M Score	1.0000	REM

Source: Eviews 13 (2025)

Based on Table 6, model selection was determined by evaluating Cross-section random values. For the Z score (1.0000 > 0.05), the REM was selected. Similarly, the F score (1.0000 > 0.05) and M score (1.0000 > 0.05) also indicated the use of the REM.

Lagrange Multiplier Test

Table 7. Lagrange Multiplier Test

Dependent	Cross-section	Information
Z Score	0.4353	CEM
F Score	0.9553	CEM
M Score	0.0167	REM

Source: Eviews 13 (2025)

Based on the results in Table 4.4, the Z score variable has a Cross-section value of 0.4353 (> 0.05), thus the CEM is selected. Likewise, the F score (0.9553 > 0.05) and the M score (0.0167 > 0.05) also indicate the use of the CEM.

Classic Assumption Test

Multicollinearity Test

Table 8. Multicollinearity Test

	IDEPBOC	EXPERBOC	GENDIVBOC	SIZE	COV	DER	RIT
IDEPBOC	1	-0.095	0.181	0.550	0.130	-0.133	-0.116
EXPERBOC	-0.095	1	0.292	0.288	-0.235	-0.292	0.190
GENDIVBOC	0.181	0.292	1	0.266	0.007	-0.008	0.053
SIZE	0.550	0.288	0.266	1	0.194	-0.241	-0.122
COV	0.130	-0.235	0.007	0.194	1	0.287	-0.539
DER	-0.133	-0.292	-0.008	-0.241	0.287	1	-0.143
RIT	-0.116	0.190	0.053	-0.122	-0.539	-0.143	1

Source: Eviews 13 (2025)

Based on the results in Table 8, the correlation between IDEPBOC and EXPERBOC is -0.038, which is well below the threshold of 0.85, indicating no multicollinearity. Similarly, the correlations of IDEPBOC with GENDIVBOC (0.054), SIZE (0.550), COV (0.299), DER (0.112), and RIT (-0.242) are all below the threshold, suggesting the absence of multicollinearity among these variables.

For EXPERBOC, the correlations with GENDIVBOC (-0.001), SIZE (0.288), COV (-0.057), DER (0.027), and RIT (-0.042) are also well below 0.85, confirming no signs of multicollinearity. Additionally, GENDIVBOC's correlations with SIZE (0.266), COV (0.222), DER (0.056), and RIT (-0.131) further support this conclusion.

Regarding SIZE, its correlations with COV (0.194), DER (-0.241), and RIT (-0.122) remain within acceptable limits, indicating that firm size operates independently within the regression model.

The correlation between COV and DER is 0.314, and between COV and RIT is -0.539, both of which fall below the multicollinearity threshold. Lastly, the correlation between DER and RIT is -0.158, further indicating no multicollinearity concerns.

In summary, all correlation values among independent variables are below the threshold of 0.85, indicating no multicollinearity issues. Therefore, the regression model is free from multicollinearity problems and is suitable for further analysis.

Heteroscedasticity Test

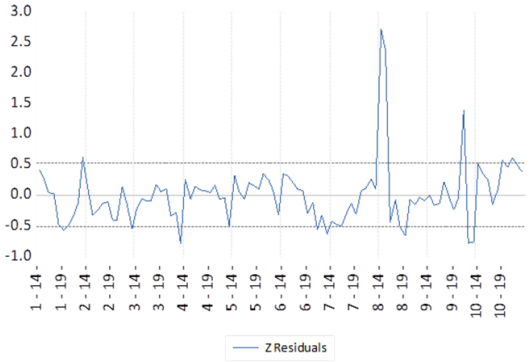


Figure 1. Heteroscedasticity Test Z Score
Source: Eviews 13 (2025)

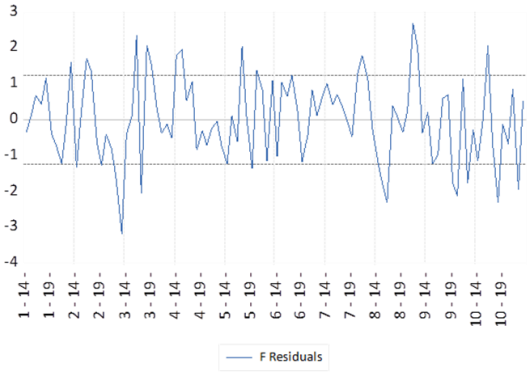


Figure 2. Heteroscedasticity Test Z Score
Source: Eviews 13 (2025)

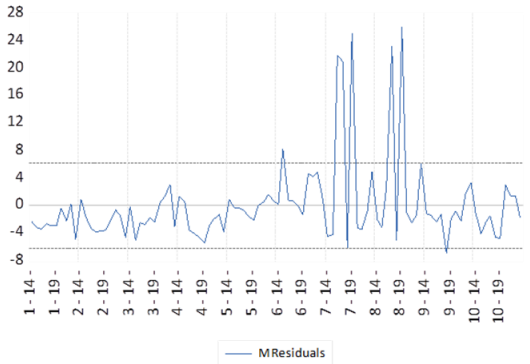


Figure 3. Heteroscedasticity Test M Score
Source: Eviews 13 (2025)

Based on the results of the heteroscedasticity test, no values exceeding 500 or below -500 were found for the Z score, F score, or M score. Therefore, it can be concluded that there

is no indication of heteroscedasticity in the model, indicating that the classical assumption of homoscedasticity is met. As a result, the regression model is valid for further analysis.

Hypothesis Test

Z Score

Table 9. Z Score Hypothesis

Variabel	Model 1	Model 2
C	0,7836 (0,0001)	11,3963 (0.0000)
IDEPBOC	0,3604 (0,3863)	1,3834* (0,0007)
EXPERBOC	1,1331* (0,0433)	1,0356* (0,0319)
GENDIVBOC	-0,1418 (0,8722)	0,8051 (0,2272)
SIZE		-0,03862* (0,0000)
COV		-0,3862* (0,0103)
DER		-0,1338* (0,000)
RIT		-0,0256 (0.,054)
R-Squared	0,0484	0,4978
Adjusted R Squared	0,0187	0,4596
F	1,630* (0,1874)	13,0327* (0,0000)

Source: Eviews 13 (2025)

Table 9 shows a comparison of two regression models, namely Model 1 which only involves the main independent variables (IDEPBOC, EXPERBOC, GENDIVBOC) and Model 2 which adds control variables such as company size (SIZE), COVID-19 impact (COV), leverage (DER), and return on investment timing (RIT). As a result, the R-squared value increased sharply from 0.0484 to 0.4978, which means that the second model is better able to explain the variation in the Z Score. The adjusted R^2 also increased from 0.0187 to 0.4596, indicating that the second model is more robust despite the increasing number of variables. The F test showed that Model 2 was simultaneously significant ($p < 0.05$), while Model 1 was insignificant.

In Model 1, only the EXPERBOC variable had a significant effect on the Z Score, with a positive direction. This means that the higher the experience of the board of commissioners, the higher the company's Z Score, which indicates a more stable financial condition. However, IDEPBOC and GENDIVBOC are not significant in this model.

In contrast to Model 1, in Model 2, after adding control variables, the variables IDEPBOC, EXPERBOC, SIZE, COV, and DER showed a significant influence. IDEPBOC and EXPERBOC had a positive effect, while SIZE, COV, and DER had a negative effect on the Z Score. This shows that the level of independence and experience of the board of commissioners can improve financial conditions, while the size of the company, the influence of COVID-19, and high leverage actually increase the risk of financial distress.

Nevertheless, GENDIVBOC and RIT remain insignificant, indicating that gender diversity and timeliness of investments do not sufficiently explain the variation in a company's financial condition statistically.

The decline in the significance of GENDIVBOC can be explained by the fact that the proportion of women on the boards of SOEs is still very low and often only symbolic

(tokenism). Data from the Ministry of SOEs (2022) shows that only 15% of leadership positions are filled by women, so this diversity is not strong enough to influence strategic decisions.

The explanation for this result can be attributed to several typical conditions in SOEs in the infrastructure sector in Indonesia. First, although SOEs are required by regulation to have independent commissioners, their implementation is often formalistic and does not fully reflect substantive independence. As revealed by Fisman and Werker (2011) and Habib et al. (2017), many commissioners are administratively declared independent, but have indirect relationships with controlling shareholders or political affiliations. The presence of actors with political connections in the board structure decreases the effectiveness of the supervisory function and increases the risk of biased decision-making against certain interests.

Independent commissioners are often added as a signal of post-crisis governance improvement. Some studies show that companies in poor condition tend to increase the proportion of independent commissioners to restore investor confidence (Bhagat & Bolton, 2008).

The addition of women to the board can occur after external pressure or a negative reputation. For example, research has found that companies often appoint female directors after social pressure or negative media publications, rather than because of proactive gender equality initiatives (Boulouta, 2013).

The function of the council can be symbolic in a crisis situation. In some cases, the addition of commissioners or women to the board is done more in the interest of reputation or legitimacy than a real change in governance (Sari & Setiawan, 2024).

Thus, the results of this study support the view that the effectiveness of governance mechanisms, such as independence and gender diversity, is highly contextual. In an unstable environment with a lack of strong supervision such as state-owned enterprises in the infrastructure sector in developing countries, the influence of these variables can be insignificant or even contrary to theoretical expectations. This is consistent with the findings of Fich and Slezak (2008) and Nam and An (2021) that the benefits of the new governance will be real if applied in a healthy and professional management ecosystem, not just a compliance formality.

F Score

Table 10. F Score Hypothesis

Variabel	Model 1	Model 2
C	6,1495 (0,0000)	20,0039 (0,0000)
IDEPBOC	-0,1795 (0,8250)	0,9051 (0,3136)
EXPERBOC	-0,8917 (0,4117)	0,4345 (0,6964)
GENDIVBOC	0,7006 (0,6846)	1,6375 (0,2925)
SIZE		-0,4079* (0,0045)
COV		-0,3089 (0,3717)
DER		-0,0754 (0,1893)
RIT		-0,2168* (0,0000)
R-Squared	0,0072	0,2525
Adjusted R Squared	-0,0236	0,1956
F	0,2360	4,4396

	(0,871)	(0,0002)

Source: Eviews 13 (2025)

Table 10 presents the regression results of two models, namely Model 1 which only includes key variables such as the independence of the board of commissioners (IDEPBOC), the experience of the board of commissioners (EXPERBOC), and gender diversity in the board of commissioners (GENDIVBOC), and Model 2 with added control variables including company size (SIZE), impact of COVID-19 (COV), debt-to-equity ratio (DER), and return on investment timing (RIT). The results showed that the R-Squared value increased from 0.0072 in Model 1 to 0.2525 in Model 2, which means that the model's ability to explain the variability of the F Score improved substantially. An increase also occurred in the Adjusted R-Squared, from -0.0236 to 0.1956. In addition, the F-statistic value in Model 2 showed significance at a rate of 5% (p = 0.0002), while Model 1 was insignificant (p = 0.8710). This shows that simultaneously, only Model 2 is statistically able to explain the relationship between independent variables and the F Score.

In Model 1, all of the major variables IDEPBOC, EXPERBOC, and GENDIVBOC had no significant influence on the F Score. In fact, the IDEPBOC and EXPERBOC coefficients show a negative direction, although not significant. This theoretically indicates the possibility of a relationship between a more independent or experienced board of commissioners and an increased financial risk. GENDIVBOC, on the other hand, is showing a positive but still insignificant direction. When the control variables were included in Model 2, the regression results remained to show that the three main variables were not statistically significant, even though the direction of the IDEPBOC and GENDIVBOC coefficients turned positive. Only two control variables had a significant effect on the F Score, namely company size (SIZE) and investment timeliness (RIT), both of which showed a negative influence. This means that the larger the size of the company and the more sensitive the investment time, the lower the F Score value, which indicates an increased risk of financial distress.

This phenomenon can be explained by considering the institutional context and governance structure of state-owned enterprises in the infrastructure sector that are the object of the research. In the context of the independence of the board of commissioners, although regulations require the existence of independent commissioners, the reality is that implementation in Indonesia often does not reflect substantial independence. Several studies, such as those conducted by Fisman and Werker (2011) and Habib et al. (2017), reveal that many board members who are administratively classified as independent retain political affiliation or affiliation with controlling shareholders. This creates potential conflicts of interest and reduces the effectiveness of supervision. As a result, the existence of formally independent board members does not necessarily improve the quality of decision-making or financial stability of the company, and can even increase coordination costs and slow down responses to operational dynamics.

Gender diversity in the board of commissioners also faces similar challenges. Theoretically, the presence of women in leadership positions is believed to enrich perspectives and improve the quality of strategic decisions. But the effectiveness of gender diversity depends heavily on adequate representation, active engagement, and inclusive board structures. Data from the Ministry of SOEs in 2022 shows that only about 15 percent of leadership positions are filled by women. This low representation causes the presence of women on the council to often be symbolic and have no substantive influence in the decision-making process. García and Herrero (2021) explain that the real contribution of gender diversity will only be seen if women have an equal sphere of influence with other board members and are involved in the company's strategic decisions.

Furthermore, the characteristics of SOE projects in the infrastructure sector that are large-scale, long-term, and have high investment risks demand an adaptive and professional board structure. However, in practice, the appointment of board members in SOEs is often influenced by political or non-professional considerations, resulting in low supervisory effectiveness and lack of responsiveness to crises, including in the face of external pressures such as the COVID-19 pandemic. Nam and An's (2021) study shows that in Korea, the presence of female directors does not necessarily lower the risk of bankruptcy, unless the woman has an active and integrated role in the company's strategy. Research by Fich and Slezak (2008) also found that independent commissioners are only effective in preventing distress when they are highly competent and not in conflicts of interest, a condition that has not been fully achieved in many developing countries.

Furthermore, Lagasio et al. (2023) emphasized that the effectiveness of the board's role in preventing financial distress is highly dependent on their level of activity, such as the frequency of meetings and direct involvement in strategic processes. If board members, both independent and female, are only symbolically involved, then their existence will not make a meaningful contribution to the company's financial stability. Thus, the results of this study show that a formally ideal council structure does not necessarily have a positive impact if it is not accompanied by high quality of implementation, meaningful participation, and freedom from political intervention.

Overall, the regression results of the F Score show that the influence of independence and gender diversity in the board of commissioners on the risk of financial distress in state-owned companies in the infrastructure sector has not been statistically significant. This indicates that the effectiveness of the governance structure is determined not only by the existence of formal elements such as independent commissioners and female directors, but also by how these elements function in real terms on the ground. Therefore, to increase financial resilience and corporate governance, structural reforms in SOEs need to be focused on improving the quality, competence, and active role of the board in strategic decision-making, not only on fulfilling administrative aspects.

M Score

Table 11. M Score Hypothesis

Variabel	Model 1	Model 2
C	-1,0339 (0,5465)	-50,4122 (0,0206)
IDEPBOC	-4,0715 (0,2793)	-9,4186* (0,0419)
EXPERBOC	9,8763* (0,0510)	2,9941 (0,5989)
GENDIVBOC	4,3475 (0,5855)	3,1311 (0,6929)
SIZE		1,6711* (0,0217)
COV		-2,8566 (0,1078)
DER		0,1163 (0,6907)
RIT		0,1069 (0,6567)
R-Squared	0,0671	0,1408
Adjusted R Squared	0,0379	0,0754
F	2,3018 (0,0819)	2,1539* (0,0455)

Source: Eviews 13 (2025)

Table 11 presents regression results on two models, namely Model 1 which only includes the main independent variables, namely the independence of the board of commissioners (IDEPBOC), the experience of the board of commissioners (EXPERBOC), and gender diversity in the board of commissioners (GENDIVBOC), and Model 2 which adds control variables such as company size (SIZE), impact of COVID-19 (COV), debt-to-equity ratio (DER), and return on investment timing (RIT).

The results of the analysis showed that the R-Squared value increased from 0.0671 in Model 1 to 0.1408 in Model 2, which means that the addition of a control variable was able to improve the model's ability to explain the variation in the M Score. The Adjusted R-Squared also increased from 0.0379 to 0.0754, indicating that the second model was statistically better despite involving more variables. The significance test with F-statistics showed that Model 2 was simultaneously significant with an F-value of 2.1539 and a p-value of 0.0455, while Model 1 was insignificant because it had a p-value greater than 0.05.

In Model 1, none of the major independent variables were statistically significant to the M Score, although the EXPERBOC variable showed a p-value close to the limit of significance (0.0510). When the control variables were incorporated into Model 2, it was found that IDEPBOC had a negative and significant influence on the M Score, while SIZE showed a significant positive influence. The EXPERBOC and GENDIVBOC variables remained insignificant in Model 2. These results show that the higher the level of independence of the board of commissioners, the lower the potential for manipulation of financial statements reflected in the M Score, while the larger the size of the company actually increases the manipulative tendency towards financial reporting.

Interestingly, although not significant in Model 2, the EXPERBOC variable had previously shown marginal significance in Model 1. These findings raise important questions because a high M Score indicates an increased likelihood of companies committing accounting manipulation. Therefore, if the proportion of board members who have financial expertise is actually correlated with an increase in the M Score, then this is contrary to the logic of governance that expertise should strengthen the supervisory and accountability functions.

Fenomena ini dapat dijelaskan melalui pendekatan perilaku oportunistik dalam konteks struktur dewan komisaris yang tidak sepenuhnya independen. Dalam kasus BUMN sektor infrastruktur di Indonesia, anggota dewan yang memiliki keahlian keuangan atau manajerial tinggi bisa jadi lebih memahami celah teknis dalam sistem pelaporan keuangan dan, dalam kondisi tertentu, memanfaatkan pengetahuan tersebut untuk membenarkan strategi manajemen laba atau praktik akuntansi agresif. Penelitian oleh Jeanjean dan Stolowy (2009) mendukung pandangan ini dengan menunjukkan bahwa literasi keuangan yang tinggi tidak selalu meningkatkan transparansi, melainkan dapat digunakan sebagai alat untuk menyiasati laporan keuangan dalam rangka mempertahankan citra perusahaan.

Lebih jauh, studi Beneish (1997) yang menjadi dasar penyusunan M Score, menjelaskan bahwa perusahaan yang berada dalam tekanan untuk mempertahankan reputasi keuangan dan memenuhi ekspektasi pemangku kepentingan cenderung lebih mungkin melakukan manipulasi laporan keuangan. Dalam konteks BUMN yang menangani proyek strategis nasional dan menghadapi tekanan performa dari pemerintah, kecenderungan ini sangat mungkin terjadi. Dengan demikian, keberadaan dewan yang memiliki keahlian finansial tanpa dukungan independensi yang kuat justru dapat memperkuat praktik oportunistik tersebut, apalagi jika peran dewan hanya bersifat administratif dan kurang aktif dalam menjalankan fungsi pengawasan.

The insignificance of the influence of IDEPBOC and GENDIVBOC in Model 1 also reflects the weak substantive role of independent boards of commissioners and gender diversity in the financial reporting process. In practice, many independent commissioners in SOEs still

have political affiliations or ties to power holders, so they do not have full autonomy to carry out supervisory functions effectively. Likewise, the representation of women on the board is still low at around 15 percent according to data from the Ministry of SOEs in 2022, which makes gender diversity more symbolic than substantive. This is reinforced by the findings of Lückerath-Rovers (2013) and García and Herrero (2021) who stated that women on boards can only have a real impact if they have positions of influence and active participation in strategic decision-making.

The results of this study are also in line with the findings of Lathiifah and Fuad (2024), which show that the presence of financial expertise in audit committees can have two sides. On the one hand, this expertise is able to strengthen supervision, but on the other hand, it can increase the risk of manipulation if it is not balanced with substantial independence. Similarly, Nam and An (2021) found that the presence of female directors has not been effective enough to lower the risk of manipulation of financial statements, although it can play a moderation role that strengthens the positive relationship between CSR and corporate financial stability.

Thus, the findings in this Model M Score show that the technical expertise possessed by the members of the board of commissioners does not automatically guarantee more transparent financial reporting practices. On the other hand, in a governance environment that is not yet fully independent and professional, these skills can actually be used to reinforce manipulative practices that are opportunistic. Therefore, it is important to build a board structure that is not only expertise-oriented, but also supported by a high level of independence, strong governance ethics, and an effective internal oversight system with high integrity.

Discussion

The Influence of the Independence Board of Commitee on the Company's Financial Distress Condition

The regression results indicate that in the first model, which excludes control variables, the variable Independence of Board of Committee (IDEPBOC) has a negative and significant effect on the Z Score. The negative coefficient suggests that a higher proportion of independent commissioners on the board is associated with a lower Z Score, implying a higher risk of financial distress. However, after including control variables such as firm size (SIZE), COVID-19 impact (COV), debt-to-equity ratio (DER), and return on investment timing (RIT), the effect of board independence becomes statistically insignificant. This suggests that the role of independent commissioners in mitigating financial distress is influenced by stronger structural and external factors.

These findings contrast with the principles of good corporate governance, which emphasize that an independent board should enhance oversight and reduce the risk of corporate failure. In practice, however, this result reflects the reality in Indonesia, especially among infrastructure state-owned enterprises (SOEs), where independent board positions are not always held by individuals free from political ties or affiliations with controlling shareholders. As noted by Fisman and Werker (2011) and Habib et al. (2017), many so-called independent commissioners in Indonesia maintain political connections that compromise their effectiveness.

This result aligns with previous research indicating that the effectiveness of independent commissioners in reducing financial distress remains context dependent. For example, Sadaa et al. (2023) found that board independence contributes to improved financial transparency and internal control, but its impact on financial stability varies depending on external conditions such as regulatory frameworks and industry characteristics. Similarly, Lagasio et al. (2023) concluded that the positive role of independent commissioners is more evident in companies with strong regulatory compliance and robust audit systems. García and Herrero (2021) further argued that board independence alone may not be sufficient to prevent earnings management,

a common driver of financial distress, indicating the need for broader oversight mechanisms. Overall, the findings suggest that although board independence is a key element of corporate governance, it does not consistently play a strong role in reducing financial distress, particularly when companies face external shocks such as the pandemic or high financial leverage. In infrastructure SOEs tasked with executing capital-intensive strategic projects, the effectiveness of independent commissioners may also be limited by restricted authority, dominance of majority shareholders, and public policy pressures.

The Influence of the Expertise Board of Commitee on the Company's Financial Distress Condition

Board expertise is a fundamental component of corporate governance architecture, serving a strategic oversight role in ensuring transparency and accountability in financial decision-making. These functions are expected to reduce the probability of financial distress. This study adopts three analytical approaches to measure financial distress, namely the Altman Z-Score, Piotroski F Score, and Beneish M Score, each providing a unique perspective on corporate financial stability.

Corporate governance is defined as the system that directs and controls companies in accordance with sound managerial principles (Cadbury, 1992). It involves mechanisms that shape corporate behavior across performance measurement, operational efficiency, growth strategy, financial structure, and stakeholder relations (Claessens, 2006). Effective implementation of governance principles is expected to enhance transparency, accountability, stakeholder alignment, and ultimately reduce financial distress.

According to the OECD (2015), corporate governance encompasses the rules and relationships connecting management, the board of commissioners, shareholders, and other stakeholders. Its core principles aim to ensure ethical, professional, and sustainable corporate conduct. From an agency theory perspective Jensen and Meckling (1976), good governance is essential to reduce principal-agent conflicts that can impair performance. Claessens (2006) also notes that sound governance improves access to external financing, reduces capital costs, and strengthens stakeholder relations.

Regression results show that in the first model, board expertise (EXPERBOC) has no significant effect on the Z Score. This suggests that the presence of financially experienced commissioners does not automatically reduce bankruptcy risk or improve financial performance. Even after the inclusion of control variables such as firm size (SIZE), COVID-19 impact (COV), debt-to-equity ratio (DER), and return on investment timing (RIT), the effect remains insignificant. This indicates that structural and external factors may dominate the role of board expertise in mitigating financial distress.

In the F Score model, board expertise again shows a negative but insignificant relationship, both before and after adding control variables. This implies that financial competence within the board does not directly contribute to financial improvement in this framework. Interestingly, return on investment timing (RIT) shows a significant negative effect on F Score once control variables are added, suggesting that investment timing strategies can influence financial stability.

In contrast, results from the M Score model reveal a significant and positive influence of board expertise on financial distress, regardless of the inclusion of control variables. This means that firms with financially skilled commissioners tend to have a higher tendency toward earnings manipulation, which can increase the risk of distress. Firm size (SIZE) also shows a significant positive relationship with M Score, indicating that larger companies may be more prone to financial statement manipulation.

These findings align with previous studies that emphasize the contextual nature of board expertise. For example, Sadaa et al. (2023) found that financial expertise contributes to

transparency and internal control, but its impact on financial stability depends on factors such as market regulation and industry characteristics. Lagasio et al. (2023) concluded that its effectiveness is more evident in firms with strong compliance and audit systems. García and Herrero (2021) also noted that expertise alone may not prevent earnings management, thus broader oversight mechanisms are needed. Overall, the regression models demonstrate that external factors, such as the pandemic and firm-level financial indicators, have a stronger influence on financial distress than board expertise. Although financial expertise contributes to better oversight and transparency, its role becomes less significant when other variables are considered.

The Influence of Gender Diversity Board of Commitee on the Company's Financial Distress Condition

Gender diversity on the board of commissioners is a crucial dimension of corporate governance that contributes to strategic oversight and the mitigation of financial distress risk. Theoretically, gender diversity is believed to enhance decision-making quality through broader perspectives and more comprehensive risk evaluation. This study uses three different approaches to measure financial distress: the Altman Z-Score, Piotroski F Score, and Beneish M Score, each offering a distinct perspective on financial stability.

Corporate governance functions as a system that guides and supervises company operations in alignment with sound managerial principles (Cadbury, 1992). It encompasses performance measurement, operational efficiency, growth strategy, financial structure, and relationships with shareholders and stakeholders (Claessens, 2006). The effective implementation of corporate governance is aimed at enhancing transparency, accountability, and balance among stakeholder interests, thereby reducing the probability of financial distress.

According to the Organization for Economic Cooperation and Development, corporate governance consists of the policies and relationships that connect management, the board of commissioners, shareholders, and stakeholders (OECD, 2015). Its principles seek to ensure that companies are managed professionally, ethically, and with long-term sustainability in mind. Harmonious relationships among these parties can enhance a company's resilience in facing business challenges and create sustainable stakeholder value.

Agency theory highlights the role of corporate governance in reducing conflicts of interest between shareholders (principals) and management (agents). Information asymmetry and misaligned objectives between these parties can lead to suboptimal decision-making and increase the risk of financial distress (Jensen & Meckling, 1976). Therefore, strong corporate governance helps align interests and promotes long-term financial stability and performance (Utama et al., 2022). Claessens (2006) further emphasizes that good governance can improve access to external financing, reduce capital costs, increase operational efficiency, and strengthen stakeholder relations.

The regression results show that in the first model (without control variables), gender diversity on the board (GENDIVBOC) does not have a significant effect on the Z Score. This indicates that the presence of female board members is not automatically associated with reduced bankruptcy risk or improved financial performance. Even after the inclusion of control variables such as firm size (SIZE), the impact of COVID-19 (COV), debt-to-equity ratio (DER), and return on investment timing (RIT), gender diversity remains statistically insignificant. This suggests that the relationship between gender diversity and financial distress may be influenced by stronger structural and external factors.

In the regression model using the F Score as the dependent variable, gender diversity shows a positive but still insignificant correlation, both before and after the inclusion of control variables. This implies that gender diversity does not directly contribute to improvements in financial health under the F Score framework. In contrast, return on investment timing (RIT)

has a significant negative effect on the F Score, indicating that investment timing plays a key role in financial stability.

In the M Score model, gender diversity also has a positive but statistically insignificant effect on financial distress, both with and without control variables. This suggests that gender diversity on the board does not substantially impact the company's tendency toward earnings manipulation. However, firm size (SIZE) does show a significant positive effect on M Score, indicating that larger firms may be more prone to financial statement manipulation.

These results are consistent with previous studies that emphasize the contextual nature of gender diversity's impact on financial distress. For example, Sadaa et al. (2023) found that gender diversity can enhance transparency and internal oversight, but its influence on financial stability is shaped by external factors such as market regulation and industry characteristics. Lagasio et al. (2023) also observed that the effectiveness of gender diversity is more evident in firms with strong audit systems and regulatory compliance. García and Herrero (2021) further noted that gender diversity alone may not be sufficient to prevent earnings management, suggesting the need for more comprehensive oversight mechanisms. Overall, the findings indicate that after including control variables, the regression models are better at predicting financial distress. External factors, such as the impact of COVID-19 and firm-level financial characteristics, appear to have greater influence than gender diversity. Although gender diversity may contribute to improved transparency and oversight, its effect on mitigating financial distress in this study is not strong enough to be considered significant.

CONCLUSION

Based on the results of this study, it can be concluded that the characteristics of the board of commissioners have varying impacts on the financial distress of infrastructure state-owned enterprises in Indonesia. The independence of the board of commissioners initially appeared to have a negative and significant effect on the Z Score, suggesting a paradox where higher proportions of independent commissioners were associated with greater financial distress. However, this effect diminished and became insignificant after including control variables, indicating that board independence alone is not a consistent determinant of financial health and may be influenced by broader structural and external factors. Similarly, the expertise of the board of commissioners did not show a significant effect on financial distress in the Z Score and F Score models, but was positively and significantly associated with higher financial manipulation risk in the M Score model before control variables were introduced. This finding highlights the potential for technical competence to be misused under certain conditions, raising concerns about opportunistic behavior. Gender diversity within the board showed no statistically significant relationship with financial distress across all models, suggesting that gender representation, in its current implementation, has not yet translated into improved corporate governance effectiveness in the observed companies. These findings contribute to the ongoing discourse on board composition and underline the importance of contextual and institutional factors in shaping governance outcomes, particularly in high-risk, state-owned sectors.

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