Review Article

ENTERPRISE RISK MANAGEMENT EFFECTIVENESS, PERFORMANCE, AND FIRM VALUE: GOVERNANCE MODERATION IN INDONESIAN TRANSPORTATION AND LOGISTICS

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DOI: https://doi.org/10.17358/ijar.1.2.87

ABSTRACT

Background: Transportation and logistics firms face substantial operational and strategic risks that may affect profitability and market valuation.
Purpose: This study examines the associations of enterprise risk management (ERM) effectiveness with financial performance and firm value, and the moderating role of good corporate governance (GCG).
Design/methodology/approach: Panel-data regressions were applied to 271 firm-year observations from 32 Indonesian listed transportation and logistics firms over 2012–2024. Financial performance was measured by return on assets (ROA) and return on equity (ROE); firm value was measured by Tobin's Q and price-to-book value (PBV).
Findings: The estimated models indicated positive, statistically significant associations between ERM effectiveness and ROA and ROE, but no significant association with Tobin's Q or PBV. GCG moderated the ERM–ROA relationship but not the other relationships.
Conclusion: ERM effectiveness appears more closely associated with accounting-based performance than with market-based valuation in the sampled firms.
Originality/value: The study jointly examines ERM, two performance measures, two firm-value measures, and governance moderation in an understudied Indonesian sector.

ARTICLE INFO

Keywords:
enterprise risk management, financial performance, firm value, corporate governance, transportation and logistics

How to Cite: Susanti, W., Widhiani, A. P., & Dewi, F. (2026). Enterprise risk management effectiveness, performance, and firm value: Governance moderation in Indonesian transportation and logistics. *Indonesian Journal of Accounting, Risk, and Governance,* 1(2), 87. https://doi.org/10.17358/ijar.1.2.87

INTRODUCTION

Transportation and logistics services support the movement of goods and people across Indonesia's archipelagic economy (Saraung, 2023; Utami & Afrida, 2022). The sector also contributes to national economic activity. According to Badan Pusat Statistik (BPS, 2025), transportation and storage recorded growth rates of 19.87% in 2022 and 13.96% in 2023. These rates indicate substantial expansion during the period, although a sector's growth rate is distinct from its share of gross domestic product (GDP).

Despite this strategic role, transportation and logistics companies face increasingly interconnected operational, technological, and supply-chain risks. Global supply-chain coordination can expose firms to disruptions and uncertainty (Irawan, 2023). Digital logistics systems may improve efficiency but also introduce system failures and cybersecurity vulnerabilities (World Economic Forum, 2020). At the same time, customer expectations for speed and reliability intensify trade-offs between operational efficiency and risk exposure (Christopher, 2016).

These conditions underscore the importance of an integrated approach to risk identification, assessment, response, and monitoring (Committee of Sponsoring Organizations of the Treadway Commission [COSO], 2017). Indonesia's position in the World Bank Logistics Performance Index declined from 46th in 2018 to 63rd in 2023 (World Bank, 2023). Although the index measures national logistics performance rather than individual firms' risk management, the result provides relevant sectoral context.

Performance and firm value are important indicators for managers, investors, and other stakeholders for listed firms, (Shad et al. 2019). Accounting-based performance can be measured through return on assets

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(ROA) and return on equity (ROE), which reflect profitability relative to assets and shareholders' equity, respectively. Market-based firm value may be assessed using Tobin's Q and the price-to-book value (PBV) ratio. Tobin's Q compares a firm's market valuation with the replacement cost or an approximation of its assets, whereas PBV compares the market value of equity with its book value (Chung & Pruitt, 1994; Damodaran, 2012).

Enterprise risk management (ERM) offers an integrated framework for identifying and managing risks in relation to corporate objectives. Prior studies have examined whether the fit between ERM and organizational characteristics is associated with performance (Gordon et al. 2009), whether the adoption of ERM is related to firm value (Hoyt & Liebenberg, 2011), and whether ERM program quality is value relevant (Baxter et al. 2013). These findings motivate further examination in transportation and logistics firms, where operational exposure is substantial.

The effectiveness of ERM may also depend on corporate governance. Good corporate governance (GCG) can provide oversight, accountability, and monitoring mechanisms that help embed risk management in organizational decisions (COSO, 2017; Viscelli et al. 2016). In this context, governance quality may condition the relationship between ERM effectiveness and organizational outcomes.

This study aims to (1) examine the relationship between ERM effectiveness and financial performance (ROA and ROE) and firm value (Tobin's Q and PBV) in Indonesian listed transportation and logistics firms; (2) test whether GCG moderates these relationships; and (3) derive managerial implications for integrating ERM and corporate governance. The study distinguishes accounting-based performance from market-based valuation rather than treating them as interchangeable outcomes.

METHODS

This quantitative study uses an unbalanced panel of listed transportation and logistics companies observed over 2012–2024. Secondary data were collected from annual reports and financial statements available through the Indonesia Stock Exchange (IDX) and corporate websites. Panel regression models were estimated for ROA, ROE, Tobin's Q, and PBV, followed by moderated specifications that include an interaction between ERM effectiveness and GCG.

Purposive sampling was applied to transportation and logistics companies listed on the IDX during the observation period. The analytical sample comprised 32 companies and 271 firm-year observations. The panel was unbalanced because not all firms were observed for every year from 2012 through 2024. Data availability and the completeness of the required financial and governance measures were considered during compilation of the panel.

The analysis began with descriptive statistics, followed by model selection among the common effects model (CEM), fixed effects model (FEM), and random effects model (REM). Chow, Hausman, and Lagrange multiplier tests were used as applicable at the 5% significance level (Sugiyanto et al. 2022). Model diagnostics were examined, and robust standard errors were used in the regression analysis to address possible violations of conventional error assumptions. Data processing was conducted in Microsoft Excel and EViews 12.

Regression coefficients were evaluated at the 5% significance level. Model fit was assessed using the coefficient of determination (R^2) and overall model tests. Moderation was tested by including ERM, GCG, and an ERM × GCG interaction term alongside the control variables (Solimun et al. 2017). The interaction coefficient was interpreted in terms of its sign and statistical significance, conditional on the other regressors.

Financial performance was represented by return on assets (ROA), the ratio of earnings to assets, and return on equity (ROE), the ratio of earnings to book equity. Firm value was represented by Tobin's Q, which relates a firm's market value to the value of its assets, and price-to-book value (PBV), which compares the market value and book value of equity. Together, the four proxies distinguish accounting-based performance from market-based valuation.

ERM effectiveness was proxied by an Enterprise Risk Management Index (ERMI) based on Gordon et al. (2009). Its conceptual domains correspond to four objectives associated with enterprise risk management: strategy, operations, reporting, and compliance. The

indicators were standardized using industry-year z-scores and aggregated into an index. A higher index score represents relatively greater effectiveness of ERM according to the operational measures employed in this study.

GCG was represented by a governance index reflecting five observable mechanisms: managerial ownership, institutional ownership, the size of the board of directors, the proportion of independent commissioners, and the audit committee. These indicators capture distinct aspects of ownership structure and board-level monitoring. GCG was included both as a separate regressor and as a moderator of the ERM relationships. The models also included firm size (SIZE), measured by the natural logarithm of total assets; leverage (LEV), measured by total debt divided by total assets; and firm age (AGE), measured by the number of years since establishment. These control variables account for observable differences in firm characteristics that may be associated with profitability and market valuation.

Figure 1 illustrates the eight principal hypotheses. H1–H4 posit positive relationships between ERM effectiveness and ROA, ROE, Tobin's Q, and PBV, respectively. H5–H8 posit that GCG strengthens each corresponding relationship. SIZE, LEV, and AGE were included as control variables, and their coefficients were examined as supplementary associations rather than treated as the study's central theoretical contribution.

The following equations represent the direct and moderated panel regression specifications:

$$ROA_{it} = \alpha + \beta_1 ERM_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 AGE_{it} + \varepsilon_{it}$$

$$ROE_{it} = \alpha + \beta_1 ERM_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 AGE_{it} + \varepsilon_{it}$$

$$Tobin's\ Q_{it} = \alpha + \beta_1 ERM_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 AGE_{it} + \varepsilon_{it}$$

$$PBV_{it} = \alpha + \beta_1 ERM_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 AGE_{it} + \varepsilon_{it}$$

$$ROA_{it} = \alpha + \beta_1 ERM_{it} + \beta_2 GCG_{it} + \beta_3 ERM \times GCG_{it} + \beta_4 SIZE_{it} + \beta_5 LEV_{it} + \beta_6 AGE_{it} + \varepsilon_{it}$$

$$ROE_{it} = \alpha + \beta_1 ERM_{it} + \beta_2 GCG_{it} + \beta_3 ERM \times GCG_{it} + \beta_4 SIZE_{it} + \beta_5 LEV_{it} + \beta_6 AGE_{it} + \varepsilon_{it}$$

$$Tobin's\ Q_{it} = \alpha + \beta_1 ERM_{it} + \beta_2 GCG_{it} + \beta_3 ERM \times GCG_{it} + \beta_4 SIZE_{it} + \beta_5 LEV_{it} + \beta_6 AGE_{it} + \varepsilon_{it}$$

$$PBV_{it} = \alpha + \beta_1 ERM_{it} + \beta_2 GCG_{it} + \beta_3 ERM \times GCG_{it} + \beta_4 SIZE_{it} + \beta_5 LEV_{it} + \beta_6 AGE_{it} + \varepsilon_{it}$$

In the equations, i denotes the firm and t the year; α is the intercept; β denotes a regression coefficient; ERM is the ERM effectiveness index; GCG is the governance index; ERM × GCG denotes the interaction term; SIZE is firm size; LEV is leverage; AGE is firm age; and ε is the disturbance term. The estimation approach incorporates the relevant firm-level effects as determined by the panel model-selection procedure.

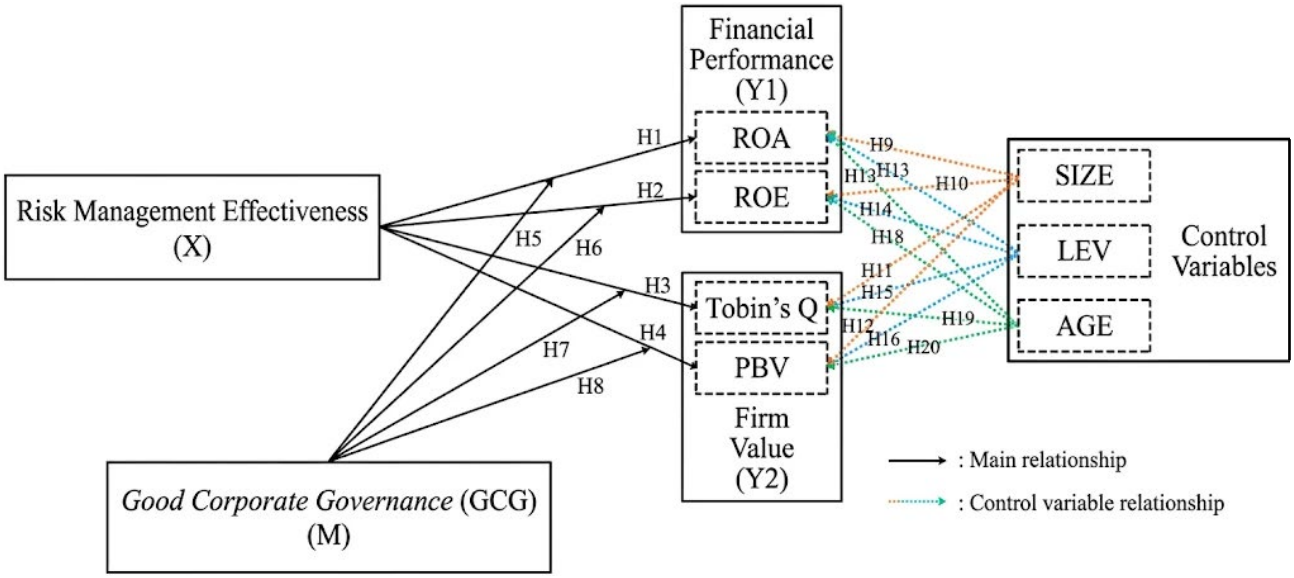


Figure 1. Research Hypotheses

RESULTS

Table 1 presents descriptive statistics for 271 firm-year observations. Financial performance and firm value show considerable variation across companies and years. Both ROA and ROE include negative values, and the distribution of market-based ratios is wide. Mean Tobin's Q exceeds one, but this aggregate measure should not be interpreted as describing every company in the sample. The extreme values of ROE, PBV, and leverage suggest that accounting denominators and financial structure are important when interpreting the regression results.

Chow, Hausman, and Lagrange multiplier tests were used to select a panel estimator for each dependent variable. The selected direct-effect specification was FEM for ROA and REM for ROE, Tobin's Q, and PBV (Table 2). Accordingly, estimation differed across outcome measures. Robust standard errors were applied to account for possible departures from conventional error assumptions, particularly serial correlation in the panel.

The direct-effect regression results indicated positive and statistically significant associations of ERM effectiveness with ROA and ROE, supporting H1 and H2. The reported models explained approximately 14% of the variation in ROA and 9% of the variation in ROE. In contrast, ERM effectiveness was not significantly associated with Tobin's Q or PBV; thus, H3 and H4 were not supported. The latter findings should be interpreted as a lack of statistically detectable associations in the estimated sample, rather than as proof that investors disregard risk-management information.

In the moderated specifications, the ERM × GCG interaction was positive and statistically significant for ROA, supporting H5. The corresponding interactions for ROE, Tobin's Q, and PBV were not significant; H6–H8 were therefore not supported. The pattern suggests that governance may condition the accounting-based relationship between ERM and asset profitability, although this association does not necessarily extend to returns on equity or market-based valuation.

Table 1. Descriptive statistics of the study variables

Variabel	N	Mean	Median	Maximum	Minimum	Std. Dev
ROA	271	0.030628	0.016762	2.192031	-0.659420	0.251216
ROE	271	0.107868	0.046561	14.26107	-5.595696	1.097323
Tobin's Q	271	1.735439	1.084969	20.71759	0.261055	2.214445
PBV	271	2.866863	0.850279	397.6502	-40.74122	24.38802
ERM	271	0.011617	-0.282851	7.155829	-7.829889	2.710375
GCG	271	34.03592	28.64364	100.0000	0.000000	22.27048
SIZE	271	27.40376	26.81646	32.65617	22.93047	1.924642
LEV	271	0.630313	0.489404	9.469790	0.023504	0.882186
AGE	271	28.99262	26.00000	74.00000	3.000000	16.31109

Table 2. Panel estimator selection for the direct-effect models

	ROA	ROE	Tobin's Q	PBV
Chow Test	FEM	CEM	FEM	CEM
Hausman Test	FEM	-	REM	-
LM Test	-	REM	-	REM
Selected Model	FEM	REM	REM	REM

Among the control variables, SIZE was statistically associated with all four outcomes. AGE was significantly related to ROA, ROE, and PBV but not Tobin's Q; LEV was significantly related to ROA, Tobin's Q, and PBV but not ROE. These associations should be interpreted in relation to each dependent variable, given differences in their definitions and economic determinants. No causal interpretation is implied by the estimated control-variable relationships. The reported positive associations between ERM effectiveness and accounting-based performance are broadly consistent with research linking structured risk management to firm outcomes (Pagach & Warr, 2010; Dinoyu & Septiani, 2020). From a stakeholder perspective, more systematic risk governance may facilitate communication and organizational accountability (Freeman et al. 2010). Nevertheless, the observational design does not establish whether improved ERM causes higher profitability or whether better-performing firms are more capable of implementing ERM.

The absence of a statistically significant ERM–valuation association in the reported models may reflect differences between accounting-based and market-based outcomes, measurement noise, heterogeneous investor expectations, or omitted factors. Previous studies likewise suggest that ERM quality and market valuation depend on context (Farrell & Gallagher, 2015; Faizah & Pujiono, 2022). The study does not directly measure investor perceptions or disclosure quality; therefore, claims that disclosures are merely symbolic or that investors focus on short-term outcomes should be presented as hypotheses for future research, not as established explanations.

The reported ERM × GCG association with ROA, but not the other outcomes, suggests that governance may condition some accounting-based benefits of ERM. Such an interpretation is consistent with the monitoring perspective of agency theory (Jensen & Meckling, 1976) and the integration of risk oversight into governance processes (COSO, 2017; Viscelli et al. 2016). The absence of a significant moderating coefficient for ROE or market-based value is not proof that governance is ineffective for these outcomes; differences in financing structures, variable construction, and statistical power may also matter (Ross et al. 2018; Brigham & Houston, 2019).

These findings suggest that transportation and logistics companies could integrate risk considerations into operational and strategic decisions and strengthen board-level oversight of ERM. Improving the clarity and comparability of risk disclosures may also be valuable. Such recommendations should be treated as practical implications consistent with the reported associations, not as causal effects demonstrated by the study.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

ERM effectiveness was positively and significantly associated with accounting-based financial performance, as measured by ROA and ROE. In contrast, no statistically significant association was identified with firm value, as measured by Tobin's Q and PBV. These results suggest that accounting profitability and market valuation respond differently to the ERM characteristics measured in the sample.

GCG significantly strengthened the association between ERM effectiveness and ROA, but did not significantly moderate the corresponding associations with ROE, Tobin's Q, or PBV. Thus, governance moderation was evident for one of the four outcomes examined. The observational panel design supports an interpretation in terms of statistical associations and does not, by itself, establish causality.

Recommendations

Managers of transportation and logistics firms may consider embedding ERM in operational and strategic planning, strengthening board and audit committee oversight, and improving the transparency of risk-related disclosures. Because the reported results are stronger for accounting-based performance than for market-based valuation, firms should avoid assuming that an ERM initiative will automatically increase their share valuation. Any implementation strategy should account for firm-specific exposures, governance capacity, and capital structure.

Future research could test alternative roles for GCG, including direct effects and mediation, and compare the results across sectors or firm sizes. More granular ERM indicators and independent assessments of risk-

management maturity may improve construct validity. Researchers should also examine reverse causality, endogeneity, extreme observations, and sensitivity to alternative estimators and valuation measures.

The study relies on publicly reported information to proxy risk-management and governance practices; these indicators may not fully capture the quality of implementation. The observational panel design leaves open the possibility of reverse causality and unobserved confounding. Accounting and valuation ratios can also be sensitive to negative or near-zero equity, financial distress, and extreme observations. Consequently, the reported associations should be interpreted within the sampling period and sectoral context, and future studies should consider alternative index construction and sensitivity analyses.

FUNDING STATEMENT: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

CONFLICTS OF INTEREST: The authors declare no conflicts of interest.

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