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Enterprise Risk Management Quality and Its Effect on Profitability and Firm Value in Indonesian Energy Sector Public Companies

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Abstract
Enterprise Risk Management (ERM) has become increasingly important for energy companies facing volatile commodity prices, regulatory pressures, operational uncertainties, and environmental, social, and governance (ESG) risks. This study aimed to examine the effect of Enterprise Risk Management Quality (ERMQ) on profitability and firm value among Indonesian energy sector public companies. A quantitative explanatory research design was employed using secondary panel data from 53 energy companies listed on the Indonesia Stock Exchange during 2020–2024, resulting in 265 firm-year observations. ERMQ was measured using a 14-indicator disclosure instrument, while profitability and firm value were proxied by Return on Assets (ROA) and Tobin's Q, respectively. The data were analyzed using Pooled Ordinary Least Squares (Pooled OLS) with robust standard errors after conducting model selection and diagnostic tests. The results showed that ERMQ had a negative but statistically insignificant effect on ROA, whereas it had a positive and significant effect on Tobin's Q. Leverage significantly reduced profitability, while firm size demonstrated only marginal effects. These findings indicate that higher ERM quality is more readily recognized by capital markets as a signal of stronger governance and long-term organizational resilience than reflected in short-term accounting performance. The study concluded that strengthening ERM quality can enhance firm value, although its impact on profitability remains context-dependent and uncertain.

INTRODUCTION

Enterprise (Baxter et al., 2013) Risk Management (ERM) has shifted from a fragmented, silo-based compliance function into a holistic corporate strategy aimed at optimizing competitive advantage through the integration of risk management (Standardization, 2018) with strategy formulation and firm performance (COSO, 2017). This paradigm shift is particularly relevant for industries exposed to environmental, social, and governance (ESG) issues, especially the energy sector, where operational activities involve a more complex range of uncertainties compared with those in many other industries (Cai et al., 2012).

Indonesia's energy sector is a strategic component of the national economy and is categorized as a sensitive industry (Garcia et al., 2017) because its operational activities directly influence environmental, social, and governance outcomes (Gujarati & Porter, 2012). Companies in this sector face multiple risks arising from global commodity price volatility, operational disruptions, environmental regulations, and reputational pressures, making the implementation of high-quality ERM a strategic necessity for sustaining organizational

performance (COSO & WBCSD, 2018; (Subramaniam et al., 2015), Wahyuni, Cooper, Leung, & Wines, 2015). This issue became increasingly relevant because the 2020–2024 observation period covered the COVID-19 pandemic, which disrupted cash flow patterns, reduced profitability, and affected investment performance among natural-resource-based companies, highlighting the need for effective risk management systems capable of mitigating external shocks.

Previous studies examining the relationship between ERM and firm performance have reported inconsistent findings. (Hoyt & Liebenberg, 2011) and (Chairani & Siregar, 2021) found a significant positive relationship between ERM adoption and financial performance or firm value, whereas (Tahir & Razali, 2011) found no significant relationship between ERM and firm value among Malaysian public companies. (Gordon et al., 2009) further argued that the relationship between ERM and performance depends on the alignment between risk management systems and firm-specific contextual factors, suggesting that the impact of ERM is neither uniform nor automatically direct (Eckles et al., 2014).

A recent methodological advancement was introduced by Oreshile, Zainudin, and Mahdzan (2026), who developed the Enterprise Risk Management Quality (Commission, 2017) (ERMQ) instrument as a more comprehensive measurement approach than earlier binary or single-item proxies, such as the existence of a Chief Risk Officer. ERMQ incorporates governance, framework, process, risk treatment, and assurance dimensions. Although the instrument has been validated in relation to financial distress among firms in Sub-Saharan Africa, its empirical relationship with profitability and firm value remains underexplored, particularly in emerging capital markets such as Indonesia. This research gap provides the foundation for the present study.

METHOD

This study employed a quantitative explanatory research design to examine the relationship between Enterprise Risk Management Quality (ERMQ) and two dependent variables: profitability (ROA) and firm value (Tobin's Q), using secondary panel data. The population consisted of all energy sector companies listed on the Indonesia Stock Exchange (IDX) during 2020–2024. Purposive sampling was applied based on the following criteria: (1) companies listed on the IDX throughout the observation period; (2) companies that published complete and verifiable annual reports and financial statements; (3) companies with IPO dates covering the entire observation period; (4) companies with complete data for all research variables; and (5) companies not experiencing prolonged trading suspension or special monitoring status during the observation period. From the initial population of 91 listed energy companies, the screening process resulted in a final sample of 53 companies, generating a balanced panel of 265 firm-year observations (53 companies × 5 years). The sample was dominated by the coal sub-industry (29 companies, 55%), followed by oil and gas (13 companies, 24%) and oil, gas, and coal support services (11 companies, 21%).

ERMQ was measured through content analysis of annual reports using a 14-indicator binary instrument adapted from (Oreshile et al., 2026). The instrument covered governance aspects (e.g., Chief Risk Officer expertise and risk committee), ERM framework components (risk map, risk register, ERM philosophy, board-level ERM function, and adoption of COSO ERM or ISO 31000), risk management processes (risk assessment frequency, scope, and

methods), and risk treatment and assurance practices (financial and non-financial risk treatment and combined assurance). Each indicator was assigned a score of 1 when disclosed or implemented and 0 otherwise. The total score was calculated, divided by 14, and transformed using the natural logarithm (Ln ERMQ = Ln[Σscore/14]). The coding process followed an LLM-assisted content analysis approach involving human coding and AI-assisted verification to improve consistency and reduce single-rater bias. The instrument achieved a Cronbach's alpha value of 0.724, indicating acceptable internal consistency. Profitability was measured using Return on Assets (ROA), calculated as net income divided by total assets. Firm value was measured using Tobin's Q, calculated as the ratio of market value of equity plus total liabilities to total assets. Leverage was measured using the Debt-to-Asset Ratio (DAR), while firm size was measured using the natural logarithm of total assets.

Two regression models were specified to examine the effects of ERMQ on profitability and firm value:

$$\text{Model 1: } ROA_{it} = \alpha + \beta 1\ LnERMQ_{it} + \beta 2\ DAR_{it} + \beta 3\ SIZE_{it} + \varepsilon_{it}$$

$$\text{Model 2: } TobinsQ_{it} = \alpha + \beta 1\ LnERMQ_{it} + \beta 2\ DAR_{it} + \beta 3\ SIZE_{it} + \varepsilon_{it}$$

Model selection was conducted using a three-step procedure: the Chow test to compare Pooled OLS and Fixed Effects models, the Breusch–Pagan Lagrange Multiplier test to compare Pooled OLS and Random Effects models, and the Hausman test to compare Fixed Effects and Random Effects models, using a 5% significance level. Classical assumption testing included the Jarque–Bera normality test, Variance Inflation Factor (VIF) analysis for multicollinearity, the Breusch–Pagan test for heteroskedasticity, and the Wooldridge test for first-order serial correlation in panel data. All regression estimations were performed using Stata with robust standard errors. A hypothesis was considered supported when the coefficient direction was consistent with the theoretical expectation and the p-value was below 0.05, with values between 0.05 and 0.10 considered as providing limited statistical evidence.

RESULTS AND DISCUSSION

Descriptive statistics (N = 265 firm-year observations) show a mean Ln ERMQ of 1.854 (SD = 0.333, range 0.693-2.564), equivalent to firms satisfying roughly 6-7 of the 14 ERMQ indicators on average. Classified by year-firm observation, 59.6% of observations fall in the Moderate ERMQ category, 20.8% in Good, 9.8% in Poor, and 9.8% in Excellent; averaged per firm, PT Bukit Asam Tbk, PT Perusahaan Gas Negara Tbk, and PT Bumi Resources Tbk consistently rank as Excellent, while several shipping-support and trading firms remain in the Poor category. ROA averages 4.713% (SD = 26.016, range -354% to 61.76%), reflecting substantial heterogeneity driven partly by pandemic-era losses in 2020. Tobin's Q averages 1.951 (SD = 3.835), indicating that, on average, the market values sample firms above their book asset value. DAR averages 0.223 (SD = 0.194) and firm size (Ln total assets) averages 12.623 (SD = 2.115).

Table 1. Descriptive Statistics of Research Variables (N = 265 Firm-Year Observations)

Variable	Mean	Std. Dev.	Min	Max
Ln ERMQ	1.854	0.333	0.693	2.564
ROA (%)	4.713	26.016	-354.00	61.76
Tobin's Q	1.951	3.835	0.098	49.207
DAR	0.223	0.194	0.000	1.070
Size (Ln Total Assets)	12.623	2.115	5.481	21.398

Multicollinearity diagnostics show VIF values between 1.04 and 1.05 for all independent and control variables, well below the conventional threshold, indicating no serious multicollinearity. Model selection tests consistently favored Pooled OLS for both equations: the Chow test failed to reject the null hypothesis for the ROA model ($F = 1.13$; $p = 0.343$) and the Tobin's Q model ($F = 0.42$; $p = 0.795$); the Breusch-Pagan LM test likewise failed to reject the null for both models ($p = 1.000$, $Var(u) = 0$); and the Hausman test confirmed no systematic difference between Fixed and Random Effects for either model (ROA: $p = 0.999$; Tobin's Q: $p = 0.942$). Diagnostic checks on the selected Pooled OLS specifications show non-normal residuals (Jarque-Bera $p = 0.000$ for both models) and heteroskedasticity (Breusch-Pagan $chi^2 = 392.45$ for ROA and 558.81 for Tobin's Q, $p = 0.000$), which is common in ratio-based financial data (Baltagi, 2008) for commodity-exposed firms; given the sample size ($N = 265$), robust standard errors were used throughout to preserve valid inference. The (Wooldridge, 2010) test indicates no significant first-order autocorrelation in either model (ROA: $F = 1.626$, $p = 0.271$; Tobin's Q: $F = 1.875$, $p = 0.243$).

The Pooled OLS estimation for Model 1 shows that ERMQ has a negative but statistically insignificant effect on ROA ($\beta = -0.768$; $p = 0.882$), so H1 is not supported. DAR has a significant negative effect on ROA ($\beta = -23.610$; $p = 0.000$), consistent with trade-off theory and the agency cost of debt (Jensen & Meckling, 1976). Firm size has a positive effect on ROA that approaches significance at the 10% level ($\beta = 4.304$; $p = 0.051$), consistent with economies-of-scale arguments (Gusaptono, 2012). The model is jointly significant ($F(3,261) = 18.67$; $p = 0.000$; $R^2 = 0.135$), although this significance is driven by DAR and SIZE rather than by ERMQ.

Table 2. Pooled OLS Regression Results (Robust Standard Errors)

Variable	Coef. (ROA)	p-value	Coef. (Tobin's Q)	p-value
Ln ERMQ	-0.768	0.882	1.389	0.043**
DAR	-23.610	0.000***	-0.043	0.954
SIZE	4.304	0.051*	-0.510	0.087*
Constant	-42.913	0.044	5.832	0.046
R^2 / F-stat / p	0.135 / 18.67 / 0.000		0.084 / 1.69 / 0.169	

In Model 2, ERMQ has a positive and statistically significant effect on Tobin's Q ($\beta = 1.389$; $p = 0.043$) at $\alpha = 5\%$, supporting H2. This indicates that a one-unit increase in Ln ERMQ

(equivalent to an $e^1 \approx 2.72$-fold increase in the raw ERMQ score) is associated with a 1.389-unit increase in Tobin's Q, ceteris paribus. DAR is not significant in this model ($\beta = -0.043$; $p = 0.954$), while SIZE has a negative effect that approaches significance at the 10% level ($\beta = -0.510$; $p = 0.087$), consistent with a mature-firm effect in which larger, more established firms receive more conservative market valuations. The overall F-test for Model 2 is not significant ($F(3,261) = 1.69$; $p = 0.169$; $R^2 = 0.084$), suggesting that Tobin's Q is also shaped by factors outside the model, such as commodity price sentiment and industry-specific dynamics.

The insignificant ERMQ-ROA relationship should not be read as evidence that ERM is valueless. Three explanations are offered. First, consistent with the contingency perspective (Gordon et al., 2009), the effect of ERM on performance depends on fit with contextual factors such as environmental uncertainty and industry competition, which are not modeled directly here. Second, the benefit of ERM on accounting profitability is often lagged: in the short run, building ERM capability (systems, expert staff, compliance infrastructure) raises operating costs, consistent with (Pagach & Warr, 2010). Third, the 2020-2024 window includes extreme commodity price volatility, most notably the 2022 coal and oil price spikes, which introduces substantial noise into ROA that can obscure the comparatively gradual, incremental signal carried by ERMQ.

By contrast, the significant and positive ERMQ-Tobin's Q relationship is well explained by Signaling Theory (Spence, 1973): investors interpret disclosed ERM quality as a credible signal of governance strength and risk resilience, which is capitalized into share price even before it shows up in short-term accounting earnings, consistent with Hoyt and Liebenberg (2011), (Iswajuni et al., 2018), and Bohnert (Bohnert et al., 2019), Gatzert, Hoyt, and Lechner (2019). Compared with Tahir and Razali (2011), who find no significant ERM-value relationship in Malaysia using a binary ERM proxy, the significant result obtained here suggests that a more granular, multidimensional ERMQ measure may be more capable of capturing genuine variation in risk management quality that the market actually prices.

CONCLUSION

This study analyzed the effect of Enterprise Risk Management (Florio & Leoni, 2017) Quality (ERMQ) (Commission, 2017), measured using a 14-indicator instrument adapted from Oreshile et al. (2026), on profitability (ROA) and firm value (Tobin’s Q) among 53 Indonesian energy sector public companies during 2020–2024, resulting in 265 firm-year observations. The analysis employed Pooled Ordinary Least Squares (OLS) with robust standard errors based on model (Lin et al., 2015) selection tests, including the Chow test, Breusch–Pagan Lagrange Multiplier test, and Hausman test. The results showed that ERMQ did not have a statistically significant effect on ROA, indicating that H1 was not supported. In contrast, ERMQ had a positive and significant effect on Tobin’s Q, supporting H2. These findings suggest that capital markets recognized ERM quality as a positive signal of long-term firm value before observable improvements appeared in short-term accounting profitability. The findings are consistent with Signaling Theory, while the relationship between ERM and profitability appears to depend on contextual factors, supporting the contingency perspective.

For corporate managers in the energy sector, the findings indicate that the value proposition of investing in ERM quality should emphasize long-term market valuation rather than short-term accounting returns (Fama & French, 1992). In addition, prudent capital

structure management remains important because leverage was found to have a significant negative effect on profitability. For regulators, including the Financial Services Authority of Indonesia (OJK) and the Indonesia Stock Exchange, the results highlight the importance of promoting more structured and verifiable ERM disclosure standards among energy sector issuers, particularly because more than half of the observed companies remained within the moderate ERMQ category. This study was limited by its reliance on annual report-based content analysis, which may not fully reflect actual risk management practices, as well as by its sector-specific focus and five-year observation period. Future research should extend the observation period, incorporate contingency and moderating variables such as environmental uncertainty and board characteristics, and apply dynamic panel estimation methods, including the Generalized Method of Moments (GMM), to address potential endogeneity between ERMQ and firm performance.

REFERENCES

Baltagi, B. H. (2008). Econometric analysis of panel data (4, Ed.). John Wiley & Sons.

Baxter, R., Bedard, J. C., Hoitash, R., & Yezegel, A. (2013). Enterprise risk management program quality: Determinants, value relevance, and the financial crisis. Auditing: A Journal of Practice & Theory, 32(1), 101–135. https://doi.org/https://doi.org/10.2308/ajpt-50288

Bohnert, A., Gatzert, N., Hoyt, R. E., & Lechner, P. (2019). The drivers and value of enterprise risk management: Evidence from ERM ratings. European Journal of Finance, 25(3), 234–255. https://doi.org/https://doi.org/10.1080/1351847X.2018.1512471

Cai, Y., Jo, H., & Pan, C. (2012). Doing well while doing bad? CSR in controversial industry sectors. Journal of Business Ethics, 108(4), 467–480. https://doi.org/https://doi.org/10.1007/s10551-011-1102-x

Chairani, C., & Siregar, S. V. (2021). The effect of enterprise risk management on financial performance and firm value: The role of environmental, social and governance performance. Meditari Accountancy Research, 29(3), 647–670. https://doi.org/https://doi.org/10.1108/MEDAR-01-2021-01166

Commission, T. C. of S. O. of the T. (2017). Enterprise Risk Management – Integrating with Strategy and Performance. The Committee of Sponsoring Organizations.

Eckles, D. L., Hoyt, R. E., & Miller, S. M. (2014). The impact of enterprise risk management on the marginal cost of reducing risk: Evidence from the insurance industry. Journal of Banking & Finance, 43(1), 247–261. https://doi.org/https://doi.org/10.1016/j.jbankfin.2014.03.028

Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. The Journal of Finance, 47(2), 427–465. https://doi.org/https://doi.org/10.1111/j.1540-6261.1992.tb04398.x

Florio, C., & Leoni, G. (2017). Enterprise risk management and firm performance: The Italian case. The British Accounting Review, 49(1), 56–74. https://doi.org/https://doi.org/10.1016/j.bar.2016.10.003

Garcia, A. S., Mendes-Da-Silva, W., & Orsato, R. J. (2017). Sensitive industries produce better ESG performance: Evidence from emerging markets. Journal of Cleaner Production, 150, 135–147. https://doi.org/https://doi.org/10.1016/j.jclepro.2017.02.180

Gordon, L. A., Loeb, M. P., & Tseng, C. Y. (2009). Enterprise risk management and firm performance: A contingency perspective. Journal of Accounting and Public Policy, 28(4), 301–327. https://doi.org/https://doi.org/10.1016/j.jaccpubpol.2009.06.006

Gujarati, D. N., & Porter, D. C. (2012). Dasar-dasar ekonometrika (5, Ed.). Salemba Empat.

Gusaptono, R. H. (2012). Faktor-faktor yang mendorong penciptaan nilai perusahaan di BEI. Buletin Ekonomi, 8(2), 149–158.

Hoyt, R. E., & Liebenberg, A. P. (2011). The value of enterprise risk management. The Journal of Risk and Insurance, 78(4), 795–822. https://doi.org/https://doi.org/10.1111/j.1539-6975.2011.01413.x

Iswajuni, I., Manasikana, A., & Soetedjo, S. (2018). The effect of enterprise risk management (ERM) on firm value in manufacturing companies listed on Indonesian Stock Exchange year 2010-2013. Asian Journal of Accounting Research, 3(2), 224–235. https://doi.org/https://doi.org/10.1108/AJAR-09-2018-0029

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, 3(4), 305–360. https://doi.org/https://doi.org/10.1016/0304-405X(76)90026-X

Lin, C. S., Chang, R. Y., & Dang, V. T. (2015). An integrated model to explain how corporate social responsibility affects corporate financial performance. Sustainability, 7(7), 8292–8311. https://doi.org/https://doi.org/10.3390/su7078292

Oreshile, S. A., Zainudin, R., & Mahdzan, N. S. (2026). Enterprise risk management quality and financial distress risk. Journal of Accounting in Emerging Economies, 16(2), 233–261.

Pagach, D., & Warr, R. (2010). The effects of enterprise risk management on firm performance. Journal of Risk and Insurance, 77(4), 841–863. https://doi.org/https://doi.org/10.1111/j.1539-6975.2010.01343.x

Spence, M. (1973). Job market signaling. Quarterly Journal of Economics, 87(3), 355–374. https://doi.org/https://doi.org/10.2307/1882010

Standardization, I. O. for. (2018). Risk management – Guidelines and principles (ISO 31000:2018). International Organization for Standardization.

Subramaniam, N., Wahyuni, D., Cooper, B. J., Leung, P., & Wines, G. (2015). Integration of carbon risks and opportunities in enterprise risk management systems: Evidence from Australian firms. Journal of Cleaner Production, 96, 407–417. https://doi.org/https://doi.org/10.1016/j.jclepro.2014.07.008

Tahir, I. M., & Razali, A. R. (2011). The relationship between enterprise risk management (ERM) and firm value: Evidence from Malaysian public listed companies. International Journal of Economics and Management Sciences, 1(2), 32–41.

Wooldridge, J. M. (2010). Econometric analysis of cross section and panel data (2, Ed.). MIT Press.