



DOI: <https://doi.org/10.38035/dijefa.v7i3>
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The Effects of ESG and Financial Ratios on Risk-Based Capital: The Moderating Role of Board Size in Indonesian Life Insurance Companies

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Abstract: This study analyzes the effects of environmental, social, and governance (ESG) disclosure and financial ratios on the solvency of life insurance companies in Indonesia, with board size as a moderating variable. Previous studies have primarily associated ESG with overall financial performance, while its relationship with risk-based capital (RBC), together with underwriting, liquidity, profitability, and governance factors, remains underexplored. This quantitative study employs panel data from 25 conventional life insurance companies registered with the Indonesian Financial Services Authority during the 2021–2024 period, resulting in 100 firm-year observations. Secondary data obtained from annual reports, financial statements, and sustainability reports were analyzed using random-effects regression and moderated regression analysis with EViews 12. The results indicate that ESG disclosure and the combined ratio have no significant effect on RBC, whereas liquidity and profitability have positive and significant effects. Board size does not moderate the effects of ESG disclosure and liquidity on RBC but significantly weakens the effects of the combined ratio and profitability on RBC. These findings indicate that financial fundamentals, particularly liquidity and profitability, are more directly associated with capital adequacy than ESG disclosure. Furthermore, board size does not necessarily strengthen the relationship between financial performance and corporate solvency.

Keywords: board size, combined ratio, environmental, social, and governance, life insurance, risk-based capital.

INTRODUCTION

Life insurance companies perform protection and financial-intermediation functions that require them to continuously maintain sufficient capital to meet long-term obligations to policyholders. In Indonesia, the financial health of insurance companies is primarily assessed using risk-based capital (RBC), which compares the available solvency level with the risk-based minimum capital requirement. Insurance companies are required to maintain RBC in accordance with the minimum threshold established by the Indonesian Financial Services Authority and to determine internal solvency targets based on their respective risk profiles and

stress-test results (Financial Services Authority, 2023). Nevertheless, the financial difficulties and license revocations experienced by several life insurance companies indicate that compliance with formal capital requirements does not necessarily eliminate weaknesses in risk management, asset–liability management, underwriting discipline, and corporate governance (Financial Services Authority, 2022, 2023).

The growing sustainability agenda introduces another dimension to the financial resilience of insurance companies. Financial institutions, issuers, and public companies in Indonesia are required to implement sustainable finance practices and disclose relevant sustainability information under POJK No. 51/POJK.03/2017 (Financial Services Authority, 2017). Environmental, social, and governance (ESG) disclosure may signal transparency, a long-term strategic orientation, and stronger management of environmental, social, and governance risks. International evidence has associated sustainability practices with insurance stability and financial performance (Chiaramonte et al., 2020; Bressan, 2023; Belgacem, 2025). However, other studies have reported weak, insignificant, or adverse effects because implementation costs, institutional conditions, and disclosure quality differ across companies and jurisdictions (Nareswari et al., 2023; Labini et al., 2025). Therefore, ESG disclosure may not directly translate into additional capital available to absorb insurance risks.

In addition to ESG disclosure, financial ratios remain important indicators of insurer solvency. The combined ratio (COR), which reflects claim and operating expenses relative to premium income, represents underwriting and operational efficiency. A higher COR generally indicates that a larger proportion of premium income is absorbed by claims and operating expenses, potentially weakening the company's capacity to accumulate solvency capital. However, its relationship with RBC may vary depending on premium growth, portfolio characteristics, risk selection, and the effectiveness of underwriting management. Liquidity, proxied by the current ratio (CR), indicates the company's capacity to meet short-term obligations without prematurely disposing of long-term investments. Return on assets (ROA), meanwhile, reflects the company's ability to generate earnings from its asset base. Previous Indonesian studies have produced mixed findings regarding the effects of claims, liquidity, profitability, and underwriting performance on RBC (Renaldo et al., 2021; Syahwildan, 2022; Anggraini & Aminah, 2023; Sukmarini & Soedaryono, 2023; Sutanto et al., 2023).

Corporate governance may explain part of the heterogeneity in these relationships. Agency theory views the board as a monitoring mechanism that reduces information asymmetry and limits managerial opportunism (Jensen & Meckling, 1976). A larger board may provide broader expertise, more diverse perspectives, and stronger oversight of underwriting, investment, liquidity, and capital-management decisions. Conversely, a larger board may create coordination problems, slower decision-making processes, and more conservative resource-allocation policies. Previous studies have generally examined board characteristics as determinants of ESG disclosure or as moderators of the relationship between ESG and financial performance (Rossi et al., 2021; Chebbi & Ammer, 2022; Meeprom et al., 2024; Sharawi, 2024). Empirical evidence remains limited regarding whether board size changes the effects of ESG disclosure and insurer-specific financial ratios on RBC, particularly in the Indonesian life insurance industry.

Signaling theory further suggests that ESG disclosure and financial ratios communicate information about managerial quality and financial resilience to regulators, investors, and policyholders (Spence, 1973). However, a credible signal must represent substantive corporate conditions and be interpreted consistently by stakeholders. When ESG reporting is primarily compliance-driven, it may remain disconnected from risk and capital management. By contrast, liquidity and profitability have more direct implications for the quality of admitted assets, retained earnings, claim-paying capacity, and available solvency capital. Consequently, financial indicators may have a more immediate relationship with RBC than ESG disclosure.

This study addresses these research gaps by integrating ESG disclosure, the combined ratio, liquidity, and profitability into a panel-data model of RBC and by examining board size as a moderator of each relationship. The study focuses on 25 conventional life insurance companies registered with the Indonesian Financial Services Authority during 2021–2024, producing 100 firm-year observations. It aims to analyze the direct effects of ESG disclosure, the combined ratio, liquidity, and profitability on RBC and to determine whether board size strengthens or weakens these relationships. The simultaneous integration of non-financial disclosure, underwriting performance, liquidity, profitability, and board structure provides a more comprehensive explanation of life-insurance solvency than studies that examine these factors separately.

METHOD

This study employed a quantitative explanatory design using balanced panel data. The population consisted of 59 life insurance companies registered with the Indonesian Financial Services Authority. Purposive sampling was applied to select conventional life insurance companies that were consistently registered and published the data required for all research variables during 2021–2024. Of the 59 life insurance companies, 49 were conventional insurers. Among these companies, 41 published complete annual financial statements, while only 25 also provided complete sustainability reports throughout the observation period. Accordingly, the final sample consisted of 25 companies observed annually over four years, resulting in 100 firm-year observations.

Secondary data were obtained from audited financial statements, annual reports, sustainability reports, company websites, and publications issued by the Indonesian Financial Services Authority. Risk-based capital (RBC) was calculated by dividing the difference between admitted assets and liabilities by the risk-based minimum capital requirement. Environmental, social, and governance (ESG) disclosure was measured by dividing the number of disclosed Global Reporting Initiative items by the total applicable disclosure items (Global Reporting Initiative, 2016). The combined ratio (COR) was calculated as the sum of the loss ratio and expense ratio. Liquidity was proxied by the current ratio (CR), calculated by dividing current assets by current liabilities. Return on assets (ROA) was calculated by dividing net income by total assets. Board size (BS) was measured as the total number of directors and commissioners.

The data were analyzed using EViews 12. The analysis began with descriptive statistics and a correlation matrix. The common-effects, fixed-effects, and random-effects estimators were compared using the Chow, Hausman, and Breusch–Pagan Lagrange multiplier tests. Based on these model-selection tests, the random-effects model (REM) was selected for both the main-effects and moderation specifications. All statistical decisions were made at a 5% significance level.

The main-effects model was specified as follows:

$$RBC_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 COR_{i,t} + \beta_3 CR_{i,t} + \beta_4 ROA_{i,t} + \varepsilon_{i,t} \quad (1)$$

H1–H4. The moderation model was specified as follows:

$$RBC_{i,t} = \beta_0 + \beta_1 ESG_{i,t} + \beta_2 COR_{i,t} + \beta_3 CR_{i,t} + \beta_4 ROA_{i,t} + \beta_5 (ESG \times BS)_{i,t} + \beta_6 (COR \times BS)_{i,t} + \beta_7 (CR \times BS)_{i,t} + \beta_8 (ROA \times BS)_{i,t} + \varepsilon_{i,t} \quad (2)$$

The interaction terms were used to evaluate H5–H8. The sign and significance of each interaction coefficient were examined to determine whether board size strengthened or weakened the corresponding relationship. Because the moderation specification reported in the thesis did not include a separate main effect of board size, board size was interpreted solely from the interaction terms. It was not classified as a pure or quasi-moderator.

Table 1. Operationalization of Variables

Variable	Measurement	Role
RBC	(Admitted assets – liabilities) / risk-based minimum capital requirement	Dependent variable
ESG	Disclosed GRI items / total applicable GRI items	Independent variable
COR	Loss ratio + expense ratio	Independent variable
CR	Current assets / current liabilities	Independent variable
ROA	Net income / total assets	Independent variable
BS	Total number of directors and commissioners	Moderating variable

Source: Processed research data (2026)

RESULTS AND DISCUSSION

Descriptive Statistics

The descriptive statistics indicate substantial heterogeneity among the sampled life insurance companies. The mean RBC was 7.0961, equivalent to approximately 709.61%, which was substantially above the 120% internal solvency target. However, RBC ranged from 1.2759 to 66.9340, indicating considerable differences in the capital buffers maintained by the sampled insurers. The minimum RBC value of 1.2759, equivalent to 127.59%, was still above the internal solvency target.

The mean ESG disclosure index was 0.2133, indicating that the sampled companies disclosed approximately 21.33% of the assessed GRI items on average. This relatively low value suggests that the scope of ESG disclosure varied considerably and remained limited among several life insurance companies during the observation period.

The mean COR was 1.0621, equivalent to approximately 106.21%, indicating that claim and operating expenses slightly exceeded premium income on average. The current ratio had a mean value of 3.3277. Relative to its mean, CR displayed the greatest dispersion, indicating substantial differences in short-term liquidity across the sampled insurers. Mean ROA was close to zero, while its minimum value was negative, suggesting that several insurers experienced weak profitability or losses. Board size ranged from 4 to 14 members, with an average of approximately eight directors and commissioners.

Table 2. Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
ESG	0.2133	0.1650	0.8500	0.0600	0.1666
COR	1.0621	1.0428	1.9958	0.5265	0.3107
CR	3.3277	1.5124	48.5808	0.8811	5.5895
ROA	0.0005	0.0069	0.0823	−0.1948	0.0436
BS	7.8300	7.0000	14.0000	4.0000	1.9491
RBC	7.0961	4.3092	66.9340	1.2759	9.2151

Source: EViews output, processed research data (2026). Observations = 100.

Model Selection and Goodness of Fit

The panel-data estimator was selected by comparing the common-effects, fixed-effects, and random-effects models. For the main-effects specification, the Chow test initially favored the fixed-effects model. However, the Hausman test produced a probability value of 0.3350, indicating that the random-effects model was preferred to the fixed-effects model. The Breusch–Pagan Lagrange multiplier test produced a probability value of 0.0000, confirming that the random-effects model was more appropriate than the pooled common-effects model.

For the moderation specification, the Hausman test produced a probability value of 0.1109, while the Breusch–Pagan Lagrange multiplier test produced a probability value of 0.0000. Therefore, the random-effects model was also selected for the moderation analysis.

The main-effects model was jointly significant, with an F-statistic of 5.481129 and a probability value of 0.000516. The model had an R^2 of 0.187500 and an adjusted R^2 of 0.153300, indicating that ESG disclosure, COR, CR, and ROA jointly explained approximately 18.75% of the variation in RBC.

The moderation model was also jointly significant, with an F-statistic of 11.89981 and a probability value below 0.001. Its R^2 increased to 0.511274, with an adjusted R^2 of 0.468309. This increase indicates that including the interaction terms improved the model's ability to explain variations in RBC. Nevertheless, each moderating effect was determined from the sign and statistical significance of its respective interaction coefficient.

Direct Effects on Risk-Based Capital

Table 3. Random-Effects Estimates for the Main-Effects Model

Variable	Coefficient	t-statistic	p-value	Decision
Constant	1.568836	8.999634	0.0000	—
ESG	−0.704164	−1.532831	0.1286	Not significant
COR	0.156124	0.865582	0.3889	Not significant
CR	0.174082	2.332090	0.0218	Positive and significant
ROA	3.382794	3.616007	0.0005	Positive and significant

Source: EViews output, processed research data (2026)

Effect of ESG Disclosure on Risk-Based Capital

ESG disclosure had a negative but statistically insignificant effect on RBC, with a coefficient of −0.704164 and a p-value of 0.1286. Therefore, H1 was rejected. The result indicates that differences in the breadth of GRI-based ESG disclosure were not significantly associated with differences in the available solvency capital of life insurance companies during the observation period.

One possible explanation is that ESG reporting remained largely compliance-oriented and had not yet been sufficiently integrated into insurance risk and capital management. ESG disclosure may communicate transparency and long-term corporate orientation, but disclosure alone does not necessarily increase the capital available to cover underwriting, market, credit, liquidity, and operational risks. The relatively low average ESG disclosure index supports the possibility that sustainability reporting had not yet reached a level at which it could materially influence solvency.

From a signaling-theory perspective, ESG disclosure may not have functioned as a sufficiently strong and credible signal of capital resilience. Stakeholders may require evidence that sustainability initiatives reduce measurable insurance and investment risks rather than merely increase the number of disclosed items. The result is consistent with Nareswari et al. (2023) and Labini et al. (2025), which indicate that ESG implementation does not automatically improve corporate financial outcomes when disclosure quality, institutional conditions, and implementation maturity differ. However, the result differs from Chiamonte et al. (2020) and Bressan (2023), which associate sustainability practices with insurance stability and financial performance.

Effect of the Combined Ratio on Risk-Based Capital

The combined ratio had a positive but statistically insignificant effect on RBC, with a coefficient of 0.156124 and a p-value of 0.3889. Consequently, H2 was rejected at the 5% significance level.

This finding indicates that COR did not have a uniform direct relationship with RBC across the sampled life insurers. A higher COR generally suggests that a greater proportion of premium income is absorbed by claims and operating expenses. However, its implications for solvency may depend on premium growth, portfolio composition, reserve adequacy, risk selection, reinsurance arrangements, investment performance, and asset–liability management.

An increase in claims and operating expenses may accompany business expansion, but it does not necessarily strengthen or weaken solvency when considered independently from the quality of premiums, technical reserves, and capital-management policies. Therefore, COR alone may not adequately explain variations in RBC. This finding helps explain why previous studies, including Syahwildan (2022) and Anggraini and Aminah (2023), produced different conclusions regarding the relationship between claims-related financial ratios and insurer solvency.

Effect of Liquidity on Risk-Based Capital

Liquidity, as proxied by the current ratio, had a positive and statistically significant effect on RBC, with a coefficient of 0.174082 and a p-value of 0.0218. Therefore, H3 was supported.

A higher current ratio indicates greater availability of current assets relative to current liabilities. This condition may support the company's capacity to meet short-term claims and operating obligations while reducing the pressure to prematurely liquidate long-term investment assets. Adequate liquidity may consequently help insurers maintain available solvency capital and reduce exposure to short-term cash-flow disruptions.

The finding supports the view that financial fundamentals have a more immediate relationship with solvency than the breadth of non-financial disclosure. From an agency-theory perspective, effective liquidity management may also reflect managerial discipline in balancing claim-payment requirements, asset allocation, and short-term obligations. This finding is consistent with Renaldo et al. (2021) and Syahwildan (2022), which identify liquidity as an important determinant of insurer financial health.

Effect of Profitability on Risk-Based Capital

Profitability, as measured by ROA, had a positive and statistically significant effect on RBC, with a coefficient of 3.382794 and a p-value of 0.0005. Thus, H4 was supported.

Higher profitability may strengthen RBC through the accumulation of retained earnings and equity, thereby increasing the capital available to absorb insurance risks. Consistent profitability may also provide insurers with greater flexibility to strengthen technical reserves, finance operational requirements, and maintain capital without relying excessively on external funding.

ROA can also function as a signal of the company's ability to manage its asset base, underwriting activities, and investment portfolio effectively. However, the result should not be interpreted as direct evidence that every profitable insurer has superior underwriting or asset–liability management because these mechanisms were not separately examined in this study. This result corroborates Sukmarini and Soedaryono (2023) and Sutanto et al. (2023), which identify profitability as an important determinant of insurer solvency.

Moderating Role of Board Size

Table 4. Random-Effects Estimates for the Moderation Model

Variable	Coefficient	t-statistic	p-value	Interpretation
ESG	-1.652306	-1.075148	0.2852	Not significant
COR	2.237443	2.568904	0.0118	Positive and significant
CR	0.600004	1.924523	0.0574	Not significant at 5%
ROA	26.663910	5.620488	0.0000	Positive and significant
ESG × BS	0.459673	0.632427	0.5287	No moderating effect
COR × BS	-1.263844	-2.854000	0.0053	Negative/weakening moderation
CR × BS	-0.247208	-1.572432	0.1193	No moderating effect
ROA × BS	-12.659870	-5.239504	0.0000	Negative/weakening moderation

Source: EViews output, processed research data (2026).

Because the estimated moderation model did not include a separate main effect of Board Size, the interpretation focuses on the signs and statistical significance of the interaction terms. The results were not used to classify Board Size as a pure or quasi-moderator.

Moderating Role of Board Size in the ESG–RBC Relationship

The ESG×BS interaction had a positive but statistically insignificant coefficient of 0.459673, with a p-value of 0.5287. Therefore, H5 was rejected. Board Size did not significantly change the relationship between ESG disclosure and RBC.

The finding indicates that having a larger number of directors and commissioners does not necessarily ensure that ESG matters are integrated into capital planning, underwriting, investment, or solvency management. Board membership count alone may not reflect sustainability expertise, board effectiveness, the division of supervisory responsibilities, or the quality of sustainability-related decisions. The result contrasts with studies reporting a significant governance role in strengthening the relationship between ESG and corporate outcomes, including Rossi et al. (2021) and Sharawi (2024). This difference may be related to variations in industry characteristics, institutional environments, sustainability-reporting maturity, and the measures of board governance employed in previous studies.

Moderating Role of Board Size in the COR–RBC Relationship

The COR×BS interaction had a negative and statistically significant coefficient of -1.263844, with a p-value of 0.0053. Accordingly, H6 was supported, with Board Size demonstrating a weakening moderating effect on the relationship between COR and RBC.

The negative interaction coefficient indicates that an increase in Board Size weakens the relationship between COR and RBC within the estimated model. From an agency-theory perspective, larger boards may provide more extensive monitoring of underwriting exposure, claim expenses, operating costs, and premium-growth strategies. Such monitoring may limit managerial decisions that increase underwriting and operational expenses without producing proportional improvements in solvency. Nevertheless, the negative moderation should not automatically be regarded as either beneficial or detrimental. Larger boards may impose greater oversight, but they may also experience coordination difficulties, slower decision-making, and more conservative responses to changing insurance risks. The study did not directly examine these board processes; therefore, they represent possible explanations rather than empirically tested mechanisms.

Moderating Role of Board Size in the Liquidity–RBC Relationship

The CR×BS interaction had a negative but statistically insignificant coefficient of -0.247208 and a p-value of 0.1193 . Therefore, H7 was rejected. Board Size did not significantly moderate the relationship between liquidity and RBC.

Liquidity management may depend more strongly on technical treasury policies, asset allocation, maturity matching, claim-payment patterns, and managerial expertise than on the number of directors and commissioners. Consequently, increasing board membership does not necessarily change how the availability of current assets relative to current liabilities affects solvency. This finding also indicates that the direct role of liquidity in supporting RBC remained relatively independent of Board Size. Future research may obtain a more complete explanation by examining board financial expertise, meeting frequency, independence, risk committees, or other qualitative governance characteristics.

Moderating Role of Board Size in the Profitability–RBC Relationship

The ROA×BS interaction had a negative and statistically significant coefficient of -12.659870 , with a p-value below 0.001 . Therefore, H8 was supported, with Board Size demonstrating a weakening moderating effect on the relationship between profitability and RBC.

The result indicates that an increase in Board Size weakens the positive relationship between profitability and RBC. One possible explanation is that larger boards introduce more diverse preferences regarding earnings retention, dividend distribution, business expansion, investment allocation, and capital strengthening. Greater diversity of views may improve oversight but can also increase coordination costs and slow capital-allocation decisions. However, dividend policy, earnings-retention decisions, and board coordination were not directly tested in this study. Therefore, these factors should be treated as possible theoretical explanations rather than confirmed causal mechanisms. The finding nevertheless supports the proposition that board structure can influence the relationship between operating performance and financial resilience, as discussed by Kiptoo et al. (2021) and Meeprom et al. (2024).

Research Novelty

The novelty of this study lies in jointly examining ESG disclosure and insurer-specific financial ratios as determinants of RBC while testing Board Size as a moderator in the Indonesian life insurance industry. Previous studies have more commonly examined ESG disclosure, financial performance, insurer solvency, and board characteristics separately.

The findings distinguish the direct roles of liquidity and profitability from the insignificant direct effects of ESG disclosure and COR. They also demonstrate that Board Size has a selective rather than universal moderating role. Board Size significantly moderates the COR–RBC and ROA–RBC relationships in a negative direction but does not significantly moderate the relationships of ESG disclosure and liquidity with RBC. These findings extend signaling theory by demonstrating that balance-sheet fundamentals, particularly liquidity and profitability, may provide more immediate information about capital adequacy than the breadth of ESG disclosure. The findings also extend agency theory by indicating that a larger board does not automatically strengthen financial outcomes and may weaken particular relationships between financial performance indicators and solvency.

Managerial Implications

The results emphasize the importance of maintaining adequate liquidity and sustainable profitability as the primary financial foundations of RBC. Life insurance management should strengthen cash-flow planning, asset–liability management, claim-payment projections, investment maturity matching, and the availability of current assets to meet short-term

obligations. Management should also ensure that profitability contributes to long-term solvency by establishing appropriate policies regarding earnings retention, dividends, business expansion, and additional capital requirements. Profitability should not be evaluated solely based on short-term earnings because its contribution to RBC depends on how earnings are allocated and retained.

Although ESG disclosure did not have a significant direct effect on RBC, insurance companies should not treat sustainability reporting merely as an administrative obligation. ESG programs should be linked to measurable reductions in underwriting, investment, operational, reputational, and governance risks. Sustainability reporting should explain how ESG initiatives influence risk exposure, asset quality, operational efficiency, policyholder protection, and capital resilience. The insignificant direct effect of COR also indicates that management should not evaluate underwriting performance solely from the combined ratio. COR should be considered alongside premium quality, claim trends, operating expenses, reserve adequacy, reinsurance arrangements, portfolio growth, and risk-adjusted profitability.

Boards should evaluate not only the number of directors and commissioners but also their expertise, independence, composition, meeting effectiveness, and ability to make timely capital-allocation decisions. The negative moderating effects found for COR and ROA indicate that increasing board membership does not automatically improve the contribution of underwriting performance and profitability to solvency. For the Indonesian Financial Services Authority, supervisory assessments should continue to emphasize liquidity quality, sustainable profitability, underwriting discipline, reserve adequacy, and capital-management policies. ESG supervision may also be linked more explicitly to insurer-specific risks and solvency indicators so that sustainability disclosure reflects substantive risk management rather than reporting compliance alone.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

This study examined the effects of ESG disclosure, combined ratio, liquidity, and profitability on the risk-based capital of Indonesian conventional life insurance companies during 2021–2024, as well as the moderating role of Board Size. Based on the main-effects model, ESG disclosure and the combined ratio did not have statistically significant effects on RBC. In contrast, liquidity and profitability had positive and significant effects on RBC. These findings indicate that short-term liquidity capacity and sustainable profitability were more directly associated with solvency than the breadth of ESG disclosure or the combined ratio during the observation period.

Board Size did not significantly moderate the relationships between ESG disclosure and RBC or between liquidity and RBC. However, Board Size had negative and significant moderating effects on the relationships of the combined ratio and profitability with RBC. Thus, a larger board weakened the COR–RBC and ROA–RBC relationships within the estimated model. These results demonstrate that Board Size performs a selective rather than universal moderating role. Nevertheless, because the moderation model did not include a separate main effect of Board Size, the findings should be interpreted solely from the signs and statistical significance of the interaction terms. Overall, the findings emphasize that life-insurance solvency should be supported by adequate liquidity, sustainable profitability, disciplined underwriting and expense management, substantive ESG implementation, and effective board decision-making. ESG practices should be connected to measurable insurance risks and capital-management outcomes rather than being limited to the breadth of sustainability disclosure.

The study is limited to 25 conventional Indonesian life insurers and four years, so its findings should not be generalized to general insurance, sharia insurance, or other jurisdictions without caution. ESG was measured using a disclosure index, which captures breadth rather

than the quality or actual impact of implementation. The main-effects model explains a limited proportion of RBC variation, indicating that investment risk, company size, premium growth, reinsurance, macroeconomic conditions, and other determinants were not included. In addition, the estimated moderation equation did not include a separate main effect for board size; therefore, the moderator type cannot be classified precisely, and the interaction results should be interpreted cautiously.

Recommendations

Life insurance companies should establish integrated liquidity, profitability, and solvency targets supported by effective cash-flow planning, asset–liability management, claim-payment projections, and investment-maturity matching. Underwriting growth should be aligned with premium quality, technical reserves, reinsurance protection, and sufficient capital. Management should also establish prudent earnings-retention and dividend policies so that profitability can contribute sustainably to strengthening RBC. ESG programs should be integrated into underwriting, investment, operational, reputational, and governance risk management. Companies should explain how their sustainability initiatives reduce specific risk exposures and support capital resilience, rather than treating ESG merely as a reporting requirement. The combined ratio should also be evaluated alongside reserve adequacy, claim trends, operating expenses, portfolio growth, reinsurance arrangements, and risk-adjusted profitability.

Boards should evaluate not only their number of members but also their composition, expertise, independence, coordination, and decision-making effectiveness. Increasing Board Size alone does not necessarily strengthen solvency and may weaken the relationships of underwriting performance and profitability with RBC when board processes are not managed effectively. The Indonesian Financial Services Authority should develop insurance-specific ESG materiality guidance and connect ESG supervision more explicitly with risk profiles and solvency indicators. Supervisory assessments should continue to emphasize liquidity quality, sustainable profitability, underwriting discipline, reserve adequacy, and the governance of dividend, expansion, and capital-allocation decisions.

Future research should extend the observation period, include broader insurance segments, and compare conventional and sharia insurance companies. Subsequent studies should employ qualitative or performance-based ESG measures, separately examine environmental, social, and governance dimensions, and include additional determinants of RBC. Future moderation models should incorporate the direct effect of Board Size and examine qualitative governance characteristics, including board expertise, independence, gender diversity, meeting frequency, risk committees, and decision-making effectiveness.

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