Underwriting performance: Foreseeing the future of sharia insurance in Indonesia

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Abstract

Healthy underwriting performance is crucial to the sustainability of insurance companies. Effective underwriting enables companies to assess and manage risks accurately, set fair premiums, and avoid unnecessary losses. However, studies on underwriting performance have primarily focused on company-specific factors and have been conducted only in developed countries. There is also a lack of specific studies on the role of underwriting performance in sharia insurance (*takaful*) companies. This study aims to fill that gap by conducting an in-depth analysis of the role of underwriting performance in sharia insurance companies in Indonesia. It also seeks to refine previous research by examining both the short-term and long-term roles of underwriting performance in these companies. The study uses secondary panel data with 20 sharia insurance companies as units of observation. The coefficient estimates in this study are obtained using dynamic panel-data regression to determine the short- and long-term effects of underwriting performance in sharia insurance. The estimation results of the dynamic panel regression model show that the underwriting variable has a positive and significant impact on sharia insurance premium income, both in the short and long term, with the rate of convergence indicating a relatively rapid adjustment of the system towards equilibrium.

Keywords: insurance, sharia, dynamic panel regressions
JEL Classification: C25; G22; G23; Z12

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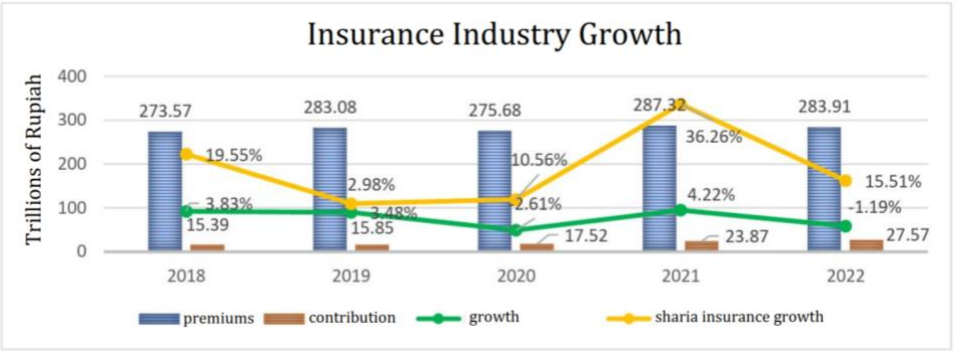
1. Introduction

Insurance is designed to protect individuals and businesses from losses due to unexpected events. The function of insurance is not only centered on improving the standard of living and ensuring business continuity by providing financial protection (Alshammari et al., 2018), but also in stimulating economic growth through premium accumulation (Prokopjeva et al, 2023; Banurea & Hafizh, 2024). The insurance sector's contribution, reflected in the accumulation of premiums, serves as a key financial resource and acts as a main source to support investment activities (Ghosh, 2013). Furthermore, the funds collected from premiums can help stabilize a country's financial system, particularly during times of economic recession (Karpitskaya & Barysenka, 2018).

Insurance institutions in Indonesia implement a dual system, consisting of conventional and Sharia systems (*Law* No. 10 of 1998). Conventional insurance has long been established in Indonesia as a mature and widespread risk protection instrument. However, with growing awareness of Sharia financial inclusion and literacy, an alternative based on Sharia principles, offering greater fairness and transparency, has emerged. According to a 2025 press release from the Financial Services Authority (OJK), Sharia insurance has begun to show significant growth. For example, in 2021, gross contributions surged to IDR 23.87 trillion (an increase of 36.2% from IDR 17.52 trillion in 2020), accounting for 8.1% of the total contributions in the national insurance industry (OJK, 2025). This positive trend continued in 2024, with Sharia life insurance premiums rising by 11% to IDR 22.1 trillion and total assets increasing to IDR 32.3 trillion. Over the past five years, conventional insurance premiums have grown by 0.9%, whereas Sharia insurance contributions have grown by 15.7%. However, the market share of Sharia insurance premiums remains relatively small compared to the conventional insurance industry (excluding social and mandatory insurance), standing at just 15.51% in 2022, or approximately IDR 27.57 trillion. (OJK, 2022)

Figure 1.
Insurance Industry Growth in Indonesia, 2018-2022



Source: OJK (2023)

Sharia financial penetration and literacy have also continued to improve, with the Sharia financial literacy index rising to 43.4% and Sharia financial inclusion reaching 13.41% as of 2025. On the other hand, the Sharia insurance industry managed to collect premiums amounting to IDR 9.84 trillion by April 2025, recording year-on-year (YoY) growth of 8.04%, although its market share remains relatively small, only around 8.45% of total commercial insurance premiums. Active financial literacy education efforts and product innovation by Sharia insurance companies have driven this growth. The contribution of Sharia insurance is increasingly evident in supporting national economic stability and inclusion more inclusively and sustainably.

To ensure the sustainability and profitability of insurance companies amid uncertainty, underwriting plays a crucial role in maintaining operational continuity (Tegegn et.al, 2020), particularly in Sharia insurance, through the processes of risk assessment, contribution (premium) determination, and policy terms and conditions setting, while upholding Sharia principles (Horvey & Mensah, 2024). Thus, underwriting not only evaluates profitability aspects but also ensures compliance with Islamic values. Effective underwriting enables companies to measure and manage risks accurately, set fair premiums, and avoid unnecessary losses, which ultimately affects not only the company's profitability but also its ability to maintain financial stability and prevent long-term losses. Therefore, a deep understanding of the underwriting process is essential to accurately identify risks and support the company's goal of maximizing profit.

Underwriting performance is a key driver of insurance profitability, especially when investment income is unstable (Swiss Re Institute, 2020). In Indonesia, weak underwriting performance has been identified as a major cause of deficits in the *tabarru'* fund and low underwriting surplus, both of which hinder business continuity (OJK, 2022). However, a gap exists in the academic literature. Most studies tend to focus on macro-financial aspects or Sharia compliance, without specifically examining the contribution of underwriting to the sustainability of insurance companies. For example, Amelia (2021) investigated profitability without considering technical indicators such as the loss ratio, while Rahmawati (2024) emphasized Sharia compliance without analyzing the risk selection process. In fact, underwriting is the operational foundation of Sharia insurance and the key to sustaining the *tabarru'* fund.

Despite the growth of Sharia insurance and increasing regulatory attention, existing literature has not yet explored how underwriting performance affects long-term sustainability, particularly through dynamic mechanisms such as convergence, adjustment processes, or lagged effects. Prior studies are predominantly static, focusing on profitability in a single period, and lack an examination of whether poor underwriting performance today affects future sustainability. Moreover, empirical studies specific to Indonesia's dual insurance market structure are limited, even though Indonesia represents one of the largest Islamic finance markets globally. This research contributes uniquely by analyzing (1) the dynamic effects of underwriting performance on company sustainability, (2) whether underwriting indicators exhibit convergence toward sustainable financial conditions, and (3) Indonesia-specific empirical patterns that have not been documented in international Sharia insurance studies.

This topic is important as it addresses two core dimensions of Sharia insurance: the technical (underwriting) and the strategic (sustainability). Amid industry

pressures such as declining profit margins, investment volatility, and increasing compliance demands, Sharia insurance companies must manage risk more efficiently. This research aims to fill an existing gap by providing an in-depth analysis of the role of underwriting performance in Indonesian Sharia insurance companies and to sharpen prior studies by examining both the short- and long-term impacts of underwriting performance on company sustainability.

2. Methodology

Studies on underwriting within the global insurance industry affirm that underwriting is a core mechanism for maintaining the profitability and resilience of insurance companies. International literature, such as Biener and Eling (2012), shows that underwriting risk plays a significant role in driving volatility in financial performance, particularly during turbulent market conditions. Similarly, Cummins and Rubio-Misas (2016) emphasize that underwriting effectiveness directly influences cost efficiency, claim stability, and the firm's ability to sustain long-term competitiveness. Other studies, such as Outreville (2012), highlight that underwriting is a dynamic process involving risk adjustments, portfolio monitoring, and convergence toward an optimal level of risk.

In the context of Sharia insurance, underwriting plays a crucial role in safeguarding the sustainability of the *tabarru'* fund and ensuring compliance with Sharia principles that emphasize fairness, transparency, and the avoidance of *gharar* and *maisir*. According to Ismail et al. (2011), effective underwriting directly influences the stability of participants' funds and the company's ability to manage claims sustainably. Meanwhile, Maysami and Kwon (1999) assert that the Sharia underwriting mechanism has unique characteristics due to the separation of risk between participants and operators, making underwriting performance even more critical for long-term sustainability compared to conventional insurance. Nevertheless, existing Sharia-focused studies remain limited in their examination of the dynamic effects of underwriting on a firm's financial sustainability.

Furthermore, technical indicators such as the loss ratio, claims ratio, and expense ratio are widely recognized as key determinants of underwriting performance. Eling and Schmit (2012) demonstrate that a high loss ratio is a strong predictor of declining underwriting profitability, while variations in the expense ratio reflect the operational efficiency of insurance firms. This relationship between cost efficiency and performance is further supported by Berger et al. (1997), who emphasize the role of managerial efficiency in shaping firm outcomes. In addition, Lee et al. (1997) find that an unfavorable combination of high claims ratios and inaccurate premium pricing can undermine an insurer's long-term sustainability, particularly when investment income is insufficient to compensate for underwriting losses. Despite their contributions, most existing studies adopt a static, single-period analytical framework, which limits their ability to capture the dynamic evolution of underwriting indicators over time or to assess how current underwriting conditions influence future firm sustainability.

Across the broader literature, several essential research gaps become evident. First, Sharia underwriting studies still lack a theoretical framework that integrates technical underwriting aspects with long-term sustainability, particularly through dynamic mechanisms such as lag effects, adjustment processes, or convergence of

underwriting indicators. Second, empirical research specifically addressing the Indonesian context, characterized by a dual insurance market with both conventional and Sharia systems, remains scarce, despite Indonesia being one of the world's largest Islamic finance markets (Ascarya & Sakti, 2022). Third, no studies have examined whether weak underwriting performance in previous periods may disrupt the stability of the *tabarru'* fund or diminish long-term financial sustainability. Therefore, there is a clear need to develop a more comprehensive and dynamic conceptual framework to explain the relationship between underwriting and the sustainability of Sharia insurance companies in Indonesia.

This study utilizes secondary panel data with 20 Sharia insurance companies as the units of observation, specifically Sharia life insurance companies that consistently published their financial statements over six years, from 2018 to 2023. The insurance data were obtained from the Financial Services Authority (OJK), Statistics Indonesia (BPS), and annual financial reports available on the insurance companies' official websites.

To examine the short-term and long-term roles of underwriting performance in Sharia insurance, this study employs dynamic panel data regression analysis using the Generalized Method of Moments (GMM) approach, combining the Difference GMM method (Arellano & Bond, 1991) and the System GMM method (Blundell & Bond, 1998), to address common issues in dynamic panel models such as endogeneity, autocorrelation, and heteroskedasticity. Arellano and Bond (1991) concluded that GMM estimators yield lower bias and variance compared to Ordinary Least Squares (OLS) and fixed effects estimators.

The Generalized Method of Moments (GMM) is more appropriate than fixed effects (FE) or random effects (RE) for this study because underwriting performance and sustainability exhibit dynamic behavior in which current outcomes depend on past conditions, creating correlation between the lagged dependent variable and the error term (an issue that FE and RE cannot address without producing biased estimates). In the context of Sharia insurance, simultaneity bias commonly arises because underwriting performance influences premium-setting decisions, while at the same time, premium levels affect underwriting outcomes; for instance, higher loss ratios may prompt insurers to raise premiums, yet increasing premiums can attract a riskier pool of participants, further deteriorating underwriting results. Such two-way causality generates endogeneity that FE/RE cannot correct. Moreover, other sources of endogeneity (such as omitted risk factors, moral hazard, and adverse selection) are inherent in underwriting processes and further compromise the consistency of FE/RE estimators. The GMM approach, particularly Difference GMM and System GMM, overcomes these issues by using internal instruments derived from lagged values of the variables, enabling consistent estimation even in the presence of simultaneity, autocorrelation, and heteroskedasticity. Consequently, GMM provides a theoretically superior framework for capturing the short-term and long-term dynamics between underwriting performance and sustainability in Sharia insurance.

The dynamic panel regression model adopts and adapts variables used in previous studies, such as those by Chugh et al. (1987); Olaosebikan (2012); Camino and Bermudez (2019); Akotey et al. (2022); Msomi and Olarewaju (2022); Hofmann and Sattarhoff (2023); and Sallemi and Zouari (2024), by considering a range of explanatory variables affecting insurance performance. The performance proxy used in this study is income (premium), represented by: (1) Internal factors: underwriting performance, investment, insurance claims, *ujrah*/commissions; and (2) External

factors: income (GDP per capita), price changes (inflation), and inequality (Gini ratio). Mathematically, the model used in this study is formulated as follows.

$$\ln\_Premi_{it} = \beta + \beta_1 In\_\text{Premi}_{it-1} + \beta_2 UPSharia_{it} + \beta_3 In\_\text{Claim}_{it} + \beta_4 ln\_Investment_{it} + \beta_5 \ln\_Ujroh_{it} + \beta_6 \ln\_GDPPercapita_{it} + \beta_7 Inflation_{it} + \beta_8 Gini_{it} + \varepsilon_{it} \quad (1)$$

The model is stated in equation 1 where ln_Premi denotes the natural logarithm of Sharia insurance premium income. At the same time, ln_Premi$_{it-1}$ represents its one-period lag, capturing the dynamic persistence of premium income. UPSharia refers to the underwriting performance of Sharia insurance companies, reflecting their effectiveness in risk selection and pricing. ln_claim measures Sharia insurance claim expenses in logarithmic form, indicating the financial obligations arising from insured risks. Ln_Investment denotes the natural logarithm of investment income generated by Sharia insurance activities. In contrast, ln_Ujroh denotes the natural logarithm of ujrah (commission) income earned by Sharia insurers, capturing operational revenue from policy administration.

The model also incorporates macroeconomic control variables. ln_GDPPercapita is the natural logarithm of gross domestic product per capita, an indicator of economic development and purchasing power. Inflation captures the annual inflation rate, reflecting overall price stability and its potential influence on insurance demand and cost structures. Gini denotes the Gini ratio, which measures income inequality and may affect the distribution of insurance participation across the population.

The parameter β_0 denotes the intercept term, while β_1 through β_8 represent the regression coefficients associated with the explanatory variables. The error term ε_{it} captures unobserved factors affecting premium income that vary across firms and over time. The subscript *i* indexes Sharia insurance companies, consisting of 20 firms, while *t* denotes the time dimension covering the period from 2018 to 2023

To ensure the validity and reliability of dynamic panel data regression estimation using GMM, a series of comprehensive diagnostic tests is required. Three main tests are commonly conducted to select the best, most consistent, and unbiased model: the instrument validity test, the instrument consistency/autocorrelation test, and the unbiasedness and estimation efficiency test.

Instrument Validity Test (Sargan Test / Hansen J-Test) is used to evaluate whether the instruments used in the GMM estimation are truly valid, i.e., uncorrelated with the error term. The Sargan test is valid under the assumption of homoskedasticity in GMM estimation. At the same time, the Hansen J-test is preferred when heteroskedasticity of present or when robust standard errors are used. The test results are interpreted using the p-value: If p-value > 0.05, there is insufficient evidence to reject the null hypothesis, meaning the instruments are considered valid and exogenous. Conversely, if p-value < 0.05, this indicates that some instruments may be correlated with the residuals, potentially leading to biased estimates (Roodman, 2009).

The Difference GMM approach relies on first-differenced equations, which mechanically induce first-order autocorrelation in the residuals due of the differencing process. However, the residuals should not exhibit second-order autocorrelation. If the Arellano–Bond test detects significant AR(2) autocorrelation, the instruments may be invalid because they are correlated with higher-order error terms. An ideal outcome, therefore, shows significant AR(1) autocorrelation but

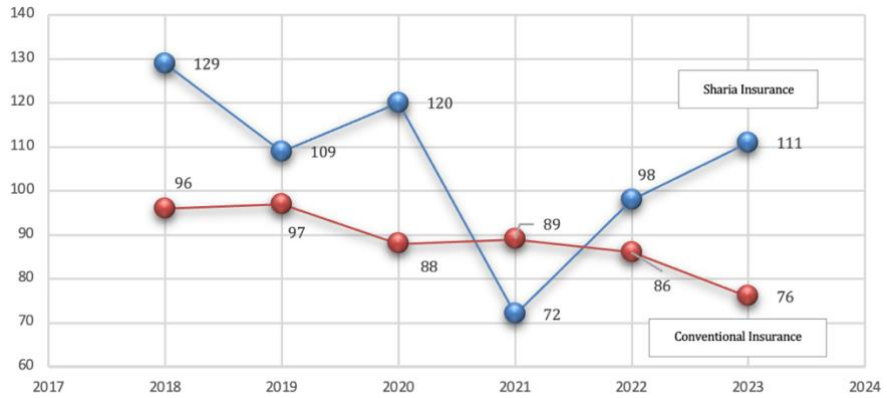
insignificant AR(2), indicating well-specified residual dynamics and confirming the validity of the model instruments (Arellano & Bond, 1991).

Unbiasedness and Estimation Efficiency Test (Robustness Checks), to prevent estimation errors due to heteroskedasticity and violations of classical assumptions, robust standard errors are used in GMM estimations. GMM estimation is known to be vulnerable to instrument overfitting, so the number of instruments must not exceed the number of cross-sectional observations. When the number of instruments is too large, the Hansen test may become invalid, a condition known as the instrument proliferation problem. To address this, strategies such as instrument collapsing or limiting the maximum lag length of instruments must be applied (Roodman, 2009).

3. Results and Discussion

The development of underwriting performance of Sharia life insurance companies in Indonesia from 2018 to 2023 is illustrated in Figure 2. Underwriting performance is defined as the ratio of total insurance revenue in the *tabarru'* fund to total insurance expenses within a given period. Based on the figure above, the average underwriting performance of all sample companies in this study shows a positive trend, though it fluctuates from year to year. The highest average underwriting performance was recorded in 2023 at 1.42%, while the lowest was in 2021 at 0.63%.

Figure 2.
Development of Underwriting Performance



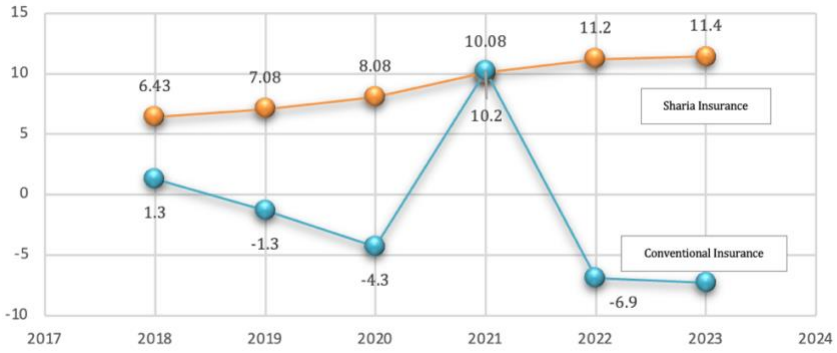
Source: OJK (2024)

The development of gross contributions from Sharia life insurance companies in Indonesia from 2018 to 2023 is shown in the figure above. The average gross contribution from all sample companies in this study shows a positive trend, increasing in each period. The highest average gross contribution was recorded in 2023 at 36%, while the lowest was recorded in 2018 at 15.41%.

This study estimates a dynamic panel regression model to analyze the role of underwriting performance in Sharia insurance companies in Indonesia and further elaborates on the short-term and long-term roles of underwriting performance in these companies. The model used is the Generalized Method of Moments (GMM) Arellano-Bond, which considers the time dynamics by using a lag of the dependent variable

(premium contribution) as one of the predictors. Data processing using Stata 15 yielded the best-fitting dynamic panel regression.

Figure 3.
Development of Underwriting Performance



Source: OJK (2024)

The diagnostic checks confirm that the model used in this study is reliable. The results indicate that the instruments used in the estimation are appropriate and uncorrelated with the error term, indicating that the model is built on a solid statistical foundation. In addition, the test for serial correlation indicates that the model's residuals behave as expected in dynamic settings, suggesting that the estimates are consistent. Overall, the model is statistically meaningful, indicating that the variables included in the analysis jointly help explain the development of Sharia insurance premiums over time.

The findings show that past premiums significantly influence current premium levels, indicating a natural momentum in which the performance of prior periods tends to shape future outcomes. Underwriting performance is an essential factor that contributes positively to premium growth in the short and long term. This means that improvements in risk assessment, pricing accuracy, and underwriting practices not only strengthen premium development in the short term but also support the industry's long-term sustainability. Claims also show a positive, strengthening influence, indicating that well-managed claim payments help build public trust and encourage continued participation in Sharia insurance. Investment activities similarly support premium growth, although the effect is more moderate.

In contrast, *ujrah* or service fees do not appear to play a significant role in influencing premium growth, suggesting that fee structures are not yet a determining factor in customer decisions. The effects of macroeconomic variables are mixed. GDP per capita, although positive, does not significantly influence Sharia insurance premiums, suggesting that rising income levels have not translated into greater insurance participation. Income inequality also does not show a significant effect, though the tendency indicates that unequal income distribution may discourage insurance uptake among lower-income groups. Meanwhile, inflation consistently has a negative impact, suggesting that rising prices reduce people's ability to allocate funds to insurance, including Sharia insurance products.

Table 1.
Dynamic Panel Data Regression Model Test Results

Variable	Short-Term Effect	Sig	Long-Term Effect	Sig	Convergence
C	4.458	0.632			
ln_Premi L1	0.372	0.048*			
ln_Underwriting	0.126	0.021*	0.201	0.010*	2.070
ln_Claim	0.157	0.049*	0.250	0.047*	1.850
ln_Ujrah	0.036	0.488	0.057	0.453	3.335
ln_Investment	0.148	0.065**	0.236	0.074**	1.909
ln_GDPPercapita	0.120	0.929	0.192	0.928	2.117
Inflation	-0.973	0.022*	-1.548	0.075**	-0.278
Gini Ratio	-1.080	0.286	-1.718	0.350	-0.765

Notes :
Prob > chi2= 0.0000. Significant, *p<0.1, **p<0.5, ***p<0.01
Source: Processed by Author (2024)

Underwriting performance plays a crucial role in determining the future of the Sharia insurance industry in Indonesia. The findings of this study reveal that underwriting performance is vital to the sustainability of Sharia insurance businesses, as it significantly drives premium income growth both in the short and long term.

In the short term, the estimation results show that of 1-unit increase in underwriting performance leads to a 0.126-unit rise in premium income, and this effect is statistically significant. This means that every effort to improve the quality of the underwriting process is met with immediate, positive market response, resulting in a noticeable increase in premiums in a relatively short period. It shows how improvements in risk selection systems and the accuracy of customer assessments directly affect the revenue of Sharia insurance companies.

In the long term, the positive effect of underwriting on premium income becomes even more substantial, with an estimated coefficient of 0.201. This indicates that the benefits of improving the underwriting process grow stronger over time. A solid reputation built on reliable risk selection fosters public trust, boosts customer loyalty, and expands the participant base of Sharia insurance. Moreover, improved risk management efficiency contributes to the financial stability of insurance companies and strengthens their long-term competitiveness. (Puławska et.al, 2021)

The convergence rate of 2.070 suggests that the premium income system in Indonesia's Sharia insurance industry can quickly adjust to shocks or disruptions. This value implies that when deviations from equilibrium occur (such as due to economic shocks or policy changes), premium income will promptly realign with its long-term trend, which is driven by underwriting variables. Hence, the adjustment process toward stability is efficient, and underwriting becomes a key component in ensuring the sustainability of Sharia insurance companies.

In the context of Sharia insurance, underwriting is not merely a technical process of risk assessment and acceptance; it also reflects the quality of risk management

grounded in Sharia principles such as transparency, fairness, and *ta'awun* (cooperation). When underwriting is conducted rigorously and professionally, companies can screen participants with appropriate risk profiles, set fair contributions (premiums), and avoid overexposure to claims. This is especially important in Sharia insurance schemes, where underwriting surplus is shared with participants (through surplus-sharing mechanisms). Therefore, efficient underwriting directly enhances the attractiveness of Sharia products and fosters participant loyalty.

Furthermore, these results align with previous literature emphasizing the importance of underwriting practices in improving the financial performance of insurance companies. For instance, Horvey & Mensah (2024) found that underwriting quality significantly affects profitability and premium growth in values-based insurance industries. In the Indonesian context, where Sharia insurance literacy is still developing, underwriting plays a strategic role in bridging the gap between Sharia insurance products and participants' understanding of their benefits and underlying Sharia values. (Rachmawati, 2024)

Additionally, the positive effect of underwriting on premiums can also be seen as a signal of a company's success in developing well-targeted insurance products that meet market needs. Strong underwriting activities indicate the presence of accurate risk assessment systems and healthy *management of the tabarru' fund*, ultimately building trust in the sustainability of insurance programs. In the long run, this will expand the penetration of Sharia insurance and increase national premium contributions.

4. Conclusion

Based on the results of the dynamic panel regression, this study demonstrates that several internal factors within Sharia insurance companies (particularly underwriting performance, claims, and investment) play a significant role in driving the growth of Sharia insurance premium income.

First, underwriting performance has a consistent and significant positive effect in both the short and long term. These highlights underwriting as the core mechanism that ensures accurate risk assessment, sustainable premium determination, and long-term financial stability. Strengthened underwriting capacity also reduces moral hazard and adverse selection, allowing Sharia insurers to maintain stable premium flows and enhance their competitiveness.

Second, claims management also contributes positively to premium growth. The findings indicate that timely, well-managed claim payments strengthen public trust, which, in turn, encourages ongoing participation in Sharia insurance products. This relationship becomes stronger over time, underscoring the strategic importance of maintaining transparency, fairness, and efficiency in claim processes.

Third, investment activities support premium growth, although the effect is relatively moderate. Sound investment management complements underwriting by improving insurer solvency and generating additional financial capacity, enabling companies to withstand economic pressures and maintain premium expansion.

From a policy standpoint, these results suggest that regulators should prioritize guidelines and incentives that improve underwriting quality, strengthen claims governance, and encourage prudent investment practices within the Sharia insurance

industry. Companies, on the other hand, need to integrate technology-based underwriting systems, enhance human resource competencies, and design customer-centric products that remain aligned with manageable risk profiles.

Despite its contributions, this study has several limitations. The use of company-level panel data restricts the analysis to internal financial indicators, leaving out behavioral or institutional factors (e.g., managerial quality, digitalization, or product innovation) that may also influence premium growth. The dynamic panel GMM method, although appropriate for addressing endogeneity, relies heavily on internal instruments; thus, the results may be sensitive to instrument validity and sample size constraints. Macroeconomic variables included in the model may not fully capture broader economic shocks or structural changes in the insurance market. Future research could incorporate micro-level customer data, cross-country comparisons, or nonlinear/dynamic structural models better to capture the full complexity of Sharia insurance growth dynamics.

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