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Fecha de entrega: 28-jul-2026 05:35a. m. (UTC-0500)
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Nombre del archivo: Cek_JEME_195.docx (101.49K)
Total de palabras: 3035
Total de caracteres: 18315

Moderating Effect of Tax Avoidance on Firm Size and ROA: Study of Insurance Sector at IDX 2021-2025 Period

Abstract

This study examines how Tax Avoidance moderates the impact of Firm Size on financial performance, specifically Return on Assets (ROA). Utilizing a quantitative approach, the methodology analyzes secondary panel data gathered from the Indonesia Stock Exchange (IDX) spanning 2021 to 2025. The sample consists of nine insurance sector companies, yielding 45 observations over the five-year period. Following classical assumption testing to ensure unbiased estimates, the analysis applies Hayes' Conditional Process Analysis to evaluate the shifting effects of corporate scale on profitability at various levels of tax management. The findings reveal that Tax Avoidance acts as an actually weakens in this relationship. While larger firm size fails to improve ROA when tax avoidance is low or average, it significantly drives profitability upward when companies engage in high levels of tax avoidance. This provides a crucial implication for corporate managers, suggesting that large insurance firms must strategically align their organizational scale with optimized tax planning to successfully maximize financial returns. The originality of this research lies in its specific application of conditional process modeling to the Indonesian insurance sector, mapping the exact thresholds where tax planning transforms from an insignificant factor into an active catalyst for asset profitability.

Keywords: *Firm Size, Return on Assets (ROA), Tax Avoidance, Hayes' Conditional Process Analysis, Insurance Sector.*

Introduction

Although previous studies extensively explore the individual connections between firm size, profitability, and tax management, they leave a critical research gap regarding the conditional thresholds where tax planning transforms corporate scale into actual performance. The existing literature, including work by Hossain et al. (2024) and Shubita (2024), establishes that firm size and profitability influence tax decisions, while other researchers focus on how governance, political connections, or executive backgrounds drive tax-saving behaviors (Chen & Yang, 2024; Firmansyah et al., 2022; Kovermann & Wendt, 2019). However, these studies predominantly employ linear or direct effect models, which fail to explain why large firms often experience inconsistent financial returns. They overlook the possibility that tax avoidance does not merely correlate with size, but actively functions as a conditional catalyst that dictates whether a larger organizational scale can successfully generate higher returns.

Furthermore, a geographical and sectoral gap exists within the current body of research. While scholars investigate tax avoidance dynamics across European economies (Delgado et al., 2023) and general family firms (Khelil & Khlif, 2023), little empirical evidence explains how these variables interact within highly regulated financial segments in emerging markets, such as the Indonesian insurance sector. Most Indonesian studies focus heavily on the neutralizing role of corporate social responsibility disclosures rather than the direct performance-amplifying mechanisms of tax planning (Firmansyah et al., 2022). This study addresses these combined gaps by applying Hayes' Conditional Process Analysis to determine the exact levels of Tax Avoidance required to unlock the positive impact of Firm Size on ROA within the Indonesian insurance market.

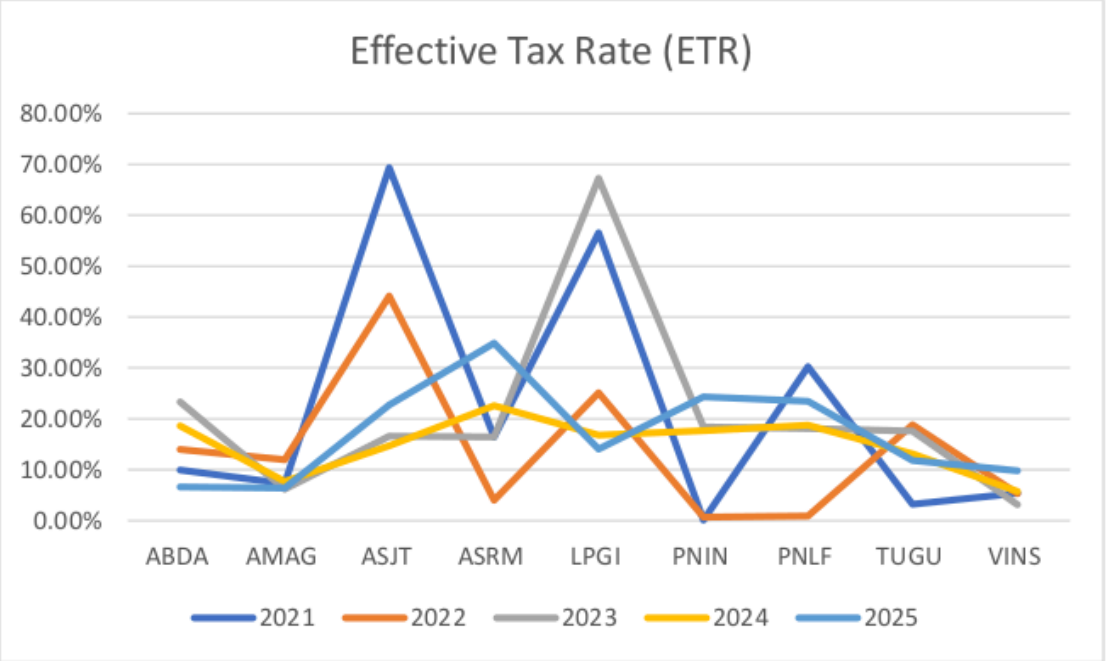

Figure 1. Effective Tax Rate (ETR) 2021-2025 period

The Effective Tax Rate (ETR) data for nine IDX-listed insurance companies from 2021 to 2025 reveals a highly volatile and fragmented landscape, where individual corporate strategies and financial shifts overrode any uniform industry trend. In 2021, the dataset showcased extreme disparity, with ASJT and LPGI shouldering massive tax burdens at 69.37% and 56.55% respectively, while PNIN enjoyed an absolute low of 0.17%. Over the next four years, these historical extremes dissolved into distinct trajectories: ASJT and LPGI successfully drove their high rates down to 22.76% and 14.09% by 2025, whereas previously low-tax companies like ASRM, PNIN, and PNLF experienced aggressive upward growth, with ASRM ultimately peaking at the industry high of 34.90% in 2025. Meanwhile, companies like AMAG, TUGU, and VINS maintained a much tighter grip on their fiscal volatility, with AMAG consistently anchoring the low end around 6% and VINS stabilizing under 10% by the end of the period, demonstrating that tax efficiencies varied wildly across the Indonesian insurance sector.

Consequently, a clear research gap exists regarding the exact thresholds where tax planning activates the benefits of firm size. This study addresses this problem by examining whether different levels of Tax Avoidance act as a significant catalyst to transform Firm Size into enhanced ROA within the Indonesian insurance sector.

Research Method

This study employs a quantitative research approach utilizing secondary data sourced from the Indonesia Stock Exchange (IDX). The research sample consists of a panel data structure tracking nine insurance sector companies that consistently published their audited financial statements from 2021 to 2025. By observing these firms over a five-year period, the dataset yields a total of 45 balanced panel observations, providing sufficient statistical power to track the behavior of financial metrics over time. The research variables comprise Firm Size as the independent variable, Return on Assets (ROA) as the dependent variable, and Tax Avoidance as the moderating variable. To examine the dynamic relationships among these variables, the analysis utilizes Hayes' Conditional Process Analysis. This specific statistical model allows the estimation of the conditional effects of Firm Size on ROA across low, average, and high levels of Tax Avoidance, effectively mapping out the exact nature of the moderation effect.

Prior to running the primary interaction analysis, the study conducts classical assumption tests to ensure the data yields unbiased and reliable estimates. These diagnostic evaluations include normality, multicollinearity, heteroscedasticity, and autocorrelation tests to confirm the panel data meets all standard econometric requirements. Once the data satisfies these assumptions, the conditional process model estimates the final parameters to

determine if Tax Avoidance functions as a significant amplifier in the relationship between Firm Size and profitability.

Results and Discussion

The result of descriptive statistics data (standardized/centered) shows that the sampled companies maintain a low but stable profitability. The Return on Assets (ROA) averages 2.77%, with a narrow standard deviation of 0.89%. Profitability ranges from a minimum of 1.25% to a maximum of 4.08%, indicating that these firms generate relatively consistent returns relative to their asset base without extreme fluctuations.

In contrast, firm size (FS) exhibits massive variation among the sampled companies. While the mean firm size stands at 13.42%, the standard deviation reaches 3.9646. This large spread is highlighted by a minimum value of -4.5585 and a maximum value of 4.5879, showing that the dataset includes both very small and very large companies.

Tax avoidance (TA) behavior displays an aggressive trend on average. The negative mean of -2.27% indicates that many firms successfully reduce their tax liabilities, though a standard deviation of 8.47% reveals diverse tax strategies across the sample. The tax avoidance metrics range from a highly aggressive -12.46% to a positive 7.05%.

The Pearson correlation analysis reveals a powerful, negative relationship between profitability and tax avoidance. ROA and TA share a strong negative correlation (r = -0.9110). This indicates that more profitable firms engage significantly less in tax avoidance, or conversely, that firms with lower profitability engage more aggressively in tax avoidance strategies to preserve capital. On the other hand, firm size shows very little to no relationship with the

other variables. Firm size shares a weak, positive correlation with ROA (r = 0.1583), suggesting that larger firms are only slightly more profitable. Meanwhile, firm size holds an absolute zero correlation with tax avoidance (r = 0.0000), demonstrating that a company's size does not influence its tax avoidance tendencies in this sample.

The classical assumption test results confirm that the regression model satisfies all necessary diagnostic requirements, proving that the Ordinary Least Squares (OLS) estimates are reliable, unbiased, and valid.

The model satisfies the normality assumption, as the distribution of the residuals closely mirrors a normal curve. The skewness value of -0.3823 (standard error = 0.7171) shows a slight, negligible left skew, while the kurtosis value of -1.2112 (standard error = 1.3997) indicates a mild platykurtic shape. Because both values fall well within their respective standard errors, the residuals demonstrate a statistically normal distribution. The data contains no problematic outliers or overly influential data points that could distort the regression results. The Bonferroni-corrected p-value for the largest studentized residual (case number 7) stands at 0.4724. Because this p-value is well above the standard 0.05 threshold, case number 7 does not qualify as a statistical outlier. Furthermore, the DFBETA values for this specific case are exceptionally low across all variables—measuring 0.0000 for the constant and Firm Size (FS), 0.0002 for Tax Avoidance (TA), and -0.0001 for the interaction term (Int_1). These negligible values prove that no single observation exerts undue influence on the model's coefficients.

The model is entirely free from multicollinearity issues. Every single predictor variable—Firm Size (FS), Tax Avoidance (TA), and the interaction term (Int_1)—displays a perfect Tolerance value of 1.0000 and a Variance Inflation Factor (VIF) of 1.0000. These perfect

scores indicate a complete lack of linear correlation among the independent variables, ensuring stable and independent coefficient estimates. The regression model successfully maintains homoscedasticity, meaning the variance of the residuals remains constant across all levels of the independent variables. The Breusch-Pagan test yields a non-significant p-value of 0.7368 under the standard normal calculation ($\chi 2$ = 1.2676, df = 3). The robust calculation confirms this outcome with a non-significant p-value of 0.3452 ($\chi 2$= 3.3179, df = 3). Because both p-values comfortably exceed 0.05, we reject the presence of heteroskedasticity.

The model achieves an R-value of 0.6893, demonstrating a strong combined correlation between Firm Size, Tax Avoidance, their interaction term, and ROA. Furthermore, the R-squared (R2) value of 0.4752 indicates that the joint contribution of Firm Size, Tax Avoidance, and their interaction effect explains 47.52% of the variance in ROA. The remaining 52.48% of the variance stems from other factors outside this model. Finally, the F-statistic of 12.3727 yields a highly significant p-value of 0.0000 ($p < 0.05$). This significant result proves that the overall regression model is statistically viable and provides a reliable fit for predicting ROA.

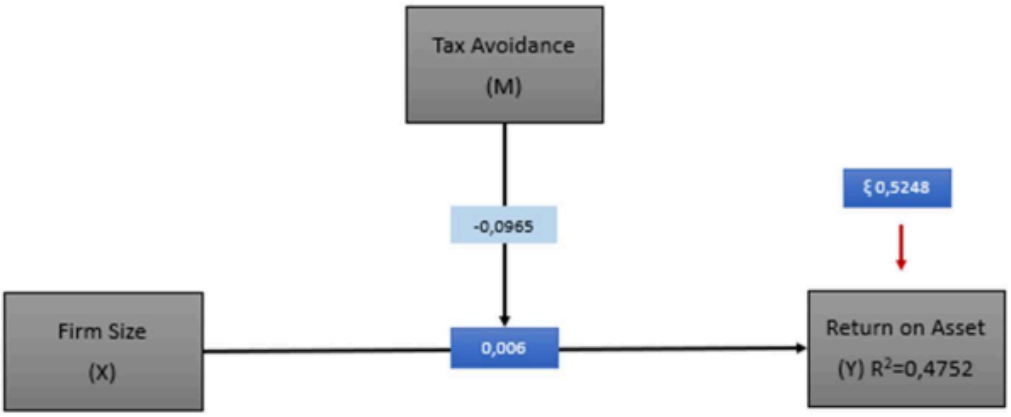

Figure 1. Result of moderated linear regression

Based on the moderated linear regression equation is structured as follows:

ROA = 0.0254 + 0.0006 (Firm Size) - 0.0965 (Tax Avoidance) + 0.0106 (Firm Size*Tax Avoidance)

The individual coefficients and the interaction effect provide the following insights into how these variables determine ROA. Main Effects of Firm Size and Tax Avoidance, Firm Size does not significantly affect ROA when Tax Avoidance rests at its mean value. The variable yields a coefficient of 0.0006 with a t-statistic of 1.1318 and a non-significant p-value of 0.2643 ($p > 0.05$). Furthermore, the 95% Confidence Interval spans from an LLCI of -0.005 to an ULCI of 0.0017, crossing zero and confirming that Firm Size lacks a direct, standalone impact on profitability in this model. Conversely, Tax Avoidance exerts a powerful and statistically significant direct impact on ROA. It produces a coefficient of -0.0965, backed by a strong t-statistic of -5.7355 and a highly significant p-value of 0.000 ($p < 0.05$). Because the 95% Confidence Interval (-1.305, -0.625) does not cross zero, the data proves that higher levels of tax avoidance directly and significantly reduce ROA.

Moderation Effect (Interaction Term), The interaction term (Int_1 = Firm Size X Tax Avoidance) confirms that Firm Size significantly moderates the relationship between Tax Avoidance and ROA. The interaction yields a positive coefficient of 0.0106, a t-statistic of 2.8346, and a significant p-value of 0.0071 ($p < 0.05$). The 95% Confidence Interval (0.0031, 0.0182) stays entirely above zero, validating the presence of a true moderation effect. The R-squared change (R2-chng) further underscores the importance of this moderation. Introducing the interaction term adds 10.29% of explanatory power to the model (R2-chng = 0.1029). An F-statistic of 8.0350 and an identical p-value of 0.0071 ($p < 0.05$) prove that this

incremental contribution is statistically significant, meaning the interplay between a firm's size and its tax strategy alters its overall profitability.

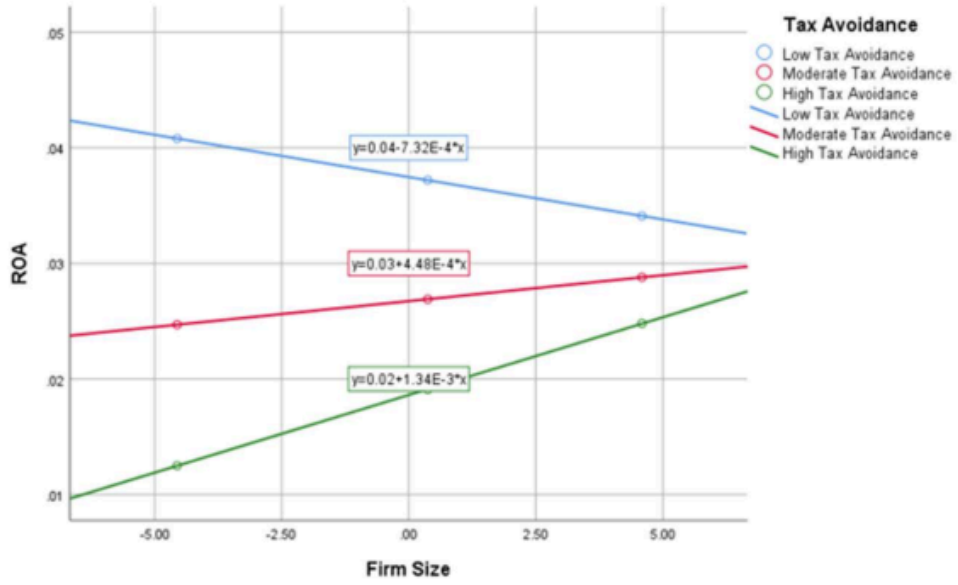

Figure 2. Conditional Process Analysis

The conditional effects analysis reveals how Tax Avoidance moderates the impact of Firm Size on ROA across three distinct levels:

When companies maintain a low level of Tax Avoidance (-0.1246), Firm Size yields a slight negative but statistically insignificant effect on ROA (effect = -0.0007). Because the 95% confidence interval spans across zero (LLCI = -0.0019, ULCI = 0.0005), larger firm size fails to significantly improve or alter ROA under this condition.

At an average level of Tax Avoidance (-0.0140), the relationship shifts slightly upward but remains statistically weak. Firm Size shows a minor positive effect of 0.0004, but the 95% confidence interval still crosses zero (LLCI = -0.0006, ULCI = 0.0015). This indicates that average tax avoidance levels do not provide enough traction for Firm Size to significantly drive ROA.

The dynamic changes dramatically at a high level of Tax Avoidance (0.0705). Here, the positive effect of Firm Size on ROA strengthens to 0.0013. Since the 95% confidence interval entirely excludes zero (LLCI = 0.0000, ULCI = 0.0027), this conditional effect is highly significant.

Overall, the moderation analysis demonstrates that Tax Avoidance acts as an actually weakens in this model. Higher levels of Tax Avoidance activate and strengthen the positive relationship between Firm Size and ROA, enabling larger firms to successfully convert their scale into higher profitability.

In the Indonesian insurance sector, large-scale insurers actively employ aggressive tax strategies to fully unlock and maximize their economies of scale. While expanding policy volume dilutes fixed operational and IT investment costs across a broader customer base, significant fiscal burdens can easily erode these operational gains and diminish net underwriting margins. To counter this, major insurance firms leverage tax-efficient investment instruments, optimize technical reserve deductions, and utilize cross-border reinsurance transfer pricing within multinational group structures to aggressively reduce their effective tax rates. By retaining substantial cash flows that would otherwise go toward tax liabilities, these large insurers aggressively strengthen their Risk-Based Capital (RBC) ratios and build massive underwriting capacity, allowing them to offer highly competitive premium rates, absorb high distribution acquisition costs, and systematically outpace smaller market competitors.

Hossain et al. (2024) confirm a direct nexus between profitability, firm size, leverage, and tax avoidance within emerging economies, demonstrating that corporate scale and financial structure actively dictate how aggressively a firm manages its tax

liabilities to protect profits. Furthermore, Kovermann and Wendt (2019) reveal that ownership structures heavily influence these strategies, showing that large firms tailor their tax avoidance practices based on their governance models and family control to balance financial gains against corporate risk.

The consequences of these tax strategies also extend beyond internal balance sheets into market and operational perceptions. Rudyanto and Pirzada (2021) highlight that shareholders do not view tax avoidance in isolation; instead, they use sustainability reporting to evaluate the ethical and financial implications of a firm's tax-saving behavior. Finally, Delgado et al. (2023) prove a sophisticated link between tax avoidance and earnings management across major European economies, showing that large corporations often deploy advanced financial strategies to simultaneously manage earnings and minimize tax burdens to optimize their overall performance metrics.

Shubita (2024) establishes a direct link between top-line expansion, operational returns, and tax management by demonstrating how sales growth and profitability actively drive corporate tax avoidance decisions. In addition, Chen and Yang (2024) highlight the profound impact of leadership dynamics on these strategies, revealing that executives with overseas backgrounds significantly alter corporate tax-avoidance behaviors through their diverse international experiences and risk perceptions.

From a structural and environmental perspective, specific corporate characteristics heavily shape how firms execute tax planning. Khelil and Khlif (2023) synthesize existing literature to show how family-owned firms navigate unique governance motivations and reputational risks when deciding whether to pursue aggressive tax avoidance. Finally, within the Indonesian context,

Firmansyah et al. (2022) demonstrate that political connections and investment opportunity sets strongly influence tax behaviors, while corporate social responsibility disclosures serve as a vital mechanism to moderate how stakeholders perceive these tax-saving actions.

The conditional effects analysis aligns perfectly with the empirical evidence from Hossain et al. (2024) and Shubita (2024), confirming that corporate scale requires active tax management to successfully drive financial performance. By demonstrating that Firm Size only significantly increases ROA under high levels of Tax Avoidance, these results validate the assertions of Delgado et al. (2023) and Chen and Yang (2024) that large corporations must deploy strategic, sophisticated tax planning to maximize their operational returns. Furthermore, this shifting interaction explains the inconsistencies noted in prior literature; while low or average tax avoidance leaves larger insurance firms unable to boost profitability due to governance or structural constraints (Khelil & Khlif, 2023; Kovermann & Wendt, 2019), high tax avoidance effectively serves as the critical amplifier within the Indonesian financial market (Firmansyah et al., 2022). Ultimately, this study bridges the gap identified across the literature by providing empirical proof that tax optimization acts as the essential catalyst that transforms organizational size into superior asset returns.

Conclusion

The study concludes that Tax Avoidance acts as a vital amplifier that strengthens the positive relationship between Firm Size and Return on Assets (ROA). While larger firm size fails to boost profitability when tax avoidance is low or average, it significantly drives ROA upward when companies engage in high levels of tax avoidance. However, this study faces a limitation as it primarily focuses on a

single financial moderator, potentially overlooking external regulatory pressures or corporate governance structures that could alter tax-planning outcomes.

To capitalize on these findings, managers of large firms should strategically align their corporate scale with optimized tax planning to effectively maximize profitability. Future research should expand on these insights by investigating how strict government tax regulations or specific corporate governance mechanisms influence this amplifying effect across different industry sectors.

This study intentionally limits its empirical scope to publicly listed insurance companies on the Indonesia Stock Exchange (IDX), which inherently restricts the direct generalizability of the findings to non-listed insurers or other broader industries. Because the insurance sector operates under unique regulatory demands, technical reserve accounting, and capital adequacy requirements (such as Risk-Based Capital ratios), the observed relationships may not fully reflect the dynamics of the broader financial landscape. Therefore, future researchers should expand the sampling criteria to encompass the entire financial sector—including banking, multi-finance, and capital market sub-sectors on the IDX—or extend the multi-year observation period. Broadening the sectoral scope and extending the time horizon will capture longitudinal market shifts and strengthen the statistical power and overall generalizability of the empirical findings.

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