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The Moderating Role of Institutional Ownership on the Relationship between Financial Determinants and Tax Aggressiveness

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Profitability, Thin Capitalization, Capital Intensity, Institutional Ownership, Tax Aggressiveness

Abstract

Purpose: *This study examines the influence of profitability, thin capitalization, and capital intensity on corporate tax aggressiveness, with institutional ownership as a moderating variable, in mining companies listed on the Indonesia Stock Exchange during 2020–2024.*

Methodology: *This study adopts a quantitative approach using secondary data from the financial statements of 34 mining firms listed on the Indonesia Stock Exchange (2020–2024), selected through purposive sampling. Panel data regression was performed using Stata version 17, and model specification tests confirmed the random effect model as the most appropriate method, capturing firm-level variations while accounting for unobserved heterogeneity.*

Findings: *The results reveal that profitability (ROA), thin capitalization (DER), and capital intensity (CAPIN) significantly affect tax aggressiveness. Profitability and thin capitalization exhibit a negative relationship, implying that higher profitability and leverage reduce aggressive tax practices. Conversely, capital intensity shows a positive relationship, suggesting firms with larger fixed assets utilize depreciation for tax minimization. Institutional ownership (INS) does not significantly moderate these relationships, indicating limited monitoring effectiveness.*

Implication: *The findings imply that regulators should enhance oversight of profitable and capital-intensive firms to prevent excessive tax aggressiveness, while managers must balance tax efficiency with ethical responsibility. Strengthening institutional investor involvement in monitoring corporate tax behavior can also promote transparency and long-term fiscal sustainability.*

Originality: *This study enriches the literature by identifying institutional ownership as a moderator of homologization in the relationship between financial characteristics and tax aggressiveness, highlighting the conditional nature of governance mechanisms in emerging markets. This study also incorporates empirical case phenomena related to PT Aneka Tambang (Antam) taxes to contextualize corporate tax behavior, while using Stata version 17 for robust panel data analysis.*

INTRODUCTION

Taxes are a crucial instrument for financing development and public services, serving as compulsory contributions grounded in law and functioning both as the primary source of state revenue and as a mechanism to mobilize resources and reduce inequality (Rahmawati & Jaeni, 2022; Yahaya & Yusuf, 2020; Afdhal & Adiwibowo, 2023). Based on the principles of equity, certainty, efficiency, and simplicity, taxes dominate government revenue and drive efforts to meet fiscal targets and support economic growth (Masrurroch et al., 2021; Simamora & Rahayu, 2020; Sumiyati & Tjahjono, 2023). For corporations, however, taxes are often perceived as a profit-reducing burden, prompting strategies of tax aggressiveness that legally minimize liabilities by exploiting regulatory loopholes, yet remain distinct from tax evasion (Martinez & Ferreira, 2019; Mariana et al., 2021; Methasari, 2021). Although such practices may sustain cash flows and investment capacity, they simultaneously increase compliance risks and reputational challenges (Suryarini et al., 2021; Dewi & Oktaviani, 2022). This dilemma is increasingly visible in Indonesia's mining and energy sectors, where profitability and fiscal responsibility often clash (Hardianti et al., 2025). The coal industry, for instance, achieved record-high output and earnings in 2023–2024 but also faced scrutiny for profit shifting through transfer pricing schemes, as observed in PT Adaro Energy Tbk. (Reuters, 2025; Sugianto, 2019; Jennifer et al., 2025). Similarly, the case of PT Antam Tbk. reflects how weak enforcement and governance gaps enable aggressive tax behaviors that erode the nation's fiscal capacity while amplifying social and environmental consequences (Gazali et al., 2020; Saha et al., 2024; Budi & Herianti, 2024). Therefore, strengthening tax governance and ensuring accountability within resource-based industries have become urgent policy priorities (Rudyanto et al., 2023).

To explain the dynamics behind such corporate behavior, this study adopts Agency Theory, which posits that conflicts between managers and shareholders can lead to opportunistic decisions, including aggressive tax planning (Jensen & Meckling, 1976). Profitability, measured by Return on Assets (ROA), is a key indicator of managerial efficiency and has been frequently linked to tax aggressiveness (Martyushev et al., 2025). However, prior research presents contrasting evidence that some suggesting that higher profitability leads to more aggressive tax strategies (Arimurti et al., 2022; Ghifary & Lastati, 2024), while others find that profitable firms prefer compliance to maintain legitimacy (Tiyanto & Achyani, 2022). These inconsistencies indicate that profitability's effect on tax aggressiveness depends on firm-specific and contextual factors, such as industry characteristics and ownership structures.

In addition to profitability, firms' financial policies or particularly capital structure play a vital role in shaping tax outcomes (Ginting, et al., 2025). Through thin capitalization, companies may deliberately increase debt levels to obtain interest deductions and reduce taxable income (Fabrila & Arieftiara, 2021). Although Indonesia's Ministry of Finance Regulation No. 169/PMK.010/2015 restricts the debt-to-equity ratio to 4:1, empirical results remain mixed: some studies find that higher leverage intensifies tax aggressiveness (Pratama & Aris, 2025), while others find no significant relationship due to conservative financing preferences (Mahmudi et al., 2023). This suggests that the influence of thin capitalization depends on firms' strategic responses to fiscal regulations and market pressures (Wulandari et al., 2025).

Furthermore, capital intensity representing the proportion of fixed assets to total assets can also influence tax behavior. Firms with higher capital intensity may record larger depreciation expenses, thereby reducing taxable profits (Christina & Wahyudi, 2022). While some studies support this link (Adnyani & Astika, 2019; Ihsan et al., 2023), others find insignificant effects because fixed assets primarily serve operational purposes rather than tax planning (Kusumawati & Kartika, 2023). These mixed findings highlight the need to reassess the role of investment structure in determining tax aggressiveness, particularly in capital-intensive industries such as mining.

To bridge these gaps, this study explores institutional ownership as a potential moderating variable that can influence the relationship between firms' financial characteristics and tax aggressiveness. Institutional investors, emphasizing transparency and long-term value, may mitigate managerial tendencies toward aggressive tax practices (Afdhal & Adiwibowo, 2023). However, prior findings are inconclusive, with some showing significant moderation effects (Prasetya & Hariyono, 2023) and others reporting none (Rusli & Mulyani, 2023). Therefore, this research aims to empirically examine the influence of profitability, thin capitalization, and capital intensity on tax aggressiveness, as well as the moderating role of institutional ownership, using panel data analysis of 34 mining firms listed on the Indonesia Stock Exchange for the 2020–2024 period, processed with Stata version 17.

LITERATURE REVIEW AND HYPOTHESES

Agency Theory

Harnovinsah et al. (2025), drawing on the framework of Jensen and Meckling, explain that agency theory highlights inherent conflicts of interest between shareholders as principals and managers as their agents. In this context, managers may be inclined to adopt aggressive tax strategies, aiming to lower the company's tax obligations while simultaneously increasing their own compensation or personal gains. Such behavior is often linked to profitability and thin capitalization, since tax policies can be used to manage capital structure, while concentrated ownership tends to make managers more cautious in order to preserve assets and protect shareholder value (Nguyen & Nguyen, 2025). At the same time, a similar agency conflict arises between the government as the tax authority and corporations as taxpayers, as differences in objectives create opportunities for firms to exploit fiscal gaps and reduce state revenue (Darsani & Sukartha, 2021). Shareholders typically anticipate that managers will enhance firm value through tax-reduction strategies, yet the separation of ownership and control often leads fiscal decisions to mirror managerial discretion rather than shareholder interests (Carrer & Slavov, 2021). This situation is further reinforced by information asymmetry, which according to Velte (2020), allows managers to exercise their discretion in ways that may benefit themselves at the expense of long-term corporate accountability.

Tax Aggressiveness

Tax aggressiveness is generally understood as a corporate strategy aimed at reducing fiscal obligations, as highlighted by Hanlon and Heitzman (2020) in Afdhal & Adiwibowo (2023). This practice reflects efforts to minimize tax liabilities through approaches that often entail economic, regulatory, and reputational risks (Chen et al., 2024). It is further viewed as a value-maximizing activity that reallocates wealth from the state to corporate shareholders (Zaitul & Ilona, 2019), although many transparency frameworks continue to place the burden of disclosure primarily on taxpayers (Edwards et al., 2024). Such conditions may also create agency problems, as the interests of managers and shareholders are not always aligned when it comes to tax-related risks (Wahab et al., 2017 in Zaitul & Ilona, 2019). To capture this behavior, prior studies often rely on the cash effective tax rate (ETR), measured as income taxes paid relative to pretax income (Bradshaw et al., 2019), or alternatively, on total tax expenses divided by pretax income (Fan & Chen, 2023; Belahouaoui, 2025).

Profitability and Tax Aggressiveness

Profitability represents a firm's capacity to optimize its resources in generating income and is regarded as a key indicator of performance and investment prospects (Alves, 2019; Chen et al., 2024; Cheng & Fang, 2023). Among financial ratios, ROA is considered relatively stable since it links net income to total assets, thereby simplifying both analysis and forecasting (Martyushev et al., 2025). Profitability is also associated with strategic leadership, resource efficiency, and corporate legitimacy, which can be strengthened through transparency and responsible business practices that enhance investor confidence and long-term competitiveness (Chishamba, 2024; Wang et al., 2025). Nevertheless, higher profitability often leads to greater tax burdens, providing stronger incentives for firms to engage in aggressive tax strategies, in line with agency theory that highlights potential conflicts of interest between managers and shareholders (Natalina, 2023; Nguyen & Nguyen, 2025; Tanjaya & Nazir, 2021). Based on previous empirical findings (Arimurti et al., 2022; Ghifary & Lastati, 2024; Harnovinsah et al., 2025), profitability has been consistently shown to contribute positively to tax aggressiveness. The greater the firm's ability to generate profits, the stronger its incentive to manage tax obligations aggressively through opportunistic or complex tax planning strategies (Nuryatun & Mulyani, 2020). This indicates that firms with high financial performance tend to reduce their tax burden strategically in order to preserve net income and enhance firm value (Mariana et al., 2021).

H1: Profitability has a positive effect on tax aggressiveness.

Thin Capitalization and Tax Aggressiveness

Thin capitalization is regarded as a tax aggressiveness strategy in which firms rely heavily on debt financing so that interest expenses can be deducted from taxable income, ultimately reducing corporate tax liabilities (Ruknan et al., 2024; Hasanudin et al., 2022). This practice is often associated with cross-jurisdictional profit-shifting schemes that pose risks of base erosion and profit shifting, leading many countries to impose interest limitation rules, including Indonesia through PMK No.169/PMK.010/2015, which restricts the debt-to-equity ratio to a maximum of 4:1 as a safeguard for fiscal stability (Gajewski, 2020; Andresen & Thorvaldsen, 2023; Iheme-Madukairo & Onyeka-Iheme, 2024). Within the framework of agency theory, divergent interests between managers and shareholders may incentivize managers to pursue short-term strategies by exploiting debt to reduce tax obligations and present higher after-tax earnings (Pratama & Aris, 2025; Tiyanto & Achyani, 2022). Empirical evidence by Salwah and Herianti (2019) indicates that thin capitalization reduces tax aggressiveness, as restrictions on debt-to-equity ratios limit managerial discretion in exploiting interest expenses for tax benefits. In contrast, Imaniah and Kurnia (2023) and Pratama and Aris (2025) document a significant positive association, suggesting that firms with higher leverage are more inclined to adopt aggressive tax planning through capital structure optimization. These divergent findings underscore the relevance of Agency Theory, where managers, motivated to maximize after-tax income, may strategically use debt to reduce fiscal obligations.

H2: Thin capitalization has a positive effect on tax aggressiveness.

Capital Intensity and Tax Aggressiveness

Capital intensity reflects the extent of a firm's investment in long-term assets that sustain operational activities and generate future income (Christina & Wahyudi, 2022). Companies with higher fixed asset proportions can leverage depreciation allowances to reduce taxable income, thereby influencing tax aggressiveness (Luo et al., 2023; Liu et al., 2025). In line with agency theory, managers may utilize fixed asset investments not only to enhance operational capacity but also to pursue tax benefits, aligning capital efficiency with reduced fiscal burdens (Tahlila et al., 2024). Empirical findings support this relationship, as firms with greater capital intensity tend to exhibit lower Cash ETR due to the depreciation effect, indicating more aggressive tax planning behaviors (Adnyani & Astika, 2019; Nuryatun & Mulyani, 2020; Ihsan et al., 2023; Sari et al., 2024). Within the Indonesian regulatory framework, depreciation is formally recognized as a deductible expense, enabling firms to strategically allocate resources toward fixed assets as a legitimate form of tax minimization (Methasari, 2021; Herianti & Marundha, 2024; Jennifer et al., 2025).

H3: Capital intensity has a positive effect on tax aggressiveness.

Institutional Ownership Moderated Profitability and Tax Aggressiveness

Institutional ownership is defined as the share of equity held by institutional investors, including financial institutions, insurance companies, and other corporate entities, both domestic and international, and is typically recognized when such holdings constitute at least five percent of the company's total outstanding shares (Gazali et al., 2020; To, 2025). These investors generally pursue long-term objectives and possess stronger monitoring capacity over corporate policies (Siswanto et al., 2021). Profitability reflects a firm's ability to generate earnings, yet higher profits are often accompanied by greater tax obligations, which may encourage managers to engage in tax aggressiveness strategies (Tanjaya & Nazir, 2021; Nuryatun & Mulyani, 2020). Within the framework of agency theory, this situation creates opportunities for managers to act opportunistically by exploiting fiscal loopholes, but institutional ownership can serve as an effective control mechanism since institutional investors are incentivized to safeguard reputation and ensure compliance (Sudiyatno et al., 2023; Prasetya & Hariyono, 2023). Accordingly, institutional ownership is expected to moderate the relationship between profitability and tax aggressiveness by limiting opportunistic behavior and aligning managerial actions with shareholder interests (Amaliyah & Nurdin, 2024).

H4: Institutional ownership significantly moderates the negatively relationship between profitability and tax aggressiveness.

Institutional Ownership Moderated Thin Capitalization and Tax Aggressiveness

Thin capitalization refers to a corporate strategy that places a greater proportion of debt over equity in the capital structure in order to utilize interest expenses as tax-deductible items (Mahmudi et al., 2023; Sudiyatmoko et al., 2025). This practice tends to increase tax aggressiveness, as higher leverage provides greater opportunities for firms to minimize fiscal obligations (Putra & Ekawanti, 2024; Imaniah & Kurnia, 2023). However, excessive reliance on debt also entails financial risks and may erode profitability (Putri & Akbar, 2025). From the perspective of agency theory, such behavior reflects a conflict of interest in which managers pursue short-term net income through opportunistic strategies, including debt-based tax minimization (Pratama & Aris, 2025; Iheme-Madukairo & Onyeka-Iheme, 2024). In this context, institutional ownership serves as a governance mechanism that constrains managerial opportunism. Institutional investors, with their long-term orientation, are generally more sensitive to audit risks and regulatory sanctions, thereby limiting excessive use of debt for aggressive tax purposes (Ruknan et al., 2024; Meyasa & Arinta, 2023). Based on the study by Meyasa and Arinta (2023), institutional ownership is shown to influence the debt strategies adopted by firms. Consequently, a higher proportion of institutional ownership is expected to strengthen monitoring and reduce the likelihood of overly aggressive thin capitalization strategies (Kosasih & Wulandari, 2025; Wulandari & Ibrahim, 2023).

H5: Institutional ownership significantly and negatively moderates the relationship between thin capitalization and tax aggressiveness.

Institutional Ownership Moderated Capital Intensity and Tax Aggressiveness

Capital intensity reflects the proportion of funds allocated by firms to fixed assets, which generate depreciation expenses and can be utilized by managers to reduce taxable income while maintaining higher reported net profits (Methasari, 2021; Tahlila et al., 2024). Investment in fixed assets provides dual benefits, not only by enhancing operational capacity but also by creating depreciation costs that are legally recognized as tax-deductible, thereby increasing the likelihood of adopting fiscal efficiency strategies as capital intensity rises (Herianti & Marundha, 2024; Sari et al., 2024). Within the framework of agency theory, this condition illustrates a potential conflict of interest, where managers as agents may exploit fixed assets for opportunistic purposes, while principals expect decisions aligned with long-term value creation (Nuryatun & Mulyani, 2020). Nevertheless, the presence of institutional ownership strengthens monitoring mechanisms, as institutional investors typically adopt a long-term orientation and remain more vigilant against audit risks and regulatory sanctions, thereby limiting excessive tax aggressiveness (Meyasa & Arinta, 2023; Tiyanto & Achyani, 2022). Empirical findings by Cahyani et al. (2021) further indicate that the effect of capital intensity on tax aggressiveness can be mitigated under significant institutional oversight, reinforcing the view that institutional ownership moderates the relationship between capital intensity and tax aggressiveness.

H6: Institutional ownership significantly and negatively moderates the relationship between capital intensity and tax aggressiveness.

In this study, the research model is designed to represent the overall framework of the analysis, illustrating how the independent variables (X) influence the dependent variable (Y) with the moderating variable (Z) affecting the strength or direction of these relationships. This model aims to provide a structured approach to addressing the research problem and achieving the study objectives. The conceptual framework is presented as follows:

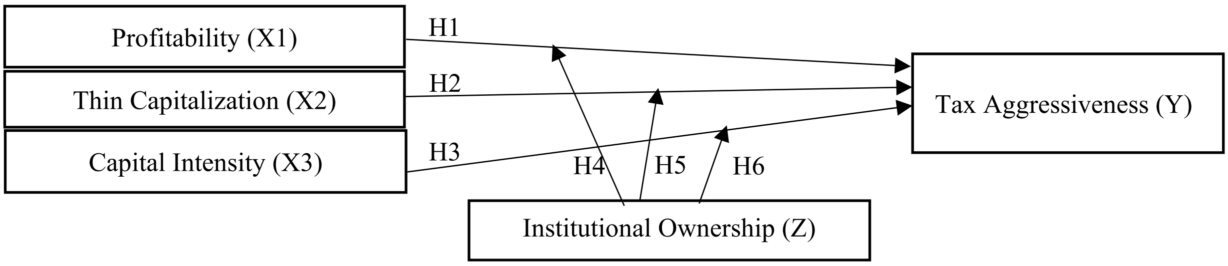

Figure 1. Research Model

METHODS

This study adopts a quantitative approach using secondary data obtained through documentation of annual reports and financial statements of mining companies listed on the Indonesia Stock Exchange (IDX) for the 2020–2024 period. Secondary data were chosen due to their objective, efficient, and reliable nature (Soesana et al., 2023), with sources including the official IDX website (www.idx.co.id), corporate websites, and credible financial portals such as idnfinancials.com and finance.yahoo.com. The research population comprises 68 mining companies across strategic subsectors such as oil and gas production, coal, drilling services, aluminum, copper, gold, iron and steel, and diversified metals and minerals. Using purposive sampling, 32 companies that met predetermined criteria were selected as the final research sample.

Table 1. Operationalization of Variables

No	Variable & Source	Type	Measurement Formula
1	Tax Aggressiveness	Dependent (Y)	ETR = Income Tax Expense / Earnings Before Tax
2	Profitability	Independent (X1)	ROA = Net Income After Tax / Total Assets
3	Thin Capitalization	Independent (X2)	DER = Total Debt / Total Assets
4	Capital Intensity	Independent (X3)	CAPIN = Net Fixed Assets / Total Assets
5	Institutional Ownership	Moderating (Z)	INS = Institutional Shares / Total Outstanding Shares

Panel data regression, which integrates cross-sectional and time-series dimensions (Wooldridge, 2019), was conducted using Stata 17. Prior to analysis, data were transformed to address outliers and distribution issues (Sholihin & Anggraini, 2021), ensuring compliance with regression assumptions. The analysis included descriptive statistics, model specification, estimation selection, classical assumption tests, Moderate Regression Analysis, and hypothesis testing to produce robust empirical results.

RESULTS AND DISCUSSION

Descriptive Statistical Test

Table 2. Descriptive Statistical Test

Variable	Obs	Mean	Standar Deviasi	Minimum	Maximum
ETR	160	0,283	0,163	0,01	**0,83**
ROA	160	0,133	0,129	0,01	**0,62**

DER	160	0,425	0,219	0,04	**0,96**
CAPIN	160	0,235	0,197	0,01	**0,80**
INS	160	0,612	0,247	0,02	**0,98**
ROAxINS	160	0,863	0,102	0,001	**0,59**
DERxINS	160	0,248	0,164	0,01	**0,698**
CAPINxINS	160	0,123	0,113	0,003	**0,627**

Based on Table 2, the descriptive statistical results show that the dependent variable, Effective Tax Rate (ETR), has an average value of 0.283 with a standard deviation of 0.163, reflecting considerable variation in the effective tax burden among mining firms, with values ranging from 0.01 to 0.83. Profitability (ROA) records a mean of 0.133 and a standard deviation of 0.129, indicating differences in asset utilization efficiency across companies. The Thin Capitalization proxy (DER) has a mean of 0.425 with a standard deviation of 0.219, suggesting that most firms rely more on equity than debt financing. Capital Intensity (CAPIN) records a mean of 0.235 with a standard deviation of 0.197, pointing to substantial variation in fixed asset investment structures. Institutional Ownership (INS) has a mean of 0.612 with a standard deviation of 0.247, implying differing degrees of institutional monitoring among firms.

Additionally, the moderating interaction variables reveal diverse dynamics across companies. The ROAxINS variable has a mean of 0.863 with a relatively low standard deviation of 0.102, suggesting a stable interaction between profitability and institutional ownership in shaping tax-related decisions. The DERxINS variable shows a mean of 0.248 and a standard deviation of 0.164, indicating moderate variation in leverage behavior under institutional influence. Meanwhile, the CAPINxINS variable records a mean of 0.123 with a standard deviation of 0.113, suggesting that institutional investors play a role in moderating the relationship between capital intensity and tax planning. Overall, these descriptive findings highlight notable heterogeneity in taxation, financial structure, and governance characteristics across mining firms, forming a robust basis for further inferential analysis of corporate tax aggressiveness.

Regressions Model

Table 3. Summary of Regression Test Results

Method	Testing	Significance	Results
Uji Chow	Common Effect Model vs Fixed Effect Model	0,000	Fixed Effect Model
Uji Lagrange Multiplier (LM)	Common Effect Model vs Random Effect Model	0,000	Random Effect Model
Uji Hausman	Fixed Effect Model vs Random Effect Model	0,093	Random Effect Model

Based on the outcomes of the model specification tests, the Random Effects Model (REM) was identified as the most appropriate estimation technique for the panel data regression analysis.

Classical Assumption Test

After determining the Random Effect Model (REM) as the most appropriate panel regression model, classical assumption tests were unnecessary because REM uses the Generalized Least Squares (GLS) method instead of Ordinary Least Squares (OLS). GLS inherently corrects for heteroskedasticity and autocorrelation through its weighting and transformation process, producing the most efficient and Best Linear Unbiased Estimator (BLUE) even under non-constant variance and correlated errors (Gujarati & Porter, 2021; Wooldridge, 2019; Baltagi, 2021).

Moderated Regression Analysis Test

Table 4. Moderated Regression Analysis Test with Random Effect Model

Variabel	Coeficient	Std Err	z	P > /z/
ROA	-0,389	0,103	-3,76	0,000

DER	-0,150	0,074	-1,97	0,049
CAPIN	0,270	0,118	2,28	0,022
INS	-0,004	0,127	-0,03	0,973
ROAxINS	-0,056	0,060	-0,93	0,353
DERxINS	0,023	0,100	0,23	0,818
CAPINxINS	-0,010	0,060	-0,16	0,873
Cons	-2,425	0,272	-8,89	0,000
Prob > chi2	0,0036			
Within	0,1689			
Between	0,0087			
Overall	0,0716			

Based on the results presented in Table 4, the form of the Moderated Regression Analysis (MRA) equation estimated using the Random Effects Model can be expressed as follows:

$$\mathrm{ETR}_{it} = -2{,}425 - 0{,}389\mathrm{X}_{1it} - 0{,}150\mathrm{X}_{2it} + 0{,}270\mathrm{X}_{3it} - 0{,}004\mathrm{Z} - 0{,}056\mathrm{X}_{1it}\mathrm{Z}_{it} + 0{,}023\mathrm{X}_{2it}\mathrm{Z}_{it} - 0{,}010\mathrm{X}_{3it}\mathrm{Z}_{it} + \varepsilon_{it}$$

The MRA results using the random effect model show that the constant value of –2.425 represents the baseline Effective Tax Rate when all independent (ROA, DER, CAPIN) and moderating (INS) variables are zero. The ROA coefficient of –0.389 indicates that increased profitability reduces the ETR, implying that more profitable firms tend to engage in greater tax aggressiveness. The DER coefficient of –0.150 suggests that higher leverage leads to a lower ETR, consistent with the use of interest expenses to minimize tax burdens. Meanwhile, the CAPIN coefficient of 0.270 indicates that higher capital intensity raises the ETR, showing that firms with substantial fixed assets have not fully optimized depreciation benefits for tax reduction.

The INS coefficient of –0.004 demonstrates that greater institutional ownership slightly reduces ETR, indicating that institutional investors promote efficient tax management through effective oversight. The ROA×INS interaction coefficient of –0.056 shows that institutional ownership weakens the negative relationship between profitability and ETR, suggesting tighter governance over profitable firms. The DER×INS interaction coefficient of 0.023 implies that institutional ownership strengthens the positive association between leverage and ETR, reflecting investor restraint on aggressive debt use. Lastly, the CAPIN×INS coefficient of –0.010 indicates that institutional ownership dampens the effect of capital intensity on ETR, limiting excessive tax planning via fixed assets. Overall, institutional ownership functions as a homologizer moderator, acting independently as a predictor without significantly moderating the main relationships in the model.

Adjusted R^2

Based on the estimation results in Table 4, the explanatory power of the panel data regression model is reflected in the three R-squared components: within, between, and overall. The within R-squared value of 0.169 indicates that 16.9% of the variation in tax aggressiveness at the individual (firm-level) dimension is explained by the model, while the rest is influenced by unobserved factors. The between R-squared value of 0.009 shows that only 0.9% of the variation across firms is captured, suggesting that inter-firm differences are primarily shaped by external elements beyond the model's scope. Meanwhile, the overall R-squared value of 0.072 reveals that the model explains 7.2% of the total variation in tax aggressiveness. Although the explanatory power is relatively low, the model remains empirically valid and statistically reliable in illustrating the influence of profitability, leverage, capital intensity, and institutional ownership on corporate tax aggressiveness within the observed mining sector sample.

Simultaneous Significance Test

The simultaneous test (p-value = 0.004 < 0.05) as reported in Table 4, indicating that the independent and moderating variables jointly exert a significant effect on the dependent variable. In other words, variations in the independent variables and their interactions with the moderating variable significantly influence the level of corporate tax aggressiveness. This finding suggests that the regression model possesses adequate predictive power and statistical relevance in explaining variations in tax aggressiveness behavior.

Hypotesis Test

According to Wooldridge (2019) and Gujarati & Porter (2009), in the Random Effect model, significance testing uses the z-test because GLS estimates asymptotically follow a standard normal distribution, where Z-score greater than 1.645 or p-values below 0.05 indicate a significant effect of the independent variable, while Z-score ≤1.645 or p-values ≥0.05 indicate no significant effect at the 95% confidence level.

The Effect of Profitability on Tax Aggressiveness

Based on the estimation results in Table 4, profitability (ROA) has a coefficient of –0.389, a z-score of –3.76, and a p-value of 0.000, indicating a negative and significant effect on tax aggressiveness (ETR). This means that higher profitability reduces tax aggressiveness, as financially strong firms tend to prioritize fiscal compliance and reputation over aggressive tax-saving strategies. Thus, the first hypothesis (H1) predicting a positive relationship is rejected. This finding aligns with Yanti & Hartono (2019), Simamora & Rahayu (2020), and Pradnya & Aryani (2024), who found that profitable firms are more compliant with taxation, though some studies Dianawati & Agustina (2020), Arimurti et al. (2022) suggest that profitability does not always lead to tax aggressiveness. From an agency theory perspective, profitability can enhance managerial incentives, but these are often directed toward maintaining corporate legitimacy rather than exploiting tax loopholes.

The Effect of Thin Capitalization on Tax Aggressiveness

Based on the estimation results in Table 4, thin capitalization (DER) shows a coefficient of –0.150, a z-score of –1.97, and a significance level of 0.049, indicating a negative and significant effect on the Effective Tax Rate. This suggests that higher debt proportions increase firms' incentives to reduce taxable income through interest deductions, reflecting the use of debt as a tax shield to lower tax burdens. The findings align with Nurariza et al. (2019), Suntari & Mulyani (2020), and Widodo et al. (2020), who assert that leverage encourages tax-saving behavior. However, studies such as Salwah & Herianti (2019) and Pratama & Aris (2025) note that excessive leverage can heighten creditor oversight, limiting tax aggressiveness. In line with agency theory, debt serves as a tool for managers to minimize taxes on behalf of shareholders, though it also invites tighter external monitoring. Overall, thin capitalization among mining firms on the IDX during 2020–2024 tends to intensify tax aggressiveness through interest expense deductions.

The Effect of Capital Intensity on Tax Aggressiveness

Based on the estimation results in Table 4, the capital intensity variable (CAPIN) exhibits a coefficient of 0,270, z-score 2,28, with a p-value of 0.022, indicating a positive and significant relationship with the Effective Tax Rate (ETR). This finding confirms that firms with higher proportions of fixed assets tend to demonstrate greater tax aggressiveness, as tangible investments not only function as productive resources but also serve as strategic instruments to reduce taxable income through depreciation deductions. The result supports the initial hypothesis (H3) and aligns with prior studies by Hasyim et al. (2022), and Syafrizal and Sugiyanto (2022), who found that capital-intensive firms often exploit depreciation as a legitimate tax shield to minimize fiscal obligations. However, divergent evidence from Dewi and Oktaviani (2022), Christina and Wahyudi

(2022), and Herianti and Marundha (2024) reveals that in sectors such as banking, healthcare, and chemical industries, capital intensity does not significantly influence tax aggressiveness, as fixed assets are viewed primarily as operational necessities rather than fiscal instruments. From an agency theory perspective, capital intensity aligns managerial incentives with shareholder value, as managers use depreciation to lower taxes and boost profits. Thus, this study concludes that higher capital intensity increases tax aggressiveness, with firms leveraging fixed assets for proactive tax management and long-term financial optimization.

The Moderating Effect of Institutional Ownership on the Relationship Between Profitability and Tax Aggressiveness

Based on the estimation results in Table 4, the interaction variable between profitability and institutional ownership (ROA×INS) exhibits a coefficient of -0,056, z-score -0,93, with a p-value of 0.353, indicating that institutional ownership does not significantly moderate the relationship between profitability and tax aggressiveness. This finding suggests that the presence of institutional investors does not substantially strengthen or weaken the influence of profitability on corporate tax behavior, reflecting a largely passive monitoring role. While institutional shareholders possess significant oversight capacity, their orientation tends to prioritize long-term stability and investment returns rather than directly constraining managerial tax planning. Consequently, the fourth hypothesis (H4) positing a significant negative moderation by institutional ownership is not supported. These results align with studies by Prananjaya et al. (2023) and Sampurno and Anwar (2023), which similarly found that institutional ownership has a negative but insignificant moderating effect, emphasizing a supervisory function focused on prudence and regulatory compliance rather than direct control over tax strategy. Conversely, research by Adeyani and Piter (2021), Prasetya and Hariyono (2023), and Rahmadani et al. (2024) suggests that high institutional ownership may reinforce the effect of profitability on tax aggressiveness, as firms under active oversight retain the capacity to optimize profits through measured and transparent fiscal strategies. From the agency theory perspective, managerial incentives to minimize tax liabilities increase with higher profitability, yet the expected moderating role of institutional investors in restraining aggressive tax planning is empirically weak (Oktaviani & Solikhah, 2019; Sudiyatno et al., 2023). Overall, these findings indicate that, although theoretically institutional ownership should mitigate the impact of profitability on tax aggressiveness, in practice its effect remains negligible, highlighting the limited effectiveness of institutional monitoring in shaping corporate fiscal behavior.

The Moderating Effect of Institutional Ownership on the Relationship Between Thin Capitalization and Tax Aggressiveness

Based on the estimation results in Table 4, the interaction between thin capitalization and institutional ownership (DER×INS) shows a coefficient of 0,023, z-score 0,23, and a p-value of 0,818, indicating that institutional ownership does not significantly moderate the relationship between thin capitalization and tax aggressiveness. This result rejects the fifth hypothesis (H5). The finding is consistent with Olivia and Dwimulyani (2019) and Cahyani et al. (2021), who argue that institutional ownership does not significantly influence debt policy decisions, as managers remain cautious in determining leverage levels to maintain stakeholders' trust. In contrast, Prasetya et al, (2020) and Meyasa and Arinta (2023) report that institutional ownership may strengthen the link between high leverage and tax aggressiveness by guiding fiscal management through debt monitoring. From the perspective of agency theory, institutional investors act as monitoring agents to reduce opportunistic behavior, but in this study their moderating effect on thin capitalization is not statistically evident. This suggests that the effectiveness of institutional ownership as a governance mechanism in shaping the tax implications of debt financing is context-dependent, varying with firms' capital structures and managerial practices (Ruknan et al., 2024; Meyasa & Arinta, 2023).

The Moderating Effect of Institutional Ownership on the Relationship Between Capital Intensity and Tax Aggressiveness

Based on the estimation results in Table 6, the interaction between capital intensity and institutional ownership (CAPIN×INS) shows a coefficient of -0,010, z-score -0,16, and a p-value of 0.873, indicating that institutional ownership does not significantly moderate the relationship between capital intensity and tax aggressiveness. This finding rejects the sixth hypothesis (H6) and suggests that institutional ownership mainly serves as a monitoring mechanism to maintain managerial accountability rather than influencing the use of fixed-asset depreciation as a tax reduction strategy. The result is consistent with Ristanti (2022), Fatimah & Nurdin (2024), Adelia (2023), and Sampurno & Anwar (2023) indicate that institutional ownership generally does not significantly moderate this relationship, as managers' utilization of depreciation from fixed assets for tax reduction is constrained by external monitoring, CSR, audit quality, and regulatory scrutiny. In contrast, Wahyuni et al. (2023), Cahyadi & Tjahjono (2025), and Rachmania & Zahra (2025) demonstrate that in certain sectors such as raw materials, mining, and property that institutional investors can limit managerial opportunism and enforce stricter fiscal compliance. These findings suggest that the moderating effect of institutional ownership is context-dependent and influenced by industry characteristics, regulatory environment, and the firm's governance practices. From the perspective of agency theory, the insignificance of the moderating effect reflects the limited capacity of institutional shareholders to alter managerial decisions regarding capital intensity, as their monitoring tends to focus on accountability and long-term stability rather than aggressive tax strategies. Thus, this study confirms that although institutional shareholders are able to constrain potential managerial opportunism, they do not significantly influence corporate decisions regarding the use of capital intensity as a tax avoidance mechanism (Christina & Wahyudi, 2022; Kusumawati & Kartika, 2023; Tahlila et al., 2024).

CONCLUSION

This section presents the conclusions, limitations, and suggestions for further research. The study, conducted on 34 mining companies listed on the Indonesia Stock Exchange during 2020–2024 using panel data and the random effect model, finds that profitability (ROA) and thin capitalization (DER) negatively influence tax aggressiveness, indicating that financially strong firms and those with higher leverage tend to adopt more compliant fiscal strategies. In contrast, capital intensity (CAPIN) positively affects tax aggressiveness, as firms leverage depreciation to reduce taxable income, reflecting strategic managerial behavior aligned with shareholder interests. Institutional ownership (INS) does not significantly moderate these relationships, functioning as a homologiser moderator and highlighting the limited practical effectiveness of external monitoring in constraining managerial opportunism. The findings contribute to agency theory by showing that the impact of financial characteristics on tax behavior is context-dependent, and they offer practical implications for regulators, managers, and investors in promoting sustainable and compliant tax practices.

The study has several limitations. First, tax aggressiveness is proxied only through the Effective Tax Rate (ETR), which may not fully capture other dimensions such as Book-Tax Differences (BTD) or Cash Effective Tax Rate (CETR). Second, the observation period is relatively short, limiting the ability to generalize findings across longer-term fiscal and regulatory changes. Third, the analysis focuses only on ROA, DER, and CAPIN with INS as a moderator, leaving out other potentially influential factors like audit quality, Corporate Social Responsibility (CSR), and broader governance mechanisms. Finally, reliance on secondary financial data may introduce measurement bias due to incomplete disclosure of fiscal strategies. Future research should employ more comprehensive proxies for tax aggressiveness, extend the observation period, incorporate additional governance and CSR variables, and consider dynamic panel or SEM approaches, as well as comparative studies across industries or countries to deepen understanding of corporate tax behavior in varied contexts.

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