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Capital Intensity and Tax Avoidance: Does Expertise-Based Tax Governance Make a Difference? Evidence from Multinational Firms Listed on the Indonesia Stock Exchange, 2020–2025

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Abstract. This study asks two questions. First, is the share of fixed assets on a firm's balance sheet associated with tax avoidance? Second, does tax governance, proxied by the proportion of audit committee and board of commissioners members with finance, accounting or tax expertise, change that association? We use a balanced panel of 16 multinational companies listed on the Indonesia Stock Exchange (IDX) from 2020 to 2025, which gives 96 firm-year observations from only 16 independent firms. Tax avoidance is measured with the effective tax rate (ETR) and capital intensity with the ratio of fixed assets to total assets. A moderated regression is estimated with a random effects model and standard errors clustered by firm. The coefficient on capital intensity is positive but not significant ($\beta = 0.055$, $p = 0.602$), and the interaction between capital intensity and tax governance is also not significant ($\beta = -0.095$, $p = 0.605$). The model explains almost none of the variation in ETR ($R^2 = 0.024$; F-test $p = 0.951$). The estimates are also imprecise: the 95% confidence interval for the capital intensity coefficient runs from about −0.17 to 0.28, so only very large effects could have been detected. In this sample we therefore find no evidence that capital intensity drives tax avoidance, or that expertise on the board and audit committee conditions it, but we cannot rule out effects of moderate size. The small number of firms, a single ETR-based proxy and a headcount measure of expertise limit what can be concluded, and we suggest ways future work could address each of them.

Keywords: Capital intensity; Tax avoidance; Tax governance; Audit Committee expertise; Multinational companies

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1 Introduction

Indonesia relies heavily on taxes to pay for infrastructure, health and education. According to the 2025 state budget report, taxes, customs and excise made up 82.1% of state revenue, up from 77.5% a year earlier. Collection has nonetheless lagged behind targets. Against a tax revenue target of Rp2,490.91 trillion, only Rp557.1 trillion, about 25.4%, had been collected by April 2025. The tax-to-GDP ratio tells a similar story: the OECD put Indonesia's 2022 ratio at 12.1%, well below the Asia-Pacific average of 19.3%. Part of this gap is usually attributed to corporate tax avoidance, and multinational groups are the obvious suspects. Estimates drawing on the Tax Justice Network suggest that profit shifting costs Indonesia roughly US$4.86 billion each year.

Tax avoidance is legal. Firms reduce their tax bill by using the rules as written, through transfer pricing, intra-group financing, and the timing and size of depreciation deductions [1], [13]. Because it stays within the law, it is hard to police, and it can still erode the tax base and the sense of fairness in the system. Multinational firms have more room than domestic ones. They operate in several jurisdictions with different rates, they trade with related parties, and their structures are complex. Cases involving Bentoel's intra-group loans and Coca- Cola's royalty and service payments to foreign affiliates are often cited as examples. The government has responded with a general anti-avoidance rule and an earnings-stripping limit through the Tax Harmonisation Law (Law No. 7 of 2021) and Government Regulation 55/2022, and with the global minimum tax of 15% under PMK 136/2024.

This paper looks at a quieter channel. A firm that holds a large share of its assets in machinery, buildings and equipment carries large depreciation charges, and depreciation is a deductible non-cash expense. The usual argument is that such firms enjoy a built-in tax shield and therefore pay a lower effective rate [15]. Several Indonesian studies report a positive link between capital intensity and tax avoidance [7], [10], but others find nothing [2], [6]. The evidence is mixed enough that a second ingredient seems worth examining, namely how closely management is monitored.

We focus on one aspect of monitoring: whether the people who oversee management have the background to understand tax-relevant decisions. Specifically, we use the share of audit committee and board of commissioners members with expertise in finance, accounting or taxation. A review of the literature (Section 2.4 and Table 1) shows that expertise-based oversight has been studied, but in a scattered way. Audit committee financial expertise has been used as a moderator in other tax avoidance models [5], [11]; commissioner competence has been examined alongside capital intensity [6]; board and audit committee expertise have been tested as direct determinants [12], [14]; and broader governance measures have been used to moderate the capital intensity link [2], [8]. To our knowledge, none of these studies combines audit committee and board of commissioners expertise in a single measure, tests it as a moderator of the capital intensity–tax avoidance link, and does so in a sample restricted to multinationals, where cross-border planning is available, over the period after 2020. We therefore do not claim that supervisory competence has never been tested as a moderator. The claim is narrower: the evidence is thin, mixed and rarely drawn from multinationals, and that is the gap we address.

The study makes two contributions. It provides evidence on capital intensity and tax avoidance for IDX-listed multinationals over a period that covers the pandemic and the recent tax reforms. It also tests whether expertise on the monitoring bodies moderates that relationship, which helps separate a governance story from a purely accounting one. Finally, it collects the scattered prior evidence in one structured summary (Table 1) and reports how precisely the data can speak to each hypothesis, so that a null result can be interpreted and not only reported.

2 Theory and hypothesis development

2.1 Agency and stewardship perspectives

Agency theory starts from the separation of ownership and control. Shareholders (principals) delegate decisions to managers (agents), and the two do not necessarily want the same thing [3]. Tax decisions are one place where this shows up. Managers know far more about the firm's tax position than owners do, so they can pursue tax reduction in ways that are hard to observe, and aggressive positions may bring legal and reputational costs that fall on shareholders [4]. Monitoring bodies exist to narrow that gap.

Stewardship theory offers a more generous reading of managers. It assumes that executives and supervisors often act in the firm's interest because they care about its survival and reputation. Under that view, governance is less a leash than a support structure. We use stewardship theory as a complement: it helps explain why expertise, rather than sheer vigilance, could be what makes oversight effective, since knowledgeable monitors can help management avoid risky tax positions rather than simply catching it out.

2.2 Capital intensity and tax avoidance

Capital intensity is the proportion of fixed assets in total assets [15]. Depreciation on those assets is deductible, so firms with more fixed assets can claim more deductions, lowering taxable income and the effective tax rate. Managers can use this deliberately as part of tax planning. Prastika and Zulfikar [9] find that capital intensity is significantly associated with a lower ETR, which indicates more avoidance. Other studies report no significant effect [2], [6], and one of them finds that governance does not moderate the effect [2]. Taking the theoretical argument and the more frequent empirical direction together, we expect the following.

H1: Capital intensity has a positive effect on tax avoidance among multinational firms listed on the IDX in 2020–2025.

2.3 The moderating role of tax governance

If high capital intensity gives managers room to cut taxes, the quality of oversight should determine how much of that room is used. Financial expertise on the audit committee has been linked to tax planning outcomes [12], and Marfou [5] and Rizqia and Lastiasti [11] both treat audit committee financial expertise as a moderator in tax avoidance models. In Indonesian data, Tania and Mukhlasin [14] report that board expertise is associated with less tax avoidance at the 10% level, while audit committee expertise is not. Omar et al. [8] find that corporate governance weakens the effect of capital intensity on tax avoidance in the property sector. We combine audit committee expertise (EXCA) and board of commissioners expertise (BOCE) into one measure of tax governance and expect that more expertise tightens oversight of how fixed assets are used for tax purposes.

The direction of moderation is not obvious, and two readings are possible. Under the monitoring view, expert supervisors are better able to see and question aggressive use of depreciation and other deductions, so the capital intensity–tax avoidance link should be weaker where expertise is high. This is the prediction in H2, and it follows directly from the agency perspective in Section 2.1. Under a complementarity view, expertise is what allows a firm to use its asset base efficiently for tax purposes: knowledgeable supervisors understand the rules and incentives well enough to approve legitimate planning, so avoidance could be

stronger, not weaker, where expertise is high. Stewardship theory is consistent with this second reading, because expert monitors may advise management and not only restrain it. We keep the monitoring reading as the hypothesis, but we treat the sign of the interaction as an empirical question and return to both readings in Section 4.4.2.

H2: Tax governance weakens the effect of capital intensity on tax avoidance among multinational firms listed on the IDX in 2020–2025.

2.4 Summary of prior evidence and research gap

To provide a clearer picture of the differences in previous research findings and the limited attention given to supervisory competence, this study reviews the studies cited in this paper alongside earlier research on the determinants of the effective tax rate. The studies are classified based on their research variables and findings, as presented in Table 1.

A structured literature search was conducted on 10 November 2026 using a general web search engine. The search covered journal websites, Garuda, RePEc/IDEAS, and university repositories. Three combinations of keywords were used, covering (1) capital intensity and tax avoidance, (2) capital intensity, tax avoidance, and corporate governance, and (3) capital intensity, tax avoidance, supervisory expertise, and moderation. Additional terms included audit committee, board of commissioners, tax governance, and Indonesia.

The studies were screened based on their titles and abstracts. The review focused on research involving listed companies, with tax avoidance as the dependent variable, capital intensity as the independent variable, and corporate governance as a moderating variable. Studies that did not meet these criteria, particularly those that did not examine the moderating role of corporate governance or did not use tax avoidance as the dependent variable, were excluded. The search was not exhaustive because it did not cover Scopus or Web of Science and was limited to the leading results of each query. Nevertheless, it identified seven additional studies relevant to these criteria.

Of these seven studies, four found that corporate governance, particularly audit committees, independent commissioners, or governance scores, weakened the relationship between capital intensity and tax avoidance. Two studies found no significant moderating effect, while one reported a moderating effect without clearly specifying its direction in the abstract. Among these studies, only Marsahala et al. [6] specifically examined supervisory competence, but found no evidence of a moderating effect.

Furthermore, none of the identified studies combined audit committee expertise and board of commissioners' expertise into a single measure of supervisory competence. None specifically focused on multinational companies either.

Although previous studies have examined the relationship between capital intensity and tax avoidance, the findings remain inconsistent. Some studies report a significant relationship, while others find no significant effect. Research has also considered corporate governance as a moderating variable; however, the evidence remains limited regarding the role of supervisory expertise in this relationship. In particular, the reviewed studies have not yet examined the combined expertise of audit committee members and board of commissioners members as a measure of tax governance in multinational companies listed on the Indonesia Stock Exchange. Therefore, this study seeks to address this gap by

examining whether expertise-based tax governance moderates the relationship between capital intensity and tax avoidance.

Overall, three main patterns can be identified from the existing literature.

Table 1. Summary of prior evidence on capital intensity, supervisory expertise and tax avoidance.

Study	Setting	What is tested	Result relevant to this paper
Prastika & Zulfikar (2026) [9]	Indonesia	Capital intensity, long-term debt ratio and corporate governance	Capital intensity is significantly associated with a lower ETR (more avoidance)
Nurdiansyah & Masripah (2023) [7]	Multinational companies, Indonesia	Determinants of tax avoidance	Positive link between capital intensity and avoidance
Putri (2023) [10]	Indonesia (mining firms, 2018–2020)	Tax planning and capital intensity	Positive link between capital intensity and avoidance
Darmawan & Prawitasari (2026) [2]	Manufacturing firms on the IDX, 2022–2024	Profitability, leverage and capital intensity; governance and size as moderators	Capital intensity not significant; governance does not moderate
Marsahala et al. (2020) [6]	Indonesia	Commissioner competence together with profitability and capital intensity	Capital intensity not significant; commissioner competence does not moderate the effect
Omar et al. (2026) [8]	Property and real estate firms on the IDX, 2020–2024	Profitability and capital intensity; corporate governance as moderator	Governance weakens the effect of capital intensity
Tania & Mukhlasin (2020) [14]	Indonesia	Corporate governance attributes as determinants of avoidance; avoidance measured with cash ETR	Board expertise significant at 10%; audit committee expertise not significant
Marfou (2021) [5]	Not stated here	Business strategy and avoidance	Audit committee financial expertise is treated as a moderator

Study	Setting	What is tested	Result relevant to this paper
Rizqia & Lastiasti (2021) [11]	Manufacturing firms, Indonesia and Malaysia	Audit quality and avoidance	Independent commissioners and audit committee financial expertise are treated as moderators
Robinson et al. (2012) [12]	U.S. firms	Audit committee financial expertise and tax planning	Financial expertise is linked to tax planning outcomes

Note: results are reported as described in the cited studies. IDX = Indonesia Stock Exchange.

First, the capital intensity–tax avoidance link is unsettled in Indonesian data: some report that capital intensity is associated with more avoidance [7], [9], [10], while others find no significant effect [2], [6]. Second, the choice of measure matters, because book ETRs reflect deferred taxes and other adjustments, so a lower or higher ETR does not by itself indicate avoidance [15]. Third, supervisory expertise has been examined in several ways: as a moderator of other relationships [5], [11], as a direct determinant [12], [14], alongside capital intensity [6], and through broader governance indices that moderate the capital intensity effect [2], [8]. These results are not uniform, and the samples differ in industry, period and measurement.

Taken together, the table supports two conclusions. The capital intensity–tax avoidance link is unsettled in Indonesian data. And none of the studies in the set tests a combined audit committee and board expertise measure as a moderator of that link in a multinational sample. We read this as a gap in the evidence, not as an absence of related work.

3 Research method

3.1 Data and sample

This is a quantitative, explanatory study using secondary data from annual reports and financial statements published on the IDX website and by the companies themselves. Sustainability reports were also used as a source. The observation window is 2020–2025, chosen because it covers the recovery from the COVID-19 shock, which affected fixed-asset investment, and the introduction of major tax rule changes. The population is all multinational companies listed on the IDX in this period. We define a firm as multinational if it belongs to, or heads, a group with operations (subsidiaries, plants or branches) in at least two countries, or if it is affiliated with a foreign multinational group.

Why multinationals. We restrict the sample to multinationals for three reasons. First, multinationals have tax-planning channels that purely domestic firms lack, such as transfer pricing, intra-group financing and shifting income across jurisdictions with different tax rates [1], [13]. Indonesian studies treat multinationality as a determinant of avoidance [1], [7]. If capital intensity or expert oversight shapes tax avoidance, a sample in which both the opportunity and the incentive to avoid tax are greatest is a natural place to look. Second, a multinational sample is more homogeneous in the rules that govern group tax planning, in

particular the related-party and transfer pricing rules that apply to cross-border transactions, which reduces unobserved differences between sample firms compared with a sample of all listed firms. Third, the question matters for policy: as the Introduction notes, multinational groups are the usual suspects in debates about profit shifting, so knowing whether a simple balance-sheet ratio such as capital intensity helps to identify avoidance among them has practical value.

Our definition has two parts. Firms that belong to or head a group with operations in at least two countries capture outward-oriented multinationals. Firms affiliated with a foreign multinational group capture inward-oriented ones: even if the Indonesian entity has no operations abroad, it can transact with foreign related parties, which is the economically relevant exposure. Classification was based on the annual reports and the notes to the financial statements. The definition has two limitations. A threshold of two countries is low, so the group is heterogeneous, and the indicator is binary, so it does not capture the degree of multinationality, for example the share of foreign sales or the number of foreign subsidiaries. Both limitations may add noise, and we return to them in the Conclusion.

We used purposive sampling. A firm was kept if it published complete annual reports for every year of the period, reported all the data needed to compute the variables, disclosed the background of audit committee and board members, reported no loss in any year, and presented its statements in rupiah (or in a currency that could be converted consistently). The final sample has 16 companies observed over six years, a balanced panel of 96 firm-year observations. Approximately 20 multinational companies were identified, of which only 16 met the sample selection criteria. These 96 observations are not 96 independent draws. They come from 16 firms observed repeatedly over six years, so the observations of one firm are likely to be correlated, and the amount of independent information is closer to 16 firms than to 96 observations. We take this into account in the standard errors (Section 3.3) and in how we read the results (Section 4.3). The selection criteria also have costs. Requiring complete reports and no loss in any year is sensible for the ETR, which is not meaningful when pre-tax income is negative, but it limits the sample to stable, profitable firms and drops loss firms, which can bias measures of tax avoidance. All variables were winsorized at the 5th and 95th percentiles, which limits the influence of outliers without dropping any observation but also narrows the spread of the variables, including ETR (Table 2).

3.2 Variable

Tax avoidance (ETR) is income tax expense divided by pre-tax income. ETR is a book measure: income tax expense is taken as reported in the profit or loss statement, which normally includes both current and deferred tax. The measure is widely used and available for every firm-year, but it also reflects deferred taxes, incentives and permanent differences, so it is an imperfect proxy for avoidance [15]. Because a lower ETR indicates more avoidance, the hypothesised positive effect of capital intensity on avoidance corresponds to a negative coefficient in the regression. Capital intensity (CI) is fixed assets divided by total assets. Fixed assets are taken from the balance sheet, so CI is an accounting proxy for the depreciation tax shield and not a direct measure of fiscal depreciation. Tax governance (TG) is the number of audit committee and board of commissioners members with finance, accounting or tax expertise divided by the total number of members of the two bodies, which is the sum of EXCA and BOCE, each scaled by the combined membership. A member is counted as having expertise if the member's work history or academic degree, as disclosed in the annual report, is in finance, accounting or taxation. Four control variables are included: profitability (ROA, net income over total assets), leverage (DER, total debt over total equity), firm size (SIZE) measured as total assets in billions of rupiah, without a logarithmic

transformation, and sales growth (GROWTH, the year-on-year change in sales).

3.3 Panel regression model

The study uses panel data regression and moderated regression analysis (MRA). The model includes capital intensity, tax governance, their interaction, and four control variables:

$$ETR_i = \alpha + \beta_1 CI_i + \beta_2 TG_i + \beta_3 (CI_i \times TG_i) + \beta_4 ROA_i + \beta_5 DER_i + \beta_6 SIZE_i + \beta_7 GROWTH_i + \varepsilon_i \quad (1)$$

H1 is evaluated through β1 and H2 through the interaction coefficient β3, both at the 5% level. Model choice followed the usual sequence for panel data: the Chow test (common effects versus fixed effects), the Hausman test (fixed versus random effects) and the Lagrange Multiplier test (common versus random effects). We then ran diagnostics for normality (Jarque–Bera), multicollinearity (pairwise correlations), heteroskedasticity and autocorrelation (Durbin–Watson).

Inference with few clusters. Because the 96 observations come from 16 firms, we cluster standard errors by firm (White period, clustered by cross-section). Cluster-robust standard errors work well only when the number of clusters is large. With about 16 clusters they tend to be biased downward and tests tend to reject too often, a well-known problem in panels with few clusters. The p-values in Section 4 should therefore be read as, if anything, too optimistic. This does not change the conclusion of no significance, but it means that borderline results in a sample of this size should be treated with caution. Wild cluster bootstrap procedures are the usual remedy, and we list them as a robustness step in Section 5.

4 Results

4.1 Descriptive statistics

Table 2 reports summary statistics for the 96 observations. The mean ETR is 22.2%, close to the statutory corporate rate of 22%, and the spread is narrow (standard deviation 0.036). Capital intensity varies much more. Its mean of 0.199 sits above its median of 0.160 and the skewness is 0.75, so a handful of firms hold far more fixed assets than the rest. Tax governance averages 0.585, which means that a bit more than half of the monitoring members in an average firm-year have the relevant background.

Table 2. Descriptive statistics (n = 96).

Variable	Mean	Std.dev.	Min	Max
ETR	0,2217	0,0363	0,1440	0,3030
CI	0,1992	0,1828	0,0100	0,5820
TG	0,5848	0,1767	0,3300	0,9100
CI × TG	0,0971	0,0866	0,0070	0,4270
ROA	0,0829	0,0760	0,0080	0,2870
DER	2,6398	2,2972	0,2250	6,3770
GROWTH	0,0391	0,0991	-0,1500	0,2130

Note: SIZE is omitted from the table because it is expressed on a nominal scale (mean 20,339.78; min 15,178; max 30,635).

The closeness of the mean ETR to the 22% statutory rate should not be read as evidence that tax avoidance is low among these firms. The ETR is a ratio of accounting numbers, and it can sit close to the statutory rate for reasons unrelated to planning. Deferred tax expense, tax incentives and permanent differences, such as non-deductible expenses that push the ETR up and income taxed at final or reduced rates that pulls it down, can offset each other in an average [15]. Firm characteristics such as size, leverage and asset mix also move ETRs [15]. In addition, the sample consists of profitable firms without losses and the variables are winsorized, both of which pull ETRs towards the middle of the distribution, and the standard deviation of 0.036 is small for that reason as well. We therefore use the ETR descriptively. We do not use its closeness to 22% as a test of the level of avoidance, and the regressions test only whether differences in ETR across firm-years line up with capital intensity and tax governance.

4.2 Model selection and diagnostics

The Chow test rejected pooled estimation in favour of fixed effects ($p = 0.0038$). The Hausman test did not reject random effects ($p = 0.5027$), and the Breusch–Pagan LM test preferred random effects over pooled estimation ($p = 0.0177$). The random effects model was therefore used. The Jarque–Bera test gave no sign of non-normal residuals (statistic 1.638, $p = 0.441$), and no pairwise correlation among the regressors exceeded 0.90; the largest was 0.683, so multicollinearity is not a concern. The heteroskedasticity test did show non-constant residual variance. We therefore report standard errors that are robust to heteroskedasticity and to correlation within firms (White period, clustered by cross-section). The Durbin– Watson statistic is 1.546, which is below 2 and consistent with mild positive serial correlation within firms; the firm-clustered standard errors are meant to allow for this. With only 16 cross-sections the Hausman and LM tests have limited power, and the White period correction is justified when the number of firms is large, so these diagnostics are indicative rather than conclusive.

4.3 Regression results

Table 3 shows the estimates. None of the coefficients is statistically significant. The model's R^2 is 0.0236 and the adjusted R^2 is −0.0541, and the joint F-test fails to reject the null that all slopes are zero ($F = 0.304$, $p = 0.951$).

Table 3. Random effects regression of ETR on capital intensity, tax governance and controls.

Variable	Coefficient	t-statistic	p-value
Constant	0,1974	-	-
CI	0,0552	0,524	0,602
TG	0,0165	0,365	0,716
CI × TG	-0,0952	-0,520	0,605
ROA	-0,0181	-0,201	0,841
DER	0,0009	0,246	0,806
SIZE	0.0000007	0,438	0,662
GROWTH	-0,0322	-0,868	0,388

Note: Dependent variable is ETR. Standard errors are robust (White period, cross-section

clustered). $R^2 = 0.0236$; adjusted $R^2 = -0.0541$; $F = 0.3036$ ($p = 0.9505$); Durbin–Watson = 1.5456; $n = 96$.

H1 predicted a negative coefficient on CI, since more capital intensity should push ETR down. The estimate is positive (0.055) and indistinguishable from zero ($p = 0.602$), so H1 is not supported. For H2, the interaction coefficient is −0.095 with $p = 0.605$, so there is no evidence of moderation and H2 is not supported either. The direction deserves a short remark. Because the CI coefficient is positive, a negative interaction would mean the CI slope shrinks as governance improves, and at TG above roughly 0.58 the point estimates imply a slightly negative slope. This is the reverse of the pattern H2 describes, in which governance should offset a negative CI effect. Given the p-values, none of this should be read as an effect; we mention it only so that the sign is not misinterpreted.

Because every estimate is insignificant, it is more useful to ask what the data can and cannot rule out. The standard error implied by the CI coefficient and its t-statistic is about 0.105, so the 95% confidence interval, using 15 degrees of freedom to reflect the 16 clusters, runs from about −0.17 to 0.28. A one-standard-deviation difference in capital intensity (0.183) therefore corresponds to anything from a 3.1 percentage-point fall to a 5.1 percentage-point rise in ETR, whereas the standard deviation of ETR itself is 3.6 points. For the interaction the interval is about −0.49 to 0.30. With these standard errors an effect would have to exceed about 0.32 for CI, and about 0.55 for the interaction, to be detected with 80% power at the 5% level. For CI this means that a one-standard-deviation increase in capital intensity would have to move the ETR by about 5.8 percentage points, more than one and a half standard deviations of ETR. The data are therefore informative only about very large effects, and insignificance here is not evidence that the true effects are zero.

The four controls (ROA, DER, SIZE and GROWTH) are all insignificant as well.

4.4 Discussion

4.4.1 Capital intensity and tax avoidance

The textbook link between fixed assets, depreciation and a lower ETR [15] does not show up here. There are several plausible explanations, and we cannot tell them apart with these data. The first is composition. The sample mixes industries, and the amount of fixed assets a firm needs depends mostly on what it does, so a high ratio may simply reflect a manufacturing or mining business model and not a tax strategy. The second is regulation. Tax depreciation follows prescribed methods and useful lives, which leaves managers little discretion over the fiscal treatment, and so a large asset base says little about intent.

Third, and probably most relevant for multinationals, the tax-planning channels that matter most for them operate across borders. Transfer pricing and intra-group financing leave no trace in a fixed-asset ratio [1]. Fourth, the measure itself is noisy. The accounting ETR is affected by deferred taxes and other adjustments, so it may respond weakly to differences in depreciation [15], and 2020–2025 includes the pandemic and several changes in tax incentives that moved ETRs for reasons unrelated to asset structure. The finding is in line with Marsahala et al. [6] and Darmawan and Prawitasari [2], who also report no significant effect, and it differs from Prastika and Zulfikar [9].

4.4.2 Tax governance as a moderator

The absence of moderation is partly mechanical. If capital intensity does not affect ETR in the first place, there is no relationship for governance to dampen. Beyond that, the measure

may be too coarse. Counting members who have a finance, accounting or tax background tells us who sits on the committee, not whether tax risk is actually discussed. General financial experience is not the same as tax expertise. Board and committee composition on the IDX is shaped by regulation that sets minimum sizes and qualifications, which may limit variation, although the overall spread of TG in Table 2 is not small (standard deviation 0.177, range 0.33 to 0.91). What matters in a random effects model is also how much TG varies within firms over six years, which we do not report and which is probably smaller, since board composition changes slowly. This may help explain why, unlike Tania and Mukhlasin [14] for board expertise and Omar et al. [8] for broader governance indicators, we find no moderating effect. Interaction effects are also known to be harder to detect than main effects and generally need larger samples, and 96 observations is a small base for that purpose. Because the interaction is not significantly different from zero, the data also cannot tell the monitoring reading of H2 from the complementarity reading in Section 2.3.

4.4.3 Control variables

None of the controls is significant, which fits the weak overall fit of the model. The negative ROA and GROWTH coefficients point in the direction that more profitable and faster-growing firms report lower ETRs, but they are far from significant. The positive DER coefficient is the opposite of the interest-deductibility argument, which may reflect limits on deductible interest such as the thin capitalisation rules. The SIZE coefficient is tiny because the variable is on a nominal scale, and size can push ETR in two directions at once: political costs raise it, while greater planning resources lower it [13].

4.4.4 Why are the results insignificant?

Four explanations for the absence of significant results are possible, and the data allow us to say something about each but not to choose between them. First, the relationships may be weak. The point estimates are small and, for capital intensity, of the opposite sign to H1. If the true effects are small, a sample of this size could not have detected them (Section 4.3). Second, the proxies may be inappropriate. The accounting ETR is affected by deferred taxes, incentives and permanent differences, CI is a book ratio, and TG counts members without measuring the depth of tax expertise or the effort devoted to tax oversight. Measurement error of this kind pulls coefficients towards zero and widens standard errors.

Third, the sample may be too small. Sixteen firms give 16 independent clusters, interaction effects need larger samples than main effects, and the confidence intervals in Section 4.3 show that this is a serious constraint. Fourth, the variation in the data may be limited. ETR has a narrow range (standard deviation 0.036) because loss firms are excluded, variables are winsorized and the statutory rate is common to all firms. CI and TG vary more in the overall sample, but the within-firm variation that a six-year panel exploits is probably small for TG. The data cannot separate these explanations. What they show is that the study had low power and a noisy outcome, so the results are best read as inconclusive and not as evidence that capital intensity and tax governance are unrelated to tax avoidance. A stronger design would use more firms and years, alternative avoidance proxies, a between and within decomposition of the variance, and an explicit measure of tax- specific expertise.

5 Conclusion

This study tested whether capital intensity is associated with tax avoidance among IDX-

listed multinational firms in 2020–2025 and whether expertise on the audit committee and board of commissioners moderates that association. Using 96 firm-year observations and a random effects model, we find that neither capital intensity nor its interaction with tax governance has a significant effect on the effective tax rate, and the model as a whole explains very little. Neither hypothesis is supported, but the estimates are imprecise, and the results are best read as inconclusive and not as evidence that capital intensity and tax governance are unrelated to tax avoidance.

The results should be read with several limits in mind. The model fit is poor, so most of the variation in ETR comes from factors outside the model. ETR is a single and imperfect proxy for avoidance. Capital intensity based on book values may not reflect how firms use fiscal depreciation, and tax governance based on headcounts of experienced members says little about the depth of expertise or how tax risk is overseen. The sample is small: its 96 observations come from only 16 firms, so the number of independent clusters is low, firm-clustered standard errors may be unreliable and statistical power is limited. The sample spans different industries, is restricted to profitable firms with complete disclosures, and cannot be generalised to non-multinational firms, loss-making firms or other exchanges. The multinational definition is binary and the two-country threshold is low. A mean ETR close to the statutory rate is not evidence of low avoidance, because ETRs reflect deferred taxes, incentives and permanent differences. The six-year window is short and is affected by the pandemic and by changing tax incentives. Finally, the controls leave out factors such as inventory intensity, institutional ownership and tax losses.

Future studies could enlarge the sample or focus on a single sector, report wild cluster bootstrap p-values and specifications with year effects and a log-transformed size variable, use alternative avoidance measures such as cash ETR or book–tax differences, and test other proxies for tax governance, for example tax-specific expertise, a written tax policy or a board- level tax committee. Variables that capture cross-border planning, particularly transfer pricing, would also be a natural addition. For practitioners, the findings suggest that capital intensity alone is a weak screen for tax avoidance risk. Tax authorities may get more from examining cross-border related-party arrangements, and firms that want stronger tax governance should consider written policies and explicit board-level discussion of tax risk, rather than relying only on the number of experienced members.

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