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Profitability and Leverage on Tax Avoidance: The Moderating Role of Firm Size in Indonesian SOEs

Mariawati[1], Meythi[2*], Riki Martusa[3] , Filia Theresia Kurniawati[4]
[1,2,3,4)]Program Pasca Sarjana Magister Akuntansi, Universitas Kristen Maranatha, Bandung, Indonesia
Maria_ig@ymail.com, meythi@eco.maranatha.edu, riki.martusa@eco.maranatha.edu, filia.theresia@gmail.com

*Corresponding Author
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ABSTRACT

This study examines the effect of profitability and leverage on tax avoidance with firm size as a moderating variable in Indonesian state-owned enterprises (SOEs) during 2020–2024. This study uses secondary data obtained from annual financial reports of SOEs listed on the Indonesia Stock Exchange and applies panel data regression analysis. The sample was selected using purposive sampling. The Chow, Hausman, and Lagrange multiplier tests are used to pick models, and the Fixed Effects Model is determined to be the best estimating technique. Given that its impact on the Effective Tax Rate (ETR) is statistically significant and positive, the results of the empirical research demonstrate that greater profitability (ROA) is associated with higher ETR, indicating lower levels of tax avoidance. Conversely, the DER suggests that leverage has no significant effect on tax avoidance. Additionally, it has been noted that firm size (FS) has a moderating effect on the profitability tax avoidance nexus, weakening the positive effect of profitability on ETR. Nevertheless, the relationship between leverage and tax avoidance is not moderated by the FS. The study focuses on the significance of firm-specific characteristics and contributes actual data on tax avoidance practices to the literature on accounting and taxation in SOEs. Practically speaking, the results can help legislators and tax authorities create more efficient government surveillance programs to increase tax payments, particularly among the biggest and most lucrative SOEs.

Keywords: Profitability, Leverage, Firm Size, Tax Avoidance.

INTRODUCTION

One of the most significant sources of funding for public services and national growth is tax revenue. To maximise fiscal capacity and promote economic development, the government of many developing nations, including Indonesia, keeps stepping up tax compliance. However, businesses usually use various tax planning means to slash their tax obligations a practice known as tax avoidance. Even though tax avoidance is largely defined as a legal practice due to the fact that it is based on a loophole in tax laws, excessive tax avoidance can decrease the revenue of the government and cause an issue in terms of transparency and corporate governance procedures (Boateng et al., 2022; Mkadmi & Ben Ali, 2024; Yasmin et al., 2024).

It is especially problematic when it comes SOEs. SOEs as organizations that are either partially or completely owned by the government are supposed to show better accountability and adherence to the taxation policies than privately owned firms do. But in reality, SOEs are faced with complicated institutional settings where they have to balance financial achievement and the role of serving the people. These dual roles also present managerial pressures that may influence financial decision-making processes, such as decisions related to tax planning and tax compliance. Therefore, the question of how to determine the determinants of tax avoidance behavior of SOEs is a significant question to the policymakers and researchers.

In terms of money, some of the most common determinants of tax avoidance are profitability and leverage. Profitability refers to a firm's ability to generate earnings from its assets and

operations (Candra et al., 2024; Erwan et al., 2023; Mulyadi et al., 2024; Novia & Meythi, 2022). More profitable firms usually have a higher taxable liability since they have a higher taxable income which may motivate managers to devise tax planning strategies so as to cut down the amount of tax paid at any given time. Meanwhile, leverage measures the degree to which firms are dependent on debts (Ernawati & Purwaningsih, 2022; Natalina, 2023). Interest paid in debt is tax deductible and this theoretically encourages companies to employ debt financing as a tool of minimizing the taxable income and in the process, leading to higher tax avoidance (Fadhila & Andayani, 2022; Purnomo & Widyawati, 2022).

In spite of these arguments that are based on theory, there is no consistent empirical evidence regarding the effect of these variables on tax avoidance. Some of the studies indicate the positive effect of profitability on tax avoidance behavior since more tax aggressive strategies are enforced by profitable firms (Margaretha & Jenni, 2019; Yolanda & Zahran, 2024). Contrarily, other works state that there is a negative correlation between profitability and tax avoidance, which can be interpreted as the fact that the better the financial performance is, the larger the tax compliance (Harahap et al., 2024; Wida Rahmayani et al., 2021). Also, other research works report that profitability is no longer a critical factor in determining the tax avoidance behavior (Aini & Ikram, 2025; Gunawan & Joni, 2021). Such contradictory results demonstrate the necessity to conduct additional research to determine the connection between profitability and tax avoidance.

The same inconsistencies are also witnessed in other studies that have been executed to understand the association between leverage and tax avoidance. According to several studies, leverage impacts tax avoidance positively since companies can finance their activities using debt because they can lower their taxable income under the deductions of interest (Enggelina, 2024; Putri et al., 2021). Nonetheless, other researchers conclude that leverage does not have a major impact on the tax avoidance behavior (Harahap et al., 2024; Sophian & Putra, 2022). Moreover, leverage is sometimes found to decrease tax avoidance due to increased examination of highly leveraged companies by creditors and regulators (Karina et al., 2021). Such contradicting results indicate that leverage and its role in corporate tax behavior are inconclusive.

Firm size (FS) is another aspect that can also affect corporate tax avoidance behavior. The bigger companies tend to be organized more, have more activities that they engage in and also tend to have more financial resources. They can enable big companies to avail professional tax skills and use more complex tax planning techniques. Simultaneously, massive companies usually have more control over the watchfulness of the regulators and the wider audience, which can prompt them to be more tax-compliant. Thus, the FS can have both a direct and indirect impact on tax avoidance by attenuating the association between the financial performance and the corporate tax behavior (Hendayana et al., 2024).

In the past, it has been proposed that the association between financial variables and tax avoidance can be enhanced by FS. Due to larger resource strength and organizational complexity, larger firms might be stronger with respect to their ability to plan taxes. Nonetheless, empirical data on the moderation of the impact of FS is scarce and inconclusive. Other studies also reveal that there is a positive association between the FS and financial performance and tax avoidance, although others also establish that the FS does not moderate the firm-to-firm relationships significantly (Aritonang et al., 2024; Monica et al., 2023). These unstable results emphasize the necessity to investigate more the moderating effect of the FS in corporate tax avoidance behavior.

Besides the uneven empirical results, the majority of the past studies concentrate on the companies privately owned or particular industrial industries like manufacturing, mining, or food and beverage industries. The literature that directly analyses the behavior of tax avoidance in SOEs businesses in Indonesia is rather scarce. Unlike the private firms, SOEs possess specific institutional features due to the fact that they work under the ownership of the state and are accountable to the public, yet they are supposed to be financially efficient and profitable.

Moreover, the 2020-2024 period is the period of economic recovery after the COVID-19 crisis, when most of the SOEs underwent financial reorganization, capital structure changes, and revision of fiscal policies. The conditions can affect corporate financial decision making and tax planning actions. A study on tax avoidance behavior at this time can therefore be of great help in

understanding how financial performance and corporate nature influence the tax compliance by SOEs.

On the basis of these considerations, this paper will be an analysis of how profitability and leverage influence tax avoidance with FS as a moderating factor in SOEs in Indonesia in the period 2020-2024. This study aims to add to the corporate taxation and financial management literature and offer a practical implication to policymakers regarding how to address better tax compliance and governance in the SOEs by concentrating on SOEs and including a moderating variable of FS.

LITERATURE REVIEW

Tax Avoidance

Tax avoidance is a concept that involves corporate practices that are trying to reduce tax payments through taking advantage of taxation laws by exploiting lapses or uncertainty in taxation laws without necessarily breaking the law. Despite the fact that tax avoidance is deemed lawful, it can lower the potential government revenue and cause some concern in the issue of corporate transparency and tax compliance (Hanlon & Heitzman, 2010).

The ETR is a widely used way of measuring tax avoidance in empirical research. The ETR is the quantity of corporate income deposited in form of tax as a percentage of earnings before tax. The value of ETR is also lower, which means there is high tax avoidance; it means that the company pays less of its income in taxes (Angel et al., 2022; Yolanda & Zahran, 2024).

Profitability and Tax Avoidance

Profitability reflects a firm's ability to generate earnings from its assets and operations (Martusa et al., 2025; Nurhalizah et al., 2025). ROA is one of the most commonly used measures of profitability in financial studies. ROA helps in the determination of the efficiency with which the company leverages its total assets to make net income.

The agency theory states that managers can put efforts to lower company tax payments to maximize after-tax earnings and enhance the performance of firms (Jensen and Meckling, 1976). The more profitable companies will raise more profit that is subject to tax and this is a possible motivator to the management to consider the tax planning strategy to cut down on tax liability.

Past research has given contradictory results on the connection between profitability and tax avoidance. According to some studies, the greater is the profitability, the more probable the tax avoidance since a firm with higher profitability is better motivated to reduce its tax burden (Margaretha & Jenni, 2019). However, according to other research, companies that are profitable are more willing to comply with tax policy because they are more openly checked and have a reputation to consider (Wida Rahmayani et al., 2021). Based on agency theory and past empirical studies, financially successful companies are more likely to continue being highly compliant with taxation procedures in order to retain the reputation and legitimacy of the business. Hence, profitability is supposed to affect the behavior of tax avoidance.

Based on agency theory and empirical findings, more profitable firms tend to maintain higher tax compliance to preserve legitimacy and corporate reputation. Since tax avoidance is inversely measured by the ETR, a higher ETR indicates lower tax avoidance. Therefore, this study proposes the following hypothesis:

H1: Profitability has a negative effect on tax avoidance.

Leverage and Tax Avoidance

Leverage is the debt ratio of the business enterprise. One of the most common measurements of leverage is the DER, which is a measure of ratio between the total debt and shareholders equity.

The interest costs are higher in companies that have more leverage. Interest payments are usually deductible from taxes, so the companies can utilize debt financing as one of the mechanisms to decrease the taxable income and decrease corporate taxes (Fadhila & Andayani, 2022).

There are also inconsistencies between empirical results on the effect of leverage on tax avoidance. In other studies, they state that leverage impacts tax avoidance positively because companies can use their deductions on interest to minimize the taxable income (Putri et al., 2021).

Conversely, the findings of other research indicate that more scrutiny of creditors can be imposed on the high-leverage firms, and hence they might not encourage aggressive tax avoidance (Karina et al., 2021). The interest on the debt finance is deductible to tax and potentially affects the corporate tax policies. As such, the leverage is likely to affect the tax avoidance behavior.

H2: Leverage has a positive effect on tax avoidance.

Firm Size as a Moderating Variable

The size of firms is often linked with financial capability of the firm, complexity of operations, and availability of resources. The bigger companies usually have more advanced financial systems and access to more professional tax advice, which can help them to adopt more advanced tax planning methods (Pahala et al., 2021).

Yet, the big companies also experience increased pressure by the authorities, shareholders, and the community. This enhanced monitoring can add stimulus to the companies to be more tax compliant and transparent to safeguard their corporate reputation and legitimacy.

With such properties, the firm size can be a moderating variable, which can be used to determine the association between profitability, leverage, and tax avoidance. A number of empirical studies also suggest that the size of a firm may either enhance or diminish the effects that the variables of financial performance have on tax avoidance behavior (Aritonang et al., 2024; Monica et al., 2023). Based on these arguments, firm size may moderate the association between profitability and tax avoidance plus leverage and tax avoidance.

H3: Firm size weakens the negative effect of profitability on tax avoidance.
H4: Firm size weakens the positive effect of leverage on tax avoidance.

METHOD

This study employs a quantitative approach with a causal associative research design to examine the association between profitability, leverage, firm size, and tax avoidance in Indonesian SOEs. The quantitative method is applied to analyze the relationships among variables through statistical testing based on numerical data. The population includes all SOEs listed on IDX. Specifically, the research concentrates on firms included in the IDX SOEs20 Index, which is the group of the SOEs and their affiliates that take the comparatively high market capitalization and liquidity rates.

Purposive sampling, which is a selection method involving the picking of companies according to certain criteria which are pertinent to the research focus, was utilized in the research to determine the sample. The sampling method is employed to make sure that the chosen companies furnish all and sufficient financial information needed to gauge the variables being utilized in the study. Table 1 displays the process of the sample selection.

Table 1 Sample Selection

No	Sample Selection Criteria	Number of Companies
1	SOEs included in the IDX SOEs20 Index	20
2	Companies that publish complete annual financial statements during 2020–2024	20
3	Companies with complete data required for measuring all research variables	20
	Total Sample Companies x Periode 2020–2024	**20 x 5 = 100**

The first criterion will make sure that the companies reflect the Indonesian SOEs that are actively listed on IDX. The second criterion is that there should be availability of full financial statements at the time of observation so that there is consistency in the data. The third criterion makes sure that every variable that will be used in this research is measurable. According to those criteria, the ultimate sample will comprise 20 companies. This study will use 100 firm-year

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observations (20 companies × 5 years) to get the total number of observations to be used within the observation period (five years).

In this study, secondary data are employed; secondary data sources are the ones that are publicly available. The information is comprised of annual financial statements of the SOEs that are members of the IDX SOE20 Index in 2020-2024 period. The documentation method was employed in the collection of the data through reviewing and recording the appropriate information on the annual publications of the company. The official websites of the IDX (www.idx.co.id) and the official websites of respective companies were used to get the financial reports. The data gathered contains data of net income, total assets, total liabilities, equity, and corporate income tax payment to be used in calculating the research variables.

The variables that are used in this study are tax avoidance as dependent variable, profitability as independent variable, leverage as independent variable, and firm size as moderating variable. Table 2 gives the operational definitions and measurements of the variables.

Table 2 Variable Measurement

Variable	Type	Proxy	Measurement
Tax Avoidance	Dependent	Effective Tax Rate (ETR)	Tax Expense / Earnings Before Tax
Profitability	Independent	Return on Assets (ROA)	Net Income / Total Assets
Leverage	Independent	Debt to Equity Ratio (DER)	Total Debt / Total Equity
Firm Size	Moderating	Firm Size (FS)	Natural logarithm of total assets (LnTA)

The lower ETR means that there is a high rate of tax avoidance as the lower rate of tax paid reflects on a lesser proportion of corporate income paid as tax. The profitability is also determined by the use of ROA, which is the factor that determines how a company will make profits on its assets. Leverage is computed as the DER that displays the characteristics of dependence of firms on debt as a source of financing. The size of firms is obtained by the natural logarithm of total assets (LnTA), which is usually employed to calculate the size of the companies in financial studies.

The analysis of data in this research is the panel data regression analysis, which is performed with the support of EViews software. Panel data analysis combines cross-sectional data from various firms and time-series data over a specific observation period, leading to more trustworthy estimation outcomes. Initially, a descriptive statistical analysis is performed to outline the characteristics of the data. Several classical assumption evaluations are also carried out to confirm the regression model's integrity, including normality tests, multicollinearity, and heteroskedasticity. In the context of panel data regression analysis, three estimation models are assessed: the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The decision to choose the appropriate model is executed using the Chow test, Hausman test, and the Lagrange Multiplier (LM) test to identify the most suitable approach. The empirical regression model established in the study is outlined as follows (Herawati & Jaeni, 2024; Winarno, 2017). The regression model employed in this study is designed as follows:

$$ETR = \alpha + \beta 1ROA + \beta 2DER + \beta 3(ROA \times LnTA) + \beta 4(DER \times LnTA) + \epsilon$$

Where:
ETR = *Effective Tax Rate* (*tax avoidance*).
ROA = *ROA* (profitability).
DER = *Debt to Equity Ratio* (*leverage*).
LnTA = *Log natural total assets* (firm size).
ROA×LnTA,DER×LnTA = interaction terms (moderation)

RESULTS

Descriptive Statistics

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Concerning all the factors being examined in the suggested research, which include profitability (ROA), leverage (DER), Firm Size (FS), tax avoidance (ETR), along with the interaction of profitability and size (ROAxFS), and the interaction of leverage and size (DERxFS) as the moderating factors, a statistical descriptive analysis is carried out to provide an initial look at the features of the data. Descriptive statistics are displayed through the use of mean, median, minimum, maximum, and standard deviation measures. Consequently, these metrics reveal the distribution of the data, the extent of variability within the companies, and the patterns observed in this research.

Table 3. Descriptive Statistics Analysis

	ROA	DER	FS	ETR	ROAFS	DERFS
Mean	0.043529	4.830140	33.20007	0.205920	1.420000	162.8140
Median	0.018755	3.819000	33.42710	0.200000	0.650000	129.0500
Maximum	0.281740	16.07900	35.42552	0.480000	8.900000	539.0000
Minimum	-0.034990	0.420000	30.18043	-0.250000	-1.100000	12.90000

In accordance with the descriptive statistical evaluation of SOEs during 2020-2024, some interesting features of the research variables can be pointed out. These are profitability ROA and DER, FS, tax avoidance in terms of the ETR, and terms of interaction ROAxFS and DERxFS, which are moderating factors.

The mean profitability, which is characterized by the ROA, is at 0.0435. This is an indication that on average, the returns on the total assets of SOEs are about 4.35 percent. The median ROA at 0.0188 is less than the mean which indicates that more firms are below profitability than the mean resulting in a slightly skewed distribution to the right. The values of ROA are (-0.0350 to 0.2817) depicting a varied performance terrain at the company level with some companies making negative returns and other companies recording relatively high profitability. This dispersion brings out the variation in the efficiency of operations of SOE in the period of observation.

The FS in natural logarithmic of the total assets is averaged at 33.2001 with median value of 33.4271. The values 30.1804 and 35.4255 that are the minimum and maximum values respectively indicate that the sample size includes quite small and large SOEs. This non-homogeneity brings out the difference in the ownership of assets of the firms under consideration and operational size.

Descriptive statistics show that the average ETR of SOEs in the 2020-2024 period is equal to 0.2059, which implies that enterprises are subjected to the effective corporate tax rate of about 20.59 percent of their pre-tax income. The value of the median (0.2000) shows a fairly equal distribution of tax payments between firms. The ETR values range from -0.2500 to 0.4800, indicating variations in tax planning practices, fiscal incentives, and corporate tax accounting adjustments across firms and observation periods. Furthermore, the interaction variables ROA×Size and DER×Size exhibit considerable variation, indicating differences in how FS moderates the relationship between financial performance and tax avoidance behavior across SOEs. In general, the descriptive statistics indicate that the research data have enough variability and can be further analyzed by the panel data regression analysis.

The presence of negative ETR values suggests that several SOEs obtained tax benefits during the observation period. This condition may result from fiscal loss compensation, deferred tax benefits, tax restitution, or adjustments related to corporate income tax accounting policies. Therefore, negative ETR values do not necessarily reflect abnormal tax behavior but may represent specific fiscal and accounting conditions faced by firms during the 2020–2024 period.

To verify the validity of the regression model, a number of classical assumption tests were performed, which include normality test, multicollinearity test and heteroskedasticity test. The Jarque-Bera test values show probability of 0.072 exceeds the value of 0.05 hence the assumption of the residues being distributed normally holds. Multicollinearity analysis shows that the centered Variance Inflation Factor (VIF) values of all independent variables are below the critical level (10), which means that there are no problems of multicollinearity in the model. Also, the heteroskedasticity test value is seen to be greater than 0. 05 which confirms that the model is not

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heteroskedastic. Therefore, the regression model is classical in nature and can be examined further with the use of panel data regression.

Model Estimation

Once it was determined that the research data follow the classical assumption and meets the required requirements to conduct the further analysis, the panel data regression model was estimated. Three major methods of estimation are used in the analysis of panel data: CEM, FEM, and REM. As both these approaches deal with cross-sectional and time-series variations in a different way, the choice of a specific model is a critical step towards the objective and correct estimation outcomes. The models that have been used in this study include the Chow test, the Hausman test, and the LM test, among others, which were used to determine the best estimating model.

Table 4 CEM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.175729	0.032825	5.353443	0.0000
ROA	3.438308	5.898316	0.582930	0.5629
DER	-0.126421	0.092234	-1.370655	0.1773
ROAFS	-0.095092	0.187168	-0.508055	0.6139
DERFS	0.003846	0.002739	1.404023	0.1672
R-squared	0.086680	Mean dependent var		0.205920
Adjusted R-squared	0.005496	S.D. dependent var		0.105645
S.E. of regression	0.105354	Akaike info criterion		-1.568334
Sum squared resid	0.499480	Schwarz criterion		-1.377132
Log likelihood	44.20836	Hannan-Quinn criter.		-1.495523
F-statistic	1.067700	Durbin-Watson stat		1.279627
Prob(F-statistic)	0.383603			

The predictors and the moderating factors do not have a statistically significant effect on tax avoidance in SOEs within the timeframe between 2020 and 2024, which can be seen in the estimation results provided by the CEM in the level of 5 percent significance. The p-values of all explanatory variables are greater than the 0.05 mark, which supports this observation.

According to the regression result, the constant coefficient (C) stands at 0. 175729 and the p-value is 0. 0000. It means that the ETR equals approximately 17. 57 percent assuming that such factors as profitability, leverage, and conditions of their interaction are zero. The intercept therefore indicates a low level of tax paid by SOEs which has not been accounted by the variables in the model.

ROA bears a positive coefficient of 3.438308 as a measure of profitability. But the p- value of 0.5629 is not less than 0.05 and therefore, the two variables are not correlated significantly in terms of profitability and tax avoidance. It implies that the variation in ETR of SOEs within the period under observation cannot be substantially related to the changes in the level of profitability.

The DER coefficient which is related to leverage bears a negative value of -0. 126421 with the probability of it being 0.1773. These findings mean that the leverage cannot have any substantial effect on tax avoidance behaviors. Although leverage theoretically reduces taxable income through interest expense deductions, the empirical results do not support a significant relationship between leverage and tax avoidance among SOEs.

Also, the likelihood of interaction between the ROA×Firm Size is 0.6139, and the coefficient is -0.095092. This means that profitability and tax avoidance have no moderating effect of the firm size implying that the effect of profitability on tax behavior is insignificant irrespective of the firm size. Similarly, the association between the DER×FS has a positive coefficient of 0. 003846. Nevertheless, the p-value of 0. 1672 is not less than 0. 05, and it means that this indicates that firm

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size does not significantly moderate factor in the relationship between leverage and tax avoidance. Simply put, the firm size has no impact on the effect of leverage on the tax avoidance behaviour.

In regards to model adequacy, the R-squared value of 0.086680 shows that the predictors and the interactions between the predictors explain the variance in tax avoidance of about 8.67 percent. The adjusted R-squared of 0.005496 is also an indication that the model is not very explanatory. Also, the overall F-statistic probability value of 0.383603 and above 0.05 proves that the model, in general, is not statistically significant.

Summing up these results, the findings obtained through the Common Effect Model show that such variables as profitability, leverage, and their relationships with the FS cannot provide significant information about the tax-avoidance behavior of SOEs between the years 2020-2024. This is an indication that there are a multitude of non-financial variables that are not reflected by the present model like institutional or government ownership arrangements and regulatory controls, which might contribute more to the tax-avoidance behavior of the SOEs.

Table 5 FEM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.168588	0.156305	1.078583	0.2879
ROA	25.60065	9.419180	2.717928	0.0100
DER	-0.521492	0.629487	-0.828441	0.4129
ROAFS	-0.786053	0.300235	-2.618128	0.0129
DERFS	0.015711	0.019245	0.816376	0.4197

Specification of Effects

Cross-section fixed (dummy variables)

R-squared	0.450021	Mean dependent var	0.205920
Adjusted R-squared	0.251417	S.D. dependent var	0.105645
S.E. of regression	0.091405	Akaike info criterion	-1.715540
Sum squared resid	0.300775	Schwarz criterion	-1.180174
Log likelihood	56.88851	Hannan-Quinn criter.	-1.511670
F-statistic	2.265927	Durbin-Watson stat	1.653552
Prob(F-statistic)	0.026439		

It is determined that profitability (ROA) and the correlation between ROAxFS are statistically significant according to the Fixed Effects Model of the five percent level of significance, showing that profitability is a key aspect of tax avoidance in the enterprises owned by state over the time of 2020 through 2024. However, DER×FS are not showing considerable results. The regression analysis indicates that the intercept value is not significant with a constant coefficient of 0. 168588 that has probability 0.2879 which is greater than 0,05. This finding indicates that firm-specific characteristics play an important role in explaining tax avoidance behavior among SOEs.

The profitability based on the ROA is positively correlated with a value of 25.60065 and a probability of 0.0100 which is less than the 0.05 level. This indicates that profitability is positively associated with the ETR. In practice, SOEs that are more profitable are more likely to report higher ETR, indicating lower levels of tax avoidance. On the other hand, leverage or DER has a negative correlation with a coefficient of -0.521492 and a probability of 0.4129. This shows that leverage is not statistically significant with regard to tax avoidance behaviors of SOEs. Therefore, the differences in ETR are not considerably influenced by capital structure differences in explaining the effects of firm-specific variables.

The interaction between profitability and firm size, as represented by the ROA× FS, is statistically significant at the 5 percent level with a coefficient of -0.786053 and a p-value of 0.0129. The negative coefficient indicates that the positive effect of profitability on tax compliance becomes weaker as firm size increases. This may occur because larger SOEs tend to face greater public scrutiny and stricter transparency requirements.

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Conversely, the interaction between DER and FS is not significant to the extent to which the value is 0.015711 with a probability of 0.4197. This suggests that the leverage-tax avoidance interaction effect is not related to the size of the firm hence the effect of leverage on tax behavior is similar across the SOEs of differing sizes.

In terms of model performance, the R-squared of Fixed Effects Model is 0.450021, and it implies that the independent variables, interaction terms, and firm specific effects are contributing around 45.00 percent to the variation in the tax avoidance. The adjusted R-squared of 0.251417 means that after adjustment. Also, the P value of F statistic, 0.026439 is less than the 0.05 level, which confirms that the model is statistically significant in general.

To conclude, FEM beats CEM regarding the extent of explanation it gives and it is worthwhile to note that when examining the tax avoidance practices in SOEs, it is important to examine the variations that occur in individual firms. The output implies that profitability and its correlation with the size of the company are critical determinants of the tax-avoidance policies of the SOEs, although leverage-related factors do not have a substantial effect on the tax behavior in the 2020-2024 years.

Tabel 6 REM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.176243	0.038472	4.581049	0.0000
ROA	9.787846	6.324148	1.547694	0.1287
DER	-0.165571	0.112272	-1.474725	0.1472
ROAFS	-0.292475	0.201043	-1.454788	0.1527
DERFS	0.005028	0.003334	1.507951	0.1386
Effects Specification				
			S.D.	Rho
Cross-section random			0.042287	0.1763
Idiosyncratic random			0.091405	0.8237
Weighted Statistics				
R-squared	0.125063	Mean dependent var		0.143119
Adjusted R-squared	0.047291	S.D. dependent var		0.099466
S.E. of regression	0.097085	Sum squared resid		0.424151
F-statistic	1.608074	Durbin-Watson stat		1.358983
Prob(F-statistic)	0.188732			
Unweighted Statistics				
R-squared	0.058914	Mean dependent var		0.205920
Sum squared resid	0.514665	Durbin-Watson stat		1.119980

The findings of the REM analysis suggest that the predictors are not significantly relevant to the SOEs tax avoidance between 2020 and 2024 with a significance level of five percent, with the moderating variable. This finding is supported by the p-values of all the explanatory variables since they all exceed 0.05.

The constant term is statistically significant, indicating the baseline level of the ETR when all independent variables are assumed to be constant. A coefficient of 0.176243 and p-value of 0.0000. It suggests that the ETR of SOEs will be about 17.62 percent when profitability and leverage are zero, and when it is coupled with these two factors. The intercept will therefore be the amount of tax paid by SOEs without the intervention of any financial effects of the model.

The coefficient of profitability expressed as ROA is 9.787846 with a p-value of 0.1287 which is more than the common significance level of 0.05. As a result, the ETR changes, which are

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realized in the context of the study, cannot be associated with profitability variations across the SOEs, which means that the profitability does not have any significant effect on tax avoidance.

The coefficient of leverage proxy is DER and its coefficient is = -0.165571 with a probability value of 0.1472. This p-value is greater than 0.05 which means that leverage does not impact tax avoidance significantly, and there is no significant correlation between the debt levels of SOEs and their tax avoidance strategies. In the same manner, the interaction term of ROA and the size of the company has a p-value of 0.1527, and a coefficient of -0.292475, which is more than the 0. 05 cutoff. This shows that the size of the business does not change the correlation between profitability and tax avoidance and this implies that the effect of profitability on tax behavior is not changing between the SOEs of different sizes.

Moreover, the correlation between leverage and DERxFirm Size has a positive coefficient of 0.005028 and the probability value of 0.1386. Such an outcome also suggests that the correlation between leverage and tax avoidance in SOEs is rather independent of the firm size. In terms of model performance, the weighted R-squared = 0.125063, which means that the variables embedded in the Random Effect Model explain an approximation of 12.51 percent of the variation in tax avoidance. Further, the probability value of the F statistic (0.188732) exceeds the 0.05 level of significance, suggesting that there is no overall statistical significance in the model and it is limited in explaining the rate of occurrence. To conclude, the results of the REM analysis suggest that profitability, leverage and their interplay with firm size do not influence tax avoidance behavior in the SOEs significantly.

Table 7 Chow Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.642580	(9,36)	0.0184
Cross-section Chi-square	25.360302	9	0.0026

The Chow test is applied to establish whether the Fixed-Effect or the Common-Effect Model can provide a superior model to explain the panel data. This test compares the fixed-effects framework with a possibly more useful model by testing whether there are significant differences across firms, so justifying the inclusion of firm-specific fixed effects together with the firm variability that the model it is investigating. Table 7 shows that the p-value of the cross-sectional F-statistic is 0. 0184 and the p-value of the cross-sectional beta-statistic is 0. 0026, which are below the 0. 05 threshold hence the rejection of the hypothesis of no heterogeneity. These findings show significant variations between separate firms, confirming the existence of firm-specific effects and showing that the FEM is a better option.

Table 8 Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.767029	4	0.0445

The Hausman test is used in comparing the REM and the FEM with a concentration on the degree of the explanatory variables that would be associated with the unobserved individual-specific effects. The statistical significance of this test is 9. 767029 and the p-value is 0. 0445, which is statistically significant, and that means that the assumption of non-correlation is not true. Thus, a more developed hypothesis that the Random Effects are sufficient is dismissed, which is an additional indicator of the use of the FEM.

This finding depicts a great difference in the FEM and REM. Therefore, it can be concluded that the FEM would be more suitable in the research than the REM. The results show that in order to obtain effective and objective estimates on the subject of tax avoidance behavior in SOEs between 2020-2024, it is necessary to take into account firm-specific features with the explanatory variables.

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Table 9 LM Test

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	0.429808 (0.5121)	1.736639 (0.1876)	2.166447 (0.1411)

Lagrange Multiplier test is leveraged to establish which model to use between the REM and the CEM when estimating panel data. The objective of this test is to determine whether the model incorporates random effects and their inclusion introduces a significant improvement over the pooled regression model.

As Table 9 shows, the p-value of the cross-sectional effect is equal to 0.5121 and the p-value of the time effect is equal to 0.1876. The p-value of the combined effect is 0.1411.

Since all these values are greater than 0.05, the null hypothesis is accepted which means that the panel data model does not have any statistically significant random effects. Therefore, the CEM is considered to be more suitable and the REM is not necessary. The combination of the panel data model selection tests shows that the Chow test results show that the FEM outperforms the CEM in cases of heterogeneity across cross-sectional. Hausman test shows that the individual-specific effects are related to the explanatory variables that once again confirms the Fixed-Effects specification. Conversely, the LM test results indicate that the REM is not preferable to the CEM, as the probability values are greater than 0.05. This suggests that random effects are not statistically significant in the model. However, despite the LM test favoring CEM over REM, the Chow test and Hausman test consistently support the FEM. Therefore, FEM was selected as the most appropriate estimation model because it is better able to capture firm-specific heterogeneity among SOEs during the 2020–2024 period.

DISCUSSION

Profitability and Tax Avoidance

The Fixed Effect Model estimates show that the coefficient of ROA is 25.60065 with the probability of 0.0100, which is less than the 5 percent significance. This result indicates that profitability has a positive and statistically significant impact on the ETR. Because the increasing ETR means the lesser tax avoidance, the outcome implies that more lucrative SOEs are likely to be more tax compliant.

This result indicates that profitability positively affects ETR. Since a higher ETR reflects lower tax avoidance, the findings imply that more profitable SOEs tend to exhibit lower levels of tax avoidance and higher tax compliance. Therefore, the findings support H1, which proposes that profitability has a negative effect on tax avoidance. This finding is consistent with prior studies (Harahap et al., 2024; Wida Rahmayani et al., 2021), which found a negative relationship between profitability and tax avoidance based on the fact that the companies with better financial performance tend to have greater tax compliance in order to preserve their image and legality. However, this observation is contrary to the findings of (Margaretha & Jenni, 2019; Yolanda & Zahran, 2024), who came up with the observation that higher profitability can encourage firms to employ tax avoidance strategies to reduce their taxes. These opposite outcomes may occur due to the fact that the SOEs are more regulated and controlled by the citizens in comparison with the privately owned enterprises.

Leverage and Tax Avoidance

The estimation results indicate that leverage (DER) has no statistically significant effect on tax avoidance. The coefficient value is -0.521492 with a probability value of 0.4129, indicating that leverage is not a significant determinant of tax avoidance behavior in SOEs.

This result does not support H2, which states that leverage has a positive effect on tax avoidance. This result is in line with the findings of (Harahap et al., 2024; Sophian & Putra, 2022), which also found that leverage has no significant influence on tax avoidance. One possible explanation is that more leveraged companies may be more heavily monitored by creditors, which

may limit their ability to engage in aggressive tax avoidance practices. However, this finding contradicts the results of (Enggelina, 2024; Putri et al., 2021), which showed that leverage positively impacts tax avoidance because interest expenses can reduce taxable income.

Moderating Effect of Firm Size on the Relationship between Profitability and Tax Avoidance

The findings reveal that firm size plays a significant moderating role in the relationship between profitability and tax avoidance, as indicated by a coefficient of -0.786053 and a probability value of 0.0129. This suggests that firm size weakens the positive effect of profitability on ETR. Since a higher ETR reflects lower tax avoidance, the negative relationship between profitability and tax avoidance becomes less pronounced in larger firms. In other words, although more profitable firms tend to engage in lower tax avoidance, this effect becomes weaker as firm size increases.

This result supports H3, which states that firm size weakens the relationship between profitability and tax avoidance. This finding is consistent with prior studies (Aritonang et al., 2024; Monica et al., 2023), which suggest that large firms possess greater resources and organizational complexity, enabling them to implement more sophisticated tax planning strategies that may reduce the strength of the profitability–tax avoidance relationship.

Moderating Effect of Firm Size on the Relationship between Leverage and Tax Avoidance

The results indicate that the interaction between leverage and firm size is not statistically significant, as reflected by a probability value of 0.4197. This suggests that firm size does not moderate the relationship between leverage and tax avoidance. Therefore, this result does not support H4.

This finding is consistent with prior research (Junaidi & Yunita, 2024), which also found that leverage and firm size do not significantly influence tax avoidance when considered simultaneously. This suggests that the effect of leverage on tax avoidance remains relatively consistent across firms of different sizes and is not influenced by organizational scale.

CONCLUSION

This study employs panel data regression to examine the effects of profitability and leverage on tax avoidance in Indonesian SOEs during the period 2020–2024, with firm size as a moderating variable. The Fixed Effects Model was identified as the most appropriate model, highlighting the importance of firm-specific characteristics in explaining corporate tax behavior.

The results indicate that profitability has a significant negative effect on tax avoidance, suggesting that more profitable firms tend to exhibit higher tax compliance. This finding implies that financially strong SOEs are less likely to engage in aggressive tax avoidance practices, possibly due to greater regulatory scrutiny and the need to maintain legitimacy and public trust.

In contrast, leverage does not have a significant effect on tax avoidance, indicating that debt financing decisions in SOEs are not primarily driven by tax minimization motives.

Furthermore, firm size is found to significantly moderate the relationship between profitability and tax avoidance by weakening this relationship. This suggests that the influence of profitability on reducing tax avoidance becomes less pronounced as firm size increases. However, firm size does not moderate the relationship between leverage and tax avoidance.

Nevertheless, the explanatory power of the regression model indicates that tax avoidance behavior may also be influenced by other variables outside the scope of this study, including institutional governance, political influence, and regulatory factors. Overall, the findings suggest that tax avoidance behavior in SOEs tends to be more closely associated with profitability and organizational characteristics than with capital structure factors. These results provide important implications for policymakers and regulators in designing tax policies and governance frameworks that consider firm performance and size characteristics within the SOEs sector.

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