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Tax Avoidance: The Role of Size and Intensity of Indonesian Manufacturing Sector (2021-2024)

ABSTRACT

Tax avoidance is an important issue that impacts state revenue, particularly in the manufacturing sector, which contributes significantly to the national economy. This study aims to verify the influence of company size and capital intensity on tax avoidance among manufacturing firms for the period of 2021-2024 at Indonesian Stock Exchange . The research employs a quantitative verifiable method with a panel data approach. Sampling is conducted using purposive sampling techniques targeting manufacturing companies that meet the research criteria. Data analysis is performed using panel data model testing, classical assumption tests, and multiple linear regression. The findings reveal that company size does not have a notable impact, while capital intensity demonstrates a significant positive effect on tax avoidance. This suggests that as the ratio of fixed assets rises, firms are presented with more opportunities to utilize tax avoidance tactics via effective management of depreciation. The results indicate that that as the proportion of fixed assets increases, companies have greater opportunities to employ tax avoidance strategies through depreciation management. These findings have implications for tax authorities and corporate management to consider internal factors influencing tax compliance, promoting a fairer, more transparent, and sustainable tax system.

Keywords: Company Size, Capital Intensity, Tax Avoidance.

INTRODUCTION

Taxes serve as a primary instrument for supporting the economic development of a country, including Indonesia. As the largest source of revenue for the State Budget, taxes play a crucial role in financing various public needs such as infrastructure development, education etc. Thus, enhancing tax revenue is critical for ensuring fiscal stability and fostering sustainable economic development. (Sidharta, 2017; Du & Li, 2024) In reality, a conflict of interest often emerges between taxpayers and the government. The government aims to increase tax revenues to fund development initiatives, while businesses typically strive to reduce their tax liabilities to boost their net profits. This differing orientation creates potential conflicts of interest, leading to various tax management strategies, ranging from legal tax planning to tax avoidance that exploits regulatory loopholes without explicitly breaking the law. (Sidharta, 2017; Hossain et al., 2024)

The manufacturing sector plays a highly strategic role in the national economy, being a major contributor to Gross Domestic Product and providing significant employment opportunities. The operational complexities within this sector, which encompass production, distribution, and investment in fixed assets, make financial management—including tax strategies—a crucial aspect. Study by Hossain et al. (2024) effective tax avoidance strategies

can help companies navigate costly tax burdens in emerging markets, fostering growth and stability. This retained capital often leads to increased investment in infrastructure, innovation, and job creation, ultimately driving economic progress. Furthermore, Wiafe et al. (2024) highlight that while tax evasion negatively impacts economies by reducing government revenue, a well-managed tax avoidance strategy contributes to the formal economy. This transformation increases transparency and compliance, which can enhance public trust in economic systems and institutions. Azémar and Giroud (2023) assert that international tax reforms, when integrated with sustainable investment strategies, can propel economic development by attracting foreign investments. A balanced approach to tax policies encourages businesses to engage in effective tax planning while ensuring that economies benefit from improved public services funded by legitimate tax revenues. Manufacturing companies must effectively balance compliance with tax regulations and the efficient management of their tax burdens to maintain competitiveness and profitability. One commonly used indicator to measure tax avoidance is the Cash Effective Tax Rate (CETR), which reflects the ratio of tax payments to pre-tax profits. A lower CETR value indicates a higher likelihood of tax avoidance practices. This situation is depicted in the following graph.

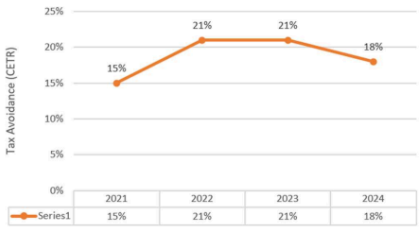

Figure 1. Progress of Cash Effective Tax Rate 2021-2024

Based on Figure 1, that the level of tax avoidance, measured using the Cash Effective Tax Rate (CETR), shows fluctuations during the period of 2021–2024. In 2021, the CETR was recorded at 15%, which then significantly increased to 21% in 2022 and remained at that level in 2023. However, in 2024, the CETR declined again to 18%. This trend reflects changes in corporate tax policies and strategies in managing tax burdens throughout the research period. The increase in CETR during 2022–2023 indicates that some companies are likely reducing tax avoidance practices or enhancing their tax compliance, potentially in response to stricter regulations and intensified oversight by the Directorate General of Taxes. Conversely, the decrease in CETR in 2024 suggests a tendency for companies to revert to tax burden efficiency through tax planning strategies that remain legally permissible, even if they may substantively reduce the amount of tax owed. This illustrates that tax avoidance practices operate within a grey area, balancing formal compliance with tax regulations and aggressive tax avoidance efforts.

One factor suspected to influence tax avoidance practices is firm size. Firm size serves as an indicator of the scale of a company, measurable through total assets, total sales, or market capitalization. In this study, firm size is measured using the natural logarithm (Ln) of total

assets. As the Ln value of total assets increases, so does the scale of the firm. Larger firms tend to possess more adequate resources, broader access to information and technology, and the capability to exploit regulatory loopholes. This situation enables larger companies to devise more efficient and often aggressive tax planning strategies to minimize their tax burdens without violating applicable laws. Another factor that may impact tax avoidance activities is capital intensity, defined as the proportion of fixed assets to total assets owned by the company. Capital intensity reflects a higher level of capital intensity indicates greater investment in fixed assets such as machinery, buildings, and production equipment. In the context of taxation, a high capital intensity presents opportunities for companies to leverage depreciation expenses as a cost component to reduce taxable income. Thus, as the proportion of fixed assets increases, so does the potential for tax burden efficiency through the optimization of depreciation as part of tax avoidance strategies.

The work by Khelil and Khlif (2023) review on tax avoidance in family firms emphasizes that larger firms often possess more resources and complex structures, enabling them to exploit tax regulations effectively and advantage allows bigger companies to engage in strategic tax planning, which in turn increases their likelihood of tax avoidance. Sun et al. (2025) explore how digital transformation can be instrumental in reducing corporate tax avoidance, that larger firms, which typically have higher capital intensity, can leverage digital tools to enhance transparency and compliance, thereby potentially curtailing tax avoidance practices. Suggests that while size can facilitate tax avoidance strategies, it can also provide the means to adopt practices that promote tax compliance. Additionally, Campanella et al. (2023) discuss the shift towards a capital-intensive business model supported by skilled human capital in the context of FinTech, highlights that firms investing heavily in assets and technology are not only better positioned to engage in tax avoidance but may also use their resources to ensure more efficient tax management. Jiang et al. (2023) focuses on tax enforcement and efficiency wages in China, demonstrating that larger firms tend to navigate tax compliance more effectively, partly due to their capability to manage resources efficiently, which allows them to invest in strategies that may reduce their tax liabilities while remaining within regulatory frameworks. Fernández-Rodríguez et al. (2023) examine the institutional determinants of effective tax rates in G7 and BRIC countries, revealing that larger companies often benefit from economies of scale, enabling them to lower their effective tax rates through tax planning and avoidance strategies. The firms with high capital intensity may have the resources necessary to engage in more sophisticated financial practices, optimizing their tax situations through depreciation and other legal deductions.

While various previous studies have examined the factors influencing tax avoidance, the findings regarding firm size and capital intensity still show inconsistencies. Moreover, research specifically investigating this relationship in Indonesian manufacturing companies for the period of 2021–2024 remains limited, especially following the implementation of the Tax Law and post-COVID-19 economic recovery policies. Therefore, this study contributes by providing the latest empirical evidence regarding the assessing how firm size and capital intensity affect tax avoidance in Indonesian manufacturing firms. In line with this, the study aims to assess the extent of the influence of firm size and capital intensity on tax avoidance in manufacturing companies during the period of 2021–2024.

METHOD

The method used in this study employs a quantitative research approach through a verificative analysis. This approach aims to determine and analyze the research variable firm size, capital intensity and tax avoidance during the period of 2021–2024. The population for this research includes 228 manufacturing firms registered on the Stock Exchange within the specified timeframe. Sampling is conducted using purposive sampling, which following these criteria, the researcher identified 12 manufacturing companies as the sample. The criteria used include: (1) manufacturing companies fully listed on the Stock Exchange during the research period; (2) companies that publish complete financial reports; (3) firms that report pre-tax profits and have not incurred losses; (4) companies that present financial statements in Indonesian Rupiah (IDR); and (5) firms that do not exhibit outlier data during the research period.

This study operationalizes three main variables: tax avoidance as the dependent variable, and firm size and capital intensity as independent variables. The operational definitions and measurements of these variables are presented in the following Table 1:

Table 1. Operational Variables

Variable	Indicator
Tax Avoidance	$CETR = \frac{Cash\ Taxes\ Paid}{Pre-tax\ Income}$
Firm Size	$Size = Ln\ (Total\ Aset)$
Capital Intensity	$CI = \frac{Total\ Fixed\ Assets}{Total\ Assets}$

The analytical method employed in this study is multiple linear regression analysis. Data analysis is conducted using statistical calculations with the application of EViews version 12. Beyond measuring the strength of the relationship between two or more variables, regression analysis also indicates the relationship between the dependent variable and the independent variables. Before performing regression analysis, the data is first tested through classical assumption tests, followed by hypothesis testing.

RESULT AND DISCUSSION

This study utilizes panel data, which is a combination of time series and cross-sectional data. The time series data illustrates the development of research variables over the period of 2021–2024, while the cross-sectional data encompasses several manufacturing companies listed on market stock. The use of panel data offers advantages over solely employing time series or cross-sectional data, as it captures the dynamics of changes over time along with the differences in characteristics among companies, resulting in more accurate and informative estimates. Prior to conducting multiple linear regression analysis, the study performs a series of tests to determine the most appropriate panel estimation technique. The Chow test conducted

to compare the CEM with the FEM, the Hausman test is employed to ascertain whether the model is more suitable and the Lagrange Multiplier test.

Table 2. Model Selection Tests

No	Model	Probability	Ho	Conclusion
1	Chow Test	0.0007	H_0 reject (Cross-section Chi-square < 0.05)	The selected model is FEM
2	Hausman Test	0.3790	H_0 accept (Cross-section random > 0.05)	The selected model is REM
3	Lagrange Multiplier Test (LM)	0.0110	H_0 reject (Both < 0.05)	The selected model is REM

The results of the model selection tests, the first step involved the Chow Test results indicated that the value was 0.0007 (0.0007 < 0.05). Therefore, H_0 is rejected, and the appropriate model is FEM. Next, the Hausman Test results showed that value was 0.3790 (0.3790 > 0.05). Thus, H_0 is accepted, and the model used is REM. Finally, a Lagrange Multiplier (LM) Test results indicated a value of 0.0110 (0.0110 < 0.05), meaning that H_0 is rejected, and the appropriate model is REM.

The tabel 2 results of the tests, it can be concluded that the most appropriate estimation model for this study is REM, as it is considered the most efficient and aligns well with the characteristics of the panel data used. To test the regression for bias, the BLUE criteria are used as a reference for evaluating the data results. The tests results are presented in Table 3 below:

Table 3. The Assumption Tests

No	Classical Assumtion	Result	Criteria	Decision
1	Normality testing	Probability = 0,805041	Prob > 0.05	Normal
2	Multicollinearity testing	Centered VIF X1 = 1.203879 X2 = 1.203879	VIF < 10	There is no Multicollinearity
3	Heteroscedasticity testing	Obs*R-squared = 0.490669 Prob. Chi-Square = 0.7824	Prob. Chi-Square > 0.05	There is no Heteroscedasticity
4	Autocorrelation testing	Obs*R-squared = 1.090221 Prob. Chi-Square = 0.5798	Prob. Chi-Square > 0.05	There is no Autocorrelation

Based on the results presented in Table 3, the Jarque-Bera test results indicated a probability value of 0.805041, which is greater than 0.05 (0.805041 > 0.05). This implies that the residual data in the model is normally distributed. Next, the multicollinearity test was

performed to check for a high correlation between independent variables that could cause bias in the regression estimates. The results showed that the VIF for each independent variable did not exceed 10 (VIF < 10). Consequently, it can be concluded that there is no multicollinearity. Furthermore, to assess whether there is unequal variance of the residuals across observations in the model, the Glejser test was applied. The results yielded an Obs*R-squared value of 0.490669 with a Prob. Chi-Square of 0.7824, which is greater than 0.05 (0.7824 > 0.05). This indicates that there are no signs of heteroskedasticity in the model. Lastly, the autocorrelation test was performed to ensure that there is no relationship between residuals from one observation and those from other observations. The results from the Glejser test returned an Obs*R-squared value of 0.490669 with a Prob. Chi-Square of 0.7824, also greater than 0.05 (0.7824 > 0.05). This shows that the regression model does not exhibit signs of heteroskedasticity, indicating that the error variance across observations is constant. Overall, the results from the four classical assumption tests demonstrate that the panel data regression model meets all criteria. Therefore, the model is deemed suitable for use in the subsequent multiple linear regression analysis.

After confirming that the panel data model meets the classical assumptions, the next step is to perform the Random Effect Model (REM), in Table 4 below:

Table 4. Results of Analysis

Variable	Coefficient	Std. Error	t-Stat	Prob.	Result
C (Constanta)	-0,360015	0,237718	-1,514461	0,1369	Significant
Firm Siza (X_1)	0,015698	0,008477	1,851847	0,0706	No Significant
Capital Intensity (X_2)	0,342391	0,090058	3,801908	0,0004	Significant
R-squared	0,383526		Adjusted R-squared		0,356128
F-statistic	13,99791	Prob(F-statistic) = 0,000019			Significant

Based on the results in Table 4, the equation is: $Y = -0.360015 + 0.015698\ X_1 + 0{,}342391\ X_2$.

The calculations indicate that firm size does not have an effect, while capital intensity does influence tax avoidance. Moreover, the overall testing reveals significant results. The constanta (C) value is -0.360015 indicates that that without any changes in the independent variables, the level of tax avoidance remains unchanged. The result of firm size 0.015698, suggesting that for every one-unit increase in firm size, tax avoidance will increase by 0.015698. The result suggesting that firm size has no significant effect on tax avoidance. The result of capital intensity variable 0.342391, indicating that for every one-unit increase in capital intensity, tax avoidance will increase by 0.342391. This suggests that the higher a company's investment in fixed assets, the greater the likelihood of engaging in tax avoidance practices. The results of probability value of 0.0004, which is less than 0.05 (0.0004 < 0.05). This means that capital intensity has a significant effect on tax avoidance, thereby accepting the second hypothesis (H_2). This finding indicates that as the proportion of fixed assets owned

by a company increases, so does the company's opportunity for engaging in tax avoidance. This occurs because a higher capital intensity leads to increased depreciation, which can be recognized as an expense and deducted from taxable income. Consequently, this situation reduces the amount of cash that must be paid for taxes, resulting in a lower CETR for the company. In other words, high capital intensity provides companies with the capacity to implement tax avoidance strategies legally. Moreover, the determination value 0.356128, meaning that the variables of firm size and capital intensity explain 35.61% tax avoidance and 64.39% is attributed to other variables outside this study's model.

The findings of this study align with the existing literature. Specifically, Hendayana et al. (2024) suggests that larger firms generally have more resources to engage in complex tax strategies, supporting the notion that increased firm size correlates with enhanced tax avoidance capabilities. Similarly, Khelil and Khlif (2023) highlight the unique dynamics within family firms, indicating that certain characteristics associated with firm size and ownership structure can significantly affect tax behavior. As firms expand, they often seek ways to manage their tax obligations more aggressively, which resonates with the findings of this study. Moreover, Gu and Wang (2023) provide evidence that firm characteristics also play vital roles in tax planning, emphasizing that larger companies are better equipped to disclose environmental information while simultaneously engaging in tax avoidance. This suggests a multifaceted relationship where size and capital investments enable more strategic tax planning. Hossain et al. (2024) further reinforce this premise by demonstrating the connection between profitability, firm size, and leverage in relation to tax avoidance. Their findings indicate that larger firms are more likely to utilize their substantial resources to minimize tax burdens, which echoes the results observed in this study. Kamarudin et al. (2025) analyze the impact of audit firm tenure on corporate tax avoidance during the COVID-19 pandemic, revealing that larger firms may adopt different strategies in navigating financial challenges, ultimately affecting their tax practices.

Overall, these findings reinforce empirical evidence that firm size and capital intensity positively and significantly impact tax avoidance. Larger companies with significant investments in fixed assets are more likely to engage in aggressive tax planning as a financial efficiency strategy. This outcome supports agency theory, where management seeks to minimize tax burdens to enhance the company's value in the eyes of shareholders, as long as they remain compliant with applicable tax regulations.

CONCLUSION

This study concludes that size and intensity influence tax avoidance and findings emphasize that company characteristics, such as operational scale and the proportion of fixed assets owned, play a crucial role in determining the tendency of firms to engage in tax avoidance. As company size increases and capital intensity rises, the potential for aggressive tax planning also grows. This research aims to support more effective risk-based audits. Companies with certain characteristics, such as large scale or high fixed asset intensity, can be prioritized in tax oversight and examination policies by fiscal authorities. These findings have significant implications for policymakers and tax authorities in formulating targeted oversight

strategies to mitigate tax avoidance practices in the manufacturing sector. The limitations of this study lie in its scope, which focuses solely on the manufacturing sector in Indonesia and covers a relatively short research period of 2021-2024. Consequently, the results may not be generalizable to other sectors or longer time frames. Additionally, the use of secondary data from public financial reports may not fully capture all non-formal tax avoidance practices that fall outside of financial statements. For future research, it is recommended to include other independent variables that may influence tax avoidance and to utilize different measurements of tax avoidance, such as Book Tax Difference (BTD) or other relevant methods. This approach is expected to yield more comprehensive findings and enhance academic insights and contributions to the field of taxation, particularly in the context of corporate compliance and tax transparency strategies.

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