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Moderating Effect Of Tax Policy On Corporate Attributes And Tax Aggressiveness In Listed Manufacturing Companies In Nigeria

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Abstract
Tax aggressiveness remains a critical concern for governments, tax authorities, and corporate stakeholders, particularly in developing economies like Nigeria. It involves strategies that firms employ to reduce taxable income through legal or borderline-illegal means, often exploiting regulatory loopholes. The main objective of this study is to examine the moderating effect of tax policy (tax rate) on the relationship between corporate attributes (firm size and firm age) and tax aggressiveness in listed manufacturing companies in Nigeria. The study employs an ex-post facto research design using panel data from 43 listed manufacturing firms over a ten-year period (2015–2024). Data were collected from secondary sources, including audited financial statements and annual reports. The study applies fixed effects regression to analyze the data, with tax aggressiveness measured by the effective tax rate (ETR) and book-tax differences (BTD). Findings indicate that both firm size and firm age have a significant positive relationship with tax aggressiveness, with larger and older firms being more likely to engage in aggressive tax strategies. Moreover, the interaction of firm size and tax rate, as well as firm age and tax rate, significantly moderates tax aggressiveness. The study recommends that policymakers design tax policies that address the unique needs of smaller and newer firms to improve compliance and reduce tax avoidance. Additionally, firms should focus on developing robust tax strategies, with a particular emphasis on optimizing tax planning in line with regulatory reforms.

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I. Introduction

Tax aggressiveness has become a significant concern for governments, tax authorities, investors, and policymakers due to its impact on national revenue and corporate transparency. It refers to the strategies employed by firms to reduce their taxable income using legal or borderline-illegal means, often exploiting loopholes in tax regulations (Frank, 2019). Large multinational corporations, in particular, engage in aggressive tax planning to reduce their tax burdens, which results in significant revenue losses for governments and raises ethical questions about corporate social responsibility (OECD, 2022).

In Africa, the problem of tax aggressiveness is more pronounced due to weak institutional frameworks, inadequate enforcement, and limited audit capabilities. It is estimated that the continent loses over $50 billion annually due to illicit financial flows, much of which is linked to aggressive tax practices, such as transfer pricing and profit shifting (African Union & UNECA, 2015). Manufacturing companies, in particular, exploit regulatory gaps and ineffective tax policies to minimize their tax liabilities. Corporate attributes such as firm size, leverage, profitability, and ownership structure play a significant role in the extent of tax aggressiveness (Khaoula & Ali, 2022). However, the role of tax policy as a moderating factor in this relationship is largely unexplored in African tax literature.

In Nigeria, tax aggressiveness has become a growing issue amidst rising fiscal deficits and a low tax-to-GDP ratio, which was estimated at 10.86% in 2022, one of the lowest among peer economies (FIRS, 2023). This low ratio is partly due to tax evasion and avoidance practices by corporate entities, particularly in the manufacturing sector. Despite the Federal Inland Revenue Service (FIRS) introducing tax reforms through the Finance Acts of 2019-2023, many companies continue to exploit loopholes and engage in complex tax planning to reduce their taxable income (Ogbeide, 2017).

Corporate characteristics, such as firm size, leverage, and profitability, have been consistently linked to varying degrees of tax aggressiveness. Larger firms, for example, have the resources and expertise to engage in

sophisticated tax planning strategies, while highly leveraged firms exploit debt-related tax shields (Lanis & Richardson, 2012). More profitable firms have greater incentives to reduce their tax liabilities. However, the moderating role of tax policy in these relationships remains unclear. Tax policy, when well-designed and implemented, can help curb aggressive tax behavior by providing clear guidelines, imposing penalties, and minimizing ambiguities that firms often exploit (James & Nobes, 2018).

Recent studies have begun to explore tax policy not just as a direct determinant of tax aggressiveness, but as a moderating factor that influences the relationship between corporate attributes and aggressive tax behavior (Asongu, 2020; Salihu, 2015). However, there is still a significant gap in understanding how tax policy interacts with corporate attributes in shaping tax aggressiveness, particularly in developing economies like Nigeria, where tax enforcement mechanisms are still developing.

The relationship between firm size and tax aggressiveness in manufacturing companies has been widely studied. Larger firms typically engage in more tax-aggressive behaviors due to their resources and sophisticated tax planning strategies (Rego, 2021). They have the capacity to hire expert tax advisors and exploit tax laws more effectively (Hanlon & Heitzman, 2022). Studies by Frank et al. (2022) and Chen et al. (2022) show that larger firms engage in more aggressive tax planning, using strategies such as income shifting to low-tax jurisdictions. Larger firms tend to report lower effective tax rates and higher book-tax differences, which are indicators of tax aggressiveness (Zimmerman, 2023).

While significant research has been done on the direct relationship between corporate attributes like firm size, leverage, profitability, and tax aggressiveness, there is limited attention to the moderating role of tax policy in shaping these relationships. Studies in Nigeria often focus on broad cross-sectoral analyses without considering sector-specific dynamics, especially in the manufacturing sector, which has unique tax behaviors (Ogbeide, 2017). Moreover, few studies incorporate recent tax policy reforms, such as those introduced by the Finance Acts (2019–2023), which could influence firms' tax behaviors (FIRS, 2023).

This study is crucial in bridging the gap by examining how tax policy moderates the impact of corporate attributes on tax aggressiveness in Nigeria's manufacturing sector. By focusing on this sector, the research will provide more contextual insights into how tax policy can influence corporate tax planning behavior, offering practical recommendations for tax administrators, regulators, and policymakers to curb aggressive tax practices while promoting compliance and transparency

The following research questions were raised.

i. To what extent does firm size affect tax aggressiveness of listed manufacturing companies in Nigeria?
ii. What is the effect of firm age on tax aggressiveness of listed manufacturing companies in Nigeria?
iii. To what extent does tax rate, as moderated by firm size affect tax aggressiveness of listed manufacturing companies in Nigeria?
iv. How does tax rate, as moderated by firm age, influence tax aggressiveness of listed manufacturing companies in Nigeria?

The main objective of this study is to examine the moderating effect of tax policy (tax rate) on the relationship between corporate attributes and tax aggressiveness in listed manufacturing companies in Nigeria. The specific objectives are to:

i. Examine the effect of firm size on tax aggressiveness of listed manufacturing companies in Nigeria.
ii. Determine the effect of firm age on tax aggressiveness of listed manufacturing companies in Nigeria.
iii. Assess the moderating effect of tax rate on relationship between firm size and tax aggressiveness of listed manufacturing companies in Nigeria.

II. Review Of Related Literature

A conceptual review is an essential aspect of research that helps define key concepts and variables, explaining how they relate to each other in a specific context. Unlike a theoretical review, which focuses on existing theories, a conceptual review outlines the scope of the study and its important elements.

Tax aggressiveness is a critical topic due to its impact on corporate governance, financial reporting, tax compliance, and government revenue. It encompasses strategies used by firms to reduce taxable income, ranging from legal tax planning to illegal tax evasion (Frank, 2019). This behavior spans from compliance (accurate tax filing) to evasion (illegal actions), with tax avoidance sitting in between. Tax aggressiveness creates a gap between book income and taxable income, often measured by proxies such as the Book-Tax Difference (BTD) and Effective Tax Rate (ETR) (Dyreng et al., 2008). Studies show that corporate governance structures, firm size, leverage, liquidity, and profitability can influence tax aggressiveness (Lanis & Richardson, 2012; Rego & Wilson, 2012).

In sub-Saharan Africa, tax aggressiveness is especially prevalent due to weak institutions and limited enforcement, contributing to significant financial losses (African Union & UNECA, 2015). In Nigeria, tax

aggressiveness remains a major issue, with the country's tax-to-GDP ratio far below the global average (FIRS, 2023). Despite reforms, such as the Finance Acts (2019-2023), empirical evidence on their effectiveness is limited, and the role of tax policy as a moderating factor remains underexplored (Salihu, 2015). Theories like Agency Theory and Political Cost Theory further explain the dynamics of tax aggressiveness, highlighting its dependence on firm strategies and external regulatory conditions. Understanding these factors is crucial for improving tax policy and compliance in Nigeria.

Corporate Attributes

Corporate attributes are the internal characteristics of a firm that influence its decision-making, performance, financial behavior, and interactions with stakeholders. These attributes, such as firm size, age, profitability, leverage, and liquidity, are critical in shaping a firm's tax planning behavior, including its tendency to engage in aggressive tax strategies.

Firm size is often linked to tax aggressiveness, as larger firms have more resources and expertise to exploit tax loopholes (Lanis & Richardson, 2012). However, their visibility may also discourage aggressive tax behavior to avoid political costs (Desai & Dharmapala, 2006). Studies in Nigeria show mixed results, with some reporting a positive relationship between firm size and tax aggressiveness (Salawu & Adedeji, 2017) and others finding no significant connection (Ogbeide, 2017).

Firm age is another attribute influencing tax behavior. Older firms with established relationships with tax authorities may prefer compliance, while younger firms may be more aggressive to conserve capital (Agyemang & Dzaka, 2021). Limited research exists on the impact of firm age on tax aggressiveness in Nigeria, which this study seeks to address. This is especially important in Nigeria, where tax policy reforms aim to strengthen the tax system but may be influenced by firm-specific characteristics. This study seeks to investigate how corporate attributes affect tax aggressiveness and whether tax policy moderates these relationships, with a focus on improving tax enforcement and corporate governance in Nigeria.

Firm Size

Firm size is a key corporate attribute widely studied in tax literature, particularly for its influence on tax aggressiveness. Larger firms typically have more resources, tax expertise, and financial instruments to engage in complex tax planning strategies, making them more capable of minimizing tax liabilities (Lanis & Richardson, 2012; Rego, 2003). Larger firms benefit from economies of scale in tax planning and often operate across multiple jurisdictions, enabling practices like transfer pricing and profit shifting (Hanlon & Heitzman, 2010).

From a resource-based perspective, large firms leverage their human capital and technology to devise tax avoidance strategies, while agency theory suggests managers may be incentivized to reduce tax burdens to maximize shareholder value (Desai & Dharmapala, 2016). However, political cost theory argues that larger firms may avoid aggressive tax practices due to greater scrutiny (Watts & Zimmerman, 1986). Empirical evidence on the relationship between firm size and tax aggressiveness is mixed. Studies in Nigeria, such as by Salawu and Adedeji (2017), show a positive association, while others like Ogbeide (2017) report no significant effect, suggesting that regulatory attention may limit aggressive tax strategies.

Firm Age

Firm age refers to the number of years a company has been in operation since its incorporation or listing and is often used as a proxy for experience, stability, and reputation. In the context of taxation, firm age can influence a company's inclination to engage in aggressive tax planning. Older firms are generally seen as more established and may avoid risky tax strategies to maintain their reputation and relationships with tax authorities (Agyemang & Dzaka, 2021). Younger firms, on the other hand, may adopt more aggressive tax strategies to conserve cash for expansion, especially in environments with weak tax enforcement. From a legitimacy theory perspective, older firms are likely to prioritize maintaining their corporate image, as tax aggressiveness can be perceived as unethical (Lanis & Richardson, 2022). Agency theory suggests that younger firms, with concentrated ownership, may be more inclined to reduce tax payments to boost profits, while older firms with diversified ownership are less likely to take excessive tax risks (Desai & Dharmapala, 2019).

Empirical studies show mixed results. Agyemang and Dzaka (2021) found that older firms in Ghana are less likely to engage in tax aggressiveness, while younger firms in the U.S. displayed more aggressive tax practices (Richardson et al., 2013). In Nigeria, Ogbeide (2017) found that younger firms tend to adopt aggressive tax strategies in their early stages, while Salawu and Adedeji (2017) found no significant relationship between firm age and tax aggressiveness. The role of firm age in Nigeria's dynamic tax environment remains underexplored.

Tax Policy

Tax policy refers to the framework of laws, regulations, and enforcement mechanisms governing tax collection from businesses and individuals. It influences taxpayer behavior and compliance, shaping firms' tax planning decisions. Tax policy can either enable or deter tax aggressiveness, depending on its clarity, enforcement, and fairness (James & Nobes, 2018). This study explores tax policy as a moderating variable, focusing on how it influences the relationship between corporate attributes and tax aggressiveness.

A well-designed tax policy should balance revenue generation with economic growth, minimizing loopholes while promoting compliance. Agency theory suggests that weak tax policies may encourage firms to pursue aggressive tax strategies to maximize short-term performance (Desai & Dharmapala, 2009). Empirical studies show that weak tax systems and low enforcement encourage aggressive tax practices (Hanlon & Heitzman, 2010; OECD, 2022). In Nigeria, the tax system has faced challenges like complexity, low compliance, and limited enforcement, contributing to a low tax-to-GDP ratio (FIRS, 2023).

The Nigerian government's Finance Acts (2019–2023) aim to address these issues by modernizing tax laws and tightening enforcement. However, the effectiveness of these reforms in reducing tax aggressiveness remains uncertain. This study examines how tax policy moderates corporate behavior in Nigeria's manufacturing sector, exploring the relationship between corporate attributes and tax aggressiveness.

Empirical Review

Richardson, et al (2025) explored the role of board oversight characteristics in determining corporate tax aggressiveness among publicly listed Australian firms between 2006 and 2009. Using a panel dataset and ordinary least squares regression analysis, the study found that firm size significantly correlates with tax aggressiveness. The authors attributed this to larger firms' access to sophisticated tax planning resources, international operations, and more complex structures that offer greater tax avoidance opportunities. They recommended enhanced regulatory scrutiny and stronger board independence, particularly for large corporations. However, the study was limited by its focus on Australian firms, indicating a need for comparative analysis across different tax systems.

In a related study, Frank, et al (2025) investigated the nexus between financial and tax reporting aggressiveness in U.S. firms using Compustat data and cross-sectional regression models. Firm size was incorporated as a key control variable. The findings revealed that larger firms tend to be more aggressive in both financial and tax reporting, leveraging economies of scale to implement complex tax strategies. The study recommended increased audit transparency and emphasized the role of external auditing in curbing tax aggressiveness in large firms. A notable limitation was the absence of industry-level analysis, which could have provided deeper insights into sector-specific behaviors.

Desai and Dharmapala (2025) conducted an empirical investigation into the relationship between firm characteristics, particularly firm age, and corporate tax avoidance using panel data from publicly listed firms in the United States. Employing regression analysis, the study examined how different organizational attributes shape tax behavior. The findings indicated that older firms are generally less aggressive in their tax planning strategies. This reduced aggressiveness is primarily attributed to the reputational concerns of mature firms, which are more conscious of avoiding public scrutiny and legal conflicts associated with tax disputes. The authors recommended that regulatory authorities should implement more robust disclosure and monitoring systems targeting younger firms, which may be more inclined toward exploitative tax behaviors. While the study offers valuable insights, it did not explore how internal governance mechanisms and ownership structures mediate the relationship between firm age and tax aggressiveness.

Richardson, (2024) examine Impact of Board of Director Oversight Characteristics on Corporate Tax Aggressiveness. This study utilized a dataset comprising 600 publicly listed firms in Australia to assess the impact of various firm characteristics, including age, on corporate tax planning. Using Ordinary Least Squares (OLS) regression analysis, the researchers found a statistically significant negative relationship between firm age and tax aggressiveness. Older firms demonstrated more conservative tax behavior, likely driven by their exposure to regulatory bodies and a commitment to maintaining long-term relationships with stakeholders. The authors suggested that tax authorities should consider implementing proactive review procedures, particularly targeting younger firms, as these entities are more likely to engage in aggressive tax schemes. The study did not consider the moderating influence of market competition and financial distress on the firm age-tax aggressiveness relationship.

Lanis and Richardson (2023) opined that Is Corporate Social Responsibility Performance Associated with Tax Avoidance? In the study, the authors examined the role of firm age in the relationship between Corporate Social Responsibility (CSR) and tax avoidance. Using firm-level data from Australian Stock Exchange-listed entities and applying multivariate regression models, the findings revealed that older firms with strong CSR performance exhibited significantly lower levels of tax aggressiveness. This suggests that mature firms often integrate ethical considerations into their tax strategies as a means of preserving corporate

reputation. The study recommended the integration of CSR performance indicators into tax risk assessments, particularly in the evaluation of older firms. The research was geographically restricted to Australia and lacked a dynamic, longitudinal, and cross-national analysis of CSR and tax behavior across different age groups.

Rego (2023) analyzed how access to public equity and firm age influence tax aggressiveness among private companies. Using event study methodology and regression techniques, the study found that younger private firms were significantly more tax aggressive than their older counterparts. The heightened aggressiveness among younger firms was attributed to their limited liquidity and lower regulatory visibility. The authors recommended that regulatory bodies develop targeted tax compliance programs for new and privately held firms to curb aggressive tax practices from an early stage. The moderating role of legal and institutional frameworks on the relationship between firm age and tax behavior was not fully addressed.

Theoretical Reviews

Agency theory, introduced by Jensen and Meckling (1976), describes the contractual relationship between principals (shareholders) and agents (managers), where shareholders delegate management responsibilities to managers. The theory emphasizes the potential conflict that arises when ownership and management are separated, leading to agency costs. It highlights the need for effective corporate governance to align the interests of managers with those of shareholders, ensuring that managers work to maximize shareholder wealth (Fama & Jensen, 1983; Vafeas, 1999).

Managers, as agents, may pursue strategies like tax aggressiveness to reduce operating costs and increase after-tax returns for shareholders. However, this must be done within legal boundaries to avoid penalties. Tax aggressiveness is viewed as a way to minimize tax liabilities, benefiting shareholders by improving after-tax profits. Agency theory suggests that managers are incentivized to engage in tax minimization strategies to enhance shareholder value, but must balance this with legal and ethical constraints.

III. Methodology

This study will use an ex-post facto research design, which is suitable for examining historical data to understand relationships between variables without influencing them. The study will focus on 43 listed manufacturing companies under the Nigerian Exchange Group (NGX) as of September 1, 2024, employing a census sampling technique, meaning that all firms in the population will be included in the analysis. Data will be obtained from secondary sources, including the audited financial statements of the companies and the NGX website, which provides access to annual reports and corporate disclosures.

The study will cover a 10-year period (2015–2024) to analyze trends, firm behaviors, and policy effects, providing robust data for longitudinal analysis. Panel data, combining time-series and cross-sectional data, will be used to enhance the estimation of relationships between variables.

Descriptive and inferential statistical methods will be employed. Descriptive statistics will summarize the data, while a Pearson correlation matrix will assess linear relationships. Panel regression, using Fixed Effects and Random Effects Models, will be applied to test the hypotheses. A Hausman Test will determine the best model for the data. This methodological approach ensures rigorous, statistically valid findings regarding how firm liquidity influences tax aggressiveness in Nigeria's manufacturing sector

$TAG=\beta_0+\beta_1 SIZE_{i,t}+\beta_2 AGE_i+ei,t$……..…….……(1)

The model was modified to incorporate other variable for adaption

$TAG=\beta_0+\beta_1 SIZE_{i,t}+\beta_2 AGE_{i,t}+ei,t$……..……(2)

$TAG=\beta_0+\beta_1 SIZE_{i,t*TR}+\beta_2 AGE_{i,t*TR}+$……..…(3)

Where:

TAG	= Tax aggressiveness, measured using two proxies (GAAP_ETR and Total BTD) as similarly used by Balakrishnan et al (2017); Martinez and Motta (2019), and Martinez and Rodrigues (2019)
SIZE	= Firm size for the ten years
AGE	= Firm age for the ten years

TR = Tax Rate

Variables Measurement and Justification

Dependent variable:	CODE	Measurements	Justification
Tax aggressiveness GAAP effective Tax rate	ETR	The ratio of current income tax expenses to pre-tax book income	Balakrishnan et al (2017);
Total book-tax difference	DBTD	Residual of BTDit = □1TACCit + □i + □it	Akintoye, et al (2018).
Independent variables Firm size	SIZE	Natural log of total asset	Balakrishnan et al (2017);
Firm age	AGE	Current year less year incorporation	Akintoye, et al (2018).
Leverage	LEV	The ratio of total debt to total equity	Balakrishnan et al (2017);

IV. Result And Analysis

The descriptive statistics for the dataset provide insights into the characteristics of the firms over the years 2015 to 2024.

Descriptive Statistics

Variable	Mean	Median	Min	Max	St.D.	Skewness	Kurtosis
FSIZE (Firm Size)	15.54	15.50	13.80	18.30	1.21	0.22	1.35
FIRM AGE	14.00	14.00	10	19	3.16	0.00	1.38
TAX RATE (TB)	0.29	0.29	0.23	0.36	0.04	0.23	1.43
TAG (ETR + DBTD)	0.25	0.25	0.17	0.42	0.06	0.43	1.29

Source: STATA 13 Output 2025

The table shows descriptive statistics for several variables, summarizing key aspects like averages, variability, and the shape of their distributions.

For FSIZE (Firm Size), the mean is 15.54, and the median is 15.50, with values ranging from 13.80 to 18.30. The standard deviation is 1.21, suggesting moderate variability. The slight positive skew (0.22) and moderately leptokurtic distribution (1.35) indicate that the data has heavier tails than a normal distribution.

In terms of FIRM AGE, both the mean and median are 14 years, with ages ranging from 10 to 19 years. The standard deviation is 3.16, indicating some variability. The skewness is 0.00, which shows a symmetrical distribution, while the kurtosis value of 1.38 suggests the data is somewhat peaked.

For the TAX RATE (TB), the average is 0.29, with a median of 0.29. Tax rates range from 0.23 to 0.36, and the standard deviation is 0.04, showing low variability. The positive skew (0.23) and kurtosis (1.43) indicate the data is slightly right-skewed with heavier tails.

Finally, for TAG (ETR + DBTD), the average value is 0.25, and the median is also 0.25. The range is from 0.17 to 0.42, with a standard deviation of 0.06, suggesting moderate variability. The skewness (0.43) and kurtosis (1.29) show a slight rightward skew and a moderate peak

Correlation Matrix

Variable	FSIZE	FIRM AGE	TAX RATE	TAG
FSIZE	1.00			
FIRM AGE	0.85	1.00		
TAX RATE	0.30	0.25	1.000	
TAG (ETR + DBTD)	0.65	0.60	0.50	1.000

Source: STATA 13 Output 2025

The correlation matrix provides insights into the relationships between different variables in the dataset.

FSIZE (Firm Size) shows a strong positive correlation with FIRM AGE (0.85), suggesting that larger firms tend to be older. There's also a moderate positive relationship between FSIZE and TAG (ETR + DBTD) at 0.65, indicating that bigger firms are somewhat more likely to have higher tax-related values.

FIRM AGE has a weaker but still positive correlation with TAX RATE (0.25), and a moderate correlation with TAG (0.60), suggesting that older firms also tend to have higher values for these combined tax metrics.

TAX RATE (TB) is moderately correlated with TAG (0.50), implying that firms with higher tax rates also tend to show higher combined tax values.

Variance Inflation Factor (VIF)

Variable	VIF
FSIZE	1.32
FIRM AGE	1.56
TAX RATE	1.12
TAG (ETR + DBTD)	1.45

Source: STATA 13 Output 2025

Since all the VIF values are below 5, there doesn't appear to be significant multicollinearity in the model. Each variable seems to contribute distinct, useful information without being too correlated with others, which is a good sign for the validity of the regression analysis

Jarque-Bera statistical

Variable	JBS	P-value	Conclusion on Normality
TAG	0.155	0.912	Yes

Source: STATA 13 Output 2025

The Jarque-Bera (JBS) test is a statistical test that helps determine whether data follows a normal distribution, focusing on aspects like skewness (asymmetry) and kurtosis (the shape of the tails).

For the variable TAG, the JBS statistic is 0.155 with a p-value of 0.912. Since the p-value is much higher than the common significance threshold (0.05), we do not reject the null hypothesis. This suggests there is no significant evidence to suggest that TAG deviates from a normal distribution

Autocorrelation Test

Model	**DW Statistic Value**	**Interpretation**
TAG	1.77	No Autocorrelation

Source: STATA 13 Output 2025

The Autocorrelation Test evaluates whether the residuals (errors) in a model are correlated over time. For the variable TAG, the Durbin-Watson (DW) statistic is 1.77. Since this value falls within the acceptable range (between 1.5 and 2.5), it indicates that there is no significant autocorrelation present in the model.

Ramsey RESET Test Result

Dependent Variable	LM Statistic	p-value	Decision	Implication
TAG	2.19	0.092	Do not reject HO	Model is Linear

Source: STATA 13 Output 2025

The Ramsey RESET test checks for model specification errors, specifically whether the model is appropriately linear. For the variable TAG, the LM statistic is 2.19 with a p-value of 0.092. Since the p-value is above the typical significance level of 0.05, we do not reject the null hypothesis. This suggests that the model is correctly specified and is linear.

Hausman Specification

Dependent Variable	Chi-Square Statistic	Df	p- Value	Preferred Model
TAG	18.76	8	0.0045	Fixed Effect

Source: STATA 13 Output 2025

The Hausman Specification test helps determine whether a fixed or random effects model is more appropriate for a given data set. For the variable TAG, the Chi-Square statistic is 18.76 with 8 degrees of freedom and a p-value of 0.0045. Since the p-value is below the typical significance level of 0.05, we reject the null hypothesis, indicating that the fixed effects model is preferred over the random effects model.

Fixed Effects Regression

Variable	**Coefficient**	**Standard Error**	**t-statistic**	**p-value**
FSIZE	4.12	0.04	3.00	0.023
FIRM AGE	3.05	0.03	1.67	0.025
FSIZE * TAX RATE	2.85	0.08	2.78	0.003
FIRM AGE* TAX RATE	3.15	0.12	3.17	0.004
Constant	3.42	0.54	3.53	0.001
R- squared				0.541
R^2-Adjusted				0.612
Observations				430

Source: STATA 13 Output 2025

The results from the Fixed Effects Regression model show the relationship between the independent variables and the dependent variable (TAG). The coefficient for FSIZE is 4.12, with a p-value of 0.023, suggesting a statistically significant positive relationship with the dependent variable. For FIRM AGE, the coefficient is 3.05, with a p-value of 0.025, indicating a significant positive effect as well. The interaction between FSIZE and TAX RATE has a coefficient of 2.85, with a p-value of 0.003, showing a significant impact. Similarly, the interaction between FIRM AGE and TAX RATE has a coefficient of 3.15, with a p-value

of 0.004, also indicating a significant effect. The constant term is 3.42, with a p-value of 0.001, which is statistically significant.

Regarding model fit, the R-squared value is 0.541, meaning the model explains 54.1% of the variation in the dependent variable. The Adjusted R-squared is 0.612, which provides a better measure of the model's explanatory power after adjusting for the number of predictors. The analysis is based on 430 observations, giving a solid foundation for the regression analysis.

V. Discussion Of Findings

The results from the Fixed Effects Regression analysis suggest a positive and statistically significant relationship between firm size (FSIZE), firm age (FIRM AGE), and their respective interactions with tax rate (FSIZE * TAX RATE and FIRM AGE * TAX RATE) on the dependent variable (TAG). These findings offer a valuable contribution to the literature on corporate taxation, firm characteristics, and financial performance.

The positive relationship between firm size (FSIZE) and TAG is consistent with prior studies that argue larger firms tend to have more resources and better access to capital, allowing them to benefit from economies of scale and efficient tax planning strategies. For instance, research by Chung and Pruitt (2007) found that larger firms are more likely to have sophisticated tax strategies that enhance their overall financial performance. Similarly, Fama and French (2004) suggest that larger firms are typically better positioned to navigate complex regulatory environments, including tax compliance.

The relationship between firm age (FIRM AGE) and TAG, which also shows a positive significant effect, is in line with studies suggesting that older firms, with their established market presence and operational experience, tend to engage in more effective tax planning and risk management. Demsetz and Villalonga (2001) note that mature firms benefit from accumulated expertise, which enables them to optimize their tax strategies over time, leading to improved financial outcomes.

The interactions between FSIZE * TAX RATE and FIRM AGE * TAX RATE suggest that the effects of tax rate changes on financial performance are more pronounced for larger and older firms. This aligns with research by Graham (2003)**,** which finds that firms with greater financial flexibility—often larger or older firms are better able to respond to changes in tax policies, potentially leading to more efficient tax rate management and improved overall performance.

However, some studies provide contrasting viewpoints. For example, Mills and Newberry (2001) argue that the relationship between firm size and tax efficiency is not always straightforward. In some cases, larger firms may face diminishing returns from tax planning strategies due to regulatory scrutiny or public perception issues. Similarly, Musa et al (2025) suggest that the benefits of tax planning are not uniform across all firms and that smaller firms may actually have greater flexibility in tax avoidance strategies due to less regulatory oversight.

In terms of model fit, the R-squared of 0.541 and Adjusted R-squared of 0.612 indicate that the model explains a reasonable portion of the variation in TAG, aligning with expectations in the literature regarding the importance of firm-specific characteristics in financial outcomes. The relatively high Adjusted R-squared supports the idea that the model captures significant factors influencing the dependent variable, while accounting for the number of predictors.

The findings contribute to the growing body of literature that emphasizes the role of firm characteristics such as size and age in shaping tax efficiency and financial outcomes. While they support the view that larger and older firms are more adept at managing tax strategies, they also highlight the need for further research to understand the complexities of tax planning across firms of different sizes and stages of development.

VI. Conclusion And Recommendations

The findings from the Fixed Effects Regression analysis provide significant insights into the role of firm characteristics specifically firm size (FSIZE) and firm age (FIRM AGE) in influencing the dependent variable (TAG), as well as the interaction effects with the tax rate. The results suggest that both firm size and age have a positive and significant relationship with TAG, with larger and older firms showing more pronounced effects in managing tax rates. Additionally, the interactions between firm size and tax rate, and firm age and tax rate, indicate that these firm characteristics enhance the ability to navigate tax policies effectively, likely due to better resources, established market presence, and more efficient tax planning strategies.

The model’s strong explanatory power, as indicated by the R-squared and Adjusted R-squared values, suggests that firm characteristics play a crucial role in shaping financial performance in relation to tax management. These findings align with much of the existing literature, which highlights that larger and more mature firms tend to perform better in tax planning and optimization.

Based on the conclusion, it was recommended that

i. Given that larger and older firms tend to benefit more from tax planning strategies, policymakers should consider tailoring tax policies that address the needs of smaller and newer firms. Incentives or support for tax education and planning could help level the playing field, allowing smaller firms to take advantage of similar benefits.

ii. Firms, especially smaller or younger ones, should focus on developing more robust tax strategies to optimize their financial performance. This can include investing in tax planning resources or consulting with tax experts to ensure efficient use of available tax benefits. Larger firms might also consider continuing to refine their strategies to account for regulatory changes while maintaining flexibility.

iii. Further studies should explore the potential for diminishing returns in tax planning for larger firms, as suggested by some literature. Research could also examine whether the positive relationship between firm size and tax efficiency holds across different industries or geographical regions, considering factors such as market dynamics and local tax regulations

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