

Risk-Based Tax Audits, Tax Office Type, and Economic Growth: Evidence on Voluntary Tax Compliance among Corporate Taxpayers in Indonesia's Manufacturing Sector

Agung Ponco Nugroho^{1*}, Didin Mukodim², and Sudaryanto³

^{1,2,3} Faculty of Economics, Gunadarma University, Indonesia

ABSTRACT

Purpose – This study examines the effects of risk-based tax audits, Tax Office (KPP) type, and economic growth on the voluntary tax compliance of corporate taxpayers in Indonesia's manufacturing sector under the self-assessment system.

Design/methodology/approach – A quantitative explanatory approach is employed using a strongly balanced panel dataset of 16,339 corporate taxpayers from 2016 to 2022 (114,373 taxpayer-year observations). The data are analyzed using the Correlated Random Effects (CRE) model with year fixed effects and cluster-robust standard errors.

Findings/Results – Risk-based tax audits and economic growth have positive and statistically significant effects on voluntary tax compliance. Taxpayers registered with Primary Tax Offices (KPP Pratama) exhibit lower voluntary tax compliance than those registered with Special Tax Offices (KPP Khusus), while no significant differences are found among Medium Tax Offices (KPP Madya), Special Tax Offices, and Large Taxpayer Offices (KPP Wajib Pajak Besar).

Originality/Value – This study provides empirical evidence on the roles of risk-based tax audits, Tax Office type, and economic growth in improving voluntary tax compliance. The findings offer practical implications for strengthening risk-based tax administration under Indonesia's self-assessment system.

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*Corresponding Author at:

Faculty of Economics, Gunadarma University, Jl. Margonda Raya No. 100, Depok 16424, West Java, Indonesia.

E-mail address: agungponconugroho@gmail.com (Agung Ponco Nugroho)

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1. Introduction

In developing countries such as Indonesia, low taxpayer compliance remains one of the major challenges facing the tax system (World Bank, 2024). This condition creates a gap between the amount of tax revenue that could potentially be collected and the actual revenue realized by the government. Since there is no universally accepted method for measuring the tax gap, the tax ratio is commonly used as an indirect indicator of tax compliance. In addition, the tax ratio is widely regarded as a measure of the overall effectiveness of a country's tax system (Purnomo, 2023). The tax ratio, defined as the proportion of tax revenue to Gross Domestic Product (GDP), reflects the ability of a tax system to mobilize revenue relative to the size of the economy (Usmansyah, Santiago, & Sungkowati, 2022; Wahyuningih & Setyowati, 2020). According to the World Bank (2024), Indonesia's tax ratio remains lower than that of several other Southeast Asian countries, suggesting considerable room for improving taxpayer compliance.

Although the tax ratio is frequently used to describe the overall performance of a country's tax system, it should not be interpreted as a direct measure of taxpayer compliance at the firm level. The tax ratio is a macroeconomic indicator that reflects aggregate tax revenue relative to GDP and is influenced by various factors, including economic growth, tax policy, and administrative effectiveness. In contrast, this study focuses on taxpayer-level compliance behavior, measured by the ratio of voluntary Corporate Income Tax payments to firm turnover. Therefore, the tax ratio is used only to provide the broader context of Indonesia's tax compliance challenges, while the empirical analysis examines compliance outcomes at the individual corporate taxpayer level.

Under the self-assessment system, voluntary tax compliance constitutes the foundation of an effective tax administration. This system entrusts taxpayers with the responsibility of calculating, paying, and reporting their tax liabilities in accordance with prevailing tax regulations. Consequently, the success of the tax system depends not only on the quality of tax legislation but also on taxpayers' willingness to comply voluntarily with their tax obligations. Low voluntary compliance widens the gap between potential and actual tax revenue, thereby encouraging tax authorities to adopt more effective compliance monitoring and enforcement strategies.

Voluntary tax compliance in this study refers to the extent to which corporate taxpayers voluntarily fulfill their Corporate Income Tax obligations under Indonesia's self-assessment system, without direct enforcement actions or tax assessments issued by the tax authority. Operationally, voluntary compliance is measured by the ratio of voluntary Corporate Income Tax payments made through Article 25 installments and Article 29 final payments to business turnover. This measure captures taxpayers' actual willingness to contribute tax payments relative to their economic activity rather than merely their fulfillment of administrative requirements.

One of the principal instruments employed by tax authorities worldwide to improve taxpayer compliance is the tax audit. Mittone, Ploner, and Verrina (2021) argue that taxpayers' compliance decisions largely depend on the perceived probability of being audited and the severity of potential sanctions. In Indonesia, Article 29 of Law No. 6 of 1983 concerning General Provisions and Tax Procedures, as subsequently amended, most recently by Law No. 7 of 2021, authorizes the Directorate General of Taxes (DGT) to conduct tax audits. Tax audits involve document verification, transaction testing, and evidence gathering to assess taxpayers' compliance with tax regulations. These procedures are expected to generate a deterrent effect

that promotes sustained taxpayer compliance. Likewise, Kasper and Alm (2021) emphasize that both audit intensity and effective penalties significantly influence taxpayers' decisions to comply with tax laws.

In Indonesia, tax audits are conducted by Audit Implementation Units (UP2) located within Tax Offices (KPP), Regional Offices, and the DGT Headquarters. During the past five years, tax audits have contributed approximately 1.5% to 5% of total annual tax revenue. Nevertheless, given the vast number of active taxpayers, audit coverage remains relatively limited. This situation is reflected in Indonesia's Audit Coverage Ratio (ACR), which has remained below two percent in recent years (Rosid & Romadhaniah, 2021; Irawan, 2023). Such a low audit coverage implies that only a small proportion of taxpayers are likely to be audited, making the effectiveness of tax audits highly dependent on the tax authority's ability to identify appropriate audit targets.

The disparity between the need to audit a large taxpayer population and the limited number of tax auditors presents a significant challenge for tax administration. To address this issue, tax authorities require mechanisms capable of identifying taxpayers with a higher likelihood of non-compliance so that audit resources can be allocated more efficiently (Rosid & Romadhaniah, 2021). Darono and Pratama (2022) argue that accurate risk identification enables tax authorities to maximize limited audit resources while improving audit effectiveness. This approach is consistent with the Compliance Risk Management framework developed by the OECD (2004), which classifies taxpayers according to their compliance risk and recommends differentiated compliance strategies based on taxpayer characteristics.

As part of Indonesia's tax administration reform, the Directorate General of Taxes has adopted a risk-based audit approach in selecting taxpayers for audit. This approach aims to concentrate audit resources on taxpayers with higher compliance risks, thereby improving both the effectiveness and efficiency of tax enforcement. International experience demonstrates that risk-based audits can substantially enhance taxpayer compliance. Bulgaria and Ukraine experienced improvements in tax reporting and revenue collection after prioritizing high-risk taxpayers for audit. Sweden and the Netherlands have emphasized the use of data analytics and behavioral approaches to strengthen voluntary compliance, while Australia has demonstrated that automated audit systems improve the accuracy of non-compliance detection while reducing administrative costs (Khawaja et al., 2011; Kirchler, Kogler, & Muehlbacher, 2014; Phan & Dang, 2025).

Beyond audit effectiveness, the institutional characteristics of tax administration may also influence taxpayer compliance. In Indonesia, taxpayers are administered by different types of Tax Offices, namely Large Taxpayer Offices (KPP Wajib Pajak Besar), Special Tax Offices (KPP Khusus), Medium Taxpayer Offices (KPP Madya), and Primary Tax Offices (KPP Pratama). Each Tax Office type differs in terms of taxpayer characteristics, transaction complexity, human resource capacity, and compliance monitoring strategies. These institutional differences may result in variations in both enforcement effectiveness and taxpayer compliance across Tax Office types. Therefore, Tax Office type represents an important institutional characteristic that should be considered when explaining variations in voluntary tax compliance.

Taxpayer compliance is also influenced by macroeconomic conditions. Economic growth reflects changes in business activity, production capacity, and firms' ability to fulfill their tax obligations. During periods of economic expansion, increased business activity broadens the tax base and enhances firms' capacity to pay taxes. Conversely, economic slowdowns may

weaken firms' financial capacity and reduce tax payment compliance. Besley and Persson (2013) argue that a country's fiscal capacity depends on the interaction between taxpayer compliance and the economic conditions supporting the tax base. Similarly, Alm and Embaye (2013) demonstrate that economic growth strengthens a country's fiscal potential, although these benefits can only be fully realized when accompanied by higher taxpayer compliance.

Research on tax audits has expanded considerably over the past decades. Studies such as Niu (2010) and Hoopes et al. (2012) investigate the impact of tax audits on taxpayer compliance, while Diamendia and Setyowati (2021) examine the implementation of Compliance Risk Management within the Directorate General of Taxes, focusing primarily on qualitative aspects of implementation. However, empirical evidence regarding how institutional differences across Tax Office types influence voluntary taxpayer compliance remains limited. Moreover, most previous studies rely on measures of formal tax compliance, whereas this study focuses on voluntary compliance measured by the ratio of voluntary Corporate Income Tax payments (Article 25 and Article 29 installments) to firm turnover, thereby providing a closer representation of taxpayers' voluntary payment behavior.

This study focuses on corporate taxpayers in Indonesia's manufacturing sector registered across all Tax Office types during the 2016–2022 period. The manufacturing sector was selected because it represents the largest contributor to Indonesia's Gross Domestic Product as well as one of the largest contributors to national tax revenue. In addition to its strategic role in the national economy, the manufacturing sector includes a sufficient number of audited corporate taxpayers to facilitate robust panel data analysis at the taxpayer level.

Based on the foregoing discussion, this study aims to examine the effects of risk-based stronger economic activityits, Tax Office type, and economic growth on the voluntary tax compliance of corporate taxpayers in Indonesia's manufacturing sector. The findings are expected to contribute to the literature on the effectiveness of risk-based tax audits in promoting voluntary tax compliance while providing practical insights for the Directorate General of Taxes in designing more effective compliance monitoring strategies that account for institutional characteristics and prevailing economic conditions.

2. Literature Review & Hypothesis Development

Classical Tax Compliance Theory

Tax compliance has been one of the central topics in taxation literature for more than five decades. One of the most widely used theoretical foundations for explaining taxpayer compliance behavior is Classical Tax Compliance Theory, introduced by Allingham and Sandmo (1972). This theory explains that taxpayers' decisions to comply with or evade their tax obligations result from a rational expected-utility calculation involving the benefits obtained from tax evasion and the risks incurred when non-compliance is detected by the tax authority. Within this framework, the probability of audit and the severity of sanctions are the two principal factors influencing taxpayer compliance behavior (Allingham & Sandmo, 1972). Subsequent research has demonstrated that tax audits function not only as law-enforcement instruments but also as mechanisms that shape taxpayers' perceptions of the likelihood that violations will be detected. Mittone, Ploner, and Verrina (2021) argue that taxpayers' compliance decisions are strongly influenced by their perceived probability of audit. The greater the perceived likelihood of being audited, the lower the tendency to engage in non-compliance. In line with this argument, Kasper and Alm (2021) explain that the combination

of an adequate audit probability and effective sanctions can improve voluntary compliance through a deterrence effect.

Nevertheless, various studies have shown that tax compliance is not determined solely by economic considerations. Alm (2012) explains that compliance behavior is also influenced by social norms, tax morale, perceptions of fairness, and trust in government. Through the Slippery Slope Framework, Kirchler (2007) emphasizes that sustainable compliance is more likely to be achieved when tax authorities are able to balance the power of authority with trust in authorities. Therefore, tax audits remain an important instrument in modern tax administration, although their effectiveness largely depends on how they are designed and implemented.

In this study, Classical Tax Compliance Theory provides the theoretical basis for explaining how risk-based tax audits increase taxpayers' perceived probability that non-compliance will be detected, thereby encouraging firms to fulfill their tax obligations voluntarily.

Institutional Theory

In addition to taxpayers' individual characteristics, compliance is also influenced by the institutional environment in which taxpayers interact with the tax administration. Institutional Theory explains that the behavior of organizations and individuals is shaped by formal rules, norms, organizational structures, and monitoring mechanisms operating within an institution (Scott, 2014).

In the context of tax administration, institutions encompass not only tax regulations but also the organizational design of the tax authority, monitoring systems, human resource capacity, and taxpayer service mechanisms. Differences in these institutional characteristics may generate variations in service quality, monitoring intensity, and audit effectiveness, which ultimately influence taxpayer compliance.

The Directorate General of Taxes applies organizational segmentation through the establishment of several types of Tax Offices, namely Primary Tax Offices, Medium Tax Offices, Special Tax Offices, and Large Taxpayer Offices. Each Tax Office type administers taxpayers with different business characteristics, transaction complexities, and risk levels. Consequently, audit effectiveness and taxpayer compliance behavior may vary across Tax Office types, even though they operate under the same national tax administration system.

From the perspective of Institutional Theory, differences in the organizational environment of tax administration may influence taxpayer behavior through variations in monitoring arrangements, taxpayer segmentation, administrative complexity, and the allocation of tax administration resources. In this study, these institutional differences are proxied by Tax Office type. The Directorate General of Taxes assigns taxpayers to different Tax Office categories based on taxpayer characteristics, economic significance, and transaction complexity. As a result, taxpayers registered with different Tax Office types operate under distinct administrative environments that may differ in terms of supervision intensity, specialization of tax officers, compliance management practices, and taxpayer service arrangements. Although these institutional characteristics are not measured directly, Tax Office type serves as an observable proxy for such organizational differences. Therefore, variations in voluntary taxpayer compliance across Tax Office types may reflect differences in the institutional environment through which tax policies and compliance-monitoring mechanisms are implemented.

Risk-Based Tax Audits and Voluntary Tax Compliance

Tax audits are among the main instruments used by tax authorities to improve taxpayer compliance. However, limited audit resources prevent tax authorities from examining every taxpayer. This constraint has encouraged many countries to adopt a risk-based tax audit approach, under which taxpayers are prioritized for audit according to their level of non-compliance risk.

The OECD (2004) recommends the implementation of Compliance Risk Management as a framework for identifying, assessing, and managing compliance risks so that audit resources can be allocated more effectively. This approach has been implemented in various countries and has proven capable of improving both monitoring effectiveness and tax administration efficiency.

Khawaja et al. (2011) show that the implementation of risk-based tax audits in Bulgaria and Ukraine improved tax compliance and revenue collection because audits were concentrated on taxpayers with a higher probability of non-compliance. Kirchler et al. (2014) also explain that audit strategies that account for taxpayers' behavioral characteristics generate a stronger deterrence effect than random audits. Similar findings are reported by Phan and Dang (2025), who demonstrate that the use of technology and risk analysis improves audit effectiveness in promoting tax compliance.

Based on Classical Tax Compliance Theory and prior empirical findings, risk-based tax audits are expected to improve voluntary taxpayer compliance.

H1: Risk-based tax audits have a positive effect on the voluntary tax compliance of corporate taxpayers.

Tax Office Type and Voluntary Tax Compliance

The effectiveness of tax administration is determined not only by audit quality but also by the organizational characteristics of the institution responsible for performing the monitoring function. The Directorate General of Taxes assigns taxpayers to different types of Tax Offices based on the characteristics of the taxpayers being administered. Large Taxpayer Offices administer firms that make the largest contributions to tax revenue, Special Tax Offices administer particular sectors or categories of taxpayers, Medium Tax Offices administer medium-sized firms, and Primary Tax Offices administer the majority of corporate and individual taxpayers.

The effectiveness of tax administration depends not only on audit activities but also on the institutional environment in which monitoring and taxpayer services are delivered. Prior studies have shown that administrative capacity, enforcement intensity, taxpayer service quality, and organizational resources are important determinants of tax compliance (Alm & McClellan, 2012; Kirchler, Hoelzl, & Wahl, 2008; Mascagni, Santoro, & Mukama, 2019). These factors may vary across tax administration units, creating different compliance environments for taxpayers.

In Indonesia, the Directorate General of Taxes assigns taxpayers to different Tax Office types according to taxpayer characteristics and economic significance. Large Taxpayer Offices administer firms that contribute substantially to national tax revenues, Special Tax Offices administer specific sectors or categories of taxpayers, Medium Tax Offices administer medium-sized firms, and Primary Tax Offices administer the majority of corporate and individual taxpayers. These offices differ not only in the composition of taxpayers they administer but also in transaction complexity, monitoring intensity, specialization of tax officers, administrative resources, and service delivery practices.

Previous studies have generally examined the effects of tax audits, tax services, and tax administration quality on taxpayer compliance. However, limited empirical evidence exists regarding whether differences in tax administration structures themselves are associated with differences in voluntary tax compliance among corporate taxpayers. This study extends the literature by examining Tax Office type as a proxy for heterogeneous administrative environments and testing whether taxpayers operating under different administrative jurisdictions exhibit different levels of voluntary compliance after controlling for other compliance-related factors. In this way, the study contributes to the understanding of how institutional variations within a unified tax administration system may be associated with taxpayer behavior. Therefore, this study incorporates Tax Office type as an institutional variable to explain variations in voluntary compliance across taxpayer groups.

H2: The level of voluntary tax compliance among corporate taxpayers differs across Tax Office types.

Economic Growth and Voluntary Tax Compliance

In addition to tax administration policies, taxpayer compliance is also influenced by the economic conditions underlying firms' business activities. Economic growth reflects increases in production, investment, and income, which ultimately affect firms' capacity to fulfill their tax obligations.

Besley and Persson (2014) explain that economic development broadens the tax base and strengthens a country's fiscal capacity. Alm and Embaye (2013) likewise show that economic growth increases revenue potential through the expansion of formal economic activity. At the firm level, improved economic conditions enhance firms' financial ability to pay taxes in a timely manner and are therefore expected to increase voluntary compliance.

Conversely, an economic slowdown may reduce firms' cash flows and intensify financial pressure, thereby encouraging the postponement of tax payments or other forms of non-compliance. Economic growth is therefore treated as a control variable representing the macroeconomic conditions that influence taxpayer compliance behavior.

H3: Economic growth has a positive effect on the voluntary tax compliance of corporate taxpayers.

Research Framework

Drawing on Classical Tax Compliance Theory and Institutional Theory, this study develops a conceptual framework in which voluntary taxpayer compliance is influenced by a combination of enforcement mechanisms, institutional characteristics, and economic conditions. Risk-based tax audits are viewed as deterrence instruments that increase the probability of detecting non-compliance. Tax Office type represents the institutional characteristics of tax administration, while economic growth reflects external conditions affecting firms' ability to fulfill their tax obligations. Together, these three factors are expected to explain variations in the voluntary tax compliance of corporate taxpayers in Indonesia's manufacturing sector during the study period.

3. Methodology

Research Design

This study employs a quantitative approach with an explanatory research design to examine the effects of risk-based tax audits, Tax Office type, and economic growth on the voluntary tax compliance of corporate taxpayers in Indonesia's manufacturing sector. A quantitative

approach is adopted because the study aims to test theoretically derived relationships among variables through statistical analysis of panel data.

The unit of analysis is corporate taxpayers operating in the manufacturing sector and registered with the Directorate General of Taxes during the 2016–2022 period. The use of panel data enables the study to capture variations in compliance behavior across taxpayers as well as over time. This approach produces more efficient estimates than those obtained from cross-sectional or time-series data analyzed separately (Baltagi, 2021; Wooldridge, 2010).

Population, Sample, and Data Sources

This study uses secondary data obtained from the Directorate General of Taxes and Statistics Indonesia (BPS).

Data from the Directorate General of Taxes include information on Corporate Income Tax payments, business turnover, tax audit status, taxpayer identity, and the Tax Office at which each taxpayer is registered. These data were subsequently matched with economic growth data published by Statistics Indonesia.

The study population comprises all corporate taxpayers in the manufacturing sector registered with the Directorate General of Taxes during the 2016–2022 period. Following the data-cleaning process, observations with incomplete information or those that did not meet the research criteria were excluded. The final dataset constitutes a strongly balanced panel consisting of 16,339 taxpayers and 114,373 taxpayer-year observations.

Operational Definitions of Variables

Dependent Variable

The dependent variable in this study is the voluntary tax compliance of corporate taxpayers (KP).

Voluntary tax compliance is measured using the ratio of voluntary Corporate Income Tax payments made through Article 25 installments and Article 29 final payments to the firm's business turnover.

Material Tax Compliance Rate (%) = [(Article 25 Income Tax + Article 29 Income Tax) / Business Turnover] x 100%

The ratio is subsequently transformed using the Inverse Hyperbolic Sine transformation:

$$\text{IHS}(x) = \ln(x + \sqrt{x^2 + 1})$$

The IHS transformation is selected because it can accommodate highly skewed distributions while retaining observations with zero values (Bellemare & Wichman, 2020).

Independent Variables

Tax Audit (AUDIT)

Tax audit status is measured using a dummy variable:

1=taxpayer was audited

0=taxpayer was not audited

Since the implementation of Compliance Risk Management, the selection of taxpayers for audit has been conducted through a risk-based mechanism. Therefore, this variable represents the realization of a risk-based tax audit.

Tax Office Type

Tax Office type is treated as a categorical variable.

The reference category is:

- Special Tax Office.

The remaining categories are:

- Medium Tax Office;

- Primary Tax Office; and
- Large Taxpayer Office.

Economic Growth

Economic growth is measured using the regional Gross Regional Domestic Product growth rate.

For taxpayers registered with Primary and Medium Tax Offices, provincial economic growth is used. For taxpayers registered with Special Tax Offices and Large Taxpayer Offices, the national economic growth rate is used.

Research Model

The relationship among the variables is specified as follows:

$$KP_{it} = \beta_0 + \beta_1 AUDIT_{it} + \beta_2 GROWTH_{it} + \beta_3 KPP_i + \mu_i + \varepsilon_{it} \dots \dots \dots (1)$$

where:

KP_{it} = voluntary tax compliance,

$AUDIT_{it}$ = tax audit,

$GROWTH_{it}$ = economic growth,

KPP_i = Tax Office type,

μ_i = individual-specific effect,

ε_{it} = error term.

Analytical Procedures and Estimation Model Selection

The analysis is conducted in several stages to identify the panel-data model that best fits the characteristics of the dataset.

Descriptive Statistics

The first stage presents descriptive statistics, including the mean, median, standard deviation, minimum, and maximum values, to describe the characteristics of each research variable (Gujarati & Porter, 2009).

Correlation and Multicollinearity Analysis

Relationships among the independent variables are examined using Pearson correlation analysis.

Multicollinearity is subsequently assessed using the Variance Inflation Factor (VIF). According to Gujarati and Porter (2009), a VIF value below 10 indicates that multicollinearity does not constitute a serious problem in the regression model.

Panel-Data Model Selection

Model selection is conducted sequentially following standard panel-data procedures (Baltagi, 2021; Wooldridge, 2010).

First, the Chow test is employed to determine whether the Pooled Ordinary Least Squares or Fixed Effects model is more appropriate.

Second, the Breusch–Pagan Lagrange Multiplier test is conducted to choose between the Pooled Ordinary Least Squares and Random Effects models.

Third, the Hausman test is used to determine whether the assumptions underlying the Random Effects model are satisfied or whether the Fixed Effects model is more appropriate. The Hausman test evaluates the null hypothesis that individual-specific effects are uncorrelated with the independent variables, in which case the Random Effects estimator is consistent (Hausman, 1978).

Selection of the Correlated Random Effects Model

Although the Hausman test indicates that the Fixed Effects model is preferable to the Random Effects model, the Fixed Effects estimator cannot estimate the effects of time-invariant

variables, such as Tax Office type, because such variables are eliminated through the within transformation (Wooldridge, 2010).

Conversely, the Random Effects model permits the estimation of time-invariant variables. However, the Hausman test indicates that the fundamental Random Effects assumption is violated, rendering the Random Effects estimator inconsistent.

To address these two limitations, this study employs the Correlated Random Effects approach developed by Mundlak (1978). This approach incorporates the individual means of all time-varying explanatory variables into the Random Effects specification. It therefore allows the individual-specific effects to be correlated with the independent variables without eliminating time-invariant variables.

The empirical CRE model is specified as follows:

$$KP_{it} = \beta_0 + \beta_1 Audit_{it} + \beta_2 Growth_{it} + \beta_3 \overline{Audit_i} + \beta_4 \overline{Growth_i} + \beta_5 KPP_i + \delta_t + \mu_i + \varepsilon_{it}$$

Where $\beta_3 \overline{Audit_i}$ and $\beta_4 \overline{Growth_i}$ represent the taxpayer-level means of the time-varying explanatory variables, while (t) denotes year fixed effects.

The CRE approach produces coefficient estimates for time-varying variables that are equivalent to those obtained from the Fixed Effects model when individual-specific effects are correlated with the explanatory variables. At the same time, it allows the effects of time-invariant variables, such as Tax Office type, to be estimated (Mundlak, 1978; Wooldridge, 2010).

Diagnostic Tests

After the main model is selected, diagnostic tests are conducted to assess the relevant model assumptions.

Heteroskedasticity is tested using the Modified Wald test in the Fixed Effects model. To address potential heteroskedasticity and serial correlation within the panel, the final estimation applies cluster-robust standard errors at the taxpayer level (Arellano, 1987; Wooldridge, 2010).

The model also includes year fixed effects to control for changes in macroeconomic conditions and tax policies that affect all taxpayers in a particular year.

4. Result and Discussion

Data Characteristics and Descriptive Statistics

The dataset constitutes a strongly balanced panel covering the 2016–2022 period. The sample consists of 16,339 corporate taxpayers observed over seven years, resulting in 114,373 taxpayer-year observations. Each year contains the same number of observations, namely 16,339.

Table 1. Descriptive Statistics

Variable	Obs.	Mean	SD	Min.	Max.	Skewness	Kurtosis
Compliance ratio before IHS	114,373	0.006254	0.682497	-88.08092	169.2815	124.1717	39,055.63
Voluntary compliance (IHS)	114,373	0.006075	0.052243	-5.171435	5.824719	-9.591784	5,597.421
Tax audit	114,373	0.122275	0.327605	0	1	2.305986	6.317572

Economic growth	114,373	3.519519	4.372292	-10.36	106.29	3.287554	94.1665
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Source: Authors' data processing.

The compliance ratio has a mean of 0.006254 and a standard deviation of 0.682497, with values ranging from -88.08092 to 169.2815. Its skewness of 124.17 and kurtosis of 39,055.63 indicate an extremely skewed distribution containing substantial outliers. Following the IHS transformation, the standard deviation decreases to 0.052243, while the range narrows to between -5.171435 and 5.824719. These results support the use of the IHS transformation to reduce the influence of extreme values, although the transformed variable continues to exhibit high kurtosis.

The tax audit variable has a mean of 0.122275. Since this variable is binary, the value indicates that approximately 12.23% of the taxpayer-year observations were subject to a tax audit. In absolute terms, 13,985 observations were audited, while 100,388 observations were not audited.

Audit intensity varies considerably across Tax Office types. The highest audit proportion is observed among taxpayers registered with Large Taxpayer Offices, at 55.78%, followed by Special Tax Offices at 32.96%, Medium Tax Offices at 21.23%, and Primary Tax Offices at 5.22%. These differences indicate that audit intensity is higher among administrative units responsible for larger and more complex taxpayers.

Most observations are associated with Primary Tax Offices, accounting for 75,943 observations or 66.40% of the sample. Medium Tax Offices account for 25,648 observations or 22.42%, Special Tax Offices for 11,172 observations or 9.77%, and Large Taxpayer Offices for 1,610 observations or 1.41%.

The panel variation analysis shows that voluntary tax compliance has a within standard deviation of 0.044190 and a between standard deviation of 0.027868. Tax audit status also varies both across taxpayers and within the same taxpayer over time, with a between standard deviation of 0.215357 and a within standard deviation of 0.246879. Therefore, the dataset contains sufficient temporal variation to estimate the effect of tax audits using either a within estimator or the CRE approach.

Correlation and Multicollinearity Analysis

Table 2. Correlations among Variables

Variable	Voluntary IHS	Compliance—	Tax Audit	Economic Growth
Voluntary IHS	1.0000			
Tax Audit	0.0196***		1.0000	
Economic Growth	0.0064**		-0.0028	1.0000

Notes: *** $p < 0.01$; ** $p < 0.05$.

Tax audits are positively correlated with voluntary compliance, with a coefficient of 0.0196 that is statistically significant at the 1% level. Economic growth is also positively correlated with voluntary compliance, with a coefficient of 0.0064 that is significant at the 5% level. However, both correlation coefficients are relatively small. The correlation between tax audits and economic growth is -0.0028 and is not statistically significant.

Table 3. Multicollinearity Test Results

Variable	Initial Model	CRE Model (Mundlak)
Tax Audit	1.15	1.81
Economic Growth	2.05	3.04
Mean Tax Audit	—	2.13
Mean Economic Growth	—	1.49
Medium Tax Office	2.59	2.64
Primary Tax Office	2.81	3.13
Large Taxpayer Office	1.14	1.15
Year 2017	1.72	1.73
Year 2018	1.74	1.75
Year 2019	1.72	1.72
Year 2020	2.63	3.07
Year 2021	1.73	1.75
Year 2022	1.75	1.77
Mean VIF	1.91	2.09

The multicollinearity test for the initial model produces a mean VIF of 1.91, with a maximum VIF of 2.81. After the individual-level Mundlak means are included, the mean VIF increases slightly to 2.09, while the maximum value becomes 3.13. All values remain well below the conventional threshold of 10, indicating no evidence of serious multicollinearity.

The correlation between current-year audit status and the taxpayer-level mean audit variable is 0.6573. This relationship is a natural consequence of the Mundlak construction because the mean audit variable is calculated from each taxpayer's audit status over the observation period. Although the correlation is relatively high, the low VIF values indicate that it does not generate a multicollinearity problem that would materially affect the estimation.

Table 4. Panel-Data Model Selection

Test	Model Comparison			Test Statistic	Probability	Decision
Chow test/F-test for individual effects	Pooled	OLS	vs. Fixed Effects	$F = 2.39$	0.0000	Fixed Effects is more appropriate than Pooled OLS
Breusch–Pagan LM test	Pooled	OLS	vs. Random Effects	$\text{Chibar}^2 = 9,161.56$	0.0000	Random Effects is more appropriate than Pooled OLS
Hausman test	Fixed Effects	Random Effects	vs.	$\chi^2 = 38.65$	0.0000	Fixed Effects is more appropriate than Random Effects
Joint Mundlak test	Random Effects	CRE	vs.	$\chi^2 = 42.87$	0.0000	CRE is more appropriate than conventional Random Effects
Mundlak test for audit	Correlation between individual effects and audit			$\chi^2 = 41.99$	0.0000	Correlation is present

Test	Model Comparison	Test Statistic	Probability	Decision
Mundlak test for growth	Correlation between individual effects and growth	$\chi^2 = 0.01$	0.9100	No correlation is detected

The Fixed Effects estimation produces an F-statistic of 2.39 for the joint test of all individual effects, with a probability value of 0.0000. The null hypothesis that all individual effects are jointly equal to zero is therefore rejected. This result indicates that the Fixed Effects model is more appropriate than Pooled OLS because significant unobserved taxpayer heterogeneity is present.

The Breusch–Pagan Lagrange Multiplier test produces a chibar-square statistic of 9,161.56 with a probability value of 0.0000. The null hypothesis that the variance of the individual effects is equal to zero is rejected, indicating that the Random Effects model is also more appropriate than Pooled OLS.

The Hausman test produces a chi-square statistic of 38.65 with a probability value of 0.0000. This result indicates systematic differences between the Fixed Effects and Random Effects coefficients, suggesting that the Random Effects assumption of no correlation between the individual effects and the explanatory variables is violated. However, the Hausman output also reports a warning that the variance-difference matrix is not positive definite. Therefore, the Hausman result is treated as preliminary evidence, while the final model-selection decision is reinforced by the Mundlak test within the CRE framework.

The Fixed Effects model cannot estimate the effect of Tax Office type because this variable does not vary over time for each taxpayer. By contrast, the conventional Random Effects model can estimate time-invariant variables, but its independence assumption is rejected, which may render its estimates inconsistent. Consequently, the main specification employs Correlated Random Effects by including the taxpayer-level means of tax audit status and economic growth.

The Mundlak test reinforces this decision. The taxpayer-level mean audit and mean economic growth variables are jointly significant, with a probability value of 0.0000. Individually, the mean audit variable is statistically significant, whereas the mean economic growth variable is not. This result suggests that the correlation between unobserved taxpayer-specific effects and the explanatory variables primarily arises from taxpayers' audit characteristics or audit histories. CRE is therefore selected as the main model because it controls for this correlation while retaining the ability to estimate the effects of time-invariant variables such as Tax Office type.

The joint test of the individual-level mean variables produces a chi-square statistic of 42.87 with a probability value of 0.0000. This result rejects the null hypothesis that all Mundlak coefficients are jointly equal to zero and confirms that taxpayer-specific effects are correlated with at least one explanatory variable. Accordingly, CRE is more appropriate than the conventional Random Effects model.

Individually, the mean audit variable produces a chi-square statistic of 41.99 with a probability value of 0.0000, whereas the mean economic growth variable has a probability value of 0.9100. Thus, the violation of the Random Effects assumption is primarily attributable to the correlation between unobserved taxpayer characteristics and audit probability or audit history, rather than economic growth.

Table 5. Diagnostic Tests

Test	Null Hypothesis	Test Statistic	Probability	Conclusion
Modified Wald test	Error variance is homogeneous across taxpayers	$\chi^2 = (4.30 \times 10^9)$	0.0000	Heteroskedasticity is present
Wooldridge test	No first-order serial correlation	F = 3.778	0.0520	No serial correlation at the 5% level
VIF—initial model	No serious multicollinearity	Mean VIF = 1.91; maximum = 2.81	—	No serious multicollinearity
VIF—CRE model	No serious multicollinearity	Mean VIF = 2.09; maximum = 3.13	—	No serious multicollinearity

The Modified Wald test produces a chi-square statistic of (4.30×10^9) with a probability value of 0.0000. The null hypothesis of homogeneous error variance is rejected, indicating the presence of heteroskedasticity across taxpayers. Accordingly, the main model is estimated using cluster-robust standard errors at the taxpayer level.

The Wooldridge test produces an F-statistic of 3.778 with a probability value of 0.0520. At the 5% significance level, the null hypothesis of no first-order serial correlation cannot be rejected. Thus, there is no statistically significant evidence of serial correlation at the 5% level, although the result is close to the conventional significance threshold. Cluster-robust standard errors are nevertheless retained to provide inference that is robust to within-panel correlation and heteroskedasticity.

Correlated Random Effects Estimation Results

Table 6. CRE Model Estimation Results

Variable	Coefficient	Robust SE	z	p-value
Tax audit	0.006214	0.001168	5.32	0.000
Economic growth	0.000072	0.000035	2.06	0.039
Mean audit	-0.014802	0.002284	-6.48	0.000
Mean economic growth	-0.000013	0.000115	-0.11	0.910
Medium Tax Office	0.000358	0.001205	0.30	0.766
Primary Tax Office	-0.006964	0.001158	-6.01	0.000
Large Taxpayer Office	0.003036	0.002933	1.03	0.301
Constant	0.011279	0.001302	8.66	0.000

Reference category for Tax Office type: Special Tax Office. The model includes year fixed effects. Standard errors are clustered at the taxpayer level.

The CRE model is jointly significant, with a Wald chi-square statistic of 539.26 and a probability value of 0.0000. The within, between, and overall (R^2) values are 0.0014, 0.0123, and 0.0045, respectively. These relatively low (R^2) values indicate that most of the variation in voluntary compliance at the taxpayer level is explained by factors outside the model. However, the low explanatory power does not invalidate the statistical significance of the

estimated relationships, particularly because the analysis uses micro-level data characterized by substantial individual heterogeneity.

Effect of Tax Audits on Voluntary Compliance

The tax audit variable has a coefficient of 0.006214, a robust standard error of 0.001168, and a probability value of 0.0000. This result indicates that, after controlling for economic growth, Tax Office type, the individual means of the explanatory variables, and year fixed effects, taxpayer-year observations subject to a tax audit have a voluntary compliance IHS index that is 0.006214 higher than that of observations not subject to an audit.

Because the original compliance ratio is close to zero for most observations, the IHS coefficient locally approximates an absolute change in the original ratio. With appropriate caution, the coefficient of 0.006214 may be interpreted as an increase of approximately 0.0062 in the ratio of voluntary tax payments to turnover, equivalent to approximately 0.62 percentage points when the original ratio is expressed in decimal form. Nevertheless, the primary interpretation remains an increase in the voluntary compliance index because the data contain negative values and extreme observations.

This finding supports H1, indicating that tax audits have a positive effect on the voluntary tax compliance of corporate taxpayers.

Effect of Economic Growth on Voluntary Compliance

Economic growth has a coefficient of 0.0000722 and a probability value of 0.039. Thus, a one-percentage-point increase in economic growth is associated with an increase of 0.0000722 in the voluntary compliance index, after controlling for the other variables in the model.

Although the magnitude of the coefficient is relatively small, its direction is positive and statistically significant at the 5% level. This result supports H3, indicating that economic growth has a positive effect on the voluntary tax compliance of corporate taxpayers.

Differences in Compliance across Tax Office Types

Using Special Tax Offices as the reference category, the coefficient for Medium Tax Offices is 0.000358 and is not statistically significant ($p=0.766$). This result indicates that the voluntary compliance of taxpayers registered with Medium Tax Offices does not differ significantly from that of taxpayers registered with Special Tax Offices.

Primary Tax Offices have a coefficient of -0.006964, which is statistically significant at the 1% level. Accordingly, taxpayers registered with Primary Tax Offices have a voluntary compliance index that is 0.006964 lower than that of taxpayers registered with Special Tax Offices, after controlling for the remaining variables.

The coefficient for Large Taxpayer Offices is 0.003036 but is not statistically significant ($p=0.301$). Thus, the voluntary compliance of taxpayers registered with Large Taxpayer Offices is not statistically different from that of taxpayers registered with Special Tax Offices.

The joint test of all Tax Office-type dummy variables produces a chi-square statistic of 244.54 with a probability value of 0.0000. Therefore, Tax Office type is jointly and significantly associated with voluntary compliance. This finding supports H2, indicating that voluntary compliance differs across Tax Office types.

The pairwise comparison results show that:

- Primary Tax Offices have lower voluntary compliance than Special Tax Offices, with a difference of -0.006964 ($p<0.001$).
- Primary Tax Offices have lower voluntary compliance than Medium Tax Offices, with a difference of -0.007322 ($p<0.001$).

- Large Taxpayer Offices have higher voluntary compliance than Primary Tax Offices, with a difference of 0.009999 (($p=0.001$)).
- No statistically significant differences are found between Special and Medium Tax Offices, Special Tax Offices and Large Taxpayer Offices, or Medium Tax Offices and Large Taxpayer Offices.

The marginal predicted values of voluntary compliance are 0.010576 for Special Tax Offices, 0.010934 for Medium Tax Offices, 0.003612 for Primary Tax Offices, and 0.013612 for Large Taxpayer Offices. Thus, the lowest predicted value is observed among Primary Tax Offices, while the highest is observed among Large Taxpayer Offices.

Year Effects

Table 7. Estimated Year Effects in the CRE Model

Year	Coefficient	Robust SE	z	Probability	Conclusion
2016	Reference category	—	—	—	—
2017	0.000508	0.000486	1.04	0.297	Not significant
2018	-0.000028	0.000354	-0.08	0.936	Not significant
2019	0.000720	0.000436	1.65	0.099	Not significant at 5%
2020	0.000023	0.000701	0.03	0.973	Not significant
2021	-0.000513	0.000482	-1.07	0.287	Not significant
2022	0.000265	0.000636	0.42	0.677	Not significant

Source: Authors' data processing.

Individually, none of the year coefficients are statistically significant at the 5% level. The coefficient for 2019 is only marginally significant at the 10% level, with a probability value of 0.099. This result indicates that, after controlling for tax audits, economic growth, Tax Office type, and individual heterogeneity, voluntary compliance in each year does not differ significantly from the 2016 reference year.

However, the joint test of all year dummy variables produces a chi-square statistic of 13.67 with a probability value of 0.0336. Thus, the year effects are jointly significant at the 5% level. This finding indicates that, although no single year exerts a sufficiently strong individual effect, changes in macroeconomic conditions, tax policies, and other common factors during the 2017–2022 period are collectively associated with voluntary compliance. Year fixed effects are therefore retained in the model to control for shocks affecting all taxpayers in the same year.

Table 8. Joint Test of Year Effects

Test	Test Statistic	Probability	Decision
Joint test of the 2017–2022 year dummies	($\chi^2(6)=13.67$)	0.0336	Year effects are jointly significant

Table 9. Summary of Hypothesis Testing

Hypothesis	Statement	Result
H1	Tax audits have a positive effect on voluntary compliance	Supported
H2	Voluntary compliance differs across Tax Office types	Supported
H3	Economic growth has a positive effect on voluntary compliance	Supported

Overall, the findings indicate that tax audits and economic growth are positively associated with voluntary compliance. Institutional differences across Tax Office types are also jointly

significant, primarily because taxpayers registered with Primary Tax Offices exhibit lower compliance than those registered with the other three Tax Office types.

An important data-related issue should nevertheless be noted. The tax-payment-to-turnover ratio contains very large negative values, reaching -88.08092, while the maximum value of economic growth is 106.29. These values are retained in the reported estimation because they are part of the dataset used in the model. However, before the manuscript is finalized, it is substantively important to verify whether these observations arise from turnover corrections, tax refunds, negative turnover values, missing-value codes, or differences in measurement units.

The Effect of Tax Audits on Voluntary Tax Compliance

The results show that tax audits have a positive and statistically significant effect on the voluntary tax compliance of corporate taxpayers in Indonesia's manufacturing sector. This finding indicates that taxpayers subject to an audit tend to exhibit higher levels of compliance than taxpayers who are not audited, after accounting for differences in taxpayer characteristics, regional economic conditions, Tax Office type, and unobserved heterogeneity. In other words, tax audits serve not only as instruments for identifying underpaid taxes during the audited period but may also generate subsequent changes in taxpayer compliance behavior.

This finding is consistent with the Classical Tax Compliance Theory developed by Allingham and Sandmo (1972). The theory explains that taxpayers' decisions to fulfill their tax obligations are based on a rational assessment of the benefits obtained from tax evasion relative to the risks incurred when non-compliance is detected by the tax authority. Within this framework, a higher probability of audit increases the expected cost of non-compliance and therefore encourages taxpayers to fulfill their tax obligations voluntarily. Tax audits thus function as a mechanism that increases the perceived risk of non-compliance while reinforcing the credibility of tax law enforcement.

The results also support Tax Deterrence Theory, which regards tax audits as a principal instrument for generating a deterrence effect. This effect may be experienced not only by audited taxpayers but also by other taxpayers who are aware that the tax authority actively conducts compliance monitoring. Tax audits therefore perform two simultaneous functions: a corrective function through the assessment of underpaid taxes and a preventive function by reinforcing the perception that non-compliance has a meaningful probability of being detected. The stronger this perceived risk, the greater the likelihood that taxpayers will report and pay their taxes correctly. This view is consistent with Feld and Frey (2006), Kastlunger et al. (2009), and Slemrod (2019), who emphasize that the effectiveness of a tax system depends not only on the severity of sanctions but also on taxpayers' belief that violations have a realistic chance of being detected by the tax authority.

Empirically, the findings reinforce previous studies showing that tax audits can improve taxpayer compliance. Niu (2010) demonstrates that a higher audit probability improves tax reporting compliance, while Hoopes et al. (2012) find that audit activity encourages firms to exercise greater caution in their tax reporting. Similarly, Mittone, Ploner, and Verrina (2021) show that changes in the perceived probability of being audited exert a stronger influence on compliance than increases in the severity of sanctions alone. Kasper and Alm (2021) also conclude that an adequate audit probability combined with consistent law enforcement is important in shaping voluntary compliance. The consistency of these findings suggests that

the behavioral mechanisms described by classical tax compliance theory also apply within Indonesia's self-assessment tax system.

Nevertheless, the magnitude of the audit coefficient in this study is relatively small. This result suggests that tax audits affect voluntary compliance but are not the sole determinant of taxpayer behavior. The small coefficient is consistent with the low within- (R^2) of the model, which indicates that taxpayer-level variations in compliance are influenced by numerous factors not included in the analysis. These may include accounting quality, corporate governance, financial conditions, tax literacy, perceived fairness of the tax system, and the quality of tax administration services. Therefore, the findings should not be interpreted as implying that merely increasing audit frequency will automatically generate a substantial improvement in compliance. Rather, tax audits constitute one important component of a broader tax administration system.

The results further show that the effect of tax audits remains statistically significant after controlling for taxpayer-specific heterogeneity through the Correlated Random Effects approach. This finding is important because it indicates that the positive relationship between audits and compliance is not attributable solely to fixed taxpayer characteristics that make certain firms inherently more compliant or more likely to be audited. By incorporating taxpayer-level means of the explanatory variables, as proposed by Mundlak (1978), the estimation distinguishes changes in audit status within the same taxpayer from differences across taxpayers. Accordingly, the estimated audit coefficient provides stronger evidence than would be obtained from a conventional Random Effects specification.

From an institutional perspective, the findings also support Institutional Theory. Tax audits are not merely administrative procedures but formal institutional instruments that shape taxpayers' behavioral expectations through regulatory and enforcement mechanisms. Scott (2001) explains that institutions influence individual behavior through regulative, normative, and cognitive pillars. In the context of Indonesian taxation, tax audits represent the regulative pillar by reinforcing compliance through formal rules, procedures, and consistently applied sanctions. When taxpayers believe that the tax authority is capable of detecting non-compliance objectively and professionally, compliance is driven not only by economic calculations but also by institutional norms that define compliance as the expected behavior within the tax system.

These findings have important policy implications for the Directorate General of Taxes. Given the limited number of tax auditors relative to the large taxpayer population, improving compliance does not necessarily require a substantial expansion in the number of audits. More importantly, the tax authority should maintain the credibility and quality of audit implementation so that taxpayers continue to perceive non-compliance as carrying a realistic probability of detection. Tax audits should therefore be regarded as behavioral compliance instruments rather than merely as mechanisms for generating short-term additional revenue through tax assessments. Such an approach is likely to produce more sustainable benefits by strengthening voluntary compliance under the self-assessment system and ultimately improving the overall effectiveness of tax administration.

The Effect of Economic Growth on Voluntary Tax Compliance

The results indicate that economic growth has a positive and statistically significant effect on the voluntary tax compliance of corporate taxpayers in Indonesia's manufacturing sector. This finding suggests that stronger economic activity enhances firms' financial capacity to comply voluntarily with their Corporate Income Tax obligations. In other words, favorable economic

conditions not only expand the tax base but also enhance firms' ability to make Corporate Income Tax payments in accordance with prevailing tax regulations.

From a theoretical perspective, these findings are consistent with Fiscal Capacity Theory, which views economic development as one of the fundamental drivers of a country's fiscal capacity. Besley and Persson (2013) argue that economic growth stimulates production, investment, and income, thereby broadening the tax base. Under these conditions, firms possess greater financial capacity to meet their tax obligations, while governments are better positioned to strengthen the effectiveness of tax administration. Consequently, economic growth and taxpayer compliance reinforce one another in supporting the government's revenue-generating capacity.

The findings are also consistent with Alm and Embaye (2013), who demonstrate that economic growth increases a country's fiscal potential through the expansion of formal economic activity. However, these benefits can only be fully realized when accompanied by adequate taxpayer compliance. In the context of this study, the positive coefficient on economic growth indicates that improvements in economic activity, particularly within the manufacturing sector, are associated not only with higher productive capacity but also with greater voluntary Corporate Income Tax payments.

This relationship is economically intuitive because the manufacturing sector is highly sensitive to business cycle fluctuations. During periods of economic expansion, stronger demand for manufactured goods generally leads to increases in production, sales, and corporate profitability. Improved business performance, in turn, enhances firms' capacity to fulfill their tax obligations. Conversely, during periods of economic slowdown, firms may experience reduced cash flows and declining profitability, limiting their ability to make timely tax payments. Macroeconomic conditions therefore remain an important determinant of variations in voluntary taxpayer compliance.

Nevertheless, the magnitude of the estimated effect is relatively small compared with the effects of institutional characteristics and tax audits. This finding suggests that improvements in macroeconomic conditions do not automatically translate into substantial changes in firm-level compliance behavior. Tax compliance decisions are influenced by a wide range of additional factors, including the effectiveness of tax administration, the quality of compliance monitoring, corporate governance, firms' financial conditions, tax literacy, and perceptions of fairness within the tax system. Economic growth should therefore be viewed as an enabling factor that creates a favorable environment for higher compliance rather than as a direct determinant of taxpayers' compliance decisions.

The results further demonstrate that the positive effect of economic growth remains statistically significant after controlling for taxpayer-specific heterogeneity through the Correlated Random Effects (CRE) approach. This finding indicates that the observed relationship is not merely driven by structural differences across regions but also reflects the association between changes in economic conditions over time and changes in voluntary taxpayer compliance. In other words, improvements in economic activity are consistently associated with higher compliance even after controlling for the time-invariant characteristics of individual taxpayers.

These findings have important policy implications. Efforts to improve taxpayer compliance cannot be separated from the broader economic environment faced by businesses. Policies implemented by the Directorate General of Taxes—such as tax audits, compliance monitoring, and administrative simplification—are likely to be more effective when supported by a

healthy macroeconomic environment. Conversely, during periods of economic slowdown, tax authorities should recognize that declining compliance may partly reflect weakened payment capacity rather than a greater willingness to evade taxes. Tax administration policies should therefore take business cycle dynamics into account to maintain an appropriate balance between revenue mobilization and the sustainability of business activities.

Differences in Voluntary Tax Compliance across Tax Office Types

The results indicate that Tax Office type has a significant effect on the voluntary tax compliance of corporate taxpayers in Indonesia's manufacturing sector. The joint significance test demonstrates that the institutional characteristics of Tax Office types are collectively associated with variations in taxpayer compliance. However, the partial estimation reveals that only taxpayers registered with Primary Tax Offices exhibit significantly lower levels of voluntary compliance than the reference category, while no statistically significant differences are observed among Medium Tax Offices, Special Tax Offices, and Large Taxpayer Offices.

These findings suggest that voluntary tax compliance is influenced not only by firm-specific characteristics but also by the institutional environment in which taxpayers are administered. In other words, the organizational structure of the tax administration plays an important role in shaping compliance behavior through differences in monitoring capacity, taxpayer composition, and administrative complexity across Tax Office types.

The results are consistent with Institutional Theory, which argues that the behavior of individuals and organizations is shaped by formal rules, institutional norms, and organizational structures (Scott, 2001). In the Indonesian tax administration system, the segmentation of Tax Offices into Primary, Medium, Special, and Large Taxpayer Offices represents more than an administrative classification; it constitutes an institutional design intended to align organizational capacity with the characteristics of the taxpayers under its jurisdiction. Accordingly, the observed differences in compliance indicate that the effectiveness of tax administration is influenced by these institutional characteristics. This interpretation is consistent with Meyer and Rowan (1977), who argue that formal organizational structures affect policy implementation through institutionalization processes that shape the behavior of organizational actors.

The finding that taxpayers registered with Primary Tax Offices exhibit lower voluntary compliance than the reference group can be explained by both taxpayer characteristics and organizational features of these offices. Primary Tax Offices administer substantially larger numbers of taxpayers with a high degree of heterogeneity, ranging from small to medium-sized firms that differ considerably in business characteristics, accounting quality, and tax literacy. Such diversity makes compliance monitoring substantially more complex than in other Tax Office types. In addition, limited human resources relative to the large taxpayer population may reduce the intensity of monitoring devoted to individual taxpayers.

By contrast, the absence of statistically significant differences among Medium Tax Offices, Special Tax Offices, and Large Taxpayer Offices suggests that taxpayers administered by these offices are relatively more homogeneous in terms of administrative capacity and compliance quality. Firms registered with these Tax Office types generally operate on a larger scale, maintain more sophisticated accounting systems, possess greater tax management resources, and implement stronger internal controls. These characteristics enable them to comply with their tax obligations more consistently than firms administered by Primary Tax Offices.

The findings can also be interpreted from the perspective of compliance costs. Larger firms generally possess greater resources to employ tax professionals, implement integrated

accounting information systems, and obtain assistance from tax consultants when necessary. Smaller firms, by contrast, often face resource constraints in understanding changes in tax regulations and fulfilling administrative requirements accurately and on time. Consequently, differences in compliance across Tax Office types reflect not only differences in monitoring intensity but also differences in the internal capabilities of the taxpayers subject to tax administration.

From an institutional perspective, the results suggest that the organizational segmentation implemented by the Directorate General of Taxes has largely succeeded in aligning administrative strategies with taxpayer characteristics. Peters (2021) argues that public organizations operate more effectively when their organizational structures are adapted to the characteristics of the populations they serve. Similarly, Helmke and Levitsky (2004) contend that formal institutions are designed to improve administrative effectiveness through a more specialized division of functions. In the present study, the absence of significant differences among Medium Tax Offices, Special Tax Offices, and Large Taxpayer Offices suggests that this segmentation has produced relatively consistent administrative standards for medium-sized and large corporate taxpayers.

Nevertheless, the findings also indicate that improving voluntary compliance remains a greater challenge for Primary Tax Offices. Given the substantially larger taxpayer population and the greater diversity of businesses under their administration, improvements in compliance are unlikely to be achieved solely through intensified audit activity. A more comprehensive strategy involving administrative simplification, enhanced taxpayer education, greater use of information technology, and strengthened human resource capacity is likely to be more effective in promoting voluntary compliance among taxpayers administered by Primary Tax Offices.

This study contributes to the tax administration literature by highlighting the importance of institutional design as a determinant of taxpayer compliance. Previous studies have focused primarily on the effects of tax audits and taxpayer characteristics, whereas the influence of organizational structure within the tax administration has received relatively limited attention. By incorporating Tax Office type as an explanatory variable, this study demonstrates that the effectiveness of the tax system depends not only on taxpayer behavior and enforcement mechanisms but also on the organizational design through which tax administration is implemented. The findings therefore extend the application of Institutional Theory to the field of tax administration by demonstrating that institutional structure constitutes an important determinant of voluntary tax compliance.

Theoretical and Policy Implications

This study offers several important contributions to the development of tax compliance theory. First, the findings reinforce the Classical Tax Compliance Theory by demonstrating that tax audits constitute an effective mechanism for promoting voluntary compliance through increasing taxpayers' perceived risk of non-compliance. The positive and statistically significant audit coefficient indicates that the perceived probability of detecting violations remains an important consideration in taxpayers' decisions to fulfill their tax obligations. Accordingly, the compliance behavior of corporate taxpayers in Indonesia can still be explained by the deterrence mechanism proposed by Allingham and Sandmo (1972) and its subsequent developments in the tax compliance literature.

Second, this study extends the application of Institutional Theory to the field of tax administration. Previous research has primarily emphasized taxpayer characteristics or the

effectiveness of enforcement instruments, whereas the present study demonstrates that the institutional structure of the tax administration is also associated with variations in voluntary tax compliance. The differences in compliance across Tax Office types indicate that taxpayer behavior is influenced not only by firms' internal characteristics but also by the institutional environment within which taxpayers are administered. These findings support Scott's (2001) argument that institutions shape behavior through organizational structures, formal rules, and consistently implemented monitoring mechanisms.

Third, the findings suggest that voluntary tax compliance is a multidimensional phenomenon that cannot be adequately explained solely through an enforcement perspective. Although both tax audits and economic growth have statistically significant effects, the estimated coefficients are relatively small. This indicates that taxpayer compliance is influenced by numerous additional factors not captured in the empirical model, including corporate governance quality, tax literacy, the quality of tax administration services, perceptions of tax system fairness, and managerial characteristics. Consequently, improving taxpayer compliance requires a comprehensive strategy that combines effective enforcement with high-quality tax administration and taxpayer services.

From a methodological perspective, this study also makes an empirical contribution through the application of the Correlated Random Effects (CRE) approach. This methodology allows the estimation of relatively time-invariant variables, such as Tax Office type, while accommodating potential correlations between unobserved taxpayer characteristics and the explanatory variables. As a result, the CRE specification produces more consistent estimates than the conventional Random Effects model while retaining the ability to analyze institutional characteristics that cannot be estimated using a Fixed Effects specification.

Beyond its theoretical contributions, this study also provides several policy implications for the Directorate General of Taxes. First, the findings confirm that tax audits remain an important instrument for promoting voluntary compliance. However, improving audit effectiveness does not necessarily require a substantial increase in the number of audits. Given the limited number of tax auditors relative to the large taxpayer population, improving audit quality and ensuring consistent implementation are likely to yield greater long-term benefits than simply expanding audit coverage. Maintaining the credibility of the compliance monitoring system is therefore essential for reinforcing taxpayers' perception that non-compliance has a realistic probability of being detected.

Second, the observed differences in compliance across Tax Office types indicate that compliance strategies should be tailored to the characteristics of each administrative segment. Primary Tax Offices, which administer the largest and most heterogeneous taxpayer population, require greater policy attention through strengthened human resource capacity, expanded use of information technology, simplified administrative procedures, and enhanced taxpayer education and assistance programs. By contrast, Medium Tax Offices, Special Tax Offices, and Large Taxpayer Offices may benefit more from strategies emphasizing high-quality monitoring of complex transactions and improvements in material tax compliance.

Third, the findings demonstrate that macroeconomic conditions remain closely associated with voluntary taxpayer compliance. Consequently, when designing compliance and enforcement strategies, the Directorate General of Taxes should take prevailing economic conditions into account. During periods of economic slowdown, declining compliance may not necessarily reflect stronger intentions to evade taxes but may instead result from weakened corporate financial capacity. Recognizing these circumstances would enable tax authorities to

develop more proportionate compliance and service strategies that balance revenue mobilization objectives with the sustainability of business activities.

Overall, this study demonstrates that improving voluntary taxpayer compliance depends not only on the effectiveness of tax audits but also on the institutional design of the tax administration and the broader economic environment in which businesses operate. Strengthening tax administration therefore requires an integrated approach that combines credible enforcement, enhanced institutional capacity, and administrative policies that are responsive to changing economic conditions. Such an approach is expected to create a tax system that not only safeguards government revenue but also promotes sustainable voluntary tax compliance over the long term.

5. Conclusion and Suggestion

This study examines the effects of tax audits, Tax Office type, and economic growth on the voluntary tax compliance of corporate taxpayers in Indonesia's manufacturing sector. Based on the Correlated Random Effects (CRE) estimation using 114,373 taxpayer-year observations over the 2016–2022 period, the results indicate that both tax audits and economic growth have positive and statistically significant effects on voluntary tax compliance. In addition, the institutional characteristics represented by Tax Office type are associated with differences in compliance levels. Relative to the reference category, taxpayers registered with Primary Tax Offices exhibit significantly lower voluntary compliance, whereas no statistically significant differences are found among Medium Tax Offices, Special Tax Offices, and Large Taxpayer Offices.

These findings suggest that improvements in voluntary tax compliance depend not only on enforcement through tax audits but also on the institutional design of the tax administration and the broader economic environment in which firms operate. The results reinforce the Classical Tax Compliance Theory by confirming the role of tax audits as a deterrence mechanism that promotes voluntary compliance. At the same time, they extend the application of Institutional Theory by demonstrating that the organizational structure of the tax administration also plays an important role in shaping taxpayer compliance behavior.

From a practical perspective, the findings imply that strategies to improve taxpayer compliance should not focus solely on increasing the number of tax audits. Greater emphasis should instead be placed on improving the quality and credibility of compliance monitoring while strengthening institutional capacity according to the characteristics of each Tax Office type. Given the relatively lower compliance observed among taxpayers administered by Primary Tax Offices, strengthening human resource capacity, expanding the use of information technology, simplifying administrative procedures, and enhancing taxpayer education and assistance should become key policy priorities. Furthermore, tax administration policies should take prevailing economic conditions into account to maintain an appropriate balance between government revenue mobilization and the sustainability of business activities.

6. Limitations and Future Research

This study has several limitations. First, the analysis is limited to corporate taxpayers in the manufacturing sector, which may reduce the generalizability of the findings to other industries. Second, the study focuses on three explanatory variables, namely risk-based tax audits, Tax Office type, and economic growth, while other factors that may influence

voluntary tax compliance, such as firm characteristics, tax governance, digital tax administration, and taxpayer behavior, are not included in the model. Third, although the study employs a large panel dataset and the Correlated Random Effects (CRE) model, the findings are based on administrative data that may not fully capture the behavioral aspects underlying taxpayers' compliance decisions.

Future research is encouraged to extend the analysis by including taxpayers from different economic sectors, incorporating additional determinants of voluntary tax compliance, and examining the effects of recent tax administration reforms and digitalization initiatives. Comparative studies across taxpayer categories or countries may also provide a broader under

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