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Analysis of The Effect of Government Expenditure and GRDP on Provincial Tax Revenue in Indonesia, 2014–2023

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ABSTRACT
This study aims to analyze the effect of government spending and Regional Domestic Product (RDP) on tax revenue in Indonesia during the period 2014-2023. The study uses a quantitative approach with a panel data model covering 34 provinces in Indonesia. The analysis was conducted through Chow tests, Hausman tests, and Lagrange Multiplier tests to determine the best model, and the results showed that the most appropriate model was the Random Effect Model (REM). The estimation results showed that government spending had a positive and significant effect on tax revenue, while GRDP had a negative and insignificant effect. Simultaneously, both variables have a significant effect on tax revenue with a coefficient of determination of 42.29%. These findings indicate that an increase in public spending, especially in the productive sector, can strengthen the government's fiscal capacity, while economic growth through GRDP is not fully reflected in an increase in tax revenue.

Keywords: *Government Expenditures, Gross Regional Domestic Product (GRDP), Tax Revenue, Fiscal Policy, Public Expenditure Efficiency, Regional Economic Growth, Panel Data Regression, Random Effect Model (REM)*

INTRODUCTION

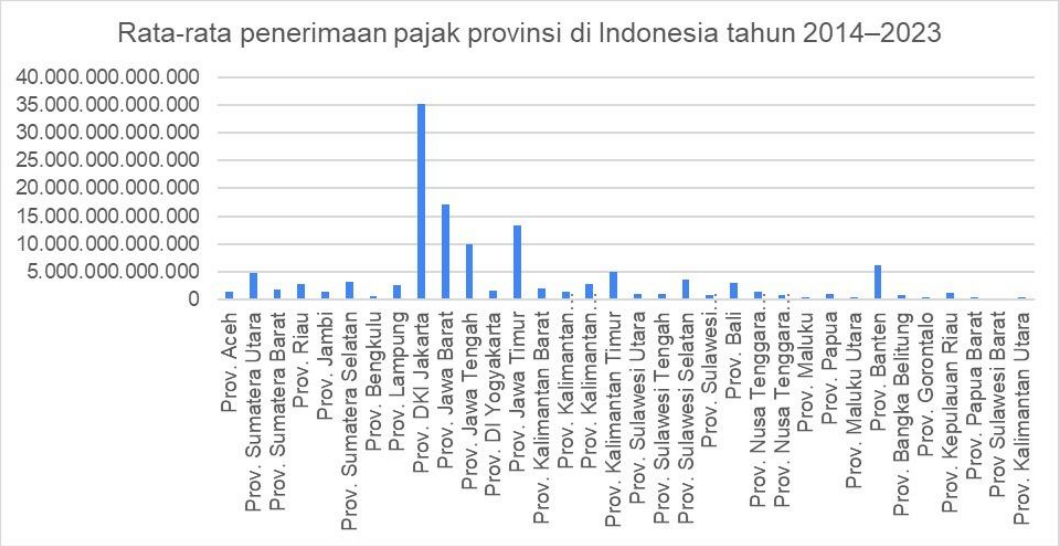
Fiscal policy is a government instrument used to regulate the economy through public spending and taxation, with the aim of stabilizing economic cycles, promoting growth, and reducing inequality (Cronin & Dunne, 2019). On one hand, this policy is effective in stimulating aggregate demand during periods of recession (Mehrotra, 2018), operates rapidly through automatic stabilizers (Blanchard & Leigh, 2013), and supports long-term growth when directed toward productive investments (Robert J. Barro, 1990).

However, on the other hand, there are limitations such as the risk of crowding out private investment (Calderón & Fuentes, 2013), implementation delays or time lags (Gnangnon, 2022), and threats to fiscal sustainability due to debt accumulation (Leeper, 2010). Its effectiveness is also highly dependent on the quality of a country's fiscal institutions (Mahfouz et al., 2002). Therefore, fiscal policy can serve as an important instrument for development, but it requires careful design to ensure its benefits are maximized and its risks are well managed.

Taxation is a mandatory contribution from individuals and businesses to the state, collected under legal authority, coercive in nature, and without direct compensation, with the primary purpose of financing public expenditures and supporting economic development (Umar, 2024). Economically, taxes function

not only as a source of government revenue but also as an instrument for income redistribution, macroeconomic stabilization, and resource allocation (Musgrave, 1961). According to (Gordon & Li, 2009), a well-designed tax system in developing countries plays a crucial role in creating economic incentives, enhancing compliance, and reducing market distortions.

Figure 1.1. Average Provincial Tax Revenue in Indonesia, 2014–2023



Source: Processed data.

Based on the graph of average provincial tax revenue in Indonesia from 2014 to 2023, there are significant differences among provinces. DKI Jakarta ranks the highest, with an average tax revenue of approximately IDR 38 trillion. It is followed by West Java and East Java, with averages of around IDR 18 trillion and IDR 13 trillion, respectively. This indicates that economic activities and national industrial centers remain concentrated on the island of Java, particularly in DKI Jakarta, which serves as the center of government, trade, and financial services.

Meanwhile, provinces in eastern Indonesia such as Maluku, North Maluku, West Papua, Gorontalo, and West Sulawesi record significantly lower tax revenues, each below IDR 1 trillion. The low revenue in these regions reflects the limited scope of productive economic activities and a relatively small tax base. Overall, the graph illustrates substantial fiscal disparities among provinces in Indonesia. The high concentration of tax revenues on the island of Java highlights the need for policies that promote economic equalization and strengthen fiscal capacity in regions outside Java, so that their contribution to national revenue can become more balanced.

Accroding to Rahayu (2020 Tax revenue refers to state income categorized by types of levies, which include central taxes, customs and excise duties, regional taxes, regional retributions, and non-tax state revenues (PNBP). This categorization underscores its role as a vital source of funding for development. Therefore, tax revenues must be managed effectively and efficiently as an effort to achieve fiscal self-reliance (Rahayu, 2020). The success of development implementation is measured at the macro level, one of which is through economic growth, as reflected by changes in the Gross Regional

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Domestic Product (GRDP). Changes in GRDP indicate increased economic activity, which directly expands the tax base and enhances the potential for state revenue (Kuncoro, 2017b).

A study by Muhammad Rizal Rosyadi found a causal relationship between GRDP and government revenue, indicating that when GRDP increases, government revenue particularly from taxes also rises significantly. This finding emphasizes that economic growth plays a crucial role in strengthening the government's fiscal capacity through the expansion of the tax base (Rosyadi, 2024). Similarly, research by Cornevin et al. (2024) revealed that economic growth has a long-term positive relationship with tax revenue in OECD countries, where the elasticity of taxes relative to GDP exhibits a stable growth pattern. This supports the view that an increase in GRDP, when accompanied by an effective taxation system, can enhance the government's fiscal capacity at both the national and regional levels (Cornevin et al., 2024).

In addition to GRDP, government expenditure also plays an important role in influencing tax revenue. According to Keynesian theory, government spending can serve as an economic stimulus through the multiplier effect, which increases aggregate demand, expands employment, and ultimately raises taxable income (Haug & Sznajderska, 2024b). Carvelli et al. (2023) mphasize that increased public spending, particularly in productive sectors such as infrastructure and education, has a sustained positive impact on economic growth and enhances future tax revenue potential. In Indonesia, research by Haryo Kuncoro (2017) found that the interaction between government expenditure and tax revenue at the regional level is reciprocal. On one hand, higher public spending can stimulate economic growth, thereby broadening the tax base. On the other hand, additional tax revenue provides fiscal space for the government to expand its spending. However, this dynamic does not operate absolutely, as it is influenced by other factors such as the effectiveness of budget allocation and local economic conditions, which determine the extent to which tax potential can be realized (Kuncoro, 2017b).

Several international studies have also highlighted that the effectiveness of the relationship between government expenditure, economic growth, and tax revenue largely depends on the quality of fiscal institutions and policy governance. Amaglobeli et al. (2022) in an IMF Working Paper, show that fiscal reforms focusing on productive expenditure can enhance medium-term tax revenues, whereas consumptive spending may instead weaken fiscal capacity. Meanwhile, a study by Juliannisa et al. (2023) found that in Indonesia, the Gross Regional Domestic Product (GRDP) does influence tax revenue; however, the magnitude of this effect does not fully reflect actual economic conditions. This occurs because the responsiveness of tax revenue to economic fluctuations tends to be weak, partly due to low taxpayer compliance and suboptimal tax administration systems (I. A. Juliannisa et al., n.d.). Therefore, this study aims to analyze the effect of government expenditure and GRDP on tax revenue in Indonesia using a provincial panel data approach, in order to understand the extent to which these two macroeconomic variables interact to influence national fiscal capacity. The findings are expected to provide empirical recommendations for formulating balanced fiscal policies that align productive spending increases with the optimization of sustainable tax revenues.

A progressive tax is a taxation mechanism in which the tax burden increases in line with rising income. The progressive tax system is designed

based on the principles of fairness and equity, imposing tax rates that correspond to an individual's or entity's economic capacity as measured by income or wealth(Slemrod & Bakija, 2017). Progressive taxation serves not only as a source of government revenue but also as a strategic fiscal policy instrument for income redistribution and efforts to reduce economic inequality in Indonesia. The implementation of progressive taxes in Indonesia can be found in several tax sectors, such as Personal Income Tax (PPh), Motor Vehicle Tax, and Land and Building Tax (PBB) (Mendrofa et al., 2025). However, the effectiveness of progressive taxation remains a complex issue despite its long-standing adoption in the national tax system. Challenges include mismatches in taxpayer data, weak oversight mechanisms, and legal loopholes that can be exploited by certain individuals to evade taxes (Rustiyaningsih, n.d.). Therefore, the government continues to pursue the effective implementation of progressive taxation as an effort to increase state revenue, promote equitable national welfare, and strengthen the national development budget (Rojikin et al., n.d.). In addition to progressive taxes, there are also regressive taxes, which are defined as tax systems that, proportionally to income, impose a heavier burden on lower-income groups than on higher-income groups (Slemrod & Bakija, 2017). If implemented or currently being implemented in Indonesia, such a tax system could lead to serious issues, including increased poverty, reduced worker productivity, and greater national economic inequality.

RESEARCH METHOD

This study employs a quantitative approach, which is a formal, objective, rigorous, deductive, and systematic strategy aimed at generating and refining knowledge for problem-solving. Quantitative research seeks to obtain accurate and reliable measurements through systematic observation and analysis of the relationships between independent and dependent variables within a population (Mohajan, 2020). This research adopts an associative quantitative approach with the objective of analyzing the effect of government expenditure and Gross Regional Domestic Product (GRDP) on tax revenue at the provincial level in Indonesia. The quantitative approach was chosen because this study aims to measure the strength of relationships among variables using numerical data that can be analyzed statistically. The data utilized are panel data, combining cross-sectional dimensions (34 provinces in Indonesia) and time-series dimensions (the 2014–2023 period), thereby enabling the analysis to capture both inter-regional and intertemporal variations simultaneously.

The econometric model employed in this study is a panel data regression, which can be estimated using three possible approaches: the Pooled Least Squares (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM). To determine the most appropriate model, several diagnostic tests were conducted: the Chow test to compare PLS and FEM, the Hausman test to choose between FEM and REM, and the Lagrange Multiplier (LM) Breusch–Pagan test to assess the suitability of the random effects model relative to the pooled model.

The mathematical model of this study is expressed as follows:

$$TAX_{it} = \alpha + \beta_1 GEXP_{it} + \beta_2 GRDP_{it} + \varepsilon_{it}$$

Where:

TAX_{it} = Provincial tax revenue of province i in year t

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$GEXP_{it}$ = Government expenditure of province i in year t
$GRDP_{it}$ = Gross Regional Domestic Product of province i in year t
β_1 β_2 = Regression Coefficients
α = Constant term
εit = Error term

Based on the theoretical framework and research objectives, the hypotheses proposed in this study are as follows:

1) H1: ross Regional Domestic Product (GRDP) has a positive effect on tax revenue in Indonesia.
2) H2: overnment expenditure has a positive effect on tax revenue in Indonesia.
3) H3: GRDP and government expenditure simultaneously have a significant effect on tax revenue in Indonesia.

RESULTS AND DISCUSSION

CHOW TEST

The Chow Test is used to determine the most appropriate estimation model between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). The hypotheses used in this test are as follows:

H_0: The appropriate model is the Common Effect Model (CEM)
H_1: The appropriate model is the Fixed Effect Moel (FEM)

Decision Criteria:

Fail to reject H_0: if the probability value (p-value) of the F-statistic is greater than the significance level α (0.05), indicating that the Common Effect Model (CEM) is the appropriate model.

Reject H_0: if the probability value (p-value) of the F-statistic is less than the significance level α (0.05), indicating that the Fixed Effect Model (FEM) is the appropriate model.

Chow Test Results

```
Fixed-effects (within) regression               Number of obs      =       340
Group variable: provinsi                        Number of groups   =        34

R-sq:                                           Obs per group:
     within  = 0.1427                                         min =        10
     between = 0.7308                                         avg =      10.0
     overall = 0.4229                                         max =        10

                                                F(2,304)           =     25.31
corr(u_i, Xb)  = -0.6208                        Prob > F           =    0.0000
```

penerimaanpajak	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
pengeluaranpemerintah	2.222105	.3148002	7.06	0.000	1.602642	2.841568
pdrb	-.0107636	.0234589	-0.46	0.647	-.0569261	.0353989
_cons	-37.32896	9.279196	-4.02	0.000	-55.58855	-19.06938
sigma_u	.9429861					
sigma_e	1.3638327					
rho	.32344051	(fraction of variance due to u_i)				

F test that all u_i=0: F(33, 304) = 2.94 Prob > F = 0.0000

Based on the results of the Chow test, the probability value (p-value) of the F-statistic was 0.0000 < 0.05, indicating that H_0 is rejected. Therefore, the selected model is the Fixed Effect Model (FEM). The next step is to conduct the Hausman test as a follow-up procedure to determine the most appropriate estimation model between the Fixed Effect Model (FEM) and the Random Effect Model (REM).

HAUSMAN TEST

The Hausman test is used to determine the most appropriate estimation model between *the Fixed Effect Model* (Fem) and *the Random Effect Model* (REM). The hypothesis in this test is formulated as follows:

H_0: The appropriate model is the Random Effect Model

H_1: The suitable model is Fixed Effect Model

The decision making criteria are as follows:

H_0 is not rejected: if the probability value (p-value) of the Hausman test is greater than α (0.05), then the model used is the *Random Effect Model*.

H_0 is rejected: if the probability value (p-value) of the Hausman test is less than α (0.05), then the correct model is *the Fixed Effect Model*.

Hausman test results

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. hausman fe re
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	Coefficients (b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
pengeluara~h	2.222105	1.620745	.6013597	.2799764
pdrb	-.0107636	-.0100639	-.0006997	.0066915

```
                b = consistent under Ho and Ha; obtained from xtreg
     B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =         4.68
                Prob>chi2 =       0.0962
```

Based on the results of the thirst test, the prob>chi2 value = 0.0962 > 0.05, which shows that H_0 is not rejected, so the chosen model is the *Random effect model* (REM).

Lagrange Multiplier (LM) Test

Appropriate estimation model between *the Common Effect Model* (CEM) and *the Random Effect Model* (REM) in the analysis of panel data. The hypothesis in this test is formulated as follows:

H_0: The appropriate model is Common Effect Model

H_1: The appropriate model is *the* Random Effect Model

The decision making criteria are as follows:

H_0 is not rejected: if the probability value (p-value) of the Hausman test is greater

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than α (0.05), then the model used is *the Common Effect Model*.
H_0 is rejected: if the probability value (p-value) of the Hausman test is less than α (0.05), then the correct model is *the Random Effect Model*.

Lagrange multiplier (LM) test results

```
Breusch and Pagan Lagrangian multiplier test for random effects

        penerimaanpajak[provinsi,t] = Xb + u[provinsi] + e[provinsi,t]

        Estimated results:
                         |       Var      sd = sqrt(Var)
                ---------+------------------------------
                penerim~k |    3.812331        1.952519
                        e |    1.860039        1.363833
                        u |    .3629085        .6024188

        Test:   Var(u) = 0
                                  chibar2(01) =    31.67
                               Prob > chibar2 =   0.0000
```

Based on the results of the lagrange multiplier (LM) test, the prob value > chibar2 = 0.0000 < 0.05, which indicates that H_0 is rejected, then the selected model is *the Random effect model* (REM).

Based on the results of the chow test, the thirst test and the breusch pagan lagrangian multiplier test, it was found that the most appropriate model in estimating the regression equation in this study is the *Random effect model* (REM), thus there is no need to perform a classical assumption test.

Random Effect Model (REM)

Random effect model (REM) is a panel data regression method that assumes that the specific effects of each individual (entity) are random variables.

```
Random-effects GLS regression                   Number of obs     =       340
Group variable: provinsi                        Number of groups  =        34

R-sq:                                           Obs per group:
     within  = 0.1427                                         min =        10
     between = 0.7307                                         avg =      10.0
     overall = 0.4229                                         max =        10

                                                Wald chi2(2)      =    129.21
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =    0.0000
```

penerimaanpajak	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
pengeluaranpemerintah	1.620745	.143918	11.26	0.000	1.338671	1.902819
pdrb	-.0100639	.0224844	-0.45	0.654	-.0541324	.0340047
_cons	-19.62038	4.251841	-4.61	0.000	-27.95383	-11.28692
sigma_u	.60241883					
sigma_e	1.3638327					
rho	.16325549	(fraction of variance due to u_i)				

Based on the results of *the Random effect model* (REM) regression, the model equation can be written as follows:

$$TAX_{it} = \alpha + \beta_1 GEXP_{it} + \beta_2 GRDP_{it} + \varepsilon_{it}$$

TAX = -19.62038 + 1.620745 GEXP - 0.0100639 GRDP + e

- The constant value obtained is -19.62038, so it can be concluded that if government expenditure and GDP are zero, then the value of tax revenue is estimated at -6.306937 units.
- The value of the variable coefficient of Government Expenditure has a positive value of 1.620745, so it can be concluded that every increase in government expenditure by 1 unit will increase tax revenue by 1.620745 units, assuming that other variables are fixed.
- The value of the variable coefficient of GDP has a negative value of -0.0100639, so it can be concluded that every increase in GDP by one unit will cause a decrease in tax revenue of 0.0100639 units, assuming that other variables are constant.

Data Analysis Results

- **F Test Results**
  The value of wald chi2 is 129.21 with the prob value of > chi2 of 0.0000 < 0.05, then it can be drawn that Government Expenditure and GDP have a significant effect simultaneously on Tax Revenue.
- **Determination Coefficient Test Results**
  The R square value is 0.4229, which shows that the contribution of the influence of Government Expenditure and GDP to Tax Revenue simultaneously is 42.29%.
- **t test (Hypothesis test)**
  The Government Expenditure variable has a prob or significance value of 0.000 < 0.005, which shows that Government Expenditure has a significant effect on the Tax Revenue variable.
- **t Test (Hypothesis Test)**
  The GDP variable has a prob or significance value of 0.654 > 0.005, which shows that GDP has no significant effect on Tax Revenue.

Discussion

The Effect of Government Spending on Tax Revenue

The influence of government expenditure on tax revenue in this study showed a positive and significant influence. This shows that increased state spending, such as the allocation of funds for infrastructure development, education, health, and economic subsidies, can encourage economic activity in the community and business actors. When government spending increases in productive sectors, people's purchasing power and income also increase, so that economic activity becomes more dynamic. The increase in economic activity has resulted in an increase in the tax base, both from income tax, value-added tax, and other taxes.

In addition, government spending also creates a multiplier effect on the economy. Any additional government spending will stimulate an increase in demand for goods and services, accelerate production growth, and expand

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people's employment opportunities. With the increase in people's income and the increase in company profits, state revenue from taxes also increases. This condition shows the role of the government as an economic driver through effective public spending and oriented towards economic productivity.

The results of this study are in line with the findings (Carvelli et al., 2023) which affirms that increased public spending, especially in productive sectors such as infrastructure and education, has a sustainable positive impact on economic growth and increases potential tax revenues. In the context of Keynesian theory, government spending can be an economic stimulus through a multiplier effect that increases aggregate demand and employment, so that taxable income also increases (Haug & Sznajderska, 2024a). Moreover (Kuncoro, 2017) explains the relationship between government spending and tax revenue at the regional level, where increased public spending can stimulate economic growth and expand the tax base, which in turn provides fiscal space for the government to enlarge the budget. These findings corroborate the results of the study that government spending has a significant positive influence on tax revenue, indicating the important role of public spending in strengthening the government's fiscal capacity.

The Effect of GDP on Tax Revenue

The influence of GDP on tax revenues in this study tends to be insignificant, showing that the increase in gross domestic product (GDP) does not necessarily have a significant impact on tax revenue. This is in line with the findings (Juliannisa et al., n.d.) which found that although GDP plays a role in influencing tax revenues in Indonesia, tax revenues remain relatively responsive to economic fluctuations. This condition is caused by several factors, including low awareness of taxpayers and an inadequate tax administration system, so that economic growth has not been fully reflected in tax revenue growth

Theoretically, GDP reflecting regional economic growth is expected to expand the tax base through increased economic activity and revenue generation. However, research results and empirical evidence show that structural and administrative factors also determine the effectiveness of obtaining tax revenue through economic growth. Studi (Roshadi, 2024) also emphasized that the increase in GDP accompanied by effective fiscal management and tax support makes a significant contribution to state revenue, especially in the tax sector.

Therefore, although GDP has the potential to increase tax revenue, optimizing the tax system and increasing taxpayer awareness is key to ensuring that increasing GDP has a significant impact on tax revenues in the field. This shows the need for synergy between economic growth and tax administration reform to strengthen national fiscal capacity.

CONCLUSION

Based on the results of this study on the effect of government expenditure and Gross Regional Domestic Product (GRDP) on provincial tax revenue in Indonesia during the 2014–2023 period, it can be concluded that government expenditure has a positive and significant effect on tax revenue. This finding indicates that an increase in public spending particularly in productive sectors such as infrastructure, education, and health can stimulate economic activity, thereby expanding the tax base and increasing government revenue. Meanwhile, the

GRDP variable shows a negative and insignificant effect on tax revenue, suggesting that economic growth has not been fully accompanied by improvements in tax compliance and administrative efficiency. This result implies that although regional economies are growing, their contribution to tax revenue remains limited due to low taxpayer awareness and weaknesses in tax administration. Simultaneously, government expenditure and GRDP have a significant combined effect on tax revenue, with a contribution of 42.29%. Thus, this study underscores the importance of fiscal policies that focus on enhancing the effectiveness of public spending and reforming the tax system so that economic growth can have a tangible impact on increasing tax revenues and strengthening national fiscal capacity.

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