MAXIMIZING ECONOMIC GROWTH IN INDONESIA:
A MODEL-BASED EXPLORATION OF OPTIMAL TAX RATIOS

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ABSTRACT
*The tax ratio is often used as an indicator to compare tax revenue to gross domestic product (GDP). It offers valuable insights into the overall tax burden on the economy, aiding policymakers and economists in comprehending the extent of taxes in relation to the economic scale. This study examines the tax ratio on economic growth and identifies the ideal tax ratio that could be implemented to achieve optimal economic growth in Indonesia. Applying ordinary least squares (OLS) regression which passes classical hypothesis testing, this study spans a research period of 39 years, covering the years 1983 to 2021. The regression estimation results show that the relationship between the tax ratio and economic growth is non-linear, with a t-statistic value of -2.952949, revealing a high significance level at a probability of 0.0057. Additionally, the t-statistic for the squared tax ratio is 2.540621, demonstrating a significant probability of 0.0158. This empirical evidence suggests that in the early stages, an increase in the tax ratio has a contractionary effect on economic growth., However, if it has reached a certain tax ratio value of 15.29%, a further rise in the tax ratio becomes expansionary, positively influencing economic growth. The tax ratio value of 15.29% is the ideal for creating optimal economic growth in Indonesia. **The regression estimation results of this study prove that the government should not be concerned about the increasing of the tax ratio, because it will actually stimulate Indonesia's economic growth**. Apart from that, the shape of the Laffer curve, illustrating the relationship between tax revenues and Indonesia's economic growth differs notably from the typical inverted "U" shape. Instead, the Indonesian Laffer curve tends to be flat and curves downwards.*

Keywords: tax revenues, economic growth, laffer curve, tax ratio, Indonesia

JEL Classification: O23, O11, O47, H21, H60

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INTRODUCTION

The magnitude of the role of taxes in the economic development of a country is known as the tax ratio. The tax ratio is an indicator that compares tax revenue to gross domestic product (GDP). Indonesia is a lower middle-income country; countries in this group tend to have a relatively stagnant tax ratio trend and often fall into a tax ratio trap. The tax ratios of countries in the lower middle-income group are particularly vulnerable to crises.

The greater the tax ratio, the greater the role of taxes in a country's economy. The average tax ratio in developed countries is more than 30%; for example, in Sweden, the average tax ratio is above 50%. The Organization for Economic Co-operation and Development (OECD) states that the tax ratio in Indonesia remains below the average of countries in the Asia Pacific region of 20%. Indonesia's tax ratio in 2021 was only 9.12%, the lowest tax ratio among the G20 and ASEAN countries (OECD, 2023). According to data from the Ministry of Finance, the pure tax ratio is only 7.52%, without duties and excise.

Taxation is a government instrument that has the power to influence and regulate the economic system of a country (Yossinomita, 2022) because tax revenue is the largest source of income for a country (Milasi & Waldmann, 2018). There is a certain ratio of tax revenue to GDP that can produce optimal economic growth. The ideal tax rate that can maximize economic growth is called the growth-maximizing tax ratio (Chen, 2019).

In 1995, economic theorists Robert J. Barro and Xavier Sala-I Martin proposed a theory of tax ratios that maximize growth. Also in 1995, Gerald W. Scully conducted the first empirical study to determine the tax ratio that maximizes economic growth in the United States.

Chao & Grubel (1998) and Scully (1995) combine the thoughts of economists: Peacock & Wiseman (1961), Due (1968), Lin (1994), and Romer & Romer (2010); with theories from economists Laffer (1981) and Barro (1990) in empirical research and find that there is an optimal point of tax revenue that achieves maximum economic growth. When this optimal point is exceeded, additional tax revenue will cause a slowdown in economic growth (Aydin & Esen, 2019). People will try to avoid paying taxes in various ways because they exceed society's tolerance level.

Di Sanzo et al. (2017) reassess the relationship between tax structure and economic growth in large European countries and conclude that if the tax burden exceeds the threshold, namely above 30%, then there will be a linear inverse relationship between tax revenue and economic growth. The negative impact of taxes on economic growth becomes substantial and significant when taxes exceed a threshold. The results of this assessment are in line with research by Arin et al. (2013), Asimakopoulos & Karavias (2016), Aydin & Esen (2019), Badel et al. (2020), Christie (2014), Di Sanzo et al. (2017), Gerritsen (2023), Jaimovich & Rebelo (2017), Prettner & Rostam-Afschar (2020), Scully (2003), and Zhang et al. (2018).

Fiscal policy in the field of taxation aims to maximize economic growth and must be financed by reasonable taxes. An optimal tax structure takes into account and maximizes economic growth and welfare.

This research aims to answer the following questions: Does the tax ratio affect economic growth in Indonesia? What tax ratio value can be applied to achieve optimal economic growth in Indonesia? Has Indonesia met or exceeded its optimal tax ratio limit?

By using an ordinary least squares (OLS) regression that has passed classical hypothesis testing, the authors hope that the results of this research can guide the government and policymakers—not only in Indonesia but also in other countries that aim to become developed—to encourage and improve economic development.

APPLICATIONS FOR PRACTICE

- This study concludes that the tax ratio has a significant negative effect on economic growth. On the other hand, the square of the tax ratio demonstrates a positive and significant influence on economic growth.
- Increasing the tax ratio will hinder economic growth. However, if a certain tax ratio is achieved, an increase in the tax ratio will encourage economic growth.
- The optimal tax ratio for maximizing economic growth is 15.29%, representing the ideal tax ratio to foster optimal economic growth in Indonesia.
- The ideal tax ratio value can be a guide for formulating realistic tax revenue targets and implementing appropriate tax policies to achieve this value

LITERATURE REVIEW

In economics, the Laffer curve theory is used to analyze the effect of the tax ratio and calculate the growth-maximizing tax ratio. Many academics and researchers have used this type of analysis as input for governments, particularly in developed countries. Economic growth will be negatively affected if the growth-maximizing tax ratio is exceeded. Furthermore, taxpayers will attempt to avoid their tax obligation in various ways because the tax rate will exceed their level of tolerance (Aydin & Esen, 2019).

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The government's role as an engine for the country's economic growth is significant and recognized by world economists, including Barro. According to Barro (1990), in the long term, differences in fiscal and monetary policies implemented by the government have a real influence on economic growth. Tax policy determines the type and amount of expenditure to spend; thus, government policy regarding taxation for encouraging the country's economic growth is of utmost importance (Baiardi et al., 2019; Hermawan, 2016; Wu et al., 2017).

The government must strive to optimize tax revenues through prudent policies while staying within the tolerance limits of taxpayers (i.e., within the growth-maximizing tax ratio). Tax policies aim to maximize reasonable tax-financed economic growth (Nguyen, 2020; Tavani & Zamparelli, 2020). A balanced tax policy is equivalent to a tax policy that aims to maximize growth (Dai, 2018). Tax policies that optimize economic growth will balance the positive and negative externalities of taxation on economic growth patterns throughout the economic and business cycles by maintaining proportional and consistent taxes at different optimal levels (Kavese & Phiri, 2020).

The Laffer curve, a pivotal taxation theory introduced by Arthur B. Laffer in the 1970s, describes the relationship between tax rates and the amount of tax revenue the state receives (Laffer, 2004). According to Laffer, a decrease in the tax rate has two effects: an arithmetic effect and an economic effect. The arithmetic effect happens when there is a decrease in tax revenue due to a reduction in tax rates. Meanwhile, the economic effect occurs when a reduction in tax rates stimulates economic activity that will increase productivity and the number of workers.

The Laffer curve in Figure 1 illustrates the relationship between tax rates and tax revenues, where two tax rate points can produce the same tax revenues. The standard zone is the curve from point 0 to point E, and the prohibited zone is the curve from point E to point 100. It is called the prohibited zone (prohibitive range) because tax rates above point E can lead to a stagnation in economic activity and trade between consumers and producers (Fullerton, 1980).

According to the Laffer curve, two tax levels always generate the same tax revenue, with the tax rates at the two extreme points (0 and 100) generating no tax revenue. At the first extreme, 0%, government tax revenue is zero because no one is obligated to pay taxes. At the other extreme of 100%, regardless of people's income, everything is transferred to the state because their income is used to pay taxes. Similarly, the tax revenue received by the government will be the same for tax rates at points A and B and at points C and D. The Laffer

Figure 1 Laffer Curve
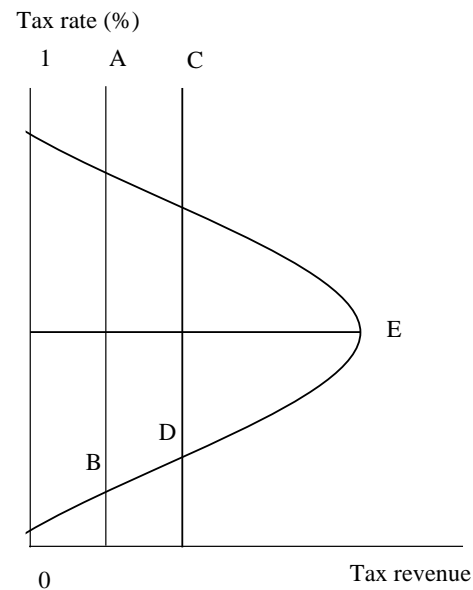
Source: Wanniski (1978)

curve shows that tax revenue will reach a maximum at a tax rate at point E (Wanniski, 1978).

According to Kohn (1997), economically, taxes have two effects on individual behaviour, as follows:

1. Income effect; an increase in income tax rates leads to a decrease in disposable income, diminishing people's purchasing power. Weakening people's purchasing power will inevitably result in a country's national consumption.

2. Replacement effect; an increase in taxes on certain goods or services causes consumers to shift away from goods and services subject to higher tax rates.

From a dynamic perspective, the two economic effects of the above changes affect state tax revenues. Laffer emphasizes that tax revenues' responses to changes in tax rates depend on the tax system, period, ease of transition to illegal (unlawful) activity, existing tax rates, falsification of accounting records and degree of tax evasion (Kohn, 1997).

Empirical studies of the Laffer curve are dominated in the 1980s. Meanwhile, in the 1990s, economists were more interested in finding the relationship between taxes and economic growth, which was termed the tax ratio, namely the comparison of tax revenues relative to GDP. Taxes are a government tool that can influence the entire economic system of a country, so that the Laffer curve can be seen in a broader context.

The economic system will become much more efficient if the taxes collected by the government are at a certain limit or level (Scully, 1995). High economic growth is only possible with the

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government's role in providing infrastructure and maintaining national security. Reducing one unit of output of private goods due to government taxes will create more than one unit of total national output. Beyond this level, however, the state uses funds collected from tax revenues to finance non-productive expenditures; a reduction of one unit of production of private goods causes a decrease in total national production by more than one unit and even damages economic growth. Therefore, a point or level of tax ratio is needed to maximize economic growth, especially the ratio between tax revenues and GDP which is expected to achieve optimal economic growth.

Theoretically, Robert J. Barro and Xavier Sala-I Martin pioneered the growth-maximizing tax ratio (Barro & Martin, 2004). Barro argues that the government's role is crucial in encouraging the country's economic growth by providing policy advice to increase growth and income, one of which is through taxation policy. Barro & Martin (1995), built a model that forms the basis for determining the growth-maximizing tax ratio, which is as follows:

$$Y = AK \qquad (1)$$

The model above is an endogenous growth model with the most straightforward model category. Where Y = total production, K = capital (equity) and A = constant (A > 0 as technology). This model states that anything that can change the level of technology (A) can affect economic growth in the long run. Tax policy can be classified as a factor that can influence technology (A) or change it in a way that allows the government to have a long-term impact on economic growth. The use of public goods is non-competitive and non-excludable. The use of the Cobb-Douglas production function is expressed as a production function in constant returns to scale, thus:

$$Y = Ak^{1-\alpha}g^{\alpha} \qquad (2)$$

This model assumes that all government spending is funded by tax revenues (G = T) or has a balanced budget system, so that g = τY. Plugging it into Equation (1), taking into account household satisfaction (utility), Barro's model has the shape of an inverted "U" plotted as a curve (Figure 2.), indicating that up to a certain peak, the maximum tax rate will encourage consumption growth, where consumption is the utility function of well-being or growth.

$$\tau = \frac{G}{Y} = \frac{T}{Y} \qquad (3)$$

Economic growth can be illustrated by the GDP growth rate which tends to rise as tax revenues increase. However, after exceeding the optimal point, an increase in tax revenue can lead to a decline in economic growth (Milasi & Waldmann,

Figure 2 The Curve of The Relationship between The Tax Rate and The Growth Rate of Consumption
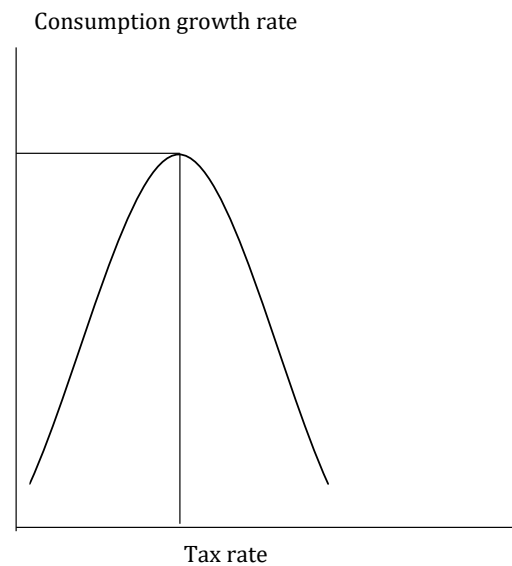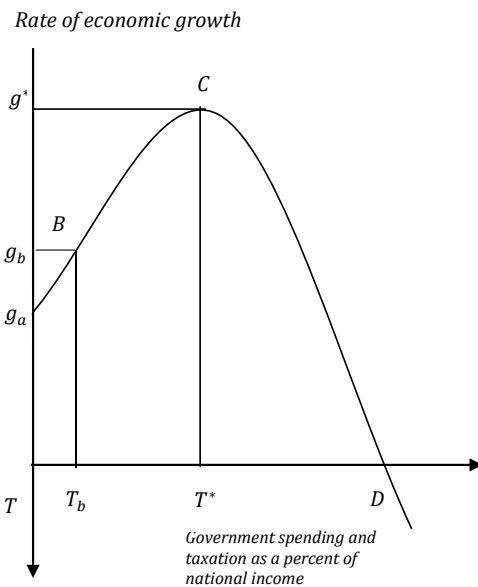

Source: (Barro & Martin, 2004)

2018). That, there is a level or point where tax revenue is at its maximum, namely the point that is able to maximize tax revenue (Tavor et al., 2019). The first empirical study to find the growth-maximizing tax ratio for the United States was conducted by Gerald W. Scully in 1995. Scully estimates the US growth-maximizing tax ratio to be 22.9%. This implies that the US government must collect taxes of 22.9% of GDP to achieve optimal economic growth for the US. In addition, Scully predicts that US real GDP growth will reach 5% per year if this ratio can be achieved. In 1996, Scully extended his research to estimate GMTR for New Zealand. Scully finds that New Zealand's GMTR is between 19.7% and 20.2%, and if New Zealand can meet this GMTR, it can be expected that the real GDP growth rate will reach 5% per year (Scully, 1996). Chao & Grubel (1998) conducted an empirical study to determine the tax ratio that maximizes economic growth in Canada by using the ratio of total government spending to GDP as a variable estimate of the tax ratio. In contrast to Scully, who utilized the percentage of total tax revenue to GDP, Chao and Grubel employed the ratio of total government spending to GDP as a variable estimate of the tax ratio. Their findings indicate that Canada possesses a growth-maximizing tax rate of 34%. Additionally, they constructed a Scully curve within their model to illustrate the relationship between tax rates and economic growth (Figure 3).

An effective tax ratio can improve a country's economy while maintaining government revenues at a sustainable level. Additionally, it offers a safety margin for both the economy and society. It is crucial to identify a turning point to prevent adverse outcomes in cases where taxes might lead to

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Figure 3 Scully Curve

Source: Chao & Grubel (1998)

economic losses. This precaution ensures that a high tax ratio does not yield unintended consequences contrary to the country's objectives (Liapis et al., 2020). Several results of empirical studies in the 2000s, such as Arin et al. (2013), Asimakopoulos & Karavias (2016), Aydin & Esen (2019), Badel et al. (2020), Christie (2014), Di Sanzo et al. (2017), Gerritsen (2023), Jaimovich & Rebelo (2017), Prettner & Rostam-Afschar (2020), Scully (2003), and Zhang et al. (2018) have consistently demonstrated that the negative impact of taxation on economic growth becomes pronounced and significant when the tax burden is above a threshold value.

The growth-maximizing tax ratio has the following advantages and disadvantages when applied in Indonesia.

1. Excess

   Knowing how to determine the optimal tax ratio (optimal point) to be used as a guideline for forming tax policies to achieve the desired economic recovery and economic growth.

2. Weaknesses

   Indonesia adheres to a deficit budget system, so the assumption that public spending is fully financed by tax revenues (G=T) does not fulfil it, so the research model is added to other independent variables in the form of the ratio of non-tax revenues and the ratio of foreign debt.

   This study looks for the shape of a curve that resembles the letter "U" upside down, using the quadratic function to find the growth-maximizing tax ratio value that can produce optimal economic growth in Indonesia.

RESEARCH METHODOLOGY
Data set

In this study, the secondary data is time series data collected from the World Bank, Bank Indonesia, BPS Indonesia, and the Ministry of Finance (Directorate General of Taxes). The research comprises state income information, including tax revenues and non-tax state revenues, along with GDP and foreign debt. The dataset spans from 1983 to 2021 (annual). The selection of this time frame commencing in 1983 is attributed to the initiation of tax reform in Indonesia during that year.

Methodology

The analysis techniques used to address the problems in this research are descriptive and quantitative. The analytical model applied in this study is grounded in the Laffer curve theory, specifically focusing on tax ratios that maximize economic growth. The limitation of this study is that the inflection point of the curve produced by the model must be as close as possible to the theory of the Laffer curve. The curve's inflection point, a critical aspect of the model, presents two possibilities, a minimum inflection point or a maximum inflection point. In the theory of the Laffer curve, the inflection point of the curve must represent the maximum point, so the best model for this study must have a maximum inflection point to fit the Laffer curve theory (Laffer, 1981). To estimate how much the tax ratio can statistically optimize economic growth, this research adopts an equation model conducted by Scully (1995, 1996) in United States and New Zealand, Chao & Herbert, (1998) in Canada, and the most recent model by Liapis et al. (2020) covering many OECD countries. However, the model has been adapted to Indonesian conditions. Considering that all independent variables in this research are in the form of ratios, economic growth or real GDP as the dependent variable is a linearization of logarithms in the form of natural logarithms. The regression analysis model in this research is formulated as follows:

$$Ln\,Y_t = \alpha + \beta_1 \tau + \beta_2 \tau^2 + \beta_3 \text{NTAX} + \beta_3 \text{FD} + \varepsilon_t \quad (4)$$

Information:

LnY	=	Natural logarithm of economic growth or real GDP
τ	=	tax ratio
NTAX	=	non-tax state revenue ratio
FD	=	foreign debt ratio

The next step is that the growth-maximizing tax ratio can be calculated from the first derivative of the model equation above, provided that it is equal to zero, then:

$$\frac{\delta Y}{\delta \tau} = \beta_1 + 2\beta_2 \tau = 0 \quad (5)$$

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$$\tau = -\frac{\beta_1}{2\beta_2} \qquad \text{the growth maximizing tax ratio (6)}$$

The Ordinary Least Squares (OLS) method was employed to test the significance of the estimates in this study, utilizing a confidence interval of 95% or 0.05. The OLS method is a general method that minimizes the sum of squared errors between the observed value and the predicted value of the outcome variable. OLS estimates rely on several key assumptions to produce valid and reliable results. This assumption is known as the classic assumption which includes the autocorrelation test, heteroscedasticity test, multicollinearity test, and normality test. Classical hypothesis testing is carried out to ensure that the regression equation has estimated accuracy, fairness, and consistency. If these assumptions are violated, OLS estimates can produce estimates that are biased, inefficient, or inconsistent.

RESULT AND DISCUSSION
Findings
Descriptive statistics of research variables

Descriptive statistics of the variables used in the research consist of economic growth or real GDP (LnY), the ratio of tax revenues to GDP or tax ratio (τ), the square of the tax ratio ($\tau2$), the ratio of PNBP to GDP (NTAX), and the ratio of FD to GDP. The research spans 39 years, from 1983 to 2021, resulting in a dataset comprising 156 data points. The descriptive statistics employed in the analysis include mean, median, maximum value, minimum value, standard deviation, skewness and kurtosis. A summary of descriptive statistics for each variable is presented in Table 1. The results of descriptive statistics indicate that all variables are statistically significant, as the difference between the mean and the median value is relatively small, and their skewness values are positive. A standard deviation value that is smaller than the mean indicates that no data has extreme values. Apart from that, the skewness and kurtosis values of the research variables also show that the data is close to normal distribution conditions, except for the foreign debt to GDP (FD) ratio variable which has a positive slope.

Quantitative analysis

Quantitative analysis is used to determine and analyze the impact of the tax ratio on economic growth in Indonesia. The results of this analysis are also used to determine the value of the tax ratio as that maximizes economic growth in Indonesia. The Ordinary Least Squares (OLS) method is utilized for regression analysis, and the results presented in Table 2. This regression analysis is crucial for identifying the relationships and estimating the impact of the tax ratio on economic growth.

The calculated F value (F statistics) is 98.65567 with a probability of F statistics 0.000000, which is less than the significance level of $\alpha = 1\%$ (0.01) with 99% confidence. This indicates that the independent variables, which consist of: τ, $\tau2$, NTAX, and FD together have a significant effect on the dependent variable, LnY. The adjusted R^2 value of 0.911344 implies that the influence of the independent variables in the form of the tax ratio, the square of the tax ratio, the non-tax state revenue ratio, and the foreign debt ratio influences the dependent variable, namely the growth of 91.13%, and the remainder of 8.87% is influenced by other variables outside the model. Results of testing each variable (t-statistic), firstly, variable tax ratio (τ) negatively impacts economic growth. Second, the squared tax ratio ($\tau2$) positively impacts economic growth. Third, the government's non-tax revenue ratio negatively impacts economic growth. Fourth, the foreign debt ratio negatively impacts economic growth. All independent variables from this model equation have a significant influence with

Table 1 Summary of descriptive statistics of economic growth variables or real GDP (LnY); tax ratio (τ); the square of the tax ratio ($\tau2$); the ratio of NTAX to GDP (NTAX); and the ratio of foreign debt to GDP (FD) in Indonesia, 1983-2021

Descriptive statistics	LnY	τ	τ^2	NTAX	FD
Mean	6.132501	13.26821	1.845128	5.883077	52.83205
Median	6.063739	12.43000	1.540000	5.440000	49.72000
Maximum	6.975414	19.14000	3.660000	12.59000	158.7000
Minimum	5.204501	8.320000	0.690000	2.110000	24.60000
Std. Dev.	0.529954	2.954902	0.804821	2.786896	25.72597
Skewness	−0.026047	0.196474	0.475149	0.818425	2.031335
Kurtosis	1.934767	1.920570	2.110223	3.186421	8.693359
Jarque-Bera	1.848332	2.144314	2.753998	4.410304	79.49441
Probability	0.396862	0.342269	0.252335	0.110234	0.000000
Sum	239.1675	517.4600	71.96000	229.4400	2060.450
Sum Sq. Dev.	10.67234	331.7950	24.61397	295.1380	25149.36
Observations	39	39	39	39	39

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probability α = 1% (0.01), with a confidence level of 99%. This means that changes in the tax ratio, square ratio, non-tax state revenue ratio, and foreign debt ratio significantly influence economic growth.

The regression equation model passes the classical assumption test, so that the regression equation model can be accepted. The classical assumption tests used in this research consist of autocorrelation test, heteroscedasticity test, multicollinearity test, and normality test.

Discussion

With a regression coefficient of –0.260897 and a probability of 1% (0.01), the tax ratio has a negative and significant effect on economic growth in Indonesia. These results indicate that Indonesia's economic growth will decrease by 0.260897% when the tax ratio increases by 1%, ceteris paribus. This finding is consistent with previous studies such as Kamiguchi & Tamai (2019), which uses data from England, Germany, and Japan; Liapis et al. (2020), which uses data from numerous OECD countries; and Phuong et al. (2022), which uses data from two groups of countries: ASEAN-7 plus China (called East) and eight European countries (called West). All of these studies find that increasing the tax ratio will have a negative impact on economic growth. The negative impact of the tax ratio on economic growth in Indonesia is most likely caused by limited liquidity and debt or foreign transfers are adjusted to balance the limited state revenue budget and government spending (Bhimjee & Leão, 2020; Feve et al., 2018).

This negative effect is also supported by Syadullah & Wibowo (2015), who find that for lower middle-income countries, such as Indonesia, the tax ratio remains relatively stable, decreasing by 0.03% per year. McNabb (2018) analyzes the relationship between tax structures and economic growth in 100 countries and concludes that taxes have different impacts in each country, supporting the view that the tax ratio of lower middle-income countries is vulnerable to crises. The current research also finds that developing countries require more attention regarding policies regarding the relationship between taxation and economic growth.

However, the results of this research do not align with those of the studies whose research equation models were used as a reference by the author, namely Chao & Grubel (1998) in Canada and Scully (1995) in the United States. In contrast to the current research, the aforementioned studies find that the tax ratio has a positive impact on economic growth. The results of recent empirical studies by Aydin & Esen (2019) and Kavese & Phiri (2020) also differ from the results of the current research.

The estimation results of the OLS equation show that the squared tax ratio has a positive coefficient of 0.853086 and is statistically significant with a probability of 1% (0.01). The research results indicate that if the squared tax ratio increases by 1%, then Indonesia's economic growth will increase by 0.853086%, ceteris paribus. This means that increasing the tax ratio will increase economic growth in the long term. Evidence from this research strengthens the endogenous economic growth model pioneered by Romer (1990) and Barro (1990). Fiscal policy through taxation has a positive influence on economic growth in the long term (Arvin et al., 2021; Bhattacharyya & Gupta, 2021; Kavese & Phiri, 2020; Miyashita, 2023).

The research results show that the tax ratio has a negative and significant effect on economic growth. However, the square of the tax ratio has a positive and significant effect on economic growth. This means that although an increase in the tax ratio will initially limit economic growth, if a certain tax ratio is achieved, an increase in the tax ratio will encourage economic growth. The point at which the tax ratio will encourage economic growth is called

Table 2 OLS Regression Results

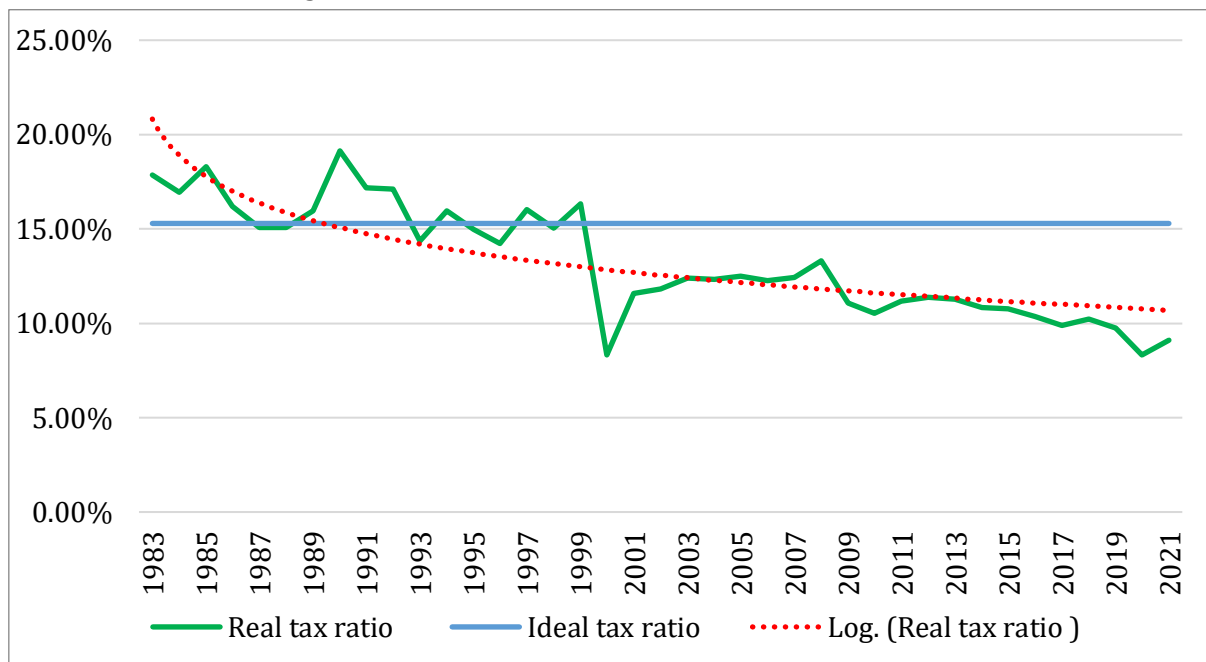| Variable	Coefficient	t-statistics	Probability	Adjusted R^2
C	9.084970	15.65684*	0.0000	
τ	−0.260897	−2.952949*	0.0057	
τ^2	0.853086	2.540621*	0.0158	0.911344
NTAX	−0.144020	−8.401695*	0.0000	
FD	−0.004119	−3.814410*	0.0005	

Note:
*   significant at the 1% confidence level
** significant at the 5% confidence level
*** significant at the 10% confidence level
d   not significant

The regression equation model is as follows:

$$LnY = 9.084970 - 0.260897\,\tau + 0.853086\,\tau^2 - 0.144020\,NTAX - 0.004119\,FD \qquad (7)$$

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Figure 4 Real and Ideal Tax Ratio in Indonesia, 1983–2021

Source: Author's preparation (2023)

the growth-maximizing tax ratio. Studies by Liapis et al. (2020), Aydin & Esen (2019), and Gerritsen (2023) have results that are consistent with those presented by the author and show that the effective tax ratio can improve a country's economy by maintaining government revenues at sustainable levels and providing a margin of safety for economic development.

With a probability of 1% (0.01) and a regression coefficient value of −0.144020, the non-tax state revenue ratio has a significant negative effect on economic growth. This means that there is a decrease in the economic growth rate of −0.144020% for every 1% increase in the government's PNBP ratio, ceteris paribus. The negative impact of the non-tax state revenue ratio on economic growth is consistent with the findings of Zhang & Huang (2019). They determine that the negative impact of the non-tax state revenue ratio on the Chinese economy tends to spread and expand due to irregular management cutting financial functions, reducing capital efficiency, disrupting the economic order, and increasing corruption. This makes it difficult for the state to take full advantage of non-tax state revenues. Therefore, Zhang and Huang suggest that to study the non-tax state revenue management system, it is necessary to examine it from the perspective of the impact of non-tax state revenue on the economy.

The foreign debt ratio has a significant negative effect on economic growth with a regression coefficient value of −0.004119 and a probability of 1% (0.01). These results indicate that every 1% increase in the foreign debt ratio will

decrease economic growth of 0.048699%, ceteris paribus. Previous research by Adam & Bevan (2005), Kamiguchi & Tamai (2019), Mensah et al. (2018), and Mtui & Ndanshau (2020) supports these results. In the neoclassical growth model, liquidity constraints are heterogeneous in each country with conditions of market imperfection; therefore, the nature of the Laffer curve is very dependent on transfers and foreign debt, which are adjusted to balance the country's budget constraints (Ehrhart et al., 2014). This can be seen in Figure 4, where the Laffer curve for Indonesia's tax ratio differs greatly from the inverted "U" shape of the traditional Laffer curve. Indonesia's Laffer curve tends to flatten and curve downwards.

The aim of this research, apart from analyzing the effect of the tax ratio on economic growth, is to determine the threshold value of the optimal tax ratio—which economists Barro and Scully call the growth-maximizing tax ratio—that can be applied to produce optimal economic growth in Indonesia. The calculation for Indonesia's optimal tax ratio (ideal tax ratio) is as follows:

***Optimal tax ratio* (ideal tax ratio):**

$$\frac{\delta \gamma}{\delta \tau} = -0.260897 + 2(0.853086)\tau = 0$$

$$\tau = -\frac{(-0.260897)}{2(0.853086)} = 15.29\%$$

Based on the calculations above, Indonesia's ideal tax ratio is 15.29%. Next, we will compare the ideal tax ratio with the real tax ratio during the

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1983–2021 period shown in Figure 4. The graph shows that the average real tax ratio is 13.17%, still lower than the ideal tax ratio of 15.29%.

The research results show that Indonesia's position is always to the left of the Laffer curve or the Scully curve. Figure 4 illustrates that in the initial period of this study, the tax ratio was higher than the optimal tax ratio. Then, from 2000 to the end of the period, in 2021, Indonesia's tax ratio was low and decreased over the years. The research results show that Indonesia's optimal tax ratio is 15.29%. Indonesia's total tax revenue during the 1983–2021 period was 19,074,546 billion rupiahs. If the optimal tax rate had been set in 1983 and remained constant until 2021, the total tax revenue from 1983 to 2021 would have increased to 27,473,034 billion rupiahs, an increase of 8,398,488 billion rupiahs. If this extraordinary amount of money had been allocated to finance productive economic activities, the economic development in Indonesia would be much more advanced.

Indonesia's average economic growth from 1983 to 2021 was 6.13%. The ideal tax ratio is entered into the regression equation model (assuming other variables remain constant) to determine Indonesia's economic growth if the ideal tax ratio had been maintained from 1983 to 2001. The results show that Indonesia's average economic growth would have increased from 2.92% to 9.05%. Therefore, it is critical for the Indonesian government to achieve the ideal tax ratio of 15.29% to attain economic development, social welfare, and the goal of becoming a developed country.

The growth-maximizing tax ratio value of 15.29% is ideal for creating optimal economic growth in Indonesia. This ratio seems to match the one predicted by the Pratama-Kreston Tax Research Institute's (TRI) executive director, Prianto Budi Saptono, who stated, "The ideal tax ratio for Indonesia is in the range of 15% so that tax revenues can be in line with economic growth."

Taxation will encourage economic growth if it is used to finance productive activities that stimulate economic growth, such as infrastructure development and increasing human resources, technology, and innovation. Conversely, taxation can negatively impact economic growth if it is used for ineffective or unproductive purposes, such as repaying government loans or debt. This is because allocating a large portion of state income to pay transfers and foreign debt will reduce the proportion of state income that should be used for developing economic activities; thus, negatively impacting economic growth and social welfare.

The fiscal policy implemented by the government must maximize economic growth and be financed by a reasonable amount of taxes. An optimal tax structure will take into account and maximize economic development and social welfare. Concrete evidence from this research shows that increasing the tax ratio is not something that should be avoided or feared because it can encourage economic growth.

CONCLUSION

The results of this research using ordinary least squares (OLS) show that the tax ratio and the square of the tax ratio have a genuine effect on economic growth: the tax ratio has a negative effect, while the square of the tax ratio has a positive effect. The results of these two different observations mean that an increase in the tax ratio will have a negative impact on economic growth at the start of its implementation. However, in the long term, increasing the tax ratio will promote economic growth. The tax ratio that encourages economic growth is called the growth-maximizing tax ratio, ideal tax ratio, or optimal tax ratio. Indonesia's ideal tax ratio is 15.29%. This tax ratio value is the threshold value at which taxes continue to have a positive impact on economic growth.

The ideal tax ratio can be a guideline for setting realistic tax revenue targets and appropriate tax policies to achieve this value. A low tax ratio indicates that the size of an economy is still small and the overall structure of production and spending needs to be more balanced. Increasing the tax ratio is a form of transferring resources from households and businesses to the public sector. This will initially reduce consumption and production capacity, thereby reducing the equilibrium level of total output. However, if tax revenues are managed efficiently and effectively, production capacity will gradually increase thanks to the increase in the quantity and quality of infrastructure, human resources, innovation, and technology. Tax policy is an important instrument to encourage economic growth and create sustainable economic development so that Indonesia's dream of escaping the middle-income trap and becoming a developed country in Asia by 2045 can become a reality.

Based on the regression results of the growth-maximizing tax ratio model, the 1983 tax reform policy, which changed the official assessment system to self-assessment, had no significant effect on economic growth. This reform allows taxpayers to reduce their tax obligations because of a self-assessment system that gives taxpayers the authority to calculate and report their taxes. Therefore, the results of this research should serve as a warning for the government to create a system that can detect possible tax evasion and implement policies to increase tax revenue. The most concrete step that the government or policy makers can take is to ensure that the government has legitimacy, accountability, openness, and responsiveness to the community. This policy requires the participation of the government, economic actors, and society. A tax

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system that is effective, safe, fair, and transparent will be a significant source of income for the country. Increasing tax revenues, as the largest contributor to state income, apart from encouraging economic growth, will also eliminate dependence on transfers, debt, and foreign aid, as well as natural resources.

This study's limitation is that it does not determine the tax revenue generation capacity of each GDP production sector, nor does it determine the contribution of various types of taxes to economic growth. Determining these factors would optimize the fiscal policy implemented by the government to increase tax revenues, thereby further improving the national economy. Future research can examine these topics in greater depth.

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