



## TRADE OPENNESS AND SERVICE SECTOR FOR INCOME TAX REVENUE: EXPLORING GOVERNMENT EXPENDITURE'S ROLE WITHIN

Destiny Wulandari <sup>1)</sup>, Suparna Wijaya <sup>2)\*</sup>

<sup>1)</sup> [dwulandari97@gmail.com](mailto:dwulandari97@gmail.com), Kementerian Keuangan

<sup>2)</sup> [suparnawijaya@upnvja.ac.id](mailto:suparnawijaya@upnvja.ac.id), Universitas Pembangunan Nasional Veteran Jakarta

\*corresponding author

### Abstract

This study aims to examine the effect of trade openness and service sector on income tax revenue in East Asia and Pacific countries from 2008 to 2019. It was examined by setting government's expenditure as a moderating variable and manufacturing sector and regulatory quality as control variables. It was performed by using a panel-corrected standard error (PCSE) model. The results of the study show that prior to moderation, trade openness has no significant effect, while the service sector has a significant negative effect on income tax revenue. After being moderated by government's expenditure which has a significant positive effect on income tax revenue, the government's expenditure moderates the effect of trade openness and the service sector on income tax revenue. However, the moderation only increases the trade openness' effect on income tax revenue. The service sector's effect on income tax revenue is reduced by the moderation. It implies that the optimization of income tax revenue can be carried out through government's expenditure so that the trade openness and the service sector can be boosted. However, to prevent the negative effect of the service sector on income tax revenue, additional efforts are needed to make the informal sector from the service sector as the source of negative effect become the formal sector.

**Keywords:** Government's expenditure, Income tax revenue, Service sector, Trade openness

### INTRODUCTION

Benedek et al., (2022) in International Monetary Fund Working Paper stated that over the last 15 years, there had been a significant increase in personal income tax (PIT) revenue in low-income developing countries (LIDCs) and emerging market economies (EMEs) when compared to advanced economies (AEs). In addition, the increase in PIT revenue was also accompanied by an increase in corporate income tax (CIT) revenue in the two categories of countries which is assumed as the result of the existing tax administration's capacity improvement (Benedek et al., 2022). In this globalization era, CIT is getting stronger (Bachas et al., 2022). Trade liberalization has increased economic activity in formal sector which allows taxation to be more facilitated (Bachas et al., 2022).

The portion of income tax revenue to total state revenue in 10 out of 14 countries in East Asia and Pacific region has an increasing trend. Figure 1 shows its development. It illustrates that most of these countries have an increasing with two until three countries with a decreasing trend.

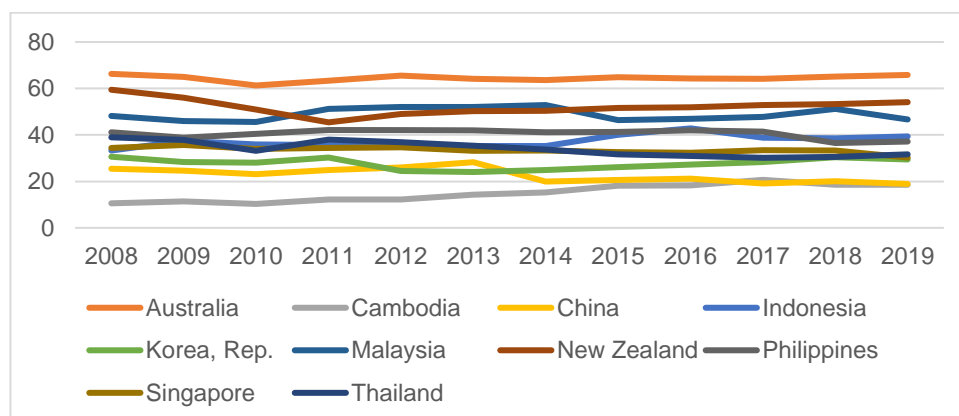




Figure 1 Development of income tax revenue's percentage to total state revenue in 2008–2019

Source: World Bank (2023b)

According to World Bank (2023), East Asia and Pacific region is a region consisting of various classes of countries which include high-income economies, upper-middle income economies, and lower-middle income economies. The other class of countries that has not been mentioned is low-income economies. The four classes of countries have different tax revenue's percentage to gross domestic product (GDP). Middle-income countries have a smaller percentage of tax revenue to GDP than high-income countries do (OECD, 2022). Figure 2 shows the development of tax revenue's percentage to GDP in the four classes of countries.

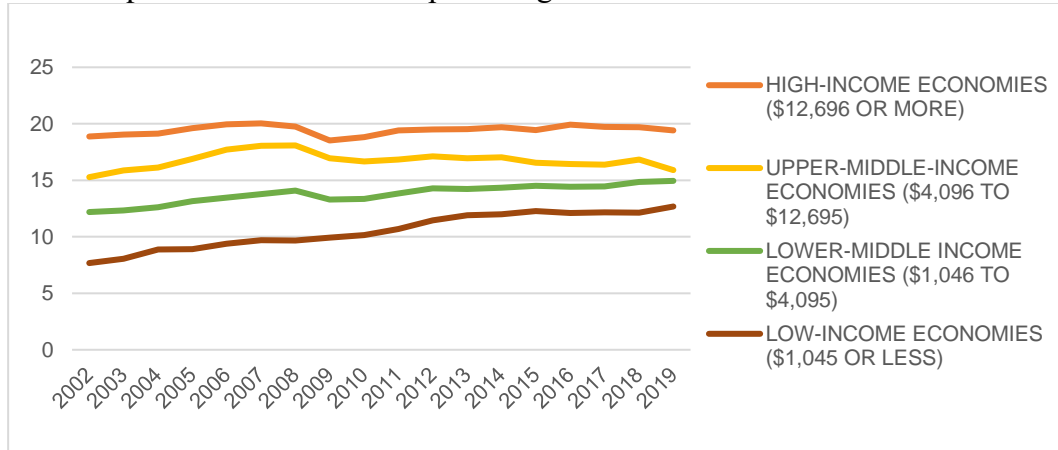


Figure 2 Tax revenue's percentage to GDP by country type

Source: World Bank (2023b)

Talking about income tax in relation to state revenue, income tax is considered as an important instrument in redistributing income. Hetland & Sabaté (2021) revealed in their research that redistribution through income taxes in Sweden, England, and the United States increased during the first half of the 20th century. More specifically, Caminada et al. (2019) stated in their research of 31 countries that income taxes contributed to redistribution by 24 percent of total redistribution besides 76 percent contribution form social transfers. Although 24 percent is much less than 76 percent, the 24 percent comes only from income tax. It is undeniable that income tax is believed to be the best tax option because it imposes taxes by considering taxpayers' ability to pay (Schmalbeck et al., 2018).

It has been mentioned previously that in this globalization era, income tax revenue, especially CIT, tends to increase due to trade liberalization (Bachas et al., 2022). Regarding the decrease in tax rates as the result of trade liberalization policy, Epaphra & Massawe (2017), Arif & Rawat (2018), and Gnangnon (2017) suggested that there was a positive effect of trade liberalization or trade openness on tax revenues. On the other hand, Cagé & Gadenne (2018), Asghar & Mehmood (2017), dan Tsaurai (2021) stated that the tax rates reduction would make trade openness negatively affect tax revenue. However, Gaalya et al. (2017) argued that trade openness only had a significant effect on total tax revenue, trade tax revenue, and indirect tax revenue, but not on direct tax revenue.

In addition to trade openness, the service sector also gets the attention. Piancastelli & Thirlwall (2021) stated that the service sector had a significant positive effect on tax revenues in developed and developing countries. In addition, the high contribution of the service sector to GDP revealed in the studies of Sharma & Singh (2015), Amoh & Adom (2018), and Terefe & Teera (2018) made the service sector had a significant positive effect on tax revenue. However, despite its high contribution to GDP, according to Tujo (2021), the service sector had a negative effect on tax revenue due to the existence of informal sector. On the other side,



Chaudry & Munir (2010) and Mawejje & Munyambonera (2016) claimed that the service sector had no significant effect on tax revenue.

With various arguments regarding the effect of trade openness and the service sector on tax revenue, this study will examine the effect of these two variables on tax revenue, especially income tax. This is due to very few studies that specifically examined the effect of various variables on income tax revenue. Furthermore, in examining this effect, this study uses government expenditure as a moderating variable and manufacturing sector and regulations' quality as control variables. The reason behind this is due to the existence of the effect of these three variables on tax revenue. Takumah & Iyke (2017), Gurdal et al., (2021), and Arvin et al. (2021) also stated that government expenditure had a two-way relationship with tax revenue. On the other hand, Castro & Camarillo (2014), Karagöz (2013), Gaalya (2015), and Minh Ha et al. (2022) explained that the manufacturing sector had a positive effect on tax revenue besides the negative effect found in the study of Hamdan & Rana (2021). In addition, the regulations' quality also had a positive effect on tax revenue according to Epaphra & Massawe (2017), Syadullah (2015), and Asmah et al. (2020) in addition to its negative effect found in Tujo (2021). This study was conducted on countries in East Asia and Pacific region over 12-year period from 2008 to 2019 by considering the data availability.

## **LITERATURE REVIEW**

### **Income Tax Revenue**

Income tax is considered as a better tax option than other tax options, such as sales tax or property tax. The standard justifications for making income as the basis for taxation are that: 1) taxes should be levied on individuals in relation to their ability to pay; and 2) a person's income is the best practical measure of ability to pay tax (Schmalbeck et al., 2018). Yahaya & Bakare (2018) found a positive relationship between income tax revenue and gross domestic product (GDP) in Nigeria. In this case, petroleum profit tax (PPT) and corporate income tax (CIT) are the main sources of revenue in Nigeria and contribute to economic growth there (Yahaya & Bakare, 2018). Similar results were found in Amah & Okey (2021) on the effect of tax on Nigerian economy for 18 years from 1999 to 2017. The results of their study indicated that there was a significant positive effect of PPT and CIT on Nigeria's GDP and a significant negative effect of VAT on GDP (Amah, 2021).

However, on the other hand, income tax rate reduction is believed to have a positive effect on the size of the economy because a lower income tax will increase the proportion of income that can be used for working, saving, and investing. In addition, reduced income tax can also minimize the value of tax distortions and stimulate economic activity that was always taxed previously (Gale & Samwick, 2017). However, Zidar (2019) in his study found that the income tax reduction had a greater effect on low-income taxpayers (the bottom 90 percent) than those with high income (the top 10 percent). This effect comes from the response of the workforce to an increase in the ability to consume and to invest because of a decrease in income tax (Zidar, 2019). Furthermore, Hoynes & Patel (2018) expressed that increasing earned income tax credit (reducing income tax for low-income individual employees who have families) can reduce the amount of poverty below the 100 percent poverty line by 8.4 percent. This impact is seen to be significant at poverty levels between 75 percent and 150 percent, but the impact decreases at the poverty level of 250 percent (Hoynes & Patel, 2018). The result of this study is similar to what was stated by Zidar (2019) that reducing income tax has a more positive impact on taxpayers with lower income.

### **Trade Openness and Its Relevance to Tax Revenue**

Trade openness refers to the ratio of the sum of exports and imports to GDP (Epaphra & Massawe, 2017). Cagé & Gadenne (2018) revealed that 99 episodes of trade liberalization in



130 countries between 1792 and 2006 resulted in a decrease in tax revenue. Trade liberalization indicates an effort to reduce taxes on trade and to cover the decline in tax revenue from other taxation sources. In this case, developing countries are more likely to experience a decline in tax revenue compared to developed countries. This may happen because the tax reduction on trade is carried out before the state is able to prepare adequate tax administration to tax domestic transactions on a large scale (Cagé & Gadenne, 2018). A similar negative effect between trade liberalization and tax revenue was also found in the study of Asghar & Mehmood (2017) in Pakistan from 1980 to 2015. Reducing tax rate during trade liberalization led to a decline in tax revenue (Asghar & Mehmood, 2017). Tsaurai (2021) also found the similar result in his study on upper middle-income countries from 2007 to 2017. The general rate reduction due to trade openness decreases tax revenue collected in an economy. Furthermore, a different view came from Gaalya et al. (2017) who concluded that trade openness had no significant effect on direct taxes. According to them, trade openness only had a significant positive effect on total tax revenue, trade tax revenue, and indirect tax revenue, but not on direct tax revenue (Gaalya et al., 2017).

On the other hand, different finding was found by Epaphra & Massawe (2017) where trade openness had a strong positive effect on total tax revenue, both direct and indirect tax. Trade liberalization tends to broaden the tax base, thereby increasing domestic tax revenue. However, the trade openness has a weak positive effect on trade tax revenue. This is because, although trade-related taxes are easier to impose because goods enter or leave the country at specific locations along the border, lowering trade tax rates eliminates the increase in the ratio of imports and imports to GDP (Epaphra & Massawe, 2017). This argument was explained further by Arif & Rawat (2018) that trade openness resulted in reduced trade barriers on imports which could lead to an increase in import volume so that it could increase tax revenue from trade. Furthermore, Gngangnon (2017) added that the increase in government revenue due to trade liberalization came from domestic direct and indirect tax revenue. The increase in exports and imports in the public and private sector because of such liberalization could lead to greater profits and increased wage for employees. As a result, direct tax revenue also increased. In addition, reducing input costs in the production of products to be exported made companies more competitive in international markets and would ultimately generate greater profits. As a result, direct and indirect tax revenues could increase. Consequently, other domestic companies that were still operating in the informal sector would be attracted to switch to the formal sector to take advantage of the low input prices for their production processes. In this case, the government could obtain greater tax revenue (Gngangnon, 2017).

### **Service Sector and Its Relevance to Tax Revenue**

Piancastelli & Thirlwall (2021) in their research on developed and developing countries from 1996 until 2015 stated that the service sector's contribution to GDP had a significant positive effect on tax revenue. According to them, the tax levied on the service sector is closely related to the tax on profits. In other words, the significant positive effect of services on tax revenue can be specifically aimed at income tax revenue. This positive effect was also found in the study of Sharma & Singh (2015) on India from 1999 until 2012. The high contribution of the service sector to GDP resulted in high tax revenues as well. The finding interprets that the recorded service sector is consistent with its tax obligations. Amoh & Adom (2018) also concluded that the service sector had a positive effect on tax revenue in their research on Ghana from 2002 until 2010. In their result, this positive effect occurred since the service sector was the dominant driver of tax revenue in that country. The service sector contributes to increased employment, international trade, and foreign direct investment (FDI) (Terefe & Teera, 2018).

Different result was expressed by Tujo (2021) in his research on Ethiopia from 2000 until 2019, where the service sector had a significant negative effect on tax revenue. According to



him, the service sector in low-income countries tended to be the informal sector so that the actual contribution of the service sector is higher than recorded. On the other hand, Chaudry & Munir (2010) revealed a negative effect of the service sector on tax revenue, but it was not significant. Apart from the insignificant effect, the negative sign was caused by the fact that the service sector in many developing countries was included in the informal sector. This resulted in a high level of tax evasion occurred in the service sector. As a result, the tax revenue that was expected to be obtained from the service sector was not achieved (Chaudry & Munir, 2010). The insignificant effect of the service sector on tax revenue is also found in the study of Mawejje & Munyambonera (2016).

### **Government Expenditure and Its Relevance to Tax Revenue**

Takumah & Iyke (2017) argued that government expenditure had Granger causality with tax revenue. Tax revenue is usually used to fund government expenditure so that they can be realized in the form of development in a country. The development is carried out in the form of productive infrastructure development, existing infrastructure repairment, research and development financing, and so on. As a result, this development can then stimulate economic growth (Takumah & Iyke, 2017). A similar causality relationship was also found by Gurdal et al., (2021) that government expenditure and tax revenue have a two-way relationship. The expenditure-tax and tax-expenditure hypotheses are equally valid. In the former hypothesis, policy makers determine how much government expenditure is and then adjust the tax policies. In the latter hypothesis, policy makers collect taxes first and then do government expenditure from the collected tax revenue. In this case, tax revenue is a funding source for government expenditure. Government expenditure is usually directed towards infrastructure development which has a positive impact on economic growth (Gurdal et al., 2021). In addition, Arvin et al. (2021) also found a Granger causality relationship between government expenditure and tax revenue besides institutional quality and economic growth in their study.

### **Manufacturing Sector and Its Relevance to Tax Revenue**

Manufacturing is an activity of processing raw materials into finished goods that have a sale value. Manufacturing adds value to a material by changing its properties or shape or combining it with other materials (Wicaksono et al., 2023). Manufacturing is a major source of process and product innovation critical to productivity growth. Manufacturing provides intermediate goods to other industries to drive global chain upgrades. Ultimately, manufacturing is the basis for international competition and a policy focus for both industrializing and non-industrializing countries (Huang et al., 2017). Manufacturing is a country's attempt to generate wealth by trading value-added products with other countries in the world and by using this wealth to meet its needs, especially for countries with limited resources. Nevertheless, a resource-rich country cannot achieve prosperity if it lacks manufacturing know-how. Conversely, a country with few resources can become a rich country if it has manufacturing know-how (Mital et al., 2014).

In middle-income countries, the manufacturing sector is the main driver of economic growth. Increasing the manufacturing sector will accelerate technological progress and optimize the utilization of human capital (Su & Yao, 2016). In addition, manufacturing can create linkages with other sectors of the economy and have high profit-generating potential. Manufacturing can: 1) contribute to food security through the supply of chemicals, machinery, and equipment for agricultural mechanization to reduce crop losses and to add added value to agricultural products; 2) support the housing sector through the production of building materials, innovation in building design and construction, and increased use of local construction materials; 3) support the health sector through the manufacture of medical devices and pharmaceutical products as well as sanitary products; and 4) create jobs in related services (transport, logistics, financial sector, and ICT) (Okeyo, 2022).



Eltony (2022) in Castro & Camarillo (2014) stated that the percentage of manufacturing to the economy could have a positive effect on taxation because manufacturing companies were easier to tax so they would generate greater tax revenue than agriculture would. Karagöz (2013) said that this might happen since manufacturing made businesses generate a lot of profit which could then be taxed. Furthermore, Gaalya (2015) explained that the larger tax contribution came from corporate income tax and personal income tax, which would increase as manufacturing companies increased. Industries with many manufacturing companies operating in dynamic and specialized sectors of the economy can obtain additional profits due to the added value of the products they produce, which will result in greater income being taxed. It will make it easier to collect taxes on the manufacturing sector than on the agricultural sector (Minh Ha et al., 2022).

However, others argued that there were times when manufacturing could have a negative effect on tax revenue in several countries (Hamdan & Rana, 2021). In his research conducted on several developing countries, Hamdan & Rana (2021) concluded that each country had its own variables that could affect its tax revenue in a significant amount. This depended on the development conditions of each economic sector in the country. If the country had a manufacturing sector that was not developing very well yet, the manufacturing sector would have a negative effect on tax revenue.

### **Regulatory Quality and Its Relevance to Tax Revenue**

Epaphra & Massawe (2017) in their research on African countries suggested that the quality of regulations tended to increase tax revenue. Good regulatory quality reflects so good governance that can create an efficient tax system and better tax administration. This condition will enable a country to make a fair taxation so that it is able to generate high tax revenue from tax collection (Epaphra & Massawe, 2017). A similar positive effect was also found by Syadullah (2015) on Association of Southeast Asian Nations (ASEAN) countries on the effect of regulatory quality on tax ratio. According to him, the government's good ability to formulate policies and regulations for the development of the private sector could increase the tax ratio. This would happen since the heavy regulatory burden, especially in the goods and labor market, would reduce growth and encourage an increase in the informal sector (Syadullah, 2015). In addition, Asmah et al. (2020) also found that there was a positive effect of regulatory quality on tax revenue in 13 countries in Africa.

However, on the other hand, Salman et al. (2022) and Mohammed & Sanusi (2020) in their research on West African countries, Yaru & Raji (2022) on Sub-Saharan African countries, and Anwar & Wijaya (2023) on ASEAN countries conclude that the quality of regulations did not significantly affect the tax revenue. It is different with Tujo (2021) who stated in his research on Ethiopia that the quality of regulations had a significant negative effect on tax revenue.

### **Research Hypotheses**

According to the previous literature review, the research hypotheses are as follows.

#### ***The effect of trade openness on income tax revenue***

Initially, the existing literature stated that there was no significant effect of trade openness on tax revenue (Gaalya et al., 2017) and there is also literature which said that trade openness had a negative effect on tax revenue (Asghar & Mehmood, 2017; Cagé & Gadenne, 2018; Tsaurai, 2021). The argument that stated the negative effect explained that trade openness reduced tax rates on trade transactions. The argument regarding the unpreparedness of adequate tax administration to tax domestic transactions on a large scale, especially in developing countries stated that these conditions resulted in tax revenue from sources other than trade taxes unable to cover the decrease in tax revenues from trade (Asghar & Mehmood, 2017; Cagé & Gadenne, 2018; Tsaurai, 2021).



Nevertheless, Epaphra & Massawe (2017), Arif & Rawat (2018), and Gngangnon (2017) suggested that trade openness had a positive effect on tax revenue. This was because the tariffs reduction could increase the imports volume, where the increase in exports and imports would generate greater profits. The greater profit also came from the reduction in input costs due to the reduction in import tariffs. As a result, employee wages would also increase. The potential for generating large profits could attract other informal sectors to switch to the formal sector to take advantage of these low input costs. Consequently, domestic direct and indirect tax revenue would increase. In addition, even though this positive effect was weak on trade tax revenue, trade tax was easier to tax because transactions of goods entering or leaving the country occurred in specific locations (Arif & Rawat, 2018; Epaphra & Massawe, 2017; Gngangnon, 2017).

Therefore, by considering the probability of conditions outside of trade taxes as presented by Epaphra & Massawe (2017), Arif & Rawat (2018), and Gngangnon (2017), the first hypothesis of this study is:

H<sub>1</sub> : Trade openness had a significant positive effect on income tax revenue

***The effect of service sector on income tax revenue***

Although there were arguments stated that service sector was closely related to the informal sector, most of the existing literature explained the positive effect of the service sector on tax revenue. In this case, the informal sector made the actual contribution of the service sector much higher than what was recorded. This was due to the high level of tax evasion in the informal sector (Chaudry & Munir, 2010; Tujo, 2021). On the other hand, Piancastelli & Thirlwall (2021), Sharma & Singh (2015), Amoh & Adom (2018), and Terefe & Teera (2018) stated that the positive effect was due to the high contribution of the service sector to GDP, thereby increasing tax revenue. Piancastelli & Thirlwall (2021) stated that the service sector was closely related to tax on profits. In this case, the service sector could increase employment, encourage international trade, and attract FDI. Therefore, the second hypothesis of this study is:

H<sub>2</sub> : Service sector had a significant positive effect on income tax revenue

***The effect of government expenditure on income tax revenue***

Takumah & Iyke (2017), Gurdal et al., (2021), and Arvin et al. (2021) all stated that government expenditure had Granger causality or a two-way relationship with tax revenue. Although the sign of the relationship was not specifically stated whether it was positive or negative, government expenditure was believed to be able to stimulate economic growth. In this case, government expenditure was usually realized in the form of productive infrastructure development, improvement of existing infrastructure, research and development financing, and so on. On this basis, the third hypothesis regarding the effect of the moderating variable in this study is:

H<sub>3</sub> : Government expenditure had a significant positive effect on income tax revenue

***The effect of government expenditure moderation on the effect of trade openness on income tax revenue***

By considering the effect that government expenditure has on tax revenues, the researchers assumed that government expenditure could strengthen the effect that trade openness had on income tax revenue. This is because the development carried out by the government through government expenditure can be in the form of efforts to encourage trade openness considering its important role in the economy and tax revenue. Therefore, the fourth hypothesis of this study is:

H<sub>4</sub> : Government expenditure increases the effect of the trade openness on income tax revenue



*The effect of government expenditure moderation on the effect of the service sector on income tax revenue*

By considering the effect of government expenditure on tax revenue, the researchers also assumed that government expenditure could strengthen the effect of the service sector on tax revenue. Development efforts carried out by the government with government expenditure can be pursued to encourage the service sector considering its positive role in the economy and tax revenue. Therefore, the fifth hypothesis of this study is:

H<sub>5</sub> : Government expenditure increases the effect of the service sector on income tax revenue

**METHODS**

This study is a quantitative study because the researchers conducted data analysis by using the panel data multiple linear regression method. Jaya (2020) stated that quantitative study was the study that used statistical procedures or other procedures capable of quantification to analyze the relationship between research variables. In this case, the researchers used the multiple linear regression method to determine the linear relationship between the dependent variable and more than one independent variable as stated by Suyono (2018). Researchers used panel data because it allowed the combination of time series data from several years and cross sections from several countries. This is in accordance with the concept of panel data as stated by Sihombing (2022). The data used in this study was secondary data in the form of World Development Indicators data from World Bank (2023b).

The data that the researchers chose for further analysis were selected based on stratified sampling, namely the selection of the sample by first dividing the population into sub-groups (Fink, 2005). Initially, from the data population, which is data from all countries in the world, the researchers categorized it based on the regional categories available on the World Development Indicators, namely East Asia and Pacific, Europe and Central Asia, Latin America and The Caribbean, South Asia, Sub-Saharan Africa, Middle East and North Africa, and North America. In this case, the researchers chose countries that are in East Asia and Pacific region which consisted of 14 countries. Then, the researchers eliminated four countries due to limited data, namely Hong Kong, Japan, Vietnam and Timor Leste. The data studied covers 2008 to 2019 due to limited data in the years before and after.

The dependent variable used is the percentage of income tax revenue to total state revenue, while the independent variables used include the percentage of total exports and imports of goods and services to GDP and the percentage of the service sector to GDP. In this case, the dependent variable is a variable that is influenced by the independent variable and vice versa, the independent variable is a variable that affects the dependent variable (Mukhid, 2021). In addition, researchers also used a moderating variable i.e., government expenditure, and control variables i.e., percentage of manufacturing sector to GDP and regulatory quality. Duli (2019) explained that the moderating variable was a variable that strengthened or weakened the relationship between the dependent variable and the independent variable, while the control variable was a variable determined by the researcher so that non-research variables did not influence the relationship between the dependent variable and the independent variable. Details of the variables used in this study are shown in Table 1.

Table 1 Research Variables

Variables	Details	Units
Taxes on income, profits, and capital gains (INCTAX) (Y)	Taxes imposed on an individual's actual or estimated net income, on corporate and corporate profits, and on realized or unrealized capital gains in land, securities, and other assets.	% total state revenue
Trade (TRADE) (X <sub>1</sub> )	The sum of exports and imports of goods and services.	% GDP



Services, value added (SERV) (X <sub>2</sub> )	Percentage of service sector contribution to GDP which includes value added in wholesale and retail trade (including hotels and restaurants), transportation, and government, financial, professional, and personal services such as education, health care, and real estate.	% GDP
General government final consumption expenditure (GOVEXP) (Z)	All current government expenditure on goods and services (including employee compensation). This spending also includes a large proportion of spending on national defense and security but does not include government military spending which is part of the government's capital formation.	% GDP
Manufacturing, value added (MANU) (control variables)	The percentage of the manufacturing industry sector's contribution to GDP.	% GDP
Regulatory quality (REG) (control variables)	The government's ability to formulate and to implement sound policies and regulations that enable and encourage private development. Expressed in normal distribution units ranging from approximately -2.5 to 2.5.	-

Source: World Bank (2023b)

Before carrying out the regression analysis, the researchers conducted classical assumption tests to test the normality, heteroscedasticity, multicollinearity, and autocorrelation of the analyzed data. The classical assumption tests were carried out so that the regression model used produces reliable and unbiased estimates (R. A. Purnomo, 2017). Details of the classical assumption tests performed are shown in Table 2.

Table 2 Classical assumption tests

Classic Assumptions	Details	Test Tools
Normality	Run to test whether the residual values in the model are distributed normally or not. H <sub>0</sub> : data is distributed normally (Prob>chi <sup>2</sup> > α) H <sub>1</sub> : data is not distributed normally (Prob>chi <sup>2</sup> < α)	Skewness and kurtosis test
Heteroscedasticity	Run to detect whether there is a change in the variance of the residual over time. H <sub>0</sub> : homogeneous data variants (Prob>chi <sup>2</sup> > α) H <sub>1</sub> : heteroscedastic data variant (Prob>chi <sup>2</sup> < α)	Breusch-Pagan/Cook-Weisberg test
Multicollinearity	Run to determine whether there is a correlation between independent variables. H <sub>0</sub> : there is no high multicollinearity between independent variables (VIF < 10) H <sub>1</sub> : there is high multicollinearity between independent variables (VIF > 10)	Variance Inflation Factor (VIF)
Autocorrelation	Run to detect whether there is a relationship between the value at time t with the value at time t-1 H <sub>0</sub> : the model contains autocorrelation (Prob>F > α) H <sub>1</sub> : the model does not contain autocorrelation (Prob>F < α)	Breusch-Godfrey/Lagrange Multiplier test

Source: Ghozali (2016), Purnomo (2017), Ismanto & Pebruary (2021), and Sihombing (2022)

After running the classical assumption tests, the researchers conducted a selection test for the best model by performing Chow Likelihood Ratio test, Breusch Pagan's Lagrange Multiplier test, and Hausman test as suggested by Sihombing (2021) with details in the following table.



**Table 3 The Best Model Selection Tests**

Tests	Details
Chow Likelihood Ratio	Run to choose which model is better between the common effect model or the fixed effect by using F test. H <sub>0</sub> : common effect model is better than fixed effect model (Prob>F > α) H <sub>1</sub> : fixed effect model is better than common effect model (Prob>F < α)
Lagrange Multiplier Breusch Pagan	Run to choose which model is better between the common effect model or random effect model by using chi square LM test. H <sub>0</sub> : common effect model is better than random effect model (Prob>chibar2 > α) H <sub>1</sub> : random effect model is better than common effect model (Prob>chibar2 < α)
Hausman	Run to choose which model is better between the random effect model or the fixed effect model by using chi square test. H <sub>0</sub> : random effect model is better than fixed effect model (Prob>chi2 > α) H <sub>1</sub> : fixed effect model is better than random effect model (Prob>chibar2 < α)

Source: Sihombing (2021) and Sihombing (2022)

In the next section, the researchers present the results of the classical assumption tests and the best model selection tests. These results ultimately led the researchers to use the panel-corrected standard error (PCSE) model in conducting the analysis instead of using the selected model from the best model selection tests results. In this case, PCSE model is a panel data linear regression model that is used for data that is heteroscedastic and contains temporary correlations or autocorrelation (Lopez, 2021). As explained by Croissant & Millo (2019), PCSE covariance is based on the hypothesis that the covariance matrix of errors in each group is the same, namely  $\Omega = \Sigma_N \otimes I_T$ , with:

$$\Sigma_N = \begin{bmatrix} \sigma_1^2 & \sigma_{1,2} & \cdots & \sigma_{1,N-1} & \sigma_{1,N} \\ \sigma_{2,1} & \sigma_2^2 & \cdots & \sigma_{2,N-1} & \sigma_{2,N} \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ \sigma_{N-1,1} & \sigma_{N-1,2} & \cdots & \sigma_{N-1,N-1}^2 & \sigma_{N-1,N} \\ \sigma_{N,1} & \sigma_{N,2} & \cdots & \sigma_{N,N-1} & \sigma_N^2 \end{bmatrix} \quad (1)$$

so  $\Sigma_N$  can be estimated by the equation below.

$$\Sigma_N = \frac{\sum_{t=1}^T \hat{\epsilon}_t \hat{\epsilon}_t^T}{T} \quad (2)$$

## RESULTS AND DISCUSSION

The average, standard deviation, minimum value, and maximum value of each analyzed variable are shown in Table 4. The TRADE\*GOVEXP and SERVICE\*GOVEXP variables, which are the interaction variables between the independent variables and the moderating variable, are the results of the multiplication of the z scores of the independent variables and moderating variable. Before multiplying the independent variables and the moderating variables, the researchers first calculated the z scores of the independent variables and the moderating variable. It was done to avoid the multicollinearity between the variables when the classical assumption tests were carried out. From Table 4, it can be interpreted that all variables except TRADE\*GOVEXP, SERVICE\*GOVEXP, and REG variables have good data distribution. This is assessed from the average value which is higher than the standard deviation value. In addition, the good data distribution can be assessed from the range between the average value and the minimum and maximum values for each variable.

**Table 4 Descriptive Statistics Results**

Variables	Mean	Std. Dev.	Min.	Max.
INCOMETAX	37,61394	14,18548	10,30044	66,28255
TRADE	108,6845	90,42607	35,8901	437,3267
SERVICE	54,53664	10,00918	37,0577	70,8733



GOVEXP	13,30587	4,301928	4,8068	20,2605
TRADE*GOVEXP	-0,3682849	0,7867286	-2,978928	0,8214972
SERVICE*GOVEXP	0,5443338	1,128409	-1,515611	3,09661
MANU	20,23995	7,240867	5,6051	32,1194
REG	0,6571329	0,9336486	-0,58363	2,260543

Source: Processed by using STATA application

Before carrying out the regression, the researchers conducted classical assumption tests first. From the classical assumption tests performed, the results obtained were that the model only passed the multicollinearity test. In other words, the data was not normally distributed (did not pass the normality test), the data variance from the model used was not homogeneous (did not pass the heteroscedasticity test), the variables did not contain correlation among each other (passed the multicollinearity test), and the variable value at time t was correlated with variable at time t-1 (did not pass the autocorrelation test). The results of the classical assumption tests are shown in Table 5.

Table 5 Classical Assumption Tests Results

Classical Assumption Tests	Results	Interpretation
Normality	Prob>chi2 = 0,0369 < $\alpha$ = 5%	H <sub>0</sub> is rejected; data is not distributed normally
Heteroscedasticity	Prob>chi2 = 0,0021 < $\alpha$ = 5%	H <sub>0</sub> is rejected; the model is not free from heteroscedasticity (heterogenous data variants)
Multicollinearity	VIF = 8,22 < 10	H <sub>0</sub> is not rejected; the model does not contain multicollinearity
Autocorrelation	Prob>chi2 = 0,0045 < $\alpha$ = 5%	H <sub>0</sub> is rejected; the model is not free from autocorrelation assumption

Source: Processed by using STATA application

Then, to determine the best regression model, the researchers conducted several selection tests for the best model i.e., Chow Likelihood test, Lagrange Multiplier Breusch Pagan test, and Hausman test. From these tests, the best model chosen was the random effect model with detailed test results as shown in Table 6.

Table 6 The Best Model Selection Tests Results

Tests	Results	The Chosen Models
Chow Likelihood test	Prob>F = 0,0461 < $\alpha$ = 5%	Fixed effect model
Lagrange Multiplier Breusch Pagan test	Prob>chibar2 = 0,0000 < $\alpha$ = 5%	Random effect model
Hausman test	Prob>chi2 = 0,5395 > $\alpha$ = 5%	Random effect model

Source: Processed by using STATA application

However, since the model did not pass the heteroscedasticity and autocorrelation tests, the model used to carry out the regression analysis was a panel-corrected standard error (PCSE) model. In this case, the researchers ignored the results of the normality test which showed that the data were not normally distributed since the normality test did not have to be done on panel data (Kusumaningtyas et al., 2022). The PCSE model is a model that can be used to address heteroscedasticity and autocorrelation symptoms as happened in the model used in this study (Croissant & Millo, 2019; Lopez, 2021). The results of the panel data linear regression using the PCSE model are shown in Table 7.

Table 7 Regression Results by Using PCSE Model

Variables	Coefficient	P> z	Prob>chi2	R-squared
TRADE	0,01773	0,1415	0,000***	0,8674
SERVICE	-0,686714	0,000***		
GOVEXP	1,096087	0,000***		



TRADE*GOVEXP	5,852775	0,0015***
SERVICE*GOVEXP	-4,039798	0,0045***
MANU	-1,464963	0,000***
REG	6,386124	0,0005***
Constanta	91,35394	0,000***

\*\*\*Significant at  $\alpha = 1\%$ ; \*\*Significant at  $\alpha = 5\%$ ; \*Significant at  $\alpha = 10\%$

Source: Processed by using STATA application

The regression model is as follows:

$$\text{INCOMETAX}_{it} = 91,35394 + 0,01773 \text{TRADE}_{it} - 0,686714 \text{SERVICE}_{it} + 1,096087 \text{GOVEXP}_{it} + 5,852775 \text{TRADE*GOVEXP}_{it} - 4,039798 \text{SERVICE*GOVEXP}_{it} \quad (3)$$

The model implies that: 1) an increase in trade openness by 1 percent of GDP will increase income tax revenue by 0.01773 percent of total revenue and vice versa; 2) an increase in the service sector by 1 percent of GDP will result in a decrease in income tax revenue by 0.686714 percent of total revenue and vice versa; 3) an increase in government expenditure by 1 percent of GDP will increase income tax revenue by 1.096087 percent of total revenue and vice versa; 4) an increase in government expenditure by 1 percent will increase the effect of trade openness on income tax revenue by 5.852775 percent; and 5) an increase in government expenditure by 1 percent will reduce the effect of the service sector on income tax revenue by 4.039798 percent.

$P > |z|$  and  $\text{Prob} > \chi^2$  listed in the table has been adjusted by dividing  $P > |z|$  and  $\text{Prob} > \chi^2$  from the STATA application with two. This was done because this study used a one-tailed statistical test in analyzing the data. This condition is described from the research hypothesis, which is not only estimating the existence of the effect of the independent variables on the dependent variable, but also estimating the direction of the relationship whether positive or negative. This is as stated by Kasim (2008) that a one-way statistical test occurs when the alternative hypothesis states that there are differences and higher or lower value statements. In the one-way statistical test, the p value is divided by two (Purnomo, 2019).

From the p-value shown before moderation, only the service sector variable has a significant effect on income tax revenue, while the trade openness variable has no significant effect. The effect of the service sector is negative. However, after the moderation with the government expenditure variable, the results show that the government expenditure variable moderates the relationship between trade openness and income tax revenue and the relationship between the service sector and income tax revenue. Furthermore, the results of  $\text{Prob} > \chi^2$  indicate that all independent variables simultaneously have a significant effect on the dependent variable of income tax revenue. All the variables used in the regression analysis (independent variables of trade openness and service sector, government expenditure as moderating variable, interaction variables between trade openness and service sector and government expenditure, and manufacturing sector and regulatory quality as control variables) affect income tax revenue by 86.74 percent observed from its R-squared result. In other words, other variables outside the model only affect income tax revenue by 13.26 percent.

### **The effect of trade openness on income tax revenue**

The first hypothesis is not supported by the result of this study. Prior to the moderation by using government expenditure variable, trade openness does not significantly affect income tax revenue. This contradicts the research results of Epaphra & Massawe (2017), Arif & Rawat (2018), and Gnangnon (2017) which stated that there was a positive effect and the research results Asghar & Mehmood (2017), Cagé & Gadenne (2018), dan Tsurai (2021) which stated that there was a negative effect. However, the results of this study are in line with the results of Gaalya et al. (2017) which stated that there was no significant effect of trade openness on income tax revenue.

**The effect of service sector on income tax revenue**

The result of this study does not support the second hypothesis. Before the moderation by using the government expenditure variable, the service sector has a significant negative effect on income tax revenue at 1-percent confidence level. The results of this study are in line with the results of Chaudry & Munir (2010) and Tujo (2021). In this case, based on the arguments of Chaudry & Munir (2010) and Tujo (2021), it could be interpreted that most service sectors in East Asia and Pacific countries were listed as the informal sector. First, the service sectors' actual contribution was much higher than recorded. Second, not all registered service sectors fulfill their tax rights and obligations. Third, the service sectors, which were listed as the informal sector, did not contribute to income tax revenue. As a result, the positive effect of the service sector on tax revenue as stated by Piancastelli & Thirlwall (2021), Sharma & Singh (2015), Amoh & Adom (2018), and Terefe & Teera (2018) from the contribution of the service sector to tax revenue did not occur. In this case, the argument stating that the service sector can increase employment, encourage international trade, and attract FDI is not positively correlated with its contribution to income tax revenue for the three reasons mentioned previously.

**The effect of government expenditure in income tax revenue**

The result of this study is in line with the third hypothesis that government expenditure has a significant positive effect on income tax revenue. This result is indirectly in accordance with the argument of Takumah & Iyke (2017), Gurdal et al., (2021), and Arvin et al. (2021). In this case, the role of government expenditure in stimulating economic growth through infrastructure development, infrastructure improvement, research and development funding, and other development efforts has a positive effect on income tax revenue.

**The effect of government expenditure moderation on the relationship between trade openness and income tax revenue**

The result of this study is in line with the fourth hypothesis. In this case, the interaction variable between trade openness and government expenditure has a significant significance at the 1-percent confidence level on income tax revenue. It means that the government expenditure variable moderates the effect of trade openness on income tax revenue. In addition, the coefficient of the interaction variable is positive, which means that government expenditure strengthens or increases the effect of trade openness on income tax revenue. The development efforts done through government expenditure can include efforts to encourage trade openness. In this case, government expenditure is also allocated to support the reduction of trade-related tax rates. Such support can be provided in the form of covering lost tax revenue from the reduction in rates. Consequently, exports and imports can increase, input costs for firms remain low, corporate profits increase, employee effort increases, and the informal sector is attracted to the formal sector. As a result, the positive effect of trade openness on tax revenue as stated by Epaphra & Massawe (2017), Arif & Rawat (2018), and Gnanon (2017) can occur.

**The effect of government expenditure moderation on the relationship between the service sector and income tax revenue**

The result of this study is not in line with the fifth hypothesis. The government expenditure variable moderates the effect of the service sector on income tax revenue with a significant result. However, the moderation is not strengthening. The coefficient of the interaction variable between government expenditure and the service sector has a negative sign which indicates that government expenditure weakens or reduces the effect of the service sector on income tax revenue. It implies that allocating government expenditure on the service sector does not make the informal sector switch to the formal sector and/or increase the existing service sectors including the informal sector. Government expenditure which can take the form of increasing employment, encouraging international trade, and attracting FDI, such as the



argument behind the positive effect of the service sector on tax revenue as stated by Piancastelli & Thirlwall (2021), Sharma & Singh (2015), Amoh & Adom (2018), and Terefe & Teera (2018), does not guarantee an increase in the formal sector from the service sector or a decrease in the informal sector from the service sector.

## CONCLUSION

From the study that has been conducted, it can be concluded that before the moderation by using government expenditure, only the service sector has a significant effect on income tax revenue but with a negative effect. On the other hand, trade openness has no significant effect. After the moderation, government expenditure which has a significant positive effect on income tax revenue, moderates the effect of trade openness and the service sector on tax revenues. However, the moderation only strengthens the effect of trade openness on income tax revenue. The moderation weakens the effect of the service sector on income tax revenue. The result of this study implies that the efforts to optimize income tax revenue can be carried out through government spending so that trade openness and the service sector can continue to be encouraged. However, additional efforts are needed so that the informal sector from the service sector which has a negative effect on tax revenue can switch to the formal sector.

Nevertheless, this study is only limited to one-way relationship that occur between one variable and another. In fact, a two-way relationship is often found between one variable and another. This relationship can be identified by using Panel Vector Autoregressive (PVAR) or Panel Vector Error Correction Model (PVECM) methods if we want to know the long-term and short-term effects.

## REFERENCES

- Amah, C. O. (2021). Taxation and Nigerian Economy: an Empirical Analysis. *International Journal of Management Science and Business Administration*, 7(4), 29–35. <https://doi.org/10.18775/IJMSBA.1849-5664-5419.2014.74.1004>
- Amah, & Okey, C. (2021). Taxation and Nigerian Economy: an Empirical Analysis. *International Journal of Management Science and Business Administration*, 7(4), 29–35. <https://doi.org/10.18775/IJMSBA.1849-5664-5419.2014.74.1004>
- Amoh, J. K., & Adom, P. K. (2018). The determinants of tax revenue growth of an emerging economy – the case of Ghana . *International Journal of Economics and Accounting*, 8(3–4), 337–353. <https://www.inderscienceonline.com/doi/abs/10.1504/IJEA.2017.092280>
- Anwar, F. M., & Wijaya, S. (2023). Tax Revenue, FDI, and Agricultural Sector: A Dynamic Interaction with Regulatory Quality as the Moderation. *Ilomata International Journal of Tax and Accounting*, 4(3), 524–545. <https://doi.org/10.52728/IJTC.V4I3.799>
- Arif, I., & Rawat, A. S. (2018). Corruption, governance, and tax revenue: evidence from EAGLE countries. *Journal of Transnational Management*, 23(2–3), 119–133. <https://doi.org/10.1080/15475778.2018.1469912>
- Arvin, M. B., Pradhan, R. P., & Nair, M. S. (2021). Are there links between institutional quality, government expenditure, tax revenue and economic growth? Evidence from low-income and lower middle-income countries. *Economic Analysis and Policy*, 70, 468–489. <https://doi.org/10.1016/J.EAP.2021.03.011>
- Asghar, F., & Mehmood, B. (2017). Effects of Trade Liberalization on Tax Revenue in Pakistan: An Empirical Scrutiny Using ARDL Bound Testing. *Pakistan Economic and Social Review*, 55(1), 187–212. <https://www.jstor.org/stable/26730218>
- Asmah, E. E., Kwaw Andoh, F., & Titriku, E. (2020). Trade misinvoicing effects on tax revenue in sub-Saharan Africa: The role of tax holidays and regulatory quality. *Annals of Public and Cooperative Economics*, 91(4), 649–672. <https://doi.org/10.1111/APCE.12289>



- Bachas, P., Fisher-Post, M. H., Jensen, A., & Zucman, G. (2022). *Globalization and Factor Income Taxation* (29819). <http://www.nber.org/papers/w29819>
- Benedek, D., Benitez, J. C., & Vellutini, C. (2022). *Progress of the Personal Income Tax in Emerging and Developing Countries* (2022/020). <https://www.imf.org/en/Publications/WP/Issues/2022/01/28/Progress-of-the-Personal-Income-Tax-in-Emerging-and-Developing-Countries-512234>
- Cagé, J., & Gadenne, L. (2018). Tax revenues and the fiscal cost of trade liberalization, 1792–2006. *Explorations in Economic History*, 70, 1–24. <https://doi.org/10.1016/J.EEH.2018.07.004>
- Caminada, K., Goudswaard, K., Wang, C., & Wang, J. (2019). Income Inequality and Fiscal Redistribution in 31 Countries After the Crisis. *Comparative Economic Studies*, 61(1), 119–148. <https://doi.org/10.1057/S41294-018-0079-Z/METRICS>
- Castro, G. Á., & Camarillo, D. B. R. (2014). Determinants of tax revenue in OECD countries over the period 2001–2011. *Contaduría y Administración*, 59(3), 35–59. [https://doi.org/10.1016/s0186-1042\(14\)71265-3](https://doi.org/10.1016/s0186-1042(14)71265-3)
- Chaudry, I. S., & Munir, F. (2010). Determinants of Low Tax Revenue in Pakistan. *Pakistan Journal of Social Sciences (PJSS)*, 30(2), 439–452. <http://pjss.bzu.edu.pk/index.php/pjss/article/download/87/73>
- Croissant, Y., & Millo, G. (2019). *Panel Data Econometrics with R*. UK: John Wiley & Sons Ltd. [https://books.google.co.id/books?id=Uu5oDwAAQBAJ&pg=PA122&dq=model+panel+corrected+standard+error&hl=id&newbks=1&newbks\\_redir=0&sa=X&ved=2ahUKEwj r5bbYkrSAAxWm9zgGHUIuDmoQ6AF6BAGJEAI#v=onepage&q=model%20panel%20corrected%20standard%20error&f=false](https://books.google.co.id/books?id=Uu5oDwAAQBAJ&pg=PA122&dq=model+panel+corrected+standard+error&hl=id&newbks=1&newbks_redir=0&sa=X&ved=2ahUKEwj r5bbYkrSAAxWm9zgGHUIuDmoQ6AF6BAGJEAI#v=onepage&q=model%20panel%20corrected%20standard%20error&f=false)
- Duli, N. (2019). *Metodologi Penelitian Kuantitatif: Beberapa Konsep Dasar untuk Penulisan Skripsi & Analisis Data dengan SPSS*. Sleman: Deepublish Publisher. [https://books.google.co.id/books?id=A6fRDwAAQBAJ&pg=PA47&dq=variabel+moderating&hl=id&newbks=1&newbks\\_redir=0&sa=X&ved=2ahUKEwjLksnrvcb-AhWQ4jgGHXxuCUQQ6AF6BAGDEAI#v=onepage&q=variabel+moderating&f=false](https://books.google.co.id/books?id=A6fRDwAAQBAJ&pg=PA47&dq=variabel+moderating&hl=id&newbks=1&newbks_redir=0&sa=X&ved=2ahUKEwjLksnrvcb-AhWQ4jgGHXxuCUQQ6AF6BAGDEAI#v=onepage&q=variabel+moderating&f=false)
- Epaphra, M., & Massawe, J. (2017). Corruption, governance and tax revenues in Africa. *Business and Economic Horizons*, 13(4), 439–467. <https://www.ceeol.com/search/article-detail?id=665463>
- Fink, A. (2005). *Conducting Research Literature Reviews: From the Internet to Paper* (2nd ed.). California: Sage Publications, Inc. [https://books.google.co.id/books?id=VyROaw-hLJMC&pg=PA86&dq=stratified+sampling&hl=id&newbks=1&newbks\\_redir=0&sa=X&ved=2ahUKEwjXg5HA15L\\_AhW3cmwGHSx7CTsQ6AF6BAGEEAI#v=onepage&q=stratified%20sampling&f=false](https://books.google.co.id/books?id=VyROaw-hLJMC&pg=PA86&dq=stratified+sampling&hl=id&newbks=1&newbks_redir=0&sa=X&ved=2ahUKEwjXg5HA15L_AhW3cmwGHSx7CTsQ6AF6BAGEEAI#v=onepage&q=stratified%20sampling&f=false)
- Gaalya, M. S. (2015). Trade Liberalization and Tax Revenue Performance in Uganda. *Modern Economy*, 06(02), 228–244. <https://doi.org/10.4236/me.2015.62021>
- Gaalya, M. S., Edward, B., & Eria, H. (2017). Trade Openness and Tax Revenue Performance in East African Countries. *Modern Economy*, 8(5), 690–711. <https://doi.org/10.4236/ME.2017.85049>
- Gale, W. G., & Samwick, A. A. (2017). Effects of Income Tax Changes on Economic Growth. In A. J. Auerbach & K. Smetters (Eds.), *The Economics of Tax Policy*. New York: Oxford University Press. [https://books.google.co.id/books?hl=id&lr=&id=ndYWDgAAQBAJ&oi=fnd&pg=PT25&dq=income+tax&ots=ng5bQgqPeS&sig=igRPtrn\\_5DNMBQkXOejmMo\\_DJ\\_c&redir\\_esc=y#v=onepage&q=income%20tax&f=false](https://books.google.co.id/books?hl=id&lr=&id=ndYWDgAAQBAJ&oi=fnd&pg=PT25&dq=income+tax&ots=ng5bQgqPeS&sig=igRPtrn_5DNMBQkXOejmMo_DJ_c&redir_esc=y#v=onepage&q=income%20tax&f=false)



- Ghozali, I. (2016). *Aplikasi Analisis Multivariete Dengan Program IBM SPSS 23*. Semarang: Badan Penerbit Universitas Diponegoro.
- Gnangnon, S. K. (2017). Multilateral Trade Liberalization and Government Revenue. *Journal of Economic Integration*, 32(3), 586–614. <https://www.jstor.org/stable/44324471>
- Gurdal, T., Aydin, M., & Inal, V. (2021). The relationship between tax revenue, government expenditure, and economic growth in G7 countries: new evidence from time and frequency domain approaches. *Economic Change and Restructuring*, 54(2), 305–337. <https://doi.org/10.1007/S10644-020-09280-X/FIGURES/9>
- Hamdan, S., & Rana, F. (2021). Determinants of Tax Revenue in Emerging Countries. *PalArch's Journal of Archaeology of Egypt/Egyptology*, 18(13), 98–106.
- Hetland, S. T., & Sabaté, O. (2021). Income Taxes and Redistribution in the Early Twentieth Century. *Lund Papers in Economic History*, 224. <https://portal.research.lu.se/en/publications/income-taxes-and-redistribution-in-the-early-twentieth-century>
- Hoynes, H. W., & Patel, A. J. (2018). Effective Policy for Reducing Poverty and Inequality? *Journal of Human Resources*, 53(4), 859–890. <https://doi.org/10.3368/JHR.53.4.1115.7494R1>
- Huang, Q., Liu, G., He, J., Jiang, F., & Huang, Y. (2017). The Middle-Income Trap and The Manufacturing Transformation of The People's Republic of China (PRC): Asian Experience and The PRC's Industrial Policy Orientation. *ADB Wo*, 752.
- Ismanto, H., & Pebruary, S. (2021). *Aplikasi SPSS dan eviews dalam analisis data penelitian*. Sleman: Deepublish. <https://books.google.co.id/books?id=hvU1EAAAQBAJ>
- Jaya, I. M. L. M. (2020). *Metode Penelitian Kuantitatif dan Kualitatif: Teori, Penerapan, dan Riset Nyata*. Yogyakarta: Anak Hebat Indonesia.
- Karagöz, K. (2013). Determinants of Tax Revenue: Does Sectorial Composition Matter? *Journal of Finance, Accounting and Management*, 4(July), 2013.
- Kasim, F. (2008). Uji Hipotesis. In *Metodologi Penelitian Biomedis*. Bandung: Danamartha Sejahtera Utama.
- Kusumingtyas, E., Sugiyanto, Subagyo, E., Adinugroho, W. C., Jacob, J., Berry, Y., Nuraini, A., Sudjono, & Syah, S. (2022). *Konsep dan Praktik Ekonometrika Menggunakan Eviews* (M. Surur, Ed.). Lamongan: Academia Publication. [https://books.google.co.id/books?id=dBp1EAAAQBAJ&pg=PA87&dq=data+panel+tidak+perlu+dilakukan+uji+asumsi+normalitas&hl=id&newbks=1&newbks\\_redir=0&sa=X&ved=2ahUKEwjy4dizzdj-AhXH7zgGHcvbAOQQ6AF6BAGFEAI#v=onepage&q=data%20panel%20tidak%20perlu%20dilakukan%20uji%20asumsi%20normalitas&f=false](https://books.google.co.id/books?id=dBp1EAAAQBAJ&pg=PA87&dq=data+panel+tidak+perlu+dilakukan+uji+asumsi+normalitas&hl=id&newbks=1&newbks_redir=0&sa=X&ved=2ahUKEwjy4dizzdj-AhXH7zgGHcvbAOQQ6AF6BAGFEAI#v=onepage&q=data%20panel%20tidak%20perlu%20dilakukan%20uji%20asumsi%20normalitas&f=false)
- Lopez, C. P. (2021). *Econometric Models with Panel Data: Applications with STATA*. USA: Lulu Press, Inc. [https://books.google.com/books/about/ECONOMETRIC\\_MODELS\\_WITH\\_PANEL\\_DATA\\_APPLI.html?hl=id&id=BcYoEAAAQBAJ](https://books.google.com/books/about/ECONOMETRIC_MODELS_WITH_PANEL_DATA_APPLI.html?hl=id&id=BcYoEAAAQBAJ)
- Mawejje, J., & Munyambonera, E. F. (2016). Tax Revenue Effects of Sectoral Growth and Public Expenditure in Uganda. *South African Journal of Economics*, 84(4), 538–554. <https://doi.org/10.1111/SAJE.12127>
- Minh Ha, N., Tan Minh, P., & Binh, Q. M. Q. (2022). The determinants of tax revenue: A study of Southeast Asia. *Cogent Economics and Finance*, 10(1). <https://doi.org/10.1080/23322039.2022.2026660>
- Mital, A., Desai, A., Subramanian, A., & Mital, A. (2014). The Significance of Manufacturing. In *Product Development* (pp. 3–19). Elsevier. <https://doi.org/10.1016/B978-0-12-799945-6.00001-6>



- Mohammed, F., & Sanusi, S. (2020). Quality of governance and tax revenue generation in West Africa: a political process theory perspective / Fatimoh Mohammed and Soliha Sanusi. *Management & Accounting Review (MAR)*, 19(1), 213–232. <https://mar.uitm.edu.my/>
- Mukhid, Abd. (2021). *Metodologi Penelitian: Pendekatan Kuantitatif* (S. R. Wahyuningrum, Ed.). Surabaya: CV Jakad Media Publishing.
- OECD. (2022). *Tax Policy Reforms in Low- and Middle-Income Countries Policy Brief*.
- Okeyo, H. B. (2022, March). *The Role of The Manufacturing Sector in Economic Diversification, Jobs Creation and Industrialization of Kenya: Opportunities and Challenges in Fostering Export-led Industrialization*. Nairbi: Ministry of Industrialization, Trade and Enterprise Development.
- Piancastelli, M., & Thirlwall, A. P. (2021). The Determinants of Tax Revenue and Tax Effort in Developed and Developing Countries: Theory and New Evidence 1996-2015. *Nova Economia*, 30(3), 871–892. <https://doi.org/10.1590/0103-6351/5788>
- Purnomo, A. K. (2019). *Pengolahan Riset Ekonomi Jadi Mudah Dengan IBM SPSS*. Surabaya: Jakad Publishing. [https://books.google.co.id/books?id=TdzYDwAAQBAJ&pg=PA92&dq=p+value+satu+arah+dibagi+2&hl=id&newbks=1&newbks\\_redir=0&sa=X&ved=2ahUKEwil-PK5zrWAAxUI7jgGHUMWACsQ6AF6BAgGEAI#v=onepage&q=p%20value%20satu%20arah%20dibagi%20&f=false](https://books.google.co.id/books?id=TdzYDwAAQBAJ&pg=PA92&dq=p+value+satu+arah+dibagi+2&hl=id&newbks=1&newbks_redir=0&sa=X&ved=2ahUKEwil-PK5zrWAAxUI7jgGHUMWACsQ6AF6BAgGEAI#v=onepage&q=p%20value%20satu%20arah%20dibagi%20&f=false)
- Purnomo, R. A. (2017). *Analisis Statistik Ekonomi dan Bisnis Dengan SPSS*. Ponorogo: CV Wade Group.
- Salman, R. T., Sanni, P., Olaniyi, T. A., & Yahaya, K. A. (2022). Governance Transparency of Tax Revenue Performance in West Africa. *Business Ethics and Leadership*, 6(1), 14–24. [https://doi.org/10.21272/bel.6\(1\).14-24.2022](https://doi.org/10.21272/bel.6(1).14-24.2022)
- Schmalbeck, R. L., Zelenak, L., & Lawsky, S. B. (2018). *Federal Income Taxation* (5th ed.). New York: Wolters Kluwer. [https://books.google.co.id/books?hl=id&lr=&id=nAFpDwAAQBAJ&oi=fnd&pg=PT17&dq=income+tax&ots=PY3SLb8mIr&sig=OQQRBSnEH6KfPpKPNk8\\_3PZ1UEw&redir\\_esc=y#v=onepage&q=income%20tax&f=false](https://books.google.co.id/books?hl=id&lr=&id=nAFpDwAAQBAJ&oi=fnd&pg=PT17&dq=income+tax&ots=PY3SLb8mIr&sig=OQQRBSnEH6KfPpKPNk8_3PZ1UEw&redir_esc=y#v=onepage&q=income%20tax&f=false)
- Sharma, P., & Singh, J. (2015). Determinants of tax-revenue in India: A principal component analysis approach. *International Journal of Economics and Business Research*, 10(1), 18–29. <https://doi.org/10.1504/IJEBR.2015.070268>
- Sihombing, P. R. (2021). *Corat Coret Catatan Statistisi Pemula* (Issue January). Bengkulu: Yayasan Sahabat Alam Rafflesia.
- Sihombing, P. R. (2022). *Aplikasi Stata Untuk Statistisi Pemula*. Depok: Gemala.
- Su, D., & Yao, Y. (2016). ADBI Working Paper Series Manufacturing as the Key Engine of Economic Growth for Middle-Income Economies Asian Development Bank Institute. *ADBI Working Paper Series*, 573. <http://www.adb.org/publications/manufacturing-key-engine-economic-growth->
- Suyono. (2018). *Analisis Regresi untuk Penelitian* (1st ed.). Yogyakarta: Deepublish. [https://books.google.co.id/books?id=3v1RDwAAQBAJ&pg=PA143&dq=model+regresi+ridge&hl=id&newbks=1&newbks\\_redir=0&sa=X&ved=2ahUKEwjKrfOd0tj-AhVF2DgGHTvmCg4Q6AF6BAgDEAI#v=onepage&q=model%20regresi%20ridge&f=false](https://books.google.co.id/books?id=3v1RDwAAQBAJ&pg=PA143&dq=model+regresi+ridge&hl=id&newbks=1&newbks_redir=0&sa=X&ved=2ahUKEwjKrfOd0tj-AhVF2DgGHTvmCg4Q6AF6BAgDEAI#v=onepage&q=model%20regresi%20ridge&f=false)
- Syadullah, M. (2015). Governance and Tax Revenue in Asean Countries. *Journal of Social and Development Sciences*, 6(2), 76–88. <https://doi.org/10.22610/JSDS.V6I2.845>
- Takumah, W., & Iyke, B. N. (2017). The links between economic growth and tax revenue in Ghana: An empirical investigation. *International Journal of Sustainable Economy*, 9(1), 34–55. <https://doi.org/10.1504/IJSE.2017.080856>



- Terefe, K. D., & Teera, J. (2018). Determinants of tax revenue in East African countries: An application of multivariate panel data cointegration analysis. *Journal of Economics and International Finance*, 10(11), 134–155. <https://doi.org/10.5897/JEIF2018.0924>
- Tsaurai, K. (2021). Determinants of Tax Revenue in Upper Middle-Income Group of Countries. *Journal of Accounting and Management*, 11(2), 148–160.
- Tujo, D. B. (2021). Tax revenue Determinants and Tax Efforts in Ethiopia from 2000 – 2019-ARDL Approach. *International Journal of Public Administration and Management Research*, 7(2), 1–18. <https://doi.org/10.36758/IJPAMR>
- Wicaksono, G., Priyambodo, V. K., Sukma, P., Parju, Nurchayati, Ridhawati, R., Hanani, T., Rizki, N., Fauzaan, R., Lestari, B. A. H., & Prasidya, T. C. I. T. (2023). *Akuntansi Perusahaan Manufaktur*. Padang: PT Global Eksekutif Teknologi. [https://books.google.co.id/books?id=c3atEAAQBAJ&pg=PA49&dq=manufaktur+adalah&hl=id&newbks=1&newbks\\_redir=0&sa=X&ved=2ahUKEwimgamG7er-AhWl-jgGHcifBcMQ6AF6BAgGEAI#v=onepage&q=manufaktur%20adalah&f=false](https://books.google.co.id/books?id=c3atEAAQBAJ&pg=PA49&dq=manufaktur+adalah&hl=id&newbks=1&newbks_redir=0&sa=X&ved=2ahUKEwimgamG7er-AhWl-jgGHcifBcMQ6AF6BAgGEAI#v=onepage&q=manufaktur%20adalah&f=false)
- World Bank. (2023). *World Development Indicators*. <https://databank.worldbank.org/source/world-development-indicators#>
- Yahaya, K. A., & Bakare, T. O. (2018). Effect of Petroleum Profit Tax and Companies Income Tax on Economic Growth in Nigeria. *Journal of Public Administration, Finance and Law*, 13, 100–120. <https://www.ceeol.com/search/article-detail?id=744259>
- Yaru, M. A., & Raji, A. S. (2022). Corruption, Governance and Tax Revenue Performance in Sub-Saharan Africa. *African Journal of Economic Review*, 10(1), 234–253. <https://www.ajol.info/index.php/ajer/article/view/219361>
- Zidar, O. (2019). Tax Cuts for Whom? Heterogeneous Effects of Income Tax Changes on Growth and Employment. *Journal of Political Economy*, 127(3), 1437–1472. <https://doi.org/10.1086/701424>