

## Tax Revenue, FDI, and Agricultural Sector: A Dynamic Interaction with Regulatory Quality as the Moderation

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**ABSTRACT:** This study aims to analyze the effect of Foreign Direct Investment (FDI), and share of agriculture on Tax Revenue in ASEAN countries with Regulatory Quality as the moderating variable. The research method used is descriptive quantitative with panel data regression analysis and the econometric model is estimated by Panel Corrected Standard Errors (PCSE). The result indicates that FDI, share of agriculture, regulatory-quality-moderated FDI and share of agriculture simultaneously have a significant effect on Tax Revenue. Partially, the result shows that FDI has a positive and significant effect on Tax Revenue. Regulatory Quality and Share of Agriculture have no effect on Tax Revenue. Furthermore, Regulatory Quality weakens the positive relationship of FDI and Tax Revenue, whereas Regulatory Quality strengthens the negative relationship between Share of Agriculture and Tax Revenue. Based on the generated results, there will be a necessity for government to create a comprehensive economic and fiscal policy to increase tax revenue and to strengthen the tax base in the ASEAN countries.

**Keywords:** ASEAN, Foreign Direct Investment, Regulatory Quality, Share of Agriculture, Tax Revenue



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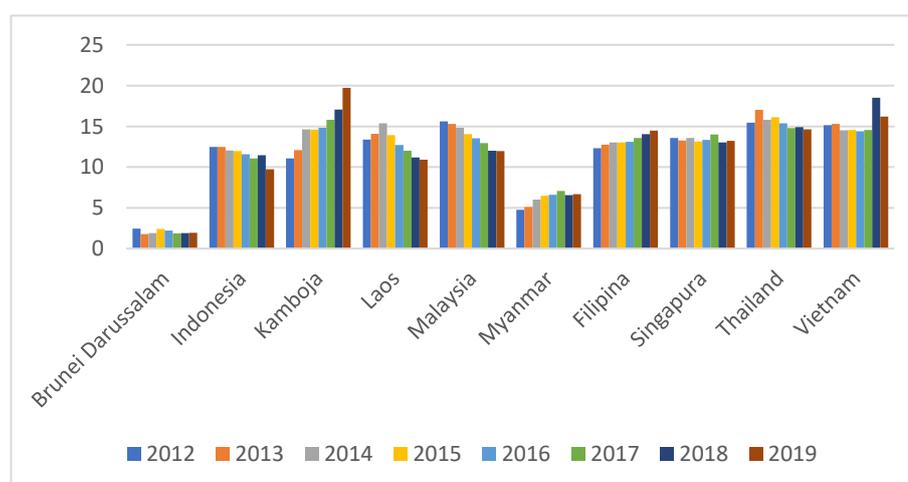
## INTRODUCTION

The government of a country is inherently overwhelmed with the responsibilities to enhance the welfare and the living standards of its citizens, to protect lives and property, to provide social welfare services, to maintain law and order, and to promote sustainable economic development. In order to fulfil these functions, the government requires revenue from various sources. Tax revenue is a significant source to fund government expenditures. [Saad \(2014\)](#) described taxation as a social and economic reform instrument that penetrates every economic aspect, including individuals, companies, citizens, and foreigners. [Worlu & Nkoro \(2012\)](#) stated that the growth and the development of a country depends heavily on the ability of the government to generate sufficient tax revenue in order to fund the availability of infrastructures. The government's responsibility to promote economic growth and the well-being of its people continues to increase over time, especially in developing countries. This is due to a significant population growth and rapid technological advancements. While taxation serves as a crucial tool in fiscal policies aimed at

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generating resources for economic growth within a nation, there exists a notable disparity between the ever-growing requirements of government spending and the insufficient amount of tax revenue collected to support developmental initiatives. (David A, 2000; Ngotho & Kerongo, 2014; OECD, 2008; Saibu & Olatunbosun, 2013). Tax revenue pertains to compulsory payments remitted to the central government for public objectives, excluding specific items such as fines, penalties, and certain social security contributions (World Bank, 2023). Conversely, refunds and corrections resulting from tax collection errors are considered negative revenue. The magnitude of tax revenue can be measured in terms of currency or as a percentage of a country's total GDP. The percentage of tax revenue in relation to GDP indicates the proportion of a nation's economic output obtained by the government through taxation. There are three common theories underlying the study on tax revenue, namely the cost-of-service theory, the benefit theory, and the socio-political theory of taxation (Ojong et al., 2016). The cost-of-service theory explained that the costs incurred by the government in providing specific services to the public should be shared by the individuals serving as the ultimate beneficiaries (Jhingan, 2004). The goal of the state is to provide services to its people, but the application of this theory creates limitations on government services. This theory was subsequently expanded into the benefit theory of taxation, which proposes that individuals should contribute taxes in proportion to the benefits they derive. However, a research by Ahuja (2012) argued that quantifying the precise number of benefits received by individuals is challenging, resulting in the declining application of this theory. The last theory, the socio-political theory, states that the primary purpose of a taxation system is for social and political objectives (Ojong et al., 2016). This theory emphasizes that the tax system is designed not for personal interests but for the benefit of society as a whole. Furthermore, tax revenue functions as a measure of the government's authority over a nation's economic resources (OECD, 2023). Tax revenue is a pillar supporting the economic development of a country (MYLES, 2000). This is further supported by numerous previous studies from which it is claimed that tax revenue has a positive impact on a country's economic growth, such as the research conducted by Ofoegbu et al., (2016), Onakoya et al., (2017). Kusi (1998) suggests that many countries tend to rely on taxes to fulfil their financial necessity. This is because tax revenue offers not only a stable but also predictable income stream to fulfil the objectives of the state needs and the economic development (Pfister, 2009).



Source: [World Bank, 2023](#) (Data processed by author)

Picture 1. Tax Revenue Data in ASEAN Member Countries 2012-2019

The ASEAN economy has demonstrated commendable progress and expansion in the last thirty years and so has in the majority of Asian nations (Nguyen & Darsono, 2022). Simultaneously, low-income economies like Cambodia, Laos, Myanmar, and Vietnam have exhibited higher growth rates compared to their neighboring nations. It is then indicated that the degree of economic is convergent within the ASEAN region (ASEAN, 2021). However, this may not be fully reflected in the percentage of tax revenue to GDP (hereinafter referred to as tax revenue). In recent years, tax revenue in ASEAN countries are fluctuating. The International Monetary Fund (IMF) states that the development of a country can be optimally and sustainably implemented if the tax ratio reaches a minimum of 15%. There is a visible tax revenue gap from one country to another one where some ASEAN nations such as Malaysia, Thailand, and Cambodia have reached the 15% tax ratio in certain years, albeit with fluctuations. Nevertheless, other ASEAN members have not experienced this phenomenon yet. A country like Brunei Darussalam even demonstrates a significant gap compared to the other countries, where their tax revenue is mostly under 5%. To address the hindrance to the economic development capacity of a country, tax revenue generation should be maximized. Quantitative research on taxation becomes crucial as to determine what factors may affect the research and identify approaches for enhancing tax revenue and funding public expenditures. Additionally, tax revenue plays a valuable role in assessing whether or not a nation has effectively gathered an adequate amount of taxes based on its capacity for tax collection.

ASEAN members comprise of mostly developing countries rely on agricultural sector. Agricultural sector is still viewed as a prime sector that contributes enormously towards GDP. People in developing countries work as a farmer to provide their daily necessities. Being a reliable and impactful sector makes it important to examine whether or not this particular sector is also impactful on country's tax revenue. The agricultural sector distinguishes itself from the industrial and service sectors based on its unique roles, which include providing food, fulfilling social needs, contributing to national economic growth, and serving environmental purposes. (BESUSPARIENÉ, 2018). The functions of the agricultural sector, which encompass economic, social, and environmental dimensions, are intricately linked to the concept of sustainable development. Agricultural activities can be differentiated based on their singularity determined by seasonal work, government regulations, work involving biological assets, and dependence on environmental conditions (Girdžiūtė & & Slavickienė, 2011). The agricultural sector is an economic domain encompassing activities such as crop cultivation, animal production, agricultural engineering, manufacturing of agricultural machinery, fertilizers supply, and other related supports aimed at supporting agricultural practices (Jean Vasile et al., 2019). The role of the agricultural sector itself is significant in meeting society's needs and implementing government policies. In developing nations, the agricultural sector is typically characterized by the predominance of numerous small-scale farmers who engage in self-consumption, selling their produce in informal markets, or practicing the barter systems for the exchange of goods. According to Matsuyama (1992), there is a positive link between the agricultural sector and industrial progress. The high income from the agricultural sector leads to the domestic demand for industrial products and increases domestic savings needed for industrialization. Furthermore, Chang et al., (2006) introduced the theory of revenue-generating effect, which means that higher productivity in the agricultural sector will lead to a higher tax base. This will result in an increase in tax revenue derived from the agricultural sector. It is also stated that an increase of output in the agricultural sector will

lead to an increased public spending on infrastructure. Therefore, it is expected that there will be a positive relationship between the agricultural sector and the tax revenue.

Conversely, in recent years, foreign investment has gained popularity as a means of financing for countries, including those within the ASEAN region. Presently, foreign direct investment (FDI) stands as a crucial external funding source for developing nations ([Camara, 2022](#)). [United Nations Conference on Trade and Development \(UNCTAD\) \(2019\)](#) stated that in recent years, developing countries in Asia have experienced a continuous increase in foreign investment inflows, accounting for 54% of total FDI. Therefore, it is also important to point out whether or not this typical financing creates a stronger foundation for a country to generate more tax revenue. Theoretically, the Harrod-Domar's growth model proposes that economic growth can be attained by investing savings in a linear or parallel manner ([DRĂGOI, 2019](#)). In this theory, economic growth is expected to progress in line with the increase in linear or parallel savings. This theory was further developed by Solow, who defined economic development (Y) as a function of capital (K) and labor (L) ([Solow, 1956](#)). Based on this theory, it can be stated that the accumulation of capital plays a crucial role in achieving economic growth. This capital can be augmented through investments, while factors such as depreciation and population growth can lead to its decline. Krugman as cited in [Sarwedi, \(2002\)](#) defines Foreign Direct Investment (FDI) as an international capital flow in which a company from a home country establishes a company in the host country for investment purposes and/or solely expands an existing company in the host country. [Dunning \(2001\)](#) proposes the OLI Paradigm theory further, stating that there are three conditions a company should cater to channel its capital into a country in the form of Foreign Direct Investment: O (ownership advantage), refers to the form of various business processes, intangible assets, know-how, and so on; L (location advantage), includes advantages gained from the host country such as accessibility, market size, labor wages, and macroeconomic stability; and I (internalization advantage), is exclusive advantages that can only be obtained by a company if it prefers direct investment to other investment forms. On the other hand, the theory of economic regulation ([Posner, 1974](#); [Becker, 1983](#); [Stigler, 1971](#)) implies that changes in economic regulations related to market entry, exit, products, prices, quantity, or market structure can impact investment choices ([Weber Waller, 2006](#)). FDI increases the amount of investment in the private sector of a country. Hence, the increased capital serve as broader economic from which positive relationship between FDI and tax revenue can be made possible.

It is important to note that the amount of tax revenue of a country cannot be separated from how the government forms a regulation. According to ([Teorell & Rothstein, 2008](#)), Governance is a comprehensive concept that encompasses the exercise of authority, both formally and informally, in the management of a nation's resources. The quality of governance is assessed based on the influence of this exercise of power on the citizens' quality of life. [Kaufmann et al. \(2010\)](#) then introduced the World Governance Indicator (WGI) as a tool to measure the quality of governance in a country. WGI consists of six indicators, one of which is Regulatory Quality that refers to both the perception of the government's competence in creating and implementing effective policies and legislation that facilitate and encourage the growth of the private sector. Therefore, Regulatory Quality is expected to have a positive influence on a country's tax revenue.

A number of studies have been conducted to examine the determinants of tax revenue in a country. A previous study by [Camara \(2022\)](#) states that FDI has a positive and significant influence on the size of tax revenue of a country. This finding is similar to the research done by [Amoh & Adom \(2017\)](#) who emphasizes that tax revenue in the economy sector can be generated by promoting greater formalization of economic activities and enhancing competitiveness. These findings are in line with the results presented by [Andrejovská & Puliková \(2018\)](#) and [Nath et al., \(2022\)](#). Contrary to these findings, [Gaspareniene et al., \(2022\)](#) conducted a study suggesting that FDI has a negative and significant impact on tax revenue. On the other hand, a research by [Pratomo \(2020\)](#) examines the influence of FDI on tax revenue in developing countries and finds that FDI inflows have no impact on tax revenue in a country. Furthermore, [Ayenew \(2016\)](#) conducted a study on the influence of the agricultural sector on tax revenue and concluded that the agricultural sector had no impact on tax revenue. This finding are in contrast with the research conducted by [Profeta & Scabrosetti \(2010\)](#) where the agricultural sector has a negative impact on tax revenue in Latin American countries. On the other hand, both sets of findings differ from the results of a study by [Kitessa & Jewaria \(2018\)](#) who state that there is a positive and significant relationship between the agricultural sector and tax revenue in a country. Moreover, governance is also a determining factor in taxpayer compliance, which ultimately affects the increase or decrease in tax revenue. [Syadullah \(2015\)](#) states that the quality of regulations in a country's governance has a positive and significant influence on tax revenue in that country. However, on the opposite spectrum, a research by [Yaru & Raji \(2022\)](#) claimed that the regulatory quality has no influence on the size of tax revenue in a country.

Due to the diverse study findings regarding the impact of FDI and the agricultural sector on tax revenue in a country, this research aims to develop and complement the previous studies by adding a moderating variable, namely the Regulatory Quality, used to better understand the direction and/or strength of the relationship between the independent and dependent variables ([Saunders et al., 2016](#)). The objective of this research is to analyze the simultaneous and partial effects of FDI and the agricultural sector on tax revenue while using the Regulatory Quality as a moderator. By selecting a sample of countries that share similarities in geographical location and development level, it is expected that this study yields more reliable and significant results. In addition, there is currently a lack of research conducted using the aforementioned combination of variables to investigate tax revenue in ASEAN countries. Therefore, this study is expected to contribute to the theory enrichment upon this subject and to provide additional references and perspectives for readers regarding the significance of these factors' influence on tax revenue in a country. Thus, the hypotheses are as follows:

H1: There is a positive influence of FDI on Tax Revenue.

H2: There is a positive influence of the agricultural sector on Tax Revenue.

H3: There is a positive influence of the Regulatory Quality on Tax Revenue.

H4: The Regulatory Quality strengthens the relationship between FDI and Tax Revenue.

H5: The Regulatory Quality strengthens the relationship between the agricultural sector and Tax Revenue.

## METHOD

### Research Type

The research is conducted using a quantitative descriptive method. According to [Arikunto \(2006\)](#), quantitative descriptive research is a method aimed at objectively describing a situation using numerical data, starting from data collection, interpretation of data, and presentation of data and its results. The research data is displayed in the form of panel data with a sample comprising 10 ASEAN member countries, namely Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Myanmar, Laos, Brunei Darussalam, and Cambodia, covering the period from 2012 to 2019. The data used in this study are secondary data sourced from the World Bank.

### Variable Identification

This study uses Tax Revenue as the dependent variable, Foreign Direct Investment (FDI) and Share of Agriculture (agricultural sector) as the independent variables, with Regulatory Quality as the moderator. Additionally, this research also includes Share of Service (service sector), urbanization, and the Control of Corruption as control variables.

**Table 1.** Research Variables

Variable	Variable Definition	Scale	Units
<b>Tax Revenue</b>	Ratio of central tax revenue to country's GDP	Ratio	Percentage (%)
<b>Foreign Direct Investment (FDI)</b>	The ratio of the amount of FDI inflow to the country's GDP	Ratio	Percentage (%)
<b>Share of Agriculture as % of GDP</b>	The ratio of income received from the agricultural sector to the country's GDP	Ratio	Percentage (%)
<b>Regulatory Quality</b>	Index with a scale of -2.5 to 2.5 to assess the Government's ability to create regulations that promote private sector development	Ratio	Without units
<b>Share of Services as % of GDP</b>	The ratio of income received from the service sector to the country's GDP	Ratio	Percentage (%)
<b>Urbanization</b>	People living in urban areas which are defined as % of the total population	Ratio	Percentage (%)
<b>Control of Corruption</b>	Index with a scale of -2.5 to 2.5 to capture perceptions about the occurrence of corruption phenomena in a country	Ratio	Without units

## Data Analysis

### 1. Model Specification

This research will be tested using three general types of regression models and one alternative regression model. The regression models include the Common Effect Model (CEM) or commonly known as Pooled Least Squares (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM), along with one alternative model, namely Panel Corrected Standard Error (PCSE). In this study, three types of tests are employed to ascertain the most suitable model. They are the Chow Test, the Lagrange Multiplier Test, and the Hausman Test. The Chow Test helps determine the preferred model between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). The Lagrange Multiplier Test (LM) examines whether panel data analysis is better suited to the Random Effect Model (REM) or the Common Effect Model (CEM). On the other hand, the Hausman test is a statistical evaluation used to select the most appropriate model between the Fixed Effect Model (FEM) and the Random Effect Model (REM) for testing panel data.

### 2. Gauss-Markov Test (Classical Assumption Test)

In the Gauss-Markov test, or commonly known as the Classical Assumption Test, there are four types of tests that will be conducted, namely the normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test.

The purpose of the normality test is to assess whether or not the residual values follow a normal distribution. [Sujarweni \(2015\)](#), states that this test aims to investigate if both the dependent and independent variables in the regression model exhibit a normal distribution. Meanwhile, the multicollinearity test is performed to determine if there is a correlation among the independent variables utilized in the analysis. As mentioned by [Sujarweni \(2015\)](#), the presence of multicollinearity suggests a perfect or definite linear relationship among one or more independent variables in the model. The heteroscedasticity test, on the other hand, aims to evaluate if there is unequal variance among the residuals across different observations in the regression model ([Ghozali, 2011](#)). Lastly, the autocorrelation test is conducted to explore whether there is a correlation between disturbance errors in period  $t$  and disturbance errors in period  $t-1$  in the linear regression model. The purpose of this test is to ensure that there are no carryover errors from previous years that may affect the data analysis in the current year.

### 3. Regression Model

The author utilized the assistance of STATA 17 software in conducting the data analysis. The panel data regression models used in this study are as follows:

$$tr = \beta_0 + \beta_1 fdi_{it} + \beta_2 agri_{it} + \beta_3 reg_{it} + \beta_4 fdireg_{it} + \beta_5 agrireg_{it} + \beta_6 serv + \beta_7 urban + \beta_8 corr + \epsilon_{it}$$

note:

tr	= Ratio of central tax revenue to GDP
$\beta_0$	= Constant parameter (Intercept)
$\beta_1$ to $\beta_5$	= Regression coefficients
fdi	= Foreign direct investment

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agri	= Share of GDP from the agricultural sector
reg	= Regulatory Quality
fdireg	= Foreign direct investment moderated by regulatory quality
agrireg	= Share of GDP from the agricultural sector moderated by regulatory quality
serv	= Share of GDP from the service sector
urban	= Urban population
corr	= Corruption Perception Index in a country
$\varepsilon$	= <i>Error terms</i>

## RESULT AND DISCUSSION

### A. Descriptive Analysis

**Table 2.** Descriptive Analysis

Variabel	Mean	Std. Dev.	Min	Max
tr	11.91136	4.362644	1.781	19.73206
fdi	6.517866	6.75909	-1.320522	32.16984
agri	12.97847	8.915805	0.0302096	33.5196
reg	-0.3174903	0.972046	-2.348573	1.149036
fdireg	-5.972091	16.00721	-71.87849	5.031719
agrireg	-1.948509	8.772189	-25.82188	19.26933
serv	47.61523	10.53963	28.28036	70.7942
urban	51.94339	23.62413	21.037	100
corr	-0.5108795	0.7410775	-1.672809	0.8577785

Source: Data processed using STATA 17, 2023

The above test results indicate the descriptive analysis findings. On average, the Tax Revenue (as a percentage) in ASEAN member countries is 11.91136%. The highest percentage of Tax Revenue is recorded in Cambodia in 2019, with a value of 19.73206%, while the lowest percentage is shown by Brunei Darussalam in 2013, at 1.781%. The FDI variable has an average of 6.517866%. The highest FDI value, which is 32.16984% of the total GDP, is owned by Singapore in 2019, while the lowest FDI value, -1.320522%, is recorded by Brunei Darussalam in 2016. On average, the agriculture sector variable falls at 12.97847%. The highest percentage of revenue from the agriculture sector is from Cambodia in 2012, at 33.5196% of the total GDP. On the other hand, the lowest percentage is owned by Singapore in 2018, with a share of 0.0302096% of the total GDP. On average, the regulatory quality has a scale of -0.3174903, with the highest scale belonging to Brunei Darussalam in 2013, at 1.149036, meanwhile the lowest scale is -2.348573, is recorded by Singapore in 2014.

## B. Model Selection Test Results

Table 3. Model Selection Test

Test	Test Value	Prob. Values	Conclusion
<i>Chow Test</i>	49.98	0.0000	<i>Fixed Effect Model</i> is better than <i>Common Effect Model / Pooled Least Square</i>
<i>LM BP Test</i>	69.80	0.0000	<i>Random Effect Model</i> is better than <i>Common Effect Model / Pooled Least Square</i>
<i>Hausman Test</i>	23.15	0.0032	<i>Fixed Effect Model</i> is better than <i>Random Effect Model</i>

Source: Data processed using STATA 17, 2023

The model selection tests conducted have determined that the Fixed Effect Model is the most suitable choice for this study. Following the selection of the panel data model, the testing will now proceed to examine the classical assumption tests.

## C. Classical Assumption Tests Results

Tabel 4. Classical Assumption Test

Test	Prob. Values	Conclusion
Uji Normalitas	0.2424	Data is normally distributed
Uji Multikolinearitas	12.83	There are symptoms of multicollinearity
Uji Heteroskedastisitas	0.0028	There are symptoms of heteroscedasticity
Uji Autokorelasi	0.1205	There are no symptoms of autocorrelation

Source: Data processed using STATA 17, 2023

The finding from the classical assumption tests presented in the table 4 is an evidence that the data successfully meet the criteria for normality and lack of autocorrelation. This is supported by the probability values exceeding  $\alpha=0.05$ . However, there is an indication of multicollinearity, as the Variance Inflation Factor (VIF) values surpass 10. Multicollinearity is considered absent when the VIF is below 10. This study uses panel data, which is a combination of cross-section and time series data, and it is a rule of thumb that multicollinearity issues can be ignored (Gujarati, 2003). Gujarati et al., (2012) also stated that classical assumption tests are not always necessary in panel data analysis as they naturally minimize biases that are likely to arise in the analysis results, and to provide more information, variation, as well as degree of freedom. On the other hand, the data indicate evidence of heteroscedasticity as the probability values are not greater than  $\alpha=0.05$ . To

address this issue, the author uses the Panel Corrected Standard Error (PCSE) method (Greene, 2018).

#### D. Hypothesis Test Results

**Table 5. Panel Corrected Standard Error (PCSE) Model Regression Analysis**

Panel-corrected							
tr	Coefficient	Std. err.	z	P> z  (Two-tailed)	P> z  (One-tailed)	[95% conf. interval]	
<b>fdi</b>	0.2455392	0.1287295	1.91	0.056	0.028	-0.006766	0.4978445
<b>fdireg</b>	0.1808459	0.0689645	2.62	0.009	0.0045	0.045678	0.3160137
<b>agri</b>	-0.0031029	0.086385	-0.04	0.971	0.4855	-0.1724145	0.1662086
<b>agrireg</b>	-0.1325244	0.0639509	-2.07	0.038	0.019	-0.2578658	-0.0071829
<b>reg</b>	0.3936803	0.8883719	0.44	0.658	0.329	-1.347497	2.134857
<b>serv</b>	0.3399658	0.0388351	8.75	0.000	0.000	0.2638504	0.4160811
<b>urban</b>	-0.0771614	0.0303262	-2.54	0.011	0.0055	-0.1365997	-0.0177231
<b>corr</b>	-2.617602	1.159781	-2.26	0.024	0.012	-4.890731	-0.3444733
<b>_cons</b>	-2.218772	3.968364	-0.56	0.576	0.288	-9.996622	5.559078

Source: Data processed using STATA 17, 2023

##### 1. Simultaneous Test (F-test)

From the test results, it is known that simultaneously the variables FDI, agricultural sector, Regulatory Quality and the interaction of FDI and the agricultural sector moderated by the Regulatory Quality have a significant influence on Tax Revenue in ASEAN countries. This can be seen from the Prob > chi2 value of 0.0000 (less than the 5 percent alpha level).

##### 2. Partial Test (t-test)

The partial test can be observed from the P>|z| values as seen in the above table. If the P>|z| value is less than the alpha level, then the variable is considered to have a significant influence on Tax Revenue in ASEAN countries. Since the research hypothesis is done in a one-tailed way, thus, the value used is the one in the P>|z| (One-tailed) column. In ASEAN member countries, the variable of Foreign Direct Investment (FDI) has a notable and positive effect on Tax Revenue, while the variable of the agricultural sector does not impact Tax Revenue. However, when Regulatory Quality is introduced as a moderating variable, the FDI variable demonstrates a positive and significant influence on Tax Revenue. Conversely, the agricultural sector variable, when moderated by Regulatory Quality, shows a significant negative impact on Tax Revenue. It is crucial to note that the moderating variable, Regulatory Quality, does not have a direct influence on Tax Revenue in ASEAN member countries.

##### 3. Coefficient of Determination (R<sup>2</sup>)

The coefficient of determination ( $R^2$ ) value is 0.7522 or 75.22 percent. This means that the FDI variable, agricultural sector variable, Regulatory Quality, FDI and agricultural sector variables moderated by the Regulatory Quality, as well as the control variables, collectively account for 75.22 percent of the variation in the dependent variable, which is a Tax Revenue in ASEAN member countries. Other variables not included in the analysis account for the remaining 24.78 percent of the influence. The regression results of the panel data are shown in the following model:

$$Y = -2.218772 + 0.2455392X_1 - 0.0031029X_2 + 0.3936803Z + 0.1808459X_1Z - 0.1325244X_2Z + 0.3399658X_3 - 0.0771614X_4 - 2.617602X_5$$

As described, the constant value of -2.218772 can be interpreted as the Tax Revenue ratio when there are no FDI, agricultural sector, and Regulatory Quality variables. The FDI variable has a coefficient of 0.2455392, with a positive sign indicating a positive relationship between FDI and Tax Revenue in ASEAN member countries. This means that a 1% increase in FDI will result in a 0.2455392% increase in Tax Revenue. Conversely, there exists a negative correlation between the agricultural sector and Tax Revenue. A 1% increase in GDP from the agricultural sector leads to a decrease of 0.0031029% in Tax Revenue. The Regulatory Quality variable has a positive coefficient, indicating that a 1% increase in the variable will result in a 0.3936803% increase in Tax Revenue. The interaction coefficient between FDI and Regulatory Quality is positively estimated at 0.1808459. This suggests that a 1% rise in the interaction between FDI and Regulatory Quality will result in a corresponding increase of 0.1808459% in Tax Revenue. Conversely, the coefficient of the agricultural sector moderated by the Regulatory Quality is negative. This concludes that a 1% increase in the interaction between the agricultural sector and Regulatory Quality will decrease Tax Revenue by 0.1325244%.

### **The Impact of Foreign Direct Investment (FDI) on Tax Revenue of ASEAN Countries**

Prior research has investigated the correlation between FDI and tax revenue. For instance, [Camara \(2022\)](#) found a positive and significant impact of FDI on a country's tax revenue. Similar findings were reported by Ade et al., (2018) dan [Mahmood & Chaudhary \(2013\)](#). The testing and data analysis in this study indicate that FDI has a significant positive effect on tax revenue in ASEAN member countries. This supports the hypothesis developed by the author, leading to the conclusion that the hypothesis is accepted. These findings align with the Harrod-Domar theory, which emphasizes the importance of investment for regional economic growth. Additionally, these findings are consistent with the research by [Camara & Comaniciu \(2014\)](#) but contradict the study conducted by [Gasparyniene et al., \(2022\)](#), which suggested a negative and significant impact of FDI on tax revenue.

In essence, Foreign Direct Investment (FDI) has the potential to boost tax revenue by fostering productivity in the host country. A company receiving FDI inflows will experience an increase in its output, lead to higher profits. [Al-Sadig \(2013\)](#) argued that FDI has a crowd-in effect on private sector investment in the host country. Increased investment levels provide more funding sources that can be utilized for a company's capital in conducting business. [EZE et al., \(2019\)](#) stated that FDI has a positive impact on increasing output in the manufacturing sector. FDI also has a positive

and significant effect on output in the service sector ([Dwivedi & Badge, 2013](#)). An increase in a company's profit will expand its tax base. Assuming the tax rate remains unchanged, an expansion of the tax base will lead to a subsequent rise in tax revenue generated by the country. Furthermore, FDI can contribute to a country's tax revenue by creating new job opportunities ([Zhang & Song, 2001](#)). FDI inflows have a ripple effect on productivity, creating a competitive environment that fosters the establishment of new businesses and the expansion of existing ones. As companies grow in size, they need more employees to run the business smoothly. The need for additional employees generates more job opportunities, which, therefore, leads to an expanded labor force. This, in turn, results in a larger tax base for individual income tax, which boosts a country's tax revenue. Furthermore, Foreign Direct Investment (FDI) affects both the economy of a country and the level of income of its residents, stimulating aggregate demand and driving an increase in consumer spending ([Mahmood & Chaudhary, 2013](#)). As consumer spending rises, the tax base for value-added tax expands accordingly, contributing further to the country's tax revenue.

### The Impact of Agricultural Sector on Tax Revenue of ASEAN Countries

Based on the test results, it can be concluded that the agricultural sector does not influence tax revenue of a country, specifically ASEAN member countries. This finding contradicts the hypothesis developed by the author, with a rejection in the hypothesis. Moreover, the results of this research also contradict the findings of [Kitessa & Jewaria \(2018\)](#) who state that agricultural sector impacts tax revenue of a country positively. On the other hand, the results of this study align with the studies conducted by [Piancastelli \(2001\)](#), [Chaudhry & Munir \(2010\)](#), [Ayenew \(2016\)](#) dan [Ahmad et al., \(2016\)](#). Each sector has different levels of ease when it comes to taxation. One sector may be more easily taxed compared to the others. The agricultural sector is one of the sectors that is challenging to optimize in terms of tax imposition. [Ayenew \(2016\)](#) mentioned that taxing the agricultural sector is not easy, especially in developing countries where agriculture dominates other sectors. According to [Agbeyegbe et al., \(2006\)](#) some countries are hesitant to tax the agricultural sector due to its subsistence nature. Additionally, the informal nature of sectors such as agriculture makes it more time-consuming and labor-intensive to enforce taxation. It is safe to say that the cost is incomparable to the potential benefits. Whereas on the surface taxing informal sectors like agriculture may appear to be a crucial and substantial revenue source to bolster the country's economy, in reality, individuals within this sector earn relatively low income ([F. Schneider, 2005](#); [F. Schneider et al., 2010](#); [F. G. Schneider & Klinglmair, 2004](#)).

The taxation system in the agricultural sector, which commonly relies on self-assessment, leads to insufficient data for government oversight. This makes government unable to fully dig the potential revenue, resulting in potential losses in the agricultural sector. In general, when income increases in a sector, taxable income derived from that sector will go up. This domino effect leads to increased tax revenue for the country as well. This concept forms the basis of the revenue-generating effect theory proposed by [Chang et al. \(2006\)](#). However, due to the self-assessment taxation system where taxpayers self-report and determine the amount they will pay, the government cannot effectively ensure and monitor tax payments from individuals working in the agricultural sector. Furthermore, the self-assessment taxation system allows taxpayers to engage in fraudulent activities such as tax evasion ([Wahyuni, 2011](#)). Consequently, when the contribution in agricultural sector rises, the effect is not accompanied by an increase in the country's tax revenues.

Additionally, the limited knowledge among individuals involved in agriculture regarding taxation contributes to the low tax revenue generated from this sector. [Rahayu, \(2017\)](#) revealed that taxpayers' knowledge of taxation regulations and provisions has a positive and significant impact on their compliance. When taxpayers have a good understanding of the taxation process, they tend to consciously pay and report their taxes to the government because they recognize the benefits derived from taxation ([Andiko et al., 2018](#)). Conversely, a lack of knowledge regarding taxation regulations can lead taxpayers to neglect their obligations.

### **The Impact of Regulatory Quality on Tax Revenue of ASEAN Countries**

Regulatory Quality does not have an influence on Tax Revenue. This is consistent with the research findings of [Phuong \(2015\)](#) and [Yaru & Raji \(2022\)](#). On the other hand, there are contradictory results between the test results and the hypotheses presented in this study. The quality of regulation reflects the perceived capability of the government to establish and execute effective policies and regulations, thereby facilitating and encouraging the development of the private sector. A research conducted by [Asmah et al., \(2020\)](#) implied that good quality regulations can weaken the effect of trade misinvoicing on tax revenue, which, although not significant, has a positive influence on tax revenue in Sub-Saharan African countries. On the contrary, the author's findings contrast with the research done by [Syadullah, \(2015\)](#) which stated that Regulatory Quality has a positive influence on tax revenue. Essentially, good quality regulations in a country can improve the country's economy, which ultimately can have an impact on increasing tax revenue. However, a regulation will take time to reap the desired effects. [Guasch & Hahn \(1999\)](#) stated that the implementation of regulations incurs substantial costs. This is in accordance with the research conducted by [Jalilian et al., \(2007\)](#) in which two types of costs need to be met when the government implements a new regulation. First, the direct administrative costs of the regulatory system are absorbed within the government and become evident in the allocation of budgets for supervisory bodies. Second, the compliance costs of a regulation implemented by the government. No matter how well the government formulates a regulation and/or policy, the regulation will not achieve the desired results if the public ignore the provisions or even seeks loopholes to gain personal benefits. This means that for a regulation to function optimally, optimal government supervision is required.

On the other hand, not all regulations related to taxation will have an impact on tax revenue. The Indonesian government issued "PMK Nomor 59 Tahun 2022 Tentang Perubahan Atas PMK Nomor 231/PMK.03/2019 Tentang Tata Cara Pendaftaran Dan Penghapusan NPWP, Penguatan Dan Pencabutan Penguatan PKP, Serta Pemotongan Dan/Atau Penyetoran, Dan Pelaporan Pajak Bagi Instansi Pemerintah" or Regulation Number 59 of 2022 concerning Amendments to Regulation Number 231/PMK.03/2019 concerning the Registration and Cancellation Procedures for Taxpayer Identification Numbers (NPWP), Confirmation and Revocation of Value Added Taxable Entrepreneurs (PKP), as well as Tax Deductions and/or Deposits, and Tax Reporting for Government Agencies. One of the provisions in this regulation deals with the tax collection treatment for transactions using government village credit cards, making it similar to the treatment for transactions using government central credit cards. This regulation falls within the field of taxation, but it has no relevance to the amount of tax revenue in Indonesia. Another example is the change in the field verification policy, which was initially conducted during the application for the confirmation of Taxable Entrepreneurs but is now done during the application for Taxable

Entrepreneurs account activation, as stated in “PER-04/PJ/2020 Tentang Petunjuk Teknis Pelaksanaan Administrasi Nomor Pokok Wajib Pajak, Sertifikat Elektronik, Dan Pengukuhan Pengusaha Kena Pajak” or PER-04/PJ/2020 concerning the Technical Guidelines for the Administration of Taxpayer Identification Numbers, Electronic Certificates, and Confirmation of Taxable Entrepreneurs. Administrative regulations which aim to facilitate a business process do not target increasing tax revenue as their ultimate goal. Therefore, the need to increase the amount of tax revenue in a country can not be fulfilled.

### **The Influence of the Interaction between Foreign Direct Investment (FDI) and Regulatory Quality on Tax Revenue in ASEAN Member Countries**

The test results show that after moderating process, FDI still has a positive and significant influence on a country's tax revenue. However, prior to the moderation process, the moderating variable actually weakens the influence of FDI on tax revenue. FDI provides various benefits that can increase a country's tax revenue. [Bénassy-Quéré et al., \(2007\)](#) argued that the FDI effect driven by good governance policy formation becomes an important indicator for sustainable and comprehensive economic growth and development. [Amelia & Sukadana \(2019\)](#) stated that there is a strong and positive relationship between the quality of regulations and governance and the value of FDI received by a country. Better regulations that support an investment climate will significantly encourage investors to invest their capital. For example, Singapore offers a policy where the government does not require investors to purchase production factors from local sources or determine the percentage of output for export. In addition, Singapore has a Smart Regulation Committee acting not only as a regulator but also as a facilitator, thus developing business and investment-friendly regulatory regimes. On the other hand, Vietnam, in its Investment Law No. 67/2014/QH13, has developed a regulation that simplifies licensing and business operations for foreign companies. The creation of regulations to facilitate the business and investment climate encourages investors to invest their capital in that country ([Wicaksono, 2021](#)).

However, despite the benefits offered by foreign investment, there is a possibility that these may not be realized under certain conditions. [Gaspariene et al., 2022](#) stated that FDI has the potential to reduce tax revenue due to tax incentives such as tax-free zones, lower corporate tax rates, or other forms of incentives. Each country competes to attract FDI into their country. This is in line with Dunning's OLI Paradigm, where location advantage is a determinant for investors to inject their capital into a country. Government regulations and policies, such as massive and aggressive tax incentives and the phenomenon of transfer pricing, can also reduce a country's tax revenue. The regulations of a country either hinder or facilitate the inflow and outflow of FDI, while market regulations such as price setting can affect the profitability of multinational companies. Likewise, the enforcement of contracts and the presence of a robust legal framework in a country affect both the conduct and profitability of companies operating in the market, and their decision to enter the country in the first place. Research conducted in Ethiopia revealed that FDI has a detrimental effect on tax revenue due to extensive tax incentives ([Jeza et al., 2016](#)). Countries will compete to lower their tax rates to appear more attractive to foreign investors. In line with this, [Pratomo \(2020\)](#) stated that FDI can also have a negative impact on a country's tax revenue if there is a phenomenon of transfer pricing by multinational companies. Globalization and substantial

variations in tax rates among nations provide multinational companies with opportunities to partake in profit shifting activities. As a result, the host country may not receive optimal tax revenue benefits from FDI if the profits of multinational companies are redirected to other countries with lower tax rates or countries referred to as tax havens.

### The Influence of the Interaction between Agricultural Sector and Regulatory Quality on Tax Revenue in ASEAN Member Countries

The agricultural sector variable shows a significant negative influence after being moderated by Regulatory Quality. It can be said that the moderating variable, namely Regulatory Quality, strengthens the negative effect of the agricultural sector on Tax Revenue. Research conducted by [Gaalya et al., \(2017\)](#) suggests that the regulatory quality in ASEAN countries reduces tax revenue both directly and indirectly. Furthermore, [Mohammed & Sanusi \(2020\)](#) obtained consistent research results, stating that the negative influence of Regulatory Quality reflects the weak regulatory structure's nature in revenue mobilization. Taxing the agricultural sector is inherently challenging due to the prevalence of subsistence activities, many of which operate within the informal sector. Febrio Kacaribu, the Head of Fiscal Policy Agency at the Ministry of Finance (BKF Kemenkeu), noted that despite the agricultural sector's substantial contribution to the country's GDP, it makes a minimal contribution to tax revenue ([Pejabat Pengelola Informasi dan Dokumentasi \(PPID\) Kementerian Keuangan, 2021](#)). One of the reasons is the numerous regulations that provide tax incentives to the agricultural sector.

In 2019, the government issued “Peraturan Pemerintah Nomor 78 Tahun 2019 Tentang Fasilitas Pajak Penghasilan Untuk Penanaman Modal Di Bidang-Bidang Usaha Tertentu” or Government Regulation Number 78 of 2019 concerning Income Tax Facilities for Investment in Certain Business Fields. The regulations mention tax incentives in the form of a 30% reduction in net income from tangible fixed assets for parties willing to invest in the agricultural sector. Furthermore, the government provides tax incentives for the agricultural sector and other sectors related to agriculture. Construction services in the Irrigation Land for instance, use Acceleration Program (P3-TGAI) generate a final income tax incentive borne by the government. Not only in Indonesia, but also other ASEAN countries have their own tax incentives for the agricultural sector. The Philippines implemented Undang-Undang 19-2021 Tentang Pembebasan Dari Pajak Penghasilan Bagi Usaha Tani Dan Nelayan Terakreditasi (Accredited Farmers and Fisherfolk Enterprises) registered at Barangay Micro-Business Enterprises (BMBEs) or Republic Act 19-2021 on Income Tax Exemption for Accredited Farmers and Fisherfolk Enterprises Registered at Barangay Micro-Business Enterprises (BMBEs), also known as the Sagip Saka Act ([Alburo, 2022](#)). On the other hand, Vietnam offers various types and layers of tax incentives for the agricultural sector, ranging from tariff percentage reductions to income tax exemptions ([Du & Tai, 2020](#)). The regulations made by these countries are intended to build and develop the existence and sustainability of the agricultural sector, as it is an important sector for a country. However, it cannot be denied that the numerous tax incentives provided will reduce the tax revenue of the country. Tax incentives prevent the government from taxing what are considered taxable and/or from properly reducing what should not be taxed.

## **CONCLUSIONS**

This study aims to determine the effects of Foreign Direct Investment (FDI) and the agricultural sector on tax revenue in ASEAN member countries, using Regulatory Quality as a moderator. The research results indicate that FDI has a significant positive effect on tax revenue in ASEAN member countries. FDI increases tax revenue by contributing to the host country's productivity. Additionally, FDI boosts a country's tax revenue by creating new employment opportunities and increasing consumer spending, thereby expanding the value-added tax-based.

The agricultural sector does not affect tax revenue in ASEAN member countries. The self-assessment taxation system in the agricultural sector makes it difficult to optimize tax collection. Moreover, the limited knowledge of individuals involved in agriculture regarding taxation is a contributing factor to the sector's low tax revenue.

As for Regulatory Quality, it does not have an impact on tax revenue in ASEAN member countries. This is due to a considerable amount of time taken for a regulation to achieve the desired effects, thus government oversight efforts are required. Furthermore, not all tax-related regulations have an impact on a country's tax revenue. Administrative regulations aimed at facilitating business processes do not affect the amount of tax revenue gained in a country as it is not their objective in the first place.

The moderating variable, Regulatory Quality, weakens the influence of FDI on tax revenue as a consequence of the existing government regulations and policies, such as extensive and aggressive tax incentives. Countries compete to lower their tax rates to appear more attractive to foreign investors. Additionally, the phenomenon of transfer pricing done by multinational companies can reduce a country's tax revenue.

Regulatory Quality as a moderating variable strengthens the negative impact of the agricultural sector on tax revenue in ASEAN member countries. This is due to the numerous regulations providing tax incentives for the agricultural sector. The regulations made by these countries aim to build and develop the existence and sustainability of the agricultural sector. However, at the same time, the abundance of tax incentives creates a trade-off by reducing the tax revenue derived from this sector.

In addition to the variables used in this study, it is important to consider other factors that influence tax revenue in ASEAN member countries. Further research may include other variables such as the influence industrial and/or service sectors have on tax revenue to determine which sector has a more significant effect. From the government's perspective as a policy-maker, it is essential to actively highlight the issues related to regulations governing foreign direct investment in their country and to rigorously implement an effective taxation system across various sectors. This, most expectedly, will strengthen tax revenue of a nation in the future.

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