



THE EFFECT OF PER CAPITA INCOME AND THE AGRICULTURAL SECTOR ON GOODS AND SERVICES TAX RECEIPTS WITH ECONOMIC GROWTH AS MODERATION IN BRICS COUNTRIES

Michael Kusuma¹⁾
Politeknik Keuangan Negara STAN

Suparna Wijaya²⁾
Universitas Pembangunan Nasional Veteran Jakarta

Corresponding author: suparnawijaya@upnvj.ac.id

ARTICLE INFORMATION

Submitted
[31 07 2023]

Accepted
[30 09 2023]

KEYWORDS:
Agriculture Sector, Economic Growth, Good and Service Tax, Per Capita Income.

JEL Classification:
H72

ABSTRACT

The purpose of this research is to analyze the effect of per capita income and the agricultural sector on goods and services tax revenues with economic growth as the moderation in the combined economy countries, BRICS (Brazil, Russia, India, China, and South Africa). The variables used in this study are the ratio of goods and services tax revenue, per capita income, the contribution of the agricultural sector, and the percentage of economic growth. The data source comes from the World Bank Data for the period 2010 to 2018. The research method used is quantitative using panel data and multiple linear regression analysis techniques. The Random Effect Model is a model selected based on panel model testing. Simultaneously, all variables have a significant effect on goods and services tax revenues. Partially, per capita income, agricultural sector, and economic growth have a significant negative effect on goods and services tax revenues. This research is expected to provide insight to the governments of the BRICS countries in making policies to optimize goods and services tax revenues through per capita income, the agricultural sector, and economic growth.

1. INTRODUCTION

1.1. Background

The combined economic countries named the BRICS are a group consisting of five developing countries namely Brazil, Russia, India, China, and South Africa. The goal of this group of countries is to increase global influence in the political and economic fields and strengthen the position of each country in the multilateral trading system. Hawksworth (2006) in his book states that the economic conditions in the BRICS combined economy countries (Brazil, Russia, India, China and South Africa) have economic projections that will be larger than the G6 countries (France, Germany, Japan, Italy, the United Kingdom and the United States). This can be realized because economic growth in the combined BRICS economic countries can reach five percent per year. In addition, Goldman Sachs in O'Neill et al (2005) published a research report related to the world economy which stated that Japan and the United States were only two of the six countries that had the largest economies but their position would still be like that. In contrast to other countries, BRICS countries will continue to increase economic growth and become top rankings. This is proven by Bitterhout & Simo-Kengne's research (2020) which states that the condition of the BRICS combined economic countries has become the center of the global economy because the contribution of the BRICS countries is able to have a large impact on the world economy and is predicted to surpass the economies of the combined G7 countries.

Based on data of gross domestic product at constant price using United States dollars in 2018 sourced from World Bank Data (2023) as in table 1, the economic contribution of the combined BRICS economic countries has had a significant impact on the world economy and even exceeds the value of The United States gross domestic product (GDP). The largest economic contribution to the BRICS countries comes from China. China itself is known as a "giant of the world" because they are able to carry out trade strategies to improve the economy by combining exports, institutional innovation, and economic diversification (Sahasrad, 2017). The GDP value in BRICS countries is expected to continue to increase in line with the development of globalization and their strategies for improving the economy.

Table 1. Gross Domestic Product at Constant Price in 2018

Countries	GDP 2018 (United States Dollar)	% GDP of GDP around the world
The World	89.75 trillion dollars	-
United States	20.95 trillion dollars	20.95%
BRICS	23.01 trillion dollars	23.01%
Brazil	1.9 trillion dollars	2.11%
Russian Federation	1.47 trillion dollars	1.63%
India	2.95 trillion dollars	3.28%
China	16.33 trillion dollars	18.19%
South Africa	0.36 trillion dollars	0.4%

Source: World Bank (2023)

In research, Prasetyowati (2022) stated that in financing investment in human resources, and providing public services for citizens and infrastructure to improve the country's economy, a basic instrument is needed to generate income, namely tax revenues. The tax itself is a revenue instrument that has a strategic role in the sustainability of a country's economy, especially if the country experiences an economic crisis (Kusuma & Wijaya, 2023). In addition, taxes have the function of acting as a source of state revenue to run the government. It's just that in collecting tax revenues, there are many challenges and obstacles so that several countries have difficulty in collecting tax revenues. A good and planned administration system and tax collection strategy will certainly increase the country's tax revenues (Trisnayanti & Jati, 2015). Then, in a publication released by the World Bank (2023), it can be seen that the tax ratio in a country whose value is less than 15% of the country's GDP will experience problems in meeting basic needs, so it is necessary to develop a strategy to improve the country's economy. Therefore, it is important for a country to know the factors that can increase tax revenue so that the country is able to optimize tax revenue effectively and efficiently through fiscal policies.

One of the indicators used to measure the performance and capacity of a country in collecting tax revenues is the ratio of taxes to national gross domestic product. In research conducted by Neog & Gaur (2021) it is stated that BRICS countries have a tax ratio that tends to be low compared to developed countries. Apart from that, in assessing the performance and capacity of implementing tax revenue collection, it is not only through the tax ratio but can be more specific, namely through the ratio of taxes on goods and services to national GDP (Godin & Hindriks, 2015). Taxes on goods and services can be described as fixed taxes, namely taxes with a constant rate. One form of taxation on goods and services is VAT. Based on World Bank data (2023), it can be seen that the ratio of tax revenues on goods and services to national GDP in BRICS countries from 2010 to 2018 tends to increase as in graph 1. This shows that the contribution of taxes on goods and services in BRICS countries has a role important in the national economy.

Graph 1. The Ratio of Taxes on Goods and Services in BRICS Countries from 2010 until 2018



Source: World Bank (2023)

The agricultural sector or commonly called agriculture and other primary product sectors are the leading sectors in developing countries, especially the BRICS. As Putra's research (2020) states that most people in developing countries still depend on the agricultural sector as a source of food supply. One of the BRICS countries that has excellence in the agricultural sector is Brazil. Brazil has high-quality agricultural natural resources such as coffee, soybean, or forest wood plantations. The agricultural sector is also a potential sector in eradicating poverty and being able to prosper the population (World Bank, 2023). This is because the agricultural sector is able to increase the income of the poor people compared to other economic sectors by more than three times. In fact, based on data from the World Bank (2023), the agricultural sector contributes almost 20% to the national GDP. Then, in a publication published by the Economic Research Service (2017), it is known that middle-income countries are able to contribute around 40% of the total production of the global agricultural sector and the growth of the agricultural sector can reach more than 3% per year. Based on the overall positive impact that has occurred on the economies of developing countries, the fact is that the results of research and research between the agricultural sector and tax revenues are inversely proportional to the agricultural sector on the national economy. This is evidenced by research conducted by Kusuma & Wijaya (2023) and Rodriguez (2018) which states that the agricultural sector has a significant and negative influence on tax revenues. More specifically, Godin & Hindriks (2015) stated that the agricultural sector has a significant and negative influence on tax revenues on goods and services. However, the result of this study are different from Chaudhry & Farzana (2010) which states that the agricultural sector has no influence on taxes.

Besides the agricultural sector, there are other factors that can affect tax revenues, namely income per capita. The strong economy of the BRICS countries is influenced by one factor in common, namely the population. Based on World Bank data (2023), the proportion of population in BRICS countries in 2018 reached 41.52% of the total population in the world, where the proportion of GDP in BRICS countries reached 23.01%. This proves that the high GDP of BRICS countries is influenced by the population in that country so that per capita income in BRICS countries is relatively small (Phiri, 2018). In fact, an increase in per capita income will increase a person's economic ability to spend on goods and/or services. As it is known that the delivery of goods and/or services will be subject to tax on goods and services. So that an increase in per capita income will increase tax revenues. This is supported by research by Bikas & Andruskaite (2013), Gupta (2007) and Eltony (2001) which states that the greater the value of per capita income, the greater the tax revenue. However, this is different from research by Godin & Hindriks (2015) which states that per capita income has no effect on tax revenue on goods and services. Apart from that, research by Fadhilah &

Wijaya (2023) and Keen & Lockwood (2010) also states that per capita income has a significant negative effect on tax revenue.

Based on the description above and differences in existing research results, researcher want to analyze the effect of per capita income and the contribution of the agricultural sector to tax revenues on goods and services in BRICS countries (Brazil, Russia, India, China and South Africa) for the period 2010 to 2018. Then, the researcher also added a variable of economic growth as a moderation. With increasing economic growth, it is hoped that it will be able to increase tax revenues on goods and services, as research by Puspitha & Supadmi (2018) which states that economic growth has a significant and positive effect on tax revenues on goods and services. It is hoped that the results of this research can help the governments of BRICS joint economic countries in taking policies to optimize goods and services tax revenues through per capita income, the agricultural sector, and economic growth.

2. THEORETICAL FRAMEWORK

2.1. Theory of Taxation on Goods and Services

Organization for Economic Cooperation and Development or OECD (2023) explains that taxes on goods and services are taxes imposed at the time of production, extraction, sale, transfer, rental or delivery of goods, and delivery of services, or on the use of goods or permission to use goods or to carry out activities. Tax on goods and services consists of value added tax and sales tax. The scope of tax on goods and services is multi-stage cumulative tax, general sales tax imposed on the level of manufacture or production, wholesale or retail, value added tax, excise, tax imposed on the import and export of goods, tax levied in connection with the use goods, taxes on permits to use goods, or carry out certain activities and taxes on the extraction, processing or production of minerals and other products. Assessment of tax performance indicators on goods and services is measured as a percentage of both GDP and total taxes. Furthermore, the indicator of the percentage of tax revenue on goods and services to GDP is able to measure the government's performance in controlling the country's resources.

In his book, Smith (2023) states that there are four principles in implementing tax imposition, namely the principle of convenience, the principle of certainty, the principle of proportionality, and the principle of efficiency. The principle of convenience is the principle in which taxes are imposed when the taxpayer is most comfortable paying, for example, when the delivery of goods and/or services is being carried out. The goal is for taxpayers to pay taxes voluntarily. Then, the principle of certainty is the principle in which taxation must be clear and certain in terms of the method of payment, the time of payment and the amount of tax to be paid. The aim is that the procedures and procedures for imposing taxes are clearer and do not cause problems.

Furthermore, the principle of proportionality is a principle whereby the amount of tax paid must be in accordance with the type of goods and/or services provided. It is intended that taxpayers do not feel objection to carrying out their tax obligations. And finally, the principle of efficiency in which the tax system should be efficient for optimal results of tax revenues.

Tax revenues for goods and services from year to year always experience dynamic changes because the country's economic activities always adjust to the goals of the country and global economic conditions (Eurostat, 2023). This causes changes in several economic aspects such as sales transactions of goods and services, the number of factories in operation, the number of workers, and so on. In addition, tax revenues can also be affected by changes in tax regulations and tax implementation mechanisms in the country. As stated by Prasetyowati (2022) in his research that tax revenue can be influenced by the use of information technology in the tax service mechanism.

2.2. Theory of Agricultural Sector Contribution

Globalization causes people's interest in working in the agricultural sector decreasing. People with low incomes work more in the agricultural sector compared to people with high incomes. This is supported by a statement from the Economic Research Service (2017) which states that middle-income countries are able to contribute around 40% of the total production of the global agricultural sector and the growth of the agricultural sector can reach more than 3% per year. Brazil and India are examples of BRICS countries that carry out national agricultural research to increase the capacity and productivity of their agricultural sector. However, a lack of knowledge of technology hampers the productivity of the agricultural sector. Agricultural land is an informal sector and is still controlled by residents, making it difficult for this sector to be taxed (Chelliah et al, 1975). This is supported by research by Kusuma & Wijaya (2023) which states that the agricultural sector has a negative and significant effect on tax revenues. Alabede (2018) stated that the difficulty of taxation in the agricultural sector in Sub-Saharan Africa is because the agricultural sector is not used for commercial purposes but only to fulfill personal needs. Then, Castro & Camarillo (2014) and Gaalya (2015) stated that middle-income countries have difficulty taxing the agricultural sector because the production scale tends to be small so the number of residents who carry out tax obligations is still small. In addition, because the agricultural sector is a sector that has high risk, preferential rates apply (Rodriguez, 2018).

2.3. Theory of Per Capita Income

Per capita income is one of the goals of a country in an effort to develop the country. Each country plans to always increase the per capita income of the people of that country. One indicator in measuring the

success of development in a country is income per capita. The higher the value of per capita income, the lower the poverty rate in the region (Azizah et al, 2018). This causes countries to try to increase their per capita income. Todaro (2015) states that a multidimensional process needs to be carried out in order to obtain an overall picture of economic development in order to eradicate inequality, poverty, and unemployment. Economic development itself can be measured by increasing income per resident in the long term (Sabyan et al, 2022). In addition, in measuring the economy of a country with other countries, it can be through income per capita. Higher income will increase per capita income so that it will ultimately affect the increase in taxation as research by Bikas & Andrusikaite (2013) which states that per capita income has a significantly positive effect on tax revenue. Furthermore, Salawali (2021) states that per capita income is obtained by dividing the value of the gross domestic product (GDP) by the total population of the country.

2.4. Theory of Economic Growth

Sukirno in Nizar (2013) states that economic growth is the development of production factors in the economy in a region which causes an increase or decrease in the production of goods and/or services as well as an increase or decrease in people's welfare. Then, Sjafrizal (2016) also stated that economic growth is the process of increasing the production of goods and/or services in the economy of a region which provides an overview of the region's economic development in one year compared to the previous year. So it can be concluded that economic growth is a reflection of the economic conditions of a region based on the impact of the policies implemented. One indicator that can be used as a benchmark for economic growth performance is Gross Domestic Product (GDP). High and continuing economic growth is a good thing for increasing taxes. As stated by Peacock and Wiseman in Pratama & Widyastuti (2022), even though tax rates do not change, economic growth will still increase tax revenues. Apart from that, Muttaqin & Halim (2019) and Puspitha & Supadmi (2018) stated that economic growth has a significant positive effect on tax revenue, which means that when economic growth increases, tax revenue also increases.

2.5. Results of Literature Review

Table 2 shows the results of a literature review on the effect of independent variables on tax revenues for goods and services.

No	Research Title	Name of Researcher and Year of Research	Research variable	Research Result
1	<i>Tax determinants revisited. An unbalanced data panel analysis.</i>	Castaneda Rodriguez, V. M. (2018).	Independent Variable Agriculture Sector and Per Capita Income Dependent Variable Tax Revenue of Goods and Services	1. The agricultural sector has a significant negative effect on taxes 2. Per capita income has a significant negative effect on taxes
2	Pengaruh Sektor Agrikultur Dan Nilai Kurs Terhadap Penerimaan Pajak Dengan Variabel Moderasi Pengendalian Korupsi Di Negara BRICS.	Kusuma, M., & Wijaya, S. (2023).	Independent Variable Agriculture Sector Dependent Variable Tax revenue	The agricultural sector has a significant negative effect on taxes
3	<i>A review of critical issues on tax design and tax administration in a global economy and developing countries.</i>	Godin, M., & Hindriks, J. (2015).	Independent Variable Agriculture Sector and Per Capita Income Dependent Variable Tax Revenue of Goods and Services	1. The agricultural sector has a significant negative effect on taxes 2. Per capita income has no effect on taxes
4	<i>Determinants of low tax revenue in Pakistan.</i>	Chaudhry, Imran Sharif, and Farzana Munir. (2010).	Independent Variable Agriculture Sector and Per Capita Income Dependent Variable Tax revenue	1. The agricultural sector has no effect on taxes 2. Per capita income has a significant negative effect on taxes
5	<i>Determinants of tax revenue efforts in developing countries.</i>	Gupta, A. S. (2007).	Independent Variable Agriculture Sector and Per Capita Income Dependent Variable Tax revenue	1. The agricultural sector has no effect on taxes 2. Per capita income has a significant positive effect on taxes
6	<i>Factors affecting value added tax revenue</i>	Bikas, E., & Andruskaite, E. (2013).	Independent Variable Per Capita Growth and Economic Growth Dependent Variable VAT Revenue	1. Per capita income has a significant positive effect on taxes 2. Economic growth has a significant positive effect on taxes
7	<i>The determinants of tax effort in Arab countries</i>	Eltony, N. (2001).	Independent Variable Per Capita Growth and the Agricultural Sector Dependent Variable Income Tax Revenue	1. Per capita income has a significant positive effect on taxes 2. The agricultural sector has no effect on taxes
8	<i>The value added tax: Its causes and consequences. Journal of Development Economics</i>	Keen, M., & Lockwood, B. (2010).	Independent Variable Agriculture Sector and Per Capita Income Dependent Variable Tax revenue	1. The agricultural sector has a significant negative effect on taxes 2. Per capita income has a significant negative effect on taxes
9	Pengaruh Pendapatan Perkapita Dan Ukuran Ekonomi Terhadap Penerimaan Perpajakan Dengan Variabel	Fadhilah, M. H., & Wijaya, S. (2023).	Independent Variable Income per capita Dependent Variable Tax revenue	Per capita income has a significant effect on taxes

Pengendalian Korupsi Sebagai Moderasi Pada Negara BRICS				
10	<i>Impact of VAT rate changes on VAT revenue in Ghana</i>	Antwi, S., Ebenezer, A. M. F. E., & Zhao, X. (2012).	Independent Variable Economic growth Dependent Variable VAT Revenue	Economic growth has a significant positive effect on taxes
11	Pengaruh pertumbuhan ekonomi dan inflasi pada penerimaan PPN (studi kasus pada kantor pelayanan pajak se-Bali)	Puspitha, P. V., & Supadmi, N. L. (2018).	Independent Variable Economic growth Dependent Variable VAT Revenue	Economic growth has a significant positive effect on taxes
12	<i>The effect of economic growth and inflation on tax revenue: Analysis on areas with dominant economic activities in agriculture, plantation, and fisheries sectors.</i>	Muttaqin, F., & Halim, R. E. (2020)	Independent Variable Economic growth Dependent Variable VAT Revenue	Economic growth has a significant effect on taxes

The hypotheses in this research are:

- H₁ : The contribution of the agricultural sector has a negative effect on tax revenues on goods and services
- H₂ : Income per capita has a positive effect on tax revenues on goods and services
- H₃ : Economic growth has a positive effect on tax revenues on goods and services
- H₄ : Economic growth strengthens the effect of the agricultural sector on tax revenues on goods and services
- H₅ : Economic growth strengthens the effect of Income per capita on tax revenues on goods and services

3. METHODS

This study uses secondary data sourced from the World Bank Data website for BRICS countries for the period 2010 to 2018. The variables used in this study are the percentage contribution of the agricultural sector to GDP, GDP per capita, the percentage of economic growth and the ratio of tax revenues on goods and services to GDP. Table 3 explains the details of the selected independent and dependent variables.

Table 3. Details of Variables in Research

Dependent Variable	Unit	Variable Definition	Data Transformation
Tax Revenue of Goods and Services (GST)	Percent	Tax Revenue on Goods and Services (% of GDP)	-
Independent Variable	Unit	Variable Definition	Data Transformation
Per Capita Income (PCI)	USD Currency	GDP per Population	Natural Logarithm
Agricultural Sector Contribution (AGR)	Percent	Agricultural Contribution (% GDP)	-
Economic Growth (GDP)	Percent	Annual GDP Growth	-

The method used in this research is a quantitative method with multiple linear regression analysis techniques using panel data. Baltagi (2005) states that there are three models that will be selected in technical multiple linear regression analysis using panel data, including the common model, random effect model and fixed effect model. To find out information regarding the relationship between the independent variable and the dependent variable, an appropriate model is determined based on the model selection test. Table 4 describes how the model selector test was performed.

Table 4. Model Selector

Panel Model Test	H ₀	H ₁
Chow Test	Common Model is better than Fixed Effect Model	Fixed Effect Model is better than Common Model
LM BP Test	Common Model is better than Random Effect Model	Random Effect Model is better than Common Model
Hausman Test	Random Effect Model is better than Fixed Effect Model	Fixed Effect Model is better than Random Effect Model

After obtaining the appropriate model for research, the next step is the classical assumption test. Gujarati (2006) states that the aim of carrying out the classical assumption test is to find out that the model that has been selected can describe the influence of each independent variable and is able to predict the dependent variable based on the selected independent variables. Table 5 explains the Classical Assumption Test.

Table 5. Classical Assumption Test.

Classical Assumption Test.	H ₀	H ₁
Heteroscedasticity Test	Homoscedastic variance	data Heteroscedastic variance
Normality Test	Normal distributed data	Data is not normally distributed
Autocorrelation Test	Non-Autocorrelation Model	Autocorrelation Model

Apart from that, the final classical assumption test in the panel data regression model is the absence of high multicollinearity between each independent variable. The results of this test can be seen through a Variant Inflation Factor (VIF) value of less than 10. If

the result is less than 10, then the independent variable passes the multicollinearity test.

Walpole (2012) states that the step taken after determining the best model and passing the classical assumption test is to carry out a model goodness-of-fit test. Table 6 explains how to test the goodness of the model. After all tests have been carried out, interpretation of the results of the multiple linear regression equation can be carried out.

Table 6. The Goodness of the Model Test

The Goodness of the Model Test	H ₀	H ₁	Tolak H ₀
Coefficient of Determination Test	R square > 0,5		
T Test or Partial Test	Independent variables have no effect	Independent variable has an effect	Prob. Value < 0.05
F Test or Simultaneous Test	All variables have no effect or the Model Does Not Fit	At least one variable has a significant effect or Model Fit	Prob. Value < 0.05

4. RESULT AND DISCUSSION

4.1. Result

Before discussing the results of the regression, first do a descriptive analysis of the variables used. The aim is to understand the characteristics of each variable selected in the research. Table 7 and 8 show descriptive analysis of each variable over the period 2010 to 2018.

Table 7. Descriptive Analysis of Each Variable

Descriptive	GST	AGRI	PCI	GDP
Mean	6.30823	7.029241	7753.811	4.041791
Standard Deviation	1.895032	5.337699	4088.299	3.398953
Minimum	2.865215	2.088751	1357.564	-3.545763
Maximum	9.893392	17.19197	15974.64	10.63587

Table 8. Descriptive Analysis of Variable Averages in each BRICS countries

Descriptive	GST	AGRI	PCI	GDP
Brazil	6.161879	4.410013	10879.89	1.468607
China	6.17385	8.461535	7365.083	7.869935
India	3.725552	16.67456	1622.088	6.943713
Russian Federation	6.148557	3.381786	12278.09	2.018868
South Africa	9.331312	2.218317	6623.905	1.907834

Based on tables 7 and 8, the average value of the tax ratio on goods and services in BRICS countries is 6.3% with the highest value being South Africa in 2015 at 9.89% and the lowest being India in 2010 at 2.86%. The country that has a tax ratio on goods and services above the average is South Africa, while below the average is Brazil, China, India and Russia. Then, the average value of the agricultural sector's contribution to GDP in BRICS countries is 7.02% with the highest value being India in 2011 at 17.19% and the lowest being South Africa in 2015 at 2.08%. Countries that have a contribution value from the agricultural sector to GDP above the average are China and India, while below the average are Brazil, Russia, and South Africa. Furthermore, the average per capita income in BRICS

countries is 7,753 US dollars with the highest per capita income being Russia in 2013 at 15,974 US dollars and the lowest being India in 2010 at 1,357 US dollars. Countries that have per capita income above the average are Brazil and Russia, while below the average are China, India, and South Africa. Finally, the average value of economic growth in the BRICS countries was 4.04% with the highest value being China in 2010 at 10.63% and the lowest being Brazil in 2015 at -3.54%. Countries that have above-average economic growth are China and India, while below-average are Brazil, Russia, and South Africa.

As explained in the research method, in the panel data regression model, variables must not have high multicollinearity. This can be seen by the Variant Inflation Factor (VIF) value being less than 10. Table 9 explains that all variables have high multicollinearity. However, this problem can be ignored because the research uses panel data, namely combining time series and cross-section data so that the problem of high multicollinearity does not technically exist as per the rule of thumb (Gujarati, 2006).

Table 9. Multicollinearity Test of Independent Variables

Variabel	VIF
PCIllog	14.55
AGRI	31.58
GDP	2527.66

Table 10. Panel Data Model Selector

Panel Model Test	Prob. Value	Result
Chow Test	0.0162	Fixed Effect Model is better than Common Model
LM BP Test	1.0000	Common Model is better than Random Effect Model
Hausman Test	0.0714	Random Effect Model is better than Fixed Effect Model

Based on Table 10, the model chosen in this research is the Random Effect Model. This model is considered the most suitable because it has a significantly greater number of independent variables than other models and the R-squared is the largest 0.9895. After analyzing the model as shown in table 10, it is continued with the classical assumption test. As explained in the research method, the tests carried out included the heteroscedasticity test, normality test, and autocorrelation test. Table 11 shows the results of the classic assumption test.

Table 11. Result of Classical Assumption Test.

Classical Assumption Test.	Prob. Value	Result
Heteroscedasticity Test	0.0734	Homoscedastic data variance
Normality Test	0.8177	Normal distributed data

Autocorrelation Test	0.0007	Autocorrelation Model
-----------------------------	--------	-----------------------

Based on table 11, the data variants are normally distributed and homoscedastic so they pass the heteroscedasticity and normality tests. However, the data variance has autocorrelation problems. As the opinion of Nachrowi & Mahyus in Ekananda (2016) states that in a regression model, the autocorrelation test has only one value. If one model has several autocorrelation test values such as panel data, then the test is no longer valid and has no meaning. So the autocorrelation problem can be ignored. Next, table 12 shows the results of the model that has been selected based on the research method.

Table 12. Hypothesis Testing

Variable	Coefficient	Std. Error	Prob.
C	46.81742	4.727974	0.000
PCllog	-4.017808	0.4995799	0.000
AGRI	-0.8955865	0.1032288	0.000
GDP	-4.873231	1.450306	0.001
PCllogGDP	0.5102259	0.1449299	0.000
AGRIGDP	0.0797636	0.0278899	0.004
Prob(F-statistic)		0.0000	
Between R-Squared		0.9895	

As in the results in table 12, it can be seen that the coefficient of determination is 0.9895, which means that all independent variables are able to explain the dependent variable by 98.95% and the remaining 1.05% is influenced by other independent variables outside the model. The results of the F test explain that all independent variables simultaneously have a significant effect on tax revenues for goods and services as can be seen from the F value $< \alpha = 0.05$. These results also indicate that the modeling has been appropriate.

Based on the results of the T test or partial test, the results obtained are that per capita income, the contribution of the agricultural sector and economic growth have a significantly negative effect on the tax ratio on goods and services as the probability result is $< \alpha = 0.05$. Furthermore, during the period 2010 to 2018, the interaction between per capita income and the contribution of the agricultural sector to economic growth on the ratio of taxes on goods and services had a significant effect. Where it can be seen that the significant value of the interaction between PCllogGDP and AgriGDP on GST is $0.000 < \alpha = 0.05$. Therefore, the regression equation is formed as below:

$$GST = 46.81742 + (-4.017808) * PCllog + (-0.8955865 * Agri) + (-4.873231 * GDP) + 0.5102259 * PCllogGDP + 0.0797636 * AgriGDP$$

4.2. Discussion

The contribution of the agricultural sector to tax revenues on goods and services has a significantly negative effect with a coefficient of -0.8955865, which means that every 1% increase in agriculture will reduce the ratio of taxes on goods and services by 0.89% assuming other independent variables are constant. These results are supported by research by

Kusuma & Wijaya (2023), Rodríguez (2018), Godin & Hindriks (2015) which states that the contribution of the agricultural sector to the ratio of tax revenues on goods and services has a significant negative effect. The reason is that the sector that experiences difficulties in being taxed is the agricultural sector compared to the service or industrial sectors. In developing countries, especially BRICS countries, farmers who work in the agricultural sector are still subsistence in nature where the yields from this sector are only able to meet the basic needs of farmers or their families so that their income is low and reduces the purchasing power of farmers for goods and services. (Kusuma & Wijaya, 2023). In addition, Agbeyegbe et al (2006) also stated that the low knowledge of farmers about tax obligations also made tax revenue not optimal. This condition is exacerbated by the weak system of tax oversight of the agricultural sector, such as in South Africa, causing tax revenues on goods and services to be suboptimal (Godin & Hindriks, 2015). Then, preferential tax treatment such as a 0% VAT rate is also applied to agricultural goods (Rodríguez, 2018). It is this condition that causes the contribution of the agricultural sector to have a significantly negative effect on the ratio of taxes on goods and services.

Per capita income has a significant negative effect on tax revenues on goods and services with a coefficient of -4.017808, which means that every 1% increase in per capita income will reduce the ratio of taxes on goods and services by 4.01%. This is inconsistent with the theoretical basis and research of Bikas & Andrusikaite (2013) and Gupta (2007). Based on World Bank data (2023), India and China are countries that have the highest proportion of population among other BRICS countries, while the per capita income of the two countries is below the average of other BRICS countries. This shows that the majority of the population in the combined BRICS countries are still classified as low-income as research by Fadhilah & Wijaya (2023) which states that the majority of the population in BRICS countries are still poor. People with low incomes can only afford to buy basic goods to meet their daily needs, where these basic goods are subject to a 0% VAT tax rate as research by Rodríguez (2018) which states that several developing countries apply preferential tax treatment such as 0% VAT on consumer goods. tree. It is this condition that causes per capita income to have a significantly negative effect on the ratio of taxes on goods and services.

Economic growth has a significantly negative effect on tax revenues on goods and services with a coefficient of -4.873231, which means that every 1% increase in economic growth will reduce the tax ratio on goods and services by 4.87%. This is contrary to the research of Muttaqin & Halim (2019), Puspitha & Supadmi (2018) and Bikas & Andrusikaite (2013). Based on World Bank data (2023), the proportion of export value to national GDP in BRICS countries in 2018 ranged from 14.6% to 30.8%, which means that export activities contributed greatly to GDP in BRICS countries. In fact, export activities are activities that

are subject to preferential rates such as VAT and tax on exports (export duties) of 0% (Rodríguez, 2018). This is what causes increased economic growth in the BRICS countries to be unable to increase tax revenues on goods and services.

The coefficient of the agricultural sector contribution after being moderated by economic growth changed from -0.89 to 0.79. Then, the coefficient of per capita income after being moderated by economic growth changed from -4.01 to 0.51. This means that the economic growth variable is able to strengthen the contribution of the agricultural sector and per capita income to tax revenues on goods and services and has a significant effect. As stated by Muttaqin & Halim (2019), Puspitha & Supadmi (2018) and Bikas & Andruskaite (2013) which state that economic growth has a significantly positive effect on tax revenues on goods and services. This condition shows that with positive economic growth, the governments of BRICS countries are able to optimize these conditions to improve the economy of the agricultural sector by increasing the use of food technology such as tractors in agricultural management and increasing the added value of agricultural products in the form of flour or other value-added products. The utilization of food technology and agricultural products with added value is related to the delivery of goods and services that can be subject to VAT so that it can increase taxes on goods and services. Apart from that, economic growth can also increase per capita income as per research by Hasbi et al (2019). So when per capita income rises, people tend not only to spend on basic necessities but also on other necessities such as cellphones, clothes, furniture, and so on, where these necessities are subject to taxes on goods and services such as VAT.

5. CONCLUSION

The purpose of this research is to analyze how the effect of income per capita and the contribution of the agricultural sector to tax revenues on goods and services in the BRICS countries with economic growth as a moderating variable. The results of the study show that per capita income and the agricultural sector simultaneously have a significant effect on tax revenues on goods and services. Then, partially, income per capita and the contribution of the agricultural sector have a significant negative effect on tax revenues on goods and services. However, after being moderated by economic growth, per capita income and the contribution of the agricultural sector can have a significantly positive effect on tax revenues on goods and services. Based on this research, BRICS country governments need to focus fiscal policy by paying attention to economic growth factors. This is because economic growth is able to strengthen per capita income and the agricultural sector so it has a significant positive effect on taxes. With good economic growth, it will certainly move society to be more advanced and more modern in managing agriculture and spending on necessities of life, such as

switching from the subsistence production stage to the industrial production stage and spending on goods and services outside of basic needs. So this can cause tax revenues on goods and services to increase. In addition, public investment in sector modernization, the inclusion of a minimum tax base, and cadastral updates can also boost the productivity of the agricultural sector and improve tax control. In subsequent research, other potential variables can be added to influence tax revenues on goods and services such as inflation, trade balance, and so on. The modeling used can also use other panel models such as common models and fixed effect models.

REFERENCES

- Agbeyegbe, T., Stotsky, J., & WoldeMariam, A. (2006). Trade liberalization, exchange rate changes, and tax revenue in Sub-Saharan Africa. *Journal of Asian Economics*, 17(2), 261–284. <https://doi.org/10.1016/j.asieco.2005.09.003>
- Alabede, J. O. (2018). Economic Freedom and Tax Revenue Performance in Sub-Saharan Afrika. *Journal of Financial Reporting and Accounting*, 14(1), 1–20. <https://doi.org/https://doi.org/10.1108/JFRA-04-2017-0024>
- Antwi, S., Ebenezer, A. M. F. E., & Zhao, X. (2012). Impact of VAT rate changes on VAT revenue in Ghana. *International Journal of Social Science Tomorrow*, 10(1), 1-10.
- Azizah, E. W., Sudarti, S., & Kusuma, H. (2018). Pengaruh pendidikan, pendapatan perkapita dan jumlah penduduk terhadap kemiskinan di Provinsi Jawa Timur. *Jurnal Ilmu Ekonomi JIE*, 2(1), 167-180.
- Baltagi, B. H. (2005). *Econometric Analysis of Panel Data (Third)*. John Wiley & Sons Ltd.
- Bikas, E., & Andruskaite, E. (2013). Factors affecting value added tax revenue. *European Scientific Journal*, 9(19).
- Bitterhout, S., & Simo-Kengne, B. D. (2020). The effect of corruption on economic growth in the BRICS countries. A panel data analysis. <http://www.bbc.com>.
- Castañeda Rodriguez, V. M. (2018). Tax determinants revisited. An unbalanced data panel analysis. *Journal of Applied Economics*, 21(1), 1-24. <https://doi.org/10.1080/15140326.2018.1526867>
- 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)
- Chaudhry, Imran Sharif, and Farzana Munir. (2010). "Determinants of low tax revenue in Pakistan." *Pakistan Journal of Social Sciences* 30.2 (2010): 439-452.
- Chelliah, R. J., Baas, H. J., & Kelly, M. R. (1975). *Tax Ratios and Tax Effort in Developing Countries, 1969-71*. Staff Papers - International Monetary

- Fund, 22(1), 187. <https://doi.org/10.2307/3866592>
- Economic Research Service. (2017). Low-income countries had the highest rate of agricultural growth, but middle-income countries had the highest rate of productivity growth. US Department of Agriculture. <https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=85381>
- Ekananda, M. (2016). Analisis Ekonometrika Data Panel Bagi Penelitian Ekonomi Bisnis Dan Sosial. *Language*, 8(436p), 26cm.
- Eltony, N. (2001). The determinants of tax effort in Arab countries. Arab Planning Institute.
- Eurostat. (2023). Tax revenue statistics. Statistics Explained. https://ec.europa.eu/eurostat/statisticsexplained/index.php?title=Tax_revenue_statistics#General_overview
- Fadhilah, M. H., & Wijaya, S. (2023). Pengaruh Pendapatan Perkapita Dan Ukuran Ekonomi Terhadap Penerimaan Perpajakan Dengan Variabel Pengendalian Korupsi Sebagai Moderasi Pada Negara BRICS. *Journal of Law, Administration, and Social Science*, 3(2), 122-132. <https://doi.org/10.54957/jolas.v3i2.476>
- 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>
- Godin, M., & Hindriks, J. (2015). A Review of critical issues on tax design and tax administration in a global economy and developing countries. CRED-UNamur, Working Paper, 7.
- Gujarati, Damodar. (2006). *Dasar-dasar ekonometrika*. Jakarta: Erlangga.
- Gupta, A. S. (2007). Determinants of tax revenue efforts in developing countries.
- Hasbi, A. R., Dahri, A., & Salju, S. (2019). Pengaruh Pertumbuhan Ekonomi Dan Upah Minimum Terhadap Pendapatan Perkapita Di Kabupaten Luwu Timur. *Equilibrium: Jurnal Ilmiah Ekonomi, Manajemen dan Akuntansi*, 8(1). <http://dx.doi.org/10.35906/je001.v8i1.332>
- Hawksworth, J. (2006). *The world in 2050*. PriceWaterHouseCoopers.
- Keen, M., & Lockwood, B. (2010). The value added tax: Its causes and consequences. *Journal of Development Economics*, 92(2), 138-151. <https://doi.org/10.1016/j.jdeveco.2009.01.012>
- Kusuma, M., & Wijaya, S. (2023). Pengaruh Sektor Agrikultur Dan Nilai Kurs Terhadap Penerimaan Pajak Dengan Variabel Moderasi Pengendalian Korupsi Di Negara BRICS. *Jurnalku*, 3(3), 280-295. <https://doi.org/10.54957/jurnalku.v3i3.475>
- Muttaqin, F., & Halim, R. E. (2020, April). The effect of economic growth and inflation on tax revenue: Analysis on areas with dominant economic activities in agriculture, plantation, and fisheries sectors. In 3rd Asia Pacific International Conference of Management and Business Science (AICMBS 2019) (pp. 27-33). Atlantis Press. <https://doi.org/10.2991/aebmr.k.200410.005>
- Neog, Y., & Gaur, A. K. (2021). Shadow economy, corruption, and tax performance: A study of BRICS. *Journal of Public Affairs*, 21(2), e2174. <https://doi.org/10.1002/pa.2174>
- Nizar, C., Hamzah, A., & Syahnur, S. (2013). Investasi dan Tenaga Kerja Ekonomi Serta Hubungannya terhadap Tingkat Kemiskinan di Indonesia. *Jurnal Ilmu Ekonomi*, 1(1), 2-3.
- OECD. (2023). *Tax Revenue*. OECD. <https://data.oecd.org/tax/tax-on-goods-and-services.htm#>
- O'Neill, J., Wilson, D., Purushothaman, R., & Stupnytska, A. (2005). Global economics paper no: 134. How solid are the BRICs.
- Phiri, A. (2018). Robust analysis of convergence in per capita GDP in BRICS economies ROBUST ANALYSIS OF CONVERGENCE IN PER CAPITA GDP IN BRICS. Munich Personal RePEc Archive.
- Prasetyowati, H., & Panjawa, J. L. (2022). Teknologi Dan Distribusi Pajak Mendukung Kualitas Pembangunan Manusia. *Transekonomika: Akuntansi, Bisnis Dan Keuangan*, 2(2), 23-36. <https://doi.org/10.55047/transekonomika.v2i2.113>
- Pratama, R. A., & Widyastuti, S. (2022). Pengaruh Penerimaan Pajak dan Tingkat Inflasi Terhadap Pertumbuhan Ekonomi di Indonesia. *Veteran Economics, Management & Accounting*, 1(1), 104-120.
- Puspitha, P. V., & Supadmi, N. L. (2018). Pengaruh pertumbuhan ekonomi dan inflasi pada penerimaan PPN (studi kasus pada kantor pelayanan pajak se-Bali). *E-Jurnal Akuntansi*, 22(2), 1530-1556.
- Putra, R. S. (2020). Analisis Produktivitas Sektor Pertanian Di Negara Asia Tenggara Tahun 1970-2016: Pendekatan Dea Malmquist Index (Doctoral dissertation, Universitas Airlangga).
- Sabyan, M., Mainita, & Widyanti, R. (2022). PENGARUH PENDAPATAN PERKAPITA DAN INVESTASI PMDN TERHADAP PENERIMAAN PAJAK BUMI DAN BANGUNAN KOTA JAMBI. *JURNAL DEVELOPMENT*, 10(1), 22-63. <https://doi.org/10.53978/jd.v10i1.192>
- Sahasrad, H. (2017). Dinamika China, ASEAN dan Indonesia. *Konfrontasi: Jurnal Kultural, Ekonomi dan Perubahan Sosial*, 4(1), 17-28.
- Salawali, W. A. (2021). Pengaruh Pendapatan Perkapita Terhadap Penerimaan Pajak Penghasilan Di Kabupaten Banggai Periode Tahun 2015-2019. *JURNAL ILMIAH PRODUKTIF*, 9(2), 30-36. <https://doi.org/10.56072/jip.v9i2.276>
- Sjafrizal. (2016). *Perencanaan Pembangunan Daerah Dalam Era Otonomi (1st ed.)*. Jakarta: Rajawali Pers.
- Smith, A. (2023). An Inquiry into the Nature and Causes of the Wealth of Nations. BoD-Books on Demand.
- Todaro, M. P., Smith, S. C. (2015). *Economic Development*. United Kingdom: Pearson.

- Trisnayanti, I. A. I., & Jati, I. K. (2015). Pengaruh Self Assessment System, Pemeriksaan Pajak, Dan Penagihan Pajak Pada Penerimaan Pajak Pertambahan Nilai (PPN). E-Jurnal Akuntansi Universitas Udayana, 13(1), 292-310.
- Walpole, R. E. (2012). Probability & Statistics for Engineers & Scientists. Pearson
- World Bank. (2023). Agriculture Overview. The World Bank.
<https://www.worldbank.org/en/topic/agriculture/overview>
- World Bank. (2023). Exports of Good and Service (% GDP).
<https://data.worldbank.org/indicator/NE.EXP.GNFS.ZS?end=2018&locations=BR-IN-CN-RU-ZA&start=2010>
- World Bank. (2023). GDP Growth (Annual %).
<https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG>
- World Bank. (2023). GDP per Capita (Current USD).
<https://data.worldbank.org/indicator/NY.GDP.PCAP.CD>
- World Bank. (2023). Gross Domestic Product (Constant 2015 US\$).
<https://data.worldbank.org/indicator/NY.GDP.MKTP.KD>
- World Bank. (2023). Population, total.
<https://data.worldbank.org/indicator/NY.GDP.MKTP.CN>
- World Bank. (2023). Gross Domestic Product (Current LCU).
<https://data.worldbank.org/indicator/SP.POP.TOTL?end=2018&locations=BR-RU-CN-1W-IN-ZA&start=2018&view=bar>
- World Bank. (2023). Taxes on Goods and Services (Current LCU)
<https://data.worldbank.org/indicator/GC.TAX.GSRV.CN>
- World Bank. (2023). Tax and Government Revenue.
<https://www.worldbank.org/en/topic/taxes-and-government-revenue#1>