



GOVERNMENT EFFECTIVENESS MODERATION ON THE EFFECT OF PER CAPITA INCOME AND EXCHANGE RATE ON GOODS AND SERVICES TAX REVENUE IN EAST ASIA AND PACIFIC

Desak Ari Gita Wahyuni ¹⁾, Suparna Wijaya ^{2)*}

¹⁾ desakarigita@gmail.com, Kementerian Keuangan

²⁾ suparnawijaya@upnvi.ac.id, Universitas Pembangunan Nasional Veteran Jakarta

*corresponding author

Abstract

Taxes have been known as the main source of revenue in every country. Tax on Goods and Services is a clear example of how tax revenue can contribute as a source of government revenue. This type of tax has been implemented in more than 143 countries in the world under the name Goods and Services Tax (GST) or Value Added Tax (VAT), including developed and developing countries which are members of the East Asia and Pacific region. Over the past few years, the issue of GST has become a hot topic of discussion as an approach in fiscal policy to reduce the budget deficit. New challenges and risks arose in line with the efforts of policy makers to maintain and accelerate economic growth in the East Asia and Pacific region. Deglobalization, population aging, and climate change overshadow the prospects for economic growth in this region, which has initially developed rapidly through trade. This research contributes to presenting the results of empirical literature regarding the determinants of tax revenue on goods and services in 12 countries that are members of the East Asia and Pacific region during the 2010-2019 period. Through a quantitative approach and panel data regression analysis method, the results show that the dependent variable GST can be explained by the independent variables consisting of Per Capita Income (PCI) and Exchange Rate (EXCH) of 56.42%. Per Capita Income, Exchange Rate has a positive and significant effect on Goods and Services Tax revenue. Meanwhile, moderation by the Government Effectiveness variable weakens the influence of the two independent variables so that the PCI and EXCH coefficient values become negative. This study also uses the variable Service Sector Contribution to GDP (SERV) as a control variable.

Keywords: Exchange rate, Goods and services tax revenue, Government effectiveness, Per capita income

INTRODUCTION

Fiscal policy is an attempt by governments around the world to regulate economic conditions in their countries. The government has the authority to choose between an expenditure or revenue approach in implementing the policy. The main objective of implementing fiscal policy is to overcome economic problems often faced by a country such as inflation and unemployment, furthermore to increase economic growth. Taxes are the biggest contributor to the revenue aspect, including countries in the East Asia and Pacific region. The word tax itself comes from the Latin "taxare" which means "to estimate". Taxes can be defined as a source of revenue that is compulsory and based on legislative authority. The tax system generally consists of direct and indirect taxes. Goods and Services Tax (GST) is a type of indirect tax that is currently under discussion for indirect tax reform. GST is levied on the production, sale and consumption of goods and services and is estimated to contribute around 2% to the growth of a country's Gross Domestic Product (GDP). Therefore, GST is one of the most important revenue instruments in any country.

Goods and Services Tax (GST) was first introduced in Papua New Guinea on July 1, 1999 amidst a sustained economic downturn from 1995 to 2002. During this period, Papua New Guinea's economy experienced high fiscal deficits, inflation, high interest rates, and a high public debt ratio (Odhuno, 2016). In addition, there were discriminatory and distorted indirect taxes, declining local sales taxes, declining mineral and petroleum revenues, and perceived pressures to liberalize trade and investment. There was then a policy reform movement to undertake research in order to improve the country's severely crashed economy. This crisis-ridden economy did not recover until the commodity price spike that emerged in 2002. To date the GST itself has become increasingly relevant in tax systems around the world, and more than



140 countries applied it to impose taxes, representing more than 20% of tax revenues (Keen, 2012). In the East Asia and Pacific region, on average GST receipts have averaged for 27.33% or one-third of total tax revenue in each country.

Despite the high percentage of GST to total tax revenue and the increasing pressure due to fiscal constraints in raising people's income, there only limited economic research on GST revenue at the global level, especially in the East Asia and Pacific region. So far, articles in the field of taxation merely examine the determinant variables of total tax revenue, not specific to the types of taxes levied. Some literature even only includes research with data limited to countries that are members of the OECD and countries outside the OECD. Such as the study conducted by Bogetic and Hasan in 1993 which used panel data from countries included in the OECD and those excluded. The study discussed the effectiveness of GST implementation and the impact of GST on the economy. Then in 2003, research was also conducted on the locus of the country, Legeida and Sologoub chose Ukraine with GST revenue data for one year. Furthermore, Keen and Lockwood conducted a study in 2011 using panel data from 143 countries over a span of 25 years. The research by Keen and Lockwood focused on the impact when countries adopt GST rates on the GST revenue itself. Therefore, this study will analyze GST from a different perspective, where the percentage of GST revenue from total tax revenue will be used as the dependent variable.

In order to increase tax revenue in general require more than just an approach through intensification and extensification of the collection system. To be more effective, the government needs to map the factors that will affect the high and low tax revenue within a year. These factors can be identified and simplified in the form of economic variables. One of the economic variables that is often researched on tax revenue is economic growth. Economic growth is an increase in the value of output or economic production of a country or region in a certain period of time. This variable is usually measured by the percentage change in gross domestic product (GDP) from one period to the next. Economic growth shows how fast or slow a country's economy is developing. In addition to the increase in GDP, economic growth in a country is also closely related to the growth of its population. According to Tait (1991), the success of a country in improving its economy can also be identified from the average income, in this case the GDP obtained by each resident referred to as per capita income (PCI). The relationship between PCI and economic growth is not always linear, but can influence each other. An increase in PCI can boost economic growth. As per capita income increases, consumers tend to have more purchasing power and are able to spend more money on goods and services. This phenomenon can drive higher demand and boost economic growth in the long run. Similarly, when economic growth increases, per capita income will also increase. When the economy grows, the output or production of goods and services increases, which in turn can lead to an increase in national income. If economic growth is faster than population growth, per capita income will increase significantly.

Meanwhile, the relationship between economic growth and exchange rates in each country is complex and can influence each other. Movements in a country's currency exchange rate can have a significant impact on its economic growth, and conversely, a country's economic conditions can also affect its currency exchange rate (Sen Gupta, 2007). If a country's currency weakens, exports from the country may become cheaper for other countries, which can increase the competitiveness of the country's products in the international market. With increased value in exports, revenues from international trade can support economic growth, as well as the opposite. Through data processed by the World Bank (2023), the projected economic growth of developing countries in the East Asia and Pacific region is stated to increase more rapidly with the reopening of the Chinese economy. Meanwhile, the economic growth rate of most other countries in the region is expected to slow down. Despite the region's strong economic



performance, growth has been hampered by a slowdown in global economic growth, rising commodity prices, and financial tightening in response to persistent inflation.

Over the past two decades, most countries in the East Asia and Pacific region have experienced significant and more stable economic growth than countries in other regions. This growth has led to a decline in poverty and inequality. However, in advanced economies, the movement to catch up with rising per capita incomes has stalled due to slowing productivity growth and the pace of structural reforms. Trade flows, investment climate, and technological development across the region will be affected by heightened tensions between major trading partners and economic conditions following the COVID-19 pandemic. In addition, globalization, aging and climate change pose a new set of challenges and risks to economic growth, fiscal balance and public health (Rizal Palil & Adha Ibrahim, 2011). Fluctuations in economic conditions in the region will certainly also have an impact on each country's tax revenue. Governments will strive to find a balance between promoting sustainable economic growth and ensuring sufficient tax revenue to support public spending and maintain fiscal stability. In this case, GST as a type of indirect tax is closely related to the level of public consumption, the volume of economic transactions and commodity prices of goods and services. The level of public consumption and the volume of domestic economic transactions will indirectly relate to per capita income while the price of commodity goods and services and cross-border transactions are influenced by the exchange rate conditions of each country's currency. Therefore, in this study the authors will analyze the effect of per capita income (PCI) and currency exchange rate (EXCH) variables on tax revenue on goods and services (GST) with the level of government effectiveness (EFF) as a moderating variable.

LITERATURE REVIEW

Taxes are used by the government to fund public expenditures, such as infrastructure development, public services, health, education, defense, and various other social programs. Without taxes, the government would find it difficult to finance the various activities and services necessary for the welfare and development of society. In addition to having an important role in a country's economy because it can help regulate resource allocation, tax revenue can also be utilized to reduce socio-economic inequality, control inflation, and achieve other fiscal objectives. Therefore, its implementation must be balanced and fair so as not to overburden the community and business actors. A wise and efficient tax policy can maintain stability and sustainable economic growth (Saira et al., t.t.). The types of taxes are generally divided into two, namely direct and indirect taxes. Direct tax is a type of tax imposed directly on the economic subject that pays the tax. This means that the tax burden is borne by the person or organization concerned and cannot be transferred to other parties. Indirect taxes, on the other hand, are taxes imposed on goods or services purchased or consumed by consumers, but the burden of these taxes can be transferred to other parties, such as end consumers or businesses, for example, VAT (Value Added Tax) or GST (Goods and Services Tax). Both of these are consumption taxes used by many countries around the world. While they share many similarities, there are some key differences between them.

VAT is a tax system in which tax is levied on the added value created at each stage of the production or marketing of a product or service. Each company in the supply chain is taxed on the added value they create, and the tax paid at each stage can be credited and offset against the tax received at the next stage. Finally, the tax is levied on the final consumer who purchases the goods or services. GST also taxes the goods and services consumed, but unlike VAT, GST has a more centralized system. Taxes are levied at each stage of production and distribution, but companies only pay tax on the value added, not the total value of the goods or services sold. This system reduces the amount of administrative burden and reduces tax avoidance practices.



According to De Castro et al. (2016), GST is not a cost to the seller and will not appear in financial statements as an expense. Usually, VAT is applied in several levels, and there are different categories of goods or services with different tax rates. While, GST can also be applied in multiple rates, but in many GST systems, there is an attempt to unify all goods and services under a single tax rate or a limited number of tax rates. In addition, GST tends to cover almost all types of goods and services consumed, including luxury goods, so the scope of GST is broader.

As explained in the background, the GST was first introduced by the Government of Papua New Guinea (GoPNG) amidst a general economic downturn and deepening recession. In the second half of the 1990s, the country's economy experienced budget deficits, high inflation, declining government revenues, and rapid exchange rate depreciation following floatation. The government then devised new policies to remedy the economic downturn. Several studies have examined aspects of the economic problems PNG faced in those years, including King and Sugden (1996) on increasing public debt. Deshpande (2011) on GoPNG's revenue shortfall, public deficit, debt and budget; Standish (1999) on extensive budget cuts; and Duncan (2002) on uncontrolled government spending. After the crisis ended, Batten (2010) argued that the GST was introduced to reassure aid providers and development partners of the GoPNG's commitment to responsible fiscal policy. The proposal of GST during the economic crisis of the second half of the 1990s was motivated by several reasons. At a seminar of the Summit on Indirect Taxes in 1996, it was officially claimed that the formulation of the new tax was aimed at reducing the deficit, cutting tariffs and excise duties and cutting personal income tax (Millet, 1996). The reasons given for this new tax were politically tolerable. However, there was also pressure felt by the government to broaden the tax base. Prior to the introduction of the GST, less than 5 percent of the population paid most of the taxes; reduced export tariffs and duties deemed too high, with various exemptions, economic incentives, and discriminatory or protective tariffs; abolished provincial sales taxes at various rates, which significantly contributed to a decrease in indirect taxes and high transaction costs for provinces in collecting taxes. These factors have led to rampant cases of tax evasion and corruption.

There appear to be strong reasons to support the proposed introduction and implementation of a value-added tax (VAT), which was later replaced by this goods and services tax (GST). However, the GST has the potential to impoverish the poor and rural economies and still requires an overhaul of the system. The value of GST is greater if certain products are purchased at a later stage in the trade transaction. Consumers who buy the product at a later stage pay more than users who buy the same product at an earlier stage. The disadvantaged payers, especially in developing countries like PNG, who bear the brunt of GST are the (relatively) poor and informal business people. Furthermore, the level of tax on goods and services will have an impact on per capita income. If the tax rate is high, consumers may experience a lack of resources to spend, thus affecting per capita income. Per capita income is an economic measure that describes the average income received by each individual in a country in a given period. Low tax rates can stimulate consumption and investment, which can contribute to economic growth and increase per capita income. How the government uses revenue from taxes on goods and services can also have an impact on per capita income. If tax revenue is used to finance efficient development, health, education, or infrastructure programs, it can increase per capita income in the long run. However, if tax revenues are not used properly or corruption occurs, the impact can be the opposite. On the other hand, many studies suggest that changes in per capita income can also affect the amount of tax revenue on goods and services themselves.

In a study conducted by Sarmiento (2016) on 27 countries in the European Union during the period 1998-2011 stated that a high level of income measured using the GDP per capita



indicator tends to generate more tax revenue for goods and services, which can be explained by marginal consumption trends, especially for goods and services subject to normal rates. The results of this study are also in line with the results obtained by Keen and Lockwood (2007) who used panel data from 143 countries for more than 26 years. They analyzed what motivated a country to adopt VAT and the impact of VAT on total tax revenue. The study concluded that, in the long run, VAT can be associated with increased tax revenue. Keen and Lockwood also found several positive determinants of VAT revenue, namely, income per capita, economic openness, and the size of the younger population. Addison and Levin (2011) also reached the same conclusion in Sub-Saharan Africa. On a smaller scale, Putra, et al (2014) also conducted research in Pekanbaru. The results showed that the number of taxable entrepreneurs, per capita income and economic growth in this region had a significant positive influence on goods and services tax revenue.

What affects tax revenue measured as the ratio of tax revenue to GDP has been the subject of much debates. Previous researchers have stated several variables such as GDP per capita, sectoral composition of output, degree of trade and financial openness, ratio of foreign aid to GDP, ratio of overall debt to GDP, size of informal economy, and institutionalization. Factors such as the level of political stability and corruption as potential determinants of income performance. Per capita income is a proxy for overall economic development and is expected to be positively correlated with tax share as it is expected to be a good indicator of the overall level of economic development and sophistication of economic structure (Amir Hasan & Azhari, 2014). In addition, according to Wagner's law, demand for government services is elastic, so the amount of goods and services provided by the government is expected to increase as income increases. The sectoral composition of output is also important because certain sectors of the economy are more easily taxed than others. For example, the agricultural sector may be difficult to tax, especially if it is dominated by a large number of subsistence farmers. On the other hand, the international trade sector can make a significant contribution to a country's tax revenue. There are many types of taxes that a country can levy on import-export transactions, one of which is VAT which is levied when goods and services are imported.

International trade is heavily influenced by currency exchange rates. The exchange rate refers to the ratio of the value of one currency to another, which determines how much of one country's currency can be exchanged for another country's currency (Seade, t.t.-a). A low exchange rate against the currency of a trading partner country will make goods and services from that country cheaper for foreign buyers. This will increase the competitiveness of the country's exports, as lower export prices will attract more foreign buyers. Conversely, a high exchange rate will make imported goods and services cheaper in the country, which can reduce the competitiveness of domestic products and lead to increased imports (Permadi & Wijaya, 2022). Changes in the exchange rate can affect the volume and value of exports and imports. If the exchange rate falls, the volume and value of exports may increase as export products become cheaper for foreign buyers. Conversely, if the exchange rate rises, the volume and value of imports may increase as imported products become cheaper for consumers in the country. So indirectly, changes in the exchange rate will also have an influence on the total goods and services tax revenue of a country. In Indonesia, research on VAT revenue has also been conducted with research results that can still be developed. Research by Renata et al. (2016) found that the inflation rate, rupiah exchange rate and the number of taxable entrepreneurs (PKP) had a significant positive effect on VAT revenue in the East Java region. Another study was also conducted by Sinambela & Rahmawati (2019) who examined the effect of inflation, the rupiah exchange rate, and the number of PKP on VAT revenue in Indonesia during the period 2013 to 2017 and found that inflation, the rupiah exchange rate, and the amount of PKP had no significant effect on VAT revenue. In 2021, similar research was also conducted by



Sapridawati, et al who analyzed the effect of inflation and the rupiah exchange rate in Pekanbaru. The results showed that inflation and exchange rate variables had a positive and significant effect on VAT revenue. Therefore, based on the theoretical basis and several literature reviews from previous studies, the authors' hypotheses in this study are as follows:

- H₁ Per capita income variable (PCI) has a positive and significant effect on the percentage of tax revenue on goods and services (GST).
- H₂ Exchange rate variable (EXCH) has a positive and significant effect on the percentage of tax revenue on goods and services (GST).
- H₃ The variable level of government effectiveness (EFF) strengthens the influence of the per capita income variable (PCI) on the percentage of tax revenue on goods and services (GST).
- H₄ The variable level of government effectiveness (EFF) strengthens the influence of the currency exchange rate variable (EXCH) on the percentage of tax revenue on goods and services (GST).
- H₅ The variable level of government effectiveness (EFF) has a positive and significant effect on the percentage of tax revenue on goods and services (GST).

METHODS

This research uses non-participant observation method with quantitative descriptive approach. The type of data used in this study is secondary data obtained indirectly from reports officially published by the World Bank and the Organization for Economic Co-operation and Development (OECD) Tax Database. The regression analysis method was conducted on panel data of goods and services tax revenue, per capita income, and currency exchange rates from 12 countries in the East Asia and Pacific region during the period 2010-2019. In addition, in this study, the authors used the government effectiveness variable as a moderating variable and added the service sector contribution variable as a control variable to obtain more accurate results. The operational definitions of all variables involved can be seen in Table 1 below.

Table 1. Operational Definition of Variables

Variable	Unit	Calculation
Dependent Variable		
Percentage of Goods and Services Tax Revenue (GST)	Percentage	% of Tax Revenue
Independent Variable		
Per Capita Income (PCI)	Nominal	Natural Logarithm
Exchange Rate (EXCH)	Nominal	Natural Logarithm
Moderating Variable		
Government Effectiveness (EFF)	Index	-
Control Variable		
Service Sector Contributor (SERV)	Percentage	% of GDP

Before conducting panel data regression analysis, the author went through several stages including: collecting and processing cross section and time series data from secondary data sources; declaring the data set into panel data; testing measurement and specification errors; conducting classical assumption tests to meet BLUE (Best Linear Unbiased Estimator) requirements, namely normality test, multicollinearity test, heteroscedasticity test and autocorrelation test with results that can be seen in Table 2.

Table 2. Classical Assumption Test Results

Assumption Test	Indicator	Results	Description
Normality	$(Prob > \chi^2) > 0.05$	0.0003	Data is not normally distributed
Heteroscedasticity	$(Prob > \chi^2) > 0.05$	0.0000	Data variance is homoskedastic



Autocorrelation	(Prob>F) > 0.05	0.0000	The model has autocorrelation symptoms
Multicollinearity	VIF < 10	PCI	23.42
		EXCH	2.87
		EFF	158.49
			PCI and EFF variables have multicollinearity symptoms

The normality test is used to test whether in a regression model, the dependent variable and the independent variable or both have normally distributed data or not. The results show the Prob>chi2 value is more than 0.05 so reject H0 and the panel data is declared not normally distributed. However, based on the Central Limit Theorem (CLT) since the number of data consists of more than 30 observations ($N > 30$), a large sample will automatically follow the normal distribution, so the normality test results can be ignored. The Central Limit Theorem is a basic concept in statistics that plays an important role in inferential statistics. This concept states that when independent random variables are added, their sum (or average) tends to follow a normal distribution, regardless of the distribution of the individual random variables themselves. In simpler terms, the Central Limit Theorem states that if you take a large enough sample from any population, calculate the average of each sample, and plot that average, the resulting distribution will approximate a normal (Gaussian) distribution, even if the original population was not normally distributed. The larger the sample size, the better the approximation of a normal distribution. The Central Limit Theorem deals with the distribution of sample means, not individual data points. The Central Limit Theorem also applies to a wide range of probability distributions, including those that are not symmetric or do not have a specified mean or variance. The practical implications of the Central Limit Theorem are significant. It is what allows statisticians and researchers to make inferences about the population based on a sample, even if the population distribution is unknown or not normal. The theorem forms the basis for most statistical analyses used in various fields, including social sciences, economics, engineering, and natural sciences.

The second test result is the multicollinearity test with the VIF (variance inflation factor) command. The multicollinearity test aims to test whether the regression model found a correlation between independent variables (independent). The prerequisite that must be met in the regression model is the absence of multicollinearity, by looking at the tolerance value and Variance Inflation Factor (VIF) in the regression model. The multicollinearity test results show that only the currency exchange rate variable does not have multicollinearity symptoms while the moderating variables of income per capita and government effectiveness have multicollinearity symptoms. Then, when averaged, this panel data shows symptoms of multicollinearity because it has a mean VIF value > 10. According to Gujarati (2003), this study uses panel data so that multicollinearity problems can be ignored considering that the combination of cross section and time series data is one application of the rule of thumb concept. Rule of thumb is a term used to refer to a rule of thumb or rough estimate used in decision making or analysis.

Some examples of "rule of thumb" in statistics include: (1) Rule of Three: In binomial statistics, the rule of three is a rule used to calculate an approximate 95% confidence interval for the success rate when there are only a few observations. It involves adding 2 to the number of successes and 2 to the number of observations, then dividing the number of successes by the number of observations. (2) Rule of 30: In regression analysis, the rule of 30 refers to the rule that at least 30 observations are needed for each independent variable to make the regression results more stable and reliable. (3) Rule of Five: In histogram analysis, the rule of five is a rule used to select the number of intervals in a histogram. This rule states that the number of histogram intervals should be about 5 square roots of the observed data.

While rules of thumb can be a useful initial guide in some situations, it is important to remember that more precise and complex statistical methods should be used when dealing with



larger data or when more critical decisions must be made. Rules of thumb cannot replace more in-depth statistical analysis and accurate calculations for more complex statistical problems. The next test result is the heteroscedasticity test. This test aims to determine whether in the regression model there is an inequality of variance from the residuals of one observation to another. If the variance of the residuals of an observation to another observation is constant, it can be called homoscedasticity and if it is different it is called heteroscedasticity. A good regression model is one with homoscedasticity or no heteroscedasticity. The results show that the data variants are homoscedastic because the value $(Prob > \chi^2) < 0.05$. The last test is the autocorrelation test where this test aims to determine whether in the linear regression model there is a correlation between confounding errors in period t and confounding errors in period $t-1$ (previous). If there is a correlation, it is stated that it does not pass the autocorrelation assumption. Autocorrelation arises because successive observations over time are related to each other. The results of the autocorrelation test in this study obtained a value $(Prob > \chi^2) < 0.05$ so that this research model has autocorrelation symptoms. According to Nachrowi and Mahyus Eka (2016), the autocorrelation test has only one value in one regression model. If in one model there are several values of autocorrelation test results, the test is no longer valid, so in panel data, this autocorrelation test is not required and its meaning can be ignored.

The analysis continues by determining the estimation model between the Common Effect Model (CEM) or Pooled Least Square (PLS), Fixed Effect Model and Random Effect Model on the panel data set by conducting the Chow Test, Lagrange Multiplier and Hausman Test. The test results show that the Fixed Effect Model (FEM) is the most appropriate estimation model to describe the effect of the dependent variable and the independent variables that the authors use in this study as can be seen in Table 3. The research equation model to be used follows the following formula.

$$Y = \alpha + (\beta_1 X_1)_{it} + (\beta_2 X_2)_{it} + (\beta_3 X_1 Z)_{it} + (\beta_4 X_2 Z)_{it} + (\beta_5 Z)_{it} + \varepsilon_{it}$$

Table 3. Research Model Selection Test

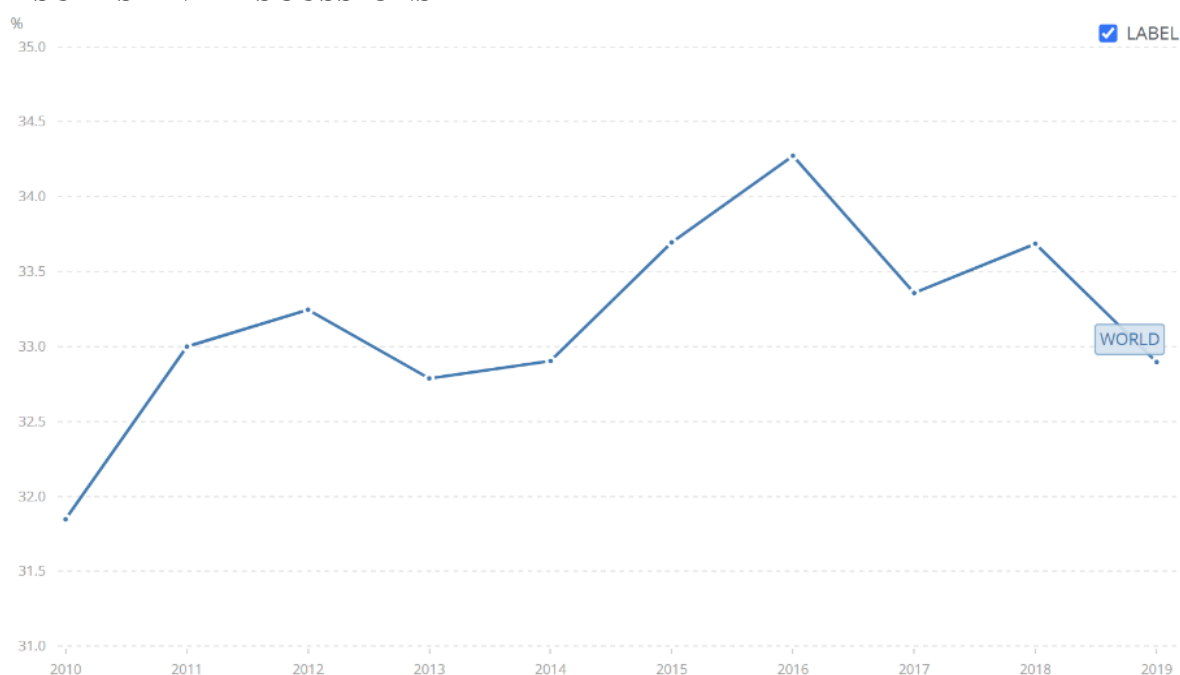
Test	Indicator	Prob	Results	Description
Chow Test	$(Prob > F) < 0.05$	0.0000	The null hypothesis is rejected	Fixed Effect Model chosen over Common Effect Model
<i>Lagrange Multiplier Test</i>	$(Prob > \chi^2) < 0.05$	0.0000	The null hypothesis is rejected	Random Effect Model chosen over Common Effect Model
Hausman Test	$(Prob > \chi^2) < 0.05$	0.0000	H The null hypothesis is rejected	Fixed Effect Model chosen over Random Effect Model

In addition to test the independent variables against the dependent variable, the author also adds moderating variables in the form of government effectiveness and control variables, namely the contribution of the service sector to GDP. Moderating variables are variables that affect the strength or direction of the relationship between the independent variable and the dependent variable. In other words, moderating variables affect the extent to which the independent variable impacts the dependent variable. Moderating variables provide a certain context or condition in which the relationship between the independent variable and the dependent variable is stronger or weaker. In regression analysis, this is reflected in the interaction effect between the independent variable and the moderating variable. Government effectiveness includes the government's ability to manage public finances, fiscal policy, tax administration, and tax-related law enforcement. An effective government can design an effective and rational tax policy, with reasonable tax rates and a fair tax system. Good tax policy can encourage greater contributions from the economic sector and society, thereby increasing the tax revenue ratio. Government effectiveness is also reflected in efficient and professional



tax administration. A good tax administration system includes an easy-to-understand tax collection process, strict monitoring of tax compliance, and strict law enforcement against tax violations. With good tax administration, the government can increase efficiency in collecting taxes and reduce the gap between potential taxes and taxes actually collected. Meanwhile, control variables are variables included in the analysis to eliminate the influence or effect of other variables that are not related to the research hypothesis. In research, there are many factors that can affect the dependent variable in addition to the independent variables to be studied. Control variables are used to ensure that the effect of the independent variable on the dependent variable is really caused by the independent variable itself and not by other unrelated variables.

RESULTS AND DISCUSSIONS



The average ratio of goods and services tax revenue to total tax revenue in the world during the period 2010 to 2019 fluctuated but the rate of change was not very significant. The lowest average value was 31.8% in 2010 while the highest was 34.3% in 2016. The increase in average goods and services tax revenue reflects the rapid growth of economic transactions at the global level over the past decade. It is also the result of more countries adopting the use of goods and services tax as a strategy to broaden their tax base. This type of tax has become a major source of revenue for more than 160 countries that have adopted it, raising, on average, more than 30% of total tax revenue. As a share of GDP, GST/VAT alone generates about 4% in low-income developing countries and more than 7% in developed countries. As a visible source of revenue, the GST has elicited a wide variety of criticisms, sometimes fair, sometimes not, due to a frequent lack of understanding. The ideal GST system has a broad base comprising all final consumption and a single tax rate, typically between 15 and 20 percent (Khurana & Sharma, 2016). This means that consumers have no incentive to shift consumption to less taxed goods and services that would be less agreeable to them. The only distortion is between goods and services purchased in formal markets and informal home-produced goods and services. But little can be done to mitigate this issue.

In the East Asia and Pacific region alone, the average GST revenue to total tax revenue is 27.33% with the highest value of 63.37% in China in 2010 and the lowest of 1.41% in Timor Leste in 2011 as shown in Table 4 below. The very high percentage of revenue in China is very



reasonable because China is a country with the second largest population in the world after India. The National Bureau of Statistics of China recorded a population of 1.4 billion people by 2022. A large population means that there are more consumers making economic transactions every day and making GST payments when purchasing goods and services. Therefore, the GST revenue of a country with a large population will tend to be higher. In addition, China has experienced rapid economic growth in recent decades. This growth has boosted consumption and production of goods and services, thereby increasing GST revenue from increased economic activity. The Chinese government has also undertaken a major transformation from a production-based economy to a service- and innovation-based economy. The provision of services and the booming industrial sector contribute greatly to GST receipts. As a global manufacturing hub with massive production of various consumer and industrial products, the presence of large factories and mass production has been one of the major factors in the country's economic growth. China is one of the countries with the largest international trade in the world. Large exports and imports contribute to China's economic growth and position as a major player in the global supply chain. The tax structure and GST rates implemented by the Chinese government also contribute to the high proportion of GST revenue. The government may have set fairly high rates on certain goods and services, which contributes to a larger proportion of revenue.

Table 4. Variable Descriptive

Variable	Mean	Standard Deviation	Minimum	Maximum
GST	27.33025	12.28512	1.410302	63.37455
PCI	21658.75	21759.4	785.5027	68150.11
EXCH	1432.053	3390.46	0.965801	14236.94
EFF	0.6770742	1.014414	-1.23125	2.241407
SERV	57.08857	10.29037	37.50396	71.58562

On the other hand, the proportion of GST revenue in Timor Leste is far too low and is among the lowest proportions in the world. Timor Leste's economy is classified as a low-income economy by the World Bank. Most of Timor Leste's revenue comes from natural resources, particularly oil and natural gas. In certain periods, revenues from this sector have contributed significantly to the country's economy. Timor Leste ranks 133rd on the Human Development Index, ranking low on the index. This is not least because 20% of the population is unemployed and 52.9% of the population lives on less than US\$1.25 per day. It is certain that there are still many people who cannot obtain a decent quality of life in terms of health and education. About half of Timor Leste's population is illiterate. Timor Leste's urbanization rate is one of the lowest in the world, at only 27%. In almost all social and economic areas, Timor Leste ranks among the lowest in the world. In 2017, Timor Leste's economic growth as measured by Gross Domestic Product (GDP) decreased by -4.6% to US\$7,426 billion (2016 GDP was US\$7,784 billion). The general economic situation of Timor Leste is still weak because the political situation in this country is still unstable. Development in Timor Leste has not progressed well during the 15 years of separation from Indonesia, and development in various fields has not yet begun to be felt by all Timorese people. Timor Leste faces various challenges in its economic development process, including limited infrastructure development, limited human resources, and poverty. The government of Timor Leste has attempted to diversify its economy by developing other sectors such as tourism, agriculture, fisheries, and other service sectors. As a newly independent country, Timor Leste still relies heavily on foreign aid to support its economic and social development. This weak economic condition will automatically impact on tax revenue in the country. When compared to other countries, the size of economic transactions in Timor Leste is still far from significant so that the proportion of tax revenue for goods and services is also very low.



Meanwhile, the highest per capita income variable with a value of \$68,150.11 was obtained by Australia in 2013 and the lowest of \$785.50 was obtained by Cambodia in 2010. Strong economic growth is key in increasing per capita income, as it creates jobs, increases the production of goods and services, and increases individual income. Labor productivity is also an important factor, where the more productive the labor force, the higher the per capita income that can be achieved. Regarding the currency exchange rate variable, the higher the exchange rate, the weaker the value of the country's currency against the US dollar. The strongest exchange rate was obtained by Australia in 2012 at 0.965 while the weakest exchange rate was obtained by Indonesia in 2018 at 14,236.94. High and low currency exchange rates are influenced by various complex factors in the foreign exchange market. The exchange rate of a country's currency can fluctuate at any time, depending on the interaction between supply and demand for the currency. Differences in interest rates between two countries can affect the exchange rates of their currencies. Higher interest rates usually attract more foreign investment and cause the demand for the country's currency to increase, so the exchange rate tends to rise. Monetary and fiscal policies taken by the government can affect currency exchange rates. Policies that favor economic stability, such as conservative fiscal policy or tight monetary policy, can increase confidence in the country's currency.

The results of regression analysis can be seen in Table 5. the coefficient of determination (overall R-squared) is 0.5642, meaning that the variables of income per capita, currency exchange rate, and government effectiveness can simultaneously explain the dependent variable on the ratio of goods and services tax revenue to total tax revenue with a confidence level of 56.42%. About 43.58% is influenced by other variables in the economy and the error component. With a Prob> chi2 value of 0.0000 (less than the 5% alpha value), based on the theory of goodness of fit tests which refers to the concept used to evaluate the extent to which the observed data fits or fits the proposed model or hypothesis, the significant Prob. chi2 value indicates that all independent variables affect the dependent variable.

Table 5. Panel Data Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob (P> t)
Cons	-19.607510	19.532680	-1.00	0.315
LnPCI	7.786784	2.316807	3.36	0.001
LnEXCH	0.985337	0.388918	2.53	0.011
EFF	35.625300	4.393534	8.11	0.000
PCI.EFF	-4.188855	0.474259	-8.83	0.000
EXCH.EFF	-1.970387	0.273604	-7.20	0.000
SERV	-0.318419	0.135411	-2.35	0.019
Number of Observations	120	Wald chi2(6)		2271.25
R-Squared	0.5642	Prob > chi2		0.0000

Based on partial test, per capita income variable has a p value of 0.001 (less than the 5% alpha value) so it can be concluded that per capita income has a significant effect on the ratio of goods and services tax revenue in 12 countries in the East Asia and Pacific region. With a positive coefficient value of 7.786784 which shows a directly proportional relationship between per capita income and the ratio of goods and services tax revenue. The higher the per capita income value in a country, the higher the goods and services tax revenue ratio. If per capita income increases by 1% then based on the assumption of ceteris paribus, the ratio of goods and services tax revenue will also increase by 7.786784%. This condition occurs because the increase in per capita income will encourage an increase in people's purchasing power for taxable goods and services. The level of consumption of goods and services tends to be positively correlated with income per capita. When individuals' income increases, they tend to consume more goods and services, which means more taxes are owed on each transaction (De Castro dkk., 2016). The results of this study are supported by (Mulyani & Hasyir, t.t.) who



examined the effect of inflation, rupiah exchange rate, number of taxable entrepreneurs and income per capita on value-added tax revenue in West Java. Based on the results of the analysis, it was found that inflation and per capita income had an effect on VAT revenue, while the rupiah exchange rate and the number of taxable entrepreneurs had no effect on VAT revenue. In addition, Sarmiento (2016) who examined the determinants of VAT revenue in 27 European Union countries during 1998 to 2011 also stated that the increase in income as measured by GDP per capita increased VAT revenue. While the moderating variable in the form of government effectiveness in this case weakens the positive effect of per capita income on the ratio of goods and services tax revenue. It can be seen from the change in the coefficient value from positive to negative value of -4.188855. Meanwhile, the government effectiveness variable itself has a significant positive effect on goods and services tax revenue as seen in the regression results, the p value is 0.0000 and the highest positive coefficient is 35.625300. These results contradict the research of Godin & Hindriks (2015).

Based on descriptive statistics, the value of government effectiveness is at the medium level. The level of government effectiveness in the sample countries is quite good because the average shows a positive value of 0.6770742 with the lowest value of -1.23125 obtained by Timor Leste and the highest of 2.241407 obtained by Singapore, almost approaching the maximum level of government effectiveness of 2.5. This value is considered quite influential on GST revenue. Research by Godin & Hindriks (2015) states that there is a positive and significant relationship between government effectiveness and total tax revenue and individual taxes. However, there is no significant influence between government effectiveness and GST revenue. It can be explained that indirect taxes are relatively easier to administer so that the quality of good and bad governance does not affect GST revenue. In contrast to the research of Godin & Hindriks (2015), the results of this study are in line with the research of Sarmiento (2016) which states that Government Effectiveness has a positive effect on GST revenue. This is in accordance with the theory put forward by Tanzi & Zee (2000) and Cnossen (2015) that an increasingly complex tax administration system will reduce the efficiency of tax revenue. Therefore, effective governance will have a positive impact on GST revenue.

Furthermore, the panel data regression results show that the currency exchange rate variable before being moderated by government effectiveness has a p value of 0.011 (less than 5% alpha). This shows that the currency exchange rate has a significant effect on the ratio of goods and services tax revenue. With a positive coefficient value of 0.985337. While after being moderated by the government effectiveness variable, the coefficient value changes to negative, meaning that the higher the government effectiveness index, the more it will weaken the positive effect of currency exchange rate on goods and services tax in a country. In the regression results without moderation, the higher the currency exchange rate in a country, the ratio of goods and services tax revenue will increase. If the currency exchange rate increases by 1%, the ratio of goods and services tax revenue will increase by 0.985337%. The results of this study are in line with research conducted by Renata (2016). The results of his research in East Java show that the inflation rate, currency exchange rate and the number of PKP have a significant positive effect on goods and services tax revenue. Similar research was also conducted by Sinambela and Rahmawati (2019), where the results stated that the inflation rate and currency exchange rate variables had a positive and significant effect on goods and services tax revenue in Indonesia during the period 2013 to 2017. These results are also supported by research conducted by Wulandari & Rahmawati (2023). The results showed that the rupiah exchange rate variable had a positive effect on GST revenue. When the exchange rate depreciates, the price of domestic goods increases and will increase public consumption. This situation can directly impact tax revenue on consumption. In addition, because the exchange rate can affect the price of goods and services, especially goods and services that require capital



goods from abroad. He also stated that there is a tendency for household consumption to increase, which is reflected in several indicators, such as electricity consumption, and domestic value-added tax (VAT) and import VAT revenues. Currency exchange rates affect the competitiveness of a country's exports and imports. When the domestic currency weakens against foreign currencies, export goods will become cheaper for international markets, thereby increasing exports and potential tax revenues from exports (Sapridawati et al., 2021). On the other hand, imported goods will become more expensive, which can stimulate domestic production and reduce imports (Seade, t.t.-b). Tax revenue will also be affected by the level of consumption of imported goods, which may be reduced. In addition, the currency exchange rate can affect the inflation rate. Depreciation of the domestic currency tends to increase inflation as import prices rise. Higher inflation rates can impact various aspects of the economy, including consumption and production.

CONCLUSION

From the above research results, it can be concluded that in the East Asia and Pacific region during the 2010-2019 period, changes in per capita income and currency exchange rates greatly affect the proportion of goods and services tax revenue to total tax revenue in the country. The higher the per capita income and currency exchange rate, the higher the proportion of goods and services tax revenue. Governments around the world have used goods and services tax as one of the main sources of revenue generation, especially over the past few years. Another important issue relates to tax administration, where the government's effectiveness in implementing good governance does not necessarily have an impact on goods and services tax revenue because this type of tax is the easiest type of tax to administer. In fact, a more stringent and complex system can actually weaken the positive effect of per capita income and currency exchange rate on the proportion of goods and services tax revenue. This phenomenon can be used as a learning process for the public sector in handling tax administration on what policies should be given greater focus.

As goods and services taxes are increasingly used by governments around the world, concerns have been raised about how to improve the efficiency of collecting this type of tax revenue. Some countries even resort to various kinds of rate reductions, exemptions of tax objects and subjects, and the formulation of special programs. Some are intended to make administration easier. For example, many countries use minimum registration limits based on turnover to exempt micro businesses from goods and services tax and related compliance and administrative costs. While most exemption and rate reduction policies are implemented with the aim of improving the distributional impact of goods and services tax, such exemptions may undermine the core objective of raising revenue, either directly or indirectly. By increasing the cost of collection, it is feared that it will lead to fraud loopholes in the future. Therefore, the results of this study are expected to provide benefits for academics, practitioners, and policy makers and can help improve our understanding of goods and services tax revenue and its determinants. However, further research is still needed to reach more concrete conclusions. Additional research on goods and services tax revenue is still needed, using more comprehensive data, especially regarding the possible relationship between economic shocks and political cycles, as well as the efficiency of tax administration and the legal institutional environment.

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