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Analysis of Value Added Tax Revenue in Indonesia from 1990 to 2022

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ABSTRACT: In enhancing welfare and advancing Indonesia, the government plays a crucial role in promoting economic cooperation and implementing effective fiscal regulations, one of which is through optimizing revenue from the taxation sector. Value Added Tax (VAT) is a key tax instrument that serves as an important source of state revenue. As a significant tax instrument, VAT revenue plays several crucial roles, including supporting the state's fiscal revenue, funding infrastructure development, and providing public services. Therefore, this study aims to analyze the factors influencing VAT revenue in Indonesia. This research uses time series data covering the period from 1990 to 2022. The analytical method employed is the ECM (Error Correction Model) analysis to examine both long-run and short-run effects. The independent variables used in this study include Government Consumption, C-Efficiency, and Import Tariffs. Meanwhile, the dependent variable is VAT revenue in Indonesia. The results of this study show that government consumption and C-efficiency has a positive and significant impact on VAT revenue in both the long-run and short-run. Meanwhile, the import tariff variable negatively and significantly impacts long- run revenue, but has no effect in the short run.

KEYWORDS: VAT Revenue, Government Consumption, C-efficiency, Import Tariffs, Error Correction Model.

I. INTRODUCTION

Indonesia, as the largest archipelago in the world, is known for its abundant natural resources and rich cultural diversity. In recent decades, the Indonesian government has made various efforts to strengthen the national economy, utilizing various policy instruments, including taxation, to finance state expenditures that include infrastructure development, education, healthcare, and various other social programs. Taxes are the main source of state revenue and play a crucial role in supporting national development (Rachdianti et al., 2016). According to Mardiasmo (2016), taxes are mandatory contributions to the state, owed by individuals or entities, coercive in nature based on law, without direct compensation, and used for state purposes to maximize the welfare of the people. The government uses taxes to enhance the welfare of society by funding routine expenditures, infrastructure development, and public facilities. Taxes also serve as a tool for regulating the economy, wealth distribution, and raising necessary funds for education and healthcare. An efficient and fair tax system plays a key role in supporting a country's economic growth, and the overall tax design reflects government policies in wealth distribution and economic incentives (Bird & Zolt, 2014).

State revenue refers to the rights held by the central government and is recognized as an addition to the nation's net wealth. This wealth encompasses various sources, such as tax revenue, non-tax revenue, and grants. In Indonesia, the management of state revenue is conducted through the National Budget (APBN). This system ensures that the revenue obtained from taxes, non-tax sources, and grants can be effectively used to finance various government programs and development activities. Tax revenue accounts for the highest proportion of the government's total income, compared to non-tax revenue and grants. It includes various types of taxes, such as Income Tax, Value Added Tax (VAT), and other taxes, all of which significantly contribute to the national treasury and play a crucial role in funding government programs. Income Tax (PPh) often shows higher revenue figures than VAT. However, while PPh contributes significantly to state revenue, this study focuses on VAT data due to its broader scope. VAT is applied to almost all goods and services transactions, allowing for more equitable revenue collection across different sectors of the economy. Furthermore, VAT is often more challenging to evade compared to Income Tax, helping to reduce tax avoidance.

Value Added Tax (VAT) is a key tax instrument that plays an important role as one of the primary sources of state revenue. In Indonesia, VAT has become a significant source of tax revenue (Iswahyudi, 2018). VAT is a tax imposed on the added value from the consumption of goods and services that are generally applicable and levied at every stage of production and distribution. The role of VAT is increasingly linked to the economic conditions of a country, where the evolving dynamics of the global economy lead to changes

in consumption patterns and the government's efforts to increase fiscal revenues to support sustainable development (Directorate General of Budget, Republic of Indonesia). Indonesia first implemented VAT on July 1,
1984, with the introduction of the first VAT Law, Law No. 8 of 1983, which officially replaced the previous Sales Tax system. The implementation of VAT marked a significant step in the tax reform system in Indonesia, aimed at improving efficiency and expanding the tax base. VAT is an indirect tax that shifts the tax burden to another party, with the final consumer bearing the tax, although they do not directly remit the tax to the state (Muljono, 2008). In Indonesia, VAT is applied to individuals or companies involved in the purchase or use of taxable goods and services, whether as sellers, buyers, importers, or exporters

II. LITERATURE REVIEW

Taxes are mandatory contributions made by individuals, companies, or other legal entities to the government or public authorities without direct compensation (Mardiasmo, 2016). Generally, taxes are used by the government to fund public expenditures and finance various programs and services such as infrastructure, education, healthcare, and security. The 20th- century economist John Maynard Keynes viewed taxes as a key instrument in fiscal policy, essential for regulating economic stability, funding public spending, and achieving income redistribution to promote economic stability and social justice.

Value Added Tax (VAT) is a type of indirect tax applied in Indonesia under the category of Taxes on Goods and Services. VAT is levied at almost every stage of the production and distribution process of goods and services, with the tax collection and remittance responsibilities falling on entities other than the final consumer (Rahardjo, 2007). Although the final consumer ultimately bears the tax burden, the parties involved in production and distribution are responsible for collecting and remitting the tax to the state. VAT is a major source of revenue for the government, significantly contributing to total tax receipts. While VAT implementation and rates may change annually, the core principle remains consistent: the tax is imposed on the value added at each stage of production and distribution, with the final consumer ultimately bearing the cost.

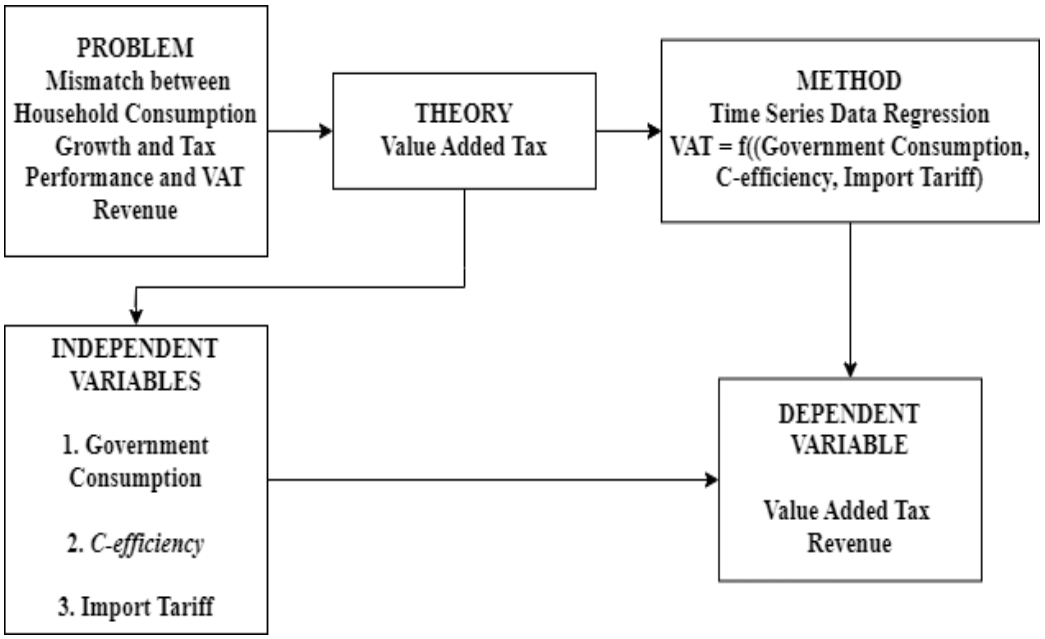
Government consumption is often associated with the purchase of goods and services that are subject to Value Added Tax (VAT). When government consumption increases, it leads to a higher demand for such taxable goods and services, which in turn results in increased VAT revenue. Theoretical research by Keen and Lockwood (2010) supports this relationship, demonstrating that tax policies like VAT reduce the marginal cost of public expenditure. Consequently, increased government consumption can stimulate the demand for taxable goods and services, thus positively influencing VAT revenue. Similarly, Bikas and Andruskaite (2013) highlight that an increase in government consumption directly contributes to higher VAT revenue. This is because government spending often translates into higher economic activity, boosting the demand for goods and services, which in turn increases production and sales. The resultant rise in production and sales further drives up VAT revenue, illustrating a positive ripple effect of government consumption on overall VAT revenue. However, this relationship is not universally consistent. Research by Andrejovská and Helcmanovská (2021) in their study reveals that government consumption does not have a significant impact on VAT revenue in the context of the European Union. Their findings suggest that the influence of government consumption on VAT revenue may vary depending on regional and economic conditions, indicating that while government consumption can positively affect VAT revenue in some contexts, it may have a negligible impact in others. This highlights the importance of considering specific economic contexts and structural differences when analyzing the relationship between government consumption and VAT revenue.

Previous research has robustly demonstrated the significant impact of C-efficiency on VAT revenue, underscoring the critical link between tax efficiency and national revenue. High C-efficiency reflects a more effective tax administration system, which plays a pivotal role in optimizing revenue collection and minimizing tax evasion. Efficient tax administration ensures that the potential VAT revenue is fully realized, leading to enhanced VAT receipts (Sarmento, 2016). In his study, Sarmento (2016) found that fluctuations in VAT revenue are significantly affected by variations in C-efficiency, suggesting that improvements in tax collection processes have a more substantial effect on boosting VAT revenue compared to merely adjusting tax rates. Keen (2013) defines C-efficiency as the ratio of VAT revenue to the product of the standard rate and consumption, providing an indicator of how closely the VAT system aligns with its intended goal of taxing all consumption. This metric is instrumental in assessing the effectiveness of the VAT system in generating revenue. Enhancing C-efficiency can mitigate deadweight loss, which represents the economic inefficiency that arises when the equilibrium outcomes are not achieved or are unattainable (Keen, 2013). By improving C-efficiency without altering the standard tax rate, it is possible to reduce deadweight loss and thereby increase VAT revenue. However, it is important to consider that the by Daniel Gusta Permadi and Suparna Wijaya (2022) found an insignificant impact of C-efficiency on VAT revenue, suggesting that the effect of C-efficiency on VAT revenue might differ based on regional or contextual factors. This discrepancy highlights the need for a nuanced understanding of how C-efficiency influences VAT revenue in various settings and underscores the importance of contextual factors in shaping the relationship between tax efficiency and revenue outcomes.

Previous research has shown that import tariffs significantly impact trade dynamics and economic outcomes. Higher tariffs tend to

increase domestic prices, which can potentially decrease the demand for imported goods as consumers look for cheaper alternatives (Yang & Nie, 2020). This reduced demand for imports can subsequently affect the tax base for VAT on these goods, as lower import volumes result in decreased VAT revenues. However, the relationship between import tariffs and VAT revenue is complex and influenced by multiple factors, including the differentiation of products and the structure of the market. For instance, while higher tariffs may push consumers towards domestic products, potentially reducing VAT revenue from imports, there are also other dimensions to consider. Research by Lubis and Panjaitan (2012) suggests that higher import volumes could lead to increased domestic prices for certain commodities, as the supply constraints caused by tariffs could drive up prices. On the other hand, higher import tariffs might lower domestic prices for some goods by reducing the volume of imported goods, which could affect the overall VAT revenue. This complex interplay highlights that while higher tariffs might decrease import volumes and consequently VAT revenue from imports, the impact on domestic prices and the subsequent effect on VAT revenue is nuanced. The variability in how tariffs influence different sectors and products illustrates the need for a careful and context- specific analysis when assessing the overall impact of import tariffs on VAT revenue.

Theoretical Framework



Hypothesis testing is a crucial stage that derunines whether a hypothesis can be accepted or rejected. This process involves assessing the relationship and impact of independent variables on the dependent variable using time series regression analysis, with each decision carrying a degree of uncertainty and risk, usually expressed as probability. The hypotheses are as follows: Hypothesis 1: Government consumption is expected to have a positive impact on VAT revenue. Hypothesis 2: C-efficiency is expected to have a positive impact on VAT revenue. Hypothesis 3: Import tariffs are expected to have a negative impact on VAT revenue.

III. RESEARCH METHODOLOGY

This study uses secondary data, including VAT Revenue, Government Consumption, C-efficiency, and Import Tariffs. The data is time series, covering the years 1990 to 2022 in Indonesia. VAT Revenue, Government Consumption, and Household Consumption data for calculating C-efficiency are obtained from the Bank Indonesia Economic and Financial Statistics publications for the period 1990–2022. Import Tariff data is sourced from the World Integrated Trade Solution by the World Bank for the same period.

To analyze the factors affecting VAT revenue, this study uses data on Government Consumption, C-efficiency, and Import Tariffs with time series regression analysis in Eviews. Time series data often exhibit non-stationarity, which can lead to spurious regression results. Ajija et al. (2011) note that spurious regressions are characterized by high R^2 values but low Durbin-Watson statistics. Therefore, Widarjono (2013) recommends using the Error Correction Model (ECM) for estimating non-stationary time series data. The long-run relationship is explained by the following equation:

$$Ln(PPN)_t = \beta_0 + \beta_1 Ln(G)_t + \beta_2 Ceff_t - \beta_3 M_t + \varepsilon_t \quad \text{.....(3.1)}$$

ECM, as described by Sargan, Engle, and Granger (1987), corrects short-run imbalances to return to long-run equilibrium and

can explain relationships between dependent and independent variables over time. The model is valid if the variables are cointegrated. The study employs the ECM-Engle Granger model to explain short-run relationships:

$$\Delta Ln(PPN)_t = \beta_0 + \beta_1 \Delta Ln(G)_t + \beta_2 \Delta Ceff_t - \beta_3 \Delta M_t - ECT(-1) \quad \text{.....(3.2)}$$

Where Δ: First Difference, ECT(-1): Error Correction Run. ECM includes the Error Correction Run (ECT) to adjust the behavior of the dependent variable in the short run. A statistically significant ECT coefficient (p-value < 5%) indicates a valid model specification

IV. RESULTS AND DISCUSSION

Value Added Tax (VAT) is a key source of tax revenue in Indonesia, applied broadly to most goods and services with a standard rate of 11% in 2024. This policy is crucial for boosting national revenue and supporting development. Over time, Indonesia has adjusted VAT rates and implementation to balance revenue needs with maintaining economic competitiveness. VAT serves not only to collect revenue but also to regulate consumption and promote tax compliance. Despite a decline in 2020 due to the pandemic, Indonesia's VAT revenue has rebounded, reflecting economic resilience and effective fiscal policies. VAT revenue is influenced by government consumption, tax collection efficiency, and import tariffs, and the government continues to refine its VAT policies to support economic growth and national development.

A. Analysis Results

1. Model Prerequisite Test

- **Unit Root Test**

The unit root test ensures that the time series data is free from time-varying trends or patterns, enhancing the validity of the analysis. This study uses the Augmented Dickey-Fuller (ADF) test, with the results shown in the table below.

Table 4.1 Results of the Unit Root Test at the Level

Variable	ADF	Probability	Decision
Ln_PPN	-1.792906	0.3771	Not Stasioner
Ln_G	-0.758884	0.8171	Not Stasioner
Ceff	-3.170426	0.0313	Stasioner
M	-3.270053	0.0259	Stasioner

Source: Running Data for Unit Root Test

Based on the results of the Unit Root Test in Table 4.1, using ADF at a critical value of 5%, it is concluded that not all variables are stationary at the unit root so that a degree of integration test is needed. Because not all research variables are stationary at the level, a degree of integration test is needed.

- **Integration Test**

The integration test derunines how many differencing steps are needed to make non-stationary variables stationary. The results from the Augmented Dickey-Fuller (ADF) test are shown in the table below.

Table 4.2 Results of the Integration Test at the First Difference

Variable	ADF	Probability	Decision
Ln_PPN	-5.444045	0.0001	Stasioner
Ln_G	-5.734021	0.0000	Stasioner
Ceff	-5.844220	0.0000	Stasioner
M	-3.284926	0.0250	Stasioner

Source: Running Data for Integration Test

Based on the integration test results in Table 4.2, using the Augmented Dickey-Fuller (ADF) test at a 5% critical value, all variables are stationary at the first difference. Therefore, the next step is to conduct the cointegration test.

- **Cointegration Test**

The cointegration test checks if non-stationary variables have a long-run equilibrium. Using the Engle-Granger method with the ADF test, significant cointegration indicates variables move together over time, validating the regression model and allowing for

more accurate interpretation.

Table 4.3 Results of the Cointegration Test at the Level

Variable	ADF	Probability	Decision
ECT	-2.095415	0.0366	Stasioner

Source: Running Data for Cointegration Test

Based on the Cointegration Test results in Table 4.3, using the Augmented Dickey-Fuller (ADF) test this indicates the data is stationary at the level. Therefore, the ECT variable can be used in the short-run ECM model. Overall, this result confirms a long-run relationship between the observed variables.

2. Regressieon Estimation Results

- **Short-run Estimation Results**

The Error Correction Model (ECM) is used to analyze the short-run impact of independent variables on the dependent variable, while also measuring the speed of adjustment to restore long-run equilibrium in time series data that shows cointegration. Based on the model's prerequisites, the data is non-stationary at the level but exhibits cointegration, making ECM estimation the next step. The following are the short-run estimation results displaying the ECM regression outcomes.

Table 4.4 Short Run Estimation Results

Variable	Coeficient	t-Statistic	Prob.
C	0.053620	2.932829*)	0.0068
D(Ln_G)	0.634565	6.281915*)	0.0000
D(Ceff)	0.802731	7.332590*)	0.0000
D(M)	-0.004786	-1.064066	0.2967
ECT(-1)	-0.233125	-2.073651*)	0.0478
R-squared	0.685965		
Adjusted R-squared	0.639441		
F-statistic	14.74439		
Prob(F-statistic)	0.000002		

Source: Running Data Model by Estimator Short-run ECM P.S.: *) Significant α=5%

In Table 4.4, the short-run estimation results show that the Error Correction Run (ECT(-1)) has a regression coefficient of -0.233125 with a probability of 0.0478. This indicates that ECT(-1) is significant at the 5% significance level (0.05), confirming that the ECM-EG model specification used in this study is accurate and capable of explaining the research model.

- **Long Run Estimation Results**

Ordinary Least Squares (OLS) was used to examine the long-run effects of independent variables on the dependent variable. Here are the long-run estimation results for Government Consumption, C-efficiency, and Import Tariffs on VAT Revenue in Indonesia:

Table 4.5 Long Run Estimation Results

Variable	Coeficient	t-Statistic	Prob.
C	0.087046	0.223204	0.8249
Ln_G	0.900609	35.10122*)	0.0000
Ceff	0.968904	10.30732*)	0.0000
M	-0.029340	-4.378092*)	0.0001
R-squared	0.991919		
Adjusted R-squared	0.991083		
F-statistic	1186.523		
Prob(F-statistic)	0.000000		

Source: Running Data Model by Estimator Long-run ECM

Multicollinearity detection checks for high correlations among independent variables in a regression model, as these should be avoided. This is done by examining centered VIF values, where values below 10.00 indicate no multicollinearity. In this model, no

VIF exceeds 10.00, confirming the absence of multicollinearity. The heteroskedasticity test checks for unequal residual variance using the Breusch-Pagan test. A Chi-Square probability above the significance level (α=0.05) indicates no heteroskedasticity. Here, the test result (0.1150) shows homoskedasticity. Autocorrelation is tested using the Breusch-Godfrey Serial Correlation LM Test. Initially, autocorrelation is present (p=0.0009), but after applying first-difference transformation, the Chi-Square probability increases to 0.6759, resolving the issue.

The coefficient of derunination (R^2) measures how well the independent variables in a regression model explain the variation in the dependent variable. R^2 values range from 0 to 1; a value close to 0 indicates that the independent variables explain very little of the variation, while a value close to 1 indicates a strong explanatory power. According to Table 4.4, the short-run coefficient of derunination (Adjusted R-squared) is 0.6394, meaning that the independent variables explain 63.94% of the variation in the dependent variable, with the remaining 36.06% attributed to other factors. In Table 4.5, the long-run coefficient of derunination (Adjusted R-squared) is 0.9911, suggesting that the independent variables explain 99.10% of the variation, with only 0.90% influenced by factors outside the model. According to Table 4.4, the short-run F-test results indicating that Government Consumption, C-efficiency, and Import Tariffs jointly affect VAT revenue in the short run. Similarly, Table 4.5 shows a long-run confirming that these variables affect VAT revenue in the long run as well.

The impact of government consumption on VAT revenue in both the short run and long run is significant and positive. In the short run, government consumption has a notable effect on VAT revenue, as evidenced by a t-statistic that exceeds the critical value, along with a highly significant p-value. This indicates that government consumption significantly increases VAT revenue. Specifically, the short-run coefficient for government consumption is 0.634565, meaning that an increase of 1 billion Rupiah in government consumption results in a 63.4 billion Rupiah rise in VAT revenue, assuming other variables are held constant. In the long run, the influence of government consumption on VAT revenue remains significant, with the t-statistic again surpassing the critical value and the p-value remaining highly significant. The long-run coefficient is 0.900609, indicating that a 1 billion Rupiah increase in government consumption leads to a 90 billion Rupiah rise in VAT revenue, under the assumption of constant other variables. These results demonstrate the critical role of government consumption in influencing VAT revenue in Indonesia over both short and long-term horizons.

The impact of C-efficiency on VAT revenue in both the short and long run is significant and positive. In the short run, the C-efficiency variable has a strong influence on VAT revenue, as evidenced by a t-statistic well above the critical value and a p-value far below the significance level, indicating a highly significant effect. The short-run coefficient for C- efficiency is 0.802731, meaning that a 1% increase in C-efficiency leads to an 80.2 billion Rupiah rise in VAT revenue, assuming other factors remain unchanged. In the long run, the positive impact of C-efficiency on VAT revenue remains significant, with a t-statistic that exceeds the critical value and a p-value that shows a strong significance. The long-run coefficient is 0.968904, indicating that a 1% improvement in C-efficiency results in a 96.8 billion Rupiah increase in VAT revenue, assuming other variables stay constant. These findings highlight the critical role of C-efficiency in enhancing VAT revenue in Indonesia over both short and long-term periods.

The impact of import tariffs on VAT revenue in both the short and long run presents contrasting results. In the short run, import tariffs do not significantly affect VAT revenue, as indicated by a t-statistic below the critical value and a p-value above the significance level. The coefficient for import tariffs is -0.004786, suggesting that a 1% increase in tariffs would result in a 0.4 billion Rupiah decrease in VAT revenue, although this effect is statistically insignificant in the short term. However, in the long run, import tariffs have a significant negative effect on VAT revenue. With a t-statistic above the critical value and a p-value well below the significance threshold, the long-run impact is statistically significant. The coefficient of -0.029340 implies that a 1% increase in import tariffs would reduce VAT revenue by 2.9 billion Rupiah, assuming other variables remain constant. This suggests that while import tariffs may not immediately impact VAT revenue, their negative effect becomes pronounced over a longer period.

CONCLUSIONS

Research in Indonesia reveals that government consumption, C-efficiency, and import tariffs significantly impact VAT revenue. Increased government consumption positively affects VAT revenue in both the short and long run, while improved C- efficiency enhances VAT collection efficiency. However, import tariffs negatively affect VAT revenue, showing a significant long- run impact. These findings underscore the need for effective fiscal policies to boost VAT revenue. Strategies should include optimizing government spending and improving tax collection efficiency. Addressing both short and long-run effects of these variables can help Indonesia achieve fiscal stability and sustainable economic development. To enhance VAT revenue, the Indonesian government should focus on three strategies: optimizing government consumption, improving C-efficiency, and adjusting import tariffs. Prioritize digital infrastructure and data-driven planning to boost VAT consumption and economic growth. Implement blockchain for transparent VAT collection and real-time reporting, and collaborate with the private sector to improve tax compliance. Address import tariffs' negative

impact by using advanced monitoring and sector-specific policies, and strengthen international cooperation. These measures will optimize VAT revenue and support fiscal stability. Future research should investigate additional factors like import quotas and labor market conditions for more effective fiscal policy.

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