# Impact of Excise Duty on Gross Domestic Product in Tanzania

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| ARTICLE INFO | ABSTRACT |
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| **Published Online:** <br> **15 April 2025** <br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br> **Corresponding Author:** <br> **Pascal Gomba** | This study investigated the impact of excise duty on Gross Domestic Product (GDP) in Tanzania using annual time-series data from the 2011/12 to 2023/24 fiscal years. Excise duty, a tax levied on specific goods such as alcohol, tobacco, and fuel, serves as both as a revenue generation mechanism and a tool for economic regulation. The study employed a log-linear Ordinary Least Squares (OLS) regression model to examine the long-run relationship between excise duty and GDP. The results revealed a strong and statistically significant positive relationship, indicating that a 1% increase in excise duty revenue is associated with a 0.72% increase in GDP. This finding highlighted the important contribution of excise taxation to macroeconomic performance in Tanzania. The positive elasticity and significant effect ($p<0.05$) underscore the role of excise duty not only in financing government expenditure but also in supporting economic growth by providing a stable and predictable revenue stream. The results were consistent with international evidence on the effectiveness of excise taxation in driving fiscal outcomes and economic development. Based on these findings, the study recommended strengthening excise tax policy through rate adjustments that reflect inflation and economic shifts, improving tax administration, and ensuring that excise revenue is allocated effectively to priority sectors. The study offered valuable insights to policymakers and fiscal authorities aiming to optimize domestic revenue mobilization while promoting sustainable economic growth. |

## 1.0 INTRODUCTION

Taxation remains a cornerstone of economic policy and national development, and among its components, excise duty is particularly vital due to its dual role in revenue generation and regulating consumption of specific goods. In Tanzania, excise duty applies to selected items such as alcoholic beverages, tobacco products, and petroleum, which not only generate considerable fiscal income but also enable policy intervention on health and environmental issues (Epaphra & Kaaya, 2020; Kidane et al., 2015). Over the past decade, Tanzania has made notable strides in strengthening excise tax administration through policy reform and the introduction of technological innovations, such as the Electronic Tax Stamp (ETS) system (Sulanda et al., 2024).

Excise taxes have been globally recognized as effective tools for enhancing public revenue and promoting macroeconomic stability. Chaloupka, Powell, and Warner (2019) emphasize that well-administered excise taxes contribute significantly to fiscal space in low- and middle-income countries. In the context of Tanzania, excise duty represents a stable and predictable revenue stream that supports public investment, infrastructure development, and social service delivery (Boesen, 2021). Moreover, Kim and Kim (2018) stress that tax reforms like ETS are critical to fostering state capacity and sustainable development.

Over time, excise duty revenue in Tanzania has grown steadily, particularly following the modernization of the tax system. Sulanda et al. (2024) document a substantial increase in excise duty collections after the adoption of ETS, reflecting improved monitoring and compliance. This upward trend in revenue coincides with Tanzania's broader efforts to boost GDP through industrial growth, infrastructure expansion, and service sector development (Rwechungura, 2016; Epaphra, 2015). However, the specific impact of excise tax revenue on GDP has received limited empirical attention in the Tanzanian context.

This study aims to fill that gap by evaluating the relationship between excise duty and GDP using annual time-series data from 2011/12 to 2023/24. It investigates whether growth in excise tax revenue contributes positively to Tanzania's

economic output. The findings are intended to inform fiscal policy and provide evidence for expanding excise tax reforms as a tool for sustainable economic growth.

## 2.0 MATERIALS AND METHODS
### 2.1 Research Design
A quantitative time-series research design was adopted to assess the impact of excise duty on Tanzania's GDP. The analysis covers thirteen fiscal years (2011/12–2023/24), enabling the evaluation of long-term trends and policy shifts such as the 2018 implementation of the ETS. The relationship between excise duty collections and GDP was examined using regression analysis to estimate the marginal effect of excise tax revenue on GDP performance.

### 2.2 Data Source
Secondary data were collected from the Tanzania Revenue Authority (TRA) and the National Bureau of Statistics (NBS). Annual data on excise duty collections (in TZS billion) and GDP at current prices were compiled for the period under review. This dataset provides a comprehensive view of the relationship between excise tax revenue and economic output over a 13-year period.

### 2.3 Data Analysis
Monetary values were standardized in Tanzanian Shillings (TZS) and adjusted where necessary to reflect current price levels for each fiscal year in order to maintain comparability. Data cleaning was involving verification of consistency across different publications and removal of outliers or anomalies through cross-validation. The time-series data were organized into a structured dataset using Microsoft Excel 2019, preparing it for further statistical analysis.

### 2.4 Model specification
The study applies a simple Ordinary Least Squares (OLS) regression model to estimate the long-run relationship between excise duty and GDP. The log-linear form of the model is specified as follows:

$$\ln(GDP_t) = \beta_0 + \beta_1 \ln(ED_t) + \epsilon_t$$

Whereby $\ln(GDP_t)$: Natural logarithm of Gross Domestic Product in year $t$, $\ln(ED_t)$: Natural logarithm of Excise Duty revenue in year $t$, $\beta_0$: Intercept term, $\beta_1$: Elasticity coefficient measuring the effect of excise duty on GDP and $\epsilon_t$: Error term

## 3.0 RESULTS
### 3.1 Impact of Excise Duty on Gross Domestic Product
### 3.1.1 Model estimation
The results of the Ordinary Least Squares (OLS) regression estimating the relationship between excise duty and GDP in Tanzania are summarized in Table 1. The model was specified in a log-log form, allowing for elasticity interpretation of the estimated coefficients. The coefficient for the log of excise duty is 0.7237, and it is statistically significant at the 1% level (p < 0.000). This implies that a 1% increase in excise duty revenue is associated with an approximate 0.72% increase in GDP, all else being equal. The positive sign and significance of the coefficient suggest a strong and positive long-run association between excise duty collections and economic output in Tanzania. The intercept term, although negative at -1.0622, is statistically insignificant (p = 0.1804), indicating it does not contribute substantially to the model's explanatory power.

**Table 1: OLS Regression Coefficients**

| Variable | Coefficient | Std. Error | t-Statistic | P-Value |
|---|---|---|---|---|
| Intercept | -1.0622 | 0.7426 | -1.4304 | 0.1804 |
| ln(Excise Duty) | 0.7237 | 0.1061 | 6.8234 | 0.0000 |

### 3.1.2 Model summary
Table 2 presents the overall performance of the regression model. The R-squared value of 0.809 indicates that approximately 81% of the variation in GDP is explained by variations in excise duty revenue. The adjusted R-squared of 0.792 further confirms the model's robustness after adjusting for the number of predictors. The F-statistic value of 46.56
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with a corresponding p-value of 0.00003 strongly rejects the null hypothesis that the model has no explanatory power. Collectively, these results demonstrate that the model provides a statistically valid and economically meaningful explanation of GDP fluctuations based on changes in excise duty revenue over the study period

**Table 2: Model Summary**

| R-squared | Adjusted R-squared | F-statistic | Prob (F-statistic) | Observations |
|---|---|---|---|---|
| 0.809 | 0.792 | 46.56 | 0.00003 | 13 |

### 3.1.3 Residual Diagnostics
The residual diagnostic in Figure 1, supports the diagnostic assessment of the OLS model in table 1. The plot shows that residuals are randomly scattered around the horizontal axis

(zero line), indicating that the assumptions of linearity and homoscedasticity (constant variance of residuals) are reasonably satisfied.
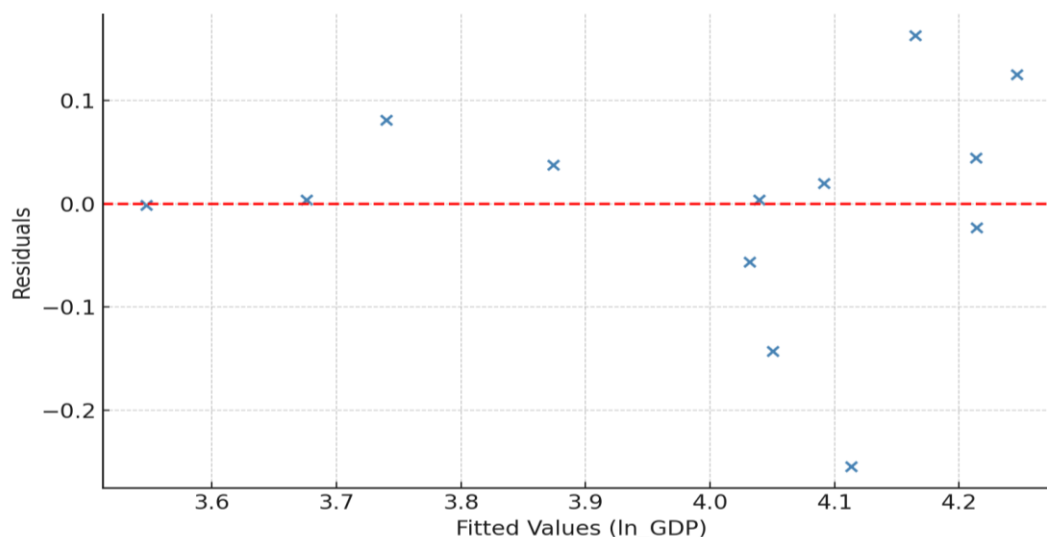
**Figure 1: Residuals vs Fitted Values**

Further the residual behaviour shown in figure 2 of the model was evaluated using several diagnostic techniques. The Normal Q-Q plot of residuals (Figure 2) shows that the residuals align closely along the 45-degree reference line, suggesting that the residuals are approximately normally distributed. While there are slight deviations at the tails, these are expected given the small sample size of 13 observations and do not pose serious concerns regarding the violation of the normality assumption.
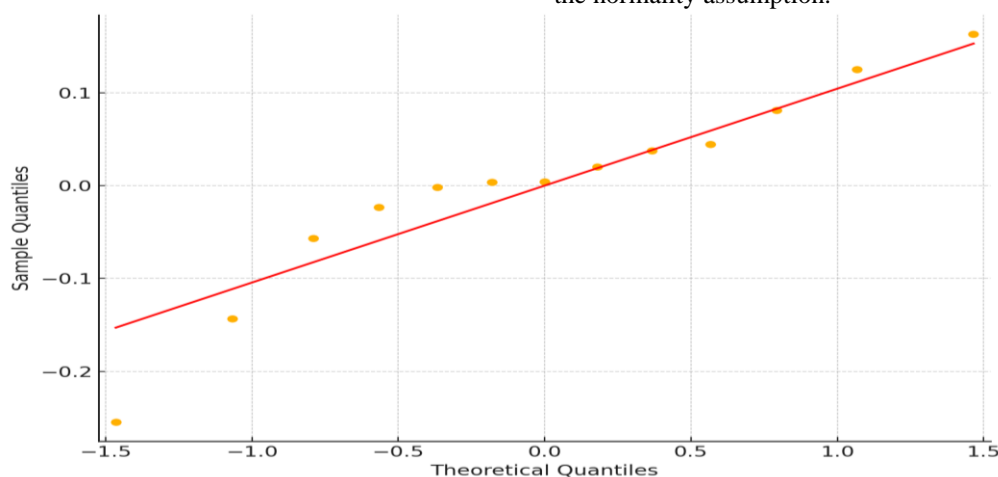


**Figure 2: Residual diagnostic using q-q plot**

## 4.0 DISCUSSION

This study provides empirical evidence supporting the existence of a strong and statistically significant long-run relationship between excise duty and Gross Domestic Product (GDP) in Tanzania over the period 2011/12 to 2023/24. The Ordinary Least Squares (OLS) estimation produced a positive coefficient of approximately 0.72 for the logarithmic transformation of excise duty, indicating that a 1% increase in excise revenue is associated with a 0.72% increase in GDP. This result aligns with the broader literature that underscores the importance of excise taxation in public finance management and macroeconomic performance (Boesen, 2021; Chaloupka, Powell, & Warner, 2019).

The findings are particularly significant in the context of Tanzania's fiscal reforms, including the introduction of the Electronic Tax Stamp (ETS) system, which has enhanced the efficiency and accuracy of excise tax collection. As noted by Sulanda, Mayala, and Komba (2024), the ETS has improved tax administration by reducing underreporting and illicit trade, thus ensuring that excise duty collections reflect actual market activity. This improved compliance mechanism likely contributed to the positive trend in excise revenue and its strong correlation with GDP observed in this study.

Further, excise taxation in Tanzania has demonstrated resilience as a source of public revenue due to its design around goods with relatively inelastic demand—such as tobacco, alcohol, and petroleum products. Kidane et al. (2015) emphasize that these commodities are not only significant contributors to fiscal income but also serve as policy tools for health and environmental outcomes. This dual role enhances the strategic value of excise duty in balancing economic growth and regulatory objectives. The positive

relationship identified in this study validates the effectiveness of excise tax policy as a developmental tool within Tanzania's broader economic strategy.

The Tanzanian case mirrors international evidence from other jurisdictions that have implemented targeted excise taxes. For example, Colchero et al. (2015) report that Mexico's excise tax on sugar-sweetened beverages resulted in both increased government revenue and decreased consumption. Similarly, Falbe et al. (2015) find a comparable outcome in Berkeley, California, where the excise tax on sugary drinks led to higher prices and improved tax collections. These studies support the argument that excise taxes can simultaneously generate revenue and serve broader economic and social policy goals, as seen in Tanzania.

Lastly, the observed relationship in this study is consistent with the theoretical expectations of fiscal policy's role in development. Epaphra (2015) notes that effective tax collection, particularly from well-targeted taxes such as excise duties, reduces tax evasion and supports national revenue generation. By financing critical public services and infrastructure, excise duty contributes indirectly to enhancing productivity and stimulating economic activity. Thus, the results of this study reinforce the importance of sustaining and refining excise tax policy as a means of supporting long-term economic growth in Tanzania.

## 5.0 IMPLICATIONS OF THE STUDY

The findings of this study have several critical implications for fiscal policy and public finance management in Tanzania. The strong positive relationship between excise duty and GDP reinforces the view that excise taxation is not only a revenue-raising mechanism but also a strategic lever for sustainable economic development. This aligns with international literature which supports the use of excise taxes to promote economic stability and self-reliance in developing countries (Morozov, 2017; Owino, 2019). In Tanzania's context, where the government seeks to reduce aid dependency and increase domestic resource mobilization, expanding the excise tax base and improving collection efficiency can contribute meaningfully to long-term fiscal sustainability (Maskaeva et al., 2022; Semboja et al., 2022).

Furthermore, the study's results suggest that excise taxes, when well-designed and efficiently administered, can complement broader macroeconomic goals such as infrastructure investment, poverty reduction, and social sector financing. As shown in previous research by Younger, Myamba, and Mdadila (2016), progressive tax instruments particularly those targeting consumption of non-essential goods have the potential to generate substantial public revenue without disproportionately burdening the poor. This is especially relevant in Tanzania, where inequality and informality remain key structural challenges. Strengthening excise tax policies can help rebalance the fiscal mix in favor of more equitable and growth-enhancing expenditures (Chindengwike, 2023; Kachumita, 2022).

On the policy front, the study provides evidence-based support for ongoing tax reform efforts aimed at modernizing Tanzania's tax system. The effectiveness of excise duty in promoting GDP growth supports recommendations from international development partners advocating for improved tax policy design and administration (Shirima, 2021; Mpfubhusa & Devotha, 2024). Additionally, the findings highlight the need for continued investment in taxpayer education, enforcement capacity, and data systems to ensure compliance and reduce evasion (Golden et al., 2016; Sharbaugh et al., 2018). As tax policy increasingly intersects with health, environmental, and behavioral economics, future excise reforms should consider multidimensional impacts ensuring that revenue objectives align with national development priorities.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

This study examined the impact of excise duty on Gross Domestic Product (GDP) in Tanzania using annual data from the 2011/12 to 2023/24 fiscal years. The empirical results from the Ordinary Least Squares (OLS) regression revealed a strong and statistically significant positive relationship between excise duty revenue and GDP. Specifically, a 1% increase in excise duty was associated with a 0.72% increase in GDP, indicating that excise taxation has been a reliable contributor to economic growth in Tanzania over the past decade.

Based on these findings, it is evident that excise duty serves not only as a critical revenue source but also as an instrument for stimulating economic output. The positive elasticity suggests that policies aimed at strengthening excise tax administration—such as expanding the Electronic Tax Stamp (ETS) system—can yield both fiscal and macroeconomic benefits. This affirms the strategic role of excise taxes in supporting Tanzania's development goals, especially in financing infrastructure, health, and education services.

Therefore, it is recommended that, the government should continue to modernize and digitize excise duty collection systems to enhance compliance and efficiency. Moreover, periodic reviews of excise duty rates and structures should be conducted to ensure they remain aligned with economic objectives and inflation trends. Lastly, public awareness campaigns and stakeholder engagement should be intensified to foster cooperation and reduce resistance among producers and consumers, thereby ensuring the sustainability and effectiveness of excise tax policy in Tanzania.

**Declarations and statements**
**Data availability**

| Year | Excise Duty (TZS Billion) | GDP (USD Billion) |
|------|---------------------------|-------------------|
| 2011/12 | 583.61 | 34.66 |
| 2012/13 | 697.39 | 39.65 |
| 2013/14 | 761.88 | 45.65 |
| 2014/15 | 916.95 | 49.99 |
| 2015/16 | 1275.78 | 47.41 |
| 2016/17 | 1169.87 | 49.77 |
| 2017/18 | 1140.31 | 53.27 |
| 2018/19 | 1151.74 | 57 |
| 2019/20 | 1237.78 | 61.03 |
| 2020/21 | 1466.61 | 66.07 |
| 2021/22 | 1465.15 | 70.66 |
| 2022/23 | 1370.01 | 75.77 |
| 2023/24 | 1533.7 | 79.16 |

**Source:** NBS and WB

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