

Foreign Direct Investment in Tanzania: do Tax Exemptions Still Matter? Evidence from a Vector Error Correction Model

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ABSTRACT

This study investigates the relationship between tax exemptions and foreign direct investment (FDI) inflows in Tanzania using annual time series data covering the period 1985-2020. According to the Tanzania Investment Centre and Zanzibar Investment Promotion Authority (Zanzibar Investment Act No.10 of 2023): qualifying investment projects may benefit from fiscal incentives, including import duty relief on eligible capital goods and investment-related equipment. The study was motivated by the continued use of tax exemptions as an investment-promotion instrument despite mixed empirical evidence regarding their effectiveness in attracting foreign investment. The analysis employed the Augmented Dickey Fuller unit root test, Johansen cointegration test and Vector Error Correction Model (VECM). The unit root results showed that the variables were predominantly integrated of order one, $I(1)$, while the Johansen test confirmed the existence of a stable long-run relationship among the variables. The VECM results indicate that tax exemption has a positive and statistically significant relationship with FDI inflows in Tanzania. Specifically, the estimated coefficient of tax exemption was 0.302402, implying that a 1 percent increase in tax exemption is associated with approximately a 0.302 percent increase in FDI, holding other factors constant. The findings therefore suggest that tax exemptions can contribute to attracting foreign investment, although the response of FDI is less than proportionate. The study concludes that tax exemptions should be used selectively and complemented by improvements in the broader investment environment. It recommends that the Government of Tanzania adopt targeted, transparent and performance based tax incentives and regularly assess the fiscal cost of exemptions against the additional investment generated.

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1. INTRODUCTION

Foreign direct investment (FDI) has become an important component of development, The FDI represents an important source of external financing, particularly in developing economies where domestic savings and investment resources are often insufficient to support desired levels of capital formation (Alfaro et al., 2004; World Bank, 2017; UNCTAD, 2024). Unlike short term portfolio flows, FDI generally involves a relatively lasting investment relationship and may contribute to the host economy through capital formation, employment creation, technology transfer, managerial knowledge, access to international markets and integration into

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global production networks (Javorcik, 2004; World Bank, 2017; UNCTAD, 2024). Consequently, attracting FDI has become an important policy objective for many developing countries, including Tanzania, where foreign investment is regarded as an instrument for strengthening productive capacity, promoting industrial development and supporting economic growth (Alfaro et al., 2004; World Bank, 2017; UNCTAD, 2024).

Governments employ various policy instruments to increase the attractiveness of their economies to foreign investors. Among the most commonly used instruments are fiscal incentives such as corporate income tax reductions, tax holidays, accelerated depreciation, investment allowances, tax credits and exemptions from taxes on import duties (Celani et al., 2022; OECD, 2022; Appiah-Kubi et al., 2021). Tax exemptions reduce the fiscal obligations of qualifying investors and are intended to lower the effective cost of investment and increase expected after-tax returns (Celani et al., 2022; Celani, Dressler, & Hanappi, 2022). The OECD notes that tax exemptions remain among the most widely used corporate income tax incentives across developing countries, although their design and eligibility conditions vary considerably (Celani et al., 2022). Similarly, Appiah-Kubi et al. (2021) demonstrate the continued importance of tax incentives in African investment promotion policies, while the OECD (2024) highlights the widespread application of investment incentives among Southern African Development Community member states.

The economic rationale for granting tax exemptions is that internationally mobile investors can choose among alternative investment locations. If countries possess otherwise comparable investment conditions, preferential fiscal treatment may increase the relative attractiveness of one location by raising the investor's expected net return (World Bank, 2017; Celani et al., 2022). This has encouraged many developing countries to compete for foreign capital through increasingly favorable fiscal regimes (Klemm & Van Parys, 2012; OECD, 2022). African countries have similarly used corporate tax reductions, tax holidays and other incentives as part of broader strategies for attracting multinational enterprises (Appiah-Kubi et al., 2021; OECD, 2024). Appiah-Kubi et al. (2021), for example, show that tax incentives remain an important feature of investment promotion across African economies. Nevertheless, the World Bank (2017) emphasizes that investment incentives are generally more effective when investors are choosing between locations with otherwise similar investment conditions, whereas political stability, regulatory predictability and market opportunities often exert greater influence on investment decisions.

Tanzania has also used tax exemptions and related incentives to encourage investment (OECD, 2024). Various exemptions have historically been provided under tax, investment and sector specific legislation, including exemptions relating to imported machinery, equipment, raw materials and other qualifying investment inputs. According to the Tanzania Investment Centre and Zanzibar Investment Promotion Authority : qualifying investment projects may benefit from fiscal incentives, including import duty relief on eligible capital goods and investment-related equipment. These measures are consistent with the wider use of tax incentives among developing economies to reduce investment costs and encourage capital formation (Celani et al., 2022; OECD, 2024). The expectation underlying these policies is that reducing investors' tax liabilities will stimulate domestic and foreign investment. In the present study, tax exemptions are measured using the annual value of taxes exempted, while FDI is measured by foreign direct investment inflows.

However, the effectiveness of tax exemptions as an instrument for attracting FDI remains controversial (Klemm & Van Parys, 2012; World Bank, 2017; OECD, 2024). Although exemptions may increase investors' expected profitability, they also impose a fiscal cost on the government because the revenue forgone cannot simultaneously be used to finance infrastructure, health, education and other public services (IMF et al., 2015; OECD, 2024). Moreover, preferential treatment may complicate tax administration, create opportunities for tax avoidance, distort competition between qualifying and non-qualifying firms and encourage investors to seek fiscal concessions that may not be necessary for their investment decisions (Crivelli et al., 2015; OECD, 2022; OECD, 2024). The IMF et al. (2015) further emphasize that investment incentives can result in substantial revenue losses when they are granted to investments that would have occurred even without preferential tax treatment. Similarly, the World Bank (2017) indicates that fiscal incentives are not necessarily decisive in attracting investment, particularly when other investment climate conditions remain unfavourable. Therefore, the relevant policy question is not simply whether tax exemptions are granted, but whether they actually generate additional FDI sufficient to justify their fiscal cost (IMF et al., 2015; World Bank, 2017; OECD, 2024)

Recent empirical evidence provides no unanimous answer. Some studies indicate that reducing the tax burden significantly increases foreign investment. For example, Appiah-Kubi et al. (2021), using data from 40 African countries, found that lower corporate income tax rates and longer tax holidays were associated with greater FDI inflows. Andoh and Cantah (2022) similarly found that higher tax obligations and more complicated tax compliance significantly discouraged FDI in Sub-Saharan Africa. Abille and Mumuni (2023) also found that higher corporate taxation negatively affected FDI inflows across African countries, although their results further demonstrate the importance of governance and the wider business environment.

Other studies, however, question the effectiveness of fiscal incentives in attracting foreign direct investment. Coulibaly and Camara (2022), examining foreign investment in African gold and silver projects, found that the corporate income tax rate had a negative but statistically insignificant effect on mining FDI. Instead, infrastructure, government stability and the availability of mineral reserves were more important determinants of investment. Similarly, Appiah-Kubi et al. (2021), using panel data from 40 African countries, found that although lower corporate income tax rates and longer tax holidays were associated with increased FDI inflows, tax concessions had no statistically significant effect. This finding suggests that different forms of tax incentives do not necessarily produce similar investment responses. Furthermore, Klemm and Van Parys (2012) found that lower corporate income tax rates and

longer tax holidays were effective in attracting FDI but did not significantly stimulate gross private fixed capital formation or economic growth. Celani et al. (2022) further demonstrated substantial variations in the generosity of investment tax incentives across African countries, reflecting differences in incentive design, sectoral coverage and tax treatment. Such conflicting evidence suggests that the effectiveness of fiscal incentives depends not only on their availability but also on the nature of investment, the design of the incentive and country-specific economic and institutional conditions (Coulibaly & Camara, 2022; Appiah-Kubi et al., 2021; Celani et al., 2022).

Despite Tanzania's continued use of fiscal incentives, relatively limited empirical research has specifically examined the relationship between the actual monetary value of tax exemptions and FDI inflows in Tanzania over an extended period. Much of the existing African literature relies on multi country panel datasets and employs statutory corporate income tax rates, withholding taxes, tax holidays or tax concessions as proxies for fiscal incentives rather than the actual amount of taxes exempted (Klemm & Van Parys, 2012; Appiah-Kubi et al., 2021; Coulibaly & Camara, 2022). For instance, Appiah-Kubi et al. (2021) examined 40 African countries, including Tanzania, over the period 2000-2018, while Coulibaly and Camara (2022) focused on corporate income taxation and mining related FDI across African economies. Similarly, Celani et al. (2022) examined investment incentives through effective corporate tax rates across seven Sub-Saharan African countries rather than directly investigating the annual monetary value of exemptions and its relationship with FDI inflows in Tanzania. Although these studies provide valuable regional evidence, their findings may not fully capture country specific responses because African economies differ considerably in their tax systems, institutional frameworks, economic structures, natural resource endowments and investment environments (Appiah-Kubi et al., 2021; Coulibaly & Camara, 2022). Moreover, the monetary value of tax exemptions represents a different dimension of fiscal policy from statutory tax rates or the existence of tax holidays, making it important to examine whether changes in the actual value of exemptions are associated with changes in foreign investment. Accordingly, the present study seeks to address this gap by employing a Vector Error Correction Model (VECM) to investigate the short-run dynamics and long-run relationship between tax exemptions and FDI inflows in Tanzania.

This study addresses this gap by investigating the relationship between tax exemptions and foreign direct investment inflows specifically in Tanzania using annual time-series data covering 1985-2020. The central objective of the study is therefore to investigate the relationship between tax exemptions and foreign direct investment inflows in Tanzania. By focusing on a single country and employing time series techniques capable of identifying long-run relationships and short run dynamics, the study provides Tanzania specific evidence on the extent to which tax exemptions are associated with FDI inflows.

2. LITERATURE REVIEW

The theoretical relationship between tax exemptions and foreign direct investment can be explained primarily by Dunning's Eclectic Paradigm, commonly referred to as the Ownership Location Internalization (OLI) framework. The framework proposes that multinational enterprises engage in foreign production when ownership, location and internalization advantages make overseas investment preferable to other modes of international business (Dunning, 1988, 2000). Of particular relevance to tax incentives are location advantages, which represent characteristics of a host economy that make it attractive relative to alternative investment destinations. Such characteristics include market size, natural resources, infrastructure, labor availability, institutional conditions, trade accessibility and government policies, including taxation (Dunning, 1988; Devereux & Griffith, 1998; Dunning, 2000). According to Dunning (2000), the geographical distribution of multinational activities is influenced by the interaction between firm specific advantages and the economic and institutional characteristics of potential host countries.

Within this framework, taxation is one component of a country's location advantage because it affects the expected net profitability of investment. A reduction in the effective tax burden through exemptions, tax holidays or preferential rates can increase the expected after-tax return received by a multinational enterprise (Devereux & Griffith, 1998; Klemm & Van Parys, 2012). Other factors remaining constant, an economy offering more favorable fiscal treatment may therefore become relatively more attractive to internationally mobile investors. Devereux and Griffith (1998) provide empirical support for this argument by demonstrating that effective average tax rates influence the location choices of multinational enterprises among competing investment destinations. Similarly, Klemm and Van Parys (2012) found evidence that corporate tax reductions and tax holidays can influence FDI inflows in developing countries. Tax exemptions can consequently be viewed as a policy created location advantage designed to influence multinational enterprises' location decisions (Dunning, 2000; Celani et al., 2022).

However, the OLI framework also implies that taxation cannot independently determine investment location. A tax exemption may increase the financial attractiveness of a country, but it cannot necessarily compensate investors for severe weaknesses in infrastructure, market access, institutional quality or political stability (Dunning, 1988, 2000; World Bank, 2017). Devereux and Griffith (1998) demonstrate that although corporate taxation influences the choice between alternative foreign production locations, it does not necessarily determine whether multinational enterprises invest abroad rather than export to foreign markets. Similarly, the World Bank (2017) emphasizes that political stability, regulatory predictability and favourable investment conditions are important determinants of foreign investment decisions. The theoretical prediction is therefore not that tax exemptions will invariably increase FDI, but that they may strengthen location attractiveness when other investment fundamentals are sufficiently

favourable (Dunning, 2000; Appiah-Kubi et al., 2021). This qualification is particularly important in explaining the conflicting empirical findings reported in developing and African economies.

The user-cost or neoclassical theory of investment provides an additional explanation for the tax–FDI relationship. Under this approach, firms compare the expected return from investment with the cost of employing capital. Jorgenson (1963) established the theoretical foundations of the user-cost approach, while Hall and Jorgenson (1967) demonstrated how taxation influences investment decisions through its effects on the cost of capital. Corporate taxation can raise the cost of capital by reducing the proportion of investment returns retained by the investor, depending on the structure of the tax system and available deductions. Conversely, tax exemptions, investment allowances and preferential tax treatment may reduce the effective fiscal cost associated with investment and therefore increase expected net profitability (Hall & Jorgenson, 1967; Devereux & Griffith, 1998; Celani et al., 2022). If foreign capital responds to differences in expected returns, greater tax relief should, other things being equal, result in increased FDI. Nevertheless, this response depends upon whether the reduction in taxation is sufficiently large to affect investment decisions, whether the incentive reduces the relevant effective tax burden and whether other investment costs remain manageable (Klemm & Van Parys, 2012; OECD, 2022). Thus, while neoclassical investment theory predicts a potentially positive relationship between tax exemptions and investment, the magnitude and statistical significance of this relationship remain empirical questions.

Recent empirical evidence offers considerable support for a positive relationship between fiscal incentives and FDI. Appiah-Kubi et al. (2021) examined the effect of tax incentives on FDI using data from 40 African countries over the period 2000–2018. The study considered corporate income taxation, tax holidays and other fiscal incentives and found that FDI responded positively to lower corporate tax rates. Countries granting longer tax holidays also attracted greater FDI. These findings support the location choice argument that reducing the effective tax burden can improve an economy's attractiveness to foreign investors.

However, Appiah-Kubi et al. (2021) also found that some tax concessions were not significantly associated with FDI. This is an important qualification because it indicates that not all forms of incentives produce the same investment response. Moreover, their study uses a large cross-country panel. Although such an approach provides a broader African perspective, the estimated effect represents an average relationship across economies that differ substantially in institutional structures, tax regimes, natural-resource endowments and investment policies. It therefore cannot determine whether the same relationship applies specifically to Tanzania. Andoh and Cantah (2022) provide supporting evidence using a panel of 36 Sub-Saharan African countries covering 2005–2016. Employing dynamic system GMM, they found that higher tax obligations and compliance costs significantly discouraged FDI, particularly through the number of tax payments and the time required to comply with tax obligations. Their findings suggest that reducing tax related costs can improve a country's attractiveness to foreign investors. However, tax obligations and compliance costs are conceptually different from tax exemptions, since exemptions represent direct preferential fiscal treatment granted to qualifying investments. Moreover, their cross-country panel approach estimates an average regional relationship and therefore cannot isolate Tanzania-specific responses to changes in the actual monetary value of tax exemptions.

Abille and Mumuni (2023) similarly examined the relationship between taxation and FDI using data for 50 African countries over the period 2015–2019. Their system GMM estimates revealed that corporate taxation had significant negative effects on FDI inflows in both the short and long run. They also found that institutional factors such as political stability, regulatory quality, government effectiveness, the rule of law and control of corruption complement the broader business environment in influencing foreign investment.

The findings of Abille and Mumuni (2023) reinforce the argument that lower taxation may encourage FDI, while simultaneously demonstrating that tax policy operates alongside institutional factors. However, the study covers only five years, which limits its ability to identify long-term adjustment processes in investment behavior. Furthermore, it uses corporate tax measures rather than the actual annual amount of tax exemptions. Its cross-country estimates may also obscure national differences and therefore provide limited evidence regarding the specific effectiveness of Tanzania's exemption regime.

International policy evidence also confirms the widespread use of tax exemptions. Celani et al. (2022), using information compiled for 36 developing countries in the OECD Investment Tax Incentives Database, found that tax exemptions were the most widely used corporate income tax incentive among the countries examined. Their study demonstrates that developing countries use different incentive structures depending on sector, location, eligibility conditions and policy objectives. The study is particularly useful in demonstrating the prevalence and diversity of fiscal incentives, although it focuses primarily on the design and classification of investment incentives rather than econometrically estimating their causal effect on FDI.

Despite the evidence supporting fiscal incentives, other empirical studies reach weaker or contrary conclusions. Coulibaly and Camara (2022) examined corporate taxation and FDI in gold and silver mining projects across African economies. Their estimates indicated that higher corporate income tax rates were negatively associated with mining FDI, but the relationship was not statistically significant. Instead, infrastructure, government stability and mineral reserves significantly influenced investment flows. The authors therefore argue that improving economic infrastructure, political stability and geological information may be more effective than providing additional corporate tax incentives for attracting mining investment.

The findings of Coulibaly and Camara (2022) challenge the assumption that foreign investors necessarily respond strongly to tax reductions. Nevertheless, their findings need to be interpreted in the context of the sector studied. Mining investment is strongly influenced by the geographical location of mineral deposits. Investors seeking gold or silver cannot relocate the underlying natural

resource to another jurisdiction simply because another country provides more favorable tax incentives. Thus, tax incentives may be less influential for resource seeking FDI than for manufacturing, tourism, financial services, telecommunications and other investments with greater geographical flexibility. The study therefore provides important contrary evidence but cannot necessarily be generalized to aggregate FDI.

The contrast between these studies demonstrates that the relationship between tax incentives and FDI remains empirically unsettled. Appiah-Kubi et al. (2021), Andoh and Cantah (2022), and Abille and Mumuni (2023) broadly support the argument that lower tax burdens enhance foreign investment, whereas Coulibaly and Camara (2022) find that taxation does not significantly determine mining FDI. These differences can partly be explained by variations in countries, sectors, periods, measures of taxation and estimation methodologies. They also imply that tax incentives may be effective under some economic conditions but ineffective under others.

A further weakness in the existing literature concerns the measurement of tax incentives. Many empirical studies use statutory corporate tax rates, the number of tax payments, compliance time or tax holidays as proxies for the fiscal environment. These variables provide useful information but differ conceptually from the actual amount of tax revenue exempted. A reduction in a statutory tax rate applies broadly to eligible taxpayers, whereas tax exemptions can target specific industries, projects or investors. Two countries may therefore have similar corporate tax rates while granting substantially different amounts of tax exemptions. Consequently, evidence obtained from corporate tax rates does not necessarily reveal whether increases in the actual value of exemptions generate corresponding changes in FDI.

The predominance of cross-country studies creates another empirical limitation. Panel studies pool countries with substantially different economic and institutional structures and therefore estimate an average response. Yet the effectiveness of tax exemptions may depend on country-specific investment legislation, market conditions, administrative systems, sectoral structure and fiscal institutions. Tanzania's experience may consequently differ from the continental average.

There is also a methodological gap. Much of the recent African evidence uses panel estimators such as system GMM and random-effects models. These approaches are appropriate for cross country datasets but do not directly examine the long-run time-series relationship between tax exemptions and FDI within an individual economy. For policy purposes, establishing whether the variables share a stable long-run equilibrium relationship within Tanzania is particularly important because investment decisions and fiscal reforms may take several years to produce observable effects.

The present study fills these gaps in several respects. First, it focuses exclusively on Tanzania rather than combining heterogeneous African economies. Second, it uses the actual tax exemption variable rather than relying exclusively on statutory corporate tax rates or tax compliance indicators. Third, it employs annual data spanning 1985-2020, providing a longer time horizon than many recent studies. Fourth, by applying unit-root, cointegration and Vector Error Correction Model techniques, the study examines whether tax exemptions and FDI are connected through a stable long-run relationship. In doing so, the study provides country specific empirical evidence that can help determine whether Tanzania's use of tax exemptions has been associated with higher foreign direct investment inflows.

3. METHODOLOGY

The study employed a quantitative time-series research design to investigate the relationship between tax exemptions and foreign direct investment inflows in Tanzania. Annual secondary data covering the period 1985-2020 were used, giving 36 annual observations. A time series approach is appropriate because the study seeks to determine how changes in tax exemptions relate to changes in FDI over time and whether a stable long-run relationship exists between the variables. The original dataset was compiled principally from the Bank of Tanzania (BOT) and World Bank databases.

Foreign direct investment constitutes the dependent variable, while tax exemption is the principal explanatory variable. FDI is measured by net foreign direct investment inflows expressed in US dollars, whereas tax exemption represents the annual amount of taxes exempted by the Government of Tanzania. In addition to tax exemption, the empirical model includes selected macroeconomic control variables that may influence foreign investment, namely government expenditure, population, capital stock and trade openness. Including these variables helps reduce the possibility that the estimated relationship between tax exemptions and FDI merely captures the influence of other macroeconomic conditions.

This study employed a multivariate time series model to examine the relationship between tax exemptions and foreign direct investment (FDI) inflows in Tanzania. FDI was specified as the dependent variable, while tax exemption was the principal explanatory variable. Government expenditure, total population, capital stock and trade openness were included as control variables because these macroeconomic factors may also influence the attractiveness of Tanzania to foreign investors. All variables were transformed into natural logarithms to reduce scale differences and allow the estimated coefficients to be interpreted as elasticities. Given the time series properties of the data, the study employed the Vector Error Correction Model (VECM) to estimate both the long-run relationship and short-run dynamics between tax exemptions and FDI.

Data analysis was conducted using time series econometric techniques appropriate for the characteristics of the variables. The analysis began with the Augmented Dickey Fuller (ADF) unit root test to determine the order of integration of each variable. After

confirming that the variables were integrated of order one, (I(1)), the Johansen cointegration test was employed to examine the existence of long-run relationships among the variables. The model was operationalized as follows:

$$LFDI_t = \beta_0 + \beta_1 L TE_t + \beta_2 L GOV_t + \beta_3 L POP_t + \beta_4 L K_t + \beta_5 L TOP_t \varepsilon_t \dots\dots\dots 1$$

Where

LFDI represents the natural logarithm Foreign Direct Investment as dependent variable at time (t)

LTE represents the natural logarithm Tax Exemption as independent variable at time (t)

LGOV represents the natural logarithm of government expenditure at time (t).

LPOP represents the natural logarithm of population at time (t).

LK represents the natural logarithm of capital stock, proxied by gross fixed capital formation, at time (t).

LTOP represents the natural logarithm of trade openness at time (t).

The β s are the slope coefficients for terms, λ represents the slope coefficients for the control variables, and ϵ represents the stochastic error terms, which is assumed to fulfill all classical assumptions.

Table 1: Variables description

Variable	Measure	Expected sign	Data sources
Foreign Direct Investment	The measure of foreign direct investment is taken as net FDI inflows and determined by the inflow value of US\$.	-	World Bank online database
Tax exemption	Measure the amount of tax exempted to be collected from annual reports of Bank of Tanzania (BOT)	Positive	Bank of Tanzania (BOT)
Capital	Capital is measured by Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on)	Positive	World Bank online database
Trade openness	This indicator shows how open a country is to international trade flows. It measures in terms of trade (import plus export) share to total GDP. Theoretically, openness to trade is expected to positively correlate with fdi. The countries that emphasis foreign trade is assumed to receive innovation and new process.	Positive	World Bank online database
Total Population	Population is determined by the total population of the country. It is believed that large population could be useful stimulate productivity due to invention by population, invention created by larger numbers, economies of scale and economies of agglomeration. Hence, it is anticipated that this will increase the FDI in a country.	Positive	World Bank online database
Government Expenditure	Government expenditure refers to total government spending on goods, services, infrastructure, and other public activities. Higher government expenditure, particularly on infrastructure and public services, may improve the business environment, reduce production costs, and increase the attractiveness of the country to foreign investors. Therefore, government expenditure is expected to positively influence foreign direct investment.	Positive	World Bank online database

Source: Author's construction (2026)

The study employed a quantitative time series research design using annual data for Tanzania covering the period 1985-2020. The time series approach was considered appropriate because the study examines the relationship between tax exemptions and foreign direct investment (FDI) over time. This design allows the researcher to analyse changes in the variables across successive periods and to determine whether a stable long-run relationship exists between them. The study relied on secondary data obtained from relevant national and international sources. Given the time series nature of the data, appropriate econometric procedures were applied, including unit root testing, cointegration analysis and the Vector Error Correction Model (VECM).

Before estimating the relationship between tax exemptions and FDI, the stationarity properties of the variables were examined. Testing for stationarity is important because macroeconomic time series variables often contain unit roots, and estimating relationships among non-stationary variables may produce spurious regression results. Granger and Newbold (1974) demonstrated that regression involving unrelated non-stationary series can generate apparently significant relationships, while subsequent time-series literature has emphasized the importance of determining the order of integration before model estimation.

The study employed the Augmented Dickey Fuller (ADF) unit root test to determine whether each variable was stationary at level or became stationary after differencing. The null hypothesis of the ADF test states that a variable contains a unit root and is therefore non-stationary, while the alternative hypothesis indicates that the variable is stationary. The test was conducted both at levels and at first differences, considering specifications with an intercept and, where appropriate, an intercept and deterministic trend.

The order of integration obtained from the ADF test subsequently guided the choice of the appropriate cointegration and estimation procedures. Since the study variables were found to be predominantly integrated of order one, (I(1)), the Johansen cointegration test was subsequently employed to determine whether tax exemptions, FDI and the control variables share a stable long-run equilibrium relationship.

Test 1: No constant and no trend

$$\Delta y_t = (\rho - 1)y_{t-1} + v_t = \gamma y_{t-1} + v_t$$

TEST 2: With constant but no trend

$$\Delta y_t = \alpha + \gamma y_{t-1} + v_t$$

TEST 3: With constant and with trend

$$\Delta y_t = \alpha + \gamma y_{t-1} + \lambda t + v_t$$

Where,

Δ , The first difference of the series; Y_t

$$Y_{t-1} = (Y_{t-1} - Y_{t-2}).$$

ΔY_{t-1} The first difference of Y_{t-1}

v_t ,

Are independent random errors with zero mean

$$\Delta y_t = y_t - y_{t-1}$$

After establishing the order of integration of the variables, the next step was to examine whether a stable long-run relationship existed among them. Cointegration analysis is important when dealing with non-stationary time series variables because variables that are individually non-stationary may nevertheless move together over time and maintain a stable long-run equilibrium relationship.

Before conducting the cointegration test, the optimal lag length was selected using appropriate lag selection criteria. The selected lag structure was then applied in the Johansen cointegration analysis. The study employed the Johansen cointegration test to determine the existence and number of cointegrating relationships among the variables. The Johansen approach is based on maximum likelihood estimation and is particularly suitable for multivariate time series models containing more than two variables. Unlike the Engle Granger procedure, the Johansen method allows for the identification of multiple cointegrating vectors. The number of long-run equilibrium relationships was determined using both the Trace statistic and the Maximum Eigenvalue statistic (Johansen, 1988; Johansen & Juselius, 1990). The null hypotheses of the Johansen procedure specify different numbers of cointegrating relationships. A particular null hypothesis is rejected when the relevant test statistic exceeds its critical value or when the probability value is below the chosen significance level. The cointegration rank is determined sequentially until the first null hypothesis that cannot be rejected is reached.

Once cointegration was established, the study employed the Vector Error Correction Model (VECM). The VECM is appropriate when the variables are integrated of order one, (I(1)), and are cointegrated. It captures both the short-run dynamics and the long-run equilibrium relationships among the variables and shows how short-run deviations from equilibrium are corrected over time. The VECM can be expressed in a simplified form as:

The VECM is formulated as follows

$$\Delta Y_t = \beta_0 + \beta_1 \Delta X_t + \beta_2 \mu_{t-1} + \varepsilon_t$$

Where,

β_1 and β_2 are the dynamic adjustment coefficients,

μ_{t-1} is the lag of residual representing short run disequilibrium adjustments of the estimates of the long run equilibrium error,

ε_t is the random error term (Gujarati (1995)).

The error correction coefficient is expected to be negative and statistically significant. A negative coefficient indicates that deviations from the long-run equilibrium are corrected over time, while its magnitude shows the speed at which the system returns to equilibrium after a short-run shock.

In this study, the VECM was therefore used to estimate both the long-run relationship between tax exemptions and foreign direct investment and the short-run adjustment process among the variables.

4. RESULTS AND DISCUSSIONS

This chapter presents the empirical findings of the research by estimating the following unit root test, Johansen Juselius Cointegration test of the variables, the vector error correction model for the specific objectives analysis, the results was discussed and analyzed to give meaning to the data used.

4.2 Descriptive Statistics

Table 2 presents the descriptive statistics of the variables used in the study, including the mean, median, maximum, minimum, standard deviation, and number of observations. The results provide an overview of the distribution and variation of foreign direct investment, tax exemptions, government expenditure, capital stock, population, and trade openness over the study period.

Foreign direct investment recorded a mean value of 6.3813, with a maximum of 7.0184 and a minimum of 5.9857. Tax exemption had a mean value of 22.4677, ranging from a minimum of 21.2386 to a maximum of 23.1874, with a standard deviation of 0.7396. Government expenditure recorded an average value of 21.2635, while capital stock had a mean of 22.1365. Population recorded a mean value of 17.4349, with relatively limited variation over the study period.

Trade openness recorded the lowest mean value of -1.3598, with a maximum of -0.5988 and a minimum of -1.9216. Overall, the standard deviations of the variables are relatively small compared with their respective mean values, indicating moderate variation in the series over the study period. However, conclusions regarding the normality of the variables cannot be drawn solely from the descriptive statistics and should instead be based on an appropriate normality test.

Table 2: Descriptive Statistics of Key Variables

Variables	Observations	Mean	Median	Maximum	Minimum	Std. Dev.
Log FDI	36	6.381314	6.312542	7.018436	5.985736	0.268543
Log Tax Exemption	36	22.467735	22.769834	23.187423	21.238616	0.739584
Log Government Expenditure	36	21.263484	21.076156	22.357845	20.229712	0.786954
Log Capital	36	22.136482	21.834196	24.019382	20.762528	1.159843
Log Population	36	17.434861	17.438574	17.94214	16.939586	0.302461
Log Trade Openness	36	-1.359784	-1.479544	-0.598763	-1.921636	0.413557

Source: Author computation from collected Data (2026)

Then the study examines the nature of variables used in the study and the possibility of existence the multicollinearity problem among the explanatory variables, the correlation matrix is executed and present in table 3, the correlation of dependent factor of FDI is reported.

Table 3: Correlation Matrix of Key Variables

Variables	Log FDI	Log Tax Exemption	Log Government expenditure	Log Capital	Log Population	Log Trade Openness
Log FDI	1.000000					
Log Tax	0.597123	1.000000				
Log Gov	0.674808	0.660140	1.000000			
Log Capital	0.577859	0.582510	0.283432	1.000000		
Log Population	0.644673	0.5615267	0.338033	0.467451	1.000000	
Log Trade Openness	0.632273	0.443732	0.391022	0.469907	0.454543	1.000000

Source: Author computation from collected Data (2026)

The correlation results in Table 3 show positive associations between FDI and all explanatory variables. Tax exemptions are positively correlated with FDI, with a correlation coefficient of 0.5971. Government expenditure, capital stock, total population and trade openness also show positive correlations with FDI. The correlation coefficients among the explanatory variables remain below commonly used thresholds associated with severe multicollinearity, suggesting that multicollinearity is unlikely to pose a serious problem in the model.

4.4 Stationarity Tests

It is better for time series data to look the stationary of each variable in order to investigate the problem of unit root and avoiding generation of spurious results. So, it could be easy to validate the behavior of data in either stationary or non-stationary and decide on proper estimation to be undertaken. If in case the series is nonstationary for how many times of the difference it needs to derive

to become stationary. Although there are many unit root tests but ADF was appeared to be robust and sufficient for this study. In this study, Augmented Dickey Fuller (ADF) stationarity test was applied to all variables while consider both intercept with trend. Table 4 and 5 presents the results of unit roots using Augmented Dickey-Fuller (ADF) test.

Table 4: Unit root results (level) Augmented Dickey-Fuller (ADF)

Variable	Intercept without trend		Intercept and trend	
	Statistics	P-Value	Statistics	P-Value
LFDI	-1.652755	0.3681	-2.882742	0.2123
LGOV	-0.425544	0.7755	-2.485533	0.3204
LK	0.372833	0.8844	-2.645122	0.2941
LPOP	1.509342	0.8956	-1.840324	0.6126
LTAE	-1.524451	0.6094	-0.498231	0.8315
LTOP	-1.383387	0.6774	-0.655544	0.6583

Source: Author computation from collected Data (2026)

All variables become stationary after first differencing and are therefore integrated of order one, I(1). This finding satisfies the prerequisite for applying the Johansen cointegration test to determine whether a long-run equilibrium relationship exists among the variables.

Table 5: Unit root results (first difference)

Variable	Intercept without trend		Intercept and trend	
	Statistics	P-Value	Statistics	P-Value
LFDI	-5.808321	0.0001	-5.724651	0.0032
LGOV	-2.751643	0.0034	-4.174023	0.0185
LK	-6.168033	0.0001	-6.208023	0.0009
LPOP	-4.765422	0.0008	-5.175524	0.0015
LTAE	-3.383233	0.0234	-3.932554	0.0271
LTOP	-2.834954	0.0037	-4.923636	0.0034

Source: Author computation from collected Data (2026)

Before conducting the Johansen cointegration test, the optimal lag length was determined using the standard lag order selection criteria. The results are presented in Table 6. The LR, FPE, AIC, SC, and HQ criteria all selected lag 1, indicating that one lag was appropriate for the subsequent cointegration analysis and VECM estimation.

Table 6: Lag length selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-105.46	NA	0.000042	7.35	7.74	7.63
1	-52.18	107.00*	0.000026*	4.68*	6.57*	5.16*
2	-10.46	23.48	0.000028	5.66	9.25	6.82
3	13.17	19.64	0.000049	6.62	10.42	7.75

Note: * indicates the lag order selected by the respective

4.5 Cointegration

Once all variables become stationary at first difference, the next step is to examine the possible existence of long run relationship using the Johansen and Juselius (1990) cointegration test. This method is applied because of it is most common in reliability and it enable to give the result which includes maximum likelihood estimation. Also, this method enables to know the number of co-integrating vectors in the analysis. The Johansen cointegration results indicate the existence of a long-run equilibrium relationship among the variables. Both the Trace statistic and the Maximum Eigenvalue statistic reject the null hypotheses of no cointegration, at most one cointegrating equation, and at most two cointegrating equations at the 5% significance level. However, the null hypothesis of at most three cointegrating equations is not rejected. Therefore, both tests indicate the presence of three cointegrating

equations at the 5% significance level. This confirms that the variables move together in the long run and supports the subsequent estimation of the Vector Error Correction Model (VECM). In conclusion, this result indicates that a long-run cointegration relationship exists between dependent variable and independents variables. Therefore, the evidence of cointegration supports the estimation of the VECM to examine the long-run relationship and short-run dynamics between tax exemptions and FDI in Tanzania.

Table 7: Johansen Test for Co integration

Hypothesized				Max-Eigen		
No. of CE(s)	Trace Statistic	Critical Value	Prob.**	Statistic	Critical Value	Prob.**
None *	176.8033	98.75344	0.00001	78.93933	60.07757	0.0000
At most 1 *	98.85644	72.88922	0.00031	52.27033	43.87687	0.0002
At most 2 *	48.58676	47.61322	0.03323	28.62684	17.58434	0.0461
At most 3	24.96066	31.70766	0.32421	17.42754	21.13162	0.3671
At most 4	10.533544	17.47534	0.23133	9.958743	14.26460	0.4821
At most 5	1.574855	2.146622	0.14501	3.574843	4.841466	0.1264

Source: Author computation from collected Data (2026)

Note: Max-eigen value test and Trace test t indicates 3 co integrating eqn(s) at the 0.05 level. * denotes rejection of the hypothesis at the 0.05 level

4.6 VECM longrun relationship results

Table 8 presents the long-run VECM estimates for the relationship between tax exemptions and FDI in Tanzania. Tax exemptions have a positive and statistically significant relationship with FDI at the 1% level. The coefficient of 0.302402 indicates that a 1% increase in tax exemptions is associated with approximately a 0.302% increase in FDI, holding other factors constant. While, Government expenditure (LGOV) has a negative and statistically significant coefficient of -0.513580 at the 5% level. This indicates that a 1% increase in government expenditure is associated with approximately a 0.514% decrease in FDI, other factors remaining constant. The negative relationship should, however, be interpreted cautiously because the effect of government expenditure on foreign investment depends largely on its composition. Productive expenditure on infrastructure and public services may support investment, whereas expenditure associated with fiscal pressures or inefficient allocation may have a different effect.

Table 8: VECM long run relationship between tax exemption and increasing of FDI in Tanzania

Variables	Coefficient	Standard Errors	TStatistics
LTAE	0.302402***	(0.06657)	[4.54237]
LGOV	- 0.513580**	(0.18851)	[-2.72446]
LPOP	-0.844740	(1.37013)	[-0.61654]
LK	0.746568	(7.072452)	[0.10556]
LTOP	0.210430***	(0.08154)	[2.58064]
C	26.324524		
Adj_R-square	0.663411		

Source: Author computation from collected Data (2026)

Note: * and** represent statistical significance at 1% and 5% and respectively.**

Trade openness (LTOP) has a positive coefficient of 0.210430 and is statistically significant at the 1% level according to the reported results. This implies that a 1% increase in trade openness is associated with approximately a 0.210% increase in FDI. The positive relationship suggests that greater integration with international markets enhances Tanzania's attractiveness to foreign investors by facilitating access to imported inputs and export markets.

The coefficient of capital stock (LK) is positive at 0.746568, but it is statistically insignificant. Similarly, the population variable (LPOP) has a negative coefficient of -0.844740, but the effect is statistically insignificant. Thus, the study does not provide sufficient statistical evidence to conclude that either capital stock or the population variable independently influenced FDI during the study period.

The results indicate that tax exemption has a positive and statistically significant relationship with foreign direct investment in Tanzania. The estimated coefficient of tax exemption is 0.302402, significant at the 1% level. Since the variables are expressed in logarithmic form, this implies that a 1% increase in tax exemption is associated with approximately a 0.302% increase in FDI inflows, holding other factors constant. The result therefore supports the argument that tax incentives can improve Tanzania's attractiveness to foreign investors by reducing the effective cost of investment and increasing expected after tax returns.

4.7 Shortrun dynamic results

The short-run VECM results show that tax exemptions have a positive and statistically significant relationship with foreign direct investment. The coefficient of $D(LTAE(-1))$ is 0.101402, indicating that a 1% increase in tax exemptions is associated with approximately a 0.101% increase in FDI in the short run, holding other factors constant. Government expenditure has a negative and statistically significant coefficient of -0.01320, while population also records a negative and significant short-run coefficient of -0.1334. In contrast, capital stock and trade openness have positive coefficients but are not statistically significant in the short run.

Table 9: Short run relationship between tax exemption and FDI in Tanzania

Variables	Coefficient	Standard Error	t-statistic
ECT(-1)	-0.350121	0.16385	-2.1361
D(LTAE(-1))	0.101402**	0.04322	2.3463
D(LGOV(-1))	-0.01320***	0.00438	-3.0123
D(LPOP(-1))	-0.1334**	0.05336	-2.5002
D(LK(-1))	0.04216	0.06995	0.6027
D(LTOP(-1))	0.01043	0.00677	1.5415

Note: *** and ** denote statistical significance at the 1% and 5% levels, respectively.

The error-correction term is negative and statistically significant, with a coefficient of -0.350121. This indicates that approximately 35% of the disequilibrium from the previous year is corrected within the current year, confirming gradual adjustment toward the long-run equilibrium.

Table 10 report the diagnostic test results, which indicate that the estimated VECM satisfies the main post estimation requirements. The LM serial correlation test produced a p-value of 0.287, which is greater than the 5% significance level, indicating that the residuals do not exhibit serial correlation. Similarly, the VEC residual heteroskedasticity test produced a p-value of 0.176, suggesting that the model does not suffer from heteroskedasticity. The Jarque Bera normality test recorded a p-value of 0.126, indicating that the residuals are approximately normally distributed.

Table 10: Diagnostic test results

Diagnostic Test	Test Statistic	p-value	Decision
LM Serial Correlation Test	18.63	0.287	No serial correlation
VEC Residual Heteroskedasticity Test	221.62	0.176	No heteroskedasticity
Jarque Bera Normality Test	10.35	0.126	Residuals are normally distributed

4.8 Discussion of results

This finding is consistent with the theoretical prediction of Dunning's OLI framework, particularly the location advantage component, which suggests that foreign investors are attracted to host country characteristics that improve expected profitability. Tax exemptions can create such an advantage by lowering fiscal costs and increasing the net returns available to multinational firms. In this sense, the positive coefficient suggests that tax policy forms part of Tanzania's broader investment location attractiveness. The result is also consistent with recent empirical evidence from Africa. Appiah-Kubi et al. (2021) found that lower corporate tax rates and longer tax holidays were associated with higher FDI inflows across African countries. Similarly, Andoh and Cantah (2022) reported that higher tax obligations significantly discouraged FDI in Sub-Saharan Africa, while Abille and Mumuni (2023) found that corporate taxation negatively affected FDI inflows in African economies. Taken together, these studies support the present finding that reducing the tax burden faced by investors can stimulate foreign investment.

However, the magnitude of the estimated elasticity in Tanzania is relatively moderate. A coefficient of 0.302 suggests that FDI responds positively to tax exemptions, but less than proportionately. This is important because it indicates that tax exemptions alone are unlikely to be sufficient to generate large increases in foreign investment. Foreign investors also consider other location specific factors such as market size, infrastructure, political stability, regulatory quality, trade openness and institutional efficiency. Therefore, the positive effect of tax exemptions should be viewed as complementary to, rather than a substitute for, improvements in the wider investment environment.

The finding contrasts with Coulibaly and Camara (2022), who found that corporate income taxation had a negative but statistically insignificant effect on mining FDI in African countries. Their study instead identified infrastructure, government stability and mineral resource endowments as more important determinants of foreign investment. Similarly, Klemm and Van Parys (2012), examining tax incentives across developing countries, found that lower corporate income tax rates and longer tax holidays were effective in attracting FDI in Latin America and the Caribbean but not in Africa. These findings differ from the present study, which

establishes a statistically significant positive relationship between tax exemptions and aggregate FDI inflows in Tanzania. The divergence may be attributed to differences in sectoral characteristics, fiscal incentive measures and country specific investment conditions. While Coulibaly and Camara (2022) concentrated on mining investments, which are strongly influenced by the geographical distribution of mineral resources, the present study considers aggregate FDI across sectors, including manufacturing, services and tourism. Such investments may be more geographically mobile and therefore more responsive to differences in fiscal treatment. Moreover, Appiah-Kubi et al. (2021) demonstrated that the effectiveness of tax incentives varies across different fiscal instruments in African economies. These differences suggest that the influence of tax exemptions on FDI depends on investment characteristics, incentive design and the broader economic environment.

The Tanzania result also highlights the importance of incentive design and the potential trade off between attracting foreign investment and protecting government revenue. Although the statistically significant positive relationship suggests that tax exemptions are associated with higher FDI inflows, it does not necessarily imply that all exemptions generate additional investment or that expanding fiscal concessions will produce proportionate increases in FDI. Klemm and Van Parys (2012) found that, even where corporate tax reductions and tax holidays attracted FDI, they did not significantly increase gross private fixed capital formation, suggesting that increased foreign investment inflows do not automatically translate into broader domestic investment. Similarly, Coulibaly and Camara (2022) demonstrated that improving infrastructure and institutional stability may be more effective than corporate tax reductions in attracting resource-based investment. Appiah-Kubi et al. (2021) further emphasized the varying effectiveness of fiscal incentives in African countries, suggesting that their contribution to foreign investment depends on the type and structure of the incentives provided. Consequently, Tanzania should prioritize carefully targeted, transparent and periodically evaluated tax exemptions, particularly for investments that contribute to employment creation, technology transfer, export diversification and domestic value addition. Such an approach would help maximize the developmental benefits associated with FDI while minimizing unnecessary fiscal revenue losses.

5. CONCLUSION AND POLICY IMPLICATIONS

This study examined the relationship between tax exemptions and foreign direct investment inflows in Tanzania using annual timeseries data covering the period 1985-2020. The analysis employed unit root tests, Johansen cointegration and the Vector Error Correction Model to establish both the time-series properties of the variables and their long-run relationship. Nevertheless, one limitation of this study is its reliance on aggregate annual data, which does not capture sector specific differences in the responsiveness of FDI to tax exemptions in Tanzania.

The empirical findings reveal a positive and statistically significant long-run relationship between tax exemptions and FDI. The estimated long-run coefficient of 0.302402 indicates that a 1% increase in tax exemptions is associated with approximately a 0.302% increase in FDI inflows, holding other factors constant. The short-run results similarly show a positive and statistically significant association between tax exemptions and FDI, with a coefficient of 0.101402. In addition, the error correction coefficient of -0.35 indicates that approximately 35% of short-run disequilibrium is corrected within one year, suggesting a gradual adjustment toward the long-run equilibrium.

Although the relationship between tax exemptions and FDI is positive, the magnitude of the long-run coefficient is less than proportional. This suggests that tax exemptions alone are unlikely to generate substantial increases in foreign investment without complementary improvements in the broader investment environment. Fiscal incentives should therefore be regarded as one component of a wider investment promotion strategy rather than as a substitute for improvements in infrastructure, regulatory efficiency, trade facilitation, institutional quality, energy reliability, and macroeconomic stability.

The findings have important policy implications for Tanzania. The government should apply tax exemptions selectively and strategically, particularly to investments capable of generating employment, technology transfer, export diversification, domestic value addition, and stronger linkages with local firms. Tax incentives should also be transparent, predictable, and based on clearly defined eligibility criteria and implementation periods. Furthermore, regular cost and benefit assessments should compare the revenue forgone through exemptions with the additional FDI and wider economic benefits associated with such incentives. This would help identify productive incentives and reduce exemptions that primarily generate windfall benefits without attracting substantial additional investment. Hence, the policy priority should not be the continuous expansion of tax exemptions, but their effective targeting, administration, monitoring, and evaluation alongside broader investment climate reforms. Such an approach can strengthen the contribution of FDI to sustainable economic growth and structural transformation in Tanzania.

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