Revisiting the Twin Deficits Hypothesis: An Empirical Analysis of the Relationship Between Budget Deficits and Trade Deficits in Tanzania (2003–2023)

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Abstract

This study revisits the Twin Deficits Hypothesis in the context of Tanzania. It examines the causal link between budget and trade deficits using quarterly data from 2003 to 2023 sourced from the Bank of Tanzania. The analysis employs a Vector Error Correction Model framework following unit root and Johansen cointegration tests, complemented by Granger causality analysis. The results confirm a long-run equilibrium relationship between the two deficits and identify a unidirectional short-run causality from the trade deficit to the budget deficit, aligning with the Current Account Targeting Hypothesis. These findings imply that external imbalances are key drivers of fiscal pressure in Tanzania. Policy recommendations emphasize targeted trade reforms, particularly enhancing export competitiveness in agriculture and manufacturing alongside exchange rate management and prudent external borrowing. These measures will lower external borrowing needs, enhance fiscal resilience, and support sustainable economic growth.

Keywords: Twin Deficits Hypothesis, Budget deficit, Trade deficit, Vector Error Correction Model, Tanzania.

JEL: F10, H62, C50

Introduction

The Twin Deficits Hypothesis, introduced in the 1980s, posits a significant relationship between a nation's fiscal deficit and its current account deficit, suggesting that an increase in the budget deficit often coincides with a larger trade gap (Bluedorn, 2011). This hypothesis is grounded within the Mundell-Fleming framework and argues that fiscal deficits lead to rising interest rates, attracting capital inflows that appreciate the domestic currency, thereby widening the current account deficit. This perspective is supported by the Keynesian view, which asserts that budget deficits boost domestic absorption, raise imports, and expand the current account deficit. However, the Twin Deficits Hypothesis is not universally accepted. The Ricardian Equivalence Hypothesis by Robert Barro (1989), contends that since various means of

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government financing do not affect private spending, there should not be a link between deficits (Normandin, 1999). Similarly, the relationship between deficits is argued to depend on the stability of savings and investments, which makes the hypothesis doubtful (Khalid & Guan, 1999).

Empirical investigations across diverse economic contexts have yielded mixed evidence. While studies such as those by Bahmani-Oskooee (1992), Leachman & Francis (2002), Baharumshah & Lau (2007), Ahmad & Aworinde (2014), and Banday & Aneja (2019), support the Twin Deficits Hypothesis, others, including Khalid & Guan (1999), Kaufmann et al. (2002), and Bird et al. (2019), find no supporting evidence, aligning more with the Ricardian equivalence. Notably, conclusions differ even in economies with similar characteristics. For instance, mixed evidence is found in SADC countries (Makochekanwa, 2014), African countries (Ahmad & Aworinde, 2014), and OECD countries (Yang et al., 2019) attributed to factors like structural shifts (Leachman, 1991), the extent of domestic capital market development, reliance on foreign financing, interest rates, taxation efficiency (Khalid & Guan, 1999), and exchange rate regimes (Lau & Baharumshah, 2004). Additionally, the direction and mechanisms of causality between fiscal and current account deficits also show mixed findings. On the one hand, some studies report a one-way relationship between trade and budget deficits, known as the Current Account Targeting Hypothesis (CATH) (Marinheiro, 2008; Kalou & Paleologou, 2012). A common feature of small open economies that rely much on Foreign Direct Investments to finance development projects in the economy (Baharumshah et al., 2006). On the other hand, Summers, 1986 Darrat, 1988 Mankiw, 2000 and Mugo et al., 2021 among others, find causality between fiscal deficits and current account deficits. Other studies such as Banday and Aneja, 2019 report a bidirectional relationship.

The inconsistencies in empirical findings on the Twin Deficits Hypothesis, particularly in developing countries, highlight the necessity of country-specific studies to understand the interplay between fiscal and external imbalances. For Tanzania, this hypothesis is especially critical given its unique economic structure, fiscal policies, and trade dynamics. Statistics in Figure 1, shows a consistent budget deficit over time. For instance, from 2013/14 to 2020/21, the country recorded an average deficit of TZS 3,513,638 million annually attributed to increased investment in strategic development projects and extensive social programs (URT, 2021). While critical for economic and social development, these expenditures have outpaced the growth in domestic revenue, which remains constrained by a narrow tax base, tax avoidance, and low compliance. Consequently, external financing has bridged the fiscal gap, further straining the country's fiscal space.

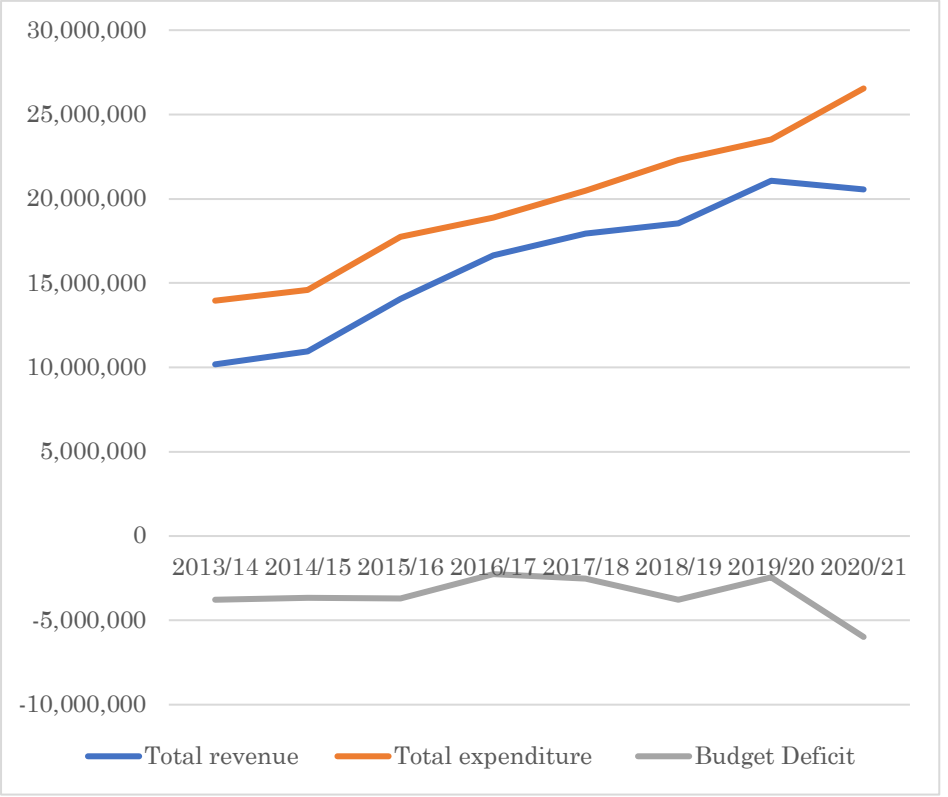

Figure 2: *Government Total Revenue and Expenditure Trend from 2013/14 to 2020/21 in Million Tanzania Shillings. Source: NBS, 2022.*

Tanzania also faces persistent trade deficits, as the value of imports consistently exceeds that of exports. As seen in Figure 2, Tanzania registered a persistent trade deficit of an annual average of TZS -5,148,932 million from 2007 to 2023, pointing to structural economic challenges. The trade deficit is driven by high demand for imported goods—such as machinery, infrastructure materials, and other capital goods—that the domestic economy cannot yet produce efficiently. Epaphra (2017) also noted that Tanzania's dependency on external financing and the widening budget deficit exert upward pressure on interest and exchange rates, further exacerbating the trade imbalance. Weaknesses in the export sector, including limited diversification, low-value addition, and insufficient competitiveness, compound the issue.

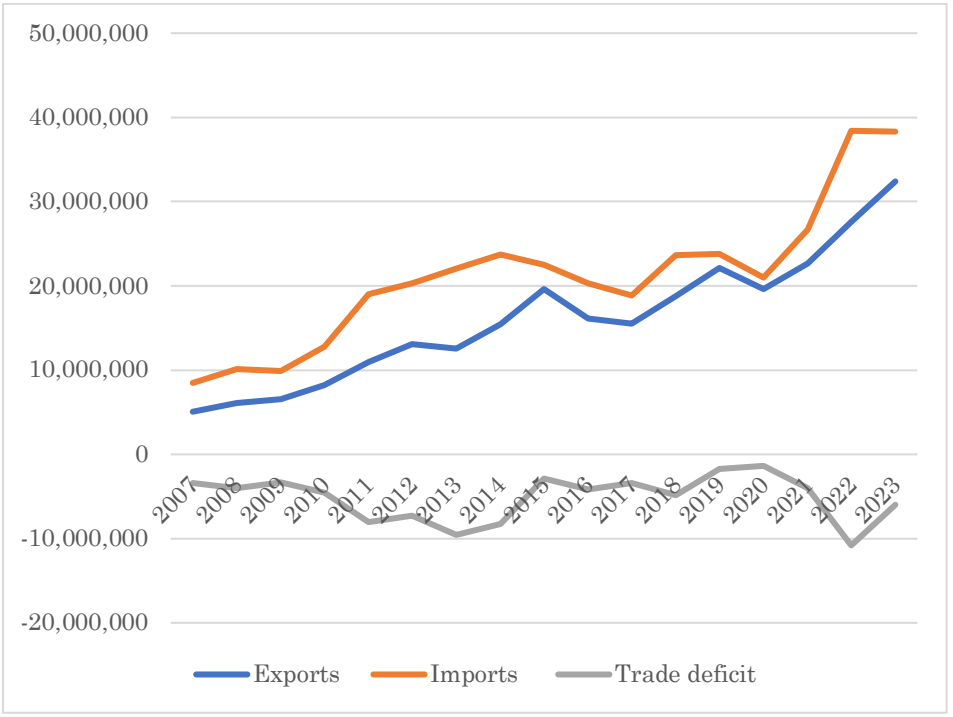

Figure 3: *Trend of exports and imports of goods and services from 2007 to 2023 in Tanzania in million TZS. Source: NBS (respective years)*

The persistent budget and trade deficits illustrated in Figures 1 and 2 point to the possible relevance of the Twin Deficits Hypothesis in the context of Tanzania. This observation raises important questions about the nature of the relationship between these two deficits and the direction of causality, critical for designing sound fiscal and external sector policies aimed at enhancing macroeconomic stability and resilience to external shocks. Although previous studies by Ndanshau (2012), Mganga (2014), and Epaphra (2017) have examined this relationship, they are based on data that precedes major structural and macroeconomic changes in Tanzania. Over the past decade, the country has experienced significant shifts, including increased public investment in infrastructure, a rise in external debt, and developments in the financial and capital accounts. These transformations may have altered the dynamics between fiscal and external imbalances, necessitating updated empirical analysis to guide contemporary policy decisions. A recent study by Mwakalila (2024) investigates the impact of budget deficits on trade deficits in Tanzania using an Autoregressive Distributed Lag (ARDL) model, finding a significant long-run relationship. While this study contributes useful insights, it presumes a unidirectional causality from fiscal to trade deficits and does not account for the possibility of bidirectional causality or structural breaks in the data.

In light of these gaps, this study revisits the Twin Deficits Hypothesis in Tanzania by extending the dataset through 2023 and employing more comprehensive econometric tools. Specifically, it adopts the Vector Error Correction Model (VECM), as used by Epaphra (2017), but expands the analysis by incorporating structural break tests. Unlike Mwakalila (2024), this study does not impose a prior assumption about the direction of causality. Instead, it explicitly tests the hypotheses that (i) a long-run equilibrium relationship exists between fiscal and trade deficits in Tanzania, and (ii) the causality between the two deficits is bidirectional. In doing so, the study offers a more nuanced understanding of the twin deficits dynamics, capturing both short- and long-term interactions and accounting for potential structural changes in the economy.

This study employs time series data analysis techniques. The Augmented Dickey-Fuller and Phillips-Perron tests are used to check for unit root problems in the variables under analysis. The bounds test for cointegration is employed to determine the presence of a long-run relationship between the variables. Like Kalou and Paleologou (2012), the relationship between the two deficits is examined in the context of the Granger Causality Test within a Multivariate Vector Error Correction Model (VECM). The empirical results indicate that the budget deficit is significantly and positively related to the trade deficit in both the short and long run, reaffirming the existence of the Twin Deficits Theory in the country. Specifically, the results align with the Current Account Targeting Hypothesis (CATH), where causality runs from the trade deficit to the fiscal deficit, as revealed by the Granger Causality test results. Given these findings, a comprehensive approach is required to address trade imbalances in Tanzania, which will alleviate the fiscal burden. Policies should focus on structural reforms that promote trade flexibility, export diversification, local production capabilities, import substitution, and economic diversification. By addressing trade deficits, Tanzania can reduce the need for increased external borrowing to finance external deficits and increase the country's fiscal and economic resilience against external shocks.

Although Tanzania is used as a case study, the country exhibits macroeconomic characteristics, such as persistent fiscal deficits, external vulnerability, aid dependency, and underdeveloped capital markets, that are broadly shared across many developing countries. Therefore, the findings of this study offer valuable insights that are applicable to a wider set of low- and middle-income economies, especially those undergoing fiscal reforms and facing external imbalances. To support the empirical analysis, this study uses a time series of quarterly data from 2003 to 2023. The data on the trade deficit, budget deficit, interest rates, exchange rates, and GDP growth rate are collected from the Bank of Tanzania's quarterly reports of economic reviews.

Beyond policy relevance, this study makes several key contributions to the literature. First, it provides a comprehensive empirical analysis of the Twin Deficits Hypothesis using a country-specific time series approach, thereby filling a gap in the Tanzanian macroeconomic literature where systematic studies on this hypothesis have been limited. Second, it contributes methodologically by applying both cointegration and causality techniques to unpack the dynamic interactions between fiscal and external balances, something not extensively done in the Tanzanian context. Third, it enriches the broader Twin Deficits debate by offering insights from a small open economy with rising development financing needs, reliance on foreign capital, and persistent trade imbalances. Finally, the study provides a nuanced policy perspective that can inform debt sustainability frameworks and macroeconomic coordination strategies in other low- and middle-income economies facing similar fiscal-external trade-offs. Understanding these dynamics is vital not only for formulating effective fiscal and external policies but also for addressing a critical gap in the empirical literature on macroeconomic balance in sub-Saharan Africa.

2. Literature Review

2.1 Theoretical Literature Review

The Twin Deficits Hypothesis examines the connection between a country's fiscal deficit and its current account deficit. This idea was introduced by Robert Mundell and Marcus Fleming, who proposed that a widening fiscal deficit—the shortfall between government revenues and expenditures—could lead to an increase in the current account deficit, reflecting the imbalance between national savings and investment, often observed through the trade balance (Fleming, 1962; Mundell, 1963). The hypothesis is grounded in various economic theories and models that explain the influence of fiscal policies on external economic balances.

Keynesian economics posits that an increase in the fiscal deficit, triggered by either heightened government spending or tax reductions, stimulates aggregate demand (Keynes, 1936). This heightened demand often increases consumption and investment, with a substantial share directed toward imported goods, exacerbating the trade deficit. The Keynesian perspective employs the multiplier effect to illustrate how government spending can lead to a proportionally larger rise in national income and imports.

Building on the IS-LM framework, the Mundell-Fleming model provides a nuanced analysis of macroeconomic dynamics in an open economy, addressing some of the gaps in traditional Keynesian models. According to this model, expansionary fiscal policy leads to higher interest rates as the government competes for financial resources in the market. These high interest rates attract foreign capital, resulting in an appreciation of the domestic currency. Currency appreciation impacts the economy in two ways: it reduces the

relative cost of imports, making them cheaper, while simultaneously increasing the price of exports, which can worsen the trade deficit rather than improve it. Consequently, the Twin Deficits Hypothesis is often analyzed through the lens of exchange rate mechanisms within this framework. Empirical support for this hypothesis is evident in studies by Darrat (1988) and Mankiw (2000), with its effects more prominently observed in developed economies (Summers, 1986).

Another perspective of the Twin Deficits Hypothesis is known as the Current Account Targeting Hypothesis (CATH), in which the direction of causality runs from trade deficit to fiscal deficit. This view is mainly found to hold in emerging economies given their structural trade imbalances (Darrat, 1988; Khalid & Guan, 1999; Abu-Bader & Abu-Qarn, 2003; Salvatore, 2006; Gnimassoun & Coulibaly, 2014; Hussein & Nandwa, 2015).

Conversely, the Ricardian Equivalence theorem, developed by Robert Barro, challenges the Twin Deficits Hypothesis by arguing that government deficits do not affect aggregate demand or the current account (Barro, 1974). This theory posits that rational agents anticipate the future taxes needed to service government borrowing and thus increase their savings in the present. As a result, the increase in private savings offsets the government's dissaving, leaving aggregate demand and the current account unchanged. However, fully efficient capital markets and rational consumer behavior assumptions may not hold in developing economies like Tanzania. Empirical evidence from such economies often suggests that fiscal deficits can influence the current account, challenging the applicability of the Ricardian Equivalence in these settings.

This study is primarily guided by the Mundell-Fleming framework and the Current Account Targeting Hypothesis (CATH), which together offer a more suitable explanation for the Tanzanian context. These models were selected because they explicitly incorporate the roles of exchange rate regimes, capital mobility, and trade imbalances, factors highly relevant to Tanzania as a small open economy with a managed float currency system and persistent external sector vulnerabilities. While multiple theories were reviewed, the Ricardian Equivalence theorem was not used to guide the study due to its strong assumptions about rationality and market efficiency, which are less applicable in Tanzania's underdeveloped capital markets and informal-dominated economy. The Keynesian view is acknowledged for its insights into aggregate demand but lacks the open-economy focus necessary for this analysis. Therefore, the theoretical foundation of this study is primarily built on the Mundell-Fleming and CATH perspectives, as they align more closely with Tanzania's empirical realities and macroeconomic structure. This combined theoretical lens helps to justify the structure of the study's

empirical model and its focus on the direction and nature of causality between the fiscal and current account balances.

Reviewing these theories makes it clear that the relationship between fiscal and current account deficits is complex and context-dependent. Understanding this relationship is crucial for Tanzania, as it provides insights into how fiscal policy can impact the broader economy, especially regarding external balances and exchange rate dynamics. This theoretical foundation is relevant for the empirical analysis of the Twin Deficits Hypothesis in Tanzania, helping to identify the channels through which fiscal policy affects the current account and to assess the policy implications of managing these deficits.

2.2 Empirical Literature Review

The relationship between fiscal deficits and trade deficits, viewed through the lens of the Twin Deficits Hypothesis, has been explored in various international contexts with differing outcomes. The hypothesis posits that an increase in a government's budget deficit can lead to a deterioration in the current account balance. However, empirical findings remain inconclusive, depending on country characteristics, policy environments, and methodological choices (see Table 1).

Early studies by Bahmani-Oskooee (1992) examined this relationship in 20 developed and developing countries using VAR models and found a significant positive linkage between fiscal and current account deficits, supporting the hypothesis. Similarly, Khalid and Guan (1999) used Granger causality tests and found evidence of both unidirectional and bidirectional causality, with stronger support for the hypothesis in developed countries. Normandin (1999), employing cointegration and error correction models, observed mixed results across countries, suggesting that country-specific dynamics heavily influence the validity of the hypothesis.

Diverse outcomes are also presented across regional studies. In regional studies, additional insights into the Twin Deficits Hypothesis were revealed. Lau and Baharumshah (2004), using panel data from Southeast Asian countries, found stronger evidence of the hypothesis in countries with flexible exchange rates. Mankiw et al. (2007) found that while there were evidences of the hypothesis in India and Brazil, the evidence was weaker in Russia and China, reflecting different macroeconomic structures and policy regimes. In Africa, Makochekanwa (2014) applied panel cointegration techniques to Southern African Development Community (SADC) countries and reported a mix of Keynesian-type (fiscal-led) and current account-targeting (external-led) causal relationships. Complementing these findings, Masenyetse and Motelle (2012) documented significant fiscal-trade linkages across SADC, but the direction of causality varied by country.

Several single-country studies offer deeper insights. For instance, Darrat (1988) using structural VAR models found strong support for the hypothesis in Egypt and Tunisia. Similarly, Mugo et al. (2021) identified a long-run fiscal-to-trade deficit link in Kenya, emphasizing the importance of structural characteristics, including openness, exchange rate regime, and the degree of financial development. Tanzania-specific studies generally converge with these broader findings by confirming a unidirectional causality from fiscal to trade deficits (Keynesian view of the Twin Deficit Hypothesis). Specifically, Kweka and Morrissey (2000) highlighted the influence of fiscal policy on Tanzania's macroeconomic outcomes and Ndanshau (2012) confirmed a unidirectional causality from fiscal to external deficit using cointegration and Granger causality test. Similar conclusion is reinforced by Mganga (2014) and Epaphra (2017).

However, given their scope, these studies do not incorporate recent structural shifts or external shocks, which have characterized Tanzania post 2015. Most were conducted before or during the early 2010s, and as such, do not account for major post-2015 transformations in Tanzania's macroeconomic landscape. Over the past decade, Tanzania has experienced a series of structural shifts—including large-scale public infrastructure investments, rising industrialization, expanded natural resource extraction, and intensified public borrowing. These trends have been further complicated by external shocks such as the COVID-19 pandemic, volatile commodity prices, and increasing debt servicing costs that likely altered the relationship between fiscal and trade deficits. For example, financing large-scale projects through external debt has potentially shifted the causality dynamic from external to fiscal imbalance, aligning more closely with the Current Account Targeting Hypothesis (CATH) rather than the traditional Keynesian perspective (a key conclusion of the existing studies). A notable recent contribution by Mwakalila (2024) reaffirms the Twin Deficits Hypothesis using an ARDL model with quarterly data. However, the study assumes a unidirectional causality from fiscal to trade deficits, without accounting for potential reverse or dynamic interactions. This presents a conceptual and methodological limitation, particularly in light of emerging macroeconomic patterns where external imbalances—such as those driven by debt-financed imports—may increasingly influence fiscal outcomes. Such dynamics are consistent with the Current Account Targeting Hypothesis (CATH), which posits that fiscal policy may adjust in response to external sector pressures.

Although several studies have explored the Twin Deficits Hypothesis in countries with macroeconomic characteristics similar to Tanzania—such as Kenya, Nigeria, Ghana, and Egypt—the findings remain inconclusive. These studies often differ in their methodological approaches, time spans, or the macroeconomic regimes under which they were conducted, leading to mixed evidence. For instance, while some report causality from fiscal to current

account deficits (e.g., in Nigeria and Kenya), others identify reverse or bidirectional relationships. These inconsistencies limit the applicability of cross-country findings to the Tanzanian context, which is characterized by a unique combination of a managed float exchange rate regime, dependence on imports for infrastructure and energy, constrained domestic revenue capacity, and a development strategy heavily driven by public spending. Consequently, a country-specific study is not only warranted to update the empirical evidence but also essential to capture the institutional, structural, and policy-specific factors that may shape the nature and direction of the relationship between fiscal and external imbalances in Tanzania.

This study, therefore, adds value in two main ways. First, it incorporates the most recent data up to 2023, capturing Tanzania's evolving economic landscape and employs a Vector Error Correction Model (VECM), which does not impose prior assumptions on causality, allowing both short- and long-run dynamics to emerge from the data. The VECM framework offers a key advantage over alternative models such as ARDL or standard VARs, as it explicitly separates short-run dynamics from long-run equilibrium adjustment while preserving the cointegrating relationship. This is crucial in a twin deficits' context, where fiscal and external imbalances may adjust at different speeds and through different channels. Moreover, unlike purely recursive or single-equation models, the VECM does not impose prior assumptions about the direction of causality, allowing it to be data-driven and flexible in uncovering both contemporaneous and lagged interdependencies. Second, by situating the analysis within contemporary policy debates and structural reforms, it generates more relevant insights for fiscal-external sector coordination. In doing so, this paper not only complements Mwakalila's contribution but also advances the empirical literature by offering a more comprehensive and policy-sensitive understanding of the twin deficits in Tanzania.

Table 4: Summary of Key Studies

Study	Country/Region	Methodology	Findings	Research Gap
Darrat (1988)	Egypt, Tunisia	Structural VAR	Positive long-term relationship	Old dataset; pre-2000s economic structures
Bahmani-Oskooee (1992)	20 developed & developing	VAR	Significant positive relationship between fiscal and current account deficits	Limited to early 1990s; lacks country-specific nuances
Khalid & Guan (1999)	Developed & developing countries	Granger causality	Bi-directional in some; unidirectional	No focus on sub-Saharan Africa

Study	Country/Region	Methodology	Findings	Research Gap
			(fiscal → trade) in others	economies and weak log-run dynamics
Normandin (1999)	G7 countries	Cointegration & ECM	Mixed results; some with long-run relationships	Developed economy focus; findings not generalizable to SSA
Kweka & Morrissey (2000)	Tanzania	Fiscal policy analysis	Fiscal policy significantly affected macro performance	No direct econometric test on twin deficits
Lau & Baharumshah (2004)	Southeast Asia	Panel cointegration	Hypothesis holds stronger in countries with flexible exchange rates	Region-specific; not extended to African economies
Mankiw et al. (2007)	BRIC countries	VAR	Supported in India & Brazil; weak in China & Russia	Inconclusive across emerging markets
Masenyetse & Motelle (2012)	SADC countries	Panel causality	Significant link, direction varies	Aggregated results mask country-specific dynamics
Ndanshau (2012)	Tanzania	Granger causality & cointegration	Unidirectional causality: fiscal → trade deficit	Based on data up to early 2000s; excludes recent fiscal dynamics and external account changes
Makochekanwa (2014)	SADC countries	Panel cointegration	Mixed evidence; some align with Keynesian, others with CATH	No post-2010 data; panel aggregation limits country-specific insights
Mganga (2014); Epaphra (2017)	Tanzania	VAR, cointegration	Fiscal deficits cause trade deficits	Pre-pandemic, excludes recent infrastructure & debt developments

Study	Country/Region	Methodology	Findings	Research Gap
Mugo et al. (2021)	Kenya	Granger causality	Causality from fiscal to trade deficit	Single-country study, limited regional implications
Jayasundara, J.M.D.P. & Fernando P.J.S. (2022)	Sri Lanka	ARDL	Unidirectional causality: Fiscal → trade deficit	Pre-assumes causality direction; limited by linear model structure and lack of structural break tests
Mwakalila (2024)	Tanzania	ARDL bounds testing	Fiscal deficit cause trade deficit	Assumes unidirectional causality; lacks structural break analysis

These findings must be interpreted within the broader context of Tanzania's macroeconomic policy environment, which has been characterized by sustained public investment, fiscal expansion, and structural reliance on external financing. Over the past decade, Tanzania has pursued large-scale infrastructure and social spending initiatives under the Five-Year Development Plans (FYDPs), often resulting in persistent budget deficits. Simultaneously, the country's export base remains narrow and heavily commodity-dependent, while imports of capital goods and fuel have kept the current account in deficit. This dual-deficit environment, combined with a managed float exchange rate regime and limited domestic revenue capacity, creates a structural vulnerability to external shocks and currency fluctuations. Therefore, the confirmation of the Current Account Targeting Hypothesis (CATH) in this study reflects a policy setting in which external imbalances are not merely symptoms of fiscal laxity, but structural pressures that actively shape budgetary outcomes.

3 Methodology

3.1 Sample, Data Sources, and Variable Descriptions

The study uses a time series of quarterly data from 2003 to 2023. The data on the trade deficit, budget deficit, interest rates, exchange rates, and GDP growth rate are collected from the Bank of Tanzania's quarterly reports of economic reviews. Table 2 summarizes the variables' description and their sources.

Table 5: Variable name, definition, and source

Variable	***Definition***	***Source***
Trade deficit (tdeficit)	The difference between imports and exports measured in billions of Tshs	Bank of Tanzania
Budget deficit (bdeficit)	The difference between government expenditure and government revenue collected, measured in billions of Tshs	Bank of Tanzania
Exchange rate (exrate)	The rate of US dollar to Tanzanian shillings	Bank of Tanzania
Gross Domestic Product (GDP)	The Gross Domestic Product (Quarterly percentage growth)	Bank of Tanzania
Interest rate (Ir)	Overall lending interest rate from commercial banks	Bank of Tanzania

This study employs five key macroeconomic variables to empirically examine the validity of the twin deficits hypothesis in the Tanzanian context. The variables are sourced exclusively from the Bank of Tanzania to ensure data consistency, credibility, and comparability across periods.

Trade Deficit (tdeficit) is the difference between the value of imports and exports. It serves as the dependent variable in the analysis and is used as a proxy for external imbalance. A positive trade deficit indicates that Tanzania imports more goods and services than it exports, which may reflect structural vulnerabilities in the trade sector or broader macroeconomic imbalances. Budget Deficit (bdeficit) represents the difference between total government expenditure and government revenue collected. A persistent budget deficit implies the government is spending beyond its means, potentially financed through borrowing or monetary expansion. According to the twin deficits hypothesis, such a fiscal imbalance may contribute to a deterioration in the trade balance, as government spending can influence domestic demand and foreign borrowing.

Exchange Rate (exrate) refers to the nominal exchange rate, specifically the rate of Tanzanian shillings per one US dollar. It captures the relative value of the domestic currency in international markets and can significantly influence trade flows. A depreciation of the Tanzanian shilling may improve export competitiveness and increase the cost of imports, thus affecting the trade balance. Gross Domestic Product (GDP) is measured as the quarterly percentage growth rate of the economy. It serves as a control variable to account for the overall level of economic activity. Higher GDP growth can be associated with increased import demand due to rising income levels, which may, in turn, widen the trade deficit unless matched by export growth.

Interest Rate (Ir) represents commercial banks' overall lending interest rate. This variable is important in capturing the monetary policy stance and the cost of borrowing in the economy. Higher interest rates may dampen domestic investment and consumption, potentially influencing the budget balance and trade flows. Together, these variables provide a robust framework for analyzing Tanzania's dynamic relationship between fiscal and external imbalances. All data are obtained from the Bank of Tanzania and are available quarterly to facilitate time series econometric analysis.

The trade deficit and budget deficit are the main interest variables, while the exchange rate, GDP, and interest rate are the main control variables. Given the conclusion of the Twin Deficits Hypothesis and the findings of various empirical studies, including those of Ndanshau (2012) and Mganga (2014), the trade deficit and budget deficit are expected to relate positively.

3.2 Analytical Techniques and Model Specification

Unit Root and Cointegration Tests

Since the data used in the analysis of this study is time series, the traditional Augmented Dickey-Fuller (ADF) and Philip Perron tests are employed to check for the existence of a unit root problem (examining the trend and behavior of the variables). Next, Johansen's Cointegration test is employed to check for long-run equilibrium under the null hypothesis of cointegration. The cointegration between the VAR model allows us to apply the Vector Error Correction Model (VECM). The Granger Causality test is then used in the model to examine the causal link between the budget deficit and trade deficit.

Model Specification

Given the unit root test results where variables are stationary at different levels, this study uses the VECM model to analyze the link between the budget and trade deficits. The VECM accounts for the short-run dynamics (in first differences) and long-run equilibrium relationships (cointegration) between these variables. The VECM equation is thus written as follows for each dependent variable (in first differences):

$$\Delta Y_t = \alpha\left(Y_{t-1} - \beta_1 X_{1,t-1} - \beta_2 X_{2,t-2} - \cdots - \beta_n X_{n,t-1}\right) + \sum_{i=1}^{p-1} \Gamma_i \, \Delta Y_{t-i} + \varepsilon_t$$

Where:

- ΔY_t represents the first difference of the dependent variable. The model treats each variable as endogenous; therefore, five dependent variables are analyzed in this case (budget deficit, trade deficit, exchange rate, GDP, and interest rate). However, given that this paper focuses on trade and budget deficits, the analysis is only presented for the two variables).

- $Y_{t-1} - \beta_1 X_{1,t-1}$,-…-,$\beta_n X_{n,t-1}$represents the long-run equilibrium relationship (cointegration), captured by the error correction term (ECT).
- $\Gamma_i \Delta Y_{t-i}$ represents the short-run dynamics, where the differences of lagged variables are included to capture short-term adjustments.
- α_t is the speed of adjustment towards the long-run equilibrium.
- ε_t is the error term.

3.3 Diagnostic Tests

This study employs stability, heteroskedasticity, and autocorrelation tests to check the model's compliance with the assumptions. The models' stability is tested using the AR roots, heteroscedasticity using the White heteroscedasticity test under the null hypothesis of homoskedasticity, and autocorrelation using the Autocorrelation LM test under the null hypothesis of no serial correlation between the variables in the model.

3.4 Granger Causality Test

The Granger Causality Test is applied to determine whether there is unidirectional causality, implying that the causality runs from the budget deficit to the trade deficit, or vice versa, or bidirectional causality, where both variables Granger cause each other, indicating mutual influence. Alternatively, the test may show no causality between the variables.

The general equation for the Granger causality test for our models is specified as $y_t = \delta_0 + \sum_{i=1}^{j} \delta_i x_{t-i} + \mu_{1t}$……3

Where x_t is the dependent variable, and y_{t-j} stands for the respective model's lagged independent variables. The null hypothesis for equation 3 is $\sum_{i=1}^{j} \delta_i = 0$. Rejecting the null hypothesis suggests that the variable in question, Granger, causes the other variable.

4. Estimation Results and Discussion

4.1 Descriptive Statistics

The summary statistics provide key descriptive insights into the budget deficit (measured in TZS billion) and the trade deficit (measured in USD million), crucial variables for revisiting the Twin Deficits Hypothesis in Tanzania. The average budget deficit over the study period is TZS 562.37 billion, reflecting a significant fiscal shortfall. However, the large standard deviation of TZS 739.36 billion indicates substantial fluctuations in fiscal performance across years. The budget deficit ranges from a minimum of -TZS 802 billion, representing occasional surpluses, to a maximum of TZS 3575.3 billion, highlighting periods of extreme fiscal imbalance. This variability points to the impact of fluctuating government expenditures and revenue collection efficiency on Tanzania's fiscal health.

The trade deficit exhibits a consistent shortfall, with an average of USD 859.16 million. The standard deviation of USD 489.85 million indicates

moderate variability, though less pronounced than the fiscal deficit. The trade deficit ranges from a minimum of USD 21.4 million, suggesting occasional improvements in the trade balance, to a maximum of USD 2275.7 million, signifying significant external imbalances during certain periods. These figures underscore the persistent challenge in Tanzania's external sector, where imports have consistently outpaced exports. The statistics reveal notable fiscal and trade imbalances, providing a strong basis for exploring the interrelationship between these deficits within the Twin Deficits Hypothesis framework, as shown in Table 3.

Table 6: Summary statistics

Variable	Observation	Mean	SD	Minimum	Maximum
Budget Deficit	82	562.3659	739.363	-802	3575.3
Trade Deficit	81	859.1636	489.851	21.40002	2275.7
Gross Domestic Product (GDP)	83	6.398795	1.862564	2.9	11.3
Interest rate	83	15.76602	1.048659	13.3	17.97
Foreign exchange rate	82	1728.787	488.7329	1016.1	2428.26

Notes: *The budget deficit shows greater variability (relative to its mean) than the trade deficit, suggesting that fiscal policies and outcomes in Tanzania have been more erratic than trade balances.*

4.2 Unit Root and Cointegration Results

Table 4 illustrates the unit root tests (Augmented Dickey-Fuller and Phillips-Perron) in levels and first differences. The results imply that all variables except exchange and interest rates (stationary in the first difference) are stationary in the levels.

Table 7. Unit root test

	H0: Non-stationary in levels		H0: Non-stationary in first difference	
Variable	**ADF Statistics**	**PP Statistics**	**ADF Statistics**	**PP Statistics**
gdp	-5.830***	-5.873***		
ln of trade deficit	-4.595***	-4.577***		
budget deficit	-6.475***	-6.585***		
Interest rate	-2.847	-2.598	-11.539 ***	-12.206***
ln of foreign exchange rate	-1.072	-1.033	-5.968***	-5.922***

Note: *The asterisks ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively, for the ADF and PP test of unit root. The null hypothesis is that the series are non-stationary.*

The Johansen cointegration test results in Table 5 indicate **five cointegrating relationships** among the variables—**budget deficit, trade deficit, GDP, interest rate, and foreign exchange rate.** This conclusion

is drawn from the trace statistic, which exceeds the critical value at each step. For instance, at **rank 0**, the trace statistic of **119.71** is greater than the critical value of **68.52**, leading to rejecting the null hypothesis of no cointegration. Similarly, at **rank 4**, the trace statistic of **5.23** exceeds the critical value of **3.76**, further rejecting the null hypothesis of fewer cointegrating relationships. Therefore, these findings suggest a strong long-run equilibrium relationship between the budget deficit, trade deficit, and the other macroeconomic variables, indicating that these variables move together in the long run despite short-run fluctuations.

Table 8. Johansen test for cointegration

Johansen tests for cointegration					
Trend: constant				**Number of obs = 81**	
Sample: 3 - 83				**Lags = 2**	
maximum rank	**parms**	**LL**	**eigenvalue**	**trace statistic**	**5% critical value**
0	30	-1140.4711	.	119.7097	68.52
1	39	-1116.8639	0.44172	72.4953	47.21
2	46	-1100.1562	0.33803	39.0799	29.68
3	51	-1088.6919	0.24653	16.1513	15.41
4	54	-1083.2287	0.12619	5.2250	3.76
5	55	-1080.6162	0.06247		

4.3 Lag Selection Criteria

Table 6 outlines results of lag length selection based on standard criteria for optimal lags selection. These include, Akaike Information Criterion (AIC), Final Prediction Error (FPE), Schwarz Information Criterion (SIC), and Hannan-Quinn (HQIC). Given that all four criteria identify a lag length of one (1) as optimal, as indicated by their minimum values at that lag, this study uses a lag length of one in all estimations.

Table 9: Lag Length Selection Criteria

Lag	**LogL**	**LR**	**FPE**	**AIC**	**SIC**	**HQIC**
0	-980.123	NA	0.00578	20.105	20.301	20.182
1	-905.567	135.221**	0.00234**	18.234**	18.821**	18.467**
2	-903.333	4.151	0.00246	18.284	19.262	18.673
3	-901.556	3.332	0.00257	18.310	19.679	18.854
4	-900.104	2.923	0.00268	18.350	20.110	19.050

Note: LR: Likelihood Ratio Test; FPE: Final Prediction Error; AIC: Akaike Information Criterion; SIC: Schwarz Information Criterion; HQIC: Hannan-Quinn Information Criterion. ** indicates lag order selected by the criterion.

4.4 Regression Estimation Results and Discussion of Findings

Table 7 presents the Vector Error Correction Model (VECM) results of the estimated models. These results provide essential insights into the dynamic relationship between the budget and trade deficits in Tanzania in the short and long run. Since the interest is in assessing whether the Twin Deficits hypothesis holds, this section only discusses the results in the table.

Table 10. The Vector Error Correction Model

MODEL	(1)	(2)	(3)	(4)	(5)
VARIABLES	D_bdeficit	D_lntdeficit	D_gdp	D_interest	D_lnforex
L._ce1	-0.188***	-2.93e-05	-0.0004***	-7.06e-05*	-0.0002***
	(0.0511)	(7.43e-05)	(0.0001)	(3.61e-05)	(5.63e-05)
LD.bdeficit	-0.416***	6.42e-05	0.0003	5.59e-05	7.00e-05
	(0.0996)	(0.0001)	(0.0002)	(7.04e-05)	(0.0001)
LD.lntdeficit	197.9**	-0.126	-0.216	0.0300	0.0406
	(79.63)	(0.116)	(0.168)	(0.0563)	(0.0878)
LD.gdp	75.66	-0.0492	-0.111	0.0416	0.129**
	(51.95)	(0.0756)	(0.110)	(0.0367)	(0.0573)
LD.interest	-18.69	-0.238	0.197	-0.251**	0.0105
	(165.1)	(0.240)	(0.349)	(0.117)	(0.182)
LD.lnforex	261.5**	0.0964	0.593**	0.0229	-0.229*
	(114.0)	(0.166)	(0.241)	(0.0806)	(0.126)
Constant	0.0001	0.0194	-0.0667	0.0110	-0.0126
	(95.66)	(0.139)	(0.202)	(0.0676)	(0.105)
Observations	81	81	81	81	81

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Long-Run Interpretation

Column 1 of the VECM results in Table 7 shows a long-run relationship between the budget deficit and the controlled variables in the model. The error correction term (ECT) in the budget deficit equation is negative (-0.188) and statistically significant at the 1% level, indicating a meaningful speed of adjustment. This means that when the budget deficit deviates from its long-run equilibrium, it adjusts by approximately 18.8% per quarter to restore balance. This reflects a relatively moderate but steady correction rate, consistent with macroeconomic dynamics in developing economies.

This finding supports the Twin Deficits Hypothesis, suggesting that persistent trade deficits drive budget deficits over time, where increasing external imbalances exert fiscal pressure. The magnitude of the adjustment suggests that the Tanzanian budget responds relatively stably but incompletely each quarter, requiring multiple periods to return to equilibrium following a shock.

Conversely, in column 2, the error correction term for the trade deficit equation is insignificant and very close to zero (-2.93e-05). This indicates that the trade balance does not respond meaningfully to deviations from the long-

run equilibrium, confirming the absence of self-correcting mechanisms in the trade sector. This is consistent with Tanzania's structural reliance on imports and limited export diversification, which constrain its ability to adjust trade balances dynamically.

Economically, this asymmetry suggests that the burden of adjustment in the twin deficits relationship falls on the fiscal side, not the external sector. This finding conforms with the Current Account Targeting Hypothesis (CATH), whereby external deficits, rather than being caused by fiscal policy, reflect deeper structural issues, like trade composition and competitiveness, that indirectly pressure the budget deficit over time. Rising national debt and its servicing costs further worsen fiscal balances. Moreover, as argued by Kalou and Paleologou (2011), developing countries are net borrowers and spend a significant part of their income on interest payments and debt servicing, leading to the current account's deterioration. In the long run, the increase in national debt will lead to increased fiscal deficit, and hence, it becomes a cycle. The Granger Causality results in this study further confirm the long-run results.

Short-Run Relationships between the two Deficits

The short-run dynamics also offer key insights. In the budget deficit equation (column 1), the lagged trade deficit (LD.lntdeficit) has a positive and statistically significant coefficient of 197.92 ($p = 0.013$). This suggests that a one-unit increase in the (log) trade deficit leads to an immediate increase of approximately 198 units in the budget deficit, a large and economically significant effect. This underscores the sensitivity of fiscal balances to short-term external shocks.

This result implies that in the short run, rising trade imbalances trigger increased government spending or reduced revenue collection, possibly due to lower import-related taxes or increased subsidies. The magnitude of the coefficient suggests this relationship is economically meaningful, not just statistically significant.

In contrast, in the trade deficit equation (column 2), the lagged budget deficit (LD.bdeficit) is insignificant (coefficient = 0.0000642, $p = 0.995$). This confirms that budgetary movements do not cause immediate adjustments in trade balances, consistent with Tanzania's structural nature. Thus, the direction of causality runs from trade deficits to budget deficits, not the reverse, reinforcing the long-run findings.

These findings underscore the need for structural reforms in Tanzania's trade sector. Emphasizing export diversification and import substitutions would improve the country's capacity to adjust to fiscal imbalances. This would reduce the need for external borrowing and ensure more balanced economic growth.

Relationship between other Controlled Variables and the Dependent Variables

In column 1, the exchange rate (LD.lnforex) has a positive and significant coefficient of 261.5 (p = 0.022). This indicates that a depreciation of the Tanzanian shilling increases the fiscal deficit in the short run. Economically, as the currency weakens, the cost of importing goods and servicing external debt rises, putting fiscal strain on the government budget. This is a meaningful finding in an import-dependent economy like Tanzania. Although included, GDP growth (LD.gdp) and interest rates (LD.interest) are not statistically significant in the budget deficit equation. This suggests that short-run variations in domestic economic growth and lending rates have a limited direct effect on fiscal balance, potentially because structural trade-related pressures and external financing mechanisms more influence budget outcomes.

In column 2, where the dependent variable is the trade deficit, none of the control variables are statistically significant. This further underscore the rigidity of Tanzania's external sector, which appears unresponsive to short-run shifts in macroeconomic indicators. However, in column 3 (GDP equation), exchange rate (LD.lnforex) has a positive and significant impact (0.593, p = 0.032), suggesting that currency movements influence overall economic activity, possibly through trade channels. Similarly, in column 4 (interest rate equation), interest rates respond negatively to their lag (-0.251, p = 0.046), indicating some monetary adjustment mechanism.

The study finds that the budget deficit exhibits a statistically significant and negative error correction term, indicating a long-run adjustment rate of approximately 18.8% per quarter toward equilibrium. In the short run, trade deficits have a strong and economically significant positive impact on budget deficits, with a coefficient of around 198. In contrast, budget deficits do not significantly influence trade balances, supporting the Current Account Targeting Hypothesis (CATH) over the traditional twin deficits' hypothesis. Additionally, the exchange rate significantly affects the budget deficit, highlighting Tanzania's vulnerability to external shocks. Other macroeconomic variables, such as GDP growth and interest rates, show limited explanatory power in the short run for both fiscal and external imbalances.

Diagnostic Tests

Table 8 shows post-estimation diagnostics test results assessing the stability and adequacy of the estimated VAR model. We conducted a structural break test to assess the potential impact of major economic disruptions over the study period. The test result yielded a p-value of 0.4494, indicating no significant structural break at the 5% level. This suggests model stability throughout the period, although key events such as the 2008 financial crisis and COVID-19 are discussed in the results section to enrich interpretation. Autocorrelation Test of Residuals (LM Test): To assess residual serial correlation, we applied the Lagrange Multiplier (LM) test for autocorrelation.

The results indicate no significant autocorrelation at lag orders up to 2. This supports the adequacy of the chosen lag length and model structure. The p-value for AR (2) = 0.274. Normality Test (Jarque-Bera): Multivariate normality of the residuals was assessed using the Jarque-Bera test, which showed no significant departure from normality: Jarque-Bera Chi² (2) = 3.287 and p-value = 0.193. This suggests the residuals are approximately normally distributed, meeting a key assumption for inference. Heteroskedasticity Test (White's Test for VAR residuals): The residual heteroskedasticity test was insignificant at the 5% level, further validating model adequacy: p-value = 0.275.

Table 11: Diagnostics results

Test	Purpose	Test Statistic / Details	p-value	Conclusion
Structural Break Test	Assess structural stability over time	F-statistic (not reported); tested over full sample	0.4494	No significant break; model stable over time
Lagrange Multiplier (LM) Test for Autocorrelation	Detect serial correlation in residuals	Lag 2: AR(2)	0.274	No autocorrelation; lag length appropriate
Jarque-Bera Test for Normality	Assess residual normality	$\chi^2(2) = 3.287$	0.193	Residuals approximately normal
White's Test for Heteroskedasticity	Detect heteroskedasticity in residuals	Chi-square test	0.275	No evidence of heteroskedasticity

Granger Causality Test

The Granger causality analysis provides valuable insights into the short-run dynamics between Tanzania's trade and budget deficits over the 2005–2023 period. Prior to testing, all variables were confirmed to be integrated of order one ($I(1)$) using both the Augmented Dickey-Fuller and Phillips-Perron unit root tests, satisfying the preconditions for valid causality testing and avoiding spurious inference. Lag selection was guided by multiple information criteria, notably the Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC), which consistently indicated an optimal lag of one.

The results in Table 5 reveal a significant short-run relationship between Tanzania's trade deficit and budget deficit. Specifically, the null hypothesis that the trade deficit does not Granger-cause the budget deficit is rejected with a p-value of 0.0129. This finding suggests that changes in the trade deficit have a meaningful impact on the budget deficit in the short run, indicating a unidirectional causality running from the trade deficit to the budget deficit. Conversely, the test fails to reject the null hypothesis that the budget deficit does not Granger-cause the trade deficit, with a p-value of

0.6579. These results support the Current Account Targeting Hypothesis, suggesting that external imbalances are a key driver of fiscal pressures in Tanzania. The absence of reverse causality implies that fiscal policy changes do not significantly affect the trade balance in the short run—likely a reflection of structural rigidities such as import dependency and a limited export base.

Empirical literature on developing economies, such as Darrat (1988), Khalid and Guan (1999), Abu-Bader and Abu-Qarn (2003), Salvatore (2006), Gnimassoun and Coulibaly (2014), and Hussein and Nandwa (2015), highlighting the importance of addressing trade-related challenges—such as export diversification and reducing import reliance—to achieve fiscal sustainability. It should be noted, however, that this study's result contradicts the findings of Ndanshau (2012) and Epaphra (2017), among others, who confirmed the Keynesian perspective of the Twin Deficits Hypothesis in Tanzania. Possible explanations could be that more recent structural and policy changes may have altered the relationship differences in model specification. Furthermore, the absence of causality from the budget deficit to the trade deficit may stem from the limited short-run responsiveness of trade balances to fiscal adjustments, especially in developing economies like Tanzania that rely heavily on imports and have underdeveloped export sectors. As Enders and Lee (1990) and Bahmani-Oskooee (1992) argue, the effect of fiscal policy on trade balances may materialize over longer horizons, and Granger causality tests may not detect such lagged structural effects. The Granger causality test confirms a unidirectional short-run relationship where the trade deficit drives the budget deficit. This finding reinforces the interconnectedness of Tanzania's fiscal and trade imbalances and underscores the importance of addressing structural weaknesses in the trade sector to achieve fiscal sustainability.

Table 12. Granger Causality Test Results

Null hypothesis	**observations**	**Chi-sq**	**P-value**	**Decision**
Trade deficit does not Granger-cause a budget deficit	83	6.18	0.0129	Reject the null hypothesis.
The budget deficit does not Granger-cause the trade deficit	83	0.20	0.6579	Fails to reject the null hypothesis

However, it is important to acknowledge the inherent limitations of the Granger causality framework. While useful for identifying temporal precedence, it does not imply structural causality and cannot fully address endogeneity or omitted variable bias. Furthermore, robustness checks such

as alternative lag structures, seasonal adjustments, and subsample analysis were not included due to scope limitations. Future research should incorporate these elements and consider structural models to validate and deepen the analysis.

Impulse Response Function

Figure 3 represents the Import Response Functions, which trace the effect of a one-time shock to one variable on the current and future values of other variables in the system. On the response of the trade deficit (lntdeficit) to a budget deficit shock, the bottom-right plot shows the trade deficit's response to a budget deficit shock. The response is initially negative (i.e., the trade deficit decreases), but after a few periods, it becomes positive. The confidence interval suggests that the initial drop and subsequent rise are significant in the early periods, but the effect diminishes over time. Therefore, a budget deficit shock initially reduces the trade deficit (possibly due to reduced imports or increased exports). Still, this effect reverses after a few periods, worsening the trade deficit in the medium term. In summary, the trade deficit initially improves (reduces), but this effect reverses in the medium term, indicating a potential worsening of trade imbalances resulting from a sustained budget deficit. Additionally, a shock to the budget deficit has a small and short-lived impact on the interest and foreign exchange rates, with no sustained or significant effects. Also, there is a positive and temporary impact on GDP, suggesting that fiscal expansion (budget deficit increase) may initially boost economic growth, but the effect fades over time.

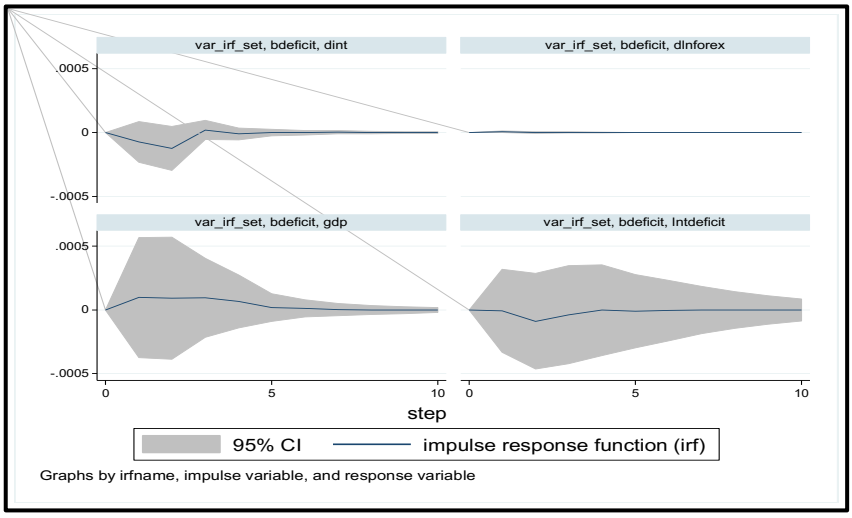

Figure 4: The Impulse Response Functions

5. Conclusion and policy implications

This study re-examined the twin deficits hypothesis in the Tanzanian context using quarterly data (2005-2023) and applying a Vector Error Correction Model (VECM) coupled with Granger causality tests. The results confirm the

presence of a statistically significant long-run relationship between the trade deficit and the budget deficit, with causality running unidirectionally from the trade deficit to the fiscal deficit. This finding supports the Current Account Targeting Hypothesis (CATH), suggesting that persistent external sector imbalances exert upward pressure on fiscal deficits, rather than fiscal policy driving external deficits. Additionally, the exchange rate significantly influenced the budget deficit in the short run, indicating Tanzania's vulnerability to external sector volatility.

These findings partially diverge from the conventional form of the Twin Deficits Hypothesis (TDH), which predicts that fiscal deficits cause trade deficits. Instead, the results in this study suggest a reverse causality, from external imbalances to fiscal deterioration, highlighting the importance of country-specific dynamics. This deviation has important theoretical implications, as it aligns more closely with a modified or reverse causality view of the TDH and reinforces the argument that in developing economies with weak export bases and high external dependency, the current account can be a leading driver of fiscal imbalances.

Despite the strength of these empirical results, this study is subject to important limitations. The VECM framework assumes linearity and symmetry in relationships, which may obscure threshold or regime-dependent effects. The analysis also does not explicitly model the impact of exogenous shocks (e.g., global commodity price swings, pandemics, or geopolitical disruptions), which are particularly relevant for open developing economies like Tanzania. Furthermore, reliance on aggregate macro-level data may mask heterogeneities in sectoral dynamics or institutional constraints. Future research should therefore, consider the application of nonlinear models such as Threshold VAR or Markov Switching VECMs to assess whether the relationship between fiscal and trade deficits shifts under different macroeconomic conditions or policy regimes, use nonlinear models such as Threshold VAR or Markov Switching VECMs to assess whether the relationship between fiscal and trade deficits shifts under different macroeconomic conditions or policy regimes, and calibrate a Dynamic Stochastic General Equilibrium (DSGE) model grounded in Tanzania's macroeconomic structure, capable of simulating the long-run effects of coordinated fiscal, trade, and monetary policies under uncertainty.

The empirical findings of this study provide important insights for macroeconomic policy coordination and structural reforms in Tanzania. One of the key implications is that the confirmation of the Current Account Targeting Hypothesis (CATH) underscores the importance of addressing external sector vulnerabilities as a foundation for achieving fiscal sustainability. In this context, efforts should focus on strengthening the implementation of the Integrated Industrial Development Strategy (IIDS)

and the priorities of the Third Five-Year Development Plan (FYDP III), particularly in promoting value-added production across agro-processing, textiles, and mining. Export promotion policies aligned with the National Export Strategy, especially in high-potential sectors such as horticulture and pharmaceuticals, should also be prioritized to support long-term trade balance improvements.

The study also highlights the short-run sensitivity of the budget deficit to exchange rate fluctuations, which calls for a more coordinated approach between fiscal and monetary authorities in responding to external shocks. Tanzania's managed float exchange rate regime, coupled with significant dependence on imports for energy, infrastructure, and food, places considerable pressure on the budget during episodes of currency depreciation. This suggests that fiscal sustainability cannot be achieved in isolation from external sector policies. To enhance fiscal resilience, policymakers should consider exchange rate-linked fiscal rules or escape clauses that shield public budgets from volatility. Coordinated action between the Ministry of Finance and the Bank of Tanzania, along with continued adherence to the benchmarks set under the IMF's Extended Credit Facility (ECF), could help reinforce macroeconomic stability.

While the recommendation to reduce import dependence is not new, this study offers empirical support for such a policy based on its potential to reinforce fiscal health. Effective import substitution strategies should include the expansion of local content policies, targeted tax incentives, and the development of industrial zones, particularly in sectors such as energy, construction materials, and agricultural inputs. Complementary trade measures, such as customs reform and the removal of non-tariff barriers under regional frameworks like the African Continental Free Trade Area (AfCFTA) and the East African Community (EAC), could further enhance competitiveness and reduce reliance on non-productive imports.

Incorporating external sector performance indicators into Tanzania's medium-term expenditure framework (MTEF) would also improve fiscal predictability and reduce procyclical spending tendencies. Instruments such as automatic stabilizers—fuel price adjustment mechanisms or countercyclical spending buffers—can help absorb the fiscal impact of trade shocks, particularly in commodity-reliant sectors where price volatility is high.

Lastly, the limited responsiveness of the trade balance to short-term fiscal changes indicates that deeper structural reforms are required. Strategic investments in logistics infrastructure—such as the Dar es Salaam and Bagamoyo ports, the Standard Gauge Railway (SGR), and inland dry ports—are essential to reduce costs and improve efficiency. Additionally, upgrading

trade facilitation systems through electronic customs and single-window platforms, and fully leveraging regional value chains via AfCFTA and EAC integration, can significantly enhance export potential and mitigate fiscal vulnerabilities stemming from trade imbalances. In conclusion, this study contributes to the growing evidence that trade imbalances, exacerbated by exchange rate volatility, can profoundly affect fiscal sustainability in developing economies. Addressing Tanzania's twin deficits requires a calibrated mix of macroeconomic management, industrial policy alignment, and institutional reform. Grounding these recommendations within existing national strategies and international commitments ensures their relevance and feasibility.

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