# Fiscal Policy and External Imbalances in Ghana: Twin Deficits in Time of Rising Debt

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**ABSTRACT**

The recent rise in debt accumulation among SSA countries has raised concerns of a possible looming debt crisis. High debt levels often lead to higher fiscal deficits and a potential fiscal crisis, which can affect future growth prospects and external adjustment. This study seeks to investigate the role of public debt on the relationship between fiscal policy and current account for Ghana, which is confronted with a high risk of debt distress and persistent twin deficits. Allowing for nonlinearity and state-dependence in the relationship between fiscal policy and the current account, the paper finds evidence of the twin deficits phenomenon for a low-debt environment; whereas for the high-debt environment, the relationship is negative and relatively stable, though statistically insignificant, which supports the Ricardian Equivalence hypothesis. Specifically, fiscal expansion on the current account is subdued in the high-debt environment, but has a sizable and significant positive effect in the low-debt environment. Thus, fiscal consolidation along with debt restructuring may be necessary for economic recovery, ensuring both debt and current account sustainability, especially in times of high debt distress.

**Keywords:** Fiscal policy; Current account; Public debt, Ghana; State-Dependence; Local projections

## 1. Introduction

In recent times, Sub-Saharan African (SSA) countries have experienced deteriorating macroeconomic fundamentals such as low economic growth, the twin deficits problem and a resurgence of rising debt (AfDB, 2021). The sudden spur in debt accumulation in the region has been driven by surging fiscal deficits. Also, the COVID-19 pandemic has led many countries to adopt various fiscal stimulus measures to curb the health crisis, stimulate demand and boost economic recovery. Thus, their fiscal positions have deteriorated significantly, with high fiscal deficits triggering an increase in debt accumulation. Indeed, this rising debt trend in the region raises concerns about its potential impact on future growth prospects, macroeconomic stability, and fiscal and current account sustainability.

Interestingly, the debt surge in the SSA region has been accompanied by growing fiscal and current account imbalances. Figure 1 shows the trend over the last two decades for public debt, fiscal and current account balances with some discernible patterns. First, both fiscal and current account balances have co-moved in the same direction, suggesting the existence of the twin deficits phenomenon in the region. More importantly, the relationship seems to be influenced by the level of indebtedness of the region. For instance, the declining pattern of public debt between 2000 and 2009, following the heavily indebted poor countries (HIPC) debt forgiveness, saw a significant improvement in both balances. The low public debt level created significant fiscal space as the region experienced both fiscal and current account surpluses. Since then, both balances have deteriorated, and public debt has taken an upward trajectory. High indebtedness worsens a country's fiscal position as debt servicing costs (i.e., interest payments) rise, squeezing available fiscal space, and leading to further debt accumulation. This vicious cycle of high debt and fiscal deficits will crowd out domestic investment, lead to growth contractions and current account deterioration. Such patterns suggest that the level of public debt may have a significant influence on the relationship between fiscal policy and the current account in the SSA region.

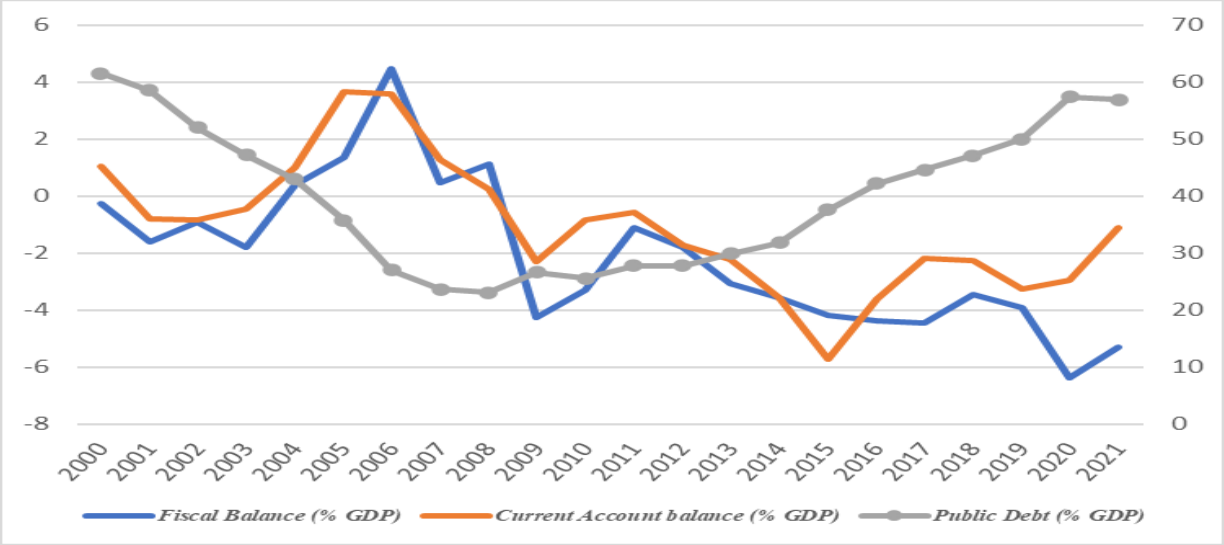


**Figure 1: SSA fiscal and current account balances (left axis) and public debt (right axis) Source: IMF WEO (2023)**

So far, the link between fiscal and current account imbalances remains a topical issue in macroeconomic policy and research. This is because global imbalances have been on an upward trajectory over the past two decades, thereby intensifying debate on the potential drivers (IMF, 2014). The textbook Mundell-Fleming model suggests that an increase in fiscal deficits will cause an increase in aggregate demand, an exchange appreciation and a fall in the current account balance. Empirical evidence suggests that the relationship is weak and inconclusive. In fact, the relationship is very complex and may be influenced by several conditioning factors such as the exchange rate regime, the business cycle, the level of trade and financial openness and the initial level of public debt (Abbas et al., 2011; Furceri and Zdzienicka, 2020). With respect to the debt factor, surging debt levels raise concerns about debt sustainability, which might affect the effectiveness of fiscal policy. In a high-debt environment, economic agents may react in an opposite manner or not respond at all to fiscal policy changes if its credibility is in doubt. Further, risk premiums may become important with forward-looking agents concerned about government's intertemporal solvency (Abbas et al., 2011). In both cases, a fiscal expansion may be contractionary (Giavazzi and Paganao, 1990). As such, the effect of fiscal policy on the current account may weaken in countries with high public debt (Nickel and Tudyka, 2014; Furceri and Zdzienicka, 2020). Hence, the relationship between fiscal and current account imbalances can be hypothesized to be state-dependent on the level of public debt.

Consequently, this study seeks to investigate whether the effect of fiscal policy on the current account depends on a country's fiscal position as characterized by the public debt level. In other words, if the effect of fiscal policy on the current account is state-dependent on public debt. This debate is related to the larger literature on the effectiveness of fiscal policy, particularly with respect to whether fiscal multipliers are dependent on fiscal positions (see e.g., Huidrom et al., 2020; Fotiou, 2022; Eminidou et al., 2023). To tackle the question at hand, this study focuses on a country-specific analysis rather than a panel of countries due to issues of country heterogeneity and avoiding a one-size-fits-all policy prescription. Specifically, the study concentrates on Ghana for the period 1990 to 2022. The interest in Ghana is spurred by the fact that the country, despite benefiting from the HIPC debt forgiveness in the early 2000s, has witnessed a significant upward trajectory of its public debt level in last two decades, in addition to the prevalence and persistence of both fiscal and current accounts deficits. Further, Ghana's overall debt burden, which is currently above 80 percent of GDP is deemed to be at high risk of debt distress (IMF, 2021). This means that fiscal adjustment will become necessary to reduce both fiscal deficits and, in turn, public debt. Thus, the potential impact of such policy action on macroeconomic variables, such as the current account, taking into account the state of public finances, requires proper examination.

Our interest in the subject matter is spurred by the backdrop of recent rising debt levels among African countries, thereby reigniting concerns over a possible looming debt crisis (Songwe and Awiti, 2021; Atingi-Ego et al., 2021), and the spiralling fiscal and current account imbalances. Much more is the dearth of research on the issue (Nickel and Vansteenkiste, 2008; Nickel and Tudyka, 2014; Sulikova and Tykhenenko, 2017; Okombi, 2020; Rajakaruna, Suardi, and Perera, 2021). Okombi (2020) finds evidence for a panel of SSA countries that below (above) the public debt threshold of 78.4 percent, the twin deficits (Ricardian equivalence) exist. Most of these studies aimed to estimate threshold debt levels that demarcate the relationship into high and low debt regimes. Our analysis deviates from these studies by concentrating on a single country analysis using a framework that does not require the estimation of threshold debt levels. We follow a two-pronged empirical strategy to uncover how the debt levels influence the link between fiscal policy and the current account. First, we estimate a Smooth Transition Regression (STR) model, which is suitable for models with nonlinear and regime-switching behaviour. Second, we characterize the nature of the state-dependence in the relationship using a local projections (LP) methodology of Jorda (2005) to estimate the nonlinear impulse responses of the current account balance following

a fiscal shock across low and high debt regimes. The latter approach is essential to understand the dynamics based on the impulse responses to explain the possible transmission mechanism in the relationship. Moreover, the LP provides an alternative to traditional VAR models for estimating impulse response functions. For models with state-dependence, the LP method is simplified and flexible without requiring typical restrictions in nonlinear VAR models.

Following the paper's introduction, the balance of the paper is presented as follows: Section 2 provides a briefly stylized fact on the trajectory of Ghana's debt profile, fiscal and current account deficits. Section 3 provides a review of related literature. Section 4 describes the empirical methodology and data. Section 5 presents the expected results and discussion, while Section 6 concludes with policy implications.

## 2. Brief Stylized facts on Ghana

Ghana's gross public debt profile exhibited an upward trajectory from 10.09 percent of GDP in 1980 to 80.17 percent of GDP in 2000 (See Figure 1 below), much of which has been linked to persistent fiscal deficits due to an ever-increasing public spending compared to low fiscal revenues (Sakyi and Opoku, 2016). However, following the joint World Bank and IMF debt relief programme known as the Heavily Indebted Poor Countries (HIPC) which started in 1996 along with the related Multilateral Debt Relief Initiative (MDRI) which aimed to reduce the unsustainable debt burden of poor countries to a manageable level, about 37 countries of which included 31 African countries benefited for debt forgiveness to the tuned of over US$100 billion. The economic rationale for the debt relief initiative was to free up resources for poor countries towards accelerating progress on poverty reduction through the erstwhile United Nations' Millenium Development Goals (MDGs), which have metamorphosed into the current Sustainable Development Goals (SDGs).


**Figure 2. Ghana's Gross Government Debt (% GDP), 1980-2021**
**Source: Public Finance in Modern History, updated database (Mauro et al., 2013)**

HIPC eligibility required affected countries to satisfy four conditions namely, (i) be eligible to borrow from the Worl Bank; (ii) be confronted with unsustainable debt burden which traditional debt mechanism cannot address; (iii) establish track record of sound economic reform and policies; and (iv) develop a Poverty Reduction Strategy Paper (PRSP) with subsequent implementation. Satisfaction of the conditionalities during the completion point guaranteed significant debt reduction. For Ghana, the debt relief initiative led to approximately US$2.198 billion reduction of government debt in net present value (NPV) terms, which represented 56 percent of total outstanding debt. Consequently, Ghana's debt profile fell from 80.17 percent of GDP in 2000 to 18.51 percent of GDP in 2006.

However, and more interestingly, Ghana's debt has since taken a resurgent upward trajectory, with the current debt burden in 2021 reaching 82.12 percent of GDP. Current Debt Sustainability Analysis (DSA) for Ghana show that the country is at a high risk of debt distress for both external and overall debt (World Bank-IMF, 2021) which brings to question the sustainability of her public debts. This means that significant fiscal adjustment will be required to reverse the current debt

trajectory, and more importantly, to improve the budget balance, which has deteriorated significantly in recent periods, particularly during the COVID-19 pandemic (See Figure 2).

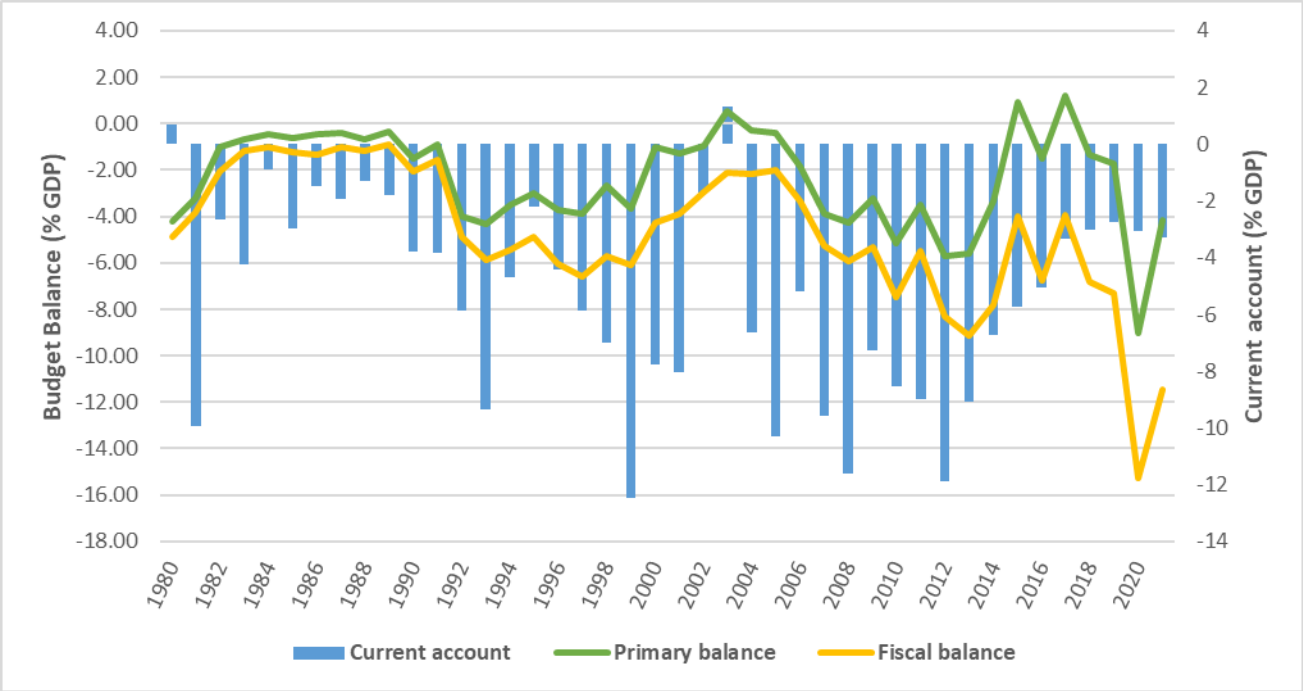


**Figure 3. Trend of current account, fiscal and primary balances (% GDP)**
**Source: WDI and Mauro et al. (2013)**

In comparison with Figure 1, it can be deduced that overall fiscal balance as a percent of GDP has declined since the aftermath of the debt relief, coinciding with elevated debt burden from 2007 onwards, which may have been driven by the higher interest payments on public debt. In other words, higher budget deficits have led to higher debt stock and debt service. Thus, for Ghana, fiscal adjustment through fiscal consolidation becomes necessary for reducing the downward trend in fiscal deficit and, in turn reduce the public debt trend towards a sustainable path. The implication of such fiscal actions, especially on macroeconomic variables, particularly the current account, remains an empirical question. As shown in Figure 2, Ghana's current account for the period has been mostly in deficit. In conjunction with the level of fiscal deficits, some patterns are discernible. First, during the mid-1980s, low fiscal deficits coincided with low current account deficits amidst low and sustainable public debt levels. In the 1990s, with a significant debt increase, both fiscal and current account deficits widened. The same pattern is observed following the aftermath of the

debt relief and the elevated trend in public debt. This may suggest that there is a possible joint interaction between the level of public debt and the fiscal and current account relationship. Ascertaining the existence of such a relationship, especially within the context of the effectiveness of fiscal policy for correcting current account imbalances, taking into consideration the government's fiscal position as characterized by the public debt level, becomes paramount and is the focus of this study.

## 3. Brief Literature

The link between fiscal policy and the current account can be explained by two competing channels with different transmission mechanism. The first channel is based on a Keynesian perspective on the transmission effects of fiscal policy on the current account through aggregate demand and the real exchange rate. This follows from the intra-temporal mechanism (or relative price effect) described by the Mundell-Fleming open economy model (Mundell, 1963; Fleming, 1962). According to the model, an expansionary fiscal policy raises aggregate demand and higher interest rates, which induce real exchange appreciation (through higher capital inflows), leading to a fall in the current account balance. Thus, on the basis of the relative price channel, fiscal expansion will be associated with current account deterioration (i.e., the so-called twin deficits hypothesis).[1] On the other hand, the inter-temporal mechanism (Frenkel and Razin, 1996; Baxter, 1995) posits that a decline in public savings following a fiscal expansion would lead to an increase in private savings, leaving national savings and aggregate demand unaffected. In this framework, a debt-financed fiscal expansion will induce forward-looking private agents to increase labour supply and reduce consumption to offset future tax hikes consistent with government inter-temporal solvency, which in turns leads to an improvement in the current account in accordance with the Ricardian equivalence hypothesis.

The corollary from the above competing channels is that the relationship between the current account and fiscal policy changes depends on whether consumers' behaviour is "Keynesian" or "Ricardian" which in part is explained by the government debt-to-GDP ratio, a crucial factor that influences private sector expectations (Blanchard, 1990; Sutherland, 1990). At high or rising debt levels, forward-looking agents concerned about inter-temporal solvency will increase private

[1] This hypothesis is further supported by the Keynesian absorption theory which suggest that an increase in budget deficit leads to higher domestic absorption and imports, and therefore a deterioration of the current account deficit.

savings in anticipation of future tax hikes. In the Ricardian case, a high debt level would be associated with a stable negative relationship between fiscal policy and the current account; whereas at low debt levels, private agents will react in a Keynesian manner, ensuring that the relationship is positive. As such, the impact of fiscal policy on current account adjustment may depend in a nonlinear fashion and vary across the debt levels.

Empirically, several studies have explored the possibility of these nonlinear dynamics to estimate a critical threshold debt level beyond which the relationship between fiscal policy and the current account changes. Based on a dynamic panel threshold regression for 22 industrialized countries, Nickel and Vansteenkiste (2008) found evidence of a positive co-movement between fiscal and the current account balances for debt ratios below the threshold of 90 percent, and a negative and insignificant effect beyond the threshold implying that private agents become Ricardian offsetting the expansion in fiscal deficit with a reduction (increase) in private consumption (savings). Similar evidence is corroborated by Nickel and Tudyka (2013) and Hürtgen and Rühmkorf, (2014). For instance, Nickel and Tudyka (2014) show that at higher government debt-to-GDP ratio, government spending shocks would have a cumulative negative effect on the trade balance as it triggers a precautionary savings channel. Hürtgen and Rühmkorf, (2014) developed a small open economy model with sovereign default and riskless international capital calibrated on Greek data to show that at high public debt-to-GDP ratios, the correlation between fiscal and current account deficits decreases.

Okombi (2020) estimate debt thresholds of 78.4, 65.25 and 13.75 percent for public external and domestic debts, respectively, for 30 SSA countries. Below (above) these thresholds, there is a positive (negative and non-significant) co-movement between fiscal and current account balances. For a panel of five South Asian countries, Rajakaruna, Suardi and Perera (2021) find evidence of a twin divergence for low to moderate debt levels between 46.2 and 65.8 percent whereas at high debt levels above the threshold of 65.8 percent the evidence show the existence of the twin deficits implying that at high debt levels, fiscal deficits lead a deterioration of the current account. For Middle East and North Africa (MENA) countries, Bousnina and Gabsi (2023) estimated two debt-to-GDP thresholds of 36.71% and 72.99%, implying three debt regimes. They find that evidence of a twin divergence when debt-to-GDP us below 36.71% and above 72.99%, whereas a twin deficit exist in the intermediate range of the two debt thresholds.

While most of these studies have centered on advanced economies, with the exception of Okombi (2020), Rajakaruna et al. (2021) and Bousnina and Gabsi (2023) for developing countries, their main focus has been on estimating the debt threshold beyond the relationship between fiscal policy and current account may switch signs. Our analysis deviates from these studies by concentrating on a single country analysis using a framework that does not require the estimation of threshold debt levels. Specifically, we use the local projections methodology of Jorda (2005) for estimating impulse response functions, and subsequently modified to account for state-dependence. The flexibility of this method couple with the obviation of typical restrictions in traditional nonlinear VAR models, makes more suitable for the analysis. Karras (2019) used the LP framework to investigate the validity of the twin deficits hypothesis for some OECD countries.

We apply this approach in the context of the Ghanaian economy, which has been characterized by high levels of public debt, fiscal and current account imbalances. The focus on Ghana is interesting as previous studies have consistently shown the existence of a positive relationship between fiscal and current account balance, that is, the twin deficits relationship (Senadza and Aloryito, 2016; Sakyi and Opoku, 2016). However, the extent to which this relationship is shaped by the level of public debt remains unresearched; hence, this study seeks to fill that gap in the literature.

## 4. Empirical Methodology and Data

We follow a two-pronged approach to understanding the role of debt in the relationship between government fiscal balance and the current account balance for Ghana. First, we estimate a smooth transition regression (STR) model, which is suitable for models with nonlinear and regime-switching behaviour. Second, we characterize the nature of the state-dependence in the relationship using the local projections (LP) methodology of Jorda (2005) to estimate the nonlinear impulse responses of the current account balance following a change in fiscal policy (or fiscal shock) across both low and high debt environments.

**Smooth Transition Regression (STR) model**

To model possible regime-switching, nonlinear and asymmetric behaviour of the relationship, we use the smooth transition regression (STR) model. The STR model is a regime-switching model which is able to model potential nonlinear behaviour between variables based on a transition function that is continuous in nature. Precisely, it allows for a smooth and gradual transition between regimes in the relationship between variables. Further, the STR computes the number of regimes, the threshold parameter and the speed of adjustment from one regime to another.

Following Teräsvirta (1994), the STR model in its generalized form can be specified as follows:

$$y_t = \pi' z_t + \theta' z_t F(s_t, \gamma, c) + \delta' \boldsymbol{X}_t + u_t \quad (1)$$

where $y_t$ is the depend variable, $F(s_t, \gamma, c)$ is the transition function with $s_t$ as the transition variable; $\pi$ and $\theta$ are parameters of the linear and nonlinear part of the model respectively. $\gamma$ is the speed of adjustment from one regime to another, and is constant over time; and $c$ is extreme threshold of the transition variable. $z_t = (y_{t-1}, \cdots, y_{t-p}; x_{t-1}, \cdots, x_{t-p})$, $y_{t-p}$ and $x_{t-q}$ indicate the optimal autoregressive lags of the dependent and independent variables with $p$ and $q$ lags respectively. $\boldsymbol{X}_t$ is a vector of controls which includes the real GDP growth ($GDP$), the short-term interest rate ($INTR$), and the real effective exchange rate ($RER$). If the $\gamma \to \infty$, the STR model reduces to a discrete threshold regression (TR) model. That is, if $s_t > c$, then $F(\cdot) = 1$. However, if $s_t < c$, then $F(\cdot) = 0$. Further, as $\gamma \to 0$, the STR model reduces to a linear model.

Generally, the transition function can be specified either logistically or exponentially as follows respectively:

$$F(s_t, \gamma, c) = \left[\frac{1}{1 - \exp\left(-\gamma(s_t - c)\right)} - \frac{1}{2}\right] \quad (2)$$

or

$$F(s_t, \gamma, c) = [1 - \exp\left(-\gamma(s_t - c)\right)^2] \quad (3)$$

The estimation process for the STR model typically involves testing for the presence of nonlinearity, selecting the transition variable, and the number of regimes. The first two steps can be identified based on coefficient test of an auxiliary regression derived from a third order Taylor approximation of the transition function as specified below:

$$y_t = \beta_0' z_t + \beta_1' z_t s_t + \beta_2' z_t s_t^2 + \beta_3' z_t s_t^3 + \upsilon_t \quad (4)$$

For the linearity test, the null hypothesis is based on the joint test for the significance of the coefficient of the interactive terms in Equation (5) as follows:

$$H_{01}: \beta_1 = \beta_2 = \beta_3 = 0 \quad (5)$$

of which the test statistic follows an $F$ distribution. A rejection of the test implies the existence of a nonlinear relationship. Consequently, the appropriate transition function for the nonlinear model must be selected. This involves three coefficient tests, all of which follow an $F$ distribution, with the following null hypotheses:

$$H_{02}: \beta_1 = 0 \mid \beta_2 = \beta_3 = 0 \quad (6)$$

$$H_{03}: \beta_2 = 0 \mid \beta_3 = 0 \quad (7)$$

$$H_{04}: \beta_3 = 0 \quad (8)$$

The rejection of $H_{03}$ indicates that the optimal model is a second-order logistic STR model with two regimes (LSTR2) or an exponential STR (ESTR), either of which can be selected based on the null hypothesis of $H_0: c_1 = c_2 = 0$. The rejection of the null hypothesis would indicate that LSTR2 is the optimum model. Alternatively, if the rejection of $H_{02}$ or $H_{04}$ is strongest, then the logistic STR with one regime (LSTR1) is the optimum model. Following these steps, the appropriate transition variable is selected, and the parameters of the transition function are estimated. This involves a grid search method for the initial estimates of $\gamma$ and $c$ based on the optimum transition variable for the model with the minimum value of the sum of squared residuals (SSR) following the Newton-Raphson algorithm.

Following from the above description of the STR model, Equation (1) is modified appropriately as follows:

$$CA_t = \beta_0 + \beta_1 PB_t + \beta_2 PB_t F(s_t, \gamma, c) + \delta' \boldsymbol{X}_t + \varepsilon_t \quad (9)$$

with the definition of variables maintained from above. The transition variable is the public debt-to-GDP ratio, and we consider its first to fourth lags as candidates for the selection of the optimum STR model.

**Local Projection (LP) model**

Following Karras (2019), we use Jorda's (2005) local projection (LP) method to estimate impulse responses of the current account to changes in primary fiscal balance as follows:

$$ca_{t+h} = \alpha_h + \sum_{j=0}^{k} \beta'_{h,j} \Delta pb_{t-j} + \sum_{j=1}^{k} \varphi'_{h,j} ca_{t-j} + \sum_{j=1}^{k} \gamma'_{h,j} \boldsymbol{X}_{t-j} + \varepsilon_{t+h} \quad (10)$$

where $t$ is index over time, and $h$ is indicates the horizon (i.e., quarters over time $t$), $ca$ denotes current account balance, and $\Delta pb_t$ is the change in government primary fiscal balance which represents government's fiscal stance -- or alternatively as a measure of fiscal shock. $\boldsymbol{X}_t$ is a vector of controls which includes the real GDP growth, the short-term interest, the real effective exchange rate; and $\varepsilon_t$ is the stochastic idiosyncratic error terms. Equation (10) is a reduced-form single equation which based on the LP method is used to obtain the impulse response functions (IRFs) of the variable of interest from a series of OLS regression estimations over the horizon $h$. This is constructed as a sequence of the $\beta_h$'s which capture the dynamic response of the current account to changes in government primary fiscal balance over the $h$ horizon ranging from a zero to a maximum of $H$. Hereafter, we set the $H = 8$, and the number of lags in the Equation (10) to two (i.e., $k = 2$) to ensure that the error term is approximately uncorrelated.

Equation (11) represents a linear specification of the LP method, which serves as a baseline model for investigating the twin deficit hypothesis without conditioning on the economic environment. To shed light on how the level of public debt may influence the twin deficit relationship, Equation (10) is modified following Auerbach and Gorodnichenko (2017) and Alpanda et al. (2021) to capture state-dependence across the debt environment as follows:

$$\begin{aligned} ca_{t+h} = I_{t-1} &\left[ \alpha_h^A + \sum_{j=0}^{k} \beta_{h,j}^A \Delta pb_{t-j} + \sum_{j=1}^{k} \varphi_{h,j}^A ca_{t-j} + \sum_{j=1}^{k} \gamma_{h,j}^A \boldsymbol{X}_{t-j} \right] \\ &+ (1 - I_{t-1}) \left[ \alpha_h^B + \sum_{j=0}^{k} \beta_{h,j}^B \Delta pb_{t-j} + \sum_{j=1}^{k} \varphi_{h,j}^B ca_{t-j} + \sum_{j=1}^{k} \gamma_{h,j}^B \boldsymbol{X}_{t-j} \right] + \varepsilon_{t+h} \end{aligned} \quad (11)$$

where $I_{t-1} \in [0,1]$ represents the state of the economy across the debt environment (or regimes). Estimates of the $\beta_h^A$'s and $\beta_h^B$'s provides the impulse responses for the current account following

changes in the government fiscal deficits in the high- and low-debt environment, respectively, over the horizon $h$.

Equation (11) assumes that the level of public debt affects nonlinearly the relationship between fiscal policy and the current account. Given that the debt-to-GDP ratio is often used as a measure of a country's debt burden, we define the debt state as follows:

$$I_t = \frac{D_t - D^{min}}{D^{max} - D^{min}}$$

where $D_t$ is the debt-to-GDP ratio at time $t$, and $D^{max}$ and $D^{min}$ are the maximum and minimum values of the debt ratio over the sample period. By construction, $I_t \epsilon [0,1]$ where $I_t = 0$ denotes low debt regime and $I_t = 1$ denotes high debt regime. An alternative approach to characterize the debt environment using a defined debt threshold, for example the median debt ratio, to construct the debt state, with $I_t = 1$ if the debt ratio exceeds the median debt ratio, and zero otherwise.

As an alternative to the traditional VAR models for the construction of impulse response functions, Jorda (2005) introduced the LP method, which does not require the specification and estimation of the unknown true multivariate dynamic system as with VAR models. The advantage of the LP method, as highlighted by Jorda (2005) includes the following. First, the LP model can be estimated using the ordinary least squares (OLS) estimator when only a handful of parameters are required. Hence, it is suitable even in cases where the length of the time series is relatively short. Second, LP is robust to the misspecification of the true data-generating process and model uncertainty since it does not require the estimation of the complete system of equations, as is typical with VAR models. Third, the LP method is amenable to highly nonlinear specifications that are often impractical and infeasible in a multivariate setting. In other words, the LP method can capture nonlinearity, regime-switching and state-dependent behaviour of parameter estimates as well as the construction of state-dependent impulse response functions even for relatively small sample sizes. Hence, it is possible to evaluate differences in the response of variables across different regimes following a shock. On these accounts, the LP method is a natural alternative to VAR models for estimating impulse response functions. Recently, the LP method has gained popularity among researchers in studying the effects of state-dependent fiscal and monetary policy shocks (see Auerbach and Gorodnichenko, 2017; Tenreyro and Thwaites, 2016; Ramey and Zubairy, 2018; Alpanda et al., 2021).

**Data**

Data for the empirical analysis is obtained for Ghana over the period 1990 to 2022. The key variables of interest include the government primary balance, gross government debt (i.e., public debt), and the current account balance, all expressed as percentage terms relative to the GDP. Additional variables include the real GDP growth, short-term interest rate and the real effective exchange rate, which are standard variables often included in empirical analysis of the determinants of external imbalances. Specifically, data for government primary balance, the current account balance, gross government debt and the real GDP are drawn from the IMF's World Economic Outlook database. The real effective exchange rate is obtained from the IMF's International Financial Statistics (IFS), while the short-term interest rates are sourced from the Bank of Ghana online database.

Figure 4 presents the time series plots of these variables. Interestingly, Ghana has posted positive GDP growth (Panel E) over the sample. This is in addition to her primary fiscal balance being mostly in deficit (Panel A). In fact, both fiscal balances and GDP growth deteriorated significantly during the COVID-19 pandemic with the adoption of fiscal stimulus packages to curtail the spread of the virus and also boost economic recovery. Like the government's primary balances, current account balances have mostly been in deficits over the sample period (Panel F). The real effective exchange rate, on the other hand, shows significant volatilities with marked depreciation over time (Panel C). Similarly, the short-term interest rate is not without marked fluctuations as well (Panel B). Government gross public debt has maintained an upward trajectory in the aftermath of the HIPC debt relief programme of the mid-2000s (Panel E). Table 1 presents the descriptive statistics of the variables used for the empirical analysis, as well as their stationarity test based on the Kwiatkowski et al. (1992) test with a null hypothesis of no unit roots. Interestingly, all the variables are stationary at levels except the real effective exchange rate, which is stationary after first differencing.

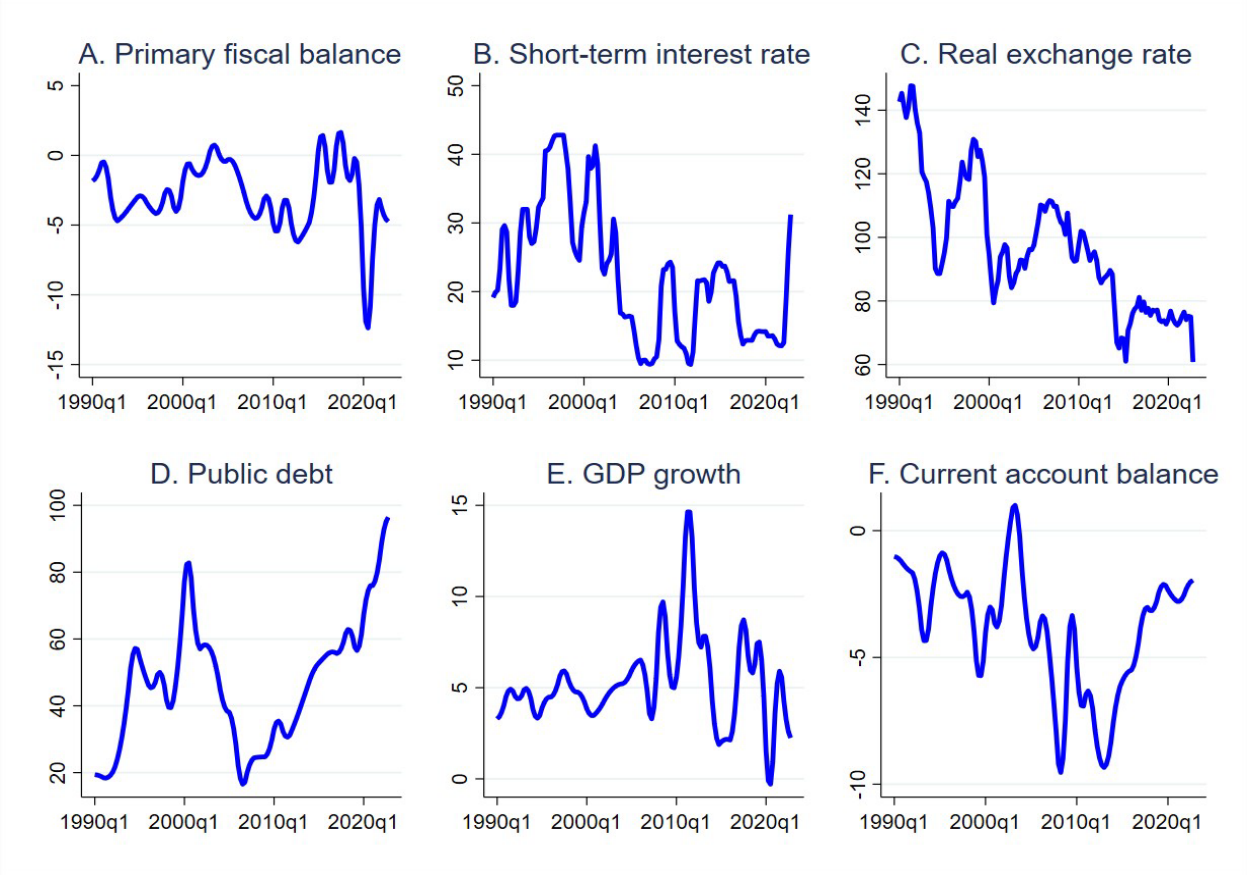


**Figure 4. Time series plots of variables**

**Table 1. Summary Statistics and Unit Roots Test**

| Statistics | GDP growth | Public Debt | Current account balance | Primary balance | Short-term interest rate | Real exchange rate |
|---|---|---|---|---|---|---|
| N | 132 | 132 | 132 | 132 | 132 | 132 |
| Mean | 5.274 | 46.723 | -3.826 | -2.848 | 22.416 | 97.192 |
| SD | 2.466 | 18.852 | 2.415 | 2.443 | 9.511 | 20.618 |
| Median | 4.866 | 47.441 | -3.234 | -3.039 | 21.613 | 94.256 |
| Min | -0.293 | 16.534 | -9.537 | -12.378 | 9.38 | 60.783 |
| Max | 14.643 | 96.461 | 0.997 | 1.647 | 42.8 | 147.734 |
| *Unit root tests* | | | | | | |
| KPSS | 0.190[0]*** | 0.169[0]*** | 0.412[0]** | 0.137[0]*** | 0.702[0]*** | 0.051[1]*** |

Note: KPSS is Kwiatkowski-Phillips-Schmidt-Shin (1992). Unit root tests reported for RER at first difference. Order of integration in brackets. All units roots are based on automatic lag selection. Unit root is performed at levels without trend.

## 5. Empirical Results and Discussion

### STR model results

For the STR model, we use the public debt-to-GDP ratio as the transition variable to evaluate for possible nonlinear behaviour in the relationship between fiscal policy and the current account. We consider the first to fourth lag of the debt ratio as possible candidates for the transition variable. The best candidate transition variable is one that minimizes the sum of squares of the residuals (SSR). Table 2 Panel A shows that among these four variables; the first lag of the debt ratio has the lowest SSR value of 30.281. Consequently, Panel B of Table 2 presents the nonlinear model test for the selected transition variable. As shown, the null hypothesis of the linearity test, $H_{01}$, is rejected, and therefore indicate the existence of nonlinear relationship between the twin balances characterized by the transitional dynamics of the first lagged debt ratio. Further, the non-rejection of the null hypothesis, $H_{03}$, suggest that the transition function is neither a second-order logistic STR model nor an exponential. Rather, the rejection of the null hypothesis, $H_{02}$, indicate that a first-order logistic STR model (LSTR1) with two regimes is appropriate for the modeling the nonlinear relationship.

**Table 2: Threshold variable and nonlinear model test**

A. Model selection criteria

| Threshold Variable | SSR | Regimes |
|---|---|---|
| $DEBT(-1)$ | 30.281 | 2 |
| $DEBT(-2)$ | 31.442 | 2 |
| $DEBT(-3)$ | 32.710 | 2 |
| $DEBT(-4)$ | 33.481 | 2 |

B. Nonlinear model test for threshold variable $DEBT(-1)$

| | Hypothesis | F-stat |
|---|---|---|
| $F_1$ | $H_{01}: \beta_1 = \beta_2 = \beta_3 = 0$ | 4.835*** |
| $F_2$ | $H_{02}: \beta_1 = 0 \mid \beta_2 = \beta_3 = 0$ | 9.175*** |
| $F_3$ | $H_{03}: \beta_2 = 0 \mid \beta_3 = 0$ | 0.531 |
| $F_4$ | $H_{04}: \beta_3 = 0$ | — |

Following the analysis of the nonlinear model test, Table 3 presents the STR model results with two regimes. The slope adjustment parameter (i.e., $\gamma$) equals 0.362, which suggests a slow and gradual transition from one regime to another. This is a slow adjustment that supports the fact that

most macroeconomic variables do not exhibit rapid and discrete jumps but rather evolve in a gradual manner. Specifically, public debt accumulation over time is gradualistic with increased expansion of fiscal deficits over successive years. Meanwhile, the extreme threshold parameter (i.e., $c$) for the STR model is 47.648 percent which demarcates the STR model into linear and nonlinear part which is equivalent to a low and high debt regime. In other words, the linear (nonlinear) part of the STR model defines the low (high) debt regime in which the public debt ratio is below or equal to 47.648 percent (higher than). Interestingly, this estimated debt threshold is roughly equal to the sample median of the debt ratio. Figure 5 presents the plots of the transition function over the selected transition variable.

**Table 3: Logistic STR model results**

| | | |
|---|---|---|
| Threshold Variables (linear part) | | |
| $GB$ | 0.183 | (0.033)*** |
| | | |
| Threshold Variables (nonlinear part) | | |
| $GB$ | -0.195 | (0.041)*** |
| | | |
| Non-Threshold Variables | | |
| $CAB(-1)$ | 0.883 | (0.033)*** |
| $GDP$ | 0.037 | (0.018)** |
| $INTR$ | 0.017 | (0.007)** |
| $RER$ | -0.001 | (0.003) |
| $Constant$ | -0.634 | (0.410) |
| | | |
| Slope ($\gamma$) | 0.362 | (0.269) |
| Threshold ($c$) | 47.658 | (2.804)*** |
| | | |
| R-sq. | 0.959 | |
| Adj. R-sq. | 0.957 | |
| S.E. of regression | 0.503 | |

Note: Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

As seen from Table 3, the linear part of the STR model shows a positive and statistically significant relationship between the government primary balance and the current account balance. Precisely, a one percentage point increase in the primary balance results in a 0.183 percentage point improvement in the current account balance, which further provides support for the existence of

the twin deficits hypothesis for Ghana. Moreover, for the nonlinear part, a negative and statistically significant relationship exists between the primary balance and the current account balance, with a coefficient estimate of 0.195. This result indicates that as the public debt ratio, which is the transition variable, rises, the relationship between the twin balances becomes less positive. Put differently, as debt rises, the twin relationship becomes weak. Broadly, the result points to the fact that the twin balance relationship can change in the opposite direction as debt rises over time. Further, it shows that the relationship is nonlinear and asymmetric, and is therefore subject to state dependence.

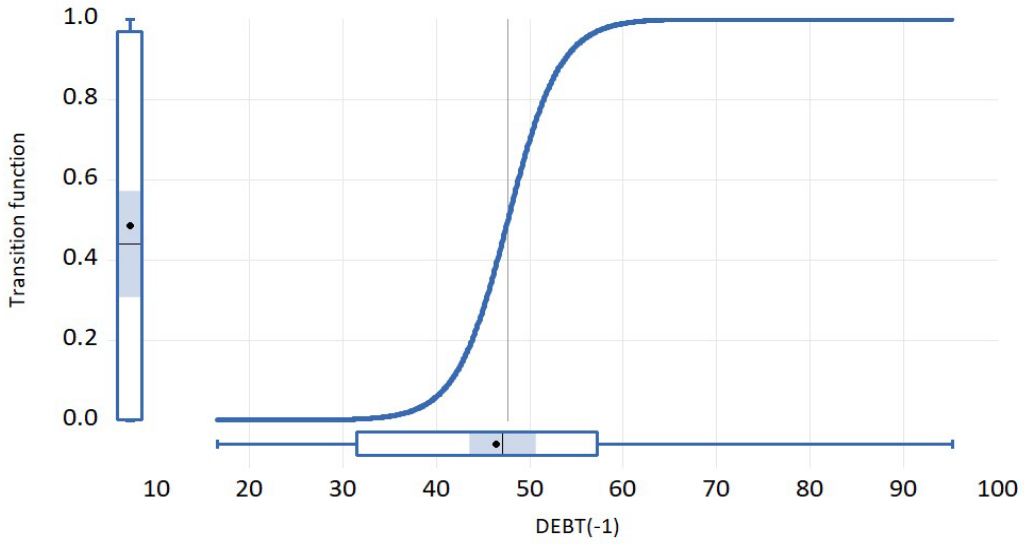


**Figure 5. Plot of the transition threshold weights against the transition variable**

**Local Projections (LP) results**

**Baseline (Linear) results**

Figure 6 presents the impulse responses for the baseline linear LP model in Equation (10) following a one percentage point change increase in the government primary deficit. a 1 percent of GDP increase in fiscal primary deficits leads to a -0.171 percent of GDP deterioration in the current account balance on impact. This impact is strong and statistically significant, as it suggests that an increase in fiscal deficits is followed by a deterioration of the current account in a manner that is less than one-to-one. The downward adjustment of the current account following the fiscal

deficit expansion persist reaching the trough of -0.28 percentage points in the third quarter, and thereafter, a gradual improvement. Interestingly, the impact of the fiscal expansion on the current account remains statistically significant until the fifth (5th) quarter, implying a lasting effect over a year. Moreover, the impulse response of the current account remains negative and relatively persistent over the horizon, thus supporting the existence of the twin deficits hypothesis for Ghana. This finding is consistent with that of the STR model

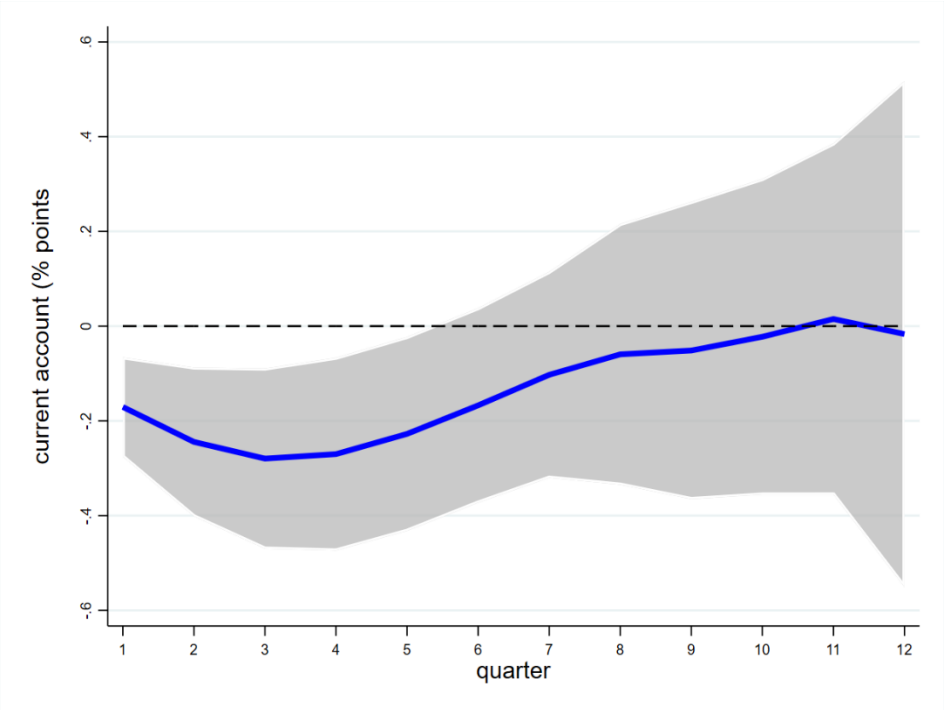


**Figure 6. Baseline impulse response of the current account to 1% percent shock in the change in primary deficit. The shaded area represents 90% confidence bands.**

This means that an improvement in the government's primary balance can boost debt sustainability. Overall, the impact of the government‘s fiscal contraction through an improvement in its primary balance can be growth catalytic in the short-term as concerns over fiscal and debt sustainability dissipate, and the drop in debt burden frees up available resources for investment in growth-enhancing economic activities. The surge in domestic production can further be boosted with the depreciation of the exchange rate, which in turn should spur export and discourage imports, leading to an improvement in the current account position.

**State-dependent LP result**

Next, we turn to the nonlinear and state-dependent LP estimation result for Equation (11) with debt regimes demarcated into low and high debt environments. Figure 7 presents the impulse response of the current account balance to a 1 percentage point of GDP change in government primary fiscal deficit for both low and high debt environments. Interestingly, the response of the current account balance to the fiscal expansion in the low debt environment mirrors the response obtained in Figure 6 for the baseline linear scenario. However, the magnitude of the impact is much stronger. For instance, a one percentage point increase in the primary deficit leads to a 1.34 percentage point deterioration in the current account on impact, reaching the trough of 1.77 percentage points in the third quarter; thereafter, a gradual upward improvement over the horizon. More specifically, the deterioration of the current account balance following the fiscal deficit expansion is statistically significant on impact till the sixth quarter. This again reiterates that fiscal deficit expansion can lead to a significant short-term effect on the current account, and in turn confirms the existence of the twin deficits hypothesis for the Ghanaian economy, especially when public debt levels are low and there are no debt sustainability concerns.

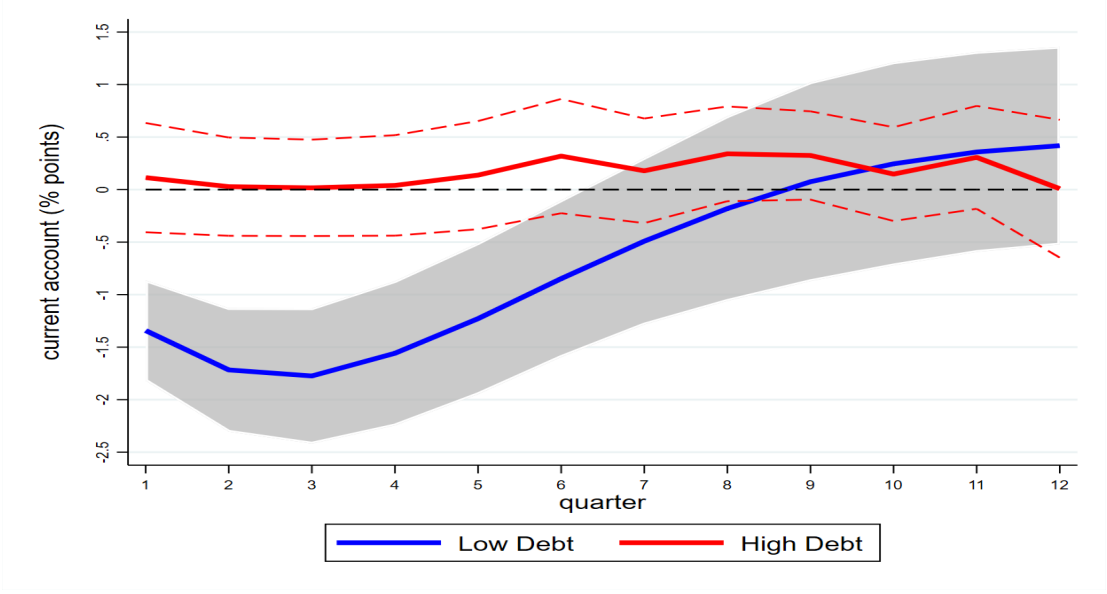


**Figure 7. State-dependent impulse response of current account to 1% percent change in primary deficit across low and high debt environment. Shaded area represents 90% confidence bands.**

On the other hand, an expansion in the primary deficit leads to an improvement in the current account over the entire horizon under the high debt environment. For instance, a one percentage point increase in the primary deficit results in a 0.114 percentage point improvement in the current account balance on impact. Moreover, this response is relatively flat and statistically insignificant over the horizon. This means that in a high debt environment with elevated public debt levels and heightened debt sustainability challenges, an expansion in fiscal deficit does not have any significant impact on the current account. This result supports the Ricardian Equivalence Hypothesis (REH), which posits that both deficits are independent and unrelated to each other.

**Robustness checks**

We consider some robustness checks to ensure that our empirical results are plausible. First, we use a fixed threshold public debt level of 60%, which is in tandem with the debt sustainability threshold of international financial institutions such as the IMF and the World Bank. Second, we consider an alternative identification of fiscal shocks based on residuals obtained from the regression of the primary deficit on one lag of the current account balance, GDP growth, real effective exchange rate, short-term interest rates and the debt-to-GDP ratio, respectively. This follows the approach in Karras (2019).

For a debt threshold of 60% of GDP, Figure 8 presents the impulse responses for the current account for both low and high debt environments following a fiscal deficit expansion. Following a one percentage point increase in the primary deficit, the current account deteriorates by 0.613 percentage points in impact, falls further to 0.715 percentage points before rebounding on an upward trajectory, and they tapering off in the low debt environment. Meanwhile, the impulse response of the current account in the high debt environment is mostly positive, indicating an improvement in the current account balance, though statistically insignificant. This evidence corroborates the results obtained in Figure 7.

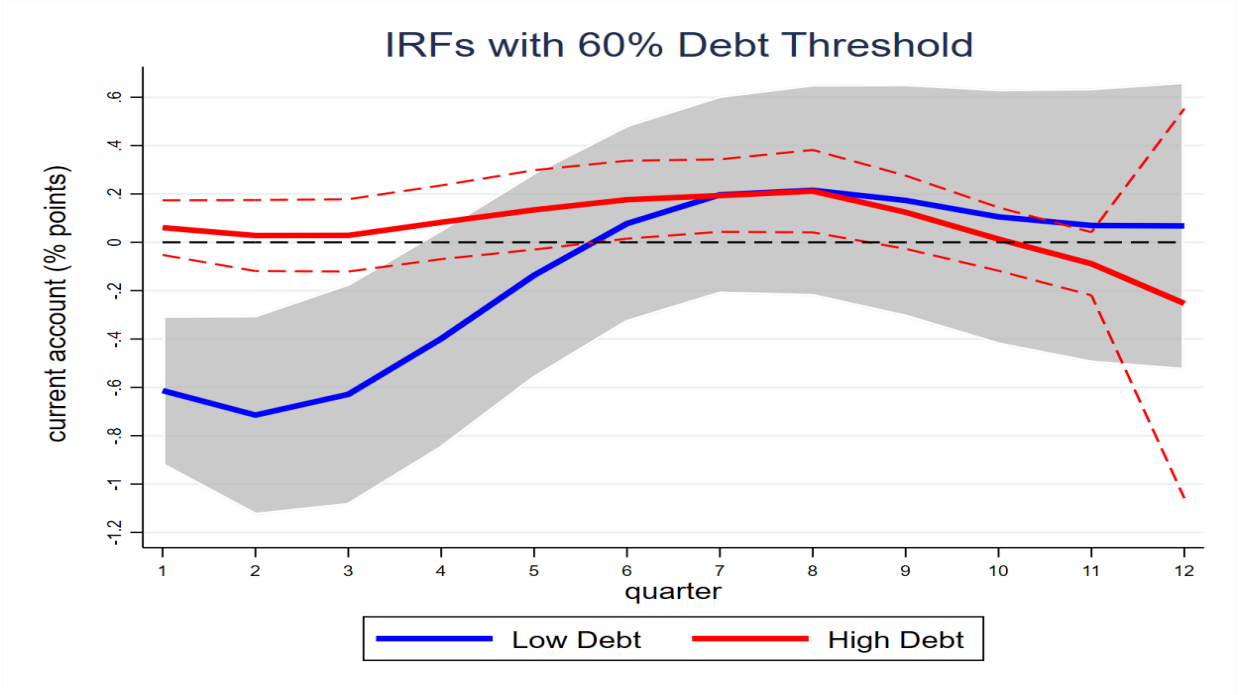


**Figure 8. State-dependent impulse response of current account to 1% percent shock in the change in primary deficit with 60% debt threshold. The shaded area represents 90% confidence bands.**

Turning to the sensitivity check with an alternative identification of fiscal shock, Panel A of Figure 9 presents the residuals obtained from the regression of primary deficit on one lag of the aforementioned variables. While the fiscal shocks seem to be well-behaved before 2018, after which there were significant spikes, particularly in 2020, which corresponds with the COVID-19 period, which witnessed significant fiscal spending and therefore deficits towards containment of the virus, offering social protection, and supporting economic recovery in the economy. Thus, fiscal shocks obtained as residuals from the regression on these control variables fit well with the fiscal developments in Ghana. Using this alternative measure of fiscal shocks, Panel B of Figure 10 shows the impulse responses of the current account across both low and high debt environments. The impulse response of the current account is similar to that of Figure 7. A one percentage point fiscal shock leads to a deterioration of the current account by 1.44 percentage points in the first quarter and then drops to -1.788 percentage points in the second quarter before a gradual upward trajectory, indicating an improvement in subsequent quarters in the low debt environment. Moreover, the impulse response is significant in the first five quarters following the shock. On the one hand, the current account deteriorates in the first three quarters following the fiscal shock

before reverting back. However, the impulse responses across the horizon are statistically insignificant, as with other results obtained in Figures 7 and 8.

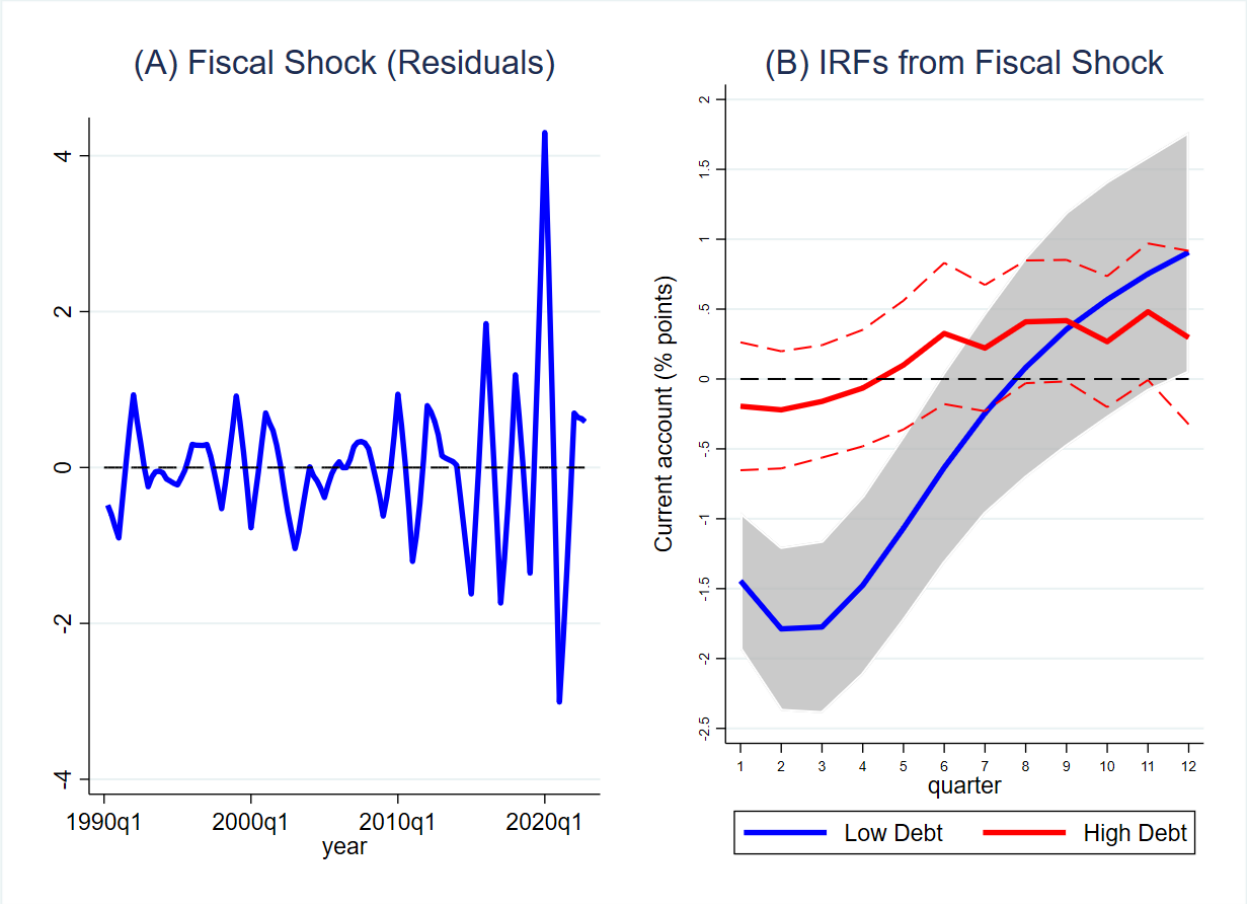


**Figure 10. State-dependent impulse response of the current account to 1% percent shock in fiscal shocks. The shaded area represents 90% confidence bands.**

### 5.3.4 Discussion of results

Our results clearly show that the relationship between fiscal policy and the current account can be dependent on the state of public finances measured using the level of public debt-GDP ratio. When public debt levels are low or moderate, fiscal expansion will trigger a significant deterioration in the current account, which supports the twin deficits hypothesis as public debt is deemed sustainable and there is no risk of debt distress. When debt is low, fiscal expansion will have Keynesian effects on the economy, leading to the deterioration of the current account. Fiscal expansion stimulates aggregate demand and output growth (higher income), which spur high

imports relative to exports, and therefore a worsening of the current account. Moreover, low and moderate levels of public debt may have growth-enhancing effects which can also affect the current account.

Meanwhile, at high public debt levels, the relationship between fiscal policy and the current accounts is mostly negative and statistically insignificant. This means that following fiscal expansion in the high debt environment leads to an improvement, which indicates the existence of a twin divergence; however, the lack of statistical significance points to the validity of the Ricardian Equivalence Hypothesis (REH). This result is consistent with the findings of Nickel and Vansteenkiste (2008) and Okombi (2020) in which the twin deficits hold under a low debt environment, while the Ricardian equivalence holds under a high debt environment. Furthermore, both findings from the STR and LP models are also similar to those of Abbas et al. (2011), who found a weakened association between fiscal policy and the current account by 0.45 percentage points for developing countries with external debt-to-GDP above 45 percent.

Thus, High debt levels accentuate debt sustainability concerns and the likelihood of near future fiscal adjustment following a fiscal expansion. Such adjustment through fiscal consolidation may necessitate a large short-term contractionary effect on aggregate demand as well as imports, leading to an upward adjustment in the current account. On the contrary, when debt is low or moderate and is considered sustainable, the expansionary effect of fiscal policy on aggregate demand may be augmented through an increase in imports, leading to a significant deterioration in the current account balances.

## 6. Conclusion and policy implications

This research investigates the role of public debt in influencing the relationship between fiscal policy and the current account in Ghana. First, we find evidence of the existence of the twin deficits phenomenon in Ghana. Second, this relationship is state-dependent on the levels of public debt. For low debt environment, we find significant evidence in support of the twin deficits hypothesis; whereas, for a high debt environment, the relationship is negative and relatively stable, though statistically insignificant, which supports the Ricardian Equivalence hypothesis. In other words, the effect of fiscal expansion on the current account improvement is subdued in the high-debt environment, whereas the effect is very pronounced based on the magnitude of the response and

statistical significance in the low-debt environment. Thus, fiscal expansion will have a sizeable impact in the low-debt environment and a weakened effect in the high-debt environment.

Therefore, and from a policy perspective, there is a need for policymakers to implement a gradual fiscal adjustment which provides the best bet for economic recovery, ensuring debt sustainability, and improving the current account. In view of the mounting fiscal deficits and high debt environment that currently constrain the Ghana economy, the implementation of fiscal consolidation remains a first-best solution to addressing these surging debt sustainability concerns and restoring macroeconomic stability. Interestingly, the Ghanaian government has followed this path since its debt default in 2022, in conjunction with the Extended Credit Facility (ECF) arrangement with the International Monetary Fund (IMF). The creation of fiscal space through increasing fiscal revenue is vital for surmounting these fiscal vulnerabilities. Ghana, as with other African countries, are plagued with low domestic resource mobilization. As at 2021, Ghana's tax-to-GDP ratio stood at a meagre 14.1 percent which clearly indicates a revenue mobilization problem for the government. Thus, upping the revenue side of the fiscal policy should be a key part of the current fiscal strategy. So far, the Ghana authorities have initiated a Medium-Term Revenue Strategy (MTRS) for tax policy and revenue administration reforms with ultimate goal of raising non-oil revenue to 16.5 percent of GDP by 2026 (IMF, 2024). These efforts must be sustained along with rationalizing government expenditures for greater effectiveness and efficiency. These measures should help keep the government fiscal balance on a more sustainable path over the medium term.

Further, these fiscal consolidation measures should also help to reduce debt vulnerabilities and restore the public debt on a sustainable path. Although the Ghanaian government has benefited from the IMF ECF-support programme, the need for a comprehensive restructuring of her debt is also warranted following the 2022 default. Success in this area will nonetheless help to reduce the country's debt burden and debt servicing costs over the medium term and usher in economic recovery and macroeconomic stability. Overall, the combination of fiscal consolidation and debt restructuring, accompanied by structural reforms to create a conducive business environment, attract foreign direct investment, increase export earnings, reduce debt financing pressures and boost economic growth, should culminate in strengthening the current account position.

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