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The twin deficits hypothesis in developing countries

Empirical evidence for Ghana

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Abstract

The issue of whether the long-run relationship between fiscal and current account deficits follow the tenets of the twin deficits hypothesis, the Ricardian equivalence, and the twin divergence hypothesis has in recent years become debatable both in the developed and, mainly the developing countries. In contributing to this ongoing debate, we use the case of Ghana over the period 1960-2012 as a sort of laboratory and, by employing relatively novel estimation techniques, namely cointegration techniques with allowance for structural break, we find that fiscal deficit improves the current account deficit. In other words, this paper provides evidence of the twin divergence hypothesis and therefore, adds to demonstrate the fact that the twin deficits hypothesis should not necessarily gain universal acceptability over the twin divergence counterpart.

Keywords: twin deficits hypothesis, current account deficit, fiscal deficit, cointegration, Ghana

1 Introduction

The role of fiscal discipline and a current account close to equilibrium for macroeconomic stability and sustained economic growth of countries is clearly out of question (see Lau et al., 2010; Fatima et al., 2011; Udoh, 2011). For this reason, the relationship between fiscal and current account deficits has received much attention over the past few decades, in many cases by adopting a global perspective. This is because persistent fiscal and current account deficits, if unattended, could extend beyond the own country (or region) and lead to a global financial instability and probably an economic crisis (Mendoza et al., 2007) with dire repercussions on future generations. Moreover, they could serve as a deterrent to prospective foreign investors and donors to the country as they paint a gloomy picture about the state of the economy, which eventually would affect its rate of growth.

Ghana is a typical developing country worth mentioning with regard to fiscal and current account deficits occurrence. This is the case as the liberalisation of the Ghanaian economy in the early 1980s has seen a tremendous increase in trade flows with the rest of the world (see Sakyi, 2011; Alagidede et al., 2013). Besides, the rich natural resource endowment and recent oil discoveries have made the country one of the best trade destination for foreign investment and trade in Africa. However, Ghana's impoverished nature of industry, continual dependence on a few and mainly primary export commodities, and the incessant taste for foreign produced goods have rendered the country a net importer for considerably a long period of time. With the exclusion of the years 1972, 1973, 1975 and 1982 with current account surpluses, the country has witnessed current account deficit for the last six decades (see Figure 1)[1]. It is quite surprising to note that over the post-liberalisation period (i.e. 1984-2012), in which one would expect current account performance to be better, at least at the later stages of the liberalisation process due to the many export promotion programmes[2], the deficit was getting higher and higher. Whilst the pre-liberalisation period (i.e. 1960-1983) recorded an average current account deficit of 3.3 per cent with 0.3 per cent (the lowest value) and 11.8 per cent (the highest value) in 1979 and 1961 respectively, the average for the post-liberalisation period was 14.5 per cent with 3.8 per cent

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[1] Figure 1 shows the trend of fiscal and current account deficits expressed as a percentage of GDP.
[2] Such as the establishment of Ghana Free Zones Board in 1995, African Growth Opportunity Act in 2000, Export Development and Investment Fund in 2000, Presidential Special Initiatives in 2004 (which collapsed in 2008), and National Trade Policy (NTP) in 2005 among others.

(the lowest value) and 26.5 per cent (the highest value) in 1984 and 2005 respectively. This increasing current account deficit has often been attributed to the more than expected oil import bill and the depreciation of the Ghana Cedi against its trading currencies (AfDB/OECD, 2007). It is not surprising that Bawumia (2014) blames the country's rampant currency depreciation on its current account balance situation among other factors. Though one would expect depreciation of the country's currency to reduce imports and increase exports ceteris paribus, Ghana's case seems to be different as imports have rather increased.

Figure 1. Trend of fiscal and current account deficits (1960-2012)
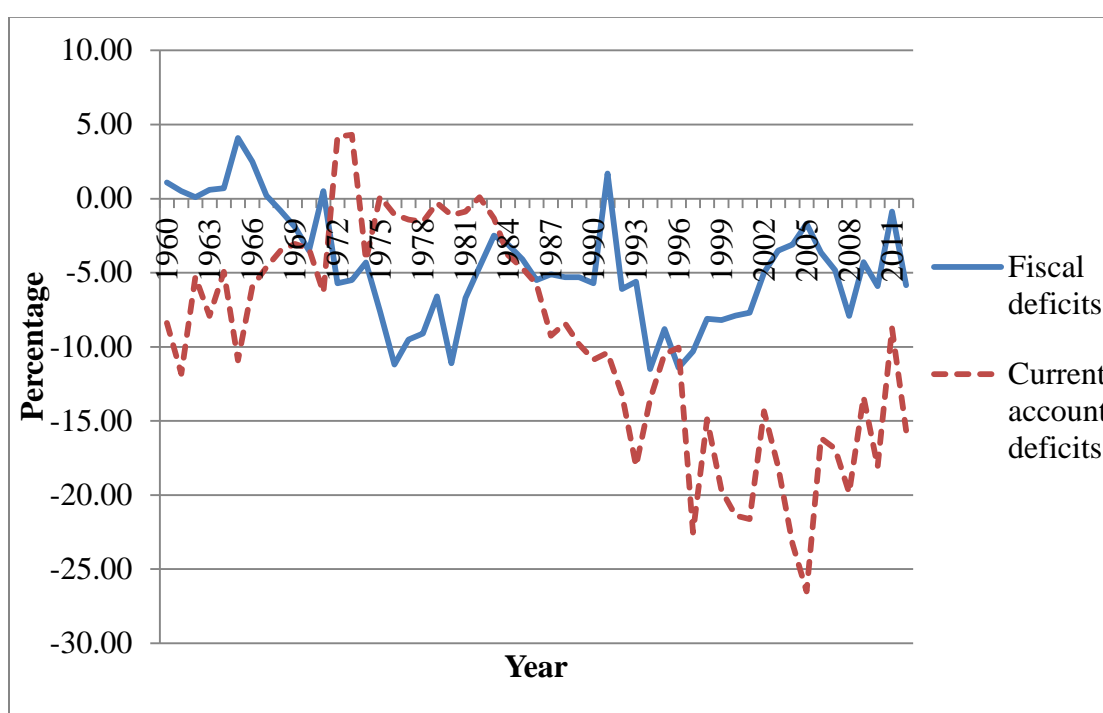
The story is not different when we look at the country's fiscal deficits situation; the government outruns its budgets almost every year. With the exception of the years 1960 through 1967 and also 1971 with fiscal surpluses (see Figure 1), the pre-liberalisation period was mainly characterised by fiscal deficit. This period recorded an average fiscal deficit of 3.3 per cent with 0.8 per cent (the lowest value) and 11.2 per cent (the highest value) in 1968 and 1976 respectively. Excluding the year 1991 with fiscal surplus of 1.7 per cent, the post-liberalisation period recorded an average fiscal deficit of 5.7 per cent with 0.88 per cent (the lowest value) and 11.5 per cent (the highest value) in 2011 and 1994 respectively. Although out of our sample

3

period, it is also pertinent to indicate that the 2013 budget indicates that as at September 2013 the total government debt of the country stood at \$23,498.7 million relative to \$19,150.7 million in 2012 (BoG 2013 Annual Report). Provisional fiscal data released by the Ministry of Finance and Economic Planning tells that the government ended the first half of 2014 with a fiscal deficit of Gh¢2.36 billion. As often argued, the government's inability to raise sufficient revenue to meet its escalating expenditure and hence resorting to massive borrowing from both internal and external sources has triggered an increase in fiscal deficit. As a result of the country's deteriorating fiscal strength and huge debt, international rating agencies such as Standard and Poor, Fitch Rating and Moody's Investors Service have between 2013 and 2014 downgraded Ghana's credit rating (worthiness).

In this context, the question worth investigating is whether there could be a long run relationship between a country's fiscal and current account deficits. Answering this question, allows us to investigate whether the (i) twin deficits hypothesis (i.e. an increase in fiscal deficit worsens the current account deficit), (ii) Ricardian equivalence (i.e. an increase in fiscal deficit has no effect on the current account deficit), or (iii) twin divergence hypothesis (i.e. an increase in fiscal deficit improves the current account deficit) hold. In considering this topic for Ghana, the very likely research questions that emanate are; i) how has Ghana's fiscal deficit contributed to its current account deficit? ii) What are the implications of such a relationship, if any or otherwise, for macroeconomic stability and sustained economic growth? A very good way to answer these questions is through empirical investigation. Notwithstanding the potential repercussions of the relationship between fiscal and current account deficits for macroeconomic stability and sustained economic growth, most recent works done on it for developing countries have focused on countries outside Africa (see Fountas and Tsoukis, 2000; Salvatore, 2006; Muktar et al., 2007; Lau et al., 2010; Bose and Jha, 2011; Perera and Liyanage, 2012; Sobrino, 2013), with only a few studies on African countries (see Marinheiro, 2008 for Egypt; Omoniyi et al., 2012 for Nigeria; Anas, 2013 for Morocco; and Ogbonna, 2014 for South Africa). To the best of the author's knowledge, virtually no work on this topic has been done on Ghana. Moreover, many of the existing studies on this topic have not considered the potential impact of structural break in their estimation procedures. Given that Ghana has gone through both economic and political liberalisation regimes, we opt for relatively novel estimation techniques, namely cointegration techniques with allowance for structural break.

The rest of the paper is structured as follows. The next section presents the theoretical framework of the relationship between fiscal and current account deficits and a review of the extant empirical literature. The third and fourth sections present the methodology and the empirical analysis. Finally, the conclusion and policy implications are offered in the fifth section.

2 Literature review

This section of the paper review the literature related to the the relationship between fiscal and current account deficits. It is divided into two subsections; (i) the theoretical framework and (ii) an in-depth review of the extant empirical literature.

2.1 Theoretical framework of the twin deficit hypothesis

The twin deficits hypothesis (TDefH) was originally put forward in the 1980s and 90s to explain current account deficit in the United States (see Darrat, 1988; Abell, 1990; Markin and Narayan, 2013). This follows a period of excessive fiscal expansion, Dollar depreciation and an unfamiliar current account deficit expansion during the regime of President Reagan. Theoretically the analysis and the understanding of the relationship between fiscal and current account deficits derive their basis from the national income identity (NII). The NII for an open economy is given as;

$$Y = C + I + G + (X - M) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots. (2.1)$$

where Y is gross domestic product (GDP), C is household consumption expenditure, I is investment expenditure, G is government expenditure, X is total exports of goods and services and M is total imports of goods and services.

We define current account (CA) as:

$$CA = X - M + NF \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.2)$$

where NF is net factor income from abroad. That is the difference between the country's income receipts from abroad and its payments abroad.

According to the NII for an open economy, national saving (S) in an open economy can be expressed as;

$$S = I + CA \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots. (2.3)$$

We can distinguish S into private saving (Sp) and government saving (Sg). Sp is that part of individuals' income left after adjusting for taxes (T) and consumption expenditure. It can be expressed as; $Sp = Y - T - C$. Sg is the difference between pubic (government) receipts from taxes, expenditure on goods and services (G) and transfers (R). This can also be expressed as; $Sg = T - G - R$.

With the understanding of Sp and Sg, equation (2.3) can be rewritten as;

$$S = Sp + Sg = Y - T - C + (T - G - R) = I + CA \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots. (2.4)$$

We can rewrite equation (2.4) as;

$$Sp + (T - G - R) = I + CA \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots. \dots\dots. (2.5)$$

The above equation can be simplified and expressed in terms of CA as;

$$CA = Sp - I + (T - G - R) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.6)$$

Equation (2.6) implies that CA depends on the saving deficit (represented by the difference between private saving and investment) and the fiscal deficit (represented by the difference between private saving and investment, and the difference between government revenue through taxes, and government expenditure on goods and services and transfers).

Two possible inferences can be drawn from equation (2.6); the first is what happens when it is assumed that the difference between Sp and I is constant or stable overtime. If this is the case, then fluctuations in the fiscal side $(T - G - R)$ of equation (2.6) could cause fluctuations in the current account side, and either (i) the assertion of the TDefH will hold (see Abell, 1990; Bachman, 1992; Vamvoukas, 1999; Dudley and McKelvey, 2004; Salvatore, 2006; Suresh and Tiwari, 2014) or (ii) the assertion of the twin divergence hypothesis (TDivH) will hold (see, Cavallo, 2005, Corsetti and Muller, 2005; Kim and Roubini 2008, Tosun et al., 2014). Based on this, it can be understood that the relationship between deficits in the fiscal and the current account are interrelated. The second inference is drawn if the relationship between Sp and I is not stable as assumed afore. If this happens, then changes in the fiscal side (i.e. $T - G - R$) of equation (2.6) could be offset by changes in the difference between Sp and I and the assertions of both the TDefH and the TDivH would not hold. In this case, fluctuations in the fiscal and the

current account deficits will be unrelated (see Barro, 1974, 1989; Suresh and Tiwari, 2014). Following from this analysis, studies on the relationship between the fiscal and current account deficits have been rooted in three major economic propositions namely; (i) the TDefH, (ii) the Ricardian equivalence (RE), and (iii) the TDivH.

The main tenet behind the TDefH which emanate from the Keynesian proposition asserts that excessive borrowing by the government to finance its spending results in fiscal deficit that crowds out the financial resources available in the economy. The resulting fiscal deficit leads to fluctuations in the current account through (i) the increasing of domestic interest rate (as a result of the crowding out), (ii) the exchange rate, and (iii) the extent of inflows of capital (see for example Fleming, 1962; Mundell, 1963; Ball and Mankiw, 1995; Dudley and McKelvey, 2004). With liberalisation, the increase in domestic interest rate entices foreign investors to invest in the home country. As the increase in the demand for financial assets in the country would imply an increase in the demand of home currency, this leads to an appreciation of the home currency which makes imports relatively cheaper and exports relatively expensive. Ball and Mankiw (1995) and Dudley and McKelvey (2004) further explain that the fiscal and the current account deficits are closely linked together and that prolong fiscal deficit leads to a decrease in domestic saving. The decline in domestic saving cause domestic interest rates to rise which makes domestic investment relatively more attractive to both domestic and foreign investors. The increase in demand for domestic investment by foreign investors leads to appreciation of the domestic currency. With the appreciation of the domestic currency, exports become relatively expensive and imports relatively cheaper. The eventual effect will be an increase in imports at home and subsequent deficits in the country's current account (Salvatore, 2006).

Contrary to the assertion of the TDefH is the RE gleaned from the seminal work of Barro (1974). The RE refutes the relationship between the fiscal and the current account deficits and asserts that the current account deficits are independent of the fiscal deficits. The reason is simply that fiscal deficits have a consequential effect of tax cut which in the sense of national saving, would affect (decrease) only government but not private saving. That is "a deficit-financed cut in current taxes leads to higher future taxes that have the same present value as the initial cut" (Barro, 1989). Because tax cuts are usually temporary individuals save more in the period of the tax cuts so as to either pay for future increase in the tax or raise more financial resources to

smoothen consumption in the future following a rise in taxes (Lau et al., 2010). This is the case because though individuals would increase their saving, their consumption would not necessarily be affected since the increase in their saving would emanate from cuts in their taxes. A decrease in government saving causes fiscal deficit to rise however this would be offset by subsequent rise in private saving and there would therefore be no effect on national saving. Since desired national saving does not change, this would have no implications for the current account balance as private saving rises by enough to prevent international borrowing (Barro, 1989).

It is interesting to note that aside the TDefH and the RE propositions, there can also be a case for the TDivH (see, Cavallo, 2005, Corsetti and Muller, 2005; Kim and Roubini 2008, Tosun et al., 2014) where an increase in the fiscal deficit can improve the current account deficit. Thus contrary to the TDefH the relationship between the fiscal and current account deficits could be negative. As explained by Cavallo (2005) and Kim and Roubini (2008) the TDivH can occur through (i) an investment crowding out effect and (ii) productivity or output shock. An investment crowding out effect would lead to a situation whereby fiscal expansion (and hence fiscal deficit) would cause domestic interest rate to increase and in turn crowd out private investment and boost private saving. This situation leads to a fall in aggregate demand that improves the current account deficit. In periods of economic recession where unemployment is generally high and aggregate demand low, output drastically declines. In such periods, expansionary fiscal policy is necessitated to boost economic activity. Though the expansionary fiscal policy worsens the fiscal balance, the general decline in demand improves the current account balance. In contrast, in periods of economic boom when economic activities are on the rise and aggregate demand is generally high, fiscal balance improves as the government might earn more tax and also cut some expenditure. However, in these periods of rising aggregate demand, current account balance is likely to deteriorate as consumers might demand more goods including imports. It can therefore be implied that during periods of recession (boom), fiscal deficit increases (falls) and current account deficit falls (increases).

2.2 Empirical review

Generally speaking, the empirical studies testing the relationship between fiscal and current account deficits have produced mixed results. Following this, we review the literature following five strands of the empirical findings as also done in the cases of Kim and Kim (2006), Lau and

Tang (2009), Lau et al., (2010) and Anas (2013). The first strand of the empirical literature finds support for the TDefH (see Abell, 1990; Saleh et al., 2005; Salvatore, 2006; Forte and Magazzino, 2013), whilst the second strand lends support to the RE (see Rahman and Mishra, 1992; Wheeler, 1999; Kiran, 2011; Tosun et al., 2014). The third strand finds support for the TDivH (see Cavallo, 2005, Corsetti and Muller, 2005; Kim and Roubini 2008, Tosun et al., 2014). The fourth strand finds unidirectional (one-way) causality that runs from either current account to fiscal deficits or fiscal to current account deficits (see Anoruo and Ramchander, 1998; Hatemi-J and Shukur, 2002; Pattichis, 2004; Marinheiro, 2008; Sobrino, 2013). In the final strand a bi-directional (two-way) causality is found between fiscal and current account deficits (Darrat, 1988; Mukhtar et al., 2007; Ganchew, 2010; Omoniyi et al., 2012; Alam et al., 2014).

Several reasons including country specificity, sample size (i.e. time span and countries considered), and methodology (estimation techniques) used have been cited for the difference in the results (see Mukhtar et al., 2007; Bose and Jha, 2011; Ratha, 2012; Sobrino, 2013). In relation to the country specific studies, the methodological approaches adopted have been centred on the use of the autoregressive distributed lag (ARDL) bounds test for cointegration (see for example, Saleh et al., 2005; Ratha, 2012; Tosun et al., 2014), the Johansen cointegration approach (see for example, Kaufmann et al., 2002; Panagiotis et al., 2009; Merza et al., 2012; Mohammadi and Moshrefi, 2012), other cointegration approaches (see for example, Enders and Lee; 1990, Wheeler, 1999; Kim and Roubini, 2008; Kiran, 2011; Anas, 2013) and causality tests[3] (see for example, Darrat, 1988; Kim and Kim, 2006; Lau and Tang, 2009; Sobrino, 2013). Regarding panel studies, the panel fixed and random effects, the generalised method of moments (GMM), and panel cointegration estimation methods (see for example, Bartoloni and Lahiri, 2006; Lau and Baharumshah, 2006; Miteza, 2012) have been used. In recent years however, issues related to testing for structural break(s) have to some extent become even more important (see Holmes, 2010; Suresh and Tiwari, 2014).

When we consider the first strand of the empirical literature supporting the TDefH, Abell (1990) using quarterly data for the period 1979 to 1985 and the vector autoregressive (VAR) model, finds that fiscal deficits influence current account deficits in the United States. Saleh et al.,

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[3] Within this context, the Granger Causality test (Granger, 1969) and Toda and Yamamoto Causality test (Toda and Yamamoto, 1995) have widely been used.

(2005) in a study for the period 1970 to 2003 using the ARDL bounds test for cointegration, for Sri Lanka, find a robust connection between fiscal and current account deficits in support of the TDefH. For the sample period considered, an increase in fiscal deficits is found to cause an increase in current account deficits. Using panel data for the period 1980 to 2001 from nine South East Asian Central Banks (SEACEN) countries and the dynamic OLS (DOLS) panel VAR methodology, Lau and Baharumshah (2006) find that increase in fiscal deficits cause current account deficits to increase, thereby leaning support to the TDefH. Using two sets of dataset for the 1972-1998 and the 1992-2003 periods and the fixed effect panel estimation method, Bartolini and Lahiri (2006) find support for the TDefH for countries belonging to the Organization for Economic Co-operation and Development (OECD). Salvatore (2006) also finds robust support for the TDefH for the G-7 countries using data covering the 1973 to 2005 period. Panagiotis et al., (2009) find support for the TDefH in Greece using data from 1960 to 2007 and the Johansen cointegration approach. Using data from 1959 to 2007 and the Johansen cointegration method, Zamanzadeh and Mehrara (2011) find support for the TDefH for Iran. Miteza (2012) examines the relationship between fiscal and current account deficits for 20 OECD countries using data for the 1974 to 2008 period and the Arellano-Bond GMM estimator and finds that increasing fiscal deficits leads to higher current account deficits. Anas (2013) used the impulse responses analysis of the VAR model and data for the 1980 to 2012 period, and finds that fiscal deficits are the main cause of current account deficits in Morocco. Forte and Magazzino (2013) find evidence supporting the premise that fiscal deficits generate current account deficits using data for the 1970 to 2010 period and both the fixed effects and the GMM estimation methods for 33 European countries. Mudassa et al., (2013) utilised the ARDL methodology and data for the 1980 to 2011 period and found evidence supporting the TDefH for Pakistan. Evidence is also found for the TDefH in India by Suresh and Tiwari (2014) using data for the 1975/76 to 2011/12 period and the VAR and the Structural VAR methodologies.

In relation to the second strand of the empirical literature that find support for the RE, Rahman and Mishra (1992) employed the Engle and Granger two-step cointegration methodology for the period 1946 to 1988 for the United States and finds no long-run relationship between fiscal and current account deficits. Their results instead lend support for the RE. Wheeler (1999) finds support for the RE using the VAR model and data for the 1980 and 1990 period for the United Sates. Using the vector error correction (VEC) model and quarterly data for the 1976 to 1998

period, Kaufmann et al., (2002) find support in favour of RE for the Austrian. In Turkey, Kiran (2011) used the fractional cointegration approach and data for the 1975 to 2009 period, and finds results that lend support to the RE. Mohammadi and Moshrefi (2012) find evidence for the RE using data over the 1975 to 2008 period and the Johansen cointegration approach for South Korea, Malaysia, Singapore and Thailand. Using quarterly data for the 1993 to 2010 period and the Johansen cointegration and the VAR methodology, Merza et al., (2012) find results that support the RE in Kuwait. With the use of both monthly and quarterly data for the 1998 to 2009 period and the ARDL bounds test for cointegration and the VEC model, the results of the study by Ratha (2012) for India suggest that in the long-run the RE is validated. Tosun et al., (2014) provide support for the RE in Latvia, Lithuania, Poland, Romania, Serbia and Slovenia using the ARDL bounds test for cointegration and quarterly data for the 1995 and 2013 period. Using data for the 1960 to 2012 period and the Johansen cointegration approach, Ogbonna (2014) in a study for South Africa finds evidence for the RE.

A number of empirical studies have found support for the third strand of the empirical literature (i.e. TDivH). Corsetti and Muller (2005) find evidence for the TDivH in Australia, Canada, the United Kingdom and the United States using the VAR methodology and data from 1980Q1-2004Q4. Kim and Roubini (2008) find fiscal deficit to improve the current account deficit in the United States using the VAR methodology and data for the period 1973-2004Q1. In Pakistan, Javid et al. (2010) uses the VAR methodology and data for the period 1960-2009 and find that fiscal deficit improves the current account deficit. Abbas et al. (2011) find evidence for the TDivH in 88 non-oil exporting countries using the fixed effect methodology and data for the period 1970-2007. Their results further revealed that this effect is stronger in emerging and low income countries, and those with very high debt to GDP ratio. Using the dynamic general equilibrium (DGE) model for the Spanish economy, Cardoso and Domenech (2011) find that fiscal deficit improves the current account deficit. Misztal (2012) finds fiscal deficit to improve the current account deficit in Latvia, Lithuania and Estonia using the VAR methodology and data for the period 1999-2010. Nazier and Essam (2012) find evidence for the TDivH in Egypt using the SVAR and data for the period 1992-2010. In a sample of 94 countries over the 1973-2008 period, Cheung et al. (2013) find that fiscal deficits improves the current account deficits of these countries using the fixed effect estimation approach. Using the GMM and the pooled mean group

estimation methods for the period 1985-2012, Bon (2014) finds evidence for the TDivH in 10 developing Asian countries.

With reference to the fourth strand of the empirical literature which shows a one-way causality from either current account deficits to fiscal deficits or from fiscal deficits to current account deficits, Anoruo and Ramchander (1998) find that current account deficits cause fiscal deficits but not vice versa for five developing South-East Asian countries namely; India, Indonesia, Korea, Malaysia and the Philippines using the Granger causality test and different datasets covering the 1957 to 1993 period. Hatemi-J and Shukur (2002) used quarterly data for the 1975Q1 to 1998Q2 period, and the Rao's multivariate F-test combined with the bootstrap simulation technique, and found that for the period 1975 to 1989, causality runs from fiscal deficits to current account deficits, however for the period 1990 to 1998, causality runs from current accounts deficits to fiscal deficits. Using Granger causality test within an error correction framework and data for the 1982 to 1997 period, Pattichis (2004) find a unidirectional causality running from fiscal deficits to current account deficits in Lebanon. Kim and Kim (2006) find a unidirectional causality running from current account deficits to fiscal deficits in Korea using data for the 1970 to 2003 period and the modified Wald test proposed by Toda and Yamamoto (1995). In analysing the validity of the TDefH for Egypt using the Granger Causality test and data for the 1974 to 1989 period, Marinheiro (2008) finds that causality runs from current account deficits to fiscal deficits only. Using data for the 1970 to 2004 period for 24 small Islands and the Granger causality tests, Katircioglu et al., (2009) find causality running from current account deficits to fiscal deficits. Bagheri et al., (2012) also find a one-way causality running from fiscal deficits to current account deficits in Iran using the Granger causality test and data for the 1971 to 2007 period. Azgun (2012) studies the causal relationship between fiscal deficits and the current account deficits in Turkey using the Granger, the VAR and the VEC causality tests for the period 1980 to 2009. The study finds that causality runs from fiscal deficits to current account deficits. Sobrino (2013) studies the causal link between fiscal deficits and current account deficits and finds causality running only from current account deficits to fiscal deficits for Peru using the Toda and Yamamoto's (1995) modified Wald test and quarterly data for the 1990 to 2012 period.

Regarding the final strand of the empirical literature, Darrat (1988) provides evidence of a bi-directional causality between fiscal deficits and current accounts deficits for the United States using Granger causality test and data for the 1960 to 1984 period. A bidirectional causality is found between fiscal deficits and current account deficits in Malaysia by Lau and Baharumshah (2004) using the Toda and Yamamoto (1995) causality test and data for the 1975 to 2010 period. Using data for the 1975 to 2005 period and the Granger causality test, Mukhtar et al., (2007) find a bidirectional causality running from fiscal deficits and current account deficits in Pakistan. In Cambodia, Lau and Tang (2009) using data from 1996 to 2006 find bi-directional causality running from fiscal deficits to current account deficits. Ganchev (2010) utilised data for the 2000 to 2010 period and the Granger causality test and find a bi-directional causality between fiscal and current account deficits in Bulgaria. Lau et al., (2010) find that bidirectional causality exists for Indonesia, Korea and the Philippines in a post Asian financial crisis period of 1997-2008 using Granger causality test. Omoniyi et al., (2012) find bi-directional causality between fiscal deficits and current account deficits using data for the 1970 to 2008 period and the Granger causality test in Nigeria. Alam et al., (2014) finds a bi-directional causality between fiscal and current account deficits for Bangladesh using Granger causality test and data for the 1972/73 and 2011/12 period.

A critical examination of the empirical studies reviewed reveal that no specific methodology is peculiar to any particular study. The TDefH has been tested using country specific time series methods and panel data approaches. Though the TDefH was made popular in the 1980s, the empirical review shows that the sample size considered vary considerably. There are studies with sample size starting in the 1940s, 1950s, 1960s, 1970s, 1980s, 1990s and the 2000s. Though a number of the papers reviewed confirm the assertion of the TDefH, the stance of the hypothesis can be said to be inconclusive since quiet a significant number of the studies have supported the RE and the TDivH, and others have even shown that current account deficit rather cause fiscal deficit. What is worrying; however is that just a few studies have taken into consideration the potential impact of structural breaks (see Holmes, 2010; Suresh and Tiwari, 2014) in their analysis (either in testing for unit root or cointegration). Moreover, as earlier indicated we find that the relationship between the fiscal and the current account deficits have been tested for only a few countries in Africa with virtually no study on Ghana. This paper hopes to fill this empirical gap.

3 Methodology

In this section we describe the empirical methodology employed by the paper. It is divided into two sub-sections; (i) model specification, data and descriptive statistics and (ii) estimation strategy.

3.1 Model specification, data and descriptive statistics

In specifying a suitable model to investigate the long-run relationship between fiscal and current account deficits in Ghana, we rewrite equation (2.6) in the following form;

$$CA = (Sp - I) + FD \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.1)$$

where FD is fiscal deficit and it is equal to $T - G - R$,

Economic theory postulates that private saving (Sp) is positively affected by households' disposable income (y) and the interest rate (r). In the same sense, domestic investment (I) is also upheld to be negatively affected by r. Based on this argument, we rewrite equation (3.1) as follows;

$$CA = [(Sp(y,r) - I(r)) + FD] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.2)$$

Following equation (3.2) we specify the model as;

$$CA = f(y, r, FD) \ldots\ldots\ldots\ldots\ldots\ldots\ldots..\ldots\ldots\ldots\ldots..\ldots\ldots\ldots\ldots..\ldots\ldots\ldots\ldots (3.3)$$

Equation (3.3) can be specified in an estimable econometric form as;

$$CA_t = \alpha_1 + \alpha_2 y_t + \alpha_3 r_t + \alpha_4 FD_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (3.4)$$

where CA, FD, r and y are as previously defined, t is the time period considered (i.e. 1960-2012), ε is the error term and α_i are parameters to be estimated. The definitions and sources of data for the variables (in equation 3.4) are presented in Table 3.1.

Table 3.1: Data definition and sources

Variables	Definition	Source
CA	Trade balance plus net factor income from abroad expressed as a percentage of GDP. Net factor income from abroad is computed	Computed with data from the World Development Indicators (2014).

	as the difference between gross national product and gross domestic product.	
FD	It is the overall balance including grants and net lending but excluding divestiture receipts and liabilities expressed as a percentage of GDP.	1960-1969: Kusi (1998), 1970-1978: Musa and Gbadebo (2005), 1979-2005: Africa Development Indicators 2007 CD-ROM, 2006-2012: Bank of Ghana Statistical Bulletins: Various issues.
r	End of period discount rate	International Financial Statistics (2013) of the International Monetary Fund
y	GDP expressed in constant 2005 US Dollars.	World Development Indicators (2014)

Source: Authors

The descriptive statistics of the variables are summarized in Table 3.2. With the exception of CA and FD which have negative values, all other variables are expressed in the logarithm form. As evident, the mean of both CA and FD are negative indicating the persistence of these deficits over the 1960-2012 period.

Table 3.2: Descriptive statistics (1960-2012)

Variables	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
CA	53	-9.408	7.565	-26.494	4.304
FD	53	-4.621	3.841	-11.500	4.100
r	53	1.135	0.309	0.602	1.653
y	53	9.767	0.204	9.506	10.264

Source: Authors

3.2 Estimation strategy

In an empirical study as this, the application of time series econometric techniques is indispensable. Regarding the time series techniques we follow three estimation procedures; (i) units roots test, (ii) cointegration test, and (iii) estimation of the long-run relationship.

3.2.1 Unit roots test

Generally speaking, almost all macroeconomic time series are nonstationary and estimating models with these series without appropriate estimation methods could lead to the generation of spurious results. Given this, testing for unit root prior to estimation has become conventional. It involves testing the stationarity properties of the variables so as to determine their order of integration. Knowing the order of integration in a time series study is very relevant since it serves as a guide as to the appropriate choice of estimator. It is therefore rational to determine the order of integration of the series prior to estimation.

In testing for the stationarity property of the variables in equation (3.4), we employ three alternative tests[4]; (i) the Phillips-Perron (PP) test by Phillips and Perron (1988), (ii) the Dickey-Fuller Generalized Least Squares (DF-GLS) test by Elliot et al., (1996), and the (iii) the Zivot and Andrew (ZA) test due to Zivot and Andrew (1992). The PP and DF-GLS tests are opted over the traditional tests - the Dickey-Fuller (DF) and the Augmented Dickey-Fuller (ADF) - due to some advantages they possess over them. The PP test performs relatively better with regards to small sample sizes as in our case. It also performs very well even in the presence of heteroscedasticity and prevents the loss of observations implied by the ADF test because it is able to adjust for serial correlation and endogeneity in the regressors (Phillips and Perron, 1988). The DF-GLS test performs very well when an unusual mean or trend (which usually poses difficulty to most applied works) is present in the series. Both the DF-GLS and PP tests, test the null hypotheses of unit root (nonstationary) against the alternative hypothesis of non-existence of unit root (stationarity).

In drawing sharper conclusion on the stationarity properties or otherwise of the series, we augment the PP and DF-GLS tests with the ZA test. This is crucial as the PP and DF-GLS tests may produce misleading results in the presence of structural break(s). Perron (1989) indicates that the refusal to allow for an existing break causes bias that reduces the ability to reject a false unit root null hypothesis. Taking into consideration the effect of likely structural break(s) is regarded as very suitable and more promising particularly for this study whose sample size covers periods of both political and economic liberalisation. The ZA test allows for an endogenous (unknown) break date in the time series and tests the null hypothesis that the series

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[4] Readers are referred to Phillips and Perron (1998), Elliot et al., (1996) and Zivot and Andrew (1992) for detailed treatment of these tests.

has a unit root without a structural break, against the alternative hypothesis that the series is trend stationary with structural break at an unknown break date.

Table 3.3: Results of the units roots test

	DF-GLS		PP	
LEVELS				
Variables	Constant No Trend	Constant & Trend	Constant No Trend	Constant & Trend
FD	-1.5208	-1.9828	-2.8836	-3.2406
CA	-1.3606	-2.1817	-1.7195	-3.3349
r	-0.9016	-1.3770	-1.7786	-0.9513
y	2.3008	-0.5948	2.9409	0.5034
FIRST DIFFERENCE				
	DF-GLS		PP	
Variables	Constant No Trend	Constant & Trend	Constant No Trend	Constant & Trend
FD	-10.2483***	-10.4063***	-10.8320***	-11.0969***
CA	-8.6736***	-10.4334***	-11.7537***	-11.9797***
r	-8.1464***	-8.9563***	-8.7459***	-8.9305***
y	-4.7130***	-5.3842***	-4.6712***	-5.3644***

Note: *** denote significance at 1 percent level

We present the results of the PP and DF-GLS (in Table 3.3) and the ZA (in Table 3.4) unit roots test. The results of the PP and DF-GLS tests show that all the variables are integrated of order one $[i.e. I(1)]$, indicating that they contain unit root. The outcome of the ZA unit roots test confirms that of the PP and DF-GLS tests. That is the null hypothesis that the series has a unit root without a structural break is not rejected. With these results, we can conclude that all the variables are indeed nonstationary.

Table 3.4: ZA Unit root test results

Variable	Intercept	Trend	Intercept + Trend	Break Date
FD	-3.285	-3.169	-3.353	1972:1972:1976
CA	-2.935	-2.422	-2.585	1997:1987:1973
r	-2.628	-4.344	-4.094	1995:1999:1996
y	-2.776	-2.815	-3.394	1981:1975:1986

3.2.2 Cointegration test

Once the unit root properties of the variables are known, the next procedure is to choose an appropriate cointegration test to determine whether there exists a long-run relationship among the variables under study. In testing for cointegration, we adopt Gregory and Hansen (1996) cointegration procedure over others such as the Engel-Granger (1987), Johansen and Juselius (1990) and the ARDL bounds test for cointegration by Pesaran et al., (2001). The Gregory and Hansen (1996) procedure is deemed more appropriate as it controls for the potential effect of structural break. The Gregory and Hansen test can be viewed as a multivariate extensions of univariate tests of Perron (1989), Banerjee et al., (1992), Perron and Vogelsang (1992) and Zivot and Andrews (1992).

We consider three models of Gregory and Hansen (1996); (i) cointegration model with level shift (C) – this model allows a level shift in the cointegration relationship and is modelled as a change in the intercept, with the slope coefficient held constant, (ii) cointegration model with shift and trend (C/T) – this model introduces a time trend into the level shift model, and (iii) cointegration with regime shift (C/S) – this model allows the slope vector to shift in addition to level and trend shift. The Gregory and Hansen cointegration test, tests the null hypothesis of no cointegration against the alternative of cointegration with an unknown break. The null hypothesis is rejected if the ADF test constructed by Gregory and Hansen are lesser than the corresponding critical values. We report in Table 3.5 the results of the Gregory and Hansen cointegration test.

Table 3.5: Gregory and Hansen cointegration test results

Cointegration Models	Break Point	ADF* Test Statistics	Critical Values		Rejection of H_0 of No Cointegration
			1%	5%	
CC	1992	-6.251	-5.770	-5.280	YES
CT	1997	-6.263	-6.050	-5.570	YES
CS	1993	-6.220	-6.510	-6.000	YES

Note: CC, CT and CS are model with level shift, model with level shift and trend, and model with regime shift respectively.

The results reveal that there exists a long-run relationship among the variables. The establishment of cointegration among the variables is an indication of a possible relationship between fiscal deficits and current account deficits and hence an outright rejection of the RE proposition for Ghana. However, the existence of the TDefH or not will depend on the direction of the relationship, whether negative or positive and more importantly the statistical significance of the relationship.

3.2.3 Estimation of the long-run relationship

The next estimation procedure involves the choice of an appropriate estimator by drawing inferences from the outcome of the stationary and cointegration tests. We opt for the use of the Fully Modified OLS (FMOLS) estimator by Phillips and Hansen (1990) and the Dynamic OLS (DOLS) estimator by Stock and Watson (1993). The FMOLS and DOLS estimators are chosen over other methods due to several advantages they possess. The FMOLS controls for serial correlation and endogeneity in the explanatory variables, and possesses parametric efficiency in small samples. The FMOLS considers the following cointegrated system;

$$Y_t = \alpha + \beta X_t + \omega_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3.5)$$

$$X_t = X_{t-1} + \epsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3.6)$$

where $\vartheta_t = (\omega_t, \epsilon_t)$ is $I(0)$ with a long-run asymptotic covariance matrix Ω. Y_t and X_t being the dependent variable and vector of independent variables respectively are assumed to be $I(1)$ and cointegrated.

The DOLS also has the potential of producing robust estimates in small samples and it corrects for regressor endogeneity by including leads and lags of first difference of the regressors. The DOLS can be specified as follows;

$$Y_t = \theta + \beta X_t + \sum_{j=-q}^{p} c_j \Delta X_{t-j} + \delta_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots . (3.7)$$

where Y_t takes the place of the dependent variable, X_t is a vector of explanatory variables, β represents the long-run coefficient, p is lag length and q is lead length. θ represents the intercept, Δ is the lag operator, c_j is the coefficient of the lead or lag of first differenced explanatory variables. δ_t is the error term. According to Stock and Watson (1993) the inclusion of the leads and lags eliminates the bias of simultaneity within the sample.

4 Empirical results and discussion

We present in Tables 4.1 the long-run FMOLS and DOLS results. As evident, the long-run results of the FMOLS and the DOLS in terms of sign and statistical significance are similar. They however differ in the magnitude of the coefficients. Notwithstanding, the impact of fiscal deficit on current account deficit is stronger, followed by real income and domestic interest rate in both the FMOLS and the DOLS results.

Contrary to the assertion of the TDefH the long-run results reveal a significant negative relationship between fiscal and current account deficits. The results lend support to the TDivH and indicate that an increase in fiscal deficit improves the current account deficit. This outcome is not surprising as empirically, evidence for the twin divergence hypothesis have been found by several authors for developing countries (see for example, Javid et al. 2010 for Pakistan; Abbas et al. 2011 for 88 non-oil exporting countries; Misztal 2012 for Latvia; Lithuania and Estonia; Nazier and Essam 2012 for Egypt; Calista et al. 2013 for a panel of 94 countries; Bon 2014 for ten developing Asian countries). A probable reason for this outcome in Ghana might be due to an investment crowding out effect resulting from an increase in real interest rate. As evident in Figure 1, the fiscal balance of Ghana is highly in deficit. According to Kwakye (2012) the government is well noted to finance this deficit through domestic and foreign borrowing. In borrowing from the domestic market, the government competes with the private sector for the scarce financial resources. This consequentially leads to an increase in the real interest rate

which crowds out private sector investment. Kwakye (2010) for example notes that government borrowing to fund fiscal deficits has been one of the main causes of the high real interest rate in the country. The increase in real interest rate stimulates private saving. The situation of a reduction in private investment and an increase in private saving leads to a fall in aggregate demand which includes the demand for foreign (imported) goods. The reduction in the demand for imported goods, other things being equal, leads to an improvement in the current account deficit. A number of studies have found increases in the government of Ghana debt to crowd out private investment (see Asante, 2000: Kraev, 2004; Frimpong and Oteng-Abayie, 2006; United States Government and Government of Ghana, 2011; PricewaterhouseCoopers Ghana, 2013).

Table 4.1: Results of the FMOLS and the DOLS

	FMOLS		DOLS	
Variables	Coefficients	Std. Error	Coefficients	Std. Error
FD	-0.859***	0.283	-1.039**	0.424
r	-0.129***	0.039	-0.151***	0.047
y	-0.183***	0.049	-0.234***	0.076
Constant	1.803***	0.459	2.312***	0.729

Note: ***, ** denote significance at 1 and 5 percent respectively

The paper find that an increase in interest rate have a significant long-run negative impact on current account deficits. This result implies that an increase in interest rate improves the current account deficit. Notwithstanding, it is important to note that because current account deficit is matched by an equal net capital inflows, an increase in domestic interest rate would have implied a surge in capital inflows and worsening of the current account deficit. Based on this reasoning, an increase in domestic interest rate is expected to worsen the current account deficit. The results of the current paper, however, indicate that the case of Ghana is different. The inverse relation might be explained by the impact an increase in domestic interest rate has on private consumption and investment, instead of foreign capital inflows. As already indicated interest rate in Ghana is noted to be very high. High domestic interest rate which implies high cost of borrowing discourages private investment (Hall 1977; Bader and Malawi, 2010). In addition, it demotivates people from borrowing to fund current consumption and since a very large

component of goods consumed in Ghana are imported, a reduction in consumption would imply an improvement in the current account deficit. Besides, in period of high domestic interest rate, prices of goods and services are expected to be high (see Kraev, 2004; Kwakye, 2010). This outcome also discourages private consumption with repercussions for reduced aggregate demand. Therefore, and as earlier indicated, the situation of a reduction in private investment and an increase in private saving leads to a fall in aggregate demand which includes the demand for foreign (imported) goods. The reduction in the demand for imported goods, other things being equal, leads to an improvement in the current account deficit. The negative relationship between domestic interest rate and current account deficit is consistent with the works of Calderon et al. (1999) for 44 developing countries, Anoruo and Elike (2008) for Thailand, Bon (2014) for 10 Asian developing countries.

It was also found that an increase in real income has significant long-run negative impact on current account deficits. This implies that as real income increases, current account deficit improves. As the results suggest, a 1 percent increase in real income is found to result in a 0.183 percent reduction in Ghana's current account deficit. A similar finding was reported by Calderon et al. (2001), who showed that for a sample of African countries a 1 percent increase in the real income leads to about 0.22 percent decline in the current account deficit. Following the stages of development hypothesis, increase in real income is expected to worsen current account deficit as developing countries usually tend to import more capital goods as their income level increases (see Roldos, 1996). In addition, increase in real income implies that consumers have increased income and therefore stand the better chance of demanding for more consumable goods. The Ghanaian case is not different. Therefore since most of the capital needed for development and consumable goods in Ghana are imported, the increase in demand for these goods would have implied increased imports and worsening of the current account deficit, other things being equal. Moreover, increase in real income is believed to necessitate an increase in capital inflows which in turn worsens the current account deficit. Based on these reasoning, it is therefore surprising that for the case of a developing country such as Ghana, increase in real income is found to improve the current account deficit. Notwithstanding, the outcome of this research on the impact of real income on current account deficit, though surprising, is reasonable and might be explained by the impact the consumption-smoothing role of the current account balance has on

private saving. In particular, it is reasonable to think within the framework of the intertemporal approach to the balance of payments that, the current account balance plays a consumption-smoothing role and acts as a buffer against transitory changes in domestic productivity and hence, income levels (Obstfeld and Rogoff, 1995). In line with our results, an increase real income (mainly caused by transitory, country-specific growth in productivity) will increase precautionary saving, with no immediate effect on investment. The boost in domestic productivity, though may increase exports, will reduce consumption as households heighten their saving rate in anticipation of a slump in future levels of domestic income. Since a very large component of goods consumed in Ghana are imported, a reduction in consumption would imply an improvement in the current account balance. Therefore, and as earlier indicated, a reduction in consumption leads to a fall in aggregate demand which includes the demand for foreign (imported) goods. The reduction in the demand for imported goods, other things being equal, leads to an improvement in the current account deficit.

5. Policy Implications and Conclusions

This paper has investigated the long-run relationship between fiscal and current account deficits in an attempt to validate whether the twin deficits hypothesis holds for Ghana for the period 1960-2012. By employing relatively novel estimation techniques, namely cointegration techniques with allowance for structural break, we find that fiscal deficit improves the current account deficit. In other words, this paper provides evidence of the twin divergence hypothesis and therefore, adds to demonstrate the fact that the twin deficits hypothesis should not necessarily gain universal acceptability over the twin divergence counterpart. Further evidence shows that an increase in domestic interest rate and real income improves the current account deficit. Although the results we present in this paper should be interpreted with caution, given the relatively limited sample considered, the findings provide important policy implications the Ministry of Finance and Economic Planning, the Ministry of Trade and Industry and the Bank of Ghana may consider in their policy reforms.

As the findings of this paper have shown, an increase in fiscal deficit improves the current account deficit. Does it necessarily mean that government should continuously increase fiscal deficit to eliminate the current account deficit? Given the potential ills that this action might

create for the economy in the long run (especially when it comes to financing the deficit) this option may not be ideal if seen as a long term policy. However, given the implications fiscal and current account deficits have for economic prosperity of developing countries, it will instead be wise for policy makers to focus on addressing the impact of current account deficit on *net* employment (i.e. the difference between jobs lost from trade deficit and jobs created from foreign capital inflows). This is crucial as the *net* employment effect may not favour the Ghanaian economy which is import dependent. This is the case because jobs created from foreign capital inflows may not necessarily match job losses from export competing firms as workers get displaced by increased imports and closure of these domestic firms. With these effects in mind reducing fiscal deficit may not necessarily resolve the current account deficit problem as wealth are transferred to foreigners with repercussions for future generations.

A case is therefore made for (i) increased government spending, if and only if it is seen as a short-run phenomenon, and the purpose is to spend on productive sectors of the economy for *net* employment benefits, and (ii) tax cuts (incentives) to private sector firms, particularly export oriented ones that aim at expanding their businesses by creating jobs for Ghanaians. All other things being equal, government by lowering taxes end up running fiscal deficits without necessarily increasing its spending. The former policy option could be achieved through (i) the provision of infrastructure (transportation, telecommunication, health, education etc.) relevant for growth and development, (ii) a conducive business environment for private sector development given the potential crowding out effect of real interest rate increases - particularly if the recent increases in the policy rate by the Bank of Ghana is to achieve the intended purpose, and (iii) the facilitation of trade (particularly exports) to boost the exports performance and trade revenues of the country. The later policy option, on the other hand, could be achieved through policies that target export oriented firms that aim at expanding their businesses by creating jobs for Ghanaians. The resultant tax cuts will (i) boost private sector investment, (ii) improve the country's external competiveness as these firms correspondingly reduce the final price of their products and (iii) eventually, raise both domestic and foreign demand for locally produced goods and services. As private sector investment, employment and exports improve, it is envisaged that, these policies if effectively implemented will go a long way to reduce the domestic hardships caused by the worsening of the current account deficit and improve the country's external trade position over time.

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