



Fiscal Sustainability in the Ghanaian Economy: A Fiscal Reaction Function Approach

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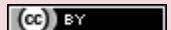
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Abstract

Fiscal Policy sustainability has been a major concern in Ghana with an increasing debt situation. This has led to the Government of Ghana seeking a bailout from the International Monetary fund. The objective of this research is to determine the role of budget deficits on the growth of debt. It will also evaluate the current fiscal stance on sustainable economic growth. This is achieved by testing a fiscal reaction function for the Ghanaian Economy based on the Intertemporal Budget Constraint. The estimation was performed using the Ordinary Least Squares (OLS) estimation technique. Stationarity test for the variables was conducted using the Augmented Dickey-Fuller Tests. The results point to a high degree of inertia present in government behaviour when it sets its primary balance. An increase in past primary deficit leads to an increase in current primary deficits. Also increase in debt has a significant and positive influence on primary balance. The study thus recommends that government should cut down on borrowing to finance its deficits.

Keywords: Primary balance, Debt, Fiscal sustainability, Intertemporal budget constraint, Deficits, Fiscal policy.

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1. Introduction

Sustainability of fiscal policy emerged as a major economic issue in Ghana following the high levels of debt experienced in the 1980s. Ghana is ranked among the most Heavily Indebted Poor Countries (HIPC) in the world. The country's high public debt and debt servicing impairs the capacity of the economy to achieve desired growth and development. Ghana, like other developing countries, has encountered several fiscal challenges. Observably, the level of government spending has been higher than government domestic revenue. The higher spending relative to revenue stems from the fact that various governments desire to increase and enhance the socio-economic wellbeing of her people. The resulting fiscal deficits have been resolved by both domestic and external financing.

Further, the domestic financing of the deficits have usually come from banking and non banking sectors. Ghana has secured various forms of external financing to supplement domestic sources (Indermit and Brian, 2005). For instance, there was an issue of US\$ 750 million sovereign bond that Ghana secured in 2007, and that increased Ghana's debt. Also, Ghana has obtained loans, both from bilateral and multilateral sources for development.

Ghana's total outstanding external debt stock at the end of September 2012 stood at US\$7,843.2 million. And total outstanding external debt stock at the end of June 2013 stood at US\$9,342.9 million and constituted 20.5 per cent of GDP (Bank of Ghana, 2013). Total revenue and grants for the year 2011 was GH¢12,851.56 million (22.8% of GDP) and total government expenditures amounted to GH¢13,379.98 million (23.8% of GDP).

The main objective of this study is to determine the role of budget deficits on the growth of debt. It will also evaluate the current fiscal stance on sustainable economic growth.

The rest of the paper is organized as follows: Section two is the literature review. The theoretical framework and methodology is in section three. Section four is the discussion of results. Lastly section five is the conclusion to the study.

2. Literature Review

2.1. Intertemporal Budget Constraint

The literature has proposed several definitions for fiscal sustainability. The requirement that the tax rate should not rise forever is one of the first definitions of sustainable fiscal policy. Balassone and Franco (2000) have noted that theory has proposed different conditions for sustainability. Employing Domar's model, they derived a necessary condition for sustainability: an ever-growing tax ratio cannot be sustainable.

Blanchard (1990) noted that sustainability is about whether current fiscal policies of governments leads to excessive debt accumulation. Operationalising this, Blanchard defines sustainable fiscal policy as a policy that ensures that the ratio of debt to GDP converges back towards its initial level.

In a similar vein, Buiter (1985) calls a fiscal policy sustainable if it maintains the ratio of government net worth to GDP at the present level. Apart from the statistical point these definitions are essentially the same. By this net worth, Buiter explicitly recognises that the government may temporarily keep its gross debt from rising by using its assets to finance the deficits.

2.2. Fiscal Rules: Definitions and Application

Different definitions by different authors have being provided for fiscal rules. Notably, all definitions implied a constraint of fiscal policy actions over time (Kopits and Symansky, 1998; Kell, 2001; Buti and Giudice, 2002; Milesi-Ferretti, 2003; Drazen, 2004; Kopits, 2004; Siebrits and Calitz, 2004). Several other authors view fiscal rules as restrictions on budget deficits, the level of public debt or government expenditure. Differences do exist as to whether rules should be permanent or could also include temporary restrictions and whether rules should be contained in policy statements or also encoded in law.

2.3. Other Analytical Tools

As noted, the intertemporal budget constraint is not the only analytical tool available for testing fiscal sustainability. A chain of the literature identifies sustainability with the dynamic stability of the public debt/GDP ratio around a constant steady state (Masson, 1985; Tobin, 1986; Zee, 1988; Blanchard *et al.*, 1990). This definition has a lot more intuitive appeal than the solvency requirement if paths of the public debt/GDP ratios are ruled out. Nevertheless, the dynamic stability approach was criticized because of its simplicity. In its simplest form it implies that *any* constant path of the public debt/GDP ratio is sustainable, be it at high or at low levels.

2.4. Fiscal Reaction Functions

Bohn (2007) proposes a fiscal reaction function approach as favourable to measure fiscal sustainability. He asserted that this was backed by economic intuition pointing to studies that follow a fiscal reaction function. Several other studies have used this specification to establish a systematic relationship between the primary surplus and public debt in the US economy. Bohn (1998) used a multiple regression technique and found that the fiscal authorities responded to positive debt dynamics with increases in primary deficit.

Bohn (1998) found a positive and statistically significant coefficient for the USA in the 20th century and concludes that policy-makers eventually reacted to the accumulation of large debt positions over this period of time. Employing the same methodology, Wyplosz (2006), Staehr (2008) using European datasets found some evidence of a positive feedback from the debt stock to the primary balance. Piergallini and Postigliola (2012) find that the primary balance in Italy has exhibited a positive reaction to the debt stock and argue that this suggests that politicians have taken corrective measures to ensure the sustainability of public finances in Italy.

Furthermore, estimating a fiscal reaction function for Brazil using monthly data, De Mello (2008) finds that the primary balance reacts positively and strongly to the lagged debt stock. Estimating a Fiscal Reaction Function for Greece, Stoica and Leonte (2011) asserted that business cycle and public debt affect fiscal policy variables in a

statistically insignificant manner. They concluded that fiscal policy conduct is a cause of the difficult macroeconomic situation facing Greece.

3. Theoretical Framework and Methodology

3.1. Theoretical Framework

Fiscal reaction functions can be estimated using historical data, linking primary balance to the stock of debt in the previous period, business cycles and random shocks. The resulting feedback parameter is typically of order of magnitude of the real rate of interest. Following Bohn (1998), Gali and Perotti (2003), the specification of fiscal reaction function is based on the government's intertemporal budget constraint:

$$Deficit = G - T = \Delta B + \Delta M \tag{1}$$

$$pb = f(debt, controls) \tag{2}$$

$$pb = f(debt, inflation, exchange rate) \tag{3}$$

Where inflation and nominal exchange rate are the control variables. The primary balance denoted by Pb is used to represent the deficit. This is to capture the real effects of the deficit.

In econometric specification, the fiscal reaction function can therefore be estimated by regressing the primary balance on the public debt, both defined in percent of GDP while controlling for other determinants of fiscal stance.

This leads to equation (4) as

$$pb = \alpha_0 + \alpha_1 PB_t(-1) + \alpha_2 DEBT_{t-1} + \alpha_3 INFL_t + \alpha_4 EXC_t + \varepsilon_t \tag{4}$$

Where Pb is primary balance, alpha PB(-1) is the inertia, DEBT_{t-1} is previous years debt, and INFL_t is inflation and EXC_t is exchange rate and ε_t is the error term.

3.2. Data and Methodology

3.2.1. Description and Sources of Data

The data used for this study consisted of annual observations. This study will focus on fiscal and macro indicators to address national solvency issues. The study considers a period of thirty-two (32) years. The period of study will span from 1980 – 2012. Data was gathered from Bank of Ghana, International Finance Statistics (IFS), and Ministry of Finance and Economic Planning.

3.2.2. Estimation Technique

The time series property of Ghanaian fiscal variables was examined concentrating on unit root and stationary tests. The Eviews 7 software was used. This employs the Augmented Dickey-Fuller Tests. The Ordinary Least Squares (OLS) Technique was also used for the research.

4. Results and Discussion

4.1. Summary Characteristics of Variables

A survey of the data used indicates that the an average and maximum of debt of 75 percent and 186 percent respectively. Primary deficit averaged about 9 percent for the study period. This is shown in table 1.

Table-1. Summary characteristics of variables

	EXR	INF	DEBT	PB
Mean	4855.863	29.55606	75.77576	-9.193076
Median	1740.400	24.00000	59.20000	-8.702520
Maximum	18800.00	123.0000	186.2000	0.600000
Minimum	2.750000	8.720000	22.10000	-22.72368
Std. Dev.	5697.718	26.58079	41.49915	6.591897

Source: Authors' construct

The economy of Ghana continued to incur debt from the period of this study with the highest debt incurred in the year 2000. This shown in figure 1 of panel A.

The primary balance is expressed as a percentage of GDP to show the portion of government net borrowing on its GDP. From the period of this study, government has had a positive primary balance in 2000. The highest negative primary balance was 2008 and lowest being 2010. This is shown in figure 2 of panel A.

Panel A. Trend of debt and primary balance as percentage of GDP

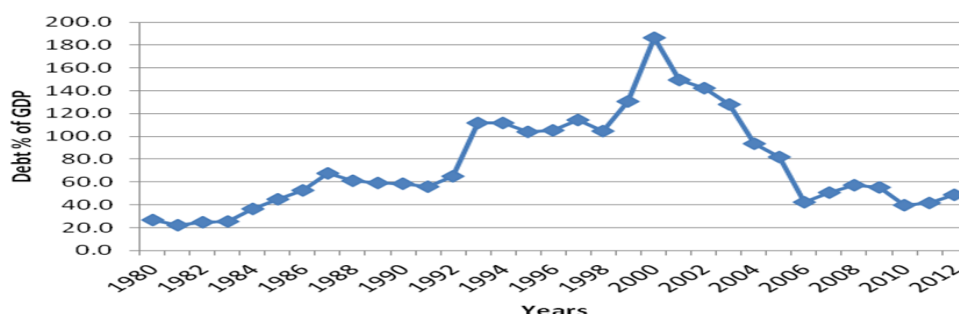


Figure-1. Trend of debt as percentage of GDP

Source: Author's construct

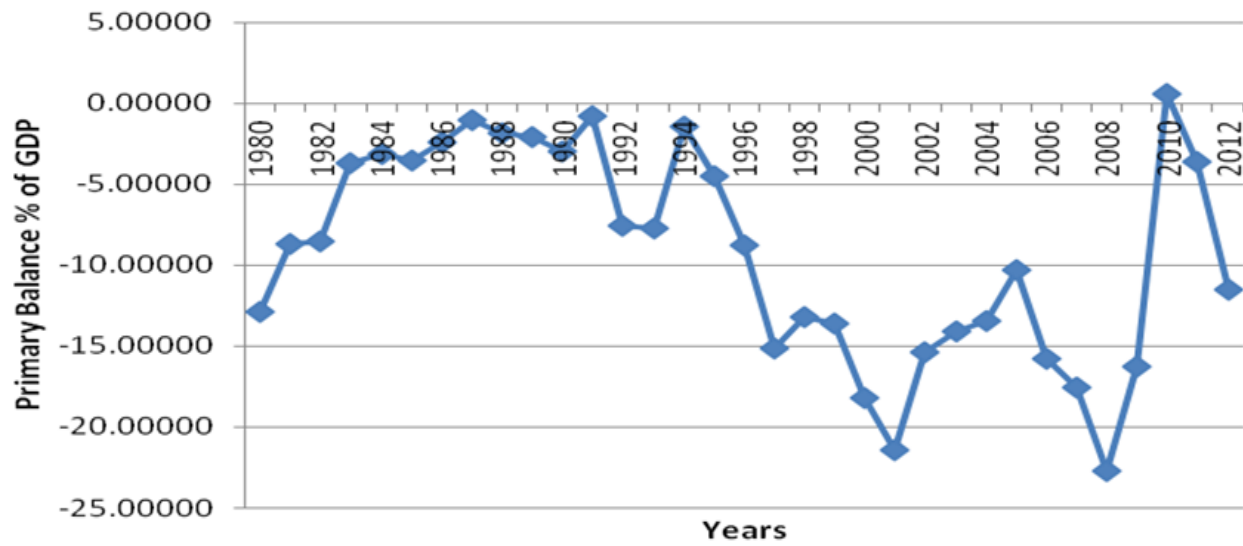


Figure-2. Trend of primary balance as percentage of GDP

Source: Authors' construct

4.2. Stationarity Characteristics of the Variables

The output of the unit characteristics using the three tests for stationarity of the variables shows that a good number of the variables are non-stationary with intercept capturing the nonzero mean under the null hypothesis. All variables are $I(1)$, i.e. first difference stationary. The end result from this is that the variables require differencing for non spurious regression results. These are shown in table 2.

Table-2. Results of unit root tests

	Variable	Level		First Difference	
		Constant	Constant+Trend	Constant	Constant+Trend
ADF test	CONSTANT	-0.203538	-2.615013	-4.923343*	-5.015405*
	PB(-1)	-.539703**	-5.771691**	-8.861007*	-8.720161*
	DEBT	-4.1809*	-2.8272	5.3568*	-6.5331*
	INFL	-2.706472	-2.452627	-4.283916*	-4.936339*
	EXC	-3.34828**	-1.019061	-3.3876**	-4.597623*
Phillips-Perron test	CONSTANT	0.417881	-2.529251	-5.032743*	-5.317066*
	PB(-1)	-.546394**	-6.109341**	-25.85766*	-26.00035*
	DEBT	-4.4138**	-2.835	-5.3415*	-10.008*
	INFL	-4.745990*	-0.762661	-4.271993*	-5.213958*
	EXC	-6.018198*	-0.619586	-3.37753**	-4.575915*
KPSS test	CONSTANT	0.638315*	0.075237	0.169752	0.106743
	PB(-1)	0.235414*	0.216892*	0.500000**	0.500000**
	DEBT	0.7302*	0.187*	0.5883	0.0897
	INFL	0.740422*	0.180728**	0.28778	0.206662
	EXC	0.725868**	0.190287**	0.493713	0.157376

ADF and PP: Null hypothesis is that the variable being examined is non-stationary.

KPSS: Null hypothesis is that the variable being examined is stationary.

* and ** denotes statistical significance at 1% and 5% levels, respectively

Source: Authors' construct

4.3. Regression Results

The estimate for the parameter of the lag of the primary balance is 0.546. This is positive and larger than 0.50 and positive. The meaning is that when past primary deficits increase by 1%, primary balance would increase by 0.55 in the current year. In general, these results point to a high degree of inertia present in government behaviour when it sets its primary balance. This finding supports that of Stoica and Leonte (2011) for the Greece economy. Also Burger et al. (2011) had similar results for South Africa. It can also be seen from the table that the primary balance is significant at the one percent level, while the debt is significant at the five percent level. It is revealed that when debt increases by 1%, primary balance would increase by 0.04. This finding agrees with Stoica and Leonte (2011) in their study for the Greece economy who found a similar result. It is also evident that the set of non-fiscal variables in the study have also had a relatively significant impact on economic growth. The results of the estimates are presented in Table 3.

Table-3. OLS Regression Results

Dependent Variable: Pb	Coefficient	t-statistic
Constant	0.039913 (2.477970)	0.016107
PB(-1)	0.546438* (0.152760)	3.577091
DEBT	-0.042474** (0.022170)	-1.915813
EXC	-0.000208 (0.000185)	-1.125290
INFL	0.006589 (0.035051)	0.187994

Adjusted R-squared = 0.54*, and * and ** denote 1% and 5% levels of significance respectively. Figure in () indicates standard error.

Source: Authors' construct

5. Conclusion

Debt increases and debt accumulation has been a major economic issue the government of Ghana is dealing with. A bailout package has been sought to salvage Ghana's economic challenges. The study sought to determine the role of budget deficits on the growth of debt. It will also evaluate the current fiscal stance on sustainable economic growth. Annual time series data from 1980 to 2012 was used for the research. A fiscal reaction function based on the Intertemporal Budget Constraint was estimated using OLS technique. The Augmented Dickey-Fuller method was used to test for the stationarity of the variables. The results suggested a high degree of inertia present in government behaviour when it sets its primary balance. That is, past primary deficits have a positive and significant influence on current primary balance. Existing studies as indicated in the literature find support for the Greece Economy in study by [Stoica and Leonte \(2011\)](#). Also [Burger et al. \(2011\)](#) researching for the South African Economy had similar results for South Africa. Further, the primary balance is significant at the one percent level, while the debt is significant at the five percent level. It is revealed that when debt increases by 1%, primary balance would increase by 0.04. This finding is also supported by with [Stoica and Leonte \(2011\)](#) in their study for the Greece economy. The study therefore recommended the reduction in the size of Government and also to resort to alternative sources of financing expenditures rather than resorting to debt.

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