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Abstract

Purpose – The management of external debt among highly indebted poor countries (HIPCs) in Africa still remains a challenge despite numerous packages and attempts to ameliorate the consequences of such odious debt. The purpose of this paper is to establish the factors that contribute to the growth rate of external debt and how these factors respond to shocks to external debt growth rate in Africa.

Design/methodology/approach – Data were obtained from 24 African countries and analyzed using a panel vector autoregression estimation methodology.

Findings – The study found that external debt growth rates respond positively to unit shock or changes in government investment spending, consumption spending, and domestic borrowings over a long period of time. In the medium term, external debt growth rates respond negatively to shocks in tax revenue, inflation, and output growth rates. The paper also provides empirical support that external debt may be consumed rather than invested among HIPCs in Africa.

Research limitations/implications – The findings of this paper are limited to only HIPCs in Africa.

Practical implications – This study has some few debilitating implications for external debt management among HIPCs in Africa. First, the paper suggests that debt repayment may be a problem. This is largely because external debt is consumed rather than invested. External debt sustainability needs a holistic approach in less developed countries. The findings place much emphasis on improvements in gross domestic product and tax revenues as the principal routes out of the debt doldrums. However, this option must be exploited with great caution as there is ample evidence that these poor countries increase their external borrowing capacities with improvements in economic outlook.

Originality/value – This paper fills a research gap that identifies specific components of government deficit budgets that may be contributing to the growth rate of external debts among HIPCs.

Keywords Africa, HIPC, External debt

Paper type Research paper

Introduction

The impact of the excessive external debt that plagued the African continent has been well documented. Earlier studies have established the debilitating impact of external debt and debt service on economic growth (Scott, 1994; Fosu, 2008; Shalishali, 2008; Ndikumana and Boyce, 2011; Mohd Daud and Podivinsky, 2012). The economic impact of the excessive indebtedness on output attracted a pool of recommendation from both academic and non-academic spheres (Osinubi *et al.*, 2010). One of such recommendations was the introduction of highly indebted poor country (HIPC) initiative by bilateral and multilateral donors. Since the introduction of the HIPC and enhanced HIPC initiatives, debt burdens in Africa have significantly declined due to massive rescheduling and write-off of numerous debts. Despite the numerous rescheduling and cancelation of external debt, the plights of most African countries have worsened (Ngassam, 1991; Muhanji and Ojah, 2011) and sustainability

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still remains a challenge notwithstanding the declines in debt levels (Yang and Nyberg, 2009). Completion and exiting from the HIPC initiative is by no means a panacea to the debt sustainability problems of African countries (Yang and Nyberg, 2009). Several solutions have been advanced for achieving sustainability of African external indebtedness with the majority of researchers calling for extensive structural reforms as a way of dealing with the problem.

Perhaps the problems with debt sustainability in Africa still linger on because the thresholds that earmark the HIPC and non-HIPC status of a country are in themselves incorrect. This latter position has been strongly emphasized by Muhanji and Ojah (2011). They argued that it is fundamental to get right what constitute sustainable debt level, most especially for African countries. It appears that the appropriate threshold for African countries has not been ascertained (Caliari, 2006; Manasse and Roubini, 2009; Muhanji and Ojah, 2011). Given that the policy threshold for external debt has been wrongly quoted for Africa, its debt sustainability will still remain a strong challenge for the governments even after reaching the completion point of the HIPC initiative. An attempt to provide long-lasting solution to the external debt problems must look beyond conventional sustainability measures to more fundamental factors that drive growth rate of external debt in Africa.

In this paper, we take a fundamental approach to dealing with the external debt problems by examining the role played by factors that contribute to the build-up of excessive external debt. If debt levels are to remain sustainable, then the fundamentals should be rightly built. This study seeks to establish the factors that fundamentally affect external debt growth rates and their relationship with external debt in HIPCs in Africa. The objective of the study is twofold: the first is to come up with factors that account for growth rate of external debt and second to establish the relationship between major contributing factors and external debt growth rates in a panel vector autoregression (VAR) setup.

The rest of the paper is organized as follows: second section presents some stylized facts on external debts. The review of relevant literature is done in third section. Fourth section presents the methodology, estimation procedure, and sources of data. Fifth section deals with the analysis and discussion of results, and finally sixth section presents the summary, conclusions, and policy implications of the study.

Stylized facts on external debt in Africa

In this section, we take a preliminary tour of the data on external debts. The discussion explores the stylized facts on external debt stocks. We highlight two popular debt stocks ratios that have formed the basis for the HIPC initiative. These are external debt-to-gross domestic product (GDP) ratio and external-debt-to-export ratio. External debt-to-GDP ratio has been as high in pre-HIPC era (1980-1995) as that of post-HIPC era (1996-2010). Average external debt-to-GDP ratio prior to the introduction of HIPC initiative stood at 105.43 percent for the 24 HIPC countries employed in the study. The average for the post-HIPC era (1996-2010) was even slightly higher at 106.07 percent. The stock of external debt-to-export ratio on the other hand revealed that averages for the pre-HIPC era stood at 576.12 percent. Following the introduction of the HIPC initiative, this ratio has significantly declined to 433.95 percent. Average interest payment on these debts has also declined significantly.

The preceding discussion of the two most important debt ratios may seem to suggest that the HIPC initiative has had relatively no impact on debt levels. This is not the case as depicted by a trend analysis of the two variables. A time trend of both ratios shows that these ratios were on the rise prior to the introduction of the HIPC initiative. The ratios have been on a gradual decline after HIPC. The averages reported in the earlier sections are only midway figures for the two ratios. The trend analysis showed that external debt-to-GDP ratio has increased steadily from a minimum of 52.96 percent on average in 1980 to a maximum of 153.59 percent. Following the introduction of the HIPC initiative, the ratio declined steadily from a maximum of 156.31 percent in 1998 to a minimum of 40.49 percent by the year 2010 (Figure 1).

Debt-to-export ratio prior to HIPC on the other hand, stood at a minimum of 217.32 percent in 1980. By 1992, this figure had reached its pre-HIPC peak of 774.85 percent. Following the introduction of HIPC initiative, this ratio declined from a maximum of 809.14 percent in 1999 to its minimum of 149.01 percent by the year 2010. The significant reductions in debt ratios as shown in the preceding analysis indicate that the HIPC initiative has had significant impact on the sustainability of external debt in the poor SSA region. External debt ratios among developing African countries have declined rapidly mainly because of the HIPC initiative. To prevent another round of HIPC initiative it is important for these developing countries to identify the factors that contribute to external debts and manage the sustainability of external debt at this level.

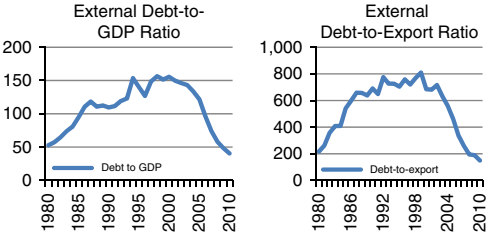
Literature review

Debt composition

In this paper, we attempt to throw more light on some macroeconomic factors that may affect external debt determination. The objective is to arouse thoughts about the role played by the structures and institutions of state that govern these variables.

The packages designed to alleviate the external debt problems of developing countries by bilateral, commercial, and multilateral creditors under negotiation of the Paris Club have not produced the much anticipated discipline and restrain regarding external borrowing. External debt still continues to grow at phenomenal rates in developing countries that have enjoyed massive debt relief. This is because the stability of external debt has been described in far too simple ratios of debt-to-GDP and export without recourse to the factors that may contribute to the worsening debt problem. Even more problematic is the fact that ratios of external debt sustainability employed by bilateral and multilateral agencies may be wrong and overly stated for developing African countries (Muhanji and Ojah, 2011).

Dealing with the external debt problems on the African continent must take a more fundamental approach. A decomposition of external debt is needed to establish the factors that contribute to its growth. Debt decomposition in this direction has been done for public debt in most cases with very little attention to external debt (De Bolle *et al.*, 2006; Abbas *et al.*, 2014). Past studies have also focused on currency composition of public debt and how that affects some other macroeconomic factors such as output (De Bolle *et al.*, 2006). For instance, Eichengreen and Hausmann (1999) and De Bolle *et al.* (2006) argued that debt denomination has a causal effect on economic outcomes. Eichengreen and Hausmann (1999) showed that currency composition of both domestic and foreign debt has different implications for the borrowing strategy of developing countries. They found that domestic currency is not used to borrow abroad or domestically in the longer term. In a related study, Hausmann and Panizza (2003), Eichengreen *et al.* (2005, 2007), and De Bolle *et al.* (2006) showed that the international component of long-term domestic borrowing is a widespread and persistent phenomenon which is not a mere consequence of bad policies or institutions.



Notes: (a) External debt-to-GDP ratio; (b) external debt-to-export ratio

Figure 1.
Trends in external debt ratios

Another recent evidence by Hausmann and Panizza (2011) shows that several developing countries have been making greater use of domestic bond markets resulting in a counter decline in foreign debt-to-GDP ratios.

The literature on sovereign debt is disproportionately biased toward solutions to the escalating total public debt by focusing on creditor, maturity, and currency denomination of this debt. In this study, the focus is on the growth rate of external debt and how this can be reduced by managing the very components that affect external debt. The components are deduced from a decomposition framework presented in the methodology. The components of external debt reflect the use (government spending), finance (taxation and domestic borrowing), and policy objective (output and price stability) of the external debt. We explore the literature on the link between external borrowing and these variables. The relationship between the two principal uses – government consumption and investment spending and external debt is reviewed first. In the second phase, the study reviews the literature on the link between external borrowing and government sources of funds such as revenue from taxes and domestic borrowing. The last section of the review explores the links between external debt and two critical policy objectives of the government – inflation and output.

Government consumption expenditure and external debt. A reduction in government consumption expenditure would lead to an improvement in the sustainable debt levels, at least at a theoretical level. Huge cuts in expenditure and increases in tax revenue may have significant impact on national output and consequently price level. Notwithstanding these possibilities, fiscal discipline in terms of reduction in government consumption expenditure and increased tax collection efforts is a sure way to achieve sustainable external debt. Empirical evidence on the relationship between government consumption expenditure and external debt is scanty. The closest evidence of this relationship is provided by Mahdavi (2004) and Makin and Narayan (2013). Mahdavi (2004) focused on the shifts in composition of government spending in relation to changing external debt burdens. Their evidence suggests that increasing external debt burdens shifts consumption away from non-wage expenditure, subsidies and transfers while leaving the politically tied wages and salaries share of government expenditure unchanged. On the other hand, Makin and Narayan (2013) examined the extent to which external debt funds government consumption in some selected industrialized counties. Their evidence supports the view that external borrowing does not fund government consumption. The majority of studies on government consumption expenditure has focused on its relationship with economic growth (Olaleye *et al.*, 2014; Hajamini and Falahi, 2014; Mehmood *et al.*, 2014) and conclusively found positive relationship between output and consumption. This study departs from these earlier studies by examining the relationship between growth of external debt and government consumption expenditure in an endogenous model.

Investment and external debt. External debts are contracted presumably to finance some underlying projects. In view of this, it is prudent to examine the linkage between investments and external debt. All things being equal, high levels of external debt should be associated with high levels of government investment spending. Empirical evidence of the relationship between external debt and government investment spending is given by Mahdavi (2004), Makin and Narayan (2013), and Makin (2014). In these papers, it was shown that investment spending has adverse effect on external debt burdens and huge debt burdens do shift the government spending away from investment. Unlike the above studies and other related ones this study examines the link between growth rates in external debt and growth rates of investment spending.

Taxation and external debt. Theoretically, the link between external debt growth rate and tax revenue is expected to be negative. This is shown in the decomposition of external debt growth rate in the "Methodology" section. From an empirical stand point, Banerjee (2014)

found that there exists a considerable opportunity for highly indebted countries to rely on taxation as a way out of the debt doldrums. The potential areas for raising the needed tax revenue include labor and consumption taxes (Banerjee, 2014).

Domestic debt and external debt. Another variable that may influence external debt is the level of domestic debt. From the theoretical perspective, changes in the domestic debt are negatively related to the external. This is not surprising as the decline in domestic debt will cause governments to increase their reliance on external debt to finance their budget deficit. Perhaps there may be a pecking order in the use of domestic and external debt to finance budget deficit or perhaps such decision regarding the choice of borrowing source may reflect the associated cost of each alternative. The answers to these thoughts are still an issue that merits an empirical investigation. On the empirical front, there is very little evidence on the relationship between domestic debt and external debt. There are few studies that have focused on domestic debt and other macroeconomic variables. For instance, Kohlscheen (2010) focused on the incidence of domestic and external debt crisis. The study showed that default rates are typically lower for domestic debt than external debt, but more importantly the study found that external defaults trigger domestic default but not the other way.

Inflation and external debt. The relationship between inflation and external debt is negative from a theoretical point of view. An increase in general price levels should reduce the external debt growth rate. During inflationary periods, borrowers tend to gain while creditors lose out. A rise in price levels will cause productivity to increase leading to a reduced share of external debt in output. On the empirical front the relationship between inflation and external debt sustainability is not a clear cut issue. The major issue that quickly arises is whether there is an optimal inflation rate which is compatible with the attainment of sustainable external and internal borrowing (Anand *et al.*, 1988). Aizenman and Marion (2011) established the fact that there is a trade-off between inflation targets and public debt sustainability which goes to confirm the theoretical relationship. This finding was earlier established by Burdekin and Wohar (1990).

Growth rate of GDP. Growth rate in real per capita GDP theoretically contributes positively to the achievement of sustainable debt levels. On the empirical level, the majority of research has focused on the impact of increasing debt levels on the economic growth prospects of the borrowing countries. The most popular phrase in this arena is the "debt Overhang" hypothesis. External debt is deemed to impact on growth positively up to a threshold. Beyond this threshold, external debt decreases growth. Butts (2009) examined the relationship between short-run external debt economic growth rates in 27 Latin American countries. They found that short-term external debt Granger causes economic growth. Clinton *et al.* (2011) also established that a well-targeted reduction in deficit and debt can lead to substantial declines in output and growth rates. Mehdi and Masoud (2011), Ajayi and Oke (2012), and Ramzan and Ahmad (2014) using time series analysis established that external debt affects growth rates negatively in Iran, Nigeria, and Pakistan, respectively. The negative impact of external debt can, however, be improved by sound macroeconomic policies (Ramzan and Ahmad, 2014).

Methodology

External debt accounting

A theoretical linkage between government spending and external debt is established in this section with reference to the government budgetary process. Government runs a budget deficit when its revenues from taxes (TAXR) and other sources fall short of its expenditure (XPNS). Total government expenditure is typically made up of two components, the first comprise public spending on consumption and investments plus transfer payment.

The second element of the government consumption expenditure is interest payment on its debt stocks. From the following equation, the total amount of interest payment is given as the product of a weighted interest rate (INTW) and the stock of debt (DEBT) in a given year. In mathematical notation, government deficit (DFCT) is given as follows:

$$\mathrm{DFCT} = \mathrm{XPNS} + (\mathrm{INTW} \times \mathrm{DEBT}) - \mathrm{TAXR} \tag{1}$$

There are at least three sources from which the government can finance its deficit. The first option is to issue more government bonds in the open market to raise the needed funds either locally or internally. The second option is to create more money through an autonomous monetary institution via seigniorage. The final option which remains quite unpopular is to rely on the proceeds from the sale of state assets or divestiture. Assuming that deficits would be financed by borrowings, taxes, and printing of more currency notes:

$$\mathrm{TAXR} + \Delta(\mathrm{DEBT}) + \Delta(\mathrm{MONY}) = \mathrm{XPNS} + (\mathrm{INTW} \times \mathrm{DEBT}) \tag{2}$$

where TAXR is the revenue from taxes; Δ(DEBT) the changes in total debt stocks; Δ(MONY) the changes in money stock; XPNS the government expenditure; INTW the weighted interest rate on total debt; DEBT the total debt stocks.

The stability of debt burdens depends on the government's ability to match its revenues to its expenditure year after year. Total revenue from taxes, increase in debt stocks, and increases in money supply should be equal to the government's expenditure and interest on total debt. In other words to prevent excessive accumulation of debt, the government must ensure that expenditure needs are sustainable relative to the revenue. From Equation (2), we can decompose total debt stock (DEBT) into domestic debt (DOMD) and external or foreign debt (EXTD). The evolution of the domestic debt (DOMD) depends on domestic interest rates (INTD) whiles the foreign debt is determined by the foreign interest rate (INTF). A more elaborate form of Equation (2) is given as follows:

$$\begin{aligned} &\mathrm{TAXR} + \Delta(\mathrm{DOMD}) + \Delta(\mathrm{EXTD}) + \Delta(\mathrm{MONY}) \\ &\quad = \mathrm{XPNS} + (\mathrm{INTF} \times \mathrm{EXTD}) + (\mathrm{INTD} \times \mathrm{DOMD}) \end{aligned} \tag{3}$$

Dividing both sides of Equation (3) by nominal GDP, (INFR × GDPR, where INFL = general price levels and GDPR = real output) and expressing variables as income shares by their lower-case letters yields:

$$\begin{aligned} &\frac{\mathrm{TAXR}}{(\mathrm{INFR} \times \mathrm{GDPR})} + \frac{\Delta(\mathrm{DOMD})}{(\mathrm{INFR} \times \mathrm{GDPR})} + \frac{\Delta(\mathrm{EXTD})}{(\mathrm{INFR} \times \mathrm{GDPR})} + \frac{\Delta(\mathrm{MONY})}{(\mathrm{INFR} \times \mathrm{GDPR})} \\ &\quad = \frac{\mathrm{XPNS}}{(\mathrm{INFR} \times \mathrm{GDPR})} + \frac{(\mathrm{INTF} \times \mathrm{EXTD})}{(\mathrm{INFR} \times \mathrm{GDPR})} + \frac{(\mathrm{INTD} \times \mathrm{DOMD})}{(\mathrm{INFR} \times \mathrm{GDPR})} \end{aligned} \tag{4}$$

$$\begin{aligned} &taxr + \frac{\Delta(\mathrm{DOMD})}{(\mathrm{INFL} \times \mathrm{GDPR})} + \frac{\Delta(\mathrm{EXTD})}{(\mathrm{INFL} \times \mathrm{GDPR})} + \frac{\Delta(\mathrm{MONY})}{(\mathrm{INFL} \times \mathrm{GDPR})} = xpns \\ &\quad + (intf \times extd) + (intd \times domd) \end{aligned} \tag{5}$$

Our interest lies in the dynamics of the foreign debt and its sustainability overtime and given that:

$$\frac{\mathrm{EXTD}}{(\mathrm{INFL} \times \mathrm{GDPR})} = extd \tag{6}$$

$$\text{EXTD} = (extd) \times (\text{INFL}) \times (\text{GDPR}) \tag{7}$$

Given that all variables in Equation (7) are functions of time, then changes in EXTD with respect to time is given as:

$$\frac{\partial(\text{EXTD})}{\partial t} = (\text{INFL}) \times (\text{GDPR}) \times \frac{\partial(extd)}{\partial t} + (extd) + \text{GDPR} \times \frac{\partial(\text{INFL})}{\partial t} + (extd) \times \text{INFL} \times \frac{\partial(\text{GDPR})}{\partial t} \tag{8}$$

$$\partial(\text{EXTD}) = [(\text{INFL}) \times (\text{GDPR}) \times \partial(extd)] + [(extd) \times (\text{GDPR}) \times \partial(\text{INFL})] + [(extd \times \text{INFL} \times \partial(\text{GDPR})] \tag{9}$$

Dividing through Equation (9) by nominal income again:

$$\partial(\text{EXTD}) = \frac{[(\text{INFL}) \times (\text{GDPR}) \times \partial(extd)]}{(\text{INFL} \times \text{GDPR})} + \frac{[(extd) \times (\text{GDPR}) \times \partial(\text{INFL})]}{(\text{INFL} \times \text{GDPR})} + \frac{[(extd \times \text{INFL} \times \partial(\text{GDPR})]}{(\text{INFL} \times \text{GDPR})} \tag{10}$$

Canceling out common terms in Equation (10) results in the following equation(11):

$$\frac{\partial(\text{EXTD})}{(\text{INFL} \times \text{GDPR})} = \partial(extd) + (extd \times infl) + (extd \times gdpr) \tag{11}$$

The evolution of the domestic debt is also derived in a similar manner:

$$\frac{\text{DOMD}}{(\text{INFL}) \times (\text{GDPR})} = domd \tag{12}$$

$$\text{DOMD} = (domd) \times (\text{INFL}) \times (\text{GDPR}) \tag{13}$$

Differentiating Equation (13) with respect to time and dividing through by nominal income:

$$\frac{\partial D}{\partial t} = (\text{INFL} \times \text{GDPR}) \times \frac{\partial(domd)}{\partial t} + (domd) \times (\text{GDPR}) \times \frac{\partial(\text{INFL})}{\partial t} + (domd) \times (\text{INFL}) \times \frac{\partial(GDPR)}{\partial t} \tag{14}$$

$$\partial D = (\text{INFL}) \times (\text{GDPR}) \times \partial(domd) + (domd) \times (\text{GDPR}) \times \partial(\text{INFL}) + (domd) \times (\text{INFL}) \times \partial(\text{GDPR}) \tag{15}$$

$$\frac{\partial(\text{DOMD})}{(\text{INFL} \times \text{GDPR})} = \frac{(\text{INFL} \times \text{GDPR}) \times \partial(domd)}{(\text{INFL} \times \text{GDPR})} + \frac{(domd) \times (\text{GDPR}) \times \partial(\text{INFL})}{(\text{INFL} \times \text{GDPR})} + \frac{(domd) \times (\text{INFL}) \times \partial(\text{GDPR})}{(\text{INFL} \times \text{GDPR})} \tag{16}$$

Again canceling out common terms from Equation (16) results in Equation (17):

$$\frac{\partial(\mathrm{DOMD})}{(\mathrm{INFL})\times(\mathrm{GDPR})}=\partial(domd)+(infl)\times(domd)+(gdpr)\times(domd) \tag{17}$$

If we re-write, from Equation (5):

$$\frac{\Delta(\mathrm{MONY})}{(\mathrm{INFL})\times(\mathrm{GDPR})}=\frac{(\mathrm{MONY})}{(\mathrm{INFL})\times(\mathrm{GDPR})}\times\frac{\Delta(\mathrm{MONY})}{\mathrm{MONY}}=(mony)\mu \tag{18}$$

where $\mu=\Delta(\mathrm{MONY})/\mathrm{MONY}=$ growth rate in money stock and $m=$ the share of money stock in national income.

Substituting Equations (11), (17) and (18) into (5), we obtain:

$$(taxr)+\partial(domd)+(infl)\times(domd)+(gdpr)\times(domd)+\partial(extd)+(extd)\times(infl)$$
$$+(extd)\times(gdpr)+(mony)\times\mu=(xpns)+(intf)\times(extd)+(intd)\times(domd) \tag{19}$$

Solving for percentage changes in foreign debt:

$$\partial(extd)=(xpns)+(intf\times extd)+(intd)\times(domd)-(taxr)-\partial(domd)-(infl)\times(domd)$$
$$-(gdpr)\times(domd)-(extd)\times(infls)-(extd)\times(gdpr)-(mony)\times\mu \tag{20}$$

$$\frac{\partial(extd)}{extd}=\frac{(xpns)}{extd}+\frac{(intf\times extd)}{extd}+\frac{(intd)\times(domd)}{extd}-\frac{(taxr)}{extd}-\partial\frac{(domd)}{extd}-\frac{(infl)\times(domd)}{extd}$$
$$-\frac{(gdpr)\times(domd)}{extd}-\frac{(extd)\times(infls)}{extd}-\frac{(extd)\times(gdpr)}{extd}-\frac{(mony)\times\mu}{extd} \tag{21}$$

$$\frac{\partial(extd)}{extd}=\frac{(xpns)}{extd}+(intf)+\frac{(intd)\times(domd)}{extd}-\frac{(taxr)}{extd}-\partial\frac{(domd)}{extd}$$
$$-\frac{(infl)\times(domd)}{extd}-\frac{(gdpr)\times(domd)}{extd}-(infl)-(gdpr)-\frac{(mony)\times\mu}{extd} \tag{22}$$

Let, $(xpns)/(extd)$, government spending be further decomposed into consumption $(cons)/(extd)$ and investment expenditure, $(invs)/(extd)$:

$$\frac{\partial(extd)}{extd}=\frac{(invs)}{(extd)}+\frac{(cons)}{(extd)}+(intf)+\frac{(intd)\times(domd)}{extd}-\frac{(taxr)}{extd}-\partial\frac{(domd)}{extd}$$
$$-\frac{(infl)\times(domd)}{extd}-\frac{(gdpr)\times(domd)}{extd}-(infl)-(gdpr)-\frac{(mony)\times\mu}{extd} \tag{23}$$

For a stable external debt stock, Equation (23) proposes several remedies: the stability of external depends on government spending, interest on external debt, the share of money stock in national income, and growth rate in money stock. The change in domestic stock as a share of income is also a factor that needs critical attention. Changes in price levels and output growth rate also play a significant role in achieving stability of external debt. Specifically, increases in government consumption and investment expenditure result in increases in the growth rate of external debt. Increases in inflation rate and real output growth lead to reduction in the growth rate of external debt. A decline in money supply as a share of income leads to increase in external debts and finally an increase in the levels of domestic borrowing decreases the share of external debt.

Model specification

Following a decomposition of external growth rates, six major variables were identified as major contributors to external debts in Africa (see Figure 2). These variables are government consumption expenditure, government investment expenditure, revenue from taxation, domestic debt, inflation, and GDP. These variables are placed in a model to explain their relationship with external debt.

The functional form of the model is given as follows:

$$extd_{it} = f(invs_{it},\ cons_{it},\ taxr_{it},\ domd_{it},\ infl_{it},\ gdpr_{it}) \tag{24}$$

where $extd_{it}$ represents external debt for country i in period t; $invs_{it}$ represents government consumption expenditure for country i in period t; $cons_{it}$ represents government investment expenditure for country i in period t; $taxr_{it}$ represents tax revenue for country i in period t; $domd_{it}$ represents domestic debt for country i in period t; $infl_{it}$ represents the growth rate of inflation for country i in time t; $gdpr_{it}$ represents growth rate in GDP for country i in time t.

The econometric specification of the model is given as follows:

$$\begin{aligned} extd_{it} = {} & \beta_0 + \beta_1(invs)_{it} + \beta_2(cons)_{it} + \beta_3(taxr)_{it} \\ & + \beta_4(domd)_{it} + \beta_5(infl)_{it} + \beta_6(gdpr)_{it} + \gamma_t + \varepsilon_{it} \end{aligned} \tag{25}$$

Panel VAR. The estimation of the relationship between external debt on one hand and government consumption spending, government investment spending, tax revenues, and domestic debt, inflation and output on another is not a straight forward issue. This is because the right hand variables may be simultaneously correlated with each other and causality may run in both directions of the equation, thereby making it extremely difficult, if not impossible, to clearly trace out the exclusive impact of one variable on another. For this reason, a panel VAR model was employed to estimate the endogenous relationship described above. The use of an impulse-response function was used to examine the reaction of one variable to a shock in another while holding all variables of the structural model constant.

The use of panel VAR has some unique advantages. It draws on the advantages of the VAR model by allowing all variables to be endogenously determined within the model while still benefiting from the use of a panel data structure that presents us with more observations and also accounts for individual heterogeneity of countries (Love and Zicchino, 2006). A panel VAR of third order was employed in this study following various lag length selection tests:

$$z_{i,\,t} = \alpha + \beta_1 z_{i,\,t-s} + \gamma_t + e_{i,\,t} \tag{26}$$

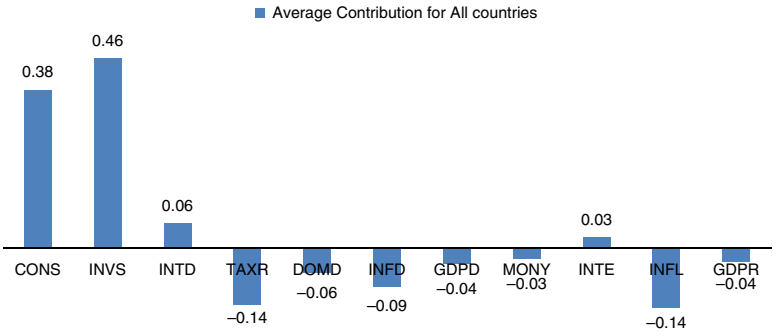


Figure 2.
Contribution of variables to growth rate of external debt

where $z_{i,\ t}$ is a vector of seven variables. These variables include external debt (*extd*), government investment expenditure (*invs*), government consumption expenditure (*cons*), revenue from taxes (*taxr*), domestic debt (*domd*), inflation (*infl*), and GDP (*gdpr*). γ_t time-specific effect and $e_{i,\ t}$ stands for the idiosyncratic error term. The estimation of Equation (26) requires stationarity of each variable. There are a number of tests that can be conducted in this direction among which are the Breitung (2002), Levin *et al.* (2002), Im *et al.* (2003), Fisher type, and residual-based LM tests. No single test dominates the other with regards to its advantages. The choice of a particular approach depends on the benefits and drawbacks in relation to the data at hand. The null hypothesis tested in most of these test is that all time series in the panel is non-stationary. The alternative hypothesis is that at least one panel is stationary.

Data sources and sample

The data for the estimation were collected for 24 HIPC countries in Africa over a 31-year period from 1980 to 2010. The source and description of these data are given in Table I.

Analysis and discussion of findings

Composition of external debt growth rate

Figure 2 contains a breakdown of external debt growth rate for the countries included in the study. These rates are averages for all the counties. The major contributors to the external debt growth rates are government consumption and investment expenditure. The two variables contribute 38 and 46 percent of external debt growth rate, respectively, and a combined average of 84 percent. Other minor positively contributing factors are interest on domestic debt and interest on external debt. The contribution of the latter two is about 9 percent in total. Positive growth rates in external debt for HIPCs in Africa are mostly influenced by consumption, investment, and interest rates about 93 percent of the time.

Besides the four factors that contribute positively to the growth rates of external debt, there are a number of other variables that influence the growth rate of external debt negatively. These variables include revenue from taxes, domestic borrowing, inflation, output, and changes in money stock. The overall reduction in external debt growth rate resulting from the just listed factors summed up to about 50 percent from Figure 2. This reduction is just

Variable	Description	Source
External debt (*extd*)	External debt growth rate. Total external debt is debt owed to nonresidents repayable in foreign currency, goods, or services	World development indicators (WDI)
Government consumption expenditure (*cons*)	Growth rate of general government final consumption expenditure. This includes all government current expenditures for purchases of goods and services (including compensation of employees)	World development indicators (WDI)
Government investment expenditure (*invs*)	Growth rate of central government's gross domestic fixed investment	African development indicators (ADI)
Taxation revenue (*taxr*)	Growth rate in government tax revenue	African development indicators (ADI)
Domestic debt (*domd*)	Growth rate in domestic debt	African development indicators
GDP growth rate (*gdpr*)	Annual percentage growth rate of gross domestic product	World development indicators (WDI)
Inflation (*infl*)	Inflation as measured by the annual percentage change in the cost, to the average consumer, of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly	World development indicators (WDI)

Table I.
Description and sources of variables

about half the percentage increase caused by the four variables that cause external debt growth rate to increase. The decomposition clearly shows an unmatched financing gap between uses of external debt and its funding sources, a situation that can lead to persistent increases in external debt growth rates among poor countries.

Following a decomposition of external growth rates, six major expenditure, revenue, and macroeconomic policy variables were identified as major contributors to external debts in HIPCs Africa. These variables are government investment expenditure, government consumption expenditure, revenue from taxation, domestic debt, inflation, and GDP. These variables are placed in a model to explain their relationship and causal linkages with external debt growth rate. A panel VAR model is used so we can assess the impact of one standard deviation shock to the system on other variables.

Descriptive analysis

Table II presents the descriptive statistics of the variables employed in the study. Average external debt growth rate for the entire sample of countries was 5 percent. The minimum was a decline of about 79 percent and a maximum of about 279 percent. Standard deviation of external debt growth rate was about 28 percent. On average, the growth rate of investment and consumption spending relative to the growth rate of external debt were the highest at about 45 and 37 percent, respectively. The two variables explain about 82 percent of external growth rates. The growth in output, domestic debt, taxes, and inflation only accounts for a total of 37 percent of the growth rate in external debt.

Correlation analysis

Table III provides a summary of the correlation between the variables on a pairwise basis. Government consumption expenditure was positively and significantly correlated with external debt. The relative growth rate in taxes, domestic debt, and output turned negatively correlated with external debt growth rate at a 5 percent level of significance.

Variable	Obs.	Mean	SD	Min.	Max.
External debt	1,067	0.05	0.28	−0.79	2.79
Investment	1,030	0.45	0.65	−0.01	10.8
Consumption	1,055	0.37	0.69	0.01	11.03
Taxation	946	0.14	0.19	−0.08	1.90
Domestic debt	965	0.06	0.43	−2.91	7.33
Inflation	941	0.14	0.22	−7.62	18.33
GDP growth rate	1,155	0.03	0.07	−0.51	1.68

Table II.
Summary statistics

	EXTD	INVS	CONS	TAXR	DOMD	INFL	GDPR
EXTD	1						
INVS	0.061 (0.01)**	1					
CONS	0.101 (0.00)***	0.867 (0.05)**	1				
TAXR	−0.002 (0.00)***	0.735 (0.14)	0.738 (0.01)**	1			
DOMD	−0.192 (0.03)**	0.238 (0.31)	0.247 (0.01)**	0.204 (0.01)**	1		
INFL	0.146 (0.21)	−0.032 (0.41)	−0.02 (0.18)	−0.04 (0.01)**	−0.032 (0.01)**	1	
GDPR	−0.214 (0.04)**	0.093 (0.01)**	0.017 (0.11)	0.103 (0.04)**	0.162 (0.02)**	−0.067 (0.14)	1

Notes: NB: *p*-values are reported in parenthesis. *,**,***Significant at 10, 5, and 1 percent levels, respectively

Table III.
Correlation matrix

Panel unit root tests

Persistent process, mostly referred to as unit root process, has had a profound place in time series literature (Hamilton, 1994). Persistence in data has been proven to have an impact on the asymptotic properties of coefficients in a model. In a panel data setting where the time dimension of the data, T, is largely relative to the individual, N, dimension, the asymptotic properties of coefficients may be misleading (Wooldridge, 1994) and for that reason it is imperative to know about the temporal dependence in the data. Three test of stationarity were performed to test the null hypothesis of a unit root in the panel data. The alternative hypothesis is that the panel data does not have a unit root, hence stationary. The Levin, Lin and Chu augmented Dickey and Fuller (1979), and Philip-Peron tests were applied in this direction and a decision about stationarity was reached on the basis of a majority.

Table IV presents the results from all three tests. The results in all cases (for all test and variables) rejected the null hypothesis of a unit root in panel data at a 1 percent level of significance. It is therefore the conclusion of this paper that all variables in the panel are stationary. The high level of significance achieved for the stationarity test is not surprising because the variables are relative growth rates. They have been differenced in the process of generation.

Lag length selection

The order determination part of a VAR model is very fundamental and crucial. The selection of the appropriate lag length for the VAR model ensures that all the dynamics of the model have been properly captured. Three of several selection methods were employed to determine the appropriate lag length for the model. These include final prediction error (FPE), Akaike information criterion, and Schwarz information criterion. With each of these tests the objective is to select the lag length that produces the least test statistic. This optimal lag length is marked with an asterisk is Table V.

Test	Levin, Lin and Chu	ADF – Fisher χ^2	PP – Fisher χ^2
External debt (EXTD)	−18.02 (0.000)***	282.13 (0.000)***	283.31 (0.000)***
Consumption (CONS)	−10.0219 (0.000)***	465.60 (0.000)***	149.02 (0.000)***
Investment (INVS)	−11.826 (0.000)***	118.46 (0.000)***	119.25 (0.000)***
Tax revenue (TAXR)	−17.89 (0.000)***	363.85 (0.000)***	405.35 (0.000)***
Domestic debt (DOMD)	−41.83 (0.000)***	566.26 (0.000)***	804.37 (0.000)***
Inflation (INFL)	−11.65 (0.000)***	172.99 (0.000)***	174.56 (0.000)***
GDP (GDPR)	−20.14 (0.000)***	450.50 (0.000)***	471.13 (0.000)***

Table IV.
Unit root tests

Notes: *,**,***Significance at 10, 5 and 1 percent levels, respectively

Lag	FPE	AIC	SC
0	0.851725	19.70465	19.77186
1	0.016794	15.77835	16.31609[a]
2	0.014544	15.63435	16.64261
3	0.013591[a]	15.56614[a]	17.04491
4	0.014909	15.65784	17.60714
5	0.015906	15.72115	18.14097
6	0.017391	15.80833	18.69867
7	0.015632	15.69879	19.05965
8	0.017904	15.83069	19.66207

Table V.
Lag length selection

Notes: FPE, Final prediction error; AIC, Akaike information criterion; SC, Schwarz information criterion.
[a]Indicates lag order selected by the criterion

Two of the three criteria, FPE and AIC, favor a lag length of three to a lag length of one predicted by the SC. It is not out of place to have conflicts with the optimal lag length chosen by these tests in which case a lag length of three is chosen for our model on the basis of a majority decision.

Granger causality/block exogeneity test

The test for a causal relationship between variables goes to the very root of a VAR model. A decision to include a particular variable in the estimation greatly depends on economic theory. At the heart of proving economic theory lies the need for a causality and exogeneity test of the variables and groups of variables to be included in the VAR model. In deciding whether to include a particular variable in the VAR model it was appropriate to establish whether that variable Granger caused any or a combination of any of the other variables in the system. The Granger causality test was employed to establish the causal relationship between the variables in the model. Table VI presents the results from the Granger causality test on a pairwise basis.

From column 2 of Table VI government consumption expenditure, tax revenue, and GDP growth rates Granger cause growth rate of external debt stocks. All combined six right hand side variables also Granger cause external debt. In column 3 we have external debt, tax revenue, and domestic debt growth rates Granger causing growth rates in government consumption expenditure. By inference, there is a bi-directional causal relationship between growth rates in government consumption expenditure and external debt stocks. In the investment, external debt stocks, government consumption expenditure, and taxation revenue do Granger cause government investment spending. Investment spending has a unidirectional causal relationship with external debt and this relationship runs from external debt to government investment spending. In the taxation equation, the causal links are less surprising. Causal links run from the two top expenditure items of government, and external debt stock. The link between taxation and external debt is also bi-directional. Domestic debt, inflation, and GDP have unidirectional relationship with external debt. In all cases, the excluded variables do have a collective causal relationship with their respective dependent variables. The establishment of these causal links in addition to the stability report in the next section gives some credence to the VAR model employed in this study.

Stability of the VAR model

The stability of the VAR model was evaluated on the basis on the inverse roots. All modulus of the system fell within the unit circle thereby attesting to the model stability (Figure 3).

Impulse-response function

In this section, we explore the behavioral properties of the model via an impulse-response function. The impulse-response graphs were computed using Cholesky decomposition with the variables ordered in the following manner: external debt, government investment spending, government consumption spending, tax revenue, domestic debt, inflation, and GDP (EXTD → INVS → CONS → TAXR → DOMD → INF → GDPR). By applying a Cholesky decomposition to this ordering we are making an implicit assumption that the current year values of a variable only enter the model for subsequent variables in the order. In our present case, current year values of external debt, government investment spending, government consumption expenditure, taxation, domestic debt, and inflation can only enter the model for GDP growth rates. This recursive limitation of the Cholesky decomposition requires the ordering of variables to be thoroughly questioned on the basis of some economic theory or transmission mechanism. The ordering adopted in this paper is based on the premise that external debts are contracted with an immediate intention to put the funds into investment. Part of these funds may find their way into the payment of salaries and

Table VI.
Granger causality/ exogeneity test

Excluded	Dependent variables						
	EXTD	CONS	INVS	TAXR	DOMD	INFL	GDPR
EXTD	na	20.49 (0.0001)***	33.43 (0.0000)***	22.12 (0.0001)***	8.05 (0.0451)**	8.00 (0.0460)**	2.04 (0.5641)
CONS	15.41 (0.0015)***	na	13.13 (0.0044)***	37.33 (0.0000)***	7.32 (0.0624)*	0.29 (0.9605)	6.90 (0.0750)*
INVS	3.12 (0.3735)	98.45 (0.0000)***	na	35.91 (0.0000)****	9.98 (0.0187)**	1.13 (0.7692)	21.61 (0.0001)***
TAXR	17.61 (0.0005)***	22.67 (0.0000)***	13.24 (0.0041)***	na	28.19 (0.0000)	1.43 (0.6994)	3.71 (0.2944)
DOMD	2.81 (0.4206)	9.21 (0.0265)**	0.54 (0.9088)	6.23 (0.1007)	na	0.38 (0.9442)	4.85 (0.1829)
INFL	0.24 (0.9702)	0.22 (0.9735)	0.51 (0.9166)	0.53 (0.9130)	0.93 (0.8169)	na	2.59 (0.4586)
GDPR	15.44 (0.0015)***	1.89 (0.5948)	4.98 (0.1731)	4.754 (0.1907)	10.57 (0.0143)**	21.15 (0.0001)***	na
ALL	114.85 (0.0000)***	193.08 (0.0000)***	83.90 (0.0000)***	102.96 (0.0000)***	74.85 (0.0000)***	27.08 (0.0775)*	40.94 (0.0016)***

Notes: *,**,***Significance at 10, 5 and 1 percent levels, respectively

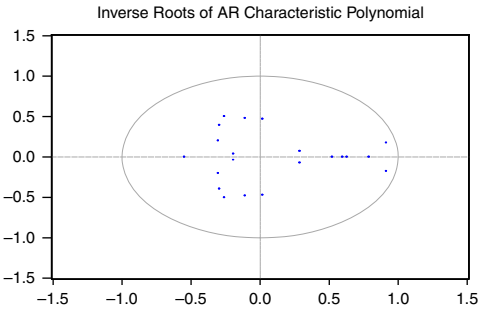


Figure 3.
Stability of VAR model

other recurring expenditure on public sector workers leading to increases in government consumption expenditure. Once the projects are ongoing, the external debt would have to be amortized over time and payment for these amounts would be made by government through internally generated funds such as taxation and internal borrowing. The choice of financing will consequently affect inflation and ultimately GDP.

The impulse-response function also examines the effect of a positive unit standard deviation shock to one of the endogenous variables on current and future values of all other variables in the system. The combined graphs are presented in this section whiles the multiple and accumulated combined response functions (long-term effects) are presented in Figures A1 and A2, respectively. Monte Carlo simulated confidence bounds are employed due to the small sample size of the study. An accumulated multiple impulse-response function using the generalized one standard deviation decomposition is also reported in Figure A3 for robustness check. The accumulated IRF from the latter decomposition method are very similar the ones obtained from the Cholesky decomposition.

Figure 4 shows the orthogonal impulse-response functions with dynamic effects over 40 years on growth rate of external debt following a positive unit shock to the other six variables. For the sake of clarity, only combined impulse responses graphs are shown in this section. Since external debt growth rate is in percentage and four out of the remaining six variables are measured relative to external debt, we can confidently interpret the shocks as the effect of a 1 percent increase in the these variables. Figure 4 is therefore the response of external debt growth rate to a unit shock to external debt growth rate, investment, consumption, taxation, domestic debt, inflation, and GDP growth rate. A shock to external debt growth rates raises the growth rate of external debt in the short term. In the longer term, this reduces external borrowing by about 2.5 percent on average. A 1 percent increase in investment expenditure raises external borrowing by 2.3 percent in the third year. Over a

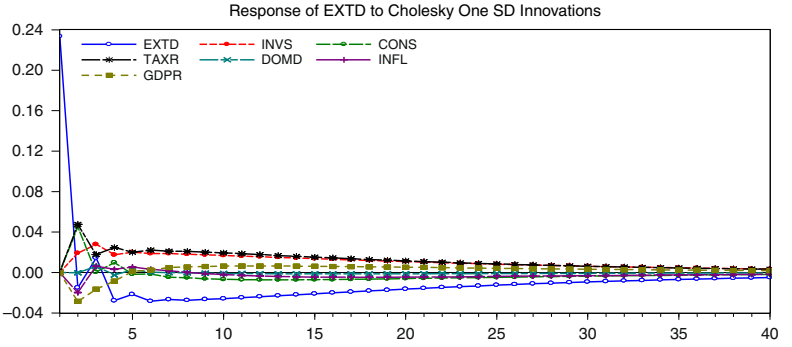


Figure 4.
Response of EXTD to shocks

ten-year period, the 1 percent increase in investment spending increases external debt growth rate by 1.6 percent. This increase is persistent over the ten-year period. The accumulated effect of the 1 percent increase in investment on external debt growth rate over a ten-year period is about 16 percent. This is deduced from the accumulated response function reported in Figure A2. A 1 percent increase in government consumption leads to an increase in the growth rate of external debt. The effect of the shock to consumption on external debt is transitory; however, the impact of the shock in the second year is higher than the shock recorded from investment. A percentage increase in consumption increases external borrowing by about 4.5 percent by the end of the second year. This effect dies off by the fifth year. The accumulative impact of a 1 percent increase in consumption is about 3 percent over a ten-year period. This, however, is far below the impact recorded for investment. Shocks to consumption expenditure have greater impact on the external borrowing in the shorter term and smaller impact in longer term whereas shocks to investment spending yield the opposite impact. The bi-directional relationship between external debt growth rate and government consumption expenditure presents a worrying situation for external debt sustainability among the countries under study. This is particularly true given the unidirectional relationship between government investment spending and external debt. This finding confirms that of Abbas *et al.* (2014), and Agénor and Yilmaz (2011) who advocate that reduction in government expenditure, through fiscal discipline, leads to reduction in external debt stocks. Contrary to expectations, the study found that a 1 percent increase in government tax revenue leads to an increase in external debt growth rates. The magnitude of the increase in external borrowing is about 4.6 percent by the second year. This persists on an average of 1.9 percent over the period. The cumulative increase in external debt growth rate resulting from a 1 percent increase in tax revenue is about 20 percent over a ten-year period. Shocks to domestic borrowing play very little role in the accumulation of external debt. Although an increase in domestic borrowing by 1 percent increases external borrowing, this is very transitory and less than 0.7 percent at its peak in the third year. The cumulative impact is about 1 percent over a ten-year period. The effect of a unit shock to inflation on external borrowing is also very transitory and small. Over the longer term, the cumulative impact of a 1 percent increase in external borrowing is nil. Finally, a 1 percent increase in GDP growth rate reduces the external debt growth rate by 3.2 percent in the second year. In the longer term, the impact of a 1 percent positive shock to GDP growth rate on external debt growth rate is a 4 percent reduction. The relationships examined in this section are mostly in line with economic reasoning. The analysis suggest that the most effective means by which poor countries in Africa can reduce their debt burdens is through output growth and employment creation.

In Figure 5, we present the response of investment spending to shocks in the other six endogenous variables. Contrary to expectations, an increase in external borrowing by

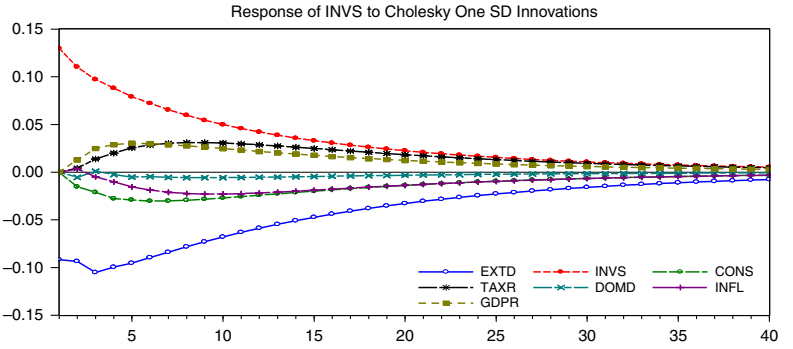


Figure 5.
Response of INVS to shocks

1 percent reduces government investment spending by about 7.3 percent by the tenth year. A unit shock to investment spending has a 6 percent positive effect on investment over a ten-year period. Again, the results indicate that a unit shock to government consumption expenditure leads to a decline in investment spending by 2.7 percent in the tenth year. The cumulative impact of this 1 percent increase in consumption is about 22.6 percent decline in investment. The finding suggests that both investment and consumption compete for the same government resources and for this reason increases in government consumption shift the national budget away from investment. A 1 percent increase in tax revenue increases investment spending by about 4.2 percent in the tenth year. The cumulative impact of this positive shock from taxation can increase investment by a total of 26.6 percent over a ten-year period. The impact of a unit shock to domestic borrowing on investment spending is small and transitory. The cumulative impact of that shock on investment spending is a decline of about 2.5 percent. Clearly, domestic market activities do not fund investment in the selected African countries. A positive unit shock to inflation also has very little effect on investment spending. Although a positive relationship is observed, this is transitory and the cumulative impact of inflation on investment over a ten-year period is an increase of 4 percent. Lastly, a 1 percent increase in GDP growth rates leads to a 2.2 percent increase investment spending over a ten-year period. This impact adds up to about 22.1 percent increases in investment spending resulting from a 1 percent increase in GDP.

Figure 6 presents the response of consumption spending resulting from shocks to the other six endogenous variables. First, a 1 percent shock to external debt leads to long-term negative effect on consumption. The contemporaneous effect on consumption is about 7.3 percent decline. This reduces to about 1.1 percent in the tenth year. The accumulated impact over the longer term is a 37 percent decline in consumption. A 1 percent shock to government investment spending has a 1.3 percent positive effect on consumption in the tenth year. This effect is transitory. The longer term cumulative effect is 34 percent. The huge impact of investment shock may be partly attributable to the positive response of consumption to previous increase in consumption. A positive unit shock to tax revenue reduces government consumption expenditure by about 1.9 percent in three years. This impact dies off over the ten-year period. The longer term cumulative impact of the 1 percent increase in taxes is a 13 percent reduction in consumption expenditure. Unlike investment spending, consumption responds positively to a unit shock in domestic borrowing. A 1 percent increase in domestic debt increases consumption temporarily by 1.5 percent. Finally, consumption spending responds positively to a unit shock in GDP growth rate. The cumulative impact of a 1 percent increase in GDP growth rate on consumption is 8 percent over a ten-year period.

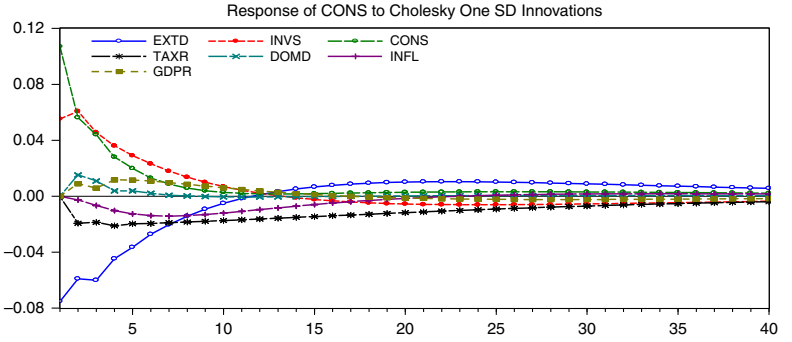


Figure 6.
Response of CONS to shocks

From Figure 7, the responses of tax revenue to a unit shock in the other variables are presented. Tax revenue, in line with expectations, responds negatively to a unit shock to external borrowing. Increases in external debt by 1 percent reduce tax revenues by 5.1 percent instantly, and 5.9 percent in the tenth year. The accumulated reduction in tax revenue over ten years from all sources is 62 percent. A positive shock to investment spending on the other hand was found to increase tax revenue. Increasing investment by 1 percent increases tax revenue by about 4.2 percent in the longer term. Activities in the domestic debt market and inflation have very little impact on tax revenue. The cumulative impact of these two shocks on tax revenue is 1 percent over the ten-year period. Finally, tax revenue respond to a unit shock to GDP growth rate positively. A 1 percent increase in GDP growth rate increases tax revenue by 1.5 percent contemporaneously while the accumulated long-term impact reaches up to 11 percent over a ten-year period.

Figure 8 highlights the response of domestic borrowing to shocks from the remaining six endogenous variables. The result shows that domestic borrowing responds negatively to a positive shock to external debt. This effect is very transitory and dies off in two years. The cumulative impact over a ten-year period is a reduction of about 4 percent. A 1 percent increase in investment spending affects domestic borrowing temporarily by increasing it by 2 percent. This effect dies off the second year. Domestic debt responds positively to GDP growth rates in a transitory manner. The effect dies out after four years. The cumulative impact of a positive shock to GDP is a 6 percent increase in domestic borrowing.

Figure 9 summarizes the response of inflation to shocks in the remaining variables. Inflation responds positively to external borrowing, investment, and consumption in the short term.

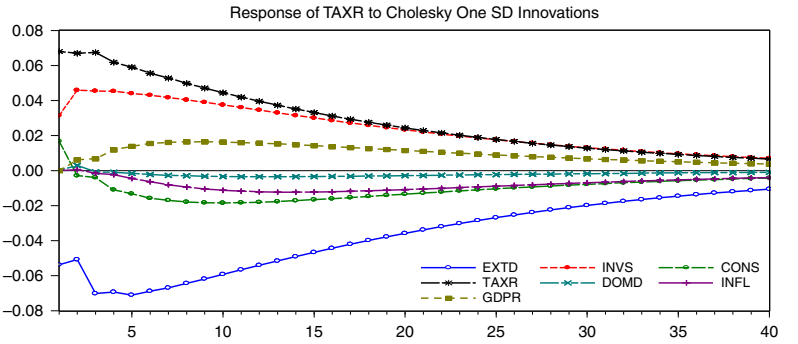


Figure 7.
Response of TAXR to shocks

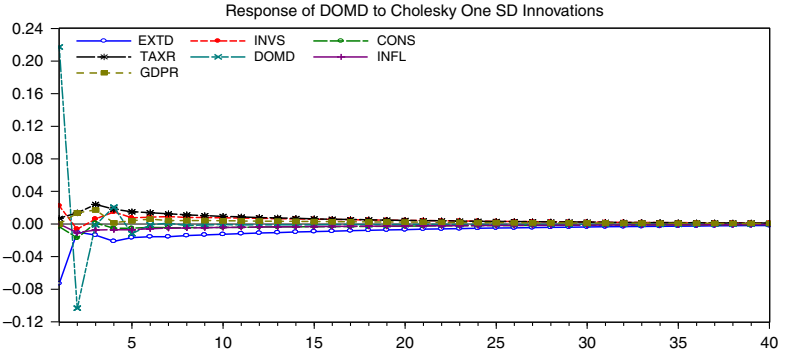


Figure 8.
Response of DOMD to shocks

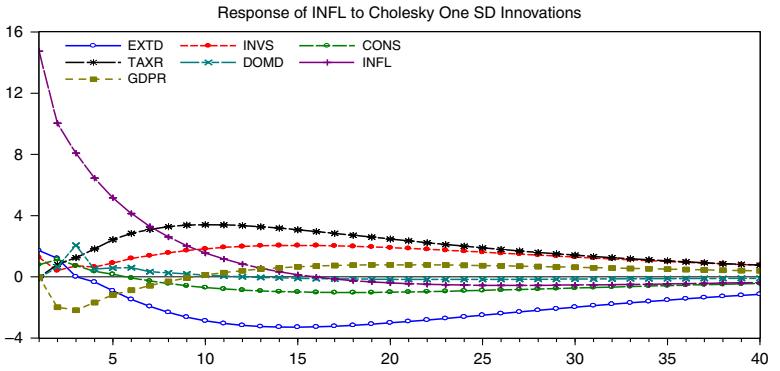


Figure 9.
Response of INFL to shocks

The effect of shocks to the above variables on inflation is transitory. Shocks to GDP growth rates affect inflation negatively in a transitory manner.

Lastly, Figure 10 presents the response of GDP growth rate to shocks in the other variables. A 1 percent increase in external debt results in a negative effect on GDP growth rate. The impact declines to 0.1 percent in the tenth year. The cumulative impact over a ten-year period is a decline in GDP growth rate by 3.3 percent. A positive unit shock to investment spending tends to have a positive effect on GDP growth rate. The impact on GDP growth rate peaks in the second year at about 0.9 percent. This eventually dies out. The cumulative impact of a 1 percent increase in investment spending is 3 percent over a ten-year period. A positive shock to consumption expenditure and inflation tend to have negative impact on GDP growth rate. These effects are transitory. A unit shock from taxation and domestic debt also do have transitory positive effect on economic growth rate in the short term. Over the longer term the impact of taxation and domestic borrowing on growth rate becomes negative.

Conclusions and policy implications

Conclusions

This study has provided an account of factors that affect external debt growth rates among HIPCs in Africa. The relationship between external debt and six of the contributing factors was assessed using a panel VAR model. The VAR model made it possible to simultaneously analyze the dynamic relationship and also decompose the correlations between the endogenous variables discussed in this paper. In spite of the usefulness of the VAR model

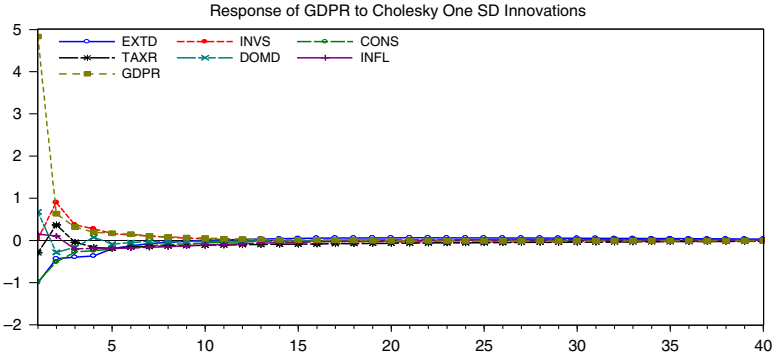


Figure 10.
Response of GDPR to shocks

for decomposing correlations among variables, it is not so informative about economic channels through which these variables affect one another. Moreover, due to the recursive nature of the VAR model it fails to adequately account for contemporaneous and short-run effects of the relationships estimated. In spite of these limitations the methodology is still considered appropriate in making such preliminary discoveries about external debt and other macroeconomic variables among HIPCs in Africa. Data were collected from 24 countries in SSA over the period 1980-2010.

The findings of the study point to the fact that, growth rate in external debt Granger causes five of the six variables (consumption expenditure, investment spending, taxation, domestic debt, and inflation) which contribute to external debt. External debt does not Granger cause economic growth. However, economic growth Granger causes external debt. Two of the six causal links with external debt were found to be bi-directional. "External debt – consumption" and "external debt – domestic tax revenue" relationships. The study found no causal links from investment, domestic debt, and inflation to external debt. The study also found that external debt growth rate responds positively to unit shock or change in government investment spending, consumption spending, and domestic borrowings over a long period of time. In the medium term, external debt growth rates respond negatively to shocks in tax revenue, inflation, and output growth rates.

Policy implications

External debt sustainability needs a holistic approach in less developed countries. The impact of external borrowings on key factors that have implications for external debt has been assessed in this paper. A closer look at the uses of external debt revealed that external debt may be consumed rather than invested in the short term by these poor countries. This state of affairs calls for stricter controls that will ensure that external borrowings are channeled into appropriate investments in recipient countries. Second, increases in external debt have been found to have long-term negative impact on growth of domestic sources of funds. The effect of external debt must therefore be evaluated on the bases of its impact on domestic revenue generation of the recipient countries prior to contracting such debts. Finally, the study points to GDP and tax revenues as the key routes out of the debt doldrums. However, this option must be exploited with great caution as there is ample evidence that these poor countries increase their external borrowing capacities with improvements in economic outlook.

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Appendix 1

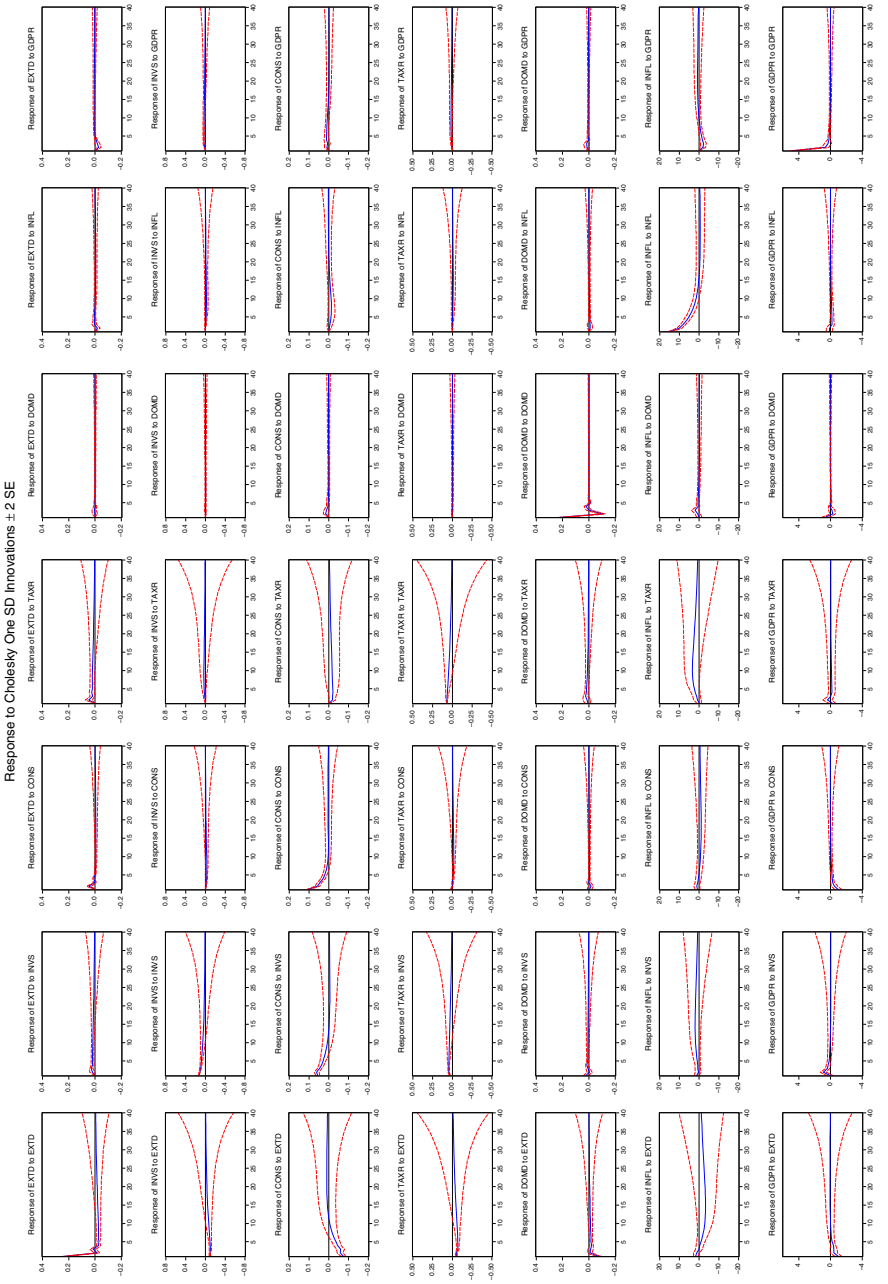

Figure A1.
Impulse-response functions for Cholesky one SD innovations with Monte Carlo standard errors

Appendix 2

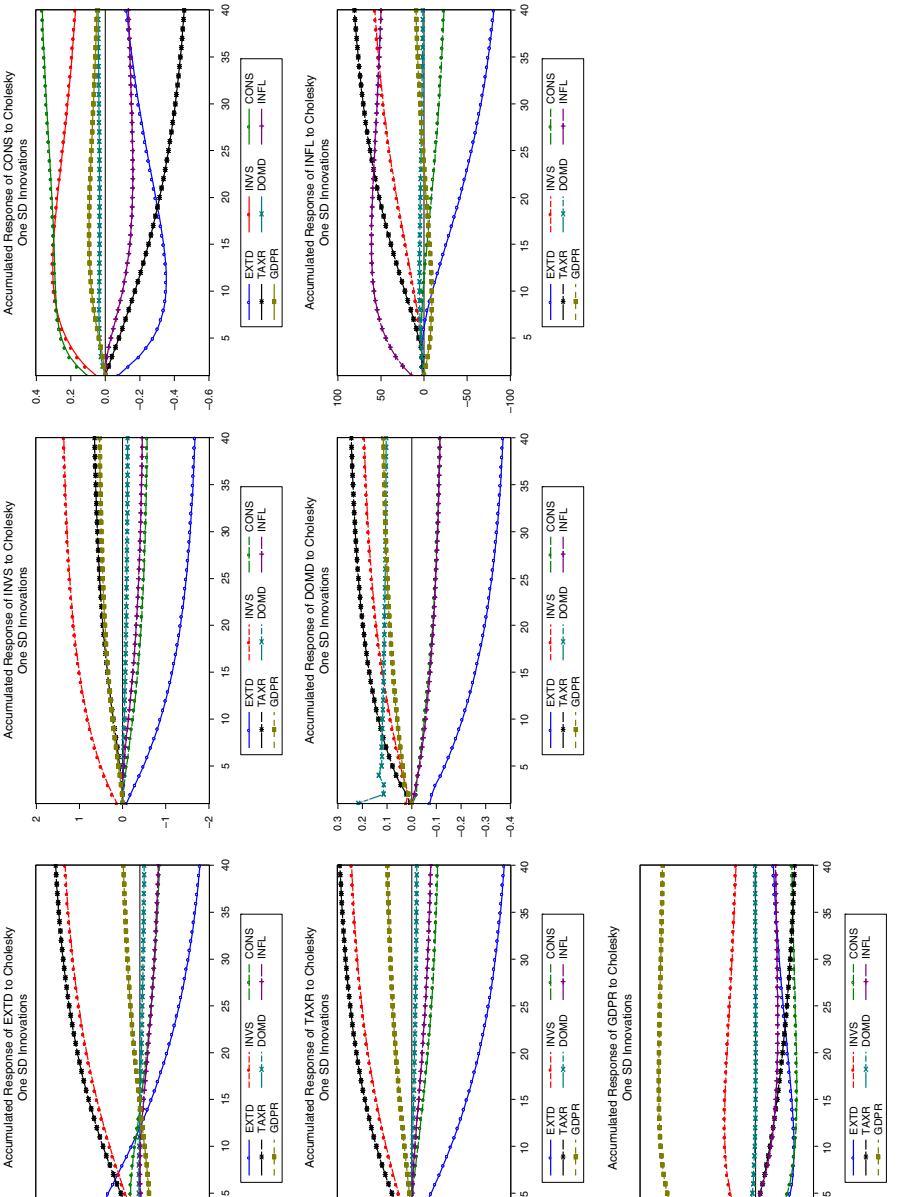

Figure A2. Accumulated combined impulse-response functions for Cholesky one SD innovations

Appendix 3

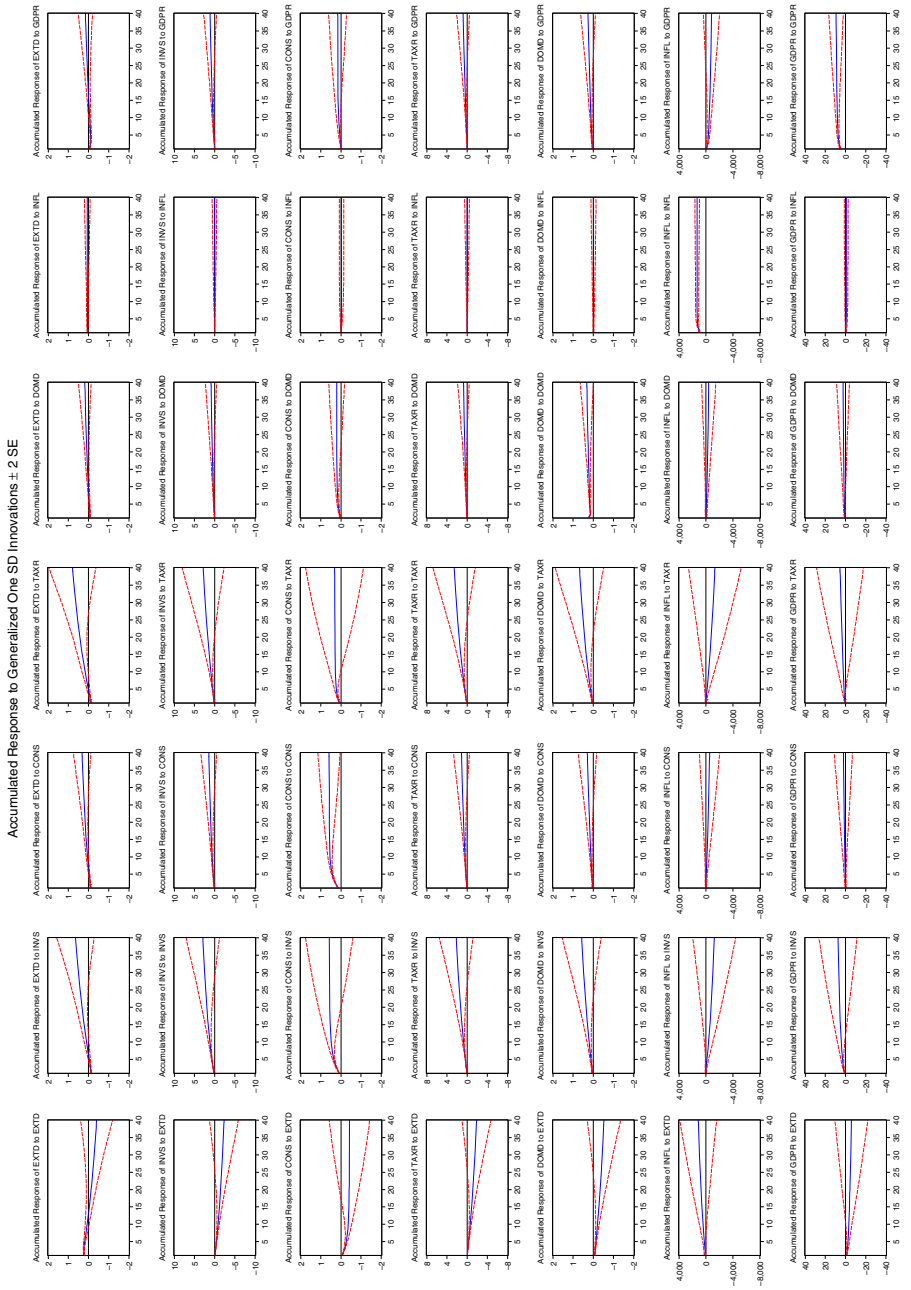

Figure A3.
Accumulated impulse-response functions for generalized one SD innovations (robustness check)