Fiscal policy burden accruing from public debt accumulation: theoretical effect on growth and empirical evidence

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Abstract

The study investigates how fiscal policy burden accruing from public debt affects economic growth in Sub-Saharan African countries over the period 1990-2022. It employs the generalized method of moments and auto-regressive distributed lag methodologies, which reveal that fiscal policy burden significantly impaired economic growth during the period. The results, therefore, support the view that the growth benefits of fiscal policy are constrained by large accumulations of public debt, validating the concern raised by multilateral institutions about the economic consequences of large and excessive debt accumulation. Furthermore, the results corroborate the Classical theory prediction of stagnation in long-run growth when existing public debt is too large for fiscal policy to accommodate. Therefore, interventions are required to contain the fiscal policy burden, in order to foster economic growth. Such policy interventions should aim at reducing the level of public debt and increasing the fiscal revenue from non-tax sources.

Keywords: fiscal policy, public debt, economic growth, developing countries

1 INTRODUCTION

Fiscal policy is one of the macroeconomic policies used by government to manage and direct the economy towards the desired goal of strong and sustainable growth. Public debt is important for effective operation of fiscal policy by providing a channel for supplementary resources to fill the funding gap. The reliance of fiscal policy on debt for effective operation is a highly contentious issue in economic development. Over the past three decades, the issue of fiscal policy and public debt remained a prominent feature of the development process in most developing countries, particularly Sub-Saharan Africa countries (OECD, 2020). These countries are largely characterized by low levels of fiscal revenue and large public debt accumulation, which is considered a critical challenge facing fiscal policy operation. A low level of fiscal revenue is generally attributed to a weak tax system and a poor non-tax revenue base, while a high level of public debt is linked to scarcity of resources and the strong desire of governments to achieve rapid growth through borrowing (Rahman and Giessen, 2017; Sagdic and Yildiz, 2020). This situation has persisted for a long period of time, raising serious concerns about the burden it imposes on fiscal policy, a burden that is likely to slow down the economy due to debt servicing obligations. According to Easterly (2009) and Deaton (2013), in such a situation, in which fiscal policy is saddled with the servicing of a huge debt, rapid growth remains unattainable. This argument was supported by Kwemo (2017) and Park (2019) who asserted that accumulation of public debt constitutes a burden that makes fiscal policy ineffective in fostering rapid economic growth. Debt augurs well for fiscal policy when resources are well utilized, but poses serious dangers when they are mismanaged (Lyons, 2014; Phiri, 2017; Ojong and Bessong, 2017).

Sub-Saharan countries accumulated large public debts from bilateral and multilateral sources in the 1980s, leading to loan default and the imposition of restrictions

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by creditors that resulted in these countries being frozen out of global financial markets. The situation necessitated an IMF/World Bank intervention in the 1990s, through a debt relief program that brought the accumulated debt down to a sustainable level, and enabled the countries to regain access to global financial markets in the mid-2000s. The restoration of access once again enabled these countries to embark on the accumulation of public debt while the level of fiscal revenue remained low. The resurgence of debt accumulation prompted multilateral institutions (IMF and World Bank) to raise their concerns about the risk of allowing a large debt to impose a burden on fiscal policy that hampers its effectiveness in economic management (IMF, 2017). This concern aligns with the classical theory postulation that large public debt inhibits the capacity of fiscal policy and impairs growth in the long-run. In view of this, Aldasoro and Seiferling (2014) advocated that a large public debt combined with a low level of fiscal revenue should be avoided in the pursuit of economic growth. This position was reiterated by Rodden, Eskelund and Litvack (2003) and Crivelli, Leive and Stratmann (2010), who asserted that the issue of fiscal policy effectiveness is paramount in the pursuit of economic growth.

More work therefore needs to be done to provide a deeper and more rigorous insight into how fiscal policy burden imposed by public debt accumulation has affected growth in Sub-Saharan countries. The concerns about the large accumulations of debt in these countries when the level of fiscal revenue is too low to service the debt obligations cannot be ignored. These issues were reiterated by Coulibaly, Gandhi and Senbet (2019), Gosh and Anna (2021), etc., who stated that fiscal policy in the face of large public debt cannot drive the economy along a rapid growth path. Broner et al. (2014) also contended that the situation can only lead to the classical theory outcome of large debt accumulation impeding long-run growth. It is thus pertinent to carry out further study to determine whether the impact of fiscal policy burden on economic growth was actually unfavourable in Sub-Saharan African countries, and hence validate/invalidate concerns about the burden.

This current study, therefore, investigates the pertinent issue in a sample of 45 Sub-Saharan African countries, within the period 1990-2022, depending on data availability. The period was characterized by changes in fiscal revenue and public debt that created uncertainties and raised concerns about the risk of fiscal policy failure. The investigation is carried out by employing the techniques of the generalized method of moments (GMM) and auto-regressive distributed lag (ARDL). The employment of two methodologies ensures robustness and consistency of estimation results. The study is structured into five sections comprising introduction, literature review, methodology and data, empirical results, policy implications, and conclusion.

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2 LITERATURE REVIEW

2.1 THEORETICAL REVIEW

The theory of growth offers diverse explanations on how growth is influenced by certain fundamental economic factors. The classical growth theory, comprising the Malthusian and Ricardian models, postulated that economic growth will decrease with an increasing population and limited resources, unless there is cheap importation from abroad to supplement domestic resources. Bucci and Torre (2009) resonated this theory by stating that along the balanced growth path, population change affects economic growth, depending on whether physical and human capital are complementary or act as substitutes. If physical and human capital complement each other, increase in population will drive rapid growth, but the growth will be slow when physical and human are substitutes. The slow growth is due to the high cost of producing a unit of physical capital to support the increase in human capital (Albelo, 1999). The theory was also re-stated by Narasimhuiu (1977) who believed that growth can be restored through international trade, when population increases and domestic resources are limited. The major limitation of classical theory is that it ignored the role of technical progress in fostering growth.

On the other hand, neo-classical growth theory outlined how a steady growth results when the forces of labour, capital and technology come into play, in contrast to classical theory postulation. The simplest and most popular neo-classical growth model is the Solow-Swan model (Solow, 1956; Swan, 1956). The model argued that capital accumulation and how a country makes use of it determines economic growth. It further claims that how capital and labour are combined in production also affects growth, while technology facilitates growth by augmenting labour productivity. The endogenous growth theory differs from the classical and neo-classical theories by stating that growth is generated by endogenous and not by exogenous forces (Lucas, 1988; Romer, 1989). It provides insight into the role of government policies in stimulating knowledge, research, innovation, and technological progress that help to drive growth. Keynesian theory also emphasized the role of fiscal policy in controlling the factors that determine growth (Elmendorf and Mankiw, 1999). It posited that government spending is used to stimulate capital investment that has a multiplier effect on growth, provided the spending is not financed with excessive borrowing (Ncanywa and Masoga, 2018). This view suggests that fiscal policy can be effective in managing growth if debt does not impose a heavy burden on it (Broner et al., 2014; Driessen and Gravelle, 2019). High levels of debt can lead to repayment obligations that channel fiscal resources away from investment and render fiscal policy ineffective (Saungweme and Odhiambo, 2019).

2.2 EMPIRICAL REVIEW

Several empirical studies have attempted to investigate growth in relation to certain factors, using different methodologies. The link between population and per capita GDP growth was investigated in Uganda by Klasen and Lawson (2007).

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The country has one of the highest population growth rates in the world due to increasing birth rate that is likely to persist for a long time. The study used an econometric approach to discover that increasing population growth put a considerable pressure on the economy and slowed per capita GDP growth. Furthermore, the level of poverty increased, making most households unable to sustain their demand for goods and services produced. Befkadu and Tafa (2022) also carried out empirical investigation on the role of population growth rate in economic growth in Ethiopia, using an auto-regressive distributed lag (ARDL) approach. The study found that population growth had significant positive impact on growth, complemented by other control variables such as FDI, inflation, and capital formation. The study therefore recommended that government needs to implement policies that attract capital inflows for the economy to grow faster than population.

The influence of physical and human capital on economic growth is probably the dominant trend in empirical research on growth. Ding et al. (2021) investigated the contributions of human and physical capital to economic growth in a sample of 143 countries within the period 1990-2014. The results showed that the elasticity of growth with respect to human capital is greater than that of physical capital. In particular, the economic growth among the countries showed that countries became less dependent on physical capital as the level of economic growth increased, but depended more on human capital. The study by Altiner and Toktas (2017) also alluded to the prominence of human capital in economic growth in an investigation of 32 developing countries, using panel data covering the period 2000-2014. The results showed that human capital affected growth significantly as compared to the lower effect of physical capital and labour. In another study, Bunyamin (2022) used auto-regressive distributed lag (ARDL) methodology to investigate the impact of physical and human capital on growth in Indonesia, within the period 1970-2017. The important finding was that human and physical capital shaped the economic growth pattern in the country, the significant effect of human capital being largely spurred by an increase in tertiary education. The effect of physical capital was significant, particularly in the long-run, suggesting that the country needs to focus on long-term infrastructure investment to sustain growth.

Several studies have investigated the role of fiscal policy and produced different effects on growth in developing countries. In one of the studies, Lau and Yip (2019) provided evidence on the fiscal policy and economic growth nexus in ASEAN countries, using annual data for the period 2001-2015, which witnessed the global financial crisis. The study found that fiscal deficit negatively affected growth before the crisis, and growth-enhancing in the post-crisis period. It was also discovered that inflation complemented fiscal policy in the impairment of growth in the pre-crisis period, while the exchange rate and FDI complemented policy to accelerate growth in the post-crisis period. In the same vein, Tung (2018) examined the effect of fiscal policy on economic growth in Vietnam, a country that is considered one of the most dynamic emerging economies, facing large fiscal deficits however. The study employed the methodology of error correction model

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and quarterly data covering the period 2003-2016. The empirical results strongly indicated a co-integrating relationship between fiscal deficit and economic growth, in which fiscal deficit had a harmful effect on economic growth in both the short and the long run. Furthermore, the study revealed that fiscal deficit was harmful to domestic private investment, foreign direct investment, and exports. In view of these adverse effects, the study recommended that fiscal deficits need to be considerably reduced in order to achieve sustainable economic growth.

Hussain and Haque (2017) investigated the relationship between fiscal balance and economic growth in Bangladesh, within the period 1994-2016, using the techniques of the vector error correction model. The results showed a positive and significant effect of fiscal expenditure on economic growth, which supported the Keynesian prediction that fiscal policy can effectively drive economic growth. The fiscal expenditure was largely financed through debt, which contradicts the classical theory postulation that debt is harmful to economic growth in the long run. The study, therefore, advocated that the government must strive to maintain the level of fiscal expenditure and debt in order to avoid crowding out private sector investment. Furthermore, Rana and Wahid (2017) carried out an econometric study of the impact of government budget on economic growth in the same country, Bangladesh, using the techniques of ordinary least squares, vector error correction, and Granger causality. The findings revealed a significant negative impact of government spending on economic growth before and after the year 2000, suggesting that fiscal policy was ineffective and needed to be reviewed, by broadening the tax revenue base and ensuring monetary policy provides necessary support.

One problem with fiscal policy is the burden of public debt, which makes it ineffective in facilitating growth. However, only a few attempts have been made in the literature to investigate this issue. Manasseh et al. (2022) examined how reliance of government expenditure on borrowing influenced growth in thirty selected Sub-Saharan countries, over the period 1997-2020. The dynamic model of the generalized method of moments was employed and revealed that borrowing to finance fiscal expenditure had only a short-term positive impact on economic growth. The study, therefore, recommended that these countries should endeavour to avoid accumulating excessive debt, in order to avoid the danger of using limited income to service loans. Similarly, Osinubi and Olateru (2006) investigated how the use of debt to finance budget deficit affected economic growth in Nigeria, within the period 1970-2003. The results revealed that the relationship was positive and linear, and concluded that financing fiscal deficit through public debt should take into consideration the optimum level of debt that would still not impair growth. In another study, of 59 developing countries, covering the period 2004-2015, Van et al. (2020) investigated the effect of budget deficit financed through borrowing. The two-step GMM method was adopted, which revealed that the effect on economic growth was negative, suggesting that the countries need to reduce the reliance of fiscal policy on borrowing.

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3 METHODOLOGY AND DATA

3.1 THEORY OF FISCAL POLICY AND GROWTH

Theoretically, the effect of fiscal policy on growth works through fundamental determinants such as physical capital, human capital, labour supply, and population trend (IMF, 2015). In other words, these factors intermediate between fiscal policy and economic growth, hence they cannot be excluded from the framework for analysing the effect of policy on growth. Any fiscal policy measure that decreases/increases tax tends to encourage/discourage growth through a rise/fall in physical capital formation at the household and corporate levels. In the same vein, a fiscal policy measure that decreases/increases government expenditure tends to decrease/increase growth through a decrease/increase in public capital formation (De Mooij, 2011). The models of Rebelo (1991), Devereux and Love (1994), etc. also demonstrated how lower tax can encourage investment in physical capital and boost long-term economic growth. Similarly, the endogenous growth model (Lucas, 1988; Barro, 2001) showed how lower tax and higher fiscal spending policies lead to growth by raising human capital stock and promoting technical progress. The endogenous growth model was also used by King and Rebelo (1990) and Pecorino (1993) to show how income tax reduction facilitates growth through human capital accumulation and returns on investment.

Fiscal policy also affects growth through labour supply, when tax-benefit and social security transfers encourage participation in the labour market. This channel of impact is particularly important when the population in the lower income bracket, comprising women and older workers, is large (IMF, 2014; OECD, 2011). Devereux and Love (1994), Turnovsky (2000) and others also used endogenous growth models to show how labour tax cuts can lift long-term growth by inducing a positive labour supply response. Furthermore, a fiscal policy that emphasizes social security benefits may affect growth through increased population growth, but the growth effect is constrained by the available resources (Bucci and Torre, 2009). The argument is that along a balanced growth path, population change may have a positive, negative or neutral effect on growth, depending on the degree to which physical and human capital are complementary.

Fiscal policy can also affect growth of the economy through investment multiplier, as postulated by Keynesian theory, and other related growth theories (Elmendorf and Mankiw, 1999; Broner et al., 2014). If a fiscal policy involves tax cuts and increased spending, it can lead to an increased investment multiplier that fosters growth. It is also argued that when there is simultaneous increase in tax and government spending, the positive effect of government spending on investment will outweigh the negative impact of the tax increase, leading to economic growth (Alesina et al., 2002).

Fiscal policy also relies on borrowing (debt) for effectiveness in managing growth to achieve the desired goal in the classical theory. However, the theory asserts that large debt accumulation may be such a burden on fiscal policy as to impair its

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effectiveness in regulating economic growth (Broner et al., 2014; Saungweme and Odhiambo, 2019). This can result from government borrowing crowding out private investment, as well as using large amounts of public resources to repay debt at the expense of capital investment.

3.2 GENERALIZED METHOD OF MOMENTS MODEL (GMM)

The preceding section highlighted some fundamental theoretical determinants of economic growth, which can be included in a simple model for analysing the fiscal policy burden and economic growth. The model shows the relationships between growth and all the variables as follows.

$$EG_{it} = f[FT_{it}, FD_{it}, PC_{it,} HC_{it}, TP_{it,} PG_{it}] \quad (1)$$

$$EG_{it} = \alpha_0 + \sum_{j=1}^{6} \alpha_j X_{it} + \mu_{it} \quad (2)$$

Equation (1) shows how the fiscal policy burden and other control variables affect economic growth, while equation (2) shows the empirical version with the parameters α_j and μ_{it} representing impact coefficient and error term, respectively. The endogenous variable is EG_{it} (economic growth), while j denotes the explanatory variables comprising FT_{it} (fiscal policy burden accruing from total public debt), FD_{it} (fiscal policy burden accruing from the domestic component of total public debt), PC_{it} (physical capital), HC_{it} (human capital), TR_{it} (trade), and PG_{it} (population growth). The vector X_{it} contains all the explanatory variables, while the parameters α_j (j = 1, 2, ..., 6) stand for the coefficient of individual explanatory variable.

The simple model is extended to include more parameters that transform it into a GMM model, as proposed by Arellano and Bond (1991) and revised by Blundell and Bond (1998). The GMM model relating growth to all the explanatory variables and own lags is presented below.

$$EG_{it} = \beta_0 + \sum_{j=1}^{6} \beta_j X_{it} + \beta_6 EG_{it-1} + \tau_{it} + \varepsilon_{it} \quad (3)$$

$$EG_{it} = \lambda_0 + \sum_{j=1}^{6} \lambda_j X_{it} + \sum_{k=7}^{N} \lambda_k EG_{it-n} + \omega_{it} \quad (4)$$

The moment conditions are:

1) $\mathcal{E}(w_{it}) = \mathcal{E}[F(EG_{it}, X_{it-1}, \lambda)] = 0$
2) $\mathcal{E}(N'w_{it}) = \mathcal{E}(N'w_{it}, \lambda) = 0$
3) $V(\lambda) = w_{it}(\lambda)'Q[Q'\Sigma(\lambda)X]^{-1} Q'w_{it}(\lambda)$, where Q represents instrumental variables, and V is value of normally distributed parameter $(\lambda)X$.

The moment conditions indicate that the expected values of residuals in exogenous variables and expected value of residuals in instrumental variable(s) should be zero. The unknown parameter λ determines whether the expected residuals are significantly close to zero or not. There is the optimum parameter λ^* that ensures expected residuals become zero.

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In equation (3), the GMM model relates the endogenous variable (EG_{it}) to the explanatory variables, including one lagged endogenous variable, and unobserved country effect (τ_{it}). In equation (4), the number of lagged endogenous variables is increased to two based on Akaike information criterion (AIC), and used as instrumental variables to minimize serial correlation and endogeneity bias in the model. The total number of explanatory variables is therefore denoted as *N*. The unobserved country effect is minimized by estimating the model in first differences. The optimizing conditions of the model are presented as *the moment conditions,* which prescribe that the expected values of random error in explanatory and instrumental variables should be zero.

3.3 AUTO-REGRESSIVE DISTRIBUTED LAG MODEL (ARDL)

The dynamic relationships between growth and all the explanatory variables are also represented in an auto-regressive distributed lag model (ARDL), which relates economic growth to all explanatory variables and own lag. The framework of this model was proposed by Pesaran, Shin and Smith (1999). The lagged first differences of explanatory variables, denoted by the symbol Δ, are included to eliminate serial correlation and endogeneity, as presented below.

$$EG_{it} = \partial_0 + \partial_1 EG_{it-1} + \sum_{j=2}^{6} \partial_j Z_{it} + \sum_{j=7}^{11} \partial_j \Delta Z_{it-1} + \eta_{it} \qquad (5)$$

Where:

1) ∂_j = impact of explanatory variables (j = 2, 3, ..., 6)

2) Long-run multiplier = $\frac{1}{1-\partial_j}$ (j = 2, 3, ..., 6)

3) Normality conditions: EG_{it} = max ($\Sigma\Delta EG_{it}$, 0) and Z_{it} = max ($\Sigma\Delta Z_{it-1}$, 0).

The normality conditions require that aggregate values of each variable equate the sum of first differences, with zero expected error. The panel estimators, mean G=group (MG) and pooled mean group (PMG), are used to determine the impact of each explanatory variable on the dependent variable.

3.4 ESTIMATION TECHNIQUES AND DATA

The first estimation procedure involves the test for stationary status of all variables in the model. This is to ensure that the variables are stationary in levels or first differences, in order to enhance the policy relevance of the estimation results. According to Engle and Yoo (1987), if non-stationary variables are used in the estimation, the parameter estimates may be biased and inconsistent. The standard approach for investigating the stationary status of variables consists of panel unit root tests (LLC, IPS, and HD), proposed by Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003), and Hadri (2000). The second procedure involves the use of the generalized method of moments (GMM) and auto-regressive distributed lag (ARDL) to estimate the effect of fiscal policy burden and other control variables on economic growth. The ARDL consists of mean group (MG) and pooled mean group (PMG) estimators, which are used to check for consistency in GMM. All

the techniques are used in this study because of their strong capacity to eliminate serial correlation and endogeneity bias (Lee and Wang, 2015).

The variables are measured as economic growth (real GDP growth rate), fiscal policy burden accruing from public debt (ratio of debt service to total fiscal revenue), physical capital (gross fixed capital formation as percentage of GDP), human capital (adult literacy rate), trade (export plus import as percentage of GDP), and population growth (annual growth rate of population). The data for economic growth, physical capital, human capital, trade, and population growth were mainly sourced from World Bank Open Database (https://data.worldbank.org), and augmented with data from World Bank Development Indicators (https://databank.worldbank.org), and IMF International Financial Statistics (https://data.imf.org). The data for fiscal policy burden were computed from data on total public debt, domestic component of public debt, and total fiscal revenue sourced from the World Bank Open Data. The data covers a sample of 45 Sub-Saharan countries, listed in table 1.

Table 1

List of eligible Sub-Saharan African countries

Angola	Djibouti	Madagascar	Sierra Leone
Benin	Equatorial Guinea	Malawi	Somalia
Botswana	Eswatini*	Mali	South Africa
Burkina Faso	Eritrea	Mauritania*	South Sudan*
Burundi	Ethiopia	Mauritius	Sudan
Cameroon	Gabon	Mozambique	Tanzania
Cape Verde	Gambia	Namibia	Togo
Central African Rep.	Ghana	Niger	Uganda
Chad	Guinea	Nigeria	Zambia
Comoros	Guinea-Bissau*	Rwanda	Zimbabwe
Congo DRC	Kenya	Sao Tome & Principe	
Congo Rep.	Lesotho	Senegal	
Cote d'Ivoire	Liberia*	Seychelles	

**Not included in study sample due to lack of complete data.*

Source: World Bank Open database.

The data also cover the period 1990-2022, with descriptive statistics presented in table 2. The statistics play important role in the evaluation and inclusion of variables in the model estimation. The mean value of all the variables falls within the range 2.6-61.4 with standard deviation 0.33-23.7, while the median is within the range 2.5-60.4. The non-negative mean values indicate that all the variables have moved largely in a positive direction. The data have moderate positive skewness as shown by the Pearson coefficients that are generally less than unity but greater than 0.5. The kurtosis of the data shows values that are mostly above the standard normal distribution kurtosis of 3.0, indicating a moderate presence of outliers in the data set. Therefore, the distribution is light-tailed with high peak. The Jarque-Bera test produced coefficients that are not significantly different from zero, hence

the data set does not remarkably deviate from normal distribution. These statistics provide an insight into the quality of the variables used in the model.

Table 2

Descriptive statistics of data

Sample size = 45 countries								
Estimation period = 1990-2022								
Observations = 1,485								
	Statistic							
Variable	**Mean**	**Median**	**Max.**	**Min.**	**Std. dev.**	**Skewness (Pearson coefficient)**	**Kurtosis**	**Jarque-Bera test**
EG	3.3	2.87	6.1	-2.1	4.3	0.55	3.9	0.16
FT	56.1	55.3	78.6	31.2	23.7	0.59	4.6	0.22
FD	42.3	40.1	60.4	26.6	17.1	0.61	3.7	0.09
PC	23.2	22.5	25.5	17.3	4.7	0.56	3.2	0.18
HC	61.4	60.4	68.3	52.1	8.2	0.53	2.5	0.11
TR	33.9	42.3	59.7	27.5	19.4	0.34	2.8	0.14
PG	2.6	2.5	2.9	2.2	0.33	0.52	4.9	0.27

Variables: EG = economic growth, FT = fiscal policy burden from total debt, FD = fiscal policy burden from domestic component of total public debt, PC = physical capital, HC = human capital, TR = trade, PG = population growth.

Source: Authors' computer estimation.

4 EMPIRICAL RESULTS

4.1 PANEL UNIT ROOT TEST RESULTS

A preliminary investigation was conducted to confirm that variables in the model possess the desirable empirical attribute that makes them suitable for GMM and ARDL estimations. In order to avoid spurious results, the variables are required to have unit root property I(0) or I(1), which ensures they are integrated in levels or first differences. The unit root test results for all the variables are reported in table 3. The estimates LLC (3.14), IPS (2.88) and HD (1.31) show that only economic growth is integrated in levels, that is I(0). All other variables are integrated in first differences, that is I(1). Therefore, all the variables are stationary and suitable for estimation.

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Table 3

Panel unit root test results

Sample size: 45 countries						
Estimation period: 1990-2022						
	Unit root test					
Variable	Level			First difference		
	LLC	IPS	HD	LLC	IPS	HD
EG	3.14*	2.88*	1.31*	–	–	–
FT	1.23	1.03	2.99	2.64*	3.22*	1.34*
FD	1.16	1.09	2.74	2.57*	2.83*	1.19*
PC	1.11	1.07	3.03	2.79*	2.44*	1.21*
HC	1.18	1.15	2.87	3.05*	2.58*	1.06*
TR	1.09	1.21	3.11	2.64*	3.01*	1.11*
PG	1.12	1.16	3.06	2.55*	2.39*	1.17*
Critical values: LLC = 2.06, IPS = 1.95, HD = 1.87						

**Variable is stationary.*

Note: LLC = Levin-Lin-Chu test, IPS = Im-Pesaran-Shin test, HD = Hadri test. In LLC and IPS, larger statistics indicate more stationary variables. In HD, smaller statistics indicate more stationary variables.

Source: Authors' computer estimation.

4.2 GENERALIZED METHOD OF MOMENTS ESTIMATION RESULTS

The GMM estimation results are reported in table 4, which show that the fiscal policy burden from total debt and the domestic debt component (FT and FD) had a significant adverse impact of -0.61 and -0.52, respectively, on growth at the 5 percent level. It suggests that fiscal policy burden slowed economic growth, which can be attributed to large budgetary allocations to debt servicing in Sub-Saharan countries over the years. Similarly, population growth (PG) produced a negative impact of -0.34 to complement the adverse impact of fiscal policy burden, though not significantly. However, physical capital (PC) had a significant positive impact of 0.64, followed by human capital (HC) with 0.56, and trade (TR) with of 0.50, all significant at the 5 percent level. The results suggest that although the fiscal policy burden was not favourable to economic growth, three key variables performed well in conformity with positive expectations of the growth theory. In spite of the high level of imports and narrow export base in Sub-Saharan African countries, trade was still able to exert a considerable impact on growth. The significant effects of the instrumental variables (EG-1 and EG-2) show that they were strong and able to minimized serial correlation and endogeneity. This is due to the optimal selection of instrumental variables based on the Akaike information criterion statistic value of 12.06. In the period 1990-2022, therefore, the fiscal policy burden played an adverse role in economic growth in Sub-Saharan Africa, which confirms the concerns raised by multilateral institutions that fiscal policy is ineffective in driving growth when there is a large public debt in the economy. The unfavourable role also confirms the classical theory postulation that large existing debt inhibits fiscal

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policy and stagnates economic growth in the long-run, which was given emphasis by Saungweme and Odhiambo (2019) and Broner et al. (2014).

The diagnostic estimates show a chi-square statistic of 2.01 and p-value of 0.019, which is significant at the 5 percent level, indicating a robust goodness-of-fit, that is, the model fits well into the set of observed data. Therefore, the null hypothesis of no good fit is rejected. The p-value of Sargan statistic also falls within the critical range, hence the null hypothesis of no correlation between instrumental variables and error terms cannot be rejected. Similarly, the p-values of A-B statistics fall within the critical range, indicating that the null hypothesis of no serial correlation in residuals cannot be rejected. The estimates from the GMM model are, therefore, unbiased and reliable.

TABLE 4
Estimation results (GMM)

Dependent variable	Explanatory variable							
	FT	**FD**	**PC**	**HC**	**TR**	**PG**	**EG-1**	**EG-2**
EG	-0.61* (-3.17)	-0.52* (-2.13)	0.64* (3.33)	0.56* (2.28)	0.50* (2.13)	-0.34 (-1.02)	0.49* (2.04)	0.47* (1.99)

Dependent variable	Diagnostic test				
	Pearson chi-square test for goodness of fit (critical p-value = 0.05)	Sargan test ($0.05 < p \leq 1$)	A-B 1st order correlation test ($0 < p < 0.1$)	A-B 2nd order correlation test ($0.25 < p \leq 1$)	Akaike (AIC)
EG	2.01 (0.019)	6.92 (0.38)	2.32 (0.07)	1.24 (0.36)	12.06 (Minimum)

** Significant at 5%, t-values in parenthesis. In diagnostic test p-values are in parenthesis. A-B stands for Arellano-Bond.*

Variables: EG = economic growth, FT = fiscal policy burden from total debt, FD = fiscal policy burden from component of total public debt, PC = physical capital, HC = human capital, TR = trade, PG = population growth, EG-1 and EG-2 = lagged dependent variables (instrumental variables).

Source: Authors' computer estimation.

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The robustness test is used to determine the resilience of explanatory variables in driving growth. This was done by excluding some variables to find out whether the impacts produced from the GMM estimation will change significantly or not, following Blundell and Bond (1998), Matemilola, Bany-Ariffin and Azman-Saini (2012), etc. The test results in table 5 show that all variables, particularly fiscal policy burden, maintained their respective impact, regardless of the small differences. Sargan test indicates no serial correlation in instrumental variables. The results therefore indicate that effects of the variables are resilient and cannot be easily disturbed, which augurs well for policy making.

Table 5

GMM estimation results (robustness check)

	Dependent variable: EG			
Independent variable	**FD excluded**		**FT excluded**	
	Coefficient	**t-value**	**Coefficient**	**t-value**
Intercept	2.11	8.73	1.94	1.99
FT	-0.57*	2.31	–	–
FD	–	–	-0.39*	2.17
PC	0.60*	3.11	0.58*	2.86
HC	0.51*	2.31	0.46*	2.19
TR	0.43*	2.08	0.50*	2.28
PG	-0.24	0.97	-0.27	1.07
EG-1	0.40*	2.01	0.38*	2.12
EG-2	0.46*	2.22	0.41*	2.09
Sargan test		3.03		2.56
$(0.05 < p \leq 1)$		(0.29)		(0.41)

**Significant at the 5% level.*

Source: Authors' computer estimation.

4.3 AUTO-REGRESSIVE DISTRIBUTED LAG ESTIMATION RESULTS

The two ARDL estimators (MG and PMG) produced the results reported in table 6, showing the role of each explanatory variable in economic growth. The estimates from both estimators indicate that fiscal policy burden from total public debt (FT) had significant negative impacts of -0.59 and -0.53, at the 5 percent level. Similarly, fiscal policy burden from the domestic debt component (FD) had significant negative effects of -0.55 and -0.50. This again suggests that the burden of debt impaired the effectiveness of fiscal policy in fostering economic growth, which confirms the concerns raised by World/IMF and classical theory advocates. Population growth (PG) had negative but insignificant impacts of -0.29 and -0.31, thus exacerbating the unfavourable effect of the fiscal policy burden. On the other hand, physical capital (PC) helped to foster economic growth as shown by its significant impacts of 0.66 and 0.60, which are significant at 5 percent. The significant impacts of physical capital are complemented by human capital (HC) with the estimates of 0.58 and 0.54, and trade (TR) with estimates of 0.49 and 0.56. It is, therefore obvious that the fiscal policy burden stalled growth, but that three of

the explanatory variables were very effective in driving growth. These results are buttressed by the long-run multiplier coefficients of the MG and PMG estimators showing that the multiplier effects of all the variables fall within the absolute range of 1.40-2.94, which indicates appreciable multiplier effect on growth. The lag economic growth (EG-1), with estimates of 0.44 and 0.51, is significant, suggesting that growth responded fairly well to its own lag. The ARDL results are largely similar to the GMM results, which indicate that the effect of the fiscal policy burden and the other control variables are consistent and reliable.

The Wald test results show statistics with p-values that are significant at the 5 percent level, which indicates rejection of the null hypothesis of no relationship between dependent variable and the set of independent variables. Therefore, the independent variables are collectively significant in explaining growth. The Hausman test was used to determine the reliability of estimates from the MG and PMG estimators. The results indicate there is no substantial evidence of heterogeneity (H0) in estimated results, which makes the PMG estimator more reliable than the MG estimator.

Table 6

Estimation results (ARDL)

Dependent variable	Explanatory variable	MG estimator			PMG estimator		
		Coefficient	t-value	Long-run multiplier coefficient	Coefficient	t-statistic	Long-run multiplier coefficient
EG	Intercept	1.52	5.02	–	2.07	5.07	–
	EG-1	0.44*	1.97	–	0.51*	2.11	–
	FT	-0.59*	-2.76	-2.43	-0.53*	-2.11	-2.13
	FD	-0.55*	-2.53	-2.22	-0.50*	-2.06	-2.00
	PC	0.66*	3.29	2.94	0.60*	3.02	2.50
	HC	0.58*	2.72	2.38	0.54*	2.21	2.16
	TR	0.49*	1.99	1.96	0.56*	2.42	2.27
	PG	-0.29	-1.01	-1.40	-0.31	-1.04	-1.44
Wald test				3.92			4.33
(Critical p-value = 0.05)				(0.009)			(0.006)
Hausman test (H0 = PMG, H1 = MG): t-statistic = 0.89, p-value = 0.13 (critical p-value = 0.05).							

** Significant at 5 %.*

Variables: EG = economic growth, FT = fiscal policy burden from total debt, FD = fiscal policy burden from component of total public debt, PC = physical capital, HC = human capital, TR = trade, PG = population growth, EG-1 = lagged dependent variable.

Source: Authors' computer estimation.

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5 POLICY IMPLICATIONS

5.1 STRUCTURAL STABILITY

Long-run estimation results are considered useful for policy making when there is structural stability. The maximum likelihood estimator was employed to test for structural stability in the model. It involved splitting the entire period of study into two sub-periods by choosing a suitable break point as proposed by Yu, Jong and Lee (2008). The break-point period of 2007 was chosen because of the global financial crisis that led to economic downturns in all developing countries. The crisis was the major economic shock within the study period, hence it is used as a basis for splitting the period of study, for the purpose of carrying out stability test. The maximum likelihood test results in table 7 show that estimates in the total period and sub-periods are not significant at 5 percent. Again, the estimates of variables in sub-period 1 are not significantly different from those in sub-period 2. The maximum likelihood test, therefore, indicates acceptance of the null hypothesis of no structural break, hence the model and estimated results may be considered suitable for policy making. Furthermore, the reliability estimates in table 8 show insignificant variation in values of Rho 1 and Rho 2 parameters, normalized bias statistic, standard deviation and root mean square error, which indicate that the test results are unbiased and reliable.

TABLE 7

Maximum likelihood structural stability estimates

	Endogenous variable: EG					
Exogenous variable	**Total period (1990-2022)**		**Sub-period 1 (1990-2007)**		**Sub-period 2 (2008-2022)**	
	Coefficient	**Asymptotic t-statistic**	**Coefficient**	**Asymptotic t-statistic**	**Coefficient**	**Asymptotic t-statistic**
Intercept	0.28	1.18	0.32	1.20	0.30	1.15
FT	0.23	1.06	0.26	1.13	0.24	1.08
FD	0.24	1.08	0.25	1.12	0.21	1.01
PC	0.30	1.16	0.31	1.17	0.22	1.06
HC	0.29	1.14	0.29	1.19	0.32	1.20
TR	0.31	1.19	0.27	1.15	0.29	1.18
PG	0.25	1.11	0.30	1.16	0.27	1.16
EG-1	0.27	1.16	0.28	1.14	0.31	1.19

Variables: EG = economic growth, FT = fiscal policy burden from total debt, FD = fiscal policy burden from domestic debt, PC = physical capital, HC = human capital, TR = trade, PG = population growth, EG-1 = lagged dependent variable.

TABLE 8

Maximum likelihood reliability estimates

Alternative break point	Structural break parameter estimate		Normalized bias statistic	Standard deviation (SD)	Root mean square error (RMSE)
	Rho 1	Rho 2			
1997	0.05	0.06	0.31	0.15	0.22
1998	0.07	0.04	0.29	0.13	0.25
1999	0.06	0.05	0.32	0.11	0.27
2000	0.09	0.10	0.30	0.16	0.23
2001	0.08	0.07	0.34	0.14	0.20
2002	0.05	0.09	0.33	0.10	0.21
2003	0.11	0.08	0.36	0.12	0.24

Note: Alternative break points are distributed evenly around the year 2000.

5.2 POLICY OPTIONS

The estimation results clearly revealed that the fiscal policy burden exerted significant negative impact on growth. The results were evaluated, using different measures, and found to be reliable, hence some policy options are proffered as follows:

a) The significant negative effect of the fiscal policy burden on economic growth confirms the concern of multilateral institutions and classical theory advocates that unsustainable public debt is inimical to fiscal policy effectiveness and economic growth. Therefore, it is imperative for policy makers and executives to ensure that the level of debt is reduced to conform with IMF/World Bank prescribed minimum debt ratio of 40 percent for developing countries. In addition, efforts should be intensified to increase the level of fiscal revenue from non-tax sources.

b) Physical and human capital were used as control variables, and found to have significant impacts on growth. These findings imply that the performance of these variables also needs to be supported in order to ensure rapid economic growth is achieved. In this regard, tax on personal and corporate income should be reduced to enable household and firms to save and invest in physical and human capital. In addition, long-term interest rates should be reduced to enable investors to take out loans to invest in capital projects.

c) Trade and population growth were also used as control variables. Trade was found to have a significant positive impact on growth, while population growth had an insignificant negative effect on growth. These findings imply that trade needs to be supported by minimizing trade restrictions, while population can be made more productive by raising the level of healthcare.

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6 CONCLUSION

Fiscal policy burden accruing from public debt accumulation was investigated in this study, with the aim of determining its effect on growth in Sub-Saharan African countries. This is sequel to the high level of public debt accumulation in these countries, and its potential risk of inhibiting effectiveness fiscal policy in driving economic growth, which was put on the front burner by IMF and World Bank. This concern aligns with the classical theory postulation that large public debt inhibits the effectiveness of fiscal policy and impairs growth in the long run. The empirical model also included fundamental determinants of growth such as physical capital, human capital, trade, and population growth, as control variables. The investigation was carried out by employing the techniques of the generalized method of moments (GMM) and the auto-regressive distributed lag model (ARDL). A sample of 45 Sub-Saharan countries was used in the study, covering the period 1990-2022.

The estimation results revealed that the fiscal policy burden had a significant negative effect on growth, which confirms the concerns of multilateral institutions and classical theory advocates regarding the long-run effect of accumulating large debt. Population growth also played a negative role in economic growth. However, the results revealed that physical and human capital had a significant positive impact on growth, which was complemented by the effect of trade. These findings are quite revealing, and thus require some policy measures that can enhance performance of the variables. The recommended policy measures include a reduction in the public debt ratio to 40 percent as prescribed by IMF/World Bank, reductions in taxes and the long-run interest rate to enhance physical and human capital formation, relaxation of trade restrictions to encourage trade flows, and raising the level of healthcare to improve productivity of the population. Finally, this study is expected to motivate further research works on the role of fiscal policy burden in economic growth in other developing regions, such as Middle East and North Africa (MENA) and South East Asia (SEA).

Disclosure statement

Authors have no conflict of interest to declare.

REFERENCES

1. Albelo, C. D., 1999. Complementarity between Physical and Human Capital, and Speed of Convergence. *Economic Letters,* 64(3), pp. 357-361. https://doi.org/10.1016/S0165-1765(99)00094-4
2. Aldasoro, I. and Seiferling, M., 2014. Vertical Fiscal Imbalances and the Accumulation of Government Debt. *IMF Working Papers*, No. 209.
3. Alesina, A. [et al.], 2002. Fiscal Policy, Profits, and Investment. *The American Economic Review*, 92(3), pp. 571-589. https://doi.org/10.1257/000282802601 36255
4. Altiner, A. and Toktas, Y., 2017. Relationship between Human Capital And Economic Growth: An Application to Developing. Countries. *Eurasian Journal of Economics and Finance,* 5(3), pp. 87-98. https://doi.org/10.15604/ejef.2017.05.03.007
5. Arellano, M. and Bond, S., 1991. Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies*, 58(2), pp. 277-297. https://doi.org/10.2307/2297968
6. Barro, R. J., 2001. Human Capital and Growth. *American Economic Review,* 91(2), pp. 12-17. https://doi.org/10.1257/aer.91.2.12
7. Befikadu, A. and Tafa, B., 2022. An Empirical Analysis of the Effects of Population Growth on Economic Growth in Ethiopia Using an Autoregressive Distributive Lag (ARDL) Model Approach. *Discrete Dynamics in Nature and Society,* 22(1), pp. 1-17. https://doi.org/10.1155/2022/3733243
8. Blundell, R. and Bond, S., 1998. Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*, 87(1), pp. 115-143. https://doi.org/10.1016/S0304-4076(98)00009-8
9. Broner, F. [et al.], 2014. Sovereign Debt Markets in Turbulent Times: Creditor Discrimination and Crowding-out Effects. *Journal of Monetary Economics,* 61(2), pp. 114-142. https://doi.org/10.1016/j.jmoneco.2013.11.009
10. Bucci, A. and Torre, D., 2009. Population and Economic Growth with Human and Physical Capital Investments. *International Review of Economics,* 56(1), pp. 17-27. https://doi.org/10.1007/s12232-008-0054-5
11. Bunyamin, F., 2022. The Impact of Physical Capital and Human Capital on Growth in Indonesia, 1970-2017. *Jurnal Ekonomi dan Pembangunan*, 30(2), pp. 115-130.
12. Coulibaly, B. S., Gandhi, D. and Senbet, L. M., 2019. *Is Sub-Saharan Africa Facing Another Systemic Sovereign Debt Crisis?* Washington D. C: Brookings Institute.
13. Crivelli, E., Leive, A. and Stratmann, T., 2010. Sub-national Health Spending and Soft Budget Constraints in OECD Countries. *IMF Working Paper,* No. 147. https://doi.org/10.5089/9781455201303.001
14. De Mooij, R. A., 2011. Tax Biases to Debt Finance: Assessing the Problem, Finding Solutions. *IMF Staff Discussion Note,* No. 11. https://doi.org/10.5089/9781463935139.006

15. Deaton, A., 2013. *Aid and Politics. In The Great Escape: Health, Wealth and the Origins of Inequality*. New Jersey: Princeton University Press. https://doi.org/10.2307/j.ctt3fgxbm
16. Devereux, M. and Love, D., 1994. The Effects of Factor Taxation in a Two-Sector Model of Endogenous Growth. *The Canadian Journal of Economics,* 27(3), pp. 509-536. https://doi.org/10.2307/135781
17. Ding, X. [et al.], 2021. A Comparative Study of the Impacts of Human Capital and Physical Capital on Building Sustainable Economies at Different Stages of Economic Development. *Energies,* 14(19), 6259. https://doi.org/10.3390/en14196259
18. Driessen, G. A. and Gravelle, J. D., 2019. *Deficit Financing, the Debt, and Modern Monetary Theory. Congressional Research Service Report.* Washington D. C: Congressional Research Service.
19. Easterly, W., 2009. Can the West Save Africa? *Journal of Economic Literature,* 47(2), pp. 373-447. https://doi.org/10.1257/jel.47.2.373
20. Elmendorf, D. and Mankiw, G. N., 1999. Government Debt. In: J. B. Taylor and M. Woodford, eds. *Handbook of Macroeconomics,* Vol. 1, pp. 1615-1669.
21. Engle, R. F. and Yoo, B. S., 1987. Forecasting and Testing in Co-integrated Systems. *Journal of Econometrics,* 35(1), pp. 143-159. https://doi.org/10.1016/0304-4076(87)90085-6
22. Gosh, A. R. and Anna, P., 2021. Growing Together the IMF and African Low-income Countries. *Finance and Development Special Feature*. Washington D. C: International Monetary Fund.
23. Hadri, K., 2000. Testing for Stationarity in Heterogeneous Panel Data. *The Econometrics Journal*, 3(2), pp. 148-161. https://doi.org/10.1111/1368-423X.00043
24. Hussain, M. E. and Haque, M., 2017. Fiscal Deficit and Its Impact on Economic Growth: Evidence from Bangladesh. *Economies,* 5(4), pp. 37-49. https://doi.org/10.3390/economies5040037
25. Im, K. S., Pesaran, M. H. and Shin, Y., 2003. Testing in Unit Roots in Heterogeneous Panels. *Journal of Econometrics*, 115(1), pp. 53-74. https://doi.org/10.1016/S0304-4076(03)00092-7
26. IMF, 2014. *Fiscal Monitor: Back to Work, How Fiscal Policy Can Help.* Washington D. C: International Monetary Fund.
27. IMF, 2015. *Fiscal Policy and Long-term Growth*. Washington D. C: International Monetary Fund.
28. IMF, 2017. *Sub-Saharan Africa Fiscal Adjustment and Economic Diversification*. Washington D. C: International Monetary Fund.
29. King, R. and Rebelo, S., 1990. Public Policy and Economic Growth: Developing Neoclassical Implications. *Journal of Political Economy,* 98(5), pp. 97-151. https://doi.org/10.1086/261727
30. Klasen, S. and Lawson, D., 2007. The Impact of Population Growth on Economic Growth and Poverty Reduction in Uganda. *Diskussionsbeiträge*, No. 133. Gottingen: Georg-August Universität Göttingen.
31. Kwemo, A. B., 2017. *Making Africa Great Again: Reducing Aid Dependency*. Brookings Institute, April 20.

32. Lau, W. and Yip, T., 2019. The Nexus between Fiscal Deficit and Economic Growth in ASEAN. *Journal of Southeast Asian Economies*, 36(1), pp. 25-36. https://doi.org/10.1355/ae36-1d
33. Lee, Y. and Wang, K., 2015. Dynamic Heterogeneous Panel Analysis of the Correlation between Stock Prices and Exchange Rates. *Economic Research*, 28(1), pp. 749-772. https://doi.org/10.1080/1331677X.2015.1084889
34. Levin, A., Lin, C. F. and Chu, C. S. J., 2002. Unit Root Tests in Panel Data: Asymptotic and Finite-sample Properties. *Journal of Econometrics*, 108(1), pp. 1-24. https://doi.org/10.1016/S0304-4076(01)00 098-7
35. Lucas, R., 1988. On the Mechanics of Economic Development. *Journal of Monetary Economics,* 22 (1), pp. 3-42. https://doi.org/10.1016/0304-3932(88)90168-7
36. Lyons, J., 2014. Foreign aid is hurting, not helping Sub-Saharan Africa. *Le Journal International*, 12(3), pp. 1-13.
37. Manasseh, C. O. [et al.], 2022. External Debt and Economic Growth in Sub-Saharan Africa: Does Governance Matter? *PLoS ONE,* 17(3), pp. 64-78. https://doi.org/10.1371/journal.pone.0264082
38. Matemilola, B., Bany-Ariffin, A. and Azman-Saini, W., 2012. Financial Leverage and Shareholder's Required Returns: Evidence from South Africa Corporate Sector. *Transit Studies Review,* 18(1), pp. 601-612. https://doi.org/10.1007/s11300-012-0214-x
39. Narasimhuiu, M., 1977. Ricardo's Theory of Economic Growth. *Indian Economic Journal,* 25(1), pp. 251-262.
40. Ncanywa, T. and Masoga, M., 2018. Can Public Debt Stimulate Public Investment and Economic Growth in South Africa? *Cogent Economics and Finance*, 6(1), pp. 1-13. https://doi.org/10.1080/23322039.2018.1516483
41. OECD, 2011. Taxation and Employment. Paris: OECD. https://doi.org/10.1787/9789264120808-en
42. OECD, 2020. *Quality Infrastructure in the 21st Century Africa: Prioritizing, Accelerating and Scaling up in the Context of Pida 2021-30*. Paris: OECD.
43. Ojong, F. and Bessong, F. E., 2017. Corruption and Infrastructure in Africa: Challenges for Integrated Sustainable Development. *International Journal of Development Strategies in Humanities, Management and Social Sciences*, 7(3), pp. 103-111.
44. Osinubi, T. S. and Olaleru, O. E., 2006. Budget Deficits, External Debt and Economic Growth In Nigeria. *Applied Econometrics and International Development*, 6(3), pp. 28-47.
45. Park, J., 2019. Assessing the Role of Foreign Aid, Donors and Recipients. In: Park, ed. Re-Inventing Africa's Development. London: Palgrave Macmillan, pp. 37-60. https://doi.org/10.1007/978-3-030-03946-2_2
46. Pecorino, P., 1993. Tax Structure and Growth in a Model with Human Capital. *Journal of Public Economics,* 52(1), pp. 251-271. https://doi.org/10.1016/0047-2727(93)90023-M
47. Pesaran, H., Shin, Y and Smith, R., 1999. Pooled Mean Group Estimation of Dynamic Heterogeneous Panels. *Journal of American Statistical Association*, 94(446), pp. 621-634. https://doi.org/10.1080/01621459.1999.10474156

48. Phiri, M., 2017. The Impact of Aid on the Economic Growth of Developing Countries (LDCs) in Sub-Saharan Africa. *The Gettysburg Economic Review*, 10(1), pp. 1-23.
49. Rahman, M. and Giessen, L., 2017. Formal and Informal Interests of Donors to Allocate Aid: Spending Patterns of USAID, GIZ, and EU Forest Development Policy in Bangladesh. *World Development*, 94(2), pp. 250-267. https://doi.org/10.1016/j.worlddev.2017.01.012
50. Rana, E. and Wahid, A., 2017. Fiscal Deficit and Economic Growth in Bangladesh. *The American Economist*, 62(1), pp. 31-42. https://doi.org/10.1177/0569434516672778
51. Rebelo, S., 1991. Long-Run Policy Analysis and Long-Run Growth. *Journal of Political Economy,* 99 (3), pp. 500-521. https://doi.org/10.1086/261764
52. Rodden, J., Eskelund, G. and Litvack, J., 2003. *Fiscal Decentralization and the Challenge of Hard Budget Constraints.* Cambridge: MIT Press. https://doi.org/10.7551/mitpress/3021.001.0001
53. Romer, P., 1989. Human Capital and Growth: Theory and Evidence. *NBER Working Papers*, No. 3173. https://doi.org/10.3386/w3173
54. Sagdic, E. and Yildiz, F., 2020. Factors Affecting External Debt in Transition Economies: The Case of Central Asia and the Caucasus. *International Journal of Management Economics and Business,* 16(4), pp. 891-909. https://doi.org/10.17130/ijmeb.853521
55. Saungweme, T. and Odhiambo, N., 2019. Government Debt, Government Debt Service and Economic Growth Nexus in Zambia: A Multivariate Analysis. *Cogent Economics and Finance*, 7(1), pp. 1-17. https://doi.org/10.1080/23322039.2019.1622998
56. Solow, R. M., 1956. A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics,* 70(1), pp. 65-94. https://doi.org/10.2307/1884513
57. Swan, T. W., 1956. Economic Growth and Capital Accumulation. *The Economic Record*, 32(1), pp. 334-343. https://doi.org/10.1111/j.1475-4932.1956.tb00434.x
58. Tung, L. T., 2018. The Effect of Fiscal Deficit on Economic Growth in an Emerging Economy: Evidence from Vietnam. *Journal of International Studies*, 11(3), pp. 191-203. https://doi.org/10.14254/2071-8330.2018/11-3/16
59. Turnovsky, S., 2000. Fiscal Policy, Elastic Labour Supply and Endogenous Growth. *Journal of Monetary Economics,* 45(1), pp. 185-210. https://doi.org/10.1016/S0304-3932(99)00047-1
60. Van, T. [et al.], 2020. The Relationship between Public Debt, Budget Deficit, and Sustainable Economic Development in Developing Countries: The Role of Corruption Control. *Journal of Economics*, 21(1), pp. 53-74. https://doi.org/10.18196/jesp.21.1.5033
61. World Bank, 2020. *World Development Indicators*. Washington D. C: World Bank Group.
62. Yu, J., Jong, R and Lee, L., 2008. Quasi-maximum Likelihood Estimators for Spatial Dynamic Panel Data with Fixed Effects when Both N and T are Large. *Journal of Econometrics*, 146(1), 118-134. https://doi.org/10.1016/j.jeconom.2008.08.002