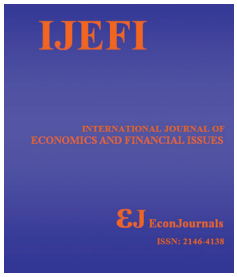

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# Public Debt and Economic Growth in Africa in the Pre-Covid Era: The Role of Control of Corruption

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**ABSTRACT**

There is evidence of recent rising public debts and low economic growth in Africa which is being attributed to the COVID-19 pandemic and the geopolitical tensions from the Russia-Ukraine war. With the evidence of also recent high corruption amidst low investments in Africa, it is thought-provoking to find empirically how public debt impact on economic growth per capita among African countries even before the COVID-19 pandemic and the geopolitical tensions from the Russia-Ukraine war and the mediation of control of corruption. The study used secondary data from the World Development Indicators, World Economic Outlook, and Worldwide Governance Indicators. The annual data spans from 1996 to 2019 for 45 countries. The study deployed a dynamic panel data estimation technique and controlled for other variables. The findings show a negative impact of gross debt percentage of GDP on economic growth but a positive interactive effect of excessive accumulation of gross public debt and the control of corruption on economic growth per capita among countries in Africa before the outbreak of the COVID-19 pandemic. In the post-COVID-19 era of high public debt, governments can reduce their indebtedness by financing appropriate infrastructure while controlling corruption to increase the economic growth in their countries.

**Keywords:** Public Debt, Economic Growth, Corruption, COVID-19 Pandemic
**JEL Classifications:** C5, E6, F2, F4

## 1. INTRODUCTION

Conventionally economic growth has been ascribed to the accumulation of human and physical capital and improved productivity (Abotsi and Iyavarakul, 2015). Investigating the determinants and benefits of economic growth is complex due to the varied experiences of countries concerning the growth of their economies. Though the determinants of economic growth have been well documented in both theoretical and applied research literature in the past decades, the process of economic performance has not been adequately conceptualized and is not well understood (Petrakos and Arvanitidis, 2008). To reduce unemployment, poverty, and its related menace in the African continent, there is a need to grow the economies to absorb the increasing number of unemployed in Africa. Unfortunately, economic growth is still too low to reduce unemployment and reduce poverty in Africa (ILO, 2019). This makes studies that seek to explore factors that influence economic growth per capita, especially in Africa and other developing countries essential.

The neoclassical viewpoint based on Solow's growth model stressed the importance of investment to economic growth, and the theory of endogenous growth advanced by Romer and Lucas emphasises the relevance of human capital and innovation capacity to economic growth (Petrakos and Arvanitidis, 2008). Even though there is no unifying theory on economic growth, there are numerous partial theories that emphasise the role of several factors in determining economic growth (Petrakos and Arvanitidis, 2008). Literature abounds on potential factors of growth (proximate and fundamental sources of growth) that influence economic growth

but according to Bhalla (2012), mapping reliable channels to economic growth has been a major concern for economists in growth analysis. Sustainable Development Goal (SDG) 8, for example, urges the international community to "promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all." To be able to achieve this Sustainable Development Goal 8, there is the need to enhance performance of the essential economic variables (diversification, technological upgrading, and innovation) to sustained per capita economic growth and productivity (United Nations, 2017) as well as institutions.

Discussions on the relationship between fiscal policy and economic growth are still ongoing in the literature probably due to its complexity and importance. Empirical literature shows that a high debt-to-GDP ratio is linked with significantly slower, or even negative economic growth (Reinhart and Rogoff, 2010). For example, high levels of debt-to-GDP ratio have been reported to have a negative effect on economic growth among OECD countries (Mencinger et al., 2015). Meanwhile, the total external debt stock of countries in sub-Sahara Africa (excluding South Africa) continued to rise in 2015, increasing by 7.5%, and this is in sharp contrast to the decrease in external debt stocks of other low- and middle-income countries within the same period (World Bank, 2017). Sub-Saharan African countries continued to issue sovereign bonds in 2018 while the North African region became the fastest accumulation in external debt stock in the same year. (World Bank, 2020a). This is before the outbreak of the COVID-19 pandemic and the geopolitical tensions from the Russia-Ukraine war. Therefore, to blame the current debt levels and the impact on the economies of African countries on the COVID-19 pandemic and the geopolitical tensions from the Russia-Ukraine war cannot be entirely true. It is a fact that some extraordinary levels of assistance were provided by the Multilateral creditors to alleviate the adverse impact of the COVID-19 pandemic on economic and social costs and also to facilitate recovery (World Bank, 2022). Indeed, the disbursement of loans to low and middle-income countries from multilateral creditors in 2021 increased slightly above the pre-pandemic levels (World Bank, 2022). However, following a decade of rapid debt accumulation, the debt-to-GNI ratios of many low- and middle income countries has continued to remain high since 2010 (World Bank, 2022) with its adverse effects on the growth of these economies.

Some literature on economic theory also postulates that growth-debt nexus is country and time-specific since the relation between growth and debt is conditional on several factors including institutional quality (Krugman, 2012; Reinhart et al., 2003). Empirical findings on the impact of corruption on economic growth have been mixed. On the one hand, some studies such as (Rock and Bonnett, 2004) and (Huang, 2016) report that corruption impact positively on economic growth, in support of the "grease the wheels" hypothesis. On the other hand, in support of the "sand in the wheels of commerce" hypothesis, the majority of the studies (Mauro, 1995; Mo, 2001; Pellegrini and Gerlagh, 2004) report that corruption impact negatively on economic growth. According to Truong (2020), numerous studies have found corruption to negatively influence economic growth. Therefore, the view that corruption is detrimental to economic growth remains dominant in the literature. Meanwhile, the 2020 report by Transparency International reveals that with an average score of 32, Sub-Saharan Africa is the lowest performing region on the Corruption Perception Index (CPI) (Transparency International, 2020). Again, with an average score of 32, Sub Saharan Africa remains the lowest performer on the corruption perception index even in 2022. Many of the countries significantly declined while few made gains in the fight against corruption with 49 countries assessed still scoring below 50 (International Transparency, 2022).

According to International Monetary Fund (2018), the African growth model continues to depend mostly on public expenditure, with low private investment among other factors in contrast to other regions of the world that are at a comparable stage of economic development (International Monetary Fund, 2018) and this is detrimental to labour productivity growth (ILO, 2019). The general theoretical conjecture is that public debt impacts growth positively at low levels and then at high levels, the effect on growth is negative (Mencinger et al., 2015). However, Greiner (2012) also argues that a well-specified model that can generate an inverted U-shaped relationship between public debt and growth does not exist. The International Monetary Fund (2012) has specified that a single threshold for debt ratios that can clearly define the "bad" from the "good" does not exist. In the least developed countries characterized by high population growth rates and low saving rates, Dombi and Dedák (2019) argue that public debt adversely affects the steady-state output. With the evidence of rising public debts and high corruption amidst low investments in Africa, it would be out of place to attribute entirely, the current economic downturn of the countries in Africa to the outbreak of the COVID-19 pandemic and the geopolitical tensions from the Russia-Ukraine war. It is thus thought-provoking to find empirically how public debt impact on economic growth per capita among African countries even before the COVID-19 pandemic and the geopolitical tensions from the Russia-Ukraine war and the mediation of control of corruption. The results of this study will guide leaders in the formulation of relevant policies concerning debt contracting and utilisation as well as the control of corruption that will positively affect the growth of their economies in the post COVID-19 pandemic era. This is the motivation for this study. The contribution of the study to the literature is to empirically show how public debt impacted economic growth and how the control of corruption has mediated in the effect of excessive accumulation of public debt on economic growth per capita among countries in Africa before the outbreak of the COVID-19 pandemic and the geopolitical tensions from the Russia-Ukraine war.

This paper continues with a literature review on theories of economic growth, African public debt profile, public debt and growth theory, corruption and growth, corruption in Africa, and other determinants of economic growth used as control variables. This is followed by a discussion of the methodology deployed in the study, the results and discussion, and finally, the conclusion.

## 2. LITERATURE REVIEW

The phenomenon of modern economic growth has been dominated by human history since the middle of the eighteenth century.

The extent to which economic growth can improve the living standards of the citizenry is best demonstrated by the history of the twentieth century. Numerous empirical studies have established the importance of economic growth as a basis for enhancements in human welfare (Dollar and Kraay, 2002; Kakwani and Pernia, 2000). Three main waves of growth theory (the Solow-Swan neoclassical model; the neo-Keynesian Harrod-Domar model; and the endogenous growth model) have been significant in the second half of the twentieth century and all three growth models highlight the proximate determinants of growth.

## 2.1. Public Debt and Growth Theory

Investment and savings were conceived to be crucial factors in earlier growth models such as the Harrod-Domar model (Domar, 1946; Harrod, 1939). The essence of the Harrod-Domar model is that the growth rate of output increases with the saving rate and this is based on the assumption that total new investment is determined by total savings (see Aghion and Howitt, 2009). The neoclassical growth model constructed by Solow (1956) and Swan (1956), shows how an economy's growth rate can be enhanced by the formulation of economic policies that encourage people to save more. The fundamental assumptions of the model are diminishing marginal productivity of capital, constant returns to scale, technical progress which is exogenously determined, and substitutability between capital and labour. The new endogenous growth theory (Lucas, 1988; Romer, 1986) once again establishes the importance of investment with respect to increasing returns to capital. The new growth models were started by Romer (1986) and Lucas (1988), and three significant sources of growth; new knowledge (Grossman and Helpman, 1991; Romer, 1990), innovation (Aghion and Howitt, 1992), and public infrastructure (Barro, 1990) were highlighted within this framework. Government spending (financed by debt instruments or taxes) that is focused on the production of capital goods will culminate in the increase of stock of public capital investment and consequently crowd in the participation of the private sector. Public infrastructure is a significant source of growth (Barro, 1990), therefore financing an appropriate infrastructure is expected to culminate in economic growth. Also running fiscal deficits may affect output positively both in the short and long run due to the negative effect on organisation of capital and investment in new economic activities particularly as the number of discouraged labour increases with its associated loss of skills (Panizza and Presbitero, 2013).

Delong and Summers (2012) opine that expansionary fiscal policy is expected to be self-financing in a country with a low-interest rate. This notwithstanding, literature shows that the excessive accumulation of public debt can negatively affect economic growth and economic stability in the future (Cecchetti et al., 2010; Mencinger and Aristovnik, 2013; Mencinger et al., 2015; Sineviciene and Vasiliauskaite, 2012). A Public debt contracted to finance a budget deficit is a primary source of crowding out private investments (Elmendorf and Mankiw, 1999). Reduction of growth rates of the productivity of labour as a result of a decrease in investment and capital stock accumulation has been ascribed to the negative influence of high sustained indebtedness levels in the public sector on economic growth (Kumar and Woo, 2010). High levels of public debt have the potential of increasing the risk premiums which will then increase financing costs that may, in turn, deteriorate the sustainability of public finances (Kirchner et al., 2010). Elsewhere, it has been argued that high public debt surges uncertainty or results in the expectations of future confiscation, perhaps due to inflation and financial repression, and in this case, the adverse effect of public debt could worsen (Cochrane, 2011).

Dombi and Dedák (2019) developed a general framework for estimating the burden of public debt in the neoclassical growth models incorporating households' saving behaviour. A reaction function is included in the initial Solow growth framework to reflect how households' savings behaviour responds to the budget deficit through a moveable parameter $q = -\frac{\partial I}{\partial D}$ (where I represent investments and D is the budget deficit in absolute terms). $q$ denotes how the budget deficit crowds out investments and it's between the interval of 0 and 1. The reaction function of private savings to the budget deficit is; $S_{KP} = \bar{S}_{KP} + (1-q)d$. The second part of the right-hand side equation, $((1–q)d)$ shows the impact of the budget deficit on private savings and $\bar{S}_{KP}$ is the autonomous savings of households which are not dependent on the budget balance compared to output. Households' reactions to the budget deficit depend on three scenarios; when $q = 0$, $q = 1$, or $0 < q < 1$. In the first scenario, the budget deficit is expected to increase private savings by its amount if $q = 0$ and consequently leaves aggregate savings unaffected. In the second scenario, the private savings do not respond to the budget deficit at all if $q = 1$, and therefore aggregate savings are reduced by the budget deficit one in one. The first scenario represents the case of Ricardian equivalence and the second represents the complete crowding out of physical capital holds. The value of $q$ (between these extreme values), will determine the impact of budget deficit on private savings (for further discussion, Dombi and Dedák, 2019) and its ultimate effect on economic growth. Assuming that the budget deficit ($d$) can be represented as a constant $z$, then fraction of the autonomous private savings ($d = z.\bar{S}_{KP}$), this study adopts the general connection between steady-state output and public debt developed by Dombi and Dedák (2019), and this is presented in equation (1).

$$\ln y = \frac{a}{1-a-\beta}\ln(\bar{S}_{KP}) - \left(\frac{a}{1-a-\beta}\right)\left(\frac{g+n}{\bar{S}_{KP}}\right) \quad (1)$$
$$q\mu^* + \frac{\beta}{1-a-\beta}\ln(S_H) - \frac{a+\beta}{1-a-\beta}\ln(n+g+\delta)$$

Where $\mu^*$ represent the debt-to-GDP ratio at a steady state.

A large number of the empirical literature (Cecchetti et al., 2010; Kumar and Woo, 2010; Minea and Parent, 2012; Reinhart and Rogoff, 2010b, 2010a) find the causal adverse relationship between the accumulation of public debt and subsequent economic growth which is manifested by the presence of a threshold value beyond which the excessive public debt levels is likely to have adverse effects on subsequent economic growth (Mencinger et al., 2015; Panizza and Presbitero, 2013). Checherita-Westphal et al. (2012) estimate optimal debt ratios for various subsamples of OECD

countries but according to Greiner (2012), their findings are based on the assumption that at each point in time, the debt deficit is equal to public investment. In such a set-up, Greiner (2012) argues that public debt is entirely irrelevant and the non-linear connection between debt and growth is due to the growth-maximizing tax rate. Greiner (2012) further opines that the impact of debt on growth depends on the existence of rigidities in the economy (Panizza and Presbitero, 2013) and that there does not exist a well-specified model capable of generating an inverted U-shaped relationship between debt and growth. A formal model provided by Ghosh et al. (2013) depicts the possibility of non-linearities arising if there is a tipping point beyond which public debt abruptly becomes unsustainable but according to Panizza and Presbitero (2013), such a theoretical model has not been sighted. Moreover, according to the International Monetary Fund (2012), there is no simple relationship between debt and growth, and also argues that there are numerous factors that matter for a country's growth and debt performance. Deploying the human capital augmented Solow model of Mankiw et al. (1992) where a constant saving rate of households and complete crowding out of physical capital is assumed, Dombi and Dedák (2019) show that public debt decreases long-run output and the magnitude of output loss reduces with the private sector's saving rate and rises with the population growth rate (Dombi and Dedák, 2019 for further discussion this issue). Empirical literature elsewhere (Eberhardt and Presbitero, 2015; Ramos-Herrera and Sosvilla-Rivero, 2017) supports this assertion and this has necessitated the current empirical research.

## 2.2. African Public Debt Profile Before COVID-19

Public debt has four components which are bank loans, bonds, loans from development organizations, and other funding from creditors in the private sector. The external debt of the poorest countries of Sub-Saharan Africa fell significantly to USD 57 billion in 2006 as a result of the enormous Highly Indebted Poor Countries (HIPC) debt relief programme. Since then, debt levels again increased significantly to a historic high of USD 102 billion in 2015. The debt-to- GDP ratio also increased from 27% in 2012 to 31% in 2015. A major source of the rise is attributable to public debt which increased in 2015 by USD 30 billion from 2010 to USD 82 billion (not including the IMF loans and short-term debt), (Raschen, 2017). The Middle East and North African countries recorded the fastest external debt stock accumulation with an average of 6 percent while Europe and Central Asia reported a 5.5% decrease in external debt stocks from the 2017 level. For example, Egypt increased its external debt by 17% (World Bank, 2020a). Sub-Saharan countries continued issuing sovereign bonds in 2018 to get to a new record high of $17.4 billion (excluding South Africa) which is more than double the amount issued in 2017 ($9 billion). Nigeria and Angola issued $5.4 billion and $3.5 billion, respectively while Cote d'Ivoire, Kenya, Ghana, and Senegal each issued bonds of around $2 billion (World Bank, 2020a). These bonds were issued for balance-of-payments support, infrastructure financing, and refinancing of prior operations among others.

## 2.3. Corruption and Growth

Two main hypotheses on corruption and economic growth have been explained in the literature. The proponents of the "grease the wheels" hypothesis (Huntington, 1968; Leff, 1964; Leys, 1965) postulate that in economies with malfunctioning institutions, corruption might be beneficial to the growth of their economies. In support of this hypothesis, Beck and Maher (1986) and Lien (1986) as cited in Abotsi (2016) are of the view that corruption will increase efficiency, especially in countries where inefficient regulations become an obstacle to investment. In such a situation, bribing bureaucrats can enhance efficiency. Some empirical studies (Huang, 2016; Rock and Bonnett, 2004) find corruption to impact positively on economic growth. The proponents of the "Sand in Wheel" hypothesis (see Mauro, 1995; Shleifer and Vishny, 1993) are rather of the view that the malfunctioning of government institutions creates a disablement to economic activity. According to Mauro (1995), the malfunctioning of government institutions constitutes a severe impediment to investment, entrepreneurship, and innovation. Empirically, numerous studies (Brunetti et al., 1997; Elliott, 1997; Knack and Keefer, 1995; Mauro, 1995; Méon and Sekkat, 2005; Pellegrini and Gerlagh, 2004) have found corruption to impact negatively on economic growth. Abotsi (2016) argues that in countries where bureaucratic regulations are bunglesome, corruption enhances investment but in countries where there is the malfunctioning of government institutions, corruption discourages private investment. The neoclassical viewpoint, which is based on Solow's growth model, has emphasised the relevance of investment to economic growth.

## 2.4. Corruption in Africa

The majority of African countries over the years scored 30 or lower on the corruption perception index rating published by Transparency International (Abotsi and Iyavarakul, 2015). In the years 2011, 2009, and 2008, 87% of the countries in Africa scored 30 or below. The percentage reduced to 83% and 77% in 2010 and 2012 respectively. Sub-Saharan Africa has been reported to be the lowest-performing region on the CPI by Transparency International in the year 2020 (Transparency International, 2020). Indeed, the report indicates that Sub-Saharan Africa has shown little improvement from previous years' CPI ranking. Seychelles earned 66 mark and has been consistently at the top in the region over the years. This is followed by Botswana (60) and Cabo Verde (58). With a score of 16 (Sudan), and 12 (Somalia and South Sudan), these countries are at the bottom of the CPI ranking. Both theoretical and empirical literature has emphasized the negative effect of corruption on economic growth and so the current state of corruption in Africa is very worrisome. With an average score of 32, Sub-Saharan Africa remains the lowest performer on the corruption perception index even in 2022 as indicated earlier (International Transparency, 2022).

## 2.5. Proximate Sources of Growth

The research of growth accountants such as Denison (1974), Jorgenson (2001), and Maddison (1987) has produced a suitable taxonomy of the numerous proximate sources of growth, and the neo-Keynesian, neoclassical, and endogenous growth theories concentrate on modeling proximate variables Snowdon and Vane (2005). Ciccone and Jarociński (2010) in their research on factors inhibiting and facilitating economic growth enumerated a list of determinants of economic growth. Based on the theoretical and empirical literature on the determinants of economic growth and

data availability, the following factors; total investment, trade, population growth, and inflation, have been included as control variables in this study to find the effect of debt on economic growth per capita among Africa countries. Investment is one of the most essential determinants of economic growth indicated by both neoclassical and endogenous growth models. In the neoclassical model, investment affects the transitional period, whereas the endogenous growth models contend for more permanent effects. Numerous empirical studies investigated the relationship between investment and economic growth. Though the findings of some of these studies are not conclusive (Petrakos and Arvanitidis, 2008; Podrecca and Carmeci, 2001), studies elsewhere show that one of the most robust determinants of economic growth is investment (Barro, 2003; Levine and Renelt, 1992). Trade openness can improve economic growth for at least three reasons. Trade openness increases the scale of the economy, generates knowledge spillovers, fosters competition (Aghion and Howitt, 2009), and contributes to the exploitation of comparative advantage (Petrakos and Arvanitidis, 2008). Numerous studies have documented a robust positive effect of trade openness on economic growth (Dollar and Kraay, 2000; Sachs and Warner, 1995). High population growth, has been hypothesized to be detrimental to economic growth and this is likely to affect investment, dependency ratio, saving behaviour, and quality of human capital. The population growth rate was used in a similar study by Mencinger et al. (2015) and their findings show that the population growth rate adversely affects the economic growth rate per capita. Concerning inflation, some studies have shown a robust negative effect of inflation on economic growth (Mencinger et al., 2015).

Based on the evidence of rising public debts and high corruption amidst low investments in Africa, and its associate implications which are well highlighted in the literature reviewed, this study seeks to empirically find out how public debt impacted economic growth and how the control of corruption has mediated in the effect of excessive accumulation of public debt on economic growth per capita among countries in Africa before the outbreak of the COVID-19 pandemic and the geopolitical tensions from the Russia-Ukraine war.

## 3. METHODOLOGY

### 3.1. Data

The variables deployed in this study are founded on secondary data obtained from the World Development Indicators, Worldwide Governance Indicators, and the World Economic Outlook for 2019. The annual data available from 1996 to 2019 for 45 countries in Africa was deployed for the study. Data on GDP per capita growth, population growth, trade, and inflation are obtained from the Worldwide Development Indicators Databank (World Bank, 2020b), total investment and general gross debt from the World Economic Outlook databank (International Monetary Fund, 2020) while control of corruption variable is from Worldwide Governance Indicators (World Bank - WGI, 2019).

### 3.2. Data Analysis

It has been argued by Nerlove (2002), that the behaviour of the economic agents is inherently dynamic, and so most econometric relationships are either implicitly or explicitly dynamic. Also, the inclusion of lag of dependent variables as an explanatory variable is a penurious way of accounting for the impact of explanatory variables in the past, and this helps to remove serial correlation in the disturbance term (Beck and Katz, 1996). Also, to a large extent, models with lagged dependent variables can control for many omitted variables (Abotsi, 2018; Abotsi and Iyavarakul, 2015). All of these informed the choice of the dynamic panel data estimation technique in this study.

The general dynamic model is of the form presented in equation (2);

$$y_{it} = \alpha y_{i,t-1} + x'_{it}\,\beta + \varepsilon_{it} \quad (2)$$

Where $y_{it}$ is the dependent variable, $y_{i,t-1}$ is the lag-dependent variable, $x_{it}$ represent the independent variables, $\varepsilon_{it} = u_i + v_i$ for $i = 1,\ldots\ldots, N$ and $t = 2,\ldots, T$, with $|\alpha| < 1$.

The disturbance term $\varepsilon_{it}$ has two orthogonal components. These components are the fixed effects $u_i$ and the idiosyncratic shocks $v_i$. $E(u_i) = E(v_{it}) = E(u_i v_{it}) = 0$ for $i = 1,\ldots\ldots, N$ and $t = 2,\ldots, T$.

The framework for assessing the relations between GDP per capita growth, gross debt, the interaction between debt and control of corruption, and other determinants of GDP per capita

growth is presented in equation (3).

$$y_{it} = \beta_1 + \beta_2 Debt_{it} + \beta_3 Debt\_corruption_{it} + \delta z_{it} + \alpha y_{i,t-1} + \varepsilon_{it} \quad (3)$$

Where $y_{it}$ is a measure of GDP per capita growth in country $i$ at time $t$, $y_i$, $t-1$ is a measure of GDP per capita growth in country $i$ at time t − 1, $Debt$ is a measure of general gross debt per GDP in country $i$ at time $t$, $Debt\_corruption$ is a measure of the interactive term between debt per GDP and control of corruption in country $i$ at time $t$, $zit$ represents a set of control variables in a country $i$ at time t, $\beta_1$, $\beta_2$, $\beta_3$, $\delta$ and $\alpha$ represent parameters to be estimated, and $\varepsilon_{it}$ is the disturbance term. StataCorp 2014 is the statistical software used in data analysis.

### 3.3. The System Generalized Method of Moments (System GMM) Model

The System GMM was deployed in this study because, for variables that exhibit "random walk" or are close to random walk, the System GMM estimate has an advantage over the Difference GMM and is also a good estimator, or at least better than the Difference GMM for dynamic models (Presbitero, 2005). The System GMM estimator is reliable and asymptotically more efficient (Abotsi, 2018). The benchmark GDP per capita growth equation in a linear form with a constant term is shown in equation (4).

$$GDP\_per\_capita\_growth_{it} = \beta_1 + \beta_2\, GDP\_per\_capita\_growth\_1_{it} + \beta_3\, Gen\_gross\_debt\_Percent\_GDP_{it} + \beta_4\, Gen\_gross\_debt\_corruption_{it} + \beta_5\, Total\_investment\_Percent\_GDP_{it} + \beta_6\, Trade\_percent\_GDP_{it} + \beta_7\, Inflation\_Rate_{it} + \beta_8\, Population\_growth_{it} + \varepsilon_{it} \quad (4)$$

The GDP per capita growth is the dependent variable in the

system dynamic model equation (3). The lag of GDP per capita growth, general government gross debt percent of GDP, the interaction between gross debt and control of corruption, and the total investment percent of GDP are the independent variables of interest with trade percent of GDP, annual inflation rate, annual population growth rate as control variables. These variables were chosen based on theoretical and empirical literature and also data available for the selected period of study. The study adopted the formula ($x = [a + 2.5]*20$) where $x$ and $a$ refer to the value of the transformed variable and that of the original scale respectively (Abotsi and Iyavarakul, 2015) to transform the original scale which is between –2.5 and 2.5.

The two-step estimator is used in the estimation since the standard covariance matrix is robust to panel-specific autocorrelation and heteroscedasticity (Abotsi, 2018) and is thus asymptotically efficient. The variable, general government gross debt percentage of GDP is treated as endogenous in this study. The other independent variables are treated as strictly exogenous and there are no external instruments. The study included 45 countries (N) analyzed over 37 years (T) which means the countries (N) are more than the years (T) and this supports the argument made by many authors (Baltagi, 2008; Baum, 2006; Bond, 2002; Roodman, 2006, 2007) that dynamic panel model are specially designed for conditions where T is smaller than N to control for dynamic panel bias. To address problems of over-identification restrictions and serial correlation due to the inclusion of the lag of the dependent variable, specification testing in dynamic panel models is conducted. The tests deployed are the standard Sargan and Hansen J test for over-identification restrictions and the Arellano-Bond test for autocorrelation. Roodman (2009) clarifies that if the model is overidentified a test statistic for the joint validity of the moment conditions cannot be considered under the GMM framework. In both of these tests, the null hypothesis is that all of the instruments are valid while the alternative is that some subsets are not valid. Also, when the number of instruments $i$ is large relative to the cross-section sample size $n$, these tests lose power. The rule of thumb is that the number of instruments should be less than or equal to the number of groups (Abotsi and Iyavarakul, 2015).

## 4. RESULTS AND DISCUSSION

### 4.1. Descriptive Statistics

The descriptive statistics of the variables included in the study are shown in Table 1. All the variables have values ranging from 1004 as the lowest to 1235, as the highest number of observations. The period under study is from 1996 to 2019. The mean GDP per capita growth is 2.14% and the standard deviation is 7.8767, which shows that the observations are moderately dispersed relatively. On average, the population growth rate across Africa within the study period is 2.41% and the standard deviation (1.0069) shows the pattern of population

growth is not widely different across African countries. The mean general government gross debt percent of GDP is 64.61% and the standard deviation of 57.2579 shows the general government gross debt percent of GDP is widely dispersed across African countries. This result is consistent with Abotsi (2021) who found that most African countries have surpassed the debt-to-GDP ratio threshold of 60% and 55% recommended by the African Monetary Co-operation Programme (AMCP) and IMF respectively for developing economies. The mean value of 23.76% and standard deviation of 12.1754 show that the total investment percentage of GDP is also dispersed across African countries. The mean inflation rate (14.16%) and standard deviation of 129.8439 are also worthy of mention since they show the high fluctuation of the inflation rate within the period of observation.

### 4.2. Model Specification Diagnostics Test

The results of the dynamic panel model estimated are presented in Table 2. GDP per capita growth is the dependent variable in the estimated model. The general government gross debt percent of GDP, the interaction term between government gross debt percent of GDP and control of corruption, the total investment percent of GDP, and other control variables are used as independent variables. The two-step estimator is deployed in the estimation, with the general government gross debt percent of GDP variable used as endogenous while all the other independent variables are strictly exogenous. No external instruments are used in this estimation. The validity of the estimated results in System GMM is hinged on the statistical diagnostics tests of the estimated model. If the model is well specified, the expectation is that the null hypothesis of no autocorrelation of the second order, AR (2), is not rejected. The p-value of 0.381 shows that the null hypothesis of no autocorrelation of the second order, AR (2), is not rejected. Therefore, the Arellano-Bond test for serial correlation indicates the validity of the model specification (Basu, 2008). Since the number of instruments (36) is less than the number of groups (45) the assumptions underpinning the two procedures are not violated. The rule of thumb is that the number of instruments should be less than or equal to the number of groups (Abotsi and Iyavarakul, 2015). The 36 instruments came from the restriction of using 2 lags for levels and 2 for differences in the data (i.e., the restriction is set to (2 2) in xtabond2). The Hansen J-statistic tests the null hypothesis of the correct model specification and valid over-identifying restrictions, i.e., the validity of instruments.

**Table 1: Descriptive statistics of the variables**

| Variable | Observation | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| GDP_per_capita_growth | 1,163 | 2.144119 | 7.876684 | −62.3781 | 140.3708 |
| Gen_gross_debt_Percent_GDP | 1,116 | 64.6065 | 57.25786 | −9.445 | 514.916 |
| Gen_gross_debt_corruption | 1,004 | 2311.257 | 2536.569 | −494.614 | 23724.2 |
| Total_investment_Percent_GDP | 1,180 | 23.75849 | 12.17574 | 0.565 | 115.102 |
| Trade_percent_GDP | 1,117 | 73.93595 | 39.8742 | 17.85861 | 376.2241 |
| Inflation_Rate | 1,087 | 14.16281 | 129.8439 | −9.79765 | 4145.106 |
| Population_growth | 1,235 | 2.411379 | 1.006856 | −2.62866 | 8.117928 |

**Table 2: Results of the estimated dynamic panel model**

| Variables | GDP_per_capita_growth |
|---|---|
| GDP_per_capita_growth_1 | 0.150*** (0.0290) |
| Gen_gross_debt_Percent_GDP | −0.0552*** (0.00981) |
| Gen_gross_debt_corruption | 0.0963*** (0.000234) |
| Total_investment_Percent_GDP | 0.0625*** (0.0215) |
| Trade_percent_GDP | 0.0307*** (0.00513) |
| Inflation_Rate | 0.0628*** (0.0208) |
| Population_growth | 0.560* (0.322) |
| Constant | −2.945*** (0.832) |
| Observations | 752 |
| Arellano-Bond test for AR (1) | 0.005 |
| Arellano-Bond test for AR (2) | 0.381 |
| OIR test (P-value) | 0.226 |
| Number of instruments | 37 |
| Number of countries (groups) | 45 |

Hansen J-test is the most commonly used diagnostic in GMM estimation for assessment of the suitability of the model (Baum, 2006). The rejection of the null hypothesis means that either or both assumptions are violated. The Hansen J-test of over-identifying restrictions does not reject the null hypothesis at any conventional level of significance (P = 0.226), signifying that the model has valid instrumentation. Also, the null hypothesis that the specified variables are proper instruments cannot be rejected with a P = 0.120 for GMM differenced instruments and 0.650 for system instruments. The check for the "steady state" assumption suggested by Roodman (2006) can also be used to check the validity of instruments in System GMM (Efendic et al., 2009). This assumption necessitates a kind of steady state because deviations from long-term values are not systematically related to the fixed effects. The estimated result (Table 2) shows that the coefficient of the lagged dependent variable (GDP_per_capita_growth_1) is 0.150, confirming that the steady-state assumption holds. Finally, the Wild Chi-square test of joint significance rejects the null hypothesis that independent variables are jointly equal to zero (P = 0.000) at any conventional level of significance. Therefore, there is enough indication to conclude that the statistical tests conducted satisfy the key assumptions of System GMM estimation and thus conclude that the estimated model is a suitable statistical generating mechanism.

### 4.3. Discussion of Results of the Estimated Dynamic Panel Model

The results show that all the variables included in the model are highly significant at various levels of significance (Table 2). The sign on the general gross debt percentage of GDP is negative which indicates that increasing debt has a negative impact on GDP per capita growth among African countries. The results show that when the general gross debt percentage of GDP is increased by 1%, GDP per capita growth will decrease by 0.06%. When public debts are contracted to finance budget deficits, it tends to crowd out private investment and this is detrimental to economic growth (Elmendorf and Mankiw, 1999). This finding is in line with both theoretical and empirical literature which indicate that the accumulation of public debt can have a potentially negative impact on future economic growth and economic stability (Asteriou et al., 2020; Cecchetti et al., 2010; Mencinger and Aristovnik, 2013; Mencinger et al., 2015; Phiri and Mhlaba, 2019; Sineviciene and Vasiliauskaite, 2012). African countries are still developing and typically exhibit low saving rates and high population growth rates. It is therefore expected that the excessive debt accumulation by these countries will have a huge negative impact on their economic growth and so, reducing government indebtedness is likely to improve steady-state output significantly.

The results show that the interactive term of gross public debt and control of corruption is positive and significant at a 1% level of significance. This means there is a positive interactive effect of excessive accumulation of public debt and the control of corruption on economic growth per capita among countries in Africa. Since corruption has been found in the literature to impact economic growth negatively (Brunetti et al., 1997; Elliott, 1997; Knack and Keefer, 1995; Mauro, 1995; Méon and Sekkat, 2005; Pellegrini and Gerlagh, 2004), controlling corruption is likely to impact positively on economic growth amidst an excessive accumulation of public debt. Research has shown that by controlling corruption, the efficiency of resource allocation and investment in new projects is enhanced (Gründler and Potrafke, 2019; Malanski and Póvoa, 2021; Mauro, 1995; Méon and Sekkat, 2005; Pellegrini and Gerlagh, 2004). In the post-COVID era where many African countries significantly declined on the corruption perception index while few made gains in the fight against corruption with 49 countries assessed still scoring below 50 (International Transparency, 2022) amidst increasing public debt, governments can reduce their indebtedness by controlling corruption. The results also show that the total investment percentage of GDP has a positive effect on GDP per capita growth and an increase of 1% in the total investment percentage of GDP will increase GDP per capita growth by 0.06%. This finding is consistent with other studies elsewhere (Barro, 2003; Levine and Renelt, 1992) where investment is found to be one of the most robust determinants of economic growth. Trade percentage of GDP is also positive and similar to numerous studies that have documented a robust positive effect of trade openness on economic growth (Dollar and Kraay, 2000; Sachs and Warner, 1995). This implies an increase in the trade percentage of GDP by 1% will increase GDP per capita growth by 0.03%. Inflation and population growth have a positive impact on economic growth at 1% and 10% percent respectively in this study.

## 5. CONCLUSION

The study sought to find empirically the effect of the general gross debt percentage of GDP and the interactive effect of excessive accumulation of public debt and the control of corruption on economic growth per capita among countries in Africa before the outbreak of COVID-19. With knowledge of the possible impact of excessive debt accumulation and corruption on the growth of the economy, leaders of these countries will formulate relevant policies concerning debt contracting, investment, and the control of corruption that will positively affect the growth of their economies. Deploying a dynamic panel data estimation technique while controlling for other variables, the study shows that the general gross debt percentage of GDP has a significant negative impact on economic growth per capita among African countries even before the outbreak of the COVID-19 pandemic and the geopolitical tensions from the Russia-Ukraine war.

This confirms the assertion that attributing entirely, the current economic downturn of the countries in Africa to the outbreak of the COVID-19 pandemic and the geopolitical tensions from the Russia-Ukraine war may be inappropriate. The results also show that a 1% increase in the general gross debt percentage of GDP will lead to a decrease in GDP per capita growth by 0.06%. The results also show that the total investment percentage of GDP has a positive effect on GDP per capita growth. An increase of 1% in the total investment percentage of GDP will increase GDP per capita growth by 0.06%. More significant is the finding of a positive interactive effect of excessive accumulation of public debt and the control of corruption on economic growth per capita even before the outbreak of the COVID-19 pandemic and the geopolitical tensions from the Russia-Ukraine war.

The study shows that the excessive accumulation of public gross debt is likely to have a positive impact on economic growth only if corruption is controlled. Leaders of African countries are therefore recommended to reduce government indebtedness by financing appropriate infrastructure while controlling corruption to enhance economic growth in their economies and stop blaming the current predicament only on the COVID-19 pandemic and the Russia-Ukraine war. The growth of the economy will decrease unemployment and poverty on the African continent since economists have argued that growth in the economy is the best way to achieve poverty reduction. Other factors may influence the way debt affects growth such as the dimension of the public sector, and the structure and composition of public debt among others (Inter-American Development Bank, 2006) but these factors were not included in the current study due to data unavailability. This is the limitation of the study.

## REFERENCES


Abotsi, A.K. (2016), Theory of foreign direct investment and corruption. International Journal of Asian Social Science, 6(6), 359-378.

Abotsi, A.K. (2018), Tolerable level of corruption for foreign direct investment in Europe and Asia. Contemporary Economics, 12(3), 269-283.

Abotsi, A.K., Iyavarakul, T. (2015), Tolerable level of corruption for foreign direct investment in Africa. Contemporary Economics, 9(3), 249-270.

Abotsi, A. K. (2021). Factors influencing the ability to honour debt repayment obligations by Governments in Africa. International Journal of Finance & Economics, 1-10.

Aghion, P., Howitt, P. (1992), A model of growth through creative destruction. Econometrica, 60, 323-351.

Aghion, P., Howitt, P. (2009), The Economics of Growth. Massachusetts: Massachusetts Institute of Technology.

Asteriou, D., Pilbeam, K., Pratiwi, C.E. (2020), Public debt and economic growth: Panel data evidence for Asian countries. Journal of Economics and Finance, 45, 270-287.

Baltagi, B.H. (2008), Econometric Analysis of Panel Data. 4th ed. Chichester: John Wiley and Sons Ltd.

Barro, R.J. (1990), Government spending in a simple model of endogenous growth. Journal of Political Economy, 98, 103-125.

Barro, R.J. (2003), Determinants of economic growth in a panel of countries. Annals of Economics and Finance, 4, 231-274.

Basu, S.R. (2008), A New Way to Link Development to Institutions, Policies and Geography (No. 37). Available from: https://unctad.org/en/docs/itcdtab38_en.pdf

Baum, F.C. (2006), An Introduction to Modern Econometrics Using Stata. Cambridge: Stata Press.

Beck, N., Katz, J.N. (1996), Nuisance vs substance: Specifying and estimating time-series-cross-section models. Political Analysis, 6(1), 1-36.

Beck, P.J., Maher, M.W. (1986), A comparison of bribery and bidding in thin markets. Economics Letters, 20(1), 1-5.

Bhalla, S.S. (2012), Devaluing to Prosperity: Misaligned Currencies and their Growth Consequences. United States: The Peterson Institute for International Economics. Available from: https://www.piie.com

Bond, S. (2002), Dynamic Panel Models: A Guide to Micro Data Methods and Practice. Institute for Fiscal Studies (CWPO9/02). Available from: https://cemmap.ifs.org.uk/wps/cwp0209.pdf

Brunetti, A., Kisunko, G., Weder, B. (1997), Credibility of Rules and Economic Growth-Evidence From a World Wide Private Sector Survey. Washington, DC: The World Bank.

Cecchetti, S.G., Mohanty, M.S., Zampolli, F. (2010), The Future of Public Debt: Prospects and Implications (No. 300; BIS Working Papers No. 300).

Checherita-Westphal, C., Hallett, H.A. and Rother, P. (2012), Fiscal Sustainability using Growth-Maximising Debt Targets (Working Paper Series 1472, European Central Bank).

Ciccone, A., Jarociński, M. (2010), Determinants of economic growth: Will data tell? American Economic Journal: Macroeconomics, 2(4), 222-246.

Cochrane, J.H. (2011), Inflation and debt. National Affairs, 9, 56-78.

Delong, B.J., Summers, L.H. (2012), Fiscal Policy in a Depressed Economy (Brookings Papers on Economic Activity, Spring).

Denison, E.F. (1974), Accounting for United States Growth. United States: The Brookings Institution. p1929-1969.

Dollar, D., Kraay, A. (2000), Trade, Growth and Poverty. United States: The World Bank Development Research Group.

Dollar, D., Kraay, A. (2002), Growth is good for the poor. Journal of Economic Growth, 7(3), 195-225.

Domar, E.D. (1946), Capital expansion, rate of growth, and employment. Econometrica, 14, 137-147.

Dombi, Á., Dedák, I. (2019), Public debt and economic growth: What do neoclassical growth models teach us? Applied Economics, 51(29), 3104-3121.

Eberhardt, M., Presbitero, A.F. (2015), Public Debt and Growth: Heterogeneity and Non-Linearity. Journal of International Economics, 97(1), 45-58.

Efendic, A., Pugh, G., Adnett, N. (2009), Institutions and Economic Performance: System GMM Modelling of Institutional Effects in Transition. Available from: https://www.riinvestinstitute.org/pdf/Efendic_et_al.pdf

Elliott, K.A. (1997), Corruption as an international policy problem: Overview and recommendations. In: Elliot, K.A. editors. Corruption and the Global Economy, Washington, DC: Institute of Development Economics. p175-233.

Elmendorf, D.W., Mankiw, N.G. (1999), Government Debt. In: Taylor M, Woodford JB, editors. Handbook of Macroeconomics. Netherlands: Elsevier. p1615-1669.

Ghosh, A.R., Kim, J.I., Mendoza, E.G., Ostry, J.D., Qureshi, M.S. (2013), Fiscal fatigue, fiscal space and debt sustainability in advanced economies. The Economic Journal, 123(566), F4-F30.

Greiner, A. (2012), Debt and Growth: Is There a Non-Monotonic Relation? (Working Papers in Economics and Management 04-2012, Bielefeld University).

Grossman, G., Helpman, E. (1991), Innovation and Growth in the World Economy. United States: MIT Press.

Gründler, K., Potrafke, N. (2019), Corruption and economic growth:

New empirical evidence. European Journal of Political Economy, 60, 101810.
Harrod, R.F. (1939), An essay in dynamic theory. The Economic Journal, 49(193), 14-33.
Huang, C.J. (2016), Is corruption bad for economic growth? Evidence from Asia-Pacific countries. The North American Journal of Economics and Finance, 35, 247-256.
Huntington, S.P. (1968), Political Order in Changing Societies. Connecticut: Yale University Press.
ILO. (2019), World Employment Social Outlook: Trends 2019. Geneva: International Labour Office.
Inter-American Development Bank. (2006), Living with Debt: How to Limit the Risks of Sovereign Finance. United States: Harvard University Press.
International Monetary Fund. (2012), The good, the bad, and the ugly: 100 years of dealing with public debt overhangs. In: World Ecoomic Outlook-Coping with High Debt and Sluggish Growth. Washington, DC: International Monetary Fund (IMF).
International Monetary Fund. (2018), World Economic Outlook October 2018: Subdued Demand: Symptoms and Remedies. Washington, DC: International Monetary Fund (IMF).
International Monetary Fund. (2020), World Economic Outlook Database. IMF Publications. Available from: https://www.imf.org/external/pubs/ft/weo/2020/01/weodata/index.aspx#:~:text=the world economic outlook (WEO,and in many individual countries
International Transparency. (2022), Corruption perception Index. Available from: www.transparency.org/cpi
Jorgenson, D.W. (2001), Information Technology and the US Economy. American Economic Review.
Kakwani, N., Pernia, E.M. (2000), What is pro-poor growth? Asian Development Review, 18(1), 1-16.
Kirchner, M., Cimadomo, J., Hauptmeier, S. (2010), Transmission of Government Spending Shocks in the Euro Area: Time Variation and Driving Forces (No. 1219; ECB Working Paper Series No. 1219).
Knack, S., Keefer, P. (1995), Institutions and economic performance: Cross-country tests using alternative institutional measures. Economics and Politics, 7(3), 207-227.
Krugman, P. (2012), End This Depression Now. United States: W.W. Norton and Company.
Kumar, M.S., Woo, J. (2010), Public Debt and Growth (10/174; IMF Working Paper 10/174).
Leff, N.H. (1964), Economic development through bureaucratic corruption. American Behavioral Scientist, 8(3), 8-14.
Levine, R., Renelt, D. (1992), A sensitivity analysis of cross-country growth regression. American Economic Review, 82(4), 942-963.
Leys, C. (1965), What is the problem about corruption? Journal of Modern African Studies, 3(2), 215-230.
Lien, D.H.D. (1986), A note on competitive bribery games. Economics Letters, 22(4), 337-341.
Lucas, R.E Jr. (1988), On the mechanics of economic development. Journal of Monetary Economics, 22, 3-42.
Maddison, A. (1987), Growth and slowdown in advanced capitalist economies: Techniques of quantitative assessment. Journal of Economic Literature, 25, 649-98.
Malanski, L.K., Póvoa, A.C.S. (2021), Economic growth and corruption in emerging markets: Does economic freedom matter? International Economics, 166, 58-70.
Mankiw, N.G., Romer, P., Weil, D.N. (1992), A contribution to the empirics of economic growth. Quarterly Journal of Economics, 107, 407-437.
Mauro, P. (1995), Corruption and growth. Quarterly Journal of Economics, 110(3), 681-712.
Mencinger, J., Aristovnik, A. (2013), Fiscal policy stance in the European Union: The imacpt of the Euro. Inzinerine Ekonomika-Engineering Economics, 25(2), 52-62.
Mencinger, J., Aristovnik, A., Verbic, M. (2015), Revisiting the role of public debt in economic growth: The case of OECD countries. Inzinerine Ekonomika Engineering Economics, 26(1), 61-66.
Méon, P.G., Sekkat, K. (2005), Does corruption grease or sand the wheels of growth? Public Choice, 122(1-2), 69-97.
Minea, A., Parent, A. (2012), Is High Public Debt Always Harmful to Economic Growth? Reinhart and Rogoff and Some Complex Nonlinearities (Working Papers 8).
Mo, P.H. (2001), Corruption and economic growth. Journal of Comparative Economics, 29(1), 66-79.
Nerlove, M. (2002), Essays in Panel Data Econometrics. United Kingdom: Cambridge University Press.
Panizza, U., Presbitero, A.F. (2013), Public Debt And Economic Growth in Advanced Economies: A Survey (MoFir Working Paper No.78).
Pellegrini, L., Gerlagh, R. (2004), Corruption's effect on growth and its transmission channels. Kyklos, 57(3), 429-456.
Petrakos, G., Arvanitidis, P. (2008), Determinants of economic growth. Economic Alternatives, 1, 11-30.
Phiri, A., Mhlaba, N. (2019), Is public debt harmful towards economic growth? New evidence from South Africa. Cogent Economics and Finance, 7(1), 1-15.
Podrecca, E., Carmeci, G. (2001), Fixed investment and economic growth: New results on causality. Applied Economics, 33, 177-182.
Presbitero, A.F. (2005), The Debt-growth Nexus: A Dynamic Panel Data Estimation (No. 243). https://utenti.dea.univpm.it/presbitero/pubblicazioni/presbitero_rie.pdf
Ramos-Herrera, M.C., Sosvilla-Rivero, S. (2017), An empirical characterization of the effects of public debt on economic growth. Applied Economics, 49(35), 3495-3508.
Raschen, M. (2017), The external debt levels of the poorest Sub-Saharan countries must be monitored closely. Available from: https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-Volkswirtschaft-Kompakt/One-Pager-2017-EN/VK-No.-126-March-2017-Subsahara-Afrika_EN.pdf. [Last accessed on 2020 Aug 28].
Reinhart, C.M., Rogoff, K.S. (2010a), Debt and Growth Revisited (No. 24376; MPRA Paper No. 24376).
Reinhart, C.M., Rogoff, K.S. (2010b), Growth in a time of debt. American Economic Review, 100(2), 573-578.
Reinhart, C.M., Rogoff, K.S., Savastano, M.A. (2003), Debt Intolerance. Brookings Papers on Economic Activity. Available from: http://www.nber.org/papers/w9908
Rock, M.T., Bonnett, H. (2004), The comparative politics of corruption: Accounting for the east Asian paradox in empirical studies of corruption, growth and investment. World Development, 32(6), 999-1017.
Romer, P. (1986), Increasing returns and long-run growth. Journal of Political Economy, 94, 1002-1037.
Romer, P. (1990), Endogenous technological change. Journal of Political Economy, 98, 71-102.
Roodman, D. (2006), How To Do Xtabond2: An Introduction to "Difference" and "System" GMM in Stata (No. 103). Available from: https://www.nuffield.ox.ac.uk/users/bond/file_howtodoxtabond8_with_foreword.pdf
Roodman, D. (2007), A Short Note on the Theme of Too Many Instruments (No. 125). Available from: https://www.cgdev.org/files/14256_file_instruments.pdf
Roodman, D. (2009), How to do xtabond2: An introduction to difference and system GMM in Stata. The Stata Journal, 9(1), 86-136.
Sachs, J.D., Warner, A.M. (1995), Economic reform and the process of global integration. Brookings Papers on Economic Activity, 1, 1-118.
Shleifer, A., Vishny, R.W. (1993), Corruption. Quarterly Journal of

Economics, 108(3), 599-617.
Sineviciene, L., Vasiliauskaite, A. (2012), Fiscal policy interaction with private investment: The case of the baltic states. Inzinerine Ekonomika Engineering Economics, 23(2), 233-241.
Snowdon, B., Vane, H.R. (2005), Modern Macroeconomics: Its Origins, Development and Current State. United Kingdom: Edward Elgar Publishing Limited.
Solow, R.M. (1956), A contribution to the theory of economic growth. Quarterly Journal of Economics, 70, 65-94.
Swan, T.W. (1956), Economic growth and capital accumulation. Economic Record, 32, 334-361.
Transparency International. (2020), Corruption Perception Index. Available from: https://images.transparencycdn.org/images/cpi-2020-sub-saharan-africa-infographic-1.jpg
Truong, H.T. (2020), Corruption impacting regional economic growth: A dynamic panel data analysis for the case of Vietnam. Pacific Economic Review, 25, 601-661.
United Nations. (2017), SDG Indicators. Global Indicator Framework for the Sustainable Development Goals and Targets of the 2030 Agenda for Sustainable Development. Available from: https://unstats.un.org/sdgs/indicators/indicators-list
World Bank. (2017), International Debt Statistics 2017. United State: World Bank Publications. Available from: https://www.worldbank.org
World Bank. (2020a), International Debt Statistics 2020. United States: World Bank Publications. https://www.worldbank.org
World Bank. (2020b), World Development Indicators. Washington, DC: World Bank. https://www.worldbank.org/data
World Bank. (2022), International Debt Report 2022: Updated International Debt Statistics. United States: World Bank Publications.
World Bank-WGI. (2019), Worldwide Governance Indicators. Available from: https://databank.worldbank.org/source/worldwide-governance-indicators