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Public spending and economic growth: The role of institutions in Ivory Coast

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Abstract

Several studies have analysed the effects of public spending, institutions and interaction between public spending and institutions on economic activity. This existing literature has ignored the effect of institutional shocks on the relationship between public spending and economic growth. To fill this gap, the current study aims to estimate the effects of public spending, institutional factors and institutional shocks on GDP per capita in Ivory Coast. It uses annual data that covers the period 1984-2019. We exploit the principal component analysis technique to construct an institutional composite index. We then estimate two Nonlinear AutoRegressive Distributed Lag models with interaction variables such as institutional index and public spending, corruption and public spending. The empirical results reveal symmetric effects of long-run institutional and corruption shocks on GDP per capita. In contrast, the effects of institutions are asymmetric in the short term. Negative institutional shocks worsen GDP per capita in the short term, as do positive corruption shocks in the long term. Similarly, public spending promotes economic growth, but neither institutions nor corruption significantly accentuate its effects. These results imply that improving the efficiency of public spending requires a prior improvement in the institutional framework and, above all, in the fight against corruption.

Keywords: Corruption, Efficiency public spending, Institutions, NARDL bounds tests.
JEL Classification: O43; H54; C43; C22.

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Contents

Contribution of this paper to the literature
Several studies emphasized the relationship between public spending and economic growth, taking institutions into account. However, these studies ignored the nonlinear nature of institutions. Unlike these papers, this article provides a new analysis of the effects of institutions and corruption by considering the effects of their shocks on economic growth.

1. Introduction

Since the third United Nations International Conference on Financing for Development in Addis-Abeba in July 2015, the idea that domestic public resources should be mobilized has been widely defended. This thesis takes on even more meaning in a context where development aid is stagnating, as well as the limited debt capacity of countries in monetary union. However, in developing countries, a large public sector is needed to provide basic infrastructure and launch projects that are essential for development, and which are not undertaken by the private sector. For this reason, the mobilization of domestic public resources is becoming more necessary the ever, and improving the efficiency of public spending remains essential for developing countries. Public spending is said to be efficient if it improves economic growth. According to Rota-Graziosi, Arezki, and Dama (2021), improving the quality of public spending fosters a virtuous circle between public spending efficiency, fiscal civic-mindedness and revenue mobilization. This idea corroborates the thesis that productive expenditure is necessary for long-term economic growth, supported by the authors of endogenous growth. It's clear that developing countries are struggling to get off the ground, yet public spending is rising steadily. This is the case in Ivory Coast, where public spending has risen from an average of 7.85% of GDP between 1984 and 1989 to 15.35% of GDP between 2010 and 2019. However, Ivory Coast is ranked among the countries with the lowest level of human capital, with a value of 0.538, occupying 162nd place out of 189 countries in 2019. As a result, public spending may be inefficient or ineffective.

A key reason for this could be the level of institutions. As North (1990) points out, institutions are a major cause of economic development in both the short and long-term. In fact, a country with good institutions is able to avoid the waste and misappropriation of public resources, and provide a sound framework that guarantees economic agents in general, and investors in particular. However, if we look closely, institutions have deteriorated over the same period. Indeed, between 1984 and 1989, the composite institutional index stood at 0.58, before dropping to 0.26 between 2010 and 2019. In contrast, corruption is slowly declining, from an average of 0.58 to 0.47 in the 2000-2009 and 2010-2019 periods respectively. In this context, we wonder about the role of institutions in the relationship between public spending and economic growth in Ivory Coast? In other words, does public spending improve economic growth? How do institutional shocks affect economic growth? How do institutions affect the relationship between public spending and economic growth?

This study seems important in the current context of Ivory Coast, as no specific study exists in this country. Also, unlike existing studies, this study goes beyond the simple determinant of economic growth. It uses sophisticated modeling to analyze the effects of public spending, institutional shocks and corruption shocks on GDP per capita. This study contributes to the debate on the relationship between public spending and economic growth. The rest of this article is organized as follow. The section 2 presents the literature review on the institution's contribution to the relationship between public spending and economic growth. The data and methodology are discussed in section 3. The 4th section is devoted to the presentation of results and discussion. The conclusion is presented in section 5.

2. Literature Review

The impact of public spending on economic activity in general, and on economic growth in particular, has been the subject of a number of theoretical and empirical studies. Examples include studies by Butkiewicz and Yanikkaya (2011); Friday, Ogwumike, Udongwo, and Ayodele (2016); Chinwuba and Ibrahim (2016) and Oyinlola and Akinnibosun (2013). Indeed Friday et al. (2016) assessed the impact of public investment on economic growth in Nigeria. The authors disaggregated public investment into agricultural, health, education and infrastructure public investment. For this purpose, they used an error correction model with annual data covering the period 1970 to 2012. The results showed that overall public investment is effective. Similarly, public investment in education and infrastructure is growth enhancing in both the short and long term. The effects of public investment in health are insignificant. As for public investment in agriculture, it has no influence in the short or long term. The work of Chinwuba and Ibrahim (2016) seeks to identify the determinants of growth in Nigeria. The authors use quarterly data from 1986 to 2013 and co-integration method with bounds. They conclude that only population and trade openness have been determinants of economic growth in Nigeria. However, the authors encourage strong transparency in public affairs. Abdulrasheed (2017) analyzed the causal relationship between public and revenue in Nigeria. The author used annual data and applied the co-integration technique and a vector autoregressive error correction model. The results highlight a long-term relationship between public spending and public revenues. An increase in public spending requires a simultaneous increase in public revenues to avoid widening the budget deficit and jeopardizing long-term growth. Oyinlola and Akinnibosun (2013) examined the relationship between public spending and economic growth in Nigeria over the period 1970 – 2009. A disaggregated level of public spending was used using the Gregory-Hansen structural break co-integration technique. The results confirmed Wagner's law in the long term. The results also revealed that public spending on investment in infrastructure and human resources is conducive to economic growth.

The work of Butkiewicz and Yanikkaya (2011) highlighted the effects of public spending on spending on economic growth, focusing on the level of efficiency of country governments over the period 1970–2004. The results revealed that public consumption expenditure is detrimental to economic growth. However, developing countries with efficient governments recorded lower negative effects from consumer spending than those with inefficient governments. In fact, developing countries with inefficient government tend to crowd out the private sector, so that public investment is substituted for private investment. Secondly, all developing countries benefit from the positive effects of public capital expenditure, regardless of the state of government. Unlike this study, the work of Afonso and Jalles (2016) integrated institutions into their analysis and also in a broader context. The results first indicated a negative effect of government size and positive effect of institutions on economic activity.

Secondly, good-quality institutions mitigate the negative effects of government size. In other words, the better the quality of institutions, the less the negative effect of government size.

Afonso, Jalles, and Venâncio (2022) estimate public spending efficiency scores in Organization for Economic Co-operation and Development (OECD) countries and assess how these scores affect capital markets. The authors use a sample of 35 OECD countries over the period 2007-2020 and data envelopment analysis (DEA) to estimate the scores. They then use linear regression models to estimate the relationship between public spending efficiency and sovereign debt rating. The results revealed that an improvement in public spending efficiency leads to a higher sovereign debt rating. The relationship between institutional quality and development was recently analyzed by Vianna and Mollick (2018) on a panel of 192 countries. The results indicated that a 0.1-point increase in institutional quality leads to a 3.9% improvement in GDP per capita.

Oppong, Atchulo, and Oman (2023) analyzed the effects of institutional quality and public debt on economic growth in 35 Sub-Saharan African countries over the period 2010 – 2020. They used fixed-effects estimation techniques and generalized systems of moments. The authors conclude that institutional quality has a negative effect on public debt and a positive effect on economic growth. Secondly, public debt has a strong negative and significant effect on economic growth. These results show that countries with weak institutions are likely to be over-indebted or even insolvent, which would further undermine economic growth. The effect of public spending on economic growth is only significant in countries with good institutions. Clearly, good institutional quality guarantees optimal use of public resources and mitigates the negative effects of public spending on GDP per capita.

However analyzing the contribution of institutional factors to inclusive growth in Ivory. Botchuin (2021) used the bounds co-integration approach and an ARDL model over the period going from 1984 to 2018. The results showed that only government stability as institutional factors has a significant effect on inclusive growth in the short and long term.

Hussen (2023) examined the relationship between institutional quality and economic growth in Sub-Saharan Africa. The author uses a panel of 31 countries over the period 1991 to 2015 applying the generalized method systems of moments. Furthermore, he classifies institutions into three categories: investment-promoting economic institutions, democratic and regulatory institutions and conflict-preventing institutions. The results indicate that investment-promoting economic and democratic and regulatory institutions promote investment and economic growth. Conflict-preventing institutions, on the other hand, have no significant impact on economic growth. It therefore seems crucial that good quality institutions are indispensable for improving investment and economic growth. Arvin, Pradhan, and Nair (2021) the relationships between institutional quality, public spending, tax revenues and economic growth in low and middle income countries over the period 2005-2019. They borrowed modelling to study short and long-term relationships, as well as causal relationships. Firstly, the results indicated endogenous temporal causal relationships between certain short and long-term variables. Secondly, the results revealed that institutional quality, public spending and tax revenues altogether have favorable effects on economic growth in the studied countries. Thirdly, the results showed that there is no causal relationship between institutional quality and public spending in either the short or long-term. In other words, public spending has no significant effect on the quality of institutions. They rather have a positive impact on economic growth in the countries studied. Corruption being a variant of institutions, several studies have examined its effects on economic activity. Recently, many studies such as Shleifer and Vishny (1993); Mauro (1998); Tanzi and Davoodi (1997); Dzhumashev (2014) and Agostino, Dunne, and Pieroni (2016) have indicated that corruption distorts public spending. In fact, corruption leads to allocation of public resources to less productive areas and above all to making less optimal allocations. Agostino et al. (2016) examined the effects of corruption and public spending on economic growth in African countries. To this end, authors used an endogenous growth model, subsequently decomposing public spending into military spending and public investment spending. Estimation of the resulting model on the sample showed firstly that the growth rate is strongly and significantly influenced by the interaction between corruption and military public spending, while the effect of the interaction between corruption and investment spending is weak. Secondly, the results revealed that countries with high levels of political instability experienced more extreme negative effects of corruption on economic growth, both directly and indirectly through higher military spending. Finally, the results highlighted a neutral effect of government size on economic growth. Mauro (1998) used ICRG corruption index data for the period 1982-1995 to analyze the relationship between corruption and the composition of public spending. The author applied ordinary least squares estimation and the results revealed that corruption creates distortions. In other words, corruption increases the level of public spending and, at the same time, changes the structure of public spending away from more productive sectors such as health and education to less productive sectors.

Hakizimana (2021) analyzed the effects of corruption on economic growth in Congo. The author used quarterly data dating from the first quarter of 2003 to the fourth quarter of 2019 to estimate a Nonlinear AutoRegressive Distributed Lag (NARDL) model. The results highlighted the existence of asymmetric effects of corruption on short and long-run economic growth. Furthermore, the results emphasized that economic growth is more sensitive to an increase of the corruption perception index than its decrease. Corruption harms economic activity through private and public investment.

Dzhumashev (2014) examined the relationship between bureaucratic corruption and economic growth, showing the role of governance, public spending and economic development. The author therefore used the endogenous growth model, then constructed an interaction model and a panel sample of three countries: Kenya, Turkey and the UK, categorized respectively as low-income, middle –income and high-income countries. The sample data covered the period from 1960 to 2010. The results revealed that corruption worsens the efficiency of public spending. However, the effects of corruption on economic growth depend on the weight of regulation and productive public inputs. Similarly, the role of governance in the relationship between corruption and economic growth seems somewhat unclear, insofar as it determines the incidence of corruption and the efficiency of public spending.

Afonso and Rodrigues (2022) sought to determine the transmission channels of the negative effects of corruption on economic growth over a sample of 48 countries covering the period from 2012 to 2019. As such, the authors use dynamic models and the generalized method of moments. The results indicated that corruption has a negative and significant impact on GDP per capita. In other words, corruption affects economic performance in general and public finance variables in particular (Afonso & Rodrigues, 2022; Ali & Ahmed, 2017; Barişik & Baris,

2017; Kim, Ha, & Kim, 2017; Dani Rodrik, 1999). Furthermore, Rodrik (1999) examined the influence of institutions such as corruption control, rule and law, political instability and government effectiveness on economic growth. The author concluded the better institutional quality boosts economic growth. Indeed, he argues that countries with good institutions tend to manage available resources more efficiently than countries with poor institutions. Arawomo and Adeoye (2020) examined the effect of institutions in the relationship between public spending and economic growth in Nigeria over the 1986-2016. The authors estimated an ARDL (AutoRegressive Distributed Lag). They used corruption, law and order plus democracy as institutional variables, and disaggregated public spending into current and capital expenditure. The results revealed firstly that corruption affects the relationship between public investment expenditure and growth, as well as the relationship between public current expenditure and economic growth, in a significant and negative way. Secondly, democracy has a negative and significant effect on the relationship between public capital expenditure and economic growth, while it generates positive and significant effects in the relationship between public current expenditure and economic growth. Finally, law and order has negative and significant effect on the relationship between current public expenditure and economic growth, while generating positive effects in the relationship public investment spending and economic growth.

In contrast, other studies such as Diandy and Seck (2021) have concluded that institutions have a negative impact on economic growth. However, the authors justify this result by pointing out that the institutions level of these countries is low. They argue that there is a minimum level at which the institutions become conducive to economic activity. Contrary to several works that found corruption to be detrimental to economic growth, the work of Mallik and Saha (2016) revealed a positive effect of corruption on economic growth in a panel of 146 countries over the period 1984-2009. The authors argued that in moderately corrupt countries, corruption invigorates economic growth by reducing red tape. All in all, the results are mixed as to the role of institutions in the relationship between public spending and economic growth. Moreover, there is less empirical work on developing countries, and in particular Ivory Coast, to justify specific analyses of the latter.

3. Empirical Framework

This part of the study first presents the data and structure of the institutional index, and finally the econometric framework. A large literature has shown the importance of institutions in economic activity. Studies such as North (1990); Acemoglu (2008) and Keho (2012) have shown that good institutions are a condition for sustainable growth. In other words, the classic factors of economic growth (labor and capital) are limited to accelerating growth in the long term. Thus, institutions could play a key role in the efficiency of public spending.

3.1. Scope of Study

This study uses annual data for the period 1984-2019. Gross Domestic Product (GDP) per capita is an indicator for measuring the social well-being of a population. The working population represents the labor force, private investment presented by private gross fixed capital formation and public debt are social well-being factors used as control variables in this study. These variables are taken from the World-Development-Indicators (WDI) database. The degree of trade openness variable is taken from Central Bank of West Africa (BCEAO) database, and the institutional variables are taken from the International Country Risk Guide (ICRG) database.

3.2. Data Analysis

In the empirical literature, there is no single indicator for measuring the level of institutional quality. Several indicators have been used to study the effects of institutional quality on economic activity. Following this study selects government stability, bureaucratic quality, investment conditions, law and order, democratic accountability, economic and social condition and corruption. These indicators come from the ICRG produced by the Political Risk Service Group (PRS-Group). The advantage of these data is that they are available over a relatively long period, from 1984 to 2019, with no missing values. Using all these seven indicators in a model can lead to problems of multicollinearity, as these variables may be highly correlated. Similarly, there is also the risk of over-identification due to the large number of coefficients to be estimated. On the other hand, using each of these variables can lead to omission bias. One solution to these problems is to combine the variables into a single indicator with specific weights, like the Human Development Index (HDI) frequently published by the United Nations Development Program (UNDP). However, such an approach comes up against the question of the weights to be assigned to each variable. In order to avoid any subjectivity in defining these weights, we resort to a principal component analysis (PCA). This involves "letting the data speak" so that they themselves determine their respective weights (Keho, 2012). Diandy and Seck (2021) used Kaufman indicators and the PCA technique to construct a composite index of institutions. Unlike that study, we use the first six indicators from "Political Risk Service Group" (PRS Group) to construct our composite index. In addition, these indicators are used to construct our composite index because they can be interpreted in the same direction. In other words, the higher these indicators are, the better the quality of the institutions.

Table 1. Principal component analysis results.

Components						
	PCA1	**PCA2**	**PCA3**	**PCA4**	**PCA5**	**PCA6**
Eigen value	3.355	1.247	0.744	0.379	0.194	0.081
Proportion (%)	55.91	20.78	12.40	6.31	3.23	1.34
Cumulative (%)	55.91	76.70	89.10	95.42	99.65	100
Variable	Vector 1	Vector 2	Vector 3	Vector 4	Vector 5	Vector 6
QB	0.948	-0.117	0.073	0.043	-0.199	0.202
RL	0.847	-0.171	0.217	-0.380	0.248	0.008
CSE	0.790	0.128	0.529	0.232	-0.070	-0.144
SG	-0.760	0.314	0.516	0.127	0.155	0.135
DEM	0.728	0.431	-0.382	0.299	0.221	0.026
PI	0.084	0.951	-0.020	-0.272	-0.122	-0.011

Note: QB: Bureaucratic quality; RL: Law and order; CSE: Economic and social condition; SG: Government stability; DEM: Democratic accountability; PI: Investment conditions.

Finally, corruption alone would be considered as institutional quality, as this variable is an essential phenomenon that undermines the economic development of developing countries, particularly that of Ivory Coast. PCA also requires prior testing of variable reducibility, using the Bartlett (1950) and Kaiser-Meyer-Olkin (KMO) tests (Kaiser, 1974). The KMO index thus measures the adequacy of the variables used in the PCA analysis. KMO values of 0.8 and above are considered well, those between 0.5 and 0.7 are acceptable, and those below 0.5 are unacceptable. In our case, the KMO index is equal to 0.635, so we use PCA.

The results of the principal component analysis are shown in Table 1. This table shows that the first principal component extracts 55.91% of the initial total variance, the second principal component restores around 20.78% of the variance, and so on. Under these conditions, we retain the first two components, since together they account for 79.70% of the total variance. The percentages of variance explained by each of these two components are used to obtain the specific weights used to calculate the institutional composite index. The index values were then normalized according to the formula:

$$IQ_{norm} = (IQ - IQ_{min})/(IQ_{max} - IQ_{min})$$

Values range from 0 to 1 with a high value indicating a good quality institution. Similarly, corruption values have been transformed the closer the value is to 1, the more corrupt the country.

Table 2. Average public spending/GDP ratio and institutional indices.

Period	1984-1989	1990-1999	2000-2009	2010-2019
PE_GDP	7.85	7.79	9.60	15.35
IQn	0.58	0.80	0.31	0.26
Corn	0.72	0.80	0.58	0.47

Table 2 shows trends in the ratio of public spending/GDP (PE_GDP), the composite index of institutions (IQn) and corruption (Corn). Over the 1984-1989 period, the public spending ratio averaged 7.85% of GDP. This was followed by a slight decline in the public spending ratio (-0.06%) over the period 1990-1999. Both decades saw an increase in the public spending ratio. This increase is strongest over the 2010-2019 period, rising from an average of 9.60% of GDP to 15.35% of GDP an increase of (5.75%). We also note that over the 1984-1989 period, the composite institutional index and corruption are 0.58 and 0.72 respectively. The composite index of institutions and corruption reached a maximum level of 0.80. Over the last two decades, the composite institutional index has fallen from 0.80 to 0.31 over the period 2000-2009. As for corruption, there was drop of (-0.11) between the penultimate and final decades. This analysis shows the need for a study of the role of institutions in improving the efficiency of public spending in Ivory Coast.

3.3. Model Specification

We borrow the theoretical approach of the Cobb-Douglas production function defined as follows:

$$Y_t = F(A_t, K_t, L_t) = A_t K^{\alpha} L^{1-\alpha} \qquad \alpha \; and \; 1-\alpha > 0 \tag{1}$$

Where Y_t is real GDP per capita at time t, L_t is labor force, K_t physical capital stock and A_t is total factor productivity, reflecting the level of technology and efficiency of the economy.

By dividing Y_t by L_t, we obtain: $\frac{Y_t}{L_t} = \frac{A_t}{L_t} \times \frac{K_t^{\alpha} L_t}{L_t^{\alpha}} = \frac{A_t K_t^{\alpha}}{L_t^{\alpha}}$ (2)

Linearizing Equation 2, we obtain:

$$\ln Y_t = \ln A_t + \alpha \ln K_t + (1-\alpha) \ln L_t \tag{3}$$

Let's ask $\beta = 1 - \alpha$ and $K_t = PE_t + Kpr_t$ we have:

$$\ln Y_t = \ln A_t + \alpha_2 \ln PE_t + \alpha_4 \ln Kpr_t + \beta \ln L_t \tag{4}$$

Where PE is public spending and Kpr is private investment (private gross fixed capital formation).

Authors such as North (1990); Rodrik (2000); Keho (2012) and Hussen (2023) have argued that improved productivity can be the result of a developed institutional environment.

Hence we posit: $A_t = G(inst) = A_0 e^{\theta inst}$ (5)

Replacing (5) in (4) we obtain: $lnY_t = lnA_0 + \theta inst_t + \alpha_2 lnPE_t + \alpha_4 lnKpr_t + \beta lnL_t$ (6)

To capture the fact that institutions condition the relationship between the efficiency of public spending and gross domestic product per capita, we introduce an interaction variable between overall public spending and institutions: $inst \times lnPE$. Equation 6 thus becomes:

$$lnY_t = lnA_0 + \theta inst_t + \alpha_2 lnPE_t + \alpha_4 lnKpr_t + \alpha_5 (inst_t * lnPE_t) + \beta lnL_t \tag{7}$$

By posing $\theta = \alpha_3$; $\beta = \alpha_6$ and ε_t: the error term iid $(0; \sigma_{\mu}^2)$. We can rewrite Equation 7 as follows:

$$lnY_t = lnA_0 + \alpha_2 lnPE_t + \alpha_3 inst_t + \alpha_4 lnKpr_t + \alpha_5 (inst_t * lnPE_t) + \alpha_6 lnL_t + \varepsilon_t \tag{8}$$

Following the literature, we include in the model other factors that explain gross domestic product per capita, such as the degree of trade openness (DO) (Hakizimana, 2021) and public debt (Det).

$$lnY_t = lnA_0 + \alpha_2 lnPE_t + \alpha_3 inst_t + \alpha_4 lnKpr_t + \alpha_5 (inst_t * lnPE_t) + \alpha_6 lnL_t + \alpha_7 lnDet_t + \alpha_8 DO_t + \varepsilon_t \tag{9}$$

According to Table 3, the study variables are stationary at level or in first difference. Thus, if the variables are co-integrated, we will analyze the short and long-term dynamism of the relationship. As proposed by Pesaran, Shin, and Smith (2001), we can rewrite (9) in the form of an Autoregressive Distributed Lag (ARDL) model presented as follows:

$$\begin{aligned} \Delta lnY_t = {} & lnA_0 + \sum_{i=1}^{p-1} \alpha_1 \Delta lnY_{t-1} + \sum_{i=0}^{q-1} \alpha_2 \Delta lnPE_{t-1} + \sum_{i=0}^{r-1} \alpha_3 \Delta inst_{t-1} + \sum_{i=0}^{s-1} \alpha_4 \Delta lnKpr_{t-1} + \\ & \sum_{i=0}^{t-1} \alpha_5 \Delta (inst_{t-1} * lnPE_{t-1}) + \sum_{i=0}^{u-1} \alpha_6 \Delta lnL_{t-1} + \sum_{i=0}^{v-1} \alpha_7 \Delta lnDet_{t-1} + \sum_{i=0}^{w-1} \alpha_8 \Delta DO_{t-1} + \sum_{i=0}^{x-1} \alpha_9 \Delta dum_{t-1} + \\ & \theta_1 lnY_{t-1} + \theta_2 lnPE_{t-1} + \theta_3 inst_{t-1} + \theta_4 lnKpr_{t-1} + \theta_5 (inst_{t-1} * lnPE_{t-1}) + \theta_6 lnL_{t-1} + \theta_7 lnDet_{t-1} + \\ & \theta_8 DO_{t-1} + \theta_9 dum_{t-1} + \varepsilon_t \end{aligned} \tag{10}$$

With Δ the first difference operator: α_1-α_9 the error-correction model representation; θ_1-θ_9 denotes long-term relationships; $p-1, \ldots, x-1$ are the lag numbers of the variables; dum an indicator variable capturing changes following the creation and devaluation of the FCFA.

However, the above ARDL model does not take into account the direction of institutions. In other words, there may be potential asymmetric effects of institutional improvements and degradations on GDP per capita. A number of events, such as political instability and socio-economic and political crises, can lead to a sharp deterioration in

institutions. As a result, a more appropriate model is needed to accurately reflect the complexity of the real world. Thus, we explore the nonlinear ARDL (NARDL) model developed by Shin, Yu, and Greenwood-Nimmo (2014). According to authors such as Schorderet (2003) and Shin et al. (2014), the starting point is to decompose institutional time series ($inst$) into its positive ($inst_t^+$) and negative ($inst_t^-$) partial sums:

$$POS = inst_t^+ = \sum_{j=1}^{t} \Delta inst_j^+ = \sum_{j=1}^{t} max(\Delta inst_j, 0) \quad (11)$$

$$NEG = inst_t^- = \sum_{j=1}^{t} \Delta inst_j^- = \sum_{j=1}^{t} min(\Delta inst_j, 0) \quad (12)$$

With $\Delta inst_j^+$ and $\Delta inst_j^-$ capturing positive (improvements) and negative (degradations) variations in institutional quality. Thus the models to be estimated follow the demonstration of Shin et al. (2014) are as follows:

$$\Delta lnY_t = lnA_0 + \sum_{i=1}^{p-1} \alpha_1 \Delta lnY_{t-1} + \sum_{i=0}^{q-1} \alpha_2 \Delta lnPE_{t-1} + \sum_{i=0}^{r-1} \alpha_3^+ \Delta inst_{t-1}^+ + \sum_{i=0}^{r-1} \alpha_3^- \Delta inst_{t-1}^- + \sum_{i=0}^{s-1} \alpha_4 \Delta lnKpr_{t-1} + \sum_{i=0}^{t-1} \alpha_5 \Delta(inst_{t-1} * lnPE_{t-1}) + \sum_{i=0}^{u-1} \alpha_6 \Delta lnL_{t-1} + \sum_{i=0}^{v-1} \alpha_7 \Delta lnDet_{t-1} + \sum_{i=0}^{w-1} \alpha_8 \Delta DO_{t-1} + \sum_{i=0}^{x-1} \alpha_9 \Delta dum_{t-1} + \theta_1 lnY_{t-1} + \theta_2 lnPE_{t-1} + \theta_3^+ inst_{t-1}^+ + \theta_3^- inst_{t-1}^- + \theta_4 lnKpr_{t-1} + \theta_5(inst_{t-1} * lnPE_{t-1}) + \theta_6 lnL_{t-1} + \theta_7 lnDet_{t-1} + \theta_8 DO_{t-1} + \theta_9 dum_{t-1} + \varepsilon_t \quad (13)$$

With $-\theta_2/\theta_1$, $-\theta_3/\theta_1$, $-\theta_3'/\theta_1$, $-\theta_4/\theta_1$, $-\theta_5/\theta_1$, $-\theta_6/\theta_1$, $-\theta_7/\theta_1$, $-\theta_8/\theta_1$, $-\theta_9/\theta_1$ are the long-term coefficients. We expect the fit coefficient $\theta_1 < 0$

We can rewrite the long-run form of (13) as follows:

$$y_t = \beta_0 + \beta_1 lnY_{t-1} + \beta_2 lnPE_t + \beta_3^+ inst_t^+ + \beta_3^- inst_t^- + \beta_4 lnKpr_t + \beta_5(inst_t * lnPE_t) + \beta_6 lnL_t + \beta_7 lnDet_t + \beta_8 DO_t + \beta_9 dum_t + \varepsilon_t \quad (14)$$

Having estimated the long-run coefficients, we examine how institutional variables affect the relationship between public spending and GDP per capita. From (13), we calculate the marginal effect as follows:

$$\frac{\partial y_t}{\partial lnPE_t} = \beta_2 + \beta_5 inst_t \quad (15)$$

Equation 15 shows that the marginal effect of public spending on GDP per capita depends on institutional quality.

If β_2 *and* β_5 are all positive or respectively negative, then public spending has a positive or respectively negative effect on GDP per capita and institutions accentuate this impact.

If $\beta_2 > 0$ *and* $\beta_5 < 0$, then public spending has a positive effect on GDP per capita but institutions reduce this positive impact.

If $\beta_2 < 0$ *and* $\beta_5 > 0$, then public spending has negative effect on GDP per capita but institutions mitigate this negative impact.

3.4. NARDL Model Estimation Procedure

As with any time series analysis, the first step is to test the order of integration of variables. Thus, for a NARDL model, we need to ensure that no variable is integrated of order two I (2). The second step is to test for co-integration between variables. In view of the results of unit-root tests, we use the test of Pesaran et al. (2001) to test the existence of a long-term relationship between the variables in our two models. Furthermore, unlike the co-integration tests of Engel and Granger (1987); Johansen (1988) and Johansen (1991), the bounds test to co-integration initiated by Pesaran and Shin (1999) is used when the series have a mixed order of integration (some being stationary and others non-stationary), which is in line with our results. This test formulates the hypothesis as follows:

$H_0: \theta_1 = \theta_2 = \cdots = \theta_9$

Against the alternative hypothesis:

$H_1: \theta_1 \neq \theta_2 \neq \cdots \neq \theta_9$

In practice, this test is performed by comparing the calculated Fisher (F_{cal}) values with the simulated critical values. If we assume ω_0 to be the lower bound and ω_1 the upper bound, then we have:

$F_{cal} > \omega_1$: Existence of co-integration.

$F_{cal} < \omega_0$: No co-integration.

$\omega_0 < F_{cal} < \omega_1$: No conclusion.

The third step is to test the long-run symmetry ($\theta_3^+ = \theta_3^-$) and also the short-term symmetry, by comparing the sum of positive and negative dynamic coefficients ($\sum_{i=0}^{r-1} inst_t^+ + \sum_{i=0}^{r-1} inst_t^-$).

Finally, we check the robustness of the model using diagnostic tests. And so, we move on to the results.

4. Results and Discussion

4.1. Results

4.1.1. Unit-Root Tests for the Variables

To avoid spurious regressions, it is necessary to test for the unit root of the series to analyze their stochastic properties. To this end, we use two tests, namely the Augmented Dickey and Fuller (1981) and Zivot and Andrews (2002) tests. These tests respectively assume, under the null hypothesis, that the series has a unit root and that the series has a unit root without any break.

As for the alternative hypothesis, these tests respectively assume that the series is stationary and the series is stationary with a single break.

In case of conflict between the two tests, we prefer the Zivot-Andrews results. Depending on the results of the stationarity tests reported in Table 3, the variables are integrated of order I(0) or order I(1). With the exception of labor force, institutional variables (IQn and corn) and interaction variables, the other variables are stationary in first differences.

Table 3. Unit root tests results.

Variable	ADF		Zivot-Andrews				Remark
	Level	1st differenced	Level	Break date	1st differenced	Break date	
lnGDP	1.196 (-2.976)	-3.222** (-2.967)	-0.824 (-4.193)	1989	-6.231** (-4.443)	1994	I(1)
lnL	-0.408 (-2.951)	-5.315** (-2.986)	-4.768** (-4.443)	1990	-23.263** (-4.443)	1990	I(0)
lnKpr	-2.656 (-2.957)	-3.102** (-2.960)	-1.767 (-4.443)	1993	-7.423** (-4.443)	2011	I(1)
lnPE	0.955 (-2.948)	-5.166** (-2.951)	-1.260 (-4.443)	2011	-5.754** (-4.443)	1990	I(1)
lnDet	-2.075 (-2.951)	-4.568** (-2.951)	-2.255 (-4.443)	2002	-6.054** (-4.443)	2013	I(1)
Do	-2.968** (-2.948)	-5.803** (-2.951)	-4.148 (-4.443)	2013	-6.124** (-4.443)	1994	I(1)
IQn	-1.662 (-2.948)	-6.824** (-2.951)	-5.018** (-4.443)	2002	-7.593** (-4.443)	1990	I(0)
Corn	-2.355 (-2.951)	-4.396** (-2.951)	-4.759** (-4.443)	1995	-5.625** (-4.443)	1996	I(0)
IQn*lnPE	-1.789 (-2.948)	-6.688** (-2.951)	-5.652** (-4.443)	2001	-7.132** (-4.443)	1990	I(0)
Cor*lnPE	-2.819 (-2.951)	-4.439** (-2.951)	-4.788** (-4.443)	1995	-5.400** (-4.443)	1996	I(0)

Note: ** indicate stationary at 5%; ADF, test of Augmented Dickey and Fuller (1981), test of Zivot and Andrews (2002).

4.1.2. Co-integration Test for Nonlinear ARDL

The aim here is to verify the existence of a long-term relationship.

Table 4. Symmetric bound test results.

Model 1 H_0: No co-integration	Value	5% critical bounds		1% critical bounds	
		I(0)	I(1)	I(0)	I(1)
F-statistic	11.35	2.14	3.30	2.65	3.97
Model 2		5% critical bounds		1% critical bounds	
H_0: No co-integration	Value	I(0)	I(1)	I(0)	I(1)
F-statistic	5.03	1.86	3.05	2.37	3.68

Note: The F-statistic values at 1% of significance indicating a long-run relationship.
Source: Pesaran et al. (2001).

Table 4 highlights the results of NARDL bounds tests. In fact, the calculated Fisher value (11.35 and 5.03) is greater than the limit (respectively 3.97 and 3.68 at to 1% threshold), so the null hypothesis of no co-integration is rejected. There is therefore a long-term relationship between public spending and GDP per capita in the presence of institutional factors (IQn and Corn). The next step will be to assess the effects of public spending in the presence of institutions, and especially of short and long-term institutional shocks, on GDP per capita in Ivory Coast. These results are presented in Tables 5 and 6.

4.1.3. Estimation and Asymmetry Test Results

Table 5. Nonlinear long-run results.

Variable	Model 1: NARDL(1.1.1.0.0.1.1.1.0.1)			Model 2: NARDL(1.0.0.0.0.0.0.0.1.1)		
	Coefficient	t-statistic	Probability	Coefficient	t-statistic	Probability
Ln L	-1.891	-2.891	0.010	0.228	2.609	0.015
Ln Kpr	0.255	1.648	0.117	0.148	1.576	0.128
Ln PE	0.351	2.262	0.037	0.282	1.875	0.073
Iqn_POS	-3.858	-1.317	0.205			
Iqn_NEG	-3.844	-1.324	0.202			
Iqn*lnPE	0.461	1.207	0.243			
Corn_POS				-0.286	-2.145	0.042
Corn_NEG				0.093	0.911	0.371
Corn*lnPE				0.073	1.507	0.145
Do	0.001	2.709	0.014	0.0008	1.061	0.299
Ln det	0.155	2.628	0.017	-0.001	-0.015	0.988
Dum	-0.918	-6.049	0.000	-0.909	-2.840	0.009

Note: The dependent variable is Ln (GDP per capita).

Table 6. Short-run estimates.

Variable	Model 1			Model 2		
	Coefficient	t-statistic	Probability	Coefficient	t-statistic	Probability
C	29.064	13.201	0.000			
Δ(Ln L)	-0.541	-1.690	0.109			
Δ(Ln Kpr)	0.044	0.807	0.430			
Δ(Iqn_NEG)	-4.829	-10.632	0.000			
Δ(Iqn*lnPE)	0.566	11.001	0.000			
Δ(Do)	-0.0005	-2.526	0.002	-0.0007	-2.506	0.019
Δ(Dum)	-0.487	-13.242	0.000	-0.389	-7.986	0.000
CointEq(-1)	-0.976	-13.178	0.000	-0.590	-8.370	0.000
R-squared: 0.91		DW=2.12		R-squared=0.76	DW=1.55	
Adj R-squared=0.88		Prob (F-statistic)=0.000		Adj R-squared= 0.75		

Note: The dependent variable is Ln (GDP per capita), DW indicates Durbin-Watson statistic.

Table 5 presents the long-run estimation results of models 1 and 2 to explain the dependent variable. For model 1, labor force, public spending, trade openness and public debt are significant at the 5% level. In model 2, labor force and positive institutional shocks (corruption) are significant at the 5% level. Table 6 shows the short-term estimation for the two models. Indeed, model 1 indicates that, in the short-term, negative institutional shocks, the interaction between institutions and public spending and trade openness are significant at the 1% level. As expected, the recall force CointEq (-1) is negative and significant at the 1% threshold, meaning that any exogenous shock in one of the variables will produce convergence towards equilibrium. This model also shows a predictive power of 91%. For model 2, trade openness is significant at the 5% level. The model's recall force is negative and significant at 1%. Model 2 has a predictive power of 76%.

Table 7. Asymmetry test results.

Wald test	Model 1		Model 2	
	χ^2 chi-square	Probability	χ^2 chi-square	Probability
W_{SR}	8.08	0.004	NA	NA
W_{LR}	0.08	0.766	0.02	0.871

Note: The null hypothesis is that the coefficients are symmetric. W_{SR} and W_{LR} denote the short and long-run Wald statistic symmetries, NA indicates that the values are not available (short-term coefficients for corruption shocks are zero).

Table 7 presents the results of the test for symmetries. The long-run statistics calculated for the two models are equal to 0.08 and 0.02, with respective probabilities of 0.766 and 0.871, all of which are greater than 5%. We therefore accept the null hypothesis, rejecting the alternative hypothesis of asymmetry. Consequently, GDP per capita reacts in the same way in the long-term to both positive and negative institutional shocks. As for model 1, in the short-term, the calculated statistic is equal to 8.08 with a probability of 0.004, which is less than 5%. The null hypothesis is thus rejected in favor of the alternative hypothesis. Consequently, the effects of institutional shocks on GDP per capita are asymmetrical in the short-term.

4.1.4. Nonlinear ARDL Diagnostic Tests'

Table 8. Diagnostics tests results.

Test type	Tests	Model 1		Model 2	
		Value	Prob.	Value	Prob.
Autocorrelation	Breusch-Godfrey	0.28	0.754*	0.63	0.542*
	ARCH	3.12	0.087*	0.29	0.588*
Heteroskedasticity test	Breusch-Pagan-Godfrey	1.59	0.168*	2.76	0.018
	Jarque-Bera	0.06	0.967*	0.07	0.961*
Normality test	Anderson-Darling	0.37	0.401*	0.27	0.646*
Specification test	Ramsey RESET	0.87	0.361*	2.14	0.157*

Note: * Denotes acceptance of null hypothesis.

Table 8 shows the results of the autocorrelation, heteroskedasticity, and error normality and specification tests. The Breusch-Godfrey test is used to test error autocorrelation for both models. This test confirms the absence of error autocorrelation at the 5% threshold for both models. The Breusch-Pagan-Godfrey and ARCH tests are used to test error heteroskedasticity. These tests show values of 1.59 and 3.12, with respective probabilities of 0.168 and 0.087 for model 1. Similarly, these tests show values of 2.76 and 0.29, with probabilities of 0.018 and 0.588 respectively. The null hypothesis of no heteroskedasticity of errors is thus accepted for both models. The Jarque-Bera and Anderson Darling tests show that the errors follow a normal distribution in the estimated models. The Ramsey RESET test shows that no variables are omitted, so the estimated models are well specified. To test the stability of the models, the CUSUM and CUSUM of squares tests are used, and the results confirm their stability. They are presented in Figures 1 and 2. The various tests carried out confirm the robustness of the estimated models, so we can interpret and discuss the results.

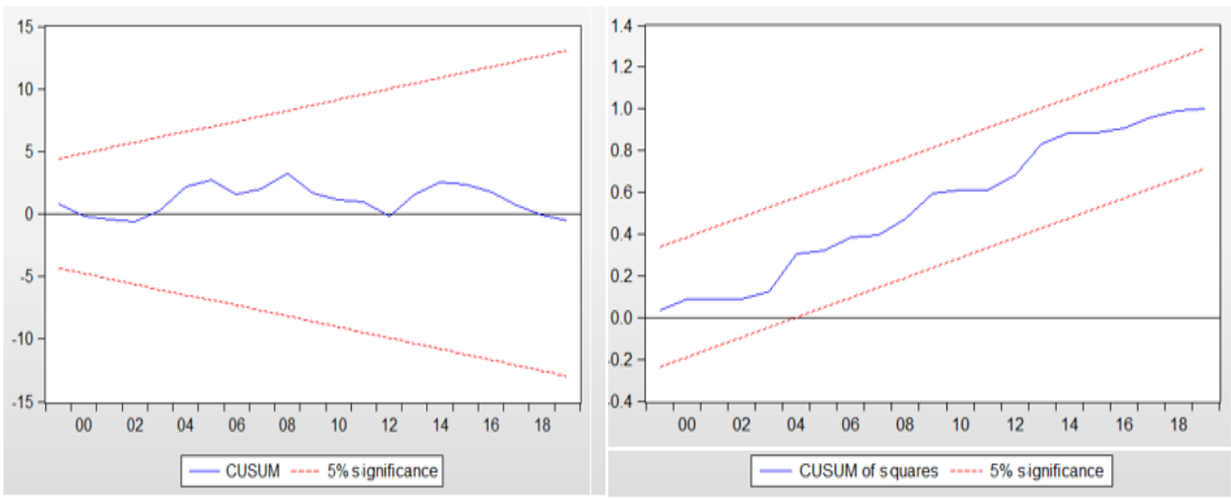

Figure 1. Cumulative sum of recursive residuals plot and cumulative sum squares of recursive residuals plot for model1.

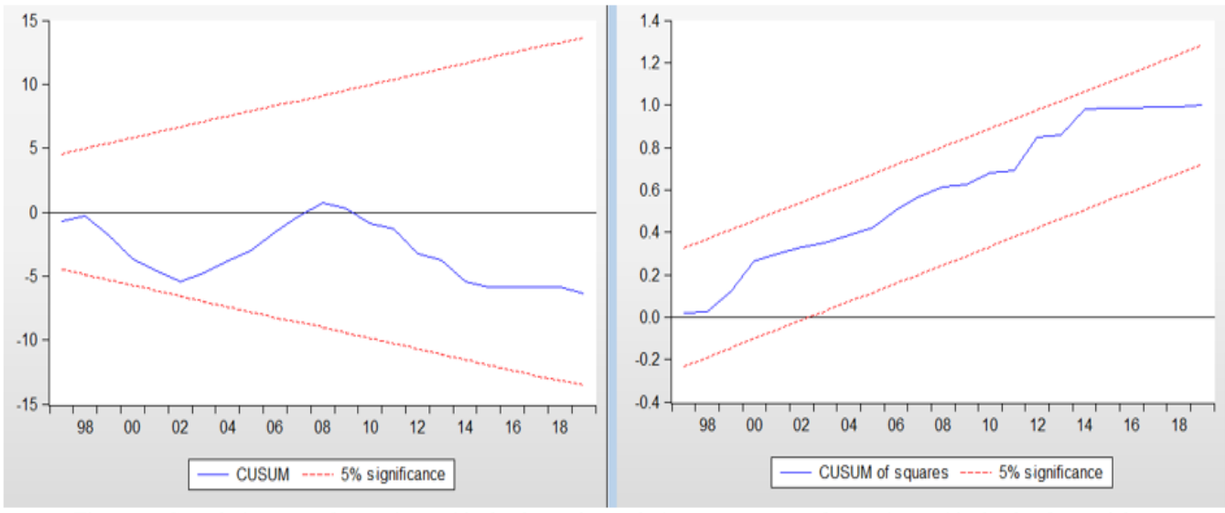

Figure 2. Cumulative sum of recursive residuals plot and cumulative sum squares of recursive residuals plot for model 2.

4.2. Discussion

This article presents three major results. Firstly, institutional and corruption shocks are symmetrical in the long-run. Whereas the effects of institutional shocks are asymmetrical in the short-term. Secondly, negative institutional shocks generate negative effects on GDP per capita in the short-term. Similarly, positive corruption shocks deteriorate economic growth in the long-run.

Finally, the current level of institutions favors the positive effects of public spending on economic growth, but not significantly so.

The effects of institutional and corruption shocks are symmetrical in the long-run. The effects of a positive corruption shock are detrimental to economic growth in long-run. A 1% positive variation in corruption leads to a 28.6% drop in GDP per capita.

This result is in line with theory and corroborates with the findings of Hakizimana (2021); Dzhumashev (2014) and Arawomo and Adeoye (2020), it invalidates the results of Mallik and Saha (2016) who revealed a positive effect of corruption on economic growth. As for negative corruption shocks, the effects are positive but not significant, suggesting that the current level of corruption is very high. The effects of short-term institutional shocks are asymmetric.

A negative variation in the institutional index of 1% causes GDP per capita to fall by 4.829. This result shows the importance of improving institutions in Ivory Coast. The result is similar to the findings of Dani Rodrik (1999); Sani, Said, Ismail, and Mazlan (2019); Oppong et al. (2023); Vianna and Mollick (2018) and Hussen (2023). Institutions improve the effects of public spending on GDP per capita, but only significantly over time. In other words, they accentuate the positive effect of public spending on GDP per capita. The result contradicts those of Diandy and Seck (2021) who argued that institutions negatively affect economic growth in Sub-Saharan Africa. The results reveal that public spending boosts GDP per capita. A 1% increase in public spending leads to a 0.351% rise GDP per capita, all other things being equal.

This result confirms the Keynesian thesis and that of the authors of endogenous growth as to the necessity of the State in the economic fabric of a country. It is also in line with the results of Arawomo and Adeoye (2020); Arvin et al. (2021) and Friday et al. (2016). The degree of trade openness and public debt encourage GDP per capita in Ivory Coast in the long-term. Indeed, a 1% increase in public debt leads to a 0.155% increase in GDP per capita. This result rejects the findings of Oppong et al. (2023), who found that public debt has a negative impact on economic growth.

In fact, public debt is an alternative means of financing major public projects. Efficient management and productive project financing can only boost economic growth. Similarly, a one unit increase in trade openness improves GDP per capita by 0.1%. This result is in line with the findings of Chinwuba and Ibrahim (2016). However, the degree of openness has negative short-term effects. A one-unit variation in the degree of openness leads to a 0.05% drop in GDP per capita. Finally, the results for labor force are mixed for both models.

5. Conclusion

The question of whether public spending improves economic growth is still topical, with the results of empirical work controversial. This question has important policy implications for improving the quality of public spending. This study examined the role of institutions in the relationship between public spending and economic growth in Ivory Coast. To do so, it used annual data covering the period 1984-2019. It constructed an institutional composite index using the PCA method, and estimated NARDL models in which it introduced two interaction variables.

Also exploiting the Pesaran et al. (2001) bounds co-integration test and Wald symmetry test, she found clear evidence a long-run relationship between public spending and real GDP per capita, as well as symmetric effects of institutions and corruption in the long-run. The effects of institutional shocks are asymmetrical in the short-term. Estimation results show that public spending promotes economic growth, but institutions do not significantly accentuate its effects. Negative institutional shocks deteriorate GDP per capita in the short-term, while positive corruption shocks deteriorate GDP per capita in the long-term. This means that a deterioration in institutions leads to a fall in GDP per capita. Similarly, the current level of institutions appears to be weak to effectively boost the positive effects of public spending on GDP per capita.

The main policy implication we draw from this study is that, to improve the effectiveness of public spending in Ivory Coast, a credible strategy should focus on improving institutional factors and effectively combating corruption. Any attempt to increase public spending without first improving institutional quality will be less productive, if not counter-productive. This study used sophisticated econometric methods, which enabled us to go

beyond the simple role of institutions by observing the effects of their shocks on GDP per capita. The limitation of this study is that it does not take account of all institutional variables.

Future research could therefore focus on other institutional variables not used in this study, to construct a second institutional composite index, for example.

References

Abdulrasheed, B. (2017). Causality between government expenditure and government revenue in Nigeria. *Asian Journal of Economics and Empirical Research, 4*(2), 91-98. https://doi.org/10.20448/journal.501.2017.42.91.98

Acemoglu, D. (2008). Interactions between gouvernance and growth: What world bank economists need to know. In Gouvernance, Growth and Development Decision-Making. In (pp. 1-9). Washington DC: World Bank.

Afonso, A., & Jalles, J. T. (2016). Economic performance, government size, and institutional quality. *Empirical, 43*, 83-109. https://doi.org/10.1007/s10663-015-9294-2

Afonso, A., Jalles, J. T., & Venâncio, A. (2022). Do financial markets reward government spending efficiency? *Journal of International Financial Markets, Institutions and Money, 77*, 101505. https://doi.org/10.1016/j.intfin.2022.101505

Afonso, A., & Rodrigues, D. S. F. L. E. (2022). Corruption and economic growth: Does the size of the government matter? *Economic Change and Restructuring, 55*(2), 543-576. https://doi.org/10.1007/s10644-021-09338-4

Agostino, G., Dunne, J. P., & Pieroni, L. (2016). Corruption and growth in Africa. *European Journal of Political Economy, 43*, 71-88.

Ali, T. B., & Ahmed, Z. (2017). Governance and public debt accumulation: Quantitative analysis in MENA countries. *Economic Analysis and Policy, 56*, 1-13. https://doi.org/10.1016/j.eap.2017.06.004

Arawomo, O., & Adeoye, T. (2020). Public spending and economic growth: The role of institutional quality. *International Journal of Accounting Research, 5*(2), 61-76. https://doi.org/10.12816/0058790

Arvin, M. B., Pradhan, R. P., & Nair, M. S. (2021). Are there links between institutional quality, government expenditure, tax revenue and economic growth? Evidence from low-income and lower middle-income countries. *Economic Analysis and Policy, 70*, 468-489. https://doi.org/10.1016/j.eap.2021.03.011

Barişik, S., & Baris, A. (2017). Impact of governance on budget deficit in developing countries. *Theoretical & Applied Economics, 24*(2), 111-130.

Bartlett, S. M. (1950). Tests of significance in factor analysis. *The British Journal of Psychology, 3*, 77-85. https://doi.org/10.1111/j.2044-8317.1950.tb00285.x

Botchuin, W. C. (2021). Institutional factors of inclusive growth: Evidence from Cte divoire. *Journal of Economics and International Finance, 13*(1), 13-23. https://doi.org/10.5897/jeif2020.1091

Butkiewicz, J. L., & Yanikkaya, H. (2011). Institutions and the impact of government spending on growth. *Journal of Applied Economics, 14*(2), 319-341. https://doi.org/10.1016/s1514-0326(11)60017-2

Chinwuba, O., & Ibrahim, S. (2016). Modelling economic growth function in Nigeria: An ARDL approach. *Asian Journal of Economics and Empirical Research, 3*(1), 84-93.

Diandy, I. Y., & Seck, A. B. (2021). Physical infrastructure and economic growth in West Africa: The role of institutions. *African Development Review, 33*(1), 154-165. https://doi.org/10.1111/1467-8268.12517

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: Journal of the Econometric Society*, 1057-1072. https://doi.org/10.2307/1912517

Dzhumashev, R. (2014). Corruption and growth: The role of governance, public spending, and economic development. *Economic Modelling, 37*, 202-215. https://doi.org/10.1016/j.econmod.2013.11.007

Engel, R. F., & Granger, C. W. (1987). Cointegration and error correction: Representation, estimation and testing. *Econometrica, 55*(2), 251-276.

Friday, E., Ogwumike, F., Udongwo, U., & Ayodele, O. (2016). Impact of government expenditure on economic growth in Nigeria: A disaggregated analysis. *Asian Journal of Economics and Empirical Research, 3*(1), 113-121.

Hakizimana, J. (2021). Effect of corruption on economic growth in the Republic of Congo: An analysis by a nonlinear model with staggered lags. *Annals of Marien Ngouabi University, 21*(1), 127-145.

Hussen, M. S. (2023). Institutional quality and economic growth in Sub-Saharan Africa: A panel data approach. *Journal of Economics and Development, 25*(4), 332-348. https://doi.org/10.1108/jed-11-2022-0231

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control, 12*(2-3), 231-254.

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica: Journal of the Econometric Society*, 1551-1580. https://doi.org/10.2307/2938278

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika, 39*(1), 31-36.

Keho, Y. (2012). The role of institutional factors in financial and economic development in WAEMU countries. *Economic and Monetary Review, 12*, 9-43.

Kim, E., Ha, Y., & Kim, S. (2017). Public debt, corruption and sustainable economic growth. *Sustainability, 9*(3), 1-30. https://doi.org/10.3390/su9030433

Mallik, G., & Saha, S. (2016). Corruption and growth: A complex relationship. *International Journal of Development Issues, 15*(2), 113-129.

Mauro, P. (1998). Corruption and the composition of government expenditure. *Journal of Public economics, 69*(2), 263-279. https://doi.org/10.1016/s0047-2727(98)00025-5

North, D. C. (1990). Institutions, institutional change and economic performance. In (pp. 33). Cambridge: Cambridge University Press.

Oppong, C., Atchulo, A. S., & Oman, S. F. (2023). Public debt and economic growth nexus in Sub-Saharan Africa: Does institutional quality. *International Review of Applied Economics, 37*, 311-323. https://doi.org/10.1080/02692171.2023.2205107

Oyinlola, M. A., & Akinnibosun, O. (2013). Public expenditure and economic growth nexus: Further evidence from Nigeria. *Journal of Economics and International Finance, 5*(4), 146-154.

Pesaran, M. H., & Shin, Y. (1999). *An autoregressive distributed lag modelling approach to cointegration analysis. In: Strom, S., Ed., Chapter 11 in Econometrics and Economic Theory in the 20th Century the Ragnar Frisch Centennial Symposium.* Cambridge: Cambridge University Press.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289-326. https://doi.org/10.1002/jae.616

Rodrik, D. (1999). Where did all the growth go? External shocks, social conflict, and growth collapses. *Journal of Economic Growth, 4*, 385-412. https://doi.org/10.3386/w6350

Rodrik, D. (2000). Institutions for high growth: What they are and how to acquire them. NBER Working Paper No. 7540.

Rota-Graziosi, G., Arezki, R., & Dama, A. A. (2021). Revisiting the relationship between trade liberalization and taxation. Working Paper 349-Revisiting the Relationship between Trade Liberalization and Taxation. No. 2475.

Sani, A., Said, R., Ismail, N. W., & Mazlan, N. S. (2019). Public debt, institutional quality and economic growth in Sub-Saharan Africa. *Institutions and Economies, 11*(3), 39-64.

Schorderet, Y. (2003). *Asymmetric cointegration, working paper.* Geneva: Econometrics Department, University of Geneva.

Shin, Y., Yu, B., & Greenwood-Nimmo, M. (2014). Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. *Festschrift in Honor of Peter Schmidt: Econometric Methods and Applications*, 281-314. https://doi.org/10.2139/ssrn.1807745

Shleifer, A., & Vishny, R. W. (1993). Corruption. *The Quarterly Journal of Economics, 108*(3), 599-617.

Tanzi, V., & Davoodi, H. R. (1997). Corruption, public investment and growth. Working Paper of the International Monetary Fund, Fiscal Affairs Department, WP/ 97/139.

Vianna, A. C., & Mollick, A. V. (2018). Institutions: Key variable for economic development in Latin America. *Journal of Economics and Business, 96*, 42-58. https://doi.org/10.1016/j.jeconbus.2017.12.002

Zivot, E., & Andrews, D. W. K. (2002). Further evidence on the great crash, the oil-price shock, and the unit-root hypothesis. *Journal of Business & Economic Statistics, 20*(1), 25-44. https://doi.org/10.2307/1391541