Does corruption really matter for the structure of public expenditures?

Itchoko Motande Mwa Ndjokou Mondjeli [a], Martin Ambassa [b],*

[a] *University of Maroua, Faculty of Economics and management, Maroua, Cameroon*
[b] *Ecoresearch, Yaoundé, Cameroon*

ARTICLE INFO

ABSTRACT

Corruption significantly distorts the allocation of public expenditures, yet systematic evidence on its effects on current and capital expenditures is limited. This study analyzes panel data from 45 Sub-Saharan African (SSA) countries from 1996 to 2022. Using fixed effects and instrumental variables models, we find that corruption reduces capital expenditures while increasing current expenditures. Additionally, mediation analysis reveals that income inequality, conflict, and the rule of law are key channels through which corruption impacts public expenditure structures in SSA. We recommend enhancing accountability and transparency in public expenditures and prioritizing good governance.

1. Introduction

The detrimental effects of corruption on economic development are among the most pressing challenges faced by developing countries. According to the United Nations (UN), countries in Sub-Saharan Africa (SSA) exhibit some of the most alarming sustainable development indicators. For instance, the World Bank (WB) reports that 41 % of the population in SSA lives below the international poverty line. Additionally, seven of the ten most unequal countries globally are in SSA. Environmental degradation is particularly severe, with nearly 90 % of households exposed to indoor air pollution (UNEP, 2022). Other indicators of sustainable development, including health, education, and food security, also reflect concerning levels. Addressing the challenges of sustainable development necessitates improved oversight of public expenditure quality. Unfortunately, public expenditures in SSA are often distorted and disproportionately allocated to non-productive sectors, a situation largely attributed to corruption.

The concept of corruption in economics is often explained through agency models. Rose-Ackerman (1975) defines corruption as a situation in which a public official exploits the power delegated to them by the community to pursue individual interests at the expense of collective interests. Economic literature typically presents two approaches to understanding the effects of corruption. The first approach, known as the "grease the wheels" hypothesis, highlights the potential benefits of corruption. This perspective suggests that corruption can help circumvent institutional shortcomings and promote development. For instance, Lui (1985) demonstrated that corrupt practices can effectively reduce waiting times in bureaucratic queues, as bribes incentivize bureaucrats to expedite the processing of applications. Similarly, Huntington (1968) argued that bribery can alleviate cumbersome bureaucratic regulations and enhance incomes. In contrast, the second approach, referred to as the "sand the wheels" hypothesis, posits that corruption generates additional distortions, erodes institutional trust, and obstructs economic development. This perspective challenges the notion that corruption can be justified or yield positive outcomes. The sand the wheels hypothesis illustrates how corruption acts as a source of delays, diverting state revenues to benefit a select few while exacerbating inequality, making the rich richer and the poor poorer. Numerous empirical studies support this view; for example, Mauro (1995) found that corruption reduces investment, which in turn hampers economic growth.

As Delavallade (2014) notes, the rent-seeking behavior associated with corruption is intrinsically linked to the mechanism of delegated responsibility and is exacerbated by the inherent asymmetry of information. Corruption manifests in various forms, including favoritism, clientelism, bribery, embezzlement, lobbying, and vote-buying. The relationship between corruption and the structure of public expenditures was first theoretically analyzed by De la Croix and Delavallade (2007). They argue that countries with weak legal systems exhibit

---

* Corresponding author.

E-mail addresses: motande@yahoo.fr (I.M.M.N. Mondjeli), martin_amb@yahoo.fr (M. Ambassa).

higher levels of corruption, allocate a greater proportion of their budgets to physical capital rather than education and health, and experience lower growth rates, particularly when political power is highly concentrated. Numerous empirical investigations have explored this relationship. For instance, Mauro et al. (2019) demonstrate that corruption diverts public funds away from education, health, and infrastructure investments crucial for enhancing economic performance and improving the standard of living. Similarly, Sedgo and Omgba (2023) find that widespread corruption distorts the composition of public expenditures, reducing the share allocated to investment. This aligns with the findings of Mauro (1997) and Tanzi and Davoodi (1997), who showed that education expenditures tend to be lower in countries with high corruption levels. While the distorting effects of corruption on the structure of public expenditures have been extensively studied, the existing literature reveals two significant shortcomings. To the best of our knowledge, no study has simultaneously examined the differential effects of corruption on capital and current expenditures in the context of SSA. This approach is important because the degree of exposure to corruption in the public expenditure process likely varies between different categories of expenditures. Two key factors justify this consideration. First, the proportion of current expenditures is significant. According to statistics from the International Monetary Fund (IMF, 2023), current expenditures account for 75 % of total expenditures in SSA, while capital expenditures comprise only 25 %. This concentration of resources in current expenditures creates a niche for corruption that warrants further investigation. Second, the prevalence and growth of corruption in SSA necessitate in-depth analysis. The Transparency International report (2023) indicates that most SSA countries score below the global average on the Corruption Perception Index, with only a few exceptions, including Seychelles, Botswana, Mauritius, Rwanda, Namibia, and São Tomé and Príncipe.

The second gap in the literature pertains to the inability to identify the transmission channels through which corruption affects the structure of public expenditures. Our study aims to address this gap by investigating the transmission channels of corruption in relation to public expenditure structures, specifically focusing on conflicts, the rule of law, and income inequality. This article serves two primary purposes. First, it analyzes the impact of corruption on the structure of public expenditures in Sub-Saharan Africa (SSA), distinguishing between its effects on capital and current expenditures. This differentiation is significant for two main reasons. As noted by Mauro (1997), interpreting any empirical relationship between corruption and specific components of government expenditures suggests that bribes may be more easily collected on certain types of expenditures than on others. Additionally, this topic is relevant and timely, reflecting the realities of SSA, a region notably affected by corruption. Second, we contend that the existing literature has yet to adequately address fundamental questions regarding the relationship between corruption and public expenditure structures. Specifically, we ask: What are the main transmission channels through which corruption influences the structure of public expenditures? How quantitatively significant are the effects of corruption on the primary drivers of public expenditurenamely, conflicts, the rule of law, and income inequality? Our study aims to elaborate on these channels, demonstrating how corruption mediates the structure of public expenditures in SSA countries. To the best of our knowledge, we are the first to empirically investigate this mediating effect in this context. The findings of this study are important. The Sustainable Development Goals emphasize that fighting poverty is essential for development, and combating corruption is vital to achieving this objective, as it can perpetuate poverty. Furthermore, the African Union's Agenda 2063 prioritizes good governance, which necessitates effective measures against corruption. This study thus contributes to the realization of both the Sustainable Development Goals and the African Union's Agenda 2063 by providing plausible and effective recommendations for combating corruption. The remainder of this study is organized as follows: Section 2 provides a literature review, while Section 3 outlines the methodological strategy employed in this study. Sections 4 and 5 present and analyze the results, and Section 6 concludes.

2. Understanding corruption's impact on public expenditures: theoretical insights, empirical evidence and transmission channels

This section outlines the theoretical framework, provides an empirical review, and discusses the transmission channels related to the impact of corruption on public expenditures.

2.1. Theoretical insights

The initial theoretical understanding of the determinants of public expenditures dates to Wagner in the 19th century. In this framework, Wagner's law posits that public expenditures increase in correlation with economic growth. Wagner emphasizes that rising public expenditures can be attributed to economic growth. As reported by Lechevalier and Vigny (2022), according to Wagner's law, as societies become more civilized, the cost of the state increases due to the growing needs that emerge from increased wealth. Peacock et al. (1967) further developed this approach by introducing the principle of the displacement effect, which suggests that public expenditures rise during times of war or crisis. Consequently, the increase in public expenditures does not follow a linear trajectory relative to economic growth. Other determinants have been explored, particularly the configuration of political systems, the democratization of societies (Meltzer and Richard, 1981), and the consequences of increasing internationalization of economies. Studies have also highlighted the role of political systems in determining public spending. Pioneering work by Persson et al. (2000) identifies two key parameters: voting systems and forms of government. Rational voters tend to choose candidates whose programs are most favorable regarding transfers and public goods supply. In a majority voting system, electoral competition is concentrated primarily in swing constituencies. Consequently, candidates will focus their spending proposals on key voter groups. In contrast, in countries with proportional voting systems, announced budgetary measures are typically higher, as they aim to build coalitions on a national scale. This analytical framework has been further developed in institutional economics, which emphasizes the effects of political systems on public spending. The role of institutions was explored by De la Croix and Delavallade (2007), who modelled the effects of corruption on public spending. They demonstrated that countries with high levels of predatory technology tend to invest more in physical capital and housing, while investing less in health and education.

The theoretical model proposed by these authors presents three key features. First, the technology of corruption allows rent-seekers to divert portions of certain expenditures that are easier to manipulate and conceal. Second, rent seekers may exert greater political influence than producers on government decisions. Lastly, the authors argue that the government maximizes utility under an incentive constraint, reflecting individuals' choices between productive activities and rent-seeking. This perspective leads to the conclusion that corruption distorts the structure of public expenditures. Specifically, in wealthier and more democratic countries, when corruption is facilitated by a weak legal system, public expenditure structures may favour education and health to deter rent-seeking behaviour. From this theoretical framework, two hypotheses emerge: first, that corruption alters the structure of public expenditures; and second, that exposure to corruption varies across different categories of public expenditures. While theoretical discussions on the determinants of public expenditures have generated lively debates, an examination of the components of public expenditure structures and the transmission channels through which corruption affects these expenditures has, to our knowledge, been largely absent from the discourse. A significant criticism of this theoretical framework is its insufficient attention to the structure of public expenditures. This

oversight emphasizes the need to differentiate the effects of corruption across various categories of public spending. Some types of public expenditures may be more susceptible to corruption than others. As a result, public policies may be ineffective if the impacts of corruption on the structure of public expenditures are not assessed according to expenditure categories. Another important criticism pertains to the mechanisms by which corruption influences public expenditure structure. The existing theoretical literature fails to identify the transmission channels through which corruption affects public expenditures. This gap may partly explain the ineffectiveness of certain public policies aimed at combating corruption. Understanding these transmission channels is essential for implementing appropriate public policies. Empirical investigations in this area remain a topic of considerable debate.

2.2. Empirical evidence

Two orientations are considered in the literature regarding the effects of corruption on public expenditures. The first emphasizes the distorting effects of corruption. Mauro (1997) provides seminal evidence indicating that education expenditures are lower in countries with high levels of corruption. He demonstrates a negative, significant, and robust relationship between corruption and public expenditures on health and education, suggesting that corrupt governments find it easier to collect bribes on certain expenditure items than others. Using the three-stage least squares method on a sample of 64 countries from 1996 to 2001, Delavallade (2006) obtained similar results, showing that corruption distorts the structure of public expenditures by reducing the share of social expenditures (education, health, and social protection) while increasing allocations for security and hydrocarbon subsidies. De la Croix and Delavallade (2007) extended this work, demonstrating that in wealthier, more democratic countries, a defective legal system allows corruption to distort public expenditure structures, favoring education and health expenditures to deter rent-seekers. These findings support Gupta et al. (2001) and other studies that highlight the effects of corruption on public expenditures. For instance, Hessami (2014) used a rent-seeking model to analyze political rent creation through public spending in 29 OECD countries from 1996 to 2009. He found that a higher level of corruption is associated with increased expenditures on health and environmental protection, with one unit increase in corruption linked to increases of 0.39 and 0.07 in these areas, respectively. Sedgo and Omgba (2023) examined the effects of corruption on capital expenditures in a panel of 48 African countries from 2000 to 2016. They compiled disaggregated public finance data and employed fixed effects and instrumental variables, finding that high corruption prevalence distorts the composition of public expenditures, decreasing the share of capital expenditures from 29 % to 18 %. Their findings suggest that corrupt bureaucrats prefer to manipulate public expenditures in favor of current rather than capital expenditures. Similarly, Nan (2022) analyzed a panel of 21 cities in China from 2007 to 2014 and found a positive correlation between grassroots corruption and government spending: higher corruption levels corresponded to larger government expenditures. Nguyen (2023) studied the impact of corruption at the judicial district level on firm investment decisions, revealing that a one standard deviation increase in corruption leads to an 8.6 % decrease in firms' investment expenditures, further supporting the negative effects of corruption.

The second orientation of the literature points to the mixed effects of corruption on public expenditures. Swaleheen et al. (2019) analyzed a sample of 134 countries over two decades and found that the effect of corruption on the structure of public expenditures specifically health and education expenditures is significant and non-linear. For most countries, corruption positively affects the share of public resources allocated to health but negatively impacts education. This non-linear framework aligns with the findings of Palguta and Pertold (2017), who demonstrated that policies allowing avoidance of open competition in public procurement led to manipulation of procurement values. They

exploited a reform permitting public bodies to pre-qualify contractors below certain discretionary thresholds, a behavior indicative of rent-seeking concealment by public officials. Timofeyev (2011) also noted that while the negative influence of corruption seems evident, the extent to which it undermines the effectiveness of social spending in Russia remains unclear.

Two fundamental criticisms arise from the literature on the direct effects of corruption on public expenditures. First, the literature often neglects to address all components of public expenditure structures. While some studies focus on capital expenditures, others highlight sectoral spending. It is crucial to analyze the effects of corruption on each component—namely, capital and current expenditures. This approach will facilitate the targeting of policies aimed at reducing corruption, enhancing the quality of public spending, and ensuring efficiency in both capital and current expenditures. Moreover, bribes may be more easily collected on certain components of public spending than others. The second criticism pertains to the lack of attention given to Sub-Saharan African (SSA) countries. According to Transparency International and the World Bank, this region exhibits some of the highest levels of corruption in the world.

2.3. The transmission channels

There appears to be no consensus on the mechanisms by which corruption affects economic variables. For instance, Bukari et al. (2024) identify loss of income and loss of trust as two channels through which corruption influences healthcare deprivation. In exploring the relationship between corruption and economic growth, Didri (2013) suggests that the negative effects of corruption are primarily transmitted through its impact on human capital and political instability. Pellegrini and Gerlagh (2004) found that investment, trade policy, education, and political stability are significant factors in explaining the detrimental effects of corruption. Similarly, Pellegrini (2011) indicates that the most important channels through which corruption affects economic growth are investments, followed by education and trade openness. Mo (2001) also highlights political instability, human capital, and investments as channels through which corruption impacts growth. In this paper, we specifically explore three channels through which corruption may affect the structure of public expenditures: conflicts, the rule of law, and income inequality.

2.3.1. Corruption, conflicts, and the structure of public expenditures

Conflicts play a crucial role in the relationship between corruption and public expenditures. On one hand, corruption is a key determinant of conflicts; on the other, conflicts influence public expenditures. Several studies have established that conflicts can be attributed to corruption. For instance, Abdel and Gamal (2024) found that institutional failures, such as corruption, exacerbate feelings of exclusion and invite conflict by undermining the principles of fairness and inclusivity essential for sustainable development. Rizvi and Véganzonès-Varoudakis (2023) employed fixed-effect Poisson regressions with robust standard errors and instrumental variables to analyze the economic, social, and institutional determinants of internal conflicts in 58 fragile developing countries from 2004 to 2017. They discovered that effective institutions measured by judicial efficiency and governance are crucial in reducing conflicts in fragile nations. Good governance, therefore, implies a reduction in corruption, which is positively associated with conflicts. The Transparency International report[1] (2022) confirms the strong links between a country's level of corruption and its risk of involvement in conflicts, whether external or civil. It reveals that corruption undermines governments' ability to protect citizens and erodes public trust, thereby provoking more severe and harder-to-control security

---

[1] The report can be found in the following link 2022 Corruption Perceptions Index: Explore the… - Transparency.org

threats.

Conversely, conflicts create opportunities for corruption and undermine governmental efforts to combat it. In a conflict context, public authorities are compelled to increase their defense spending, which entails substantial investments in equipment, armed forces personnel, and weaponry. In the short term, conflicts lead to heightened military expenditures. However, Gupta et al. (2001) conducted empirical analyses using cross-sectional and panel regression techniques on 120 countries from 1985 to 1998, suggesting that corruption is associated with higher military spending. These findings indicate that conflicts can serve as opportunities for corruption. Additional studies confirm that conflicts can act as a springboard for modifying the structure of public expenditures. For example, Farzanegan and Zamani (2022) employed a vector autoregressive model, using impulse response analysis and variance decomposition to examine how events respond to changes in corruption levels between 1962 and 2019. Their study reveals that increases in corruption lead to heightened levels of conflict, which, in turn, are associated with escalated public spending. These effects on public expenditures are corroborated by Abdel-Latif et al. (2024), who quantified the macroeconomic spillover effects of conflicts in Sub-Saharan African countries using a new conflict spillover index. Their impulse responses suggest that conflict spillover shocks are also linked to increases in current government expenditure and government debt. The hypothesis that conflicts can serve as a transmission channel between corruption and public expenditures is supported by the empirical literature mentioned above and the high incidence of conflicts recorded in Sub-Saharan Africa.

2.3.2. Corruption, income inequality, and the structure of public expenditures

Income inequality plays a crucial role in the relationship between corruption and public expenditures. On one hand, economic literature indicates that corruption exacerbates income inequalities. Conversely, when income inequalities are pronounced, public expenditures tend to increase. Regarding the effect of corruption on inequality, Gupta et al. (2002) provide compelling evidence that high and rising corruption contributes to increased income inequality and poverty. Specifically, an increase of one standard deviation in corruption is associated with an approximate 11-point rise in the Gini coefficient of income inequality, alongside a 5-percentage-point increase in income growth for the poorest segments of the population. Other studies corroborate these findings; for instance, Aperghis et al. (2010) and Pedauga et al. (2017) also demonstrate that corruption exacerbates inequality by distorting resource allocation, increasing bureaucracy, and favoring private interests. Keneck-massil et al. (2021) further found that lower levels of corruption correlate with reduced inequalities globally, regardless of the types of corruption involved. The empirical evidence presented above highlights that corruption has significant distributional consequences, undermining the government's redistribution function. Another strand of literature emphasizes the impact of inequality on public expenditures. The theoretical foundation for this effect is rooted in the model developed by Meltzer and Richard (1981). Their approach, based on the political choices of rational agents, reveals that public spending on redistributive policies is typically higher in countries with elevated levels of inequality. The greater the disparity in income (specifically, the gap between median income and average income before transfers), the more likely the median voter is to advocate for a high level of redistribution. Additionally, greater pre-tax inequality necessitates more substantial redistributive transfers.

Several empirical studies support the notion that heightened inequality can influence public expenditures. For example, Chen et al. (2023) utilized data from the Chinese Family Panel Studies (2010–2018) to demonstrate that rising income inequality prompts parents to invest more in their children's education, both in and out of school. Similarly, Bação et al. (2024) examined the relationship between inequality and public social spending across a sample of 28 OECD countries from 1997 to 2017. Their study disaggregated social expenditures into nine programs and accounted for potential non-linear relationships within a dynamic panel threshold model, revealing a positive impact of health spending specifically old-age pensions on inequality. Moreover, Figlio et al. (2024) analyzed data from 45 states between 1972 and 1992, finding that state constitutional language regarding equity influences the degree of equality in school spending within those states. The literature clearly illustrates that inequality plays a pivotal role in the interplay between corruption and public spending. Notably, apart from Latin America and the Caribbean, Sub-Saharan Africa (SSA) exhibits the highest levels of income inequality globally, as reported by the World Bank and the International Monetary Fund. The World Inequality Database indicates that the richest 10 % in the region control nearly 56 % of total income. This pronounced level of income inequality in SSA, along with its potential effects on the relationship between corruption and public expenditures, justifies its consideration as a significant transmission channel.

2.3.3. Corruption, the rule of law and the structure of public expenditures

There is limited literature addressing the role of the rule of law in the relationship between corruption and public expenditures. Nonetheless, corruption can undermine the rule of law, and conversely, the rule of law significantly affects public expenditures. Regarding the impact of corruption on the rule of law, it is evident that corruption erodes legal principles and undermines the effective administration of justice. According to the Human Rights Report[2] (2021), corruption subverts these core principles and diminishes public trust in government institutions and the legal system. Globally, corruption detracts from the rule of law. As corruption negatively impacts the rule of law, the latter also significantly affects public expenditures. For instance, Holcombe and Rodet (2012) found that countries that uphold the rule of law tend to have larger government sizes. Conversely, when the application of rules is not consistently enforced, state expenditure is adversely affected. Jetter and Parmeter (2018) identified the rule of law as the most persistent predictor of public spending, with a posterior inclusion probability of 1.00 in their true model. When the rule of law is not respected or enforced, it facilitates the spread of corruption, which, in turn, influences public expenditures through mechanisms such as bribery, favoritism, and the accumulation of private wealth, all to the detriment of the general interest. The assumption that the rule of law in Sub-Saharan Africa (SSA) can be considered a transmission channel is supported by two key factors. First, the rule of law in SSA is among the weakest globally. For example, on a scale from −2.5 (indicating a low level) to 2.5 (indicating a high level), SSA registers an average score of −0.71. Second, empirical literature consistently demonstrates that corruption adversely affects the rule of law, which is likely to influence public expenditures.

3. Corruption and the structure of public expenditures: the empirical strategy

This section outlines the empirical specification, methodology, and data employed to examine the impact of corruption on the structure of public expenditures.

3.1. The specified model

This study investigates the impact of corruption on the structure of public expenditures. Specifically, we focus on two components of public expenditures: capital expenditures and current expenditures. Building on the foundational work of previous studies, including Mauro (1998), Gupta et al. (2001), and Sedgo and Omgba (2023), we specify a general dynamic model as follows:

---

[2] Report can be found in the following link Corruption undermines human rights and the rule of law - Commissioner for Human Rights (coe.int)

$$SPS_{it} = \alpha_0 + \beta Corruption_{it} + \delta X_{it} + \omega_i + \delta_t + \varepsilon_i \qquad (1)$$

Where SPS_{it} is the dependent variable which describes the structure of public expenditures. It refers to the share of capital expenditures and current expenditures in total of expenditures. $Corruption_{it}$ refers to the corruption indicator X_{it} represents the explanatory variables. ω_i is the country specific effects (t considers the specific elements of each country, including time-invariant components). δ_t refers to the temporal fixed effects and ε_i is the error term.

3.2. The variables of the model

3.2.1. The dependent variables

The structure of public expenditures is measured by two components: current expenditures and capital expenditures. Capital expenditures are calculated by summing the share of investment expenditures within total expenditures and net lending as a proportion of total expenditures. This component refers to expenditures related to the acquisition of fixed assets, land inventories, or intangible assets, as well as unrequited transfers intended to enable recipients to acquire these assets. Current expenditures, on the other hand, encompass all non-refundable payments made by public authorities, excluding capital expenditures and subsidies, in relation to total expenditures. This category includes salaries and other ongoing operational expenses.

3.2.2. The independent variable

The primary variable of interest in this study is the control of corruption. Corruption is defined as the misuse of public power for personal gain, encompassing both large-scale and small-scale corruption. The corruption index ranges from −2.5 (indicating high levels of corruption) to 2.5 (indicating low levels of corruption). In 2022, the average score for countries in Sub-Saharan Africa (SSA) was −0.61. Among these countries, the Seychelles had the highest score at 1.7, while Somalia recorded the lowest at −1.79. This study posits the following hypothesis: *Countries with high levels of corruption are associated with elevated current expenditures, whereas countries with low levels of corruption are linked to higher capital expenditures*. Several studies have investigated the impact of corruption on public expenditures. For example, research by Mauro (1998), Swaleheen et al. (2019), and Sedgo and Omgba (2023) has yielded mixed results. This suggests that there is currently no consensus regarding the effect of corruption on the structure of public expenditures.

3.2.3. The control variables

This paper uses several control variables, including gross domestic product (GDP), tax revenue, inflation, urban population, net official development assistance, access to electricity, political stability, natural resources, and human capital. Gross Domestic Product (GDP) is a key indicator that measures the quality of life of a population. It is calculated as the sum of the gross value added by all resident producers in the country, plus any product taxes, minus any subsidies not included in the value of the products. In Sub-Saharan Africa (SSA), the average GDP for 2022 was 5078 U.S. dollars. The highest GDP was recorded in the Seychelles at 25,206 U.S. dollars, while Burundi had the lowest at 708 U.S. dollars. Research by Brückner et al. (2012) and Demez (2021) indicates that economic growth is positively correlated with public expenditures. Tax revenue (TaxR) refers to compulsory transfers made to the central government for public purposes. Certain compulsory transfers, such as fines, penalties, and most social security contributions, are excluded from this definition. Refunds and corrections of erroneously collected tax revenue are treated as negative revenue. Tax revenue is calculated as total tax revenues (excluding subsidies and social contributions) as a percentage of GDP, minus resource tax revenues (also as a percentage of GDP). An increase in tax collection is positively associated with an increase in public spending, enabling financing for investments in human capital, infrastructure, and the provision of services for

citizens and businesses. Inflation (Infl) is measured using the consumer price index, which reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services. This basket may include fixed items or those that change at specified intervals, such as yearly. Caldara and Kamps (2008) highlight that higher inflation is associated with increased public expenditures. Urban Population (PopU) refers to individuals residing in urban areas as defined by national statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations World Urbanization Prospects, measured as total population growth (in %). Shelton (2007) demonstrated a positive correlation between public expenditures and population growth.

Net Official Development Assistance (Net ODA) per capita represents disbursement flows (net of principal repayment) that meet the Development Assistance Committee (DAC) definition of ODA, directed to countries and territories listed as aid recipients by the DAC. It is calculated by dividing the net ODA received by the midyear population estimate. Tagem (2022) found a positive relationship between Net ODA and public expenditures. Access to Electricity (AEL) is defined as the percentage of the population with access to electricity. Political Stability (PS) measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. The political stability index ranges from −2.5 (indicating weak political stability) to 2.5 (indicating strong political stability). For the reported year, the annual average was −0.62 points, with the highest value in Botswana at 1.08 points and the lowest in Mali at −2.48 points. According to Asongu et al. (2020), public expenditures, particularly military expenditures, are complementary to political stability. Natural Resources Rents (NatR) are measured as the sum of oil rents, natural gas rents, coal rents (both hard and soft), mineral rents, and forest rents, with an annual average of 10.93 percent. Human Capital (HC) is calculated by dividing the number of students enrolled in secondary education, regardless of age, by the population of the age group that officially corresponds to secondary education, then multiplying by 100. This metric reflects the ability of a population to acquire and internalize new technologies (Asongu et al., 2020; Ongo and Song, 2022). A better-educated population is more likely to engage in rational, high-quality public expenditures.

The model to be estimated is as follows:

$$\begin{aligned} SPS_{it} = {} & \alpha_0 + \beta Corruption_{it} + \delta_1 TaxR_{it} + \delta_2 GDP_{it} + \delta_3 Infl_{it} + \delta_4 PopU_{it} \\ & + \delta_5 ODA_{it} + \delta_6 NatR_{it} + \delta_7 AEL_{it} + \delta_8 PS_{it} + \delta_9 HC_{it} + \omega_i + \delta_t + \varepsilon_i \end{aligned}$$
$$(2)$$

3.3. The estimation technique

The effect of corruption on the structure of public expenditures may be obscured by several sources of endogeneity, reverse causality, measurement error, and omitted variable bias. In this study, our baseline regression employs fixed-effects ordinary least squares (FE). As noted by Saha and Sen (2023), the FE model is advantageous because it mitigates omitted variable bias by incorporating dummy variables for missing or unobserved characteristics, allowing for the measurement of changes within groups over time. The importance of the FE model lies in its ability to control for unobserved heterogeneity, which can lead to more accurate estimates of the relationships between corruption and public expenditures. Subsequently, we perform a Hausman test to verify the results of the fixed effects by comparing the parameter variances obtained from a random-effects model. The Hausman test is conditioned on the assumption that the random-effects model is consistent and efficient under the null hypothesis, while the fixed-effects model is consistent but potentially less efficient. If the Hausman test indicates a significant difference between the two models, it suggests that the random-effects model may be biased due to the correlation between the explanatory variables and the error term, thereby favoring the fixed-effects model as the appropriate specification.

In both the random-effects and fixed-effects models, it is assumed that all explanatory variables are independent of the error terms and are identically and normally distributed. All estimations are conducted using robust standard errors that are corrected for both heteroskedasticity and serial correlation. However, the FE approach may yield biased estimates due to potential endogeneity between several of our variables, such as corruption and public expenditures. Specifically, a high level of corruption is likely to lead to increased public expenditures aimed at financing sectors that may be neglected due to the adverse effects of corruption. Conversely, an increase in public expenditures may also contribute to higher levels of corruption. To address the potential endogeneity bias resulting from reverse causality, we implement two strategies. First, we lag all explanatory variables by one year to reduce the risk of reverse causation. Second, we employ instrumental variables using the two-stage least squares (2SLS) method, as recommended by Wooldridge (2006). The importance of the 2SLS approach lies in its ability to provide consistent estimates in the presence of endogeneity. By using valid instruments, we can isolate the causal effect of corruption on public expenditures, thus improving the robustness of our findings. In our estimation, we utilize "voice and accountability" as the instrument. This approach necessitates the identification of a suitable instrument, which should be correlated with the endogenous independent variable without directly influencing the dependent variable. In other words, the instrumental variable should affect corruption but not be influenced by public expenditures. Following the study by Sedgo and Omgba (2022), "voice and accountability" appears to be a strong instrument for measuring corruption, as it reflects citizens' perceptions regarding their ability to participate in government selection, as well as their freedoms of expression, association, and access to a free media. This instrument specifically measures the capacity of citizens to hold their leaders accountable for their actions. Notably, the correlation coefficient between the accountability variable used in this study and the corruption index is 0.77, indicating that countries with higher levels of accountability are perceived as less corrupt.

3.4. The data and source

The data used in this study were sourced from various databases. The control variables were obtained from the World Development Indicator database (WDI, 2023). The primary corruption variable was sourced from the World Governance Indicator database (WGI, 2023). Additionally, an alternative measure of corruption was also utilized, drawn from the International Country Risk Guide (ICRG) database. Data on the dependent variables, specifically capital and current expenditures, were derived from the Statistical Yearbook for Africa, which is prepared under the auspices of the African Committee for the Coordination of Statistics (CACS). This yearbook is endorsed by key organizations responsible for statistical development on the continent, including the African Development Bank (AfDB), the African Union Commission (AUC), and the United Nations Economic Commission for Africa (ECA).

This collaboration is part of the implementation of the Reference Regional Strategic Framework for Statistical Capacity Building in Africa (RRSF). The study encompasses the period from 1996 to 2022, utilizing a sample of 45 Sub-Saharan African countries. Small variations observed in the descriptive statistics suggest unbiased results. Descriptive statistics are presented in Table 1. Appendices A, B, and C provide the correlation of variables, a list of countries, and a table of variables and their sources, respectively.

4. Corruption and the structure of public expenditure in sub-saharan africa: empirical findings

4.1. Corruption and the structure of public expenditures: preliminary analysis

4.1.1. Stylized facts and descriptive statistics

According to the IMF's African Department Regional Studies (2023), current expenditures in Sub-Saharan African (SSA) countries represent, on average, approximately 25 percent of GDP. Notably, the size of public expenditures is significantly lower in resource-intensive countries compared to non-resource-intensive ones. Capital expenditures now account for a quarter of the total spending envelope in SSA, an increase from about one-sixth in the early 2000s. At the same time, most SSA countries score below the global average on Transparency International's Corruption Perceptions Index, with a few exceptions such as Seychelles, Botswana, Mauritius, Rwanda, Namibia, São Tomé and Príncipe, and South Africa. The Transparency International report (2024) indicates that while there have been significant improvements in the Corruption Perceptions Index for some African countries, most are stagnating, and the overall score for the region remains low. The regional average is 33 out of 100, with 90 % of Sub-Saharan African countries scoring below 50. These stylized facts support the notion that exposure to corruption varies across different categories of public expenditures. Specifically, current expenditures are more susceptible to corruption than capital expenditures (Fig. 1).

4.1.2. Unit root test

Our panel data is unbalanced, necessitating a verification of the stationarity of the variables. Ignoring stationarity in panel data can lead to errors, deviations, and spurious results in our estimations. This study employs the Cross-sectional Im, Pesaran & Shin (CIPS) test and the Cross-sectional Augmented Dickey-Fuller (CADF) test, both of which are second-generation panel unit root tests. The results from the stationarity tests indicate a rejection of the null hypothesis of a unit root for the variables utilized in this analysis. The detailed test results can be found in Table 2.

4.2. Corruption and the structure of public expenditures: baseline results

The results concerning the impact of corruption on the structure of

Table 1
Descriptive statistics.

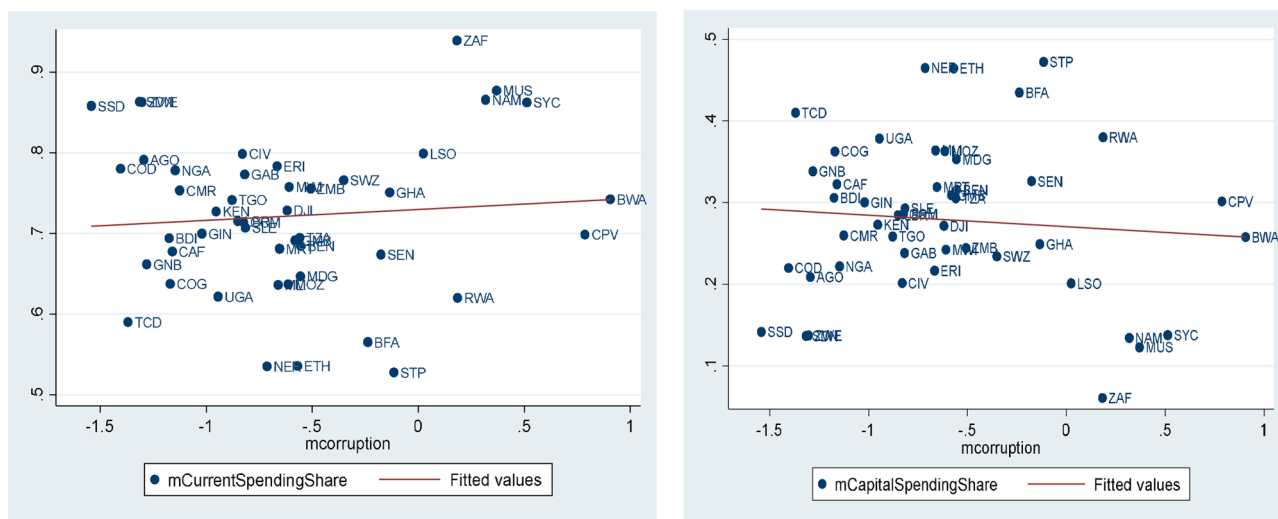| Variables	Obs	Mean	Std.dev	Min	Max
Capital expenditures (to total expenditures)	1215	0.2938326	0.1397548	0.0051546	0.8779011
Current expenditures (to total expenditures)	1215	0.7068103	0.140276	0.1220989	1
GDP per capita	1110	4784.621	5813.935	628.6933	35,688.65
Corruption	1215	−0.61487	.6310708	−1.815811	1.230001
Inflation rate	1215	9.621336	32.80723	−9.616154	557.2018
Net ODA per capita	1215	70.92	72.96	−11.97	691.92
Political stability	1215	−0.5041323	0.888716	−2.699193	1.28206
Urban population (% of total)	1215	41.41497	17.30891	8.246	90.092
Access to electricity s (% of total population)	1105	38.19116	25.956	1.252269	100
Tax revenues (% to GDP)	1215	15.78627	7.367003	3.85621	39.9876
Natural resources rent (% of GDP)	1210	11.62877	11.07977	0.0011721	59.58416
Human Capital	1015	43.21456	23.37127	6.19735	109.44

Source : Authors.

Fig. 1. Correlation between corruption and capital and current expenditures.
Source: Authors

Table 2
Panel Unit root tests.

	CIPS		CADF		Order of integration
	Zt-bar	P-value	Zt-bar	P-value	
Capital expenditures	−11.5***	0.00	−11.3***	0.00	I (0)
Current expenditures	−11.8***	0.00	−11.8***	0.00	I (0)
GDP per capita	−13.8***	0.00	−13.15***	0.00	I (0)
Corruption	−12.1***	0.00	−12.42***	0.00	I (0)
Inflation rate	−15.2***	0.00	−14.3***	0.00	I (0)
Net ODA per capita	−13.1***	0.00	−13.11***	0.00	I (0)
Political stability	−11.08***	0.00	−11.33***	0.00	I (0)
Urban population	−15.03***	0.00	−17.30***	0.00	I (0)
Access to electricity	−16.01***	0.00	−15.87***	0.00	I (0)
Tax revenues	−13.9***	0.00	−13.01***	0.00	I (0)
Natural resources rent	−16.7***	0.00	−16.33***	0.00	I (0)
Human Capital	−11.4***	0.00	−12.36***	0.00	I (0)

Source: Authors.

Table 3
Corruption's effect on the structure of public expenditures with FE.

Variables	Capital expenditures (% to total expenditures)		Current expenditures (% to total expenditures)	
	(1a)	(1b)	(2a)	(2b)
Corruption (−1)	0.043***	0.066***	−0.043***	−0.068***
	(0.00)	(0.00)	(0.00)	(0.00)
Net ODA per capita (−1)		0.016*		−0.014
		(0.09)		(0.14)
Natural resources rent (−1)		0.021***		0.021***
		(0.00)		(0.00)
Political stability (−1)		0.026**		−0.027**
		(0.03)		(0.02)
Human Capital (−1)		−0.0038***		0.0037***
		(0.00)		(0.00)
GDP per capita (−1)		−0.0056		0.0062
		(0.26)		(0.21)
Tax revenue (−1)		0.09***		0.097***
		(0.00)		(0.00)
Inflation rate (−1)		−0.0202***		0.020***
		(0.00)		(0.00)
Urban population (−1)		−0.099***		−0.099***
		(0.00)		(0.00)
Access to electricity (−1)		0.073*		0.072***
		(0.08)		(0.00)
Constant	0.726***	.0874***	0.273***	0.371***
	(0.00)	(0.00)	(0.00)	(0.00)
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	1210	1180	1210	1180
Countries	45	45	45	45
F-Stat	19.79	42.46	19.30	42.14
P-value	0.00	0.00	0.00	0.00

Indicates $p < 0.1$, **indicates $p < 0.05$, and ***indicates $p < 0.01$.
Source: Authors.

public expenditures in Sub-Saharan Africa (SSA) are presented in Table 3 below. This analysis focuses on the various components of public expenditures, specifically capital and current expenditures. A key takeaway from these findings is that the influence of corruption on public expenditure structure varies significantly between different components.

Regarding capital expenditures, our results indicate a positive correlation between corruption and capital expenditures. Specifically, we demonstrate that a one standard deviation reduction in corruption is associated with a 6.6 % increase in capital expenditures, suggesting that corruption acts as a deterrent to capital investment. Three main arguments support this finding. First, capital expenditures are directed towards physical projects such as roads, bridges, buildings, hydroelectric dams, and sports facilities which are subject to oversight from the highest levels of government. This rigorous supervision implies a greater level of scrutiny, making these projects less susceptible to the effects of corruption. Consequently, our results suggest that state orders for capital expenditures are particularly vulnerable to corrupt practices.

Second, a significant portion of the resources allocated to capital

expenditure originate from external partners. Such funding typically requires high levels of guarantees and transparency, especially since it is often provided in the form of loans that accrue interest. Donors and government representatives place considerable emphasis on these resources, leading to the establishment of specialized management systems designed to safeguard them. This often involves the inclusion of representatives from external partners in the execution of funded projects. Notably, some donors mandate that their own teams oversee the projects they finance. These measures help to mitigate the negative

impacts of corruption, reinforcing our findings that any reduction in corruption correlates with increased capital expenditure. A lower level of corruption recognized by external partners is likely to stimulate new financing, thereby boosting capital expenditures. The third argument supporting our findings relates to the tangible and observable nature of capital expenditure achievements. Capital expenditures are earmarked for specific projects, such as road construction, heavy equipment purchases, or building renovations, making them easier to monitor. If these infrastructures are incomplete or nonexistent, it may indicate corrupt practices, including the misappropriation of public funds. As noted by De la Croix and Delavallade (2007), countries with high levels of predatory technology tend to invest more in physical capital and housing while investing less in health and education. Thus, the conclusion that reducing corruption leads to increased capital expenditures is well-founded. Our results align with those of Sedgo and Omgba (2022), who found that a one standard deviation increase in corruption is associated with a decrease in the proportion of capital expenditure from 29 % to 18 %.

Results relating to the effect of corruption on current expenditures show opposite results compared to those for capital expenditure. Our findings indicate that an increase in corruption is associated with an increase in current expenditures. Three reasons can explain this result. First, current expenditures are significantly impacted by rampant corruption. Public officials often shift corrupt practices from one budget pocket to another. For instance, when public authorities decide to eliminate an expenditure pocket such as making participation in ministerial committees free of charge civil servants may create fictitious missions to compensate for the loss of income associated with the elimination of participation fees during committees. To circumvent these measures, they may also establish mechanisms for inflating invoices with key suppliers of equipment for various ministerial departments. These practices enable civil servants to maintain their level of corruption despite the measures taken by the authorities. Specifically, public officials tend to invest in sectors where bribes are maximized, leading to increased expenditures on goods and services. By restricting expenditures in critical sectors like health and education, corruption exacerbates inequalities, accelerates poverty, and undermines development. Second, this result can be explained in the context of public procurement. In SSA, various ministerial departments possess the authority to award contracts for the purchase of goods and services above a certain value.

These may include office equipment, seminars, or training courses. The awarding of contracts for these goods and services is often exchanged for bribes, while public officials may also demand inflated billing from their suppliers to justify the initial amounts allocated. Given this complexity, it becomes easier for current expenditures to evade anti-corruption measures, as corruption at this level is multi-faceted and dynamic. The theory of agency helps to illustrate this mechanism of corruption, as the state agent who has been entrusted by the state to ensure the collective interest—may engage in rent-seeking behavior by making choices that personally benefit him. The quid pro quo in this scenario involves facilitating or expediting the granting of contracts or approval to private individuals. Another factor that explains this result is the abstract nature of the outcomes associated with these expenditures. The purchase of goods and services is not systematically observable, and there is often a lack of adequate oversight. Public officials exploit these opportunities to promote and develop rent-seeking within ministerial departments. For instance, in several SSA countries, fictitious employment within the civil service has been reported. These fictitious jobs are orchestrated by public officials, who take a portion of the salaries for these non-existent positions. Consequently, authorities may observe an increase in current expenses without understanding their primary sources. Additionally, the so-called sovereign wealth funds illustrate the detrimental effects of corruption on current expenditures. These funds are typically not subject to any oversight or justification. As a result, public officials may utilize these resources to finance their personal activities, often at the expense of the state's overall functions. This is particularly evident with resources allocated for security-related issues, such as equipment and nutrition. Numerous scandals have emerged in SSA linked to these sovereign wealth funds, benefiting only a select few individuals.

Unlike capital expenditures, current expenditures are rife with corruption and appear to be subject to less rigorous and less transparent control. This finding indicates that corruption acts as a springboard for current expenditures. It reveals a corruption architecture that enables predatory elites to divert parts of current expenditures, as corrupt practices in this area are easier to implement and conceal. Our results align with those of Gupta et al. (2001), who demonstrated that corruption increases military expenditures. However, our findings contradict those of Delavallade (2006), who indicated that corruption reduces expenditures on education and health. In contrast, our results show that corruption increases current expenditures overall, as well as expenditures in military, health, and education sectors. In summary, we provide evidence that corruption significantly reduces capital expenditures while stimulating current expenditures. To further validate our findings, we will explore an alternative scenario.

4.3. Corruption and structure of public expenditures: accounting for government ideology

We utilize government ideology as a component of the structure of public expenditures to examine whether the effect of corruption on both capital and current expenditures remains consistent. Table 4 below presents the results of the estimation, considering government ideology

Table 4
Corruption and the structure of public expenditures: FE with Government ideology.

Variables	Capital expenditures (% to total expenditures)		Current expenditures (% to total expenditures)	
	(1a)	*(1b)*	*(2a)*	*(2b)*
Corruption (−1)	0.092**	0.124**	−0.091***	−0.121***
	(0.00)	(0.02)	(0.00)	(0.00)
Net ODA per capita (−1)		0.031		−0.028
		(0.22)		(0.27)
Natural resources rent (−1)		0.032***		0.034***
		(0.00)		(0.00)
Political stability (−1)		0.082*		0.091**
		(0.06)		(0.03)
Human Capital (−1)		−0.0091**		0.0090***
		(0.01)		(0.00)
GDP per capita (−1)		−0.0071		−0.0070
		(0.23)		(0.31)
Taxes revenues (−1)		0.044**		0.042**
		(0.05)		(0.03)
Inflation rate (−1)		−0.029***		0.028***
		(0.00)		(0.00)
Urban population (−1)		−0.020		−0.017
		(0.21)		(0.21)
Access to electricity (−1)		0.073**		0.086*
		(0.03)		(0.08)
Goverment ideology (−1)		**0.82***		**0.83***
		(0.07)		**(0.08)**
Constant	0.118***	0.146***	0.117***	0.134***
	(0.00)	(0.0)	(0.00)	(0.00)
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	1210	1180	1210	1180
Countries	45	45	45	45
F-Stat	10.53	46.01	11.39	73.01
P-value	0.00	0.00	0.00	0.00

Indicates $p < 0.1$, **indicates $p < 0.05$, and ***indicates $p < 0.01$.
Source: Authors.

as a control variable. In summary, the inclusion of government ideology does not alter the baseline results. Government ideology has a significant impact on the structure of public expenditures. Potrafke (2011) suggests that government ideology has had a relatively weak influence on the composition of government budgets. Specifically, leftist governments increased spending on public services during the period from 1970 to 1997, as well as on education from 1990 to 2006. Consistent with Potrafke (2011), we find that government ideology significantly affects the structure of public expenditures, and the effect of corruption on both capital and current expenditures remains unchanged.

4.4. Corruption and structure of public expenditures: empirical result with alternative measure of corruption

To address concerns about potential biases in our results stemming from the measure of corruption, we utilize an alternative measure of corruption that is widely recognized in the literature to verify the robustness of our findings. This alternative is the International Country Risk Guide (ICRG) corruption index. This index assesses corruption within the political system, focusing on factors such as favoritism, nepotism, secret party financing, and the connections between politics and business. The index ranges from 0 to 6, where 0 indicates a high level of corruption and 6 indicates a low level of corruption. The results derived from this alternative measure of corruption are presented in Table 5 below, and they confirm our baseline findings.

4.5. Corruption and structure of public expenditures: empirical results using instrumental variables

Our model revealed a potential endogeneity problem. Specifically, a high level of corruption is likely to result in increased public expenditures to finance sectors that have been neglected due to the negative effects of corruption. Additionally, public authorities take the level of

corruption into account when making investment decisions in productive sectors. To address these endogeneity issues, we employ instrumental variables. The instruments must satisfy two conditions: (a) non-weakness, meaning that the instrument is strongly correlated with the potentially endogenous corruption variable; and (b) exogeneity, indicating that the instrument is uncorrelated with the ε term (unobservable factors). Building on the work of Sedgo and Ombga (2022), we use voice accountability as our instrument. Accountability appears to be an effective measure for assessing corruption. The correlation coefficient between the accountability variable used in this study and the corruption index is 0.77, indicating that countries with a high level of accountability are perceived as less corrupt. The results regarding the effect of corruption on the structure of public expenditures in Sub-Saharan Africa (SSA) using instrumental variables are presented in Table 6 below. The Hansen over-identification test, the Stock-Yogo weak instrument test, and the Kleibergen-Paap and Cragg-Donald statistics confirm the validity of the instruments used. The estimation results obtained through the instrumental variables method corroborate the baseline results derived from fixed effects. Although the significance is slightly reduced (from 1 % with fixed-effect OLS to 5 % with instrumental variables), the instrumental variable estimates indicate that while any reduction in the level of corruption contributes to increased capital expenditures, corruption serves as a springboard for recurrent expenditures and is more resistant to anti-corruption measures.

4.6. Corruption and structure of public expenditures: sensitivity to violations of exclusion restrictions

To validate our results with the instrument, we employ the method proposed by Nevo and Rosen (2012) to analyze the sensitivity of the results concerning violations of the instrument's exclusion restriction condition. Nevo and Rosen (2012) examine the identification of

Table 5
Corruption's effect on the structure of public expenditures in SSA with alternative measure of corruption.

Variables	Capital expenditures (% to total expenditures)		Current expenditures (% to total expenditures)	
	(1a)	*(1b)*	*(2a)*	*(2b)*
Corruption	0.097***	0.064***	−0.097***	−0.064***
	(0.00)	(0.00)	(0.00)	(0.00)
Net ODA per capita		0.019		−0.019
		(0.21)		(0.21)
Natural resources rent		0.034***		0.034***
		(0.00)		(0.00)
Political stability		0.018*		0.018**
		(0.08)		(0.02)
Human Capital		−0.0040***		0.0040***
		(0.00)		(0.00)
GDP per capita		−0.00062		0.0062
		(0.93)		(0.93)
Taxes revenues		0.042**		0.042**
		(0.03)		(0.03)
Inflation rate		−0.028***		0.028***
		(0.00)		(0.00)
Urban population		−0.013*		−0.013***
		(0.07)		(0.00)
Access to electricity		0.086***		0.086***
		(0.00)		(0.00)
Constant	0.127***	0.171**	0.124***	0.173***
	(0.00)	(0.02)	(0.00)	(0.00)
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Observations	1210	1180	1210	1180
Countries	45	45	45	45
F-Stat	10.54	47.01	10.39	72.01
P-value	0.00	0.00	0.00	0.00

Indicates $p < 0.1$, **indicates $p < 0.05$, and ***indicates $p < 0.01$.
Source: Authors.

Table 6
Corruption's effect on the structure of public expenditures in SSA with instrumental variables.

Variables	Capital expenditures (% to total expenditures)		Current expenditures (% to total expenditures)	
	(1a)	*(1b)*	*(2a)*	*(2b)*
Corruption	0.072***	0.062**	−0.071***	−0.062**
	(0.00)	(0.05)	(0.00)	(0.05)
Net ODA per capita		0.025		−0.025
		(0.13)		(0.13)
Natural resources rent		0.043***		0.043***
		(0.00)		(0.00)
Political stability		0.019		−0.019
		(0.26)		(0.26)
Human Capital		−0.0036***		−0.0036***
		(0.00)		(0.00)
GDP per capita		−0.0066		−0.0066
		(0.57)		(0.57)
Tax revenues		0.048*		0.048*
		(0.09)		(0.09)
Inflation rate		−0.039***		−0.039***
		(0.00)		(0.00)
Urban population		−0.014***		−0.014***
		(0.00)		(0.00)
Access to electricity		0.079***		0.079***
		(0.00)		(0.00)
Constant	0.269***	0.319***	0.729***	0.815***
	(0.00)	(0.00)	(0.00)	(0.00)
Observations	1110	1080	1110	1080
Hansen J Stat	1.432	0.051	1.136	0.628
P-Value	0.23	0.42	0.28	0.42
Kleibergen-Paap Stat	72.85	79.97	75.21	73.24
P-value	0.00	0.00	0.00	0.00
Cragg-Donald Stat	88.25	83.12	88.23	84.17
Countries	45	45	45	45

Indicates $p < 0.1$, **indicates $p < 0.05$, and ***indicates $p < 0.01$.
Source: Authors.

parameters in a single regression equation with endogenous regressors and instruments that do not satisfy the standard exogeneity condition. They consider instruments that are assumed to have the same direction of correlation with the error term as the endogenous regressor but are less correlated with the error term than the endogenous regressor itself. They make two key assumptions: (i) the correlation between the instrument and the error term has the same sign as the correlation between the endogenous regressor and the error term, and (ii) the instrument is less correlated with the error term than the endogenous regressor. Using these assumptions, they derive analytic bounds for the parameters. To implement the sensitivity test in Stata, Clarke and Matta (2018) describe the basic syntax command: "imperfectiv", which applies the Nevo and Rosen (2012) bounding procedures by relaxing the traditional validity assumption. As noted by Clarke and Matta (2018), Nevo and Rosen (2012) document that by replacing the stringent zero covariance assumption with a condition regarding the sign of the covariance between an instrumental variable and the stochastic error, this approach yields convenient and easily estimable bounds in a linear instrumental model. Table 7 below indicates that the effect of corruption on the structure of public expenditures is robust. The correlation between voice accountability and corruption (the endogenous variable) with the error term is in the same direction.

5. Corruption and the structure of public expenditures: empirical analysis of transmission channels

This section identifies and analyzes the transmission channels through which corruption affects the structure of public expenditures in Sub-Saharan Africa (SSA), focusing on three key channels: conflict, the rule of law, and income inequality. Corruption often exacerbates existing tensions and can lead to conflicts within societies, diverting public resources away from essential services and infrastructure, which fuels grievances and instability. Furthermore, the strength of the rule of law directly influences the efficiency and integrity of public expenditure; in environments where corruption is pervasive, accountability and transparency diminish, resulting in the misallocation of resources. Lastly, corruption contributes to widening income disparities as resources concentrate in the hands of a few, leaving marginalized populations without access to critical services. By examining these channels, this study aims to provide a comprehensive understanding of how corruption shapes public expenditure structures in SSA, highlighting the importance of developing effective policies to enhance governance, promote equitable resource allocation, and foster sustainable development in the region. The methodology employed is based on mediation analysis using Structural Equation Modeling (SEM), specifically the Medsem approach. This model incorporates both observed and latent variables, as well as combinations of both, and is estimated using the SEM command in Stata. The Medsem approach utilizes two primary methods for its procedures: the Baron and Kenny approach, which has been adapted by Iacobucci et al. (2007) for applications within the framework of structural equation modeling, and the methodology proposed by Zhao et al. (2010). In this analysis, we first establish the direct relationships among the variables of interest, ensuring that the model accurately reflects the theoretical framework. The SEM approach allows for the simultaneous

estimation of multiple equations, which is particularly useful for understanding the complex interactions among variables. Furthermore, mediation analysis is conducted to explore how corruption influences public expenditure composition through intermediary variables such as income inequality, conflict, and the rule of law. By applying the Medsem approach, we can assess the strength and significance of these mediating effects, providing a nuanced understanding of the pathways through which corruption impacts fiscal outcomes. To this end, we estimate Eqs. (3) and (4).

Model1 $\quad CT_{it} = \alpha_1 + \beta_1 Corruption_{it} + \delta_1 X_{it} + \delta_{it}$ (3)

Model2 $\quad SPS_{it} = \alpha_2 + \beta_2 Corruption_{it} + \beta_3 CT_{it} + \delta_2 X_{it} + \omega_{it}$ (4)

Where CT_{it} represents the transmission channels or mediating variables through which corruption transits to affect the structure of public expenditures. The estimation of the mediator effect is subject to two steps. In the first stage, Eq. (3) estimates the effect of corruption on the various mediating variables, namely conflicts, rule of law and income inequality. The second step consists of estimating the effect of corruption on the structure of public expenditures, controlled by the mediation variables (see Eq. (4)). The direct effect is obtained by the parameter β_2 and the indirect one is obtained by the product $\beta_1 * \beta_3$. The transmission channels analysis can be described by the Fig. 2 below.

The results obtained for each type of public expenditures (capital and current) are shown in Tables 8 and 9. The analysis highlights that corruption affects the structure of public expenditures through income inequality, the rule of law and conflicts. Regarding income inequality, our results show that when income inequality is high, the richest people are likely to be more motivated and have more opportunities to engage in corruption and fraud to preserve and promote their status, privileges, and interests, while the poor are more vulnerable to extortion at higher levels of inequality. As shown by Gupta et al. (2002) corruption will increase inequality. Faced with precarious resources, public sector agents will be vulnerable and will accept bribes to increase their level of income. Thus, low incomes are conducive to negatively impact public expenditures. This result was also found by Bukari et al. (2024), who showed that loss of income and loss of trust in public institutions are the main transmission channels for corruption. Our results conclude that income inequality in SSA constitute a key transmission channel of corruption on the structure of public expenditures. Consequently, one way of limiting the deleterious effects of corruption on the structure of public expenditures would be to initially tackle income inequality. This fight against income inequality will consist in implementing effective redistributive policies. About conflicts, our results show that conflicts constitute a significant transmission channel for the effects of corruption on the structure of public expenditures. Indeed, when countries are faced with security challenges such as terrorist attacks, ethnic-tribal wars or other types of conflicts, public authorities are led to increase the defense capacity of the country concerned. As a result, contracts may be awarded for the purchase of equipment, weapons or the recruitment of armed forces personnel. Powerful elites will seize this opportunity to accept bribes either to win contracts or to purchase inferior equipment in return for bribes. The level of corruption will be positively associated with the level of spending, especially military spending. This result was found by Gupta et al. (2001), who showed that corruption is associated with higher military spending relative to GDP and total public expenditures, as well as with arms purchase relative to GDP and total public expenditures. The third transmission channel we highlight is the rule of law. According to the World Bank, rule of law reflects perceptions of the extent to which agents have confidence in and abide by the rules of the society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. In the case of SSA countries, however, the level of impunity is among the highest in the world. People sometimes suspected of corruption are still in office without being brought to justice. In addition, the business climate is unattractive due to the low level of confidence in

Table 7
Sensitivity to violations of exclusion restrictions: Nevo and Rosen (2012)'s Imperfect IV bounds[31].

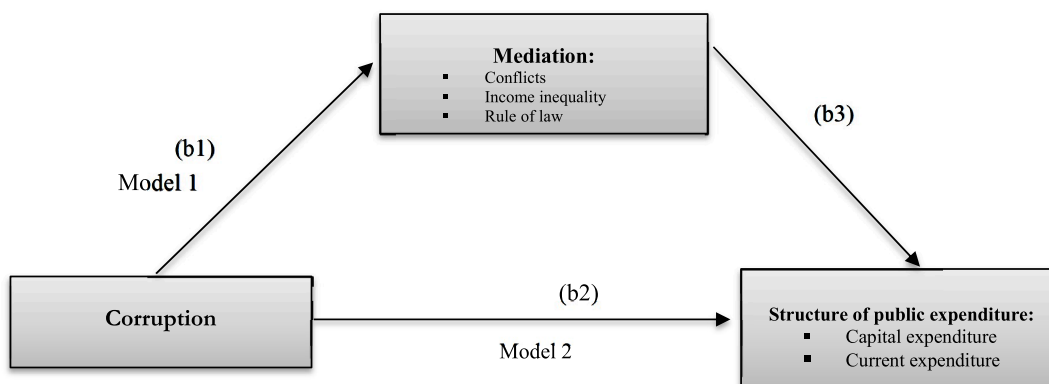|	Number of observations	1290
Variable	**Lower Bound**	**Upper Bound**
Corruption	−1.3717	−1.1730
Dependent variables: capital and current expenditure		
Variables of interest: Corruption		
Instrument: Voice and accountability		

Sources: Author's calculation.

Fig. 2. Mediation effect of corruption on the structure of public expenditures.
<u>Sources</u>: Authors

Table 8
Analysis of mediation effects on Capital expenditures.

	Mediator: Conflicts		Mediator: Rule of Law		Mediator: income inequality		
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	Baseline regression
	Conflicts	Capital Expenditures	Rule of Law	Capital Expenditures	Income inequality	Capital Expenditures	Capital Expenditures
Corruption	0.038***	0.023**	0.031***	0.061***	−0.73***	0.052***	0.029***
	(0.00)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Conflicts		0.0057***					
		(0.00)					
Rule of Law				0.0041**			
				(0.03)			
Income inequality						0.032***	
						(0.00)	
Constant	0.0071***	0.368***	0.70***	0.51***	0.073***	0.336***	0.29***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	642	630	623	619	868	851	868
Boostrap replications	500	500	500	500	500	500	

	Mediating the effect of conflicts			Mediating the effect of rule of Law			Mediating the effect of income inequality		
	Coef	Std.error	P-value	Coef	Std.error	P-value	Coef	Std.error	P-value
Mediations tests									
Delta	−0.041	0.005	0.00	−0.073	0.008	0.00	0.061	0.009	0.00
Sobel	−0.041	0.005	0.00	−0.073	0.008	0.00	0.061	0.009	0.00
Monte Carlo	−0.041	0.005	0.00	−0.073	0.008	0.00	0.061	0.009	0.00
Composition of the effect									
Indirect effect	0.041			0.073			0.061		
Direct effect	0.047			0.037			0.028		
Total effect	0.088			0.110			0.89		
% of the total effect mediated	**65** %			**71** %			**86** %		

Source: Authors.

the justice system. Our results clearly show that rule of law is a channel through which corruption spreads. Indeed, predatory elites aware of the flaws in the legal system will take advantage of them to promote corruption and compromise the efficiency of public expenditures. Our results thus conclude that weak rule of law in SSA favors the adverse effects of corruption on the structure of public expenditures.

6. Conclusion

A consensus is emerging that corruption poses a serious problem for economic development, with low-income populations being the primary victims. Resources allocated to public policies intended to improve living conditions are often significantly diverted or misallocated. The

economic literature is unanimous regarding the harmful effects of corruption, particularly on public expenditures. However, there is a lack of research on how corruption affects the various components of the structure of public expenditures and the transmission channels that facilitate this effect. We contribute to the limited literature by examining the effect of corruption on both capital and current expenditures, while analyzing the mediation effect of corruption on the structure of public expenditures with a focus on Sub-Saharan Africa (SSA). Our findings provide evidence that corruption significantly reduces capital expenditures while stimulating current expenditures in SSA. These results stem from rampant corruption practices affecting recurrent expenditures, deficiencies in governance quality, and the concentration of power among predatory political elites. Both findings suggest that simply mitigating the effect of corruption on the structure of public expenditures may not suffice to eliminate the adverse impacts of corruption in SSA countries. Furthermore, through mediation analysis utilizing a structural equation model our results reveal that the effect of corruption on the structure of public expenditure operates through at least three

Table 9
Analysis of mediation effects on current expenditures.

	Mediator: Conflicts		Mediator: Rule of law		Mediator : income inequality		
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	Baseline regression
	Conflicts	Current Expenditures	Rule of Law	Current Expenditures	Income inequality	Current Expenditures	Current Expenditures
Corruption	0.047***	−0.071*	0.031***	−0.041***	−0.92***	−0.071***	−0.052***
	(0.00)	(0.09)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Conflicts		0.0049***					
		(0.00)					
Rule of Law				0.0057***			
				(0.00)			
Income inequality						0.061***	
						(0.00)	
Constant	0.0038***	0.40***	0.61***	0.44***	0.072***	0.38***	0.61***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	642	630	623	619	868	851	870
Boostrap replications	500	500	500	500	500	500	

	Mediating the effect conflicts			Mediating the effect of rule of law			Mediating the effect of income inequality		
	Coef	Std.error	P-value	Coef	Std.error	P-value	Coef	Std.error	P-value
Mediations tests									
Delta	0.041	0.007	0.00	0.0730	0.008	0.00	−0.060	0.009	0.00
Sobel	0.041	0.007	0.00	0.073	0.008	0.00	−0.060	0.009	0.00
Monte Carlo	0.041	0.007	0.00	0.073	0.008	0.00	−0.060	0.009	0.00
Composition of the effect									
Indirect effect	0.041			0.073			0.060		
Direct effect	0.039			0.041			0.068		
Total effect	0.080			0.114			0.128		
% of the total effect mediated	**59** %			**68** %			**81** %		

Source : Authors.

channels: conflicts, rule of law, and income inequality. The study confirms that corruption is detrimental to economic development in SSA. It amplifies inequality and poverty, compromises citizens' quality of life, weakens social cohesion, and undermines public confidence in government. Corruption adversely affects public finances by distorting expenditure priorities, thereby hindering the state's ability to pursue sustainable and inclusive growth. Political efforts should focus on two levels: first, authorities must establish institutional controls aimed at anticipating and rapidly detecting corrupt practices. This approach could include conducting daily and ongoing checks on all financial transactions and modernizing the tax collection system, as the mobilization of tax revenues directly by government officials from economic operators is a significant source of corruption. Additionally, political efforts should emphasize the elimination of cash payments. Second, political efforts should involve imposing indiscriminate sanctions on any official found guilty of corrupt practices. To achieve this, the legal framework needs strengthening through increased transparency, adherence to the law, and specialized training for legal personnel. It is also essential to enhance the coercive power of organizations tasked with combating corruption. In conclusion, this study calls on public authorities to establish a budget management framework that makes the state's various transactions accessible to all citizens, thereby ensuring greater transparency. However, our study is not without limitations. Two key limitations can be identified. First, certain transmission channels were not considered, such as the wages of public agents. Interviews with several public agents revealed that their vulnerability to corruption is partly due to low wages. The rising cost of living limits their purchasing power, which may encourage them to seek additional income through corrupt practices. Unfortunately, the lack of data on public agents' wages in our sample prevented us from testing this hypothesis. This indicates that the channels we examined are not the only ones through which corruption influences the structure of public

expenditures. Another limitation of this work is that our results cannot be generalized to all regions of the world. Future research could benefit from comparisons with other regions experiencing troubling levels of corruption.

Author agreement statement[1]

We, Prof. Mondjeli Mwa Ndjokou and Dr. Martin Ambassa, hereby declare that this manuscript is original, has not been published previously, and is not currently under consideration for publication elsewhere. We confirm that all named authors have read and approved the manuscript, and that there are no other individuals who meet the authorship criteria but are not listed. We also affirm that the order of authors presented in the manuscript has been agreed upon by all co-authors.

We acknowledge that the Corresponding Author, Dr. Martin Ambassa, will serve as the sole contact for the editorial process. He is responsible for communicating with the other author regarding the progress of the manuscript, the submission of revisions, and the final approval of proofs..

CRediT authorship contribution statement

Itchoko Motande Mwa Ndjokou Mondjeli: Supervision. **Martin Ambassa:** Writing – original draft, Software, Resources, Methodology, Investigation, Formal analysis, Conceptualization.

Declaration of competing interest

We declare that we have no conflicting interest to declare as pertains our submission of manuscript, "Does corruption really matter for the structure of public expenditures?"

Appendix A. Correlation matrix

	Corruption	ODA	NatR	PS	HC	GDP per Capita	TaxR	PopU	AEL	Capital expenditures	Current Expenditures	Infl
Corruption	1											
ODA	0.4812	1										
NatR	−0.3413	0.1351	1									
PS	0.7316	0.3766	−0.2879	1								
HC	0.6386	0.2918	−0.2672	0.5381	1							
GDP per Capita	0.0726	−0.2493	−0.1008	−0.0751	0.4431	1						
TaxR	0.534	0.2472	−0.2028	0.5021	0.4571	0.1399	1					
PopU	0.2123	0.2354	0.1544	0.2395	0.6448	0.4406	0.1934	1				
AEL	0.5177	0.2683	−0.2381	0.4578	0.8706	0.3373	0.2686	0.7216	1			
Capital expenditures	−0.201	0.0934	0.2597	−0.2328	−0.6165	−0.3984	−0.4184	−0.4448	−0.5307	1		
Current Expenditures	0.201	−0.0934	−2.2597	0.2328	0.6165	0.3984	0.4184	0.4448	0.5307	−1	1	
Infl	−0.2015	−0.0878	0.3265	−0.1974	−0.164	−0.0022	0.0434	−0.008	−0.0975	−0.0875	0.0875	1

Source: Authors.

Appendix B. List of countries under study

Cameroon, Congo, Republic of Central Africa, Chad, Equatorial Guinea, Gabon, Ivory Coast, Togo, Mali, Senegal, Niger, Benin, Burkina Faso, Guinea-Bissau, Comoros, Angola, Djibouti, Botswana, Ghana, Burundi, Mauritius, Republic democratic of Congo, Uganda, Ethiopia, Liberia, Somalia, Namibia, Nigeria, Madagascar, Cape Verde, Gambia, Lesotho, Malawi, Mozambique, Rwanda, Kenya, Sao Tome and Principe, Mauritania, Malawi, Seychelles, Tanzania, Sudan, South Africa, Zimbabwe, Somalia, Zambia.

Appendix C. Description of variables and source

Variables	Description	Source
Corruption	Control of Corruption index reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. It ranges from approximately −2.5 (High level of corruption to 2.5 (less corruption).	WGI, Worldwide Governance Indicators |DataBank(worldbank.org)
Political stability	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism.	WGI Worldwide Governance Indicators |DataBank(worldbank.org)
Tax revenue	Tax revenue refers to compulsory transfers to the central government for public purposes. Certain compulsory transfers such as fines, penalties, and most social security contributions are excluded. Refunds and corrections of erroneously collected tax revenue are treated as negative revenue.	WDI https://data.worldbank.org/indicator/GC.TAX.TOTL.GD.ZS
Human Capital	School enrollment, secondary (% gross). Gross enrollment ratio for secondary school is calculated by dividing the number of students enrolled in secondary education regardless of age by the population of the age group which officially corresponds to secondary education and multiplying by 100.	WDI https://data.worldbank.org/indicator/SE.SEC.ENRR?locations=ZG
Access to electricity	Access to electricity is the percentage of population with access to electricity.	WDI https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=ZG
GDP per capita	Real per capita GDP in PP terms This indicator provides per capita values for gross domestic product (GDP) expressed in current international dollars converted by purchasing power parity (PPP) conversion factor. GDP is the sum of gross value added by all resident producers in the country plus any product taxes and minus any subsidies not included in the value of the products. conversion factor is a spatial price deflator and currency converter that controls for price level differences between countries. Total population is a mid-year population based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.	WDI https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations=ZG
Natural resources	Total natural resources rents (% of GDP); Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents	WDI https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS?locations=ZG
Total expenditures	General government final consumption expenditure (% of GDP).	WDI https://data.worldbank.org/indicator/NE.CON.GOVT.ZS?locations=ZG
Urban population (% of total)	Urban population refers to people living in urban areas as defined by national statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations World Urbanization Prospects.	WDI https://data.worldbank.org/indicator/SP.URB.GROW?locations=ZG
Inflation rate	inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.	https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=ZG
Net ODA per capita	Net official development assistance per capita is disbursement flows (net of repayment of principal) that meet the DAC definition of ODA and are made to	WDI https://data.worldbank.org/indicator/DT.ODA.ODAT.PC.ZS?locations=ZG

(*continued*)

Variables	Description	Source
	countries and territories on the DAC list of aid recipients; and is calculated by dividing net ODA received by the midyear population estimate.	
Capital Expenditures	Capital expenditures proportion in total expenditures and net lending	African Statistical Yearbook African Statistical Yearbook | African Development Bank Group (afdb.org)
Current Expenditures	All nonrepayable payments by government, whether requited or unrequited, other than capital expenditure or grants.	African Statistical Yearbook | African Development Bank Group (afdb.org) https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.wider.unu.edu%2Fsites%2Fdefault%2Ffiles%2FData%2FWIID_28NOV2023.xlsx&wdOrigin=BROWSELINK
Income inequality	Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. Thus, a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.	Worldwide Governance Indicators |DataBank(worldbank.org)
Rule of law		ACLED (Armed Conflict Location and Event Data) | Bringing Clarity to Crisis (acleddata.com)
Conflicts	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. It ranges from approximately −2.5 (weak performance) to 2.5 (strong performance)	
	Measure the number of conflict-related deaths relative to population.	

Source: Authors.

Data availability

Data will be made available on request.

References

Abdel-Latif, H, 2024. Echoes Across Borders: Macroeconomic Spillover Effects of Conflict in Sub-Saharan Africa, 2024, p. 1. https://doi.org/10.5089/9798400275838.001. *IMF Working Papers*.

Abdel-Latif, H., Gamal, E.M, 2024. Fraying Threads: Exclusion and Conflict in Sub-Saharan Africa, p. 1. https://doi.org/10.5089/9798400263637.001. IMF Working Papers.

Apergis, N., Dincer, O.C., Payne, J.E., 2010. The relationship between corruption and income inequality in U.S. states: evidence from a panel cointegration and error correction model. Public Choice 145, 125–135. https://doi.org/10.1007/s11127-009-9557-1.

Asongu, S., Uduji, J.I., Okolo-Obasi, E.N., 2020. Political Instability and Political terror: Global Evidence On Persistence. SSRN Scholarly Paper. Rochester, NY, March 18, 2020. https://papers.ssrn.com/abstract=3556424.

Bação, P., Duarte, J., Pereira, M., Simões, M., 2024. Social expenditure composition and inequality: a dynamic panel threshold analysis for OECD countries. Eur J Polit Econ, 102510. https://doi.org/10.1016/j.ejpoleco.2024.102510.

Brückner, M., Chong, A., Gradstein, M., 2012. Estimating the permanent income elasticity of government expenditures: Evidence on Wagner's law based on oil price shocks. J. Public Econ. 96, 1025–1035. https://doi.org/10.1016/j.jpubeco.2012.08.002.

Bukari, C., Seth, S., Yalonetkzy, G., 2024. Corruption Can Cause Healthcare deprivation: Evidence from 29 Sub-Saharan African countries. World Development. https://doi.org/10.1016/j.worlddev.2024.106630.

Caldara, D., Kamps, C., 2008. What Are the Effects of Fiscal Policy shocks? A VAR-based Comparative Analysis. Working Paper Series.

Chen, Y., Yuan, M., Zhang, M., 2023. Income inequality and educational expenditures on children: evidence from the China Family Panel Studies. China Econ. Rev. 78, 101932. https://doi.org/10.1016/j.chieco.2023.101932.

Clarke, D., Matta, B., 2018. Practical considerations for questionable ivs. The Stata J.: Promot. Comm. Statistics and Stata 18 (3), 663–691. https://doi.org/10.1177/1536867X1801800308.

De La Croix, D., Delavallade, C., 2007. Corruption et allocation optimale de l'investissement public. Revue Économique 58, 637. https://doi.org/10.3917/reco.583.0637.

Delavallade, C., 2014. 5. Pauvreté et corruption : un cercle vicieux: regards croisés sur l'économie n° 14, 72–83. https://doi.org/10.3917/rce.014.0072.

Delavallade, C., 2006. Corruption and distribution of public expenditures in developing countries. J. Econ. Finan. 30, 222–239. https://doi.org/10.1007/BF02761488.

Demez, S., 2021. Validity of wagner's law in eu member transition economies: panel causality analysis. jepr 8, 199–210. https://doi.org/10.26650/JEPR.910662.

Dridi, M. 2013. Corruption and Economic Growth: the Transmission Channels 2013. https://mpra.ub.uni-muenchen.de/47873/.

Farzanegan, M.R., Zamani, R., 2022. The effect of corruption on internal conflict in iran using newspaper coverage. Defence and Peace Econ. 35 (1), 24–43. https://doi.org/10.1080/10242694.2022.2108571.

Figlio, D.N., Husted, T.A., Kenny, L.W., 2024. Political economy of the inequality in school spending. J. Urban Econ. 55, 338–349. https://doi.org/10.1016/j.jue.2003.10.006.

Gupta, S., de Mello, L., Sharan, R., 2001a. Corruption and military expenditures. Eur. J. Polit. Econ. 17, 749–777. https://doi.org/10.1016/S0176-2680(01)00054-4.

Gupta, S., Davoodi, H., Alonso-Terme, R., 2002. Does corruption affect income inequality and poverty? Econ. Gov. 3, 23–45. https://doi.org/10.1007/s101010100039.

Hessami, Z., 2014. Political corruption, public procurement, and budget composition: theory and evidence from OECD countries. Eur. J. Polit. Econ. 34, 372–389. https://doi.org/10.1016/j.ejpoleco.2014.02.005.

Holcombe, R.G., Rodet, C.S., 2012. Rule of law and the size of government. J. Institut. Econ. 8, 49–69. https://doi.org/10.1017/S1744137411000348.

Huntington, S.P., 1968. Political Order in Changing Societies. Yale University Press, New Haven.

Iacobucci, D., Saldanha, N., Deng, X., 2007. A meditation on mediation: evidence that structural equations models perform better than regressions. J. Consum. Psychol. 17 (2), 139–153. https://doi.org/10.1016/S1057-7408(07)70020-7.

IMF, 2023. SUB-SAHARAN AFRICA FACTBOOK : A compilation of regional key facts & research results. International Monetary Fund APR, 23.

Jetter, M., Parmeter, C.F., 2018. Sorting through global corruption determinants: institutions and education matter – Not culture. World Development; 109, 279–294. https://doi.org/10.1016/j.worlddev.2018.05.013.

Keneck-Massil, J., Nomo-Beyala, C., Owoundi, F., 2021. The corruption and income inequality puzzle: does political power distribution matter? Econ Model 103, 105610. https://doi.org/10.1016/j.econmod.2021.105610.

Lechevalier, A., Vigny, L., 2022. Les dépenses publiques et leurs déterminants:Revue de la littérature et mise en perspective dans le contexte institutionnel européen. Revue de l'OFCE 179, 49–101. https://doi.org/10.3917/reof.179.0049.

Lui, F.T., 1985. An equilibrium queuing model of bribery. J. Political Econ. 93, 760–781. https://doi.org/10.1086/261329.

Mauro, P., 1995. Corruption and Growth. Q. J. Econ. 110, 681–712. https://doi.org/10.2307/2946696.

Mauro, P., 1997. Why Worry About Corruption? International Monetary Fund, Washington, D.C.. https://doi.org/10.5089/9781557756350.051, 1997.

Mauro, P., 1998. Corruption and the composition of government expenditure. J. Public Econ. 69, 263–279. https://doi.org/10.1016/S0047-2727(98)00025-5.

Mauro, P., Medas, P., Jean-Marc Fournier, J.-M., 2019. The cost of corruption. Finance & Development.

Meltzer, A.H., Richard, S.F., 1981. A rational theory of the size of government. J. Political Econ. 89, 914–927. https://doi.org/10.1086/261013.

Mo, P.H., 2001. Corruption and economic growth. J. Comp. Econ. 29, 66–79. https://doi.org/10.1006/jcec.2000.1703.

Nan, S., 2022. Study on the relationship of grassroots corruption and government expenditure based on panel data. Procedia Comput. Sci. 199, 1192–1197. https://doi.org/10.1016/j.procs.2022.01.151, 2022.

Nevo, A., Rosen, A.M., 2012. Identification with imperfect instruments. Rev. Econ. Stat. 94, 659–671. https://doi.org/10.1162/REST_a_00171.

Nguyen, H.Q., 2023. Corruption, political connection, and firm investments. Int. Rev. Financial Analysis 90, 102864. https://doi.org/10.1016/j.irfa.2023.102864.

Ongo Nkoa, B.E., Song, J.S., 2022. Les canaux de transmission des effets des TIC sur la mobilisation des recettes fiscales en Afrique. African Dev. Rev. 34. https://doi.org/10.1111/1467-8268.12650.

Palguta, J., Pertold, F., 2017. Manipulation of procurement contracts: evidence from the introduction of discretionary thresholds. Am. Econ. J.: Econ. Policy 9, 293–315. https://doi.org/10.1257/pol.20150511.

Peacock, A., Wiseman, J., Veverka, J., 1967. The growth of public expenditure in the United Kingdom. In: Modern revivals in economics, Second ed. Gregg Revivals, Aldershot.

Pedauga, L.E., Pedauga, L.D., Delgado-Márquez, B.L., 2017. Relationships between corruption, political orientation, and income inequality: evidence from Latin America. Appl. Econ. 49, 1689–1705. https://doi.org/10.1080/00036846.2016.1223830.

Pellegrini, L., Gerlagh, R., 2004. Corruption's effect on growth and its transmission channels. Kyklos; 57, 429–456. https://doi.org/10.1111/j.0023-5962.2004.00261.x.

Pellegrini, L., 2011. Chapter 4: The Effect of Corruption on Growth and Its Transmission Channels. In: Pellegrini, L. (Ed.). Corruption, Development and the Environment, Springer, Berlin, pp. 53–74.

Persson, T., Roland, G., Tabellini, G., 2000. Comparative politics and public finance. J. Political Econ. 108, 1121–1161. https://doi.org/10.1086/317686.

Potrafke, N., 2011. Does government ideology influence budget composition? Empirical evidence from OECD countries. Econ. Govern. 12 (2), 101–134. https://doi.org/10.1007/s10101-010-0092-9.

Rizvi, S.M.A.-R., Véganzonès-Varoudakis, M.-A., 2023. Institutional determinants of internal conflicts in fragile developing countries. J. Policy Model. 45, 910–934. https://doi.org/10.1016/j.jpolmod.2023.06.004.

Rose-Ackerman, S., 1975. The economics of corruption. J. Public Econ. 4, 187–203. https://doi.org/10.1016/0047-2727(75)90017-1.

Saha, S., Sen, K., 2023. Do economic and political crises lead to corruption? The role of institutions. Econ. Model. 124, 106307. https://doi.org/10.1016/j.econmod.2023.106307.

Sedgo, H., Omgba, L.D., 2023. Corruption and distortion of public expenditures: evidence from Africa. Int. Tax Public Finance 30, 419–452. https://doi.org/10.1007/s10797-021-09718-6.

Shelton, C.A., 2007. The size and composition of government expenditure. J. Public Econ. 91, 2230–2260. https://doi.org/10.1016/j.jpubeco.2007.01.003.

Swaleheen, M., Ben Ali, M.S., Temimi, A., 2019. Corruption and public expenditures on education and health. Appl Econ Lett 26, 321–325. https://doi.org/10.1080/13504851.2018.1468549.

Tagem, A.M.E., 2022. Aid, taxes, and Government expenditures: A heterogeneous Co-Integrated Panel Analysis. WIDER Working Paper Series.

Tanzi, V., Davoodi, H.R., 1997. Corruption, Public investment, and Growth, 97, p. 1. https://doi.org/10.5089/9781451929515.001. IMF Working Papers.

Timofeyev, Y., 2011. How Corruption Affects Social Expenditures: evidence from Russia (April 15, 2011). Global J. Business Res. 5 (4), 39–51. https://ssrn.com/abstract=1819289.

Transparency international, 2023. SHAPING A BETTER WORLD, Transparency International annual report Secretariat Alt-Moabit 96, 10559. Berlin, Germany.

UNEP. 2022. Annual Report, ONU programme pour l'environement.

Wooldridge, J.M., 2006. Introductory Econometrics: A Modern Approach, 3rd ed.

World Development indcator. 2023. World Bank database.

World governance indicator, 2023. World Bank data base.

Zhao, X., Lynch, J.G., Chen, Q., 2010. Reconsidering baron and kenny: myths and truths about mediation analysis. J. Consumer Res. 37 (2), 197–206. https://doi.org/10.1086/651257.