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Effect of Governance on Macroeconomic Instability in Sub-Saharan Africa: Does Regional Analysis Matter?

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Abstract: Macroeconomic instability is a growth blockage in any contemporary societies, businesses, and governments. However, how to achieve macroeconomic stability remains a gap in extant literature for most developing countries. This study examines the effect of governance on macroeconomic instability in a sample of 42 Sub-Saharan African countries over the period 1996-2019. Four governance indicators, namely political governance, economic governance, institutional governance and general governance are constructed with the use of principal component analysis. Empirical evidence based on the Generalized Method of Moments and alternatively by Two-Stage least Squares technique for regional analysis reveals that the selected governance indicators do not have the same reducing influence on macroeconomic instability in Sub-Saharan Africa. Considering sub-regional analysis, evidence of a positive effect of political governance over growth instability in Central Africa is sparingly apparent in Voice and Accountability, and liberal democracy. This finding therefore recommend, improved local contents of governance policies toward economic sustainability, redesigning and returning the content of democracy in line with the demands, peculiarities and realities of central Africa state.

Keywords: governance, macroeconomic instability, Africa

JEL Code: E02, E32, O55

1. Introduction

The literature on growth outcomes as induced by institutional quality has grown tremendously, but its relationship with macroeconomic instability remains a gap in the extant literature. The consequences of unsustain growth regimes remained a call for concern in Sub-Saharan African countries. Equally, the underlying causal relationship that exists between governance quality and macroeconomic instability remains grossly understudied in extant literature, particularly in Africa and its sub regions.

According to the Global Competitiveness Report (2017), in the absence of macroeconomic stability, growth will be anaemic or, at best, volatile. To this end, macroeconomic instability or volatility is analyzed in the empirical literature in two strands: its role and its determinant on the performance of developing countries. Talking of its impact, it has been

shown that macroeconomic instability has a negative and significant impact on economic growth (Ramey & Ramey, 1995; Güreşçi, 2018), income distribution (Chauvet et al., 2019), FDI inflow (Dinga & Fonchamnyo, 2021). Therefore, reducing macroeconomic instability is a central prerogative to the international development agenda, as well as to national development strategies. As to its determinant, the literature presents mixed results for example, Kose et al. (2006) shows that trade openness and financial integration increase macroeconomic instability; in contrast, Kapingura et al. (2022) show that financial development reduces macroeconomic instability as supported by Dabla-Norris and Srivisal (2013); Kpodar et al. (2019) and Avom et al. (2021) who also show that financial development mitigates the negative effects of macroeconomic instability.

Despite this abundant literature on the determinants of macroeconomic instability, governance quality on macroeconomic instability has received different perspectives, and there lacks a study that consolidates these perspectives together to make an analysis in full view. For example, Acemoglu et al. (2003) show that macroeconomic volatility results mainly from poor institutional quality. Mobarak (2005) shows that democracy improves macroeconomic stability. This result is shared by Klomp and De Haan (2009) who show that political institutions reduce macroeconomic instability. Improving on the methodology of previous papers, Yang (2008) finds that the causal effects of democracy on volatility are not very robust as previously suggested. Using different samples, estimation procedures and indicators of institutions and technical change, Tang (2008) show that lack of suitable institutions significantly increases GDP growth rate volatility. Recently, Kpodar et al. (2019) and Avom et al. (2021) have shown that political stability mitigate output volatility in low income countries.

Given that instability poses a significant threat to sustainable growth and development, taking into account a composite governance indicators and its constituent in the analysis of macroeconomic instability in Sub-Saharan Africa will be benefit in three aspects. First, it will deviate from the general view that sees natural resources and the term of trade shocks as the only factors of macroeconomic instability. The second contribution builds on the evolving paradigms of governance that are fundamentally driven by the need to aggregate governance variables to provide more robust policy implications (Asongu, 2016; Asongu & Nwachukwu, 2017). Third, this study focuses on Sub-Saharan African countries, obtaining more conclusive results on which form of governance is most influential in explaining macroeconomic instability in Sub-Saharan African and its sub regions.

The choice of Sub-Saharan Africa is justified by the homogeneous nature of countries in this region, which are mostly characterized by economic, political, and social structures that do not meet the basic needs of the population (Djeri et al., 2020). The massive poverty and low integration of this region of Africa also characterize these countries into the global economy. As a result, the rates of economic growth in this area of Africa are relatively low and also characterized by excess volatility. In this regard, if appropriate measures are not taken to reduce macroeconomic instability, Sub-Saharan African countries may have to face severe negative economic consequences as a result of growth volatility. To our knowledge, no study has examined the effect of a composite governance indicators on macroeconomic instability in this region and its different sub regions as well. The aim of this study is to fill this gap in the literature. However, these study ignored the influence of other governance components like the presidential term limit on growth volatility, even though the duration in the power of the president may exacerbate this association.

Our sample covers 42 Sub-Saharan African countries for the period 1996 to 2019. Our panel analysis indicates that the selected governance indicators do not have the same reducing influence on macroeconomic instability in Sub-Saharan Africa. For sub-regional analysis, results show that the positive effect of political governance over growth instability in Central Africa is apparent in Voice and Accountability, and liberal democracy whereas no proof was confirmed in relation to the impact of political stability/absence of violence and growth volatility.

The rest of the paper is organized as follows, Section 2 literature review, Section 3 discusses the data and describes the methodology, Section 4 presents the results and discussions, and Section 5 concludes with policy implications.

2. Literature review

With regard to findings done so far, there is a lack of consensus on the effects of governance on macroeconomic instability. Acemogly et al. (2003) argue that there is a strong and robust relationship between initial institutions, volatility and the severity of economic crises and countries with weak historically determined institutions, as instrumented by the mortality rates of past colonists, face higher volatility, as measured by the standard deviation of

per capita output growth. Using the two-stage least squares approach, the authors find a causal effect of institutional differences in volatility, given that the settlers' mortality as an instrument for institutional quality is valid. They find that countries that kept extractive institutions from the time of colonialism are more likely to experience high volatility and economic crises, indicated by the largest drop in output.

Similarly, Barseghyan and DiCecio (2008) investigated the institutional causes of macroeconomic volatility. With respect to macroeconomic volatility, the authors instrument institutional quality for barriers to entry and find that a one standard deviation increase in the entry costs can lead to a 40% increase in the standard deviation of output growth. In contrast to that, property rights do not seem to have a significant effect on volatility.

According to Mobarak (2005), higher levels of democracy and diversification lower volatility, whereas volatility itself reduces growth. The author justifies this result by the fact that the democratic regime is less inclined to take risky political decisions. On the other hand, Klomp and Haan (2009) examine the effect of political 'institutions' on economic growth volatility, using data from more than 100 countries over the period 1960 to 2005. Using the relative standard deviation of the growth rate of GDP per capita as a measure of volatility, their results from a dynamic panel model indicate that democracy reduces economic volatility. While regime and political instability, fiscal and monetary policy uncertainty increase output volatility.

Williams (2014) on the effect of transparency on output volatility using data from 1980-2009 for OECD countries argue that it is the political and economic transparency that arises out of democracy that leads to a relative stability in output growth, given that the ability of a country to adjust and adapt to shocks, be they internal or external, is more pronounced in countries where the flows of information are better. Improving on the methodology of previous papers, Okolie et al. (2021) uses the Marxist Instrumentalist framework of analysis and content analysis on democracy-development hypothesis in developing countries admits that the domestication of the core principles of liberal democracy is important for sustainable growth in Africa. To the authors, endogenous variables such as corruption, electoral malpractice, leadership deficit, ethno-regional power contestation, insecurity, weak government institutions and fragile civil society militate against development in developing countries and hence, attainment of expected development under democracy is hindered by leadership crisis.

In a global sample, Tang and Leung (2016) examined the different historical roots of macroeconomic instability by introducing an empirical framework that relates economic volatility to macroeconomic and institutional variables and external shocks in worldwide sample of 115 countries and in a sub-sample of 38 developing countries. In their paper, they put into question the result found by Acemoglu et al. (2003) who emphasize that distortionary macroeconomic policies reflect the institutional environment, which would be the main and ultimate cause of volatility. For this purpose, they estimate a model using a dynamic panel data approach put out by Arellano-Bover (1995) from 1963 to 2002. In their worldwide sample, they find that the lack of suitable institutions significantly increases GDP growth rate volatility. Similarly, a greater exposure to external shocks significantly increases GDP growth rate volatility as well. To these authors, the impact of the volatility of macroeconomic policies (measured by the inflation rate volatility) on output growth rate volatility is less significant than institutional ones. On the other hand, when isolating a sub-sample of 38 developing countries, they find that institutional factors have the expected sign, but their effects seem not to be significant on GDP growth rate volatility.

More recently, Avom et al. (2021) examine the effect of terms-of-trade volatility on growth volatility while using financial development and some selected indicators of institutional measurement such as control of corruption and political stability as moderators of the negative effect of terms of trade volatility on growth volatility. Using a sample of 45 African countries over the period 1997-2017, and based on the generalized method of moments for empirical strategy, their results provide strong evidence in support that terms of trade volatility increase growth volatility in African countries. The results further indicate that political stability and control of corruption, mitigates the negative effect of terms-of-trade volatility.

From the above empirical analysis, the need for governance indicators, such as political, economic and institutional governance are an important aspect neglected in the literature that may influence macroeconomic stability given that economic stability improves when government institutes are strengthened enough to enforce governance policies. Hence, this study is of the view but subject to empirical verification that, a well-functioning quality of governance improves the macroeconomic environment even if a country has a low level of income.

3. Data methodology
3.1 *Data*

Central Africa	West Africa	Southern Africa	East Africa
Angola, Cameroon, Gabon, Central African Republic, Chad, Congo, Democratic Republic of Congo, Equatorial Guinea, Sao Tome and Principe	Benin, Burkina-Faso, Mali, Cabo Verde, Guinea, Cote d'Ivoire, Gambia, Ghana, Niger, Guinea-Bissau, Liberia, Nigeria, Senegal, Togo, Sierra Leone	Botswana, Lesotho, Mozambique, Namibia, Zambia, Zimbabwe, South Africa	Comores, Burundi, Ethiopia, Uganda, Kenya, Madagascar, Seychelles, Rwanda, Malawi, Mauritius

Source: Authors
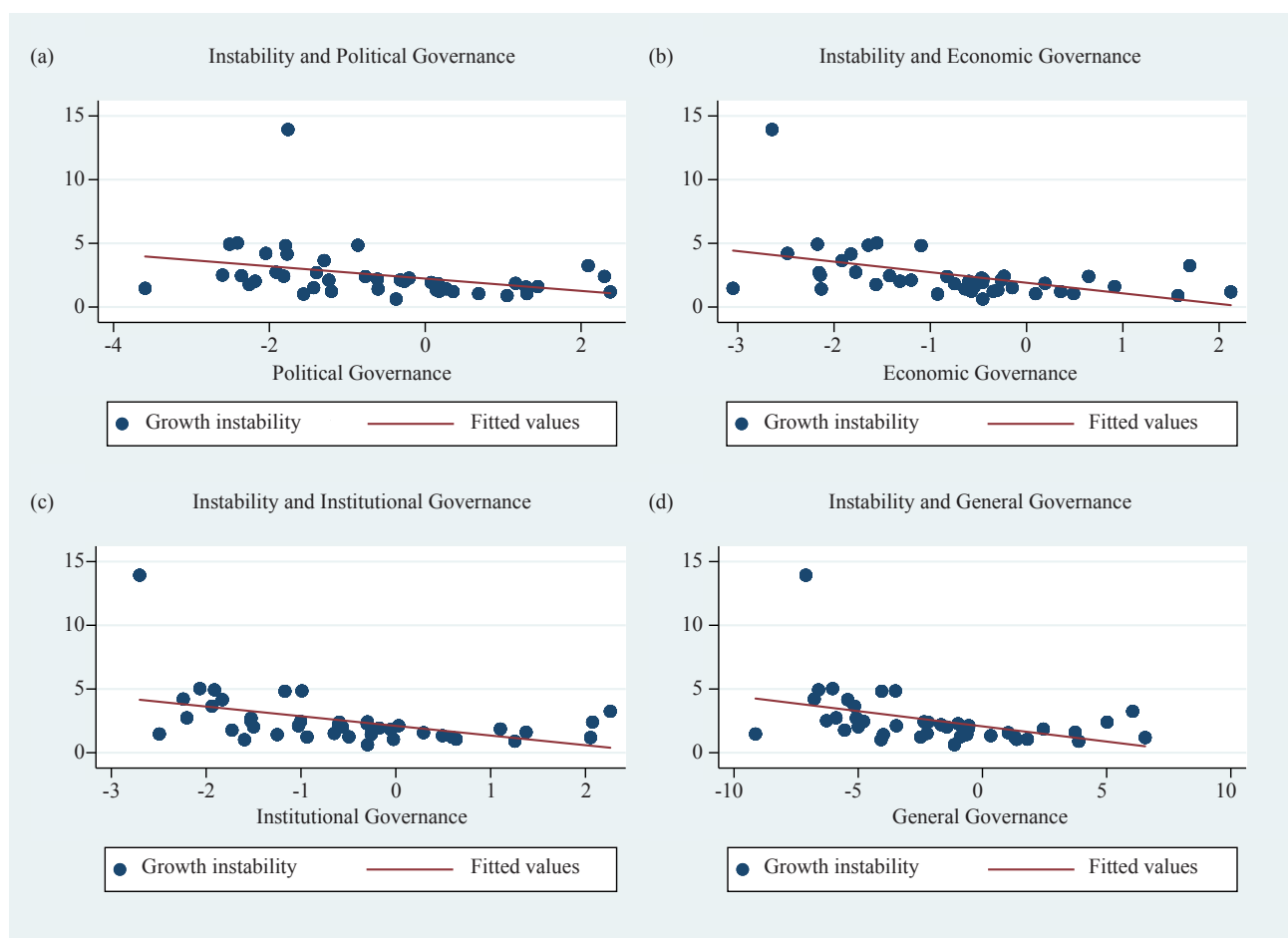
Figure 1. Scatter plot between governance indicators and Growth Instability

Source: Authors' construction

Data of this work are drawn from three source. First, macroeconomic variables are from the World Bank Development Indicators (WDI, 2019). Second, governance variables are taken from Kaufmann et al. (2010) base in the Worldwide Governance Indicators (WGI, 2019). Meanwhile, liberal democracy, property rights and freedom of expression variables are taken from Variety of Democracy (V-DEM) Codebook v9 database. This study covers a sample of 42 Sub-Saharan Africa countries over the period 1996-2019. The full list is presented in Table 1. It also describes

the geographical affiliation of each country. The period of study is delimited to data availability especially the interest variable governance. The descriptive statistics and correlation matrices of variables are contained in Appendix 1 and 2.

In view of the correlation matrix in Appendix 2, its shows that macroeconomic instability is negatively correlated with governance variables as further demonstrated by the scatter plot in Figure 1. Hence supporting the theoretical opinion that a country with good governance turns to experience lower growth instability.

3.2 *Methodology*
3.2.1 *Model specification*

To determine the effect of governance on macroeconomic instability in Sub-Saharan Africa, we use an empirical model inspired from Bruno Ongo and Song (2017), and Asamoah et al. (2016) for control variables, Asongu and Nwachukwu, (2017) for the interest variable, Avom et al. (2021); Kpodar et al. (2019) for macroeconomic instability measure. The model is given by equation (1):

$$MEL_{it} = MEL_{it-1} + \beta Gov_{it} + \alpha X_{it} + \mu_i + \gamma_t + \varepsilon_{it} \tag{1}$$

MEL_{it} represents macroeconomic instability, measure by the standard deviation of GDP per capita growth (SDGDP) in country i over period t. This instability is measured by the SDGDP following our augmented Bruno Ongo and Song (2017) formula as follow

$$SDGDP_{i,t} = \sqrt{\frac{\sum_t^T (GDP_{i,t} - \overline{GDP})^2}{n}} \tag{2}$$

$\overline{GDP}$ is the simple arithmetic mean of GDP of country i over the whole period T. $MEL_{i,t-1}$ stands for lagged *MEI* which is the instability of GPD in the previous year.

The choice of governance variables (variable of interest) $Gov_{i,t}$ is limited on data availability. And the use of a composite index is supported from the work of Buchanan et al. (2012), Asongu and Nwachukwu (2017) since it facilitates estimation and result interpretation.

Gov, is a matrix of governance indicators as use in the study which constitute:

• Political governance which measures the process by which those in authority are selected with fairness and replaced. This Consist of Political Stability and Absence of Violence (PS_AV), Voice and Accountability (VA), and Liberal Democracy (LIBDEM).

• Economic governance measures the capacity of government to formulate & implement policies, and to deliver services. This consist of Government Effectiveness (GE), Regulatory Quality (RQ) and Property Right (PPRIGHT).

• Institutional governance measures the respect for citizens and the state of institutions that govern the interactions among them. It consists of Corruption control (CC), Rule of Law (RL), and Freedom of Expression (FREEXP).

• And General governance which consist of political governance, economic governance and institutional governance.

These definitions are consistent with the governance literature of (Kaufmann et al., 2010; Andrés et al., 2015; Asongu, 2016; Asongu & Nwachukwu, 2017), and are bundled by means of principal component analysis (PCA).

X is a vector of control variables which constitute, Inflation volatility: approximated by the standard deviation of the log of Consumer Price Index calculated over a 3-year period (Avom et al., 2021; Kpodar et al., 2019; Alimi & Aflouk, 2017). Terms-of-trade volatility: measured by the standard deviation of the log of terms of trade index calculated over a 3-year period (Avom et al., 2021). External aid: approximated by the total development assistance percentage of GDP (Chauvet et al., 2019). Trade openness: approximated by the sum of exports and imports of goods and services measured as a share of GDP (Easterly et al., 2001; Kose et al., 2006; Haddad et al., 2013). Total natural resources rent: approximated by the sum of oil rents, natural gas rents, coal, mineral rents, and forest rents percentage to GDP. This is also seen as a determinant of macroeconomic instability in that countries that rely heavily on commodity exports are

likely to be more exposed to external shocks, such as sudden and unexpected fluctuations in international commodity prices (Carmignani & Avom, 2010). Population growth: is used to capture Country size given that it is one of the most important determinants of macroeconomic volatility (Afonso & Furceri, 2010). μ_i captures unobserved country specific effects, γ_t takes into account time specific effect common to all countries; i denotes countries in the sample, t represents year, ε_{it} is the error term and β, α are the parameters to be estimated.

3.2.2 *Principal component analysis (PCA)*

In accordance with the recent governance (Kaufmann et al., 2010; Asongu, 2016; Asongu & Nwachukwu, 2017) literature, this study employs PCA in order to bundle governance indicators into four composite indicators, namely; political, economic, institutional and general governances. Like factor analysis, PCA is designed for interval data, when the variables are linearly related to each other. This is the case of governance variables because they are highly correlated. The PCA is a statistical method that is employed to reduce a large set of highly correlated variables into a smaller set of uncorrelated indicators called principal components (PCs). In this light, the derived governance variables are composite indicators namely: political governance (consisting of political stability, voice & accountability and Liberal democracy); economic governance (government effectiveness, regulation quality and property right) and institutional governance (encompassing the rule of law, corruption control and freedom of expression).

The Kaiser (1974) and Jolliffe (2002) criterion is used to retain common factors. According to the authors, only common factors with an eigenvalue greater than one should be retained. It is apparent from Table 2 that General Governance (G. Gov), which accounts for more than 69% of the information in the nine governance indicators, has an eigenvalue of 6.24. The narrative on total variations and eigenvalues is in line with other combined governance indicators; namely: political governance (Polgov) that has more than 97.8% of variation and an eigenvalue of 2.46; economic governance (Ecogov) has an eigenvalue of 2.208 with more than 73.3% of variation from constituent indicators and institutional governance (Instgov) displays an eigenvalue of 2.231 with approximately 74.3% of information.

Table 2. Principal component analysis (PCA) for governance indicators

Principal components	Component matrix									Proportion	Cumulative	Eigen Value
	VA	PS	LIBDEM	RQ	GE	PPRIGHT	RL	CC	FREEXP			
First PC (G. Gov)	0.3775	0.2950	0.3682	0.3463	0.3472	0.2519	0.3640	0.3565	0.2672	0.1135	0.6937	6.242
Second PC	0.164	-0.300	0.219	-0.171	-0.363	0.376	-0.100	-0.290	0.661	0.693	0.807	1.021
Third PC	-0.107	0.4615	-0.189	-0.028	-0.112	0.7732	-0.238	-0.040	-0.264	0.072	0.879	0.6542
Fourth Pc	-0.183	-0.62	-0.22	0.538	0.336	0.307	-0.162	0.0525	-0.01	0.048	0.928	0.43390
First PC (Polgov)	0.6124	0.5170	0.5981							0.156	0.978	2.46943
Second PC	-0.294	0.8512	-0.4348							0.5137	0.8222	0.47653
Third PC	-0.733	0.090	0.6733							0.0213	1.00	0.0640
First PC (Ecogov)				0.6386	0.6154	0.4621				0.7338	0.7338	2.201
Second PC				-0.243	-0.407	0.8799				0.2276	0.9613	0.6827
Third PC				-0.730	0.6745	0.1105				0.0387	1.0000	0.1160
First PC (Instgov)							0.6383	0.6042	0.4770	0.7437	0.7437	2.231
Second PC							-0.211	-0.457	0.8634	0.2188	0.9625	0.6563
Third PC							-0.740	0.6521	0.164	0.037	1.0000	0.1125

PC: Principal Component. VA: Voice & Accountability. RL.: Rule of Law. RQ: Regulation Quality. GE: Government Effectiveness. PS: Political Stability. CC: Control of Corruption. G.Gov (General Governance): First PC of VA, PS, RQ, GE, RL & CC. Polgov (Political Governance): First PC of VA & PS. Ecogov (Economic Governance): First PC of RQ & GE. Instgov (Institutional Governance): First PC of RL & CC.
Source: Authors computation

4. Estimations and discussion of results

4.1 *Governance and macroeconomic instability in Sub-Saharan Africa countries*

Table 3 presents findings corresponding to the effect of political governance, economic governance, institutional governance, and general governance on macroeconomic instability by the use of a system GMM estimation. Macroeconomic instability captured by the standard deviation of GDP per capita growth is taken as a dependent variable and alternatively by consumption volatility in Table 4.

Columns 1, 2, 3, 5, 6, 7, 9, 10, and 11 of Table 3 present results only for constituent variables used in constructing governance indicators. Findings show that the coefficients associated with the various constituent variables are negative and statistically significant (except for property rights in column 7). This reflects the fact that improvement in one of these variables reduces macroeconomic instability. This result is consistent with the literature on the relationship between macroeconomic instability and the quality of institutions (Acemoglu et al., 2003; Avom et al., 2021; Kpodar et al., 2019).

On the same Table 3, columns 4, 8, 12 and 13 present results of the effect of composite indicators political, economic, institutional and general governance on macroeconomic instability. These results show that the coefficients associated with the governance variables political, economic, institutional and general governance has a negative and statistically significant effect on macroeconomic instability in Sub-Saharan African countries with a magnitude suggesting that a unit improvement in these indicators reduces macroeconomic instability by about 0.181, 0.078, 0.308, 0.365 percentage points respectively. Furthermore, a close look at these coefficients shows that the coefficient associated with institutional governance has a larger magnitude. This may reflect the fact that institutional governance is more important in reducing macroeconomic instability in SSA compared to other governance variables. These results corroborate with those of (Acemoglu et al., 2003; Mobarak, 2005; Williams, 2014; Avom et al., 2021).

Economically, results suggest that countries with good governance are able to provide greater resilience to fluctuations and to economic shocks. Furthermore, poor governance can lead to an uncertain playing field regarding the regulations with which firms must comply. This uncertainty may increase firms' costs and also generate bottlenecks in production by delaying investment and training, which undermines the productivity of GDP per capita growth. In contrast, good governance will lead to more responsive financial reforms that advance the productivity of firms, fostering competitiveness that increases the quality of goods and services offered by investors and hence reduction on growth instability.

At the rank of control variables, terms of trade volatility show a positive and statistically significant effect on macroeconomic instability in SSA. This variable remains positively significant across all regressions when governance variables are added into the model. This result is consistent with the work of Avom et al. (2021), Kpodar et al. (2019). This goes the same for total natural resource rent that shows a persistent positive and significant relationship to macroeconomic instability in SSA countries regardless of the governance variable consider. This result reflects that of the resource curse literature on the fact that resource-dependent countries are likely to be more exposed to external shocks such as random fluctuations in international commodity prices (Carmignani & Avom, 2010). Inversely, population growth use for country size shows a negative and statistically significant sign, reflecting the fact that an increase in the population growth rate leads to a decrease in macroeconomic instability in SSA. This result is consistent with those obtained by Alimi and Aflouk (2017) who show that small countries are subject to greater macroeconomic volatility than large countries.

Table 3. Effect of governance on macroeconomic instability: System GMM estimation

Variables						Dependent variable: Macroeconomic instability							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Lagged Growth volatility	0.57***	0.48***	0.207**	0.455***	0.205**	0.27***	0.124	0.308**	0.24***	0.20***	0.388***	0.303***	0.259***
	(0.035)	(0.027)	(0.036)	(0.054)	(0.094)	(0.092)	(0.079)	(0.073)	(0.061)	(0.049)	(0.063)	(0.051)	(0.085)
Inflation volatility	-0.001	-0.002	0.022	-0.005	0.012	0.033	0.016	0.060	-0.004	-0.001	0.092**	-0.014	0.057
	(0.001)	(0.003)	(0.006)	(0.004)	(0.016)	(0.028)	(0.019)	(0.044)	(0.006)	(0.003)	(0.041)	(0.012)	(0.034)
Terms of trade volatility	0.03***	0.02***	0.04*	0.022**	0.023*	0.018	-0.002	0.079***	0.03***	0.03***	0.076***	0.039***	0.027*
	(0.008)	(0.006)	(0.006)	(0.010)	(0.012)	(0.013)	(0.016)	(0.019)	(0.010)	(0.007)	(0.013)	(0.011)	(0.014)
Aid	0.09***	0.08***	0.09	-0.003	0.004	-0.006	0.031	-0.059	0.023	-0.035	0.007	0.025	-0.082*
	(0.017)	(0.013)	(0.013)	(0.021)	(0.033)	(0.039)	(0.042)	(0.042)	(0.043)	(0.023)	(0.033)	(0.037)	(0.043)
Trade openness	-0.008	-0.004	-0.014*	0.007	-0.008	-0.022**	-0.014	-0.043***	-0.008	-0.002	-0.007	-0.010*	-0.001
	(0.006)	(0.006)	(0.007)	(0.007)	(0.008)	(0.010)	(0.011)	(0.012)	(0.005)	(0.004)	(0.011)	(0.006)	(0.007)
Total Natural Resource	0.11***	0.018	0.028	0.051*	0.13***	0.16***	0.066*	0.036**	0.10***	0.08***	-0.039	0.102***	0.122***
	(0.013)	(0.023)	(0.023)	(0.030)	(0.034)	(0.035)	(0.039)	(0.033)	(0.021)	(0.019)	(0.038)	(0.018)	(0.032)
Population growth	-1.61***	-2.04***	-0.04***	-1.075*	-1.173	-1.507**	-1.316**	-1.838***	-2.24***	-1.28***	-1.086***	-4.211***	-1.74***
	(0.270)	(0.301)	(0.301)	(0.550)	(0.780)	(0.632)	(0.500)	(0.574)	(0.825)	(0.337)	(0.359)	(0.888)	(0.543)
Political stability/Absence of Violence	-0.95***												
	(0.164)												
Voice and accountability		-0.86***											
		(0.377)											
Liberal Democracy			-0.56***										
			(0.377)										
Political governance				-0.18***									
				(0.264)									
Governance effectiveness					-0.212*								

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Regulatory qual	(1.123)	-0.270* (1.140)											
Property right			-2.502 (2.009)										
Economic governance				-0.078** (0.380)									
Control of corruption					-0.070** (0.979)								
Rule of law						-0.51*** (0.394)							
Freedom of expression							-0.05*** (2.346)						
Institutional governance								-0.308*** (0.558)					
General governance													-0.365** (0.166)
Constant	5.79*** (0.719)	6.808*** (0.687)	5.708*** (0.667)	4.466*** (1.248)	2.821** (1.329)	4.942*** (1.346)	6.975*** (2.395)	9.343*** (1.172)	6.159*** (1.276)	4.154*** (0.827)	14.361*** (1.906)	11.653*** (1.845)	5.339*** (1.243)
Observations	270	270	270	270	279	279	278	278	276	279	278	276	279
Number of id	42	42	42	42	42	42	42	42	42	42	42	42	42
ar1p	0.0617	0.0559	0.0659	0.0458	0.0196	0.0406	0.0149	0.0658	0.0132	0.00368	0.0282	0.0249	0.00310
ar2p	0.420	0.355	0.655	0.358	0.569	0.310	0.680	0.545	0.594	0.429	0.373	0.455	0.318
j	38	38	38	28	24	24	24	24	33	32	29	33	24
hansenp	0.354	0.422	0.122	0.240	0.108	0.440	0.236	0.544	0.302	0.379	0.354	0.127	

Source author from stata 15. Notes: *, **, *** denote statistical significance at the 10%, 5% and 1% levels respectively. Robust standard errors reported in parentheses. The coefficients are based on the two-step GMM system estimation, using the finite sample correction of Windmeijer (2005). All explanatory variables are treated as potentially endogenous. The lags of the explanatory variables are taken as an instrument for the difference equation, while the first differences of the explanatory variables are taken as an instrument for the level equation.

4.2 *Alternative dependent variable as Robustness check on results*

Table 4. Effect of governance on consumption volatility: System GMM estimation

Variables	Dependent variable: Consumption volatility			
	(1)	(2)	(3)	(4)
Lagged consumption volatility	0.138**	0.161***	0.132**	0.145**
	(0.064)	(0.051)	(0.053)	(0.062)
Inflation volatility	0.014	0.003	0.005	0.002
	(0.023)	(0.007)	(0.010)	(0.009)
Terms of trade volatility	0.088***	0.093***	0.088***	0.084***
	(0.016)	(0.018)	(0.017)	(0.018)
Foreign Aid	0.060	-0.009	0.028	0.008
	(0.036)	(0.041)	(0.041)	(0.045)
Trade openness	-0.022	-0.032*	-0.019	-0.020
	(0.020)	(0.016)	(0.017)	(0.019)
Natural resource	0.117***	0.098**	0.109***	0.100**
	(0.038)	(0.038)	(0.036)	(0.042)
Population growth	-4.002**	-5.021***	-4.071**	-4.669**
	(1.859)	(1.631)	(1.808)	(2.022)
Polgov	-1.155*			
	(0.680)			
Ecogov		-2.465***		
		(0.875)		
Instgov			-1.512*	
			(0.822)	
G.gov				-0.683**
				(0.301)
Constant	12.168**	14.417***	11.710**	13.540**
	(5.491)	(4.169)	(4.587)	(5.382)
Observations	224	224	224	224
Number of countries	38	38	38	38
AR(1)	0.0727	0.0827	0.0767	0.0777
AR(2)	0.158	0.160	0.173	0.185
Instrument	28	26	26	26
Hansen test p-values	0.1897	0.172	0.128	0.139

Source. Author from stata 15. Notes: *, **, *** denote statistical significance at the 10%, 5% and 1% levels respectively. Robust standard errors reported in parentheses.

Here, we changed our measure of macroeconomic instability capture by the standard deviation of GDP per capita growth as a dependent variable to consumption volatility capture by the volatility of the consumer price index inspired from the work of Dabla-Norris and Srivisal (2013) and the results are reported in Table 4. From this table, the results show that, regardless of the specification, the different indicators of governance used all have a negative (-1.155, -2.465, -1.512, -0.683) and a significant effect on consumption volatility. Control variables remain with their expected signs especially terms of trade volatility whose coefficient shows that terms of trade volatility are associated with greater consumption volatility. This result is consistent with the work of Dabla-Norris and Srivisal (2013) and Ahmed and Suardi (2009) who show that terms of trade volatility increase consumption volatility in Africa. In addition, Trade openness although significant only under political and economic governance regression is associated with decrease consumption volatility. Our results also confirm that natural resources have a positive effect on consumption volatility. In contrast, population growth is negative and statistically significant.

4.3 *Governance and macroeconomic instability in the different Sub regions of SSA*

Table 5 presents the impact of governance on macroeconomic instability in the different sub-regions of SSA by the Two-Stage least squares to verify if governance has a differential effect on macroeconomic instability in Central Africa, Southern Africa, West Africa, and East Africa countries or not. Here, since the number of countries in the different sub-regions varies from one sub-region to another, and most cases T (number of observations) > N (number of countries per group) we apply the two-stage least squares technique in order to overcome the problem of using system GMM in small samples. Columns 1-3 present results for Central African countries, 4-6 that of Southern African countries, 7-9 West Africa and 10-12 that of East Africa countries.

In Central Africa, the coefficient of political governance is different to that obtain in the global sample above. That is, it is positive (0.479) and statistically significant at 10% level, this means that political governance increases growth volatility by 0.48 units in central Africa. These results are in line with those of Bruno Ongo and Song (2017) who showed that political system increases the volatility of FDI inflow in central Africa countries.

The mechanism that might justify this result is that central Africa countries present a startling paradox of what it should take to infuse the culture of political governance legitimacy onto the polity. This is to say in line with UNDP, (2019) that the deficit of political governance in reducing instability is due to the fact that most countries in this region suffer from unprecedented political imbroglio arising largely from the suffocation of their democratic and electoral processes which has led to a high level of inequality between the leadership and elite class and the masses of these nations. The bulk of these challenges could also be passed onto the lack of legitimacy on the part of the political regimes in these countries. This mechanism is in line with the work of Robert and Eche (2021) who explained that most political regimes in Africa came through the back doors; therefore fraudulent electoral processes midwifed irresponsible and unaccountable leaders concomitantly impinges good governance on development.

Furthermore, Central Africa is constantly plagued by violent conflicts which promotes political violence toward macroeconomic stability. In other words, the political structures and emerging ideologies embody inefficiencies that tend to foster macroeconomic instability (Buchanan et al., 2012). From the table, natural resources significantly increase growth volatility in central Africa, which might be explained by its high dependency into the oil sector. With the exception of Central African Republic, CEMAC economies remain mainly driven by the oil sector which to a greater extend, explain the region's higher-than-average growth volatility. As for economic and institutional governance, results remain robust to previous findings on their negative effect on macroeconomic instability.

In order to verify if the previously documented positive effect of political governance on macroeconomic instability in Central Africa is mainly driven by a certain variable listed in the three constructing variables of political governance (Political Stability and Absence of Violence, Voice and Accountability, and liberal democracy), we perform an analysis using the sub-components of this indicator. The results are contained in Table A2 in the Appendix. From this table, we find that the coefficients associated with Voice and Accountability and Liberal Democracy are positive and statistically significant. While the coefficient associated with Political stability and absence of violence is statistically insignificant. This result therefore reflects the fact that the positive effect of political governance on macroeconomic instability in Central Africa is driven by Voice and Accountability, and liberal democracy.

Table 5. Governance and macroeconomic instability: sub regional analysis

Dependent variable: Growth volatility measured with the standard deviation: estimation method. 2SLS

Variables	Central Africa			Southern Africa			West Africa			East Africa		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Inf volatility	0.071	0.041	0.074	0.142***	0.153***	0.210***	-0.132	0.174*	0.184*	0.000	0.010***	0.013**
	(0.127)	(0.140)	(0.118)	(0.037)	(0.036)	(0.065)	(0.157)	(0.101)	(0.098)	(0.002)	(0.003)	(0.005)
Tot volatility	0.011	0.012	0.016	0.175***	0.152***	0.299***	0.121*	0.136***	0.137**	0.046	0.058**	0.001
	(0.036)	(0.034)	(0.037)	(0.040)	(0.036)	(0.116)	(0.068)	(0.052)	(0.055)	(0.030)	(0.029)	(0.026)
Aid	-0.295	-0.343*	-0.231	-0.053	-0.075	0.195	0.126	0.115	0.101	0.018	-0.002	0.043
	(0.185)	(0.204)	(0.143)	(0.071)	(0.076)	(0.272)	(0.118)	(0.085)	(0.093)	(0.027)	(0.066)	(0.068)
Openness	0.064	0.046	0.045	0.025**	0.018*	0.091*	-0.025	-0.009	-0.007	0.013**	0.033**	0.026
	(0.044)	(0.042)	(0.044)	(0.012)	(0.010)	(0.050)	(0.021)	(0.013)	(0.011)	(0.006)	(0.016)	(0.018)
Natural Res	0.003*	0.001**	0.017*	-0.47***	-0.42***	-0.215	0.324	0.420**	0.446**	-0.033	-0.141**	-0.156*
	(0.084)	(0.078)	(0.087)	(0.130)	(0.122)	(0.237)	(0.260)	(0.214)	(0.200)	(0.044)	(0.066)	(0.082)
Pop growth	-3.142*	-3.412*	-3.29*	1.764***	1.371**	5.807***	1.912	0.888	0.583	0.223	-0.639	-0.539
	(1.874)	(1.931)	(1.867)	(0.657)	(0.532)	(2.087)	(2.678)	(1.993)	(2.331)	(0.275)	(0.702)	(0.731)
Polgove	0.479*			-0.860*			-3.344*			-0.281*		
	(0.803)			(0.449)			(1.151)			(0.268)		
Ecogove		-0.426*			-0.604*			0.274			-0.458	
		(1.330)			(0.358)			(0.189)			(1.839)	
Instgove			-0.1**			-8.43***			-0.646			-0.754
			(0.858)			(3.263)			(1.667)			(0.900)
Constant	7.739	7.724	6.939	-1.693	-1.517	-35.82**	0.247	-3.356	-2.625	-0.198	7.142*	5.287*
	(5.533)	(5.368)	(5.326)	(1.465)	(1.485)	(14.248)	(9.289)	(5.688)	(6.748)	(0.707)	(3.783)	(2.938)
Observations	41	41	41	35	35	35	75	75	75	48	48	48
R-squared	0.414	0.396	0.379	0.732	0.713	0.449	0.223	0.537	0.508	0.291	0.458	0.333
Hansen	0.268	0.272	0.560	0.132	0.215	0.583	0.250	0.236	0.230	0.507	0.367	0.412

Source author from stata 15. Notes: *, **, *** denote statistical significance at the 10%, 5% and 1% levels respectively. Robust standard errors reported in parentheses.

This result can be justified by the fact that Voice and accountability describe the public participation in governance which is directly related to transparency. In this light, if country's citizens are unable to participate in selecting their government, laws adopted will not often guarantee investment incentives which are consider important determinants of macroeconomic instability (Ajide et al., 2015; Bruno Ongo & Song, 2017) at the benefit of the citizens, but rather at the benefit of the demands of various social groups. In addition, the positive effect of liberal democracy on macroeconomic instability shows that there are endogenous constraints to the capacity of liberal democracy in generating the expected development outcome in central Africa state. This perceived antagonism against liberal democracy-economic stability stems from the realities of most transitional states in Africa (see Okolie et al., 2021) and can be justify on the fact that the time limits associated with liberal democracy predispose democratic states mostly embark only on short-time economic policies considered to be unsustainable and limited in scope, which are introduced to increase the ruling party popularity and chances for the next election. In this case, macroeconomic policies which can stimulate economic stability and ensure efficient allocation of resources are sacrificed on the altar of reelection as evident by the lack of power alternation in member state of this region.

In Southern Africa unlike East Africa, we find that regardless of the indicator used, governance reduces instability. In West Africa, the increased volatility of growth is explained by economic institutional variables. Here, political institutions are seen to be significantly reducing growth volatility due to its significant advances in democracy that provide credibility in terms of property rights and socio-political stability.

5. Conclusion

The objective of this paper has been to analyze the effect of governance on macroeconomic instability. Four composite indicators of governance are used, political governance (including political stability, voice & accountability and liberal democracy), economic governance (including government effectiveness, regulatory quality and property rights), institutional governance (involving corruption control, rule of law and freedom of expression) and general governance which is an aggregated indicator of the previous three indicators. The empirical evidence is based on the Generalized Method of Moments on a sample of 42 Sub Saharan African countries over the period 1996-2019 and Two-Stage least squares (2SLS) for regional analysis. Results obtained reveal that all governance indicators and their unbundled constituents used except for property right, significantly reduces macroeconomic instability in Sub-Saharan Africa. For sub regional analysis, findings shows that the positive effect of political governance on macroeconomic instability in Central Africa is driven by Voice and Accountability, and liberal democracy. Among the determinants of macroeconomic instability, terms of trade volatility and natural resources amplifies volatility in SSA while, population growth, trade openness reduced volatility.

Consequently, this study recommends the promotion of good governance policies that evaluate and reduce inefficient institutions (rules) that delayed competitiveness in market systems causing volatility. For regional policy, this study recommend redesigning and retuning the content of liberal democracy in line with the demands, peculiarities and realities of central Africa state. Our empirical analysis should, however, be seen as exploratory and results should be taken with cautious due to the structure of the methodology applied. This structure of the analysis is suitable to document associations but difficult to draw causal conclusions.

Further studies can improve the extant literature. First, by assessing similar studies at the country level. Second, future research can split countries by their other features such as splitting into high and low political instability and then conduct subsample analysis only in this two different groups. Third, future researches can analyse the non-linear relationship between governance and macroeconomic instability using other appropriate method such as threshold GMM or Panel Smooth Transition Regression (PSTR).

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Conflict of interest

Authors declare no conflict of interest.

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Appendix

Appendix 1 *Descriptive statistics results and data source*

Variable	Obs	Mean	Std. Dev.	Min	Max	Data source
Growth volatility	950	0.181	4.896	-35.384	77.241	WDI and Author's calculations
Political governance	840	-0.08	1.604	-4.283	3.044	WGI and Author's calculations
Economic governance	839	-0.765	1.256	-4.034	3.01	WGI and Author's calculations
Institutional governance	840	-0.563	1.34	-3.235	3.071	WGI and Author's calculations
General governance	839	-1.416	3.992	-11.342	7.862	WGI and Author's calculations
Inflation volatility	950	-0.001	97.393	-1106.174	2486.477	WDI and Author's calculations
Term of trade volatility	950	0.001	13.554	-67.497	52.767	WDI and Author's calculations
Foreign Aid	956	9.091	9.268	-0.251	92.141	WDI
Trade Openness	899	70.589	36.459	20.723	311.354	WDI
Natural Resources	951	11.476	11.221	0.001	62.04	WDI
Population Growth	966	2.532	0.978	-2.629	8.118	WDI

Source: Authors computation

Appendix 2 *Pairwise correlations*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Growth volatility	1.000											
(2) Consumption volatility.	0.121	1.000										
(3) Political governance	-0.219	-0.104	1.000									
(4) Economic governance	-0.245	-0.045	0.815	1.000								
(5) Institutional governance	-0.246	-0.081	0.882	0.915	1.000							
(6) General governance	-0.246	-0.083	0.949	0.944	0.973	1.000						
(7) Inflation Volatility	0.021	0.061	-0.154	-0.125	-0.129	-0.144	1.000					
(8) Term of trade volatility	0.099	0.176	-0.184	-0.164	-0.205	-0.193	0.057	1.000				
(9) Foreign aid	0.074	0.025	-0.098	-0.233	-0.107	-0.148	-0.022	-0.136	1.000			
(10) Trade Openness	-0.046	-0.011	0.261	0.136	0.231	0.223	-0.039	-0.037	-0.078	1.000		
(11) Natural Resources	0.359	0.147	-0.558	-0.579	-0.607	-0.607	0.140	0.254	0.063	0.180	1.000	
(12) Population growth	-0.113	0.168	-0.388	-0.394	-0.486	-0.441	0.034	0.235	0.141	-0.288	0.444	1.000

Source: Authors compXutation

Table A1. Pairwise correlations

Variables	(1)	(2)	(3)	(4)
(1) Polgove	1.000			
(2) Economigove	0.815	1.000		
(3) Institutgove	0.882	0.915	1.000	
(4) Ggov	0.949	0.944	0.973	1.000

Table A2. Effect of political governance' sub components on macroeconomic instability in Central Africa

Variables	Dependent variable: macroeconomic instability		
	(1)	(2)	(3)
Political Stability	-2.066		
	(1.394)		
Voice and Accountability		5.407**	
		(2.554)	
liberal democracy			15.948**
			(6.701)
Inflation volatility	-0.103	-0.007	0.031
	(0.144)	(0.138)	(0.133)
Terms of trade volatility	0.006	0.021	0.005
	(0.042)	(0.037)	(0.038)
Foreign Aid	-0.297	-0.225*	-0.168
	(0.208)	(0.133)	(0.126)
Trade openness	0.087*	0.042	0.053
	(0.051)	(0.042)	(0.045)
Natural resource	-0.022	0.024	-0.010
	(0.090)	(0.082)	(0.086)
Population growth	-2.700	-3.858**	-2.985
	(1.842)	(1.850)	(1.830)
Constant	5.522	5.809	11.796*
	(4.951)	(4.230)	(6.988)
Observations	41	41	41
R-squared	0.276	0.434	0.328
Hansen	0.221	0.948	0.526

Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$