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*Review article*

# Institutions and Growth Volatility: The Case of Sub-Saharan African Countries

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***Abstract*** *- In the context of recurrent crises and attention to the resilience of economies, this paper contributes to the literature by analyzing the effect of institutional quality on growth volatility in Sub-Saharan Africa. It covers the period 1980-2017 for a sample of 44 sub-Saharan African countries. Using system GMM estimators, the results show that institutional quality has a negative effect on economic growth volatility in Sub-Saharan Africa. This suggests that better institutions reduce the growing volatility in Sub-Saharan Africa. Because of these results, improving the quality of institutions should be among the priorities of economic policy in Sub-Saharan African countries to strengthen the economies' resilience.*

***Keywords*** *- Institutions-democracy-growth volatility.*

**JEL Classification:** *O43 P16 E32 O11*

## I. INTRODUCTION

Volatility refers to the variability over time of a series concerning its average value or its deviation from the trend value (Aizenman and Pinto, 2005). It is associated with risk (Aizenman and Pinto, 2005) and is also a criterion of vulnerability, itself the risk for a country to be durably affected by exogenous and unexpected factors. It results from three factors, namely, exogenous shocks, exposure to these shocks, and, above all, low resilience (P. Guillaumont, 2006).

One of the concerns about volatility is its potentially disastrous effects, in particular the human cost to the economy. Its effects in the form of slower economic growth (Imbs, 2007; Martin and Rogers, 2000; Ramey and Ramey, 1995), lower private investment in human capital (Aizenman and Marion, 1999; Hnatkovska and Loayza, 2005), and increased income inequality (Hausmann and Gavin, 1996) are intended to widen the economic development gap between developed and developing countries (Balavac and Pugh, 2016). Thus, economies marked by high volatility record low growth performance, affecting poverty, income inequality, and human capital accumulation. For these reasons, studies are undertaken to understand the root causes of this volatility, the mechanisms of transmission of disturbances to the economy, and the means to mitigate them. This paper is part of this effort and seeks to analyze the effects of institutional quality on economic growth volatility in Sub-Saharan Africa.

The economic literature emphasizes that institutions, particularly democratic ones, ensure economic stability by reducing the volatility of economic growth. This stability-enhancing effect is explained by the ability of democracies to ensure stronger control over the decisions of political leaders, to limit the implementation of distortionary public policies and, consequently, the occurrence of internal shocks (e.g., high inflation episodes, see Acemoglu et al., 2003) and to manage better redistributive conflicts caused by external shocks (e.g., trade shocks, see Rodrik, 1999a, 2000).
According to Rodrik(2000), democratic institutions, by fostering consensus on the policy responses to various shocks, help reduce the volatility of growth rates. He argues that democracies would experience less volatility than non-democracies because they "induce a greater willingness to cooperate and compromise in the political sphere". As a result, in a democracy, low volatility is expected due to the strong constitutional and institutional constraints on leaders (Nooruddin, 2010a). Democratic institutions set economic policies by consensus (Mobarak, 2005; Rodrik, 1999) and allow for greater diversification in decision-making (Chandra, 1998), leading to economic stability. Furthermore, democratic institutions can ensure the stability of an economy through political competition and voters' preference for risk avoidance, because risk-averse voters punish the incumbent government for economic instability (QuinnandWoolley, 2001).

In Sub-Saharan Africa, the problem of volatility of growth rates deserves particular attention. Indeed, SSA countries are characterized by their higher volatility and have the lowest growth rates compared to other regions of the world (Figure 1). Yet, the problem of growth volatility can become acute in the presence of weaknesses in the mechanisms for cushioning exogenous shocks that can amplify growth volatility (Kpodar et al., 2019). However, the strong correlation between institutions and volatility (Figure

2) could reveal the importance of institutional quality in reducing volatility. Therefore, one may ask: what role can institutional quality play in the stability of economic growth in Sub-Saharan Africa? This paper aims to analyze the effect of institutional quality on growth volatility in Sub-Saharan Africa (SSA). Specifically, it seeks to verify whether countries with adequate institutional arrangements would manage to reduce the volatility of their growth rate.

This work contributes to the existing literature in several ways: first, it focuses on the role of institutions while many studies emphasize other determinants[1]. Second, it focuses on the specific case of SSA countries. Indeed, while the determinants of economic growth have often been studied for SSA, studies on region-specific growth volatility are scarce (MekonnenandDogruel, 2018). SSA countries are typically included in studies of growth volatility in developing countries (Mekonnenand Dogruel, 2018), despite the magnitude of volatility and the potential costs it can induce to the economy. We aim to fill this literary gap by focusing specifically on institutional quality in the stability of economic growth in SSA. The remainder of this paper is organized into five sections. After this introductory section, Section 2 presents a literature review; Section 3 discusses the stylized facts; section 4 presents the methodology and results. Finally, Section 5 concludes.

## II. LITERATURE REVIEW

The role of institutions in macroeconomic stability has received increasing attention in recent decades. Many studies argue that the difference in volatility of growth rates observed across countries is due to institutional differences(Acemoglu et al., 2003). Most of these studies have emphasized democracy because it constitutes a "meta institution" on which other institutions are based (Rodrik, 2000). This is why the relationship between institutional quality and volatility is generally summarized as the relationship between democratic institutions and the volatility of economic growth. Indeed, in a democracy, low volatility is expected because of the strong constitutional and institutional constraints on leaders (Henisz, 2000; Nooruddin, 2010b; Weede, 1996). Democracies establish economic policies by consensus (Rodrik, 1999; Mobarak, 2005) and allow for greater diversification of decision-making (Chandra, 1998); this leads to economic stability. In addition, democratic institutions can ensure the stability of an economy through political competition and voters' preference for risk avoidance because risk-averse voters punish the incumbent government for its economic instability (Quinn and Woolley, 2001). It is also possible that "democracies induce a greater willingness to cooperate and compromise in the political sphere, which leads to greater stability" (Rodrik, 2000).

These theoretical arguments of a negative relationship between democratic institutions and growth volatility have been supported by empirical studies(Almeida and Ferreira, 2002; Rodrik, 2000; Weede, 1996), and recent work further shows that this relationship is very strong both in terms of linkage (Quinn and Woolley, 2001) and causality (Acemoglu et al., 2003; Mobarak, 2005). A quick review of previous studies thus suggests that the causal effects of democratic institutions on growth volatility are well established(Yang, 2008).

Yang(2008) and B. F. JonesandOlken(2008) have shown that growth collapse is, in some cases, strongly associated with the outbreak of civil war. CuberesandJerzmanowski(2009) further examines the issue of democracy and growth reversals. They find that non-democratic countries are less likely to have a risky sector, but when this happens, their growth may be stronger than in democratic countries.

However, others, such as Yang(2011), consider economic rather than political liberalizations. He argues that countries that open their economies to international trade and financial flows subsequently experience less volatility. Political liberalizations, on the other hand, do not seem to reduce volatility. However, KlompandDe Haan(2009) stepped back from the specific examination of democracy and focused on the interaction between political institutions and growth volatility. They identify three dimensions of a political regime that can influence economic volatility: first, they examine the type of regime, second, the stability of the regime, and finally, they focus on political uncertainty. They conclude that fiscal and monetary policy uncertainty increase volatility and that there is a negative relationship between democracy and volatility.

Overall, then, research has highlighted two main themes regarding democracies and output volatility: first, democracy better reflects society's collective decision-making and its preference for stability, which is risk-averse; second, democracy has several different constraining mechanisms that prevent governments (or at least reduce their risks) from taking actions that cause internal or external shocks. However, other studies have sought to understand the specific aspects responsible for stability in democratic systems.

Indeed, Williams(2014) analyses the role of transparency in reducing volatility. In his study, he argues that the political and economic transparency that emerges from democracies leads to this relative stability in output growth, as a country's ability to adjust and adapt to shocks, whether internal or external, is more marked in countries with better information flows. Thus, using data from 1980 to 2009, the author shows that once transparency is incorporated into the analysis, democracy appears to increase volatility, while transparency has a significant moderating effect on volatility.

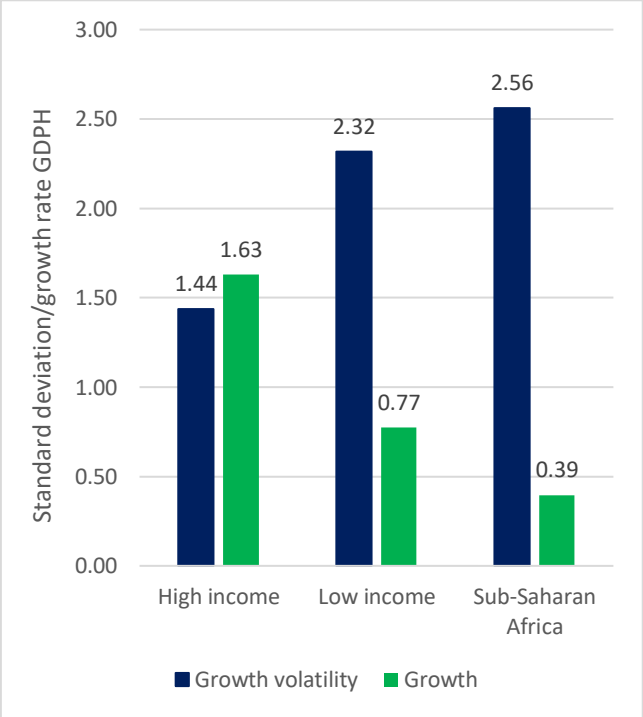
[1] For exampleKpodar et al. (2019) studied the role of financial development in the effect of terms-of-trade shocks on volatility in low-income countries.

On the other hand, other studies have also sought to explain substantial variations in the volatility of economic growth rates in democratic regimes by focusing on electoral institutions. Indeed, Béjar and Mukherjee (2011) have shown that institutional differences between plurality and proportional representation (PR) electoral systems explain why growth volatility is high in some democracies but not in others. Specifically, the authors suggest that, unlike in PR democracies, policymakers' strong concerns in majoritarian systems lead them to use their discretionary spending power to make large changes in public spending levels, which generates greater spending volatility in these countries. As a result, policymakers in majoritarian systems cannot credibly commit to stabilizing spending levels. This creates uncertainty among economic actors about future spending levels and creates unstable investment patterns that generate greater volatility in growth rates in majoritarian democracies.
These results are close to those of Mathonnat and Minea(2019). Using a panel of 140 countries over the period 1975-2007, the authors disaggregate democracies along five institutional dimensions (governmental forms, electoral rules, state forms, number of veto players, and age of democracies) to study the specific forms of democracies that can explain the low volatility of economic growth in democracies relative to non-democracies, typically highlighted in the literature. They find that, while all forms of government decrease volatility to the same extent, proportional electoral rules perform better than majoritarian and mixed electoral rules, suggesting a role for more inclusive political decision-making. Furthermore, they find that volatility is significantly lower in unitary states, suggesting a role for a limited separation of power between central and local government, while the effect of the number of veto players and the age of democracies is significant only in developed countries.
However, other authors such as Chandra and Rudra(2015) hypothesize that the level of public deliberation, rather than broad categories of regime type, is the driver of national economic performance across political regime systems. Specifically, negotiations, disagreements, and trade-offs among proponents of decentralized decision-making (e.g., citizens, business representatives, professional associations, unions, and public administrators) are the underlying causal mechanism explaining the non-monotonic relationship between different types of political systems and economic performance. According to these authors, countries with a high level of public deliberation more often experience stable growth outcomes, while other countries may make radical changes in economic policy with uncertain outcomes. It is, therefore, this level of deliberation that may explain stability in some so-called non-democratic regimes.

The following section will discuss the stylized facts on the trend in the relationship between institutions and economic growth volatility in Sub-Saharan Africa.

## III. THE TREND IN THE RELATIONSHIP BETWEEN INSTITUTIONS AND GROWTH VOLATILITY

In this section, we turn to the presentation of stylized facts, which will allow us to see the different trends of the variables. Indeed, Figure 1 below presents the relationship between economic growth and its volatility (measured by the standard deviation). This figure shows that during the period under study, the growth volatility was higher in SSA than in other world regions. For example, it was 2.56 points, twice as high as in high-income countries (1.44) and low-income countries (2.32). At the same time, SSA countries have the lowest average growth rate. As the figure shows, the regions with high growth rates are those with lower volatility. Again, in a comparative analysis with other regions of the world, SSA countries have the highest volatility but the lowest growth rates.




*Source: Author, based on WDI*

**Fig. 1 Relationship between volatility and growth in SSA and other regions of the world**

On the other hand, Figure 2 presents the correlation between the institutional variable and growth volatility in SSA. In the left-hand panel, institutional quality is measured by the polity2 democracy index. The figure shows that countries with good democratic institutions tend to experience less growth volatility in the considered sample of SSA countries. The same pattern emerges using the index of political freedom (Right Frame).

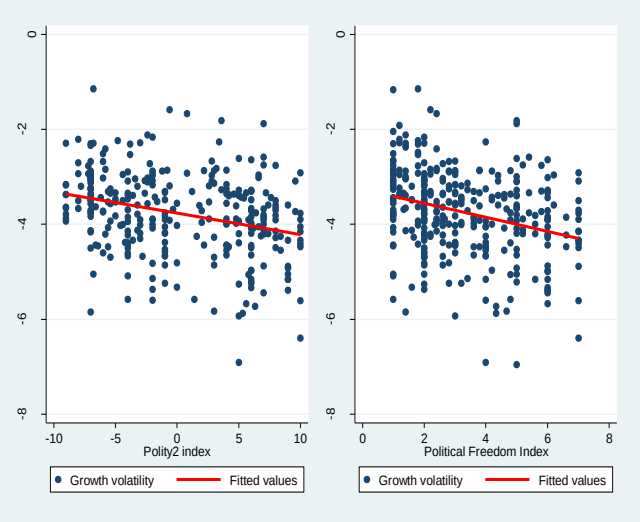



**Fig. 2 Relationship between institutions and growth volatility in SSA**
*Source: Author*

Thus, these preliminary results seem to support the hypothesis that institutional quality is a factor of lower volatility. In light of these observations, an econometric analysis is needed to verify these presumptions. Therefore, the following section will discuss the methodology for presenting the model and the results of the econometric estimates.

## IV. METHODOLOGY AND RESULTS

This section presents the model and the estimation results.

### *A. Presentation of the model*

To study the effect of institutional quality on growth volatility in SSA, we rely on the panel data model used by Yang (2008) and then Nooruddin (2010). Thus, the empirical equation is given by:

$$\sigma_{it} = \alpha\sigma_{i,t-1} + \beta' X_{it} + \theta I_{it} + \varepsilon_{it} |\alpha| < 1 \qquad (1)$$

Where the indices *i* and *t* represent the country and period, respectively, $\sigma_{it}$ is the volatility of real GDP growth, I am the indicator of institutional quality. *X* is the set of control variables;$\beta'$est la transposée de leur coefficient $\sigma_{i,t-11}$i s the lagged growth volatility variable used to account for the persistence of volatility over time? $\varepsilon_{it}$ It is the error term.

### *B. Measurement of variables and data source*

The data used for the estimates cover 1980-2017 and come from the World Bank and the Polity IV database. It is also important to show how our variables were measured.

### *a) Explained variable*

Our explained variable is the volatility of growth. Several indicators are used to account for the volatility of a variable generally, but each method has its advantages and disadvantages. For example, EdwardsandThames(2010) measure volatility by the absolute deviations from the mean of the real GDP per capita growth rate. Although this method has the advantage of calculating volatility on an annual basis, it may overestimate or underestimate volatility by considering the mean as a trend (J. S. Guillaumont and Kpodar, 2004). Another approach based on Hodrick-Prescott (HP) filters tries to remedy this problem (P. Guillaumont, 2009). It consists of refining the trend of the variable under study using HP filters. Then the difference between this trend and the observed variable is calculated. Finally, the standard deviation of this difference is used to measure volatility. This approach has the advantage of being flexible on the functional form of the series trend compared to the previous method. However, the method comes up against other statistical and econometric difficulties. It has the disadvantage of assuming that the cyclical and trend components of the series are independent (KyandCabral, 2017). This assumption risks biasing the standard deviation thus calculated when the two components are linked (Cariolle, 2012).

Another most commonly used alternative measures volatility by standard deviations of the growth rate of real GDP per capita [see, for example, Easterly et al. (2000 ); Rodrik (2000) Sahay et al.(2015); Bobbo, 2018; KlompandDe Haan(2009)]. The use of standard deviation as a measure of volatility perfectly captures the concept of stability. Here, the average growth rate is used to measure long-run equilibrium (or steady-state), and deviations from this average are treated as shocks to the system. The larger the deviation, the larger the shock. Thus, if the growth rate for a particular state is stable, the standard deviation should be small since the trend will well represent the stable growth path. However, while the standard deviation accurately measures the stability of a country's long-run growth rate, it ignores the dynamics of the growth path that aggregate to form the long-run stability (Nooruddin, 2010). The main concern is that the standard deviation does not distinguish between two countries, one of which had volatile growth around a stable trend and another that had stable growth but around two very different trends (for example, if there is a structural break in the time series).

Given the reasons mentioned above, we draw on the work of Combes and Guillaumont (2002); Hnatkovska(2004); AfonsoandFurceri(2010), Nooruddin (2010), and Kpodar et al. (2019) to use an alternative, more flexible approach by assuming that the long-run component is part of a first-order autoregressive process (1), as follows:

$$\ln(Y_{i,t}) = \alpha_i + \beta_i \ln(Y_{i,t-1}) + \gamma_i t + \varepsilon_{i,t} \qquad (2).$$

where $Y_{i,t}$ is the real GDP of country i at time t, and $\varepsilon_{i,t}$ Is the error term. Under these conditions, using equation (2) for each country with annual data from 1980-2017, we isolate the estimated value of the error term ($\widehat{\varepsilon_{i,t}}$) which is given by the following relation:

$$\widehat{\varepsilon_{i,t}} = \ln(Y_{i,t}) - \widehat{\ln(Y_{i,t})} (3).$$

In this equation (3), which takes into account the cyclical component of the logarithm of real GDP, $\widehat{\ln(Y_{i,t})}$ is the estimated value of $\ln(Y_{i,t})$ Calculated from equation (2).
Based on equation (3), for each five-year subperiod, the volatility of growth is given by the standard deviation of the cyclical component $\widehat{\varepsilon_{i,t}}$ as illustrated below:

$$\sigma = \sqrt{\frac{\sum_{j=1}^{5}(\widehat{\varepsilon_{i,t}} - \overline{\widehat{\varepsilon_{i,t}}})^2}{4}} \quad (4)$$

In equation (4) $\overline{\widehat{\varepsilon_{i,t}}}$is the average of $\widehat{\varepsilon_{i,t}}$ Over the sub-period (here five years).
This approach has the advantage of taking into account the coefficients specific to each country in equation (2) and controlling for the presence of a time trend in the series. In contrast, the standard approach of using standard deviations of the growth rate as a measure of growth volatility implicitly assumes that in equation (2),
$\alpha_i = \gamma_i = 0$ and $\beta_i = 1$ for all countries.

***b) Variable of interest***

Our measure of institutional quality is based on the polity2 democracy index. But according to the classification of Przeworski et al.(2000), PerssonandTabellini(2003), GiavazziandTabellini,(2005); Acemoglu et al. (2014), this variable is equal to 0 (1) for autocratic (democratic) regimes, especially when the Polity2 index is negative (positive). However, since our data is averaged over five years, a country is considered democratic for the corresponding period if it has a democratic regime for all five years and autocratic if not (MathonnatandMinea, 2019). This approach better reflects the nature of the regimes rather than the usually used five-year averages. However, we use the political right index and the civil liberty index for the robustness of the results, all from the Freedom House database. Initially, these two indices range from a scale of 1 (more freedom) to 7 (less freedom). However, to harmonize the interpretation of the signs of the coefficients, we follow Okey (2013) to modify. Thus, we define POL and CIL's new variables with *POL*= (8-the political right index) and CIL= (8-the civil freedom index). Under these conditions, the value 1 represents the low degree of freedom while 7 is the highest degree.

***c) Other explanatory variables***

The rest of the variables considered in our model are inspired by the theoretical and empirical literature [MalikandTemple(2006); AfonsoandFurceri(2010); Aghion et al. (2010); BeckandLevine(2005); LoayzaandHnatkovska(2004); Yougbare(2009); Kpodar, 2019] and includes *fiscal policy, nominal shocks, financial sector development, trade openness, level of economic development, agricultural output, country size, as well as terms of trade volatility*. The procedure for terms of trade volatility is identical to that for growth volatility.

However, the Fiscal Policy variable is measured by the size of government consumption expenditures as a percentage of GDP. The impact of government spending on growth volatility is indeterminate because increased government spending can help stabilize growth during periods of declining private spending. In this case, changes in government spending are negatively related to growth volatility. But, they can make growth more volatile when they generate distortions in the economy (seeAfonsoandFurceri, 2010).

We measure them by inflation volatility (Kpodar, 2019; Yougbare, 2009). Volatile inflation, reflecting the occurrence of nominal or monetary shocks, leads to higher growth volatility. Nominal shocks thus make growth more volatile. The development of the financial sector is measured by the ratio of bank credit to GDP in the private sector (Aghion et al., 2010; BeckandLevine, 2005; LoayzaandHnatkovska, 2004). Its impact is indeterminate because a developed financial sector can enhance the adjustment capacity of the economy by contributing to the mobilization and efficient allocation of productive resources and by providing risk management mechanisms (BeckandLevine, 2005. It thus contributes to more stable growth. However, financial development is also accompanied by increased risks of instability of economic growth in a context of asymmetric information (Aghion et al., 2005). Trade openness is measured by the sum of exports and imports concerning GDP. Increased trade openness can be a factor of growth stability because it strengthens the economy's adjustment capacity and improves efficiency in allocating productive resources (Yougbare, 2009). It also exposes the economy to more external shocks leading, all things being equal, to increased growth volatility. The sign of the impact of trade openness is therefore indeterminate at the theoretical level.
As for the level of economic development, it is represented by the real GDP per capita. The more developed a country is, the less volatile its growth is. Furthermore, the size of the country is captured by its total population. Indeed, large countries tend to have a relatively diversified economy, which reduces the volatility of growth. Finally, agricultural production is intended to capture the effects of agriculture (see P. Guillaumont, 2006; Mujahidand Alam, 2020). We measure it by agricultural value-added as a percentage of GDP and expect that growth in the agricultural sector may harm economic volatility (Mujahid and Alam, 2020). To measure the interaction effect between institutional quality and trade shocks, we also added an interactive term to our model. A negative sign of its coefficient is expected. In what follows, we present the estimation method.

***C. Method of estimation***

The explanatory variable of institutional quality is potentially endogenous and measured with error, and estimates of the effects of institutional quality by the ordinary least squares (OLS) estimator are biased. We use the GMM estimator in System (ArellanoandBover 1995;

BlundellandBond 1998), which is designed to solve this problem and consider the model's dynamic aspect. In this estimation, the level and first difference equations are combined into a system and estimated using a system GMM estimator; the lagged differences and lagged levels of the explanatory variables are thus used as instruments. To check the validity of the instruments, two specification tests are performed. The first is the Sargan/Hansen test of overidentifying restrictions. The second one examines the hypothesis that there is no second-order serial correlation in the first difference residuals. To avoid the problem of instrument proliferation (Roodman, 2009), the collapse command was used, and the number of lags was set so that the number of instruments is less than the number of individuals. The following subsection presents the estimation results.

### *D. Results and discussions*

Table 1 below presents the estimation results obtained from the GMM system estimator. Column 1 uses the polity2 index as a five-year average as a measure of institutional quality. Columns 2 and 3 use the Freedom House political rights and civil rights indicators, respectively. As can be seen, the results are quite similar regardless of the measure of institutional quality used.

Indeed, all three measures of institutional quality have a significantly negative coefficient, which supports the theoretical argument that institutional quality leads to the lower volatility of economic growth. This result is also consistent with previous empirical studies.

However, as mentioned above, polity2 index averages as a measure of institutional quality may mask breaks related to regime changes and bias the results. To ensure the robustness of these results, we follow Acemoglu (2014), Mathonnat (2019) to make a change in measurement (see 4.2). Thus, our institutional variable takes the value 0 (1) for autocratic (democratic) regimes, especially when the Polity2 index is negative (positive).

Using this measure, column4 shows that the democracy index (institutions) coefficient is also negative and statistically significant at 1%. Otherwise, the weak institutions increase growth volatility. These results are consistent with the theoretical prediction. Indeed, Rodrik (1999) and Acemoglu et al. (2003) have postulated that democratic political structures (for example) contribute to reducing the volatility of growth. Moreover, the lagged value of volatility is negatively correlated with the volatility of growth. This means that when a country achieves volatility, the magnitude of this volatility decreases over time. Another result concerns the effects of terms of trade volatility and inflation variables. The results show that terms of trade volatility positively affect growth volatility. Consistent with the work of Easterly et al.(2000) and the World Bank (2018), this finding suggests that terms of trade shocks are one of the main sources of growth volatility in low-income countries and particularly in SSA. This observation is not surprising, given the small export base of many SSA countries and the high dependence of the public budget on commodity income (Kpodar, 2019).

Regarding the nominal shocks represented by inflation volatility, we note that the coefficient is positive and statistically significant in three out of five estimates. In contrast to nominal and terms-of-trade shocks, the size of government reduces growth volatility and corroborates FurceriandRibeiro's (2008. According to the latter, small countries tend to have more volatile public spending. Under these conditions, the level of government spending acts as insurance against idiosyncratic shocks, leading to increasing returns to scale due to the government's greater ability to spread its financing cost over a larger number of taxpayers. Regarding financial development, one coefficient is positive and statistically significant at 10% in two estimates cases, unlike the results of Kpodar et al. (2019). The theoretical explanation for this result can be found in Aghion (2005). In a series of papers, Aghion et al.(1999, 2005) show that growth tends to be volatile in weakly developed financial systems (as is the case in SSA) because of information asymmetries. They explain that in these economies, the absence of financial intermediaries makes it costly to acquire information; thus, making it difficult for savers and investors to confront each other. This increases volatility in these countries.

**Table 1. Table of results of estimations**

| Variables | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| L. volatility | -0.153 | -0.302 | -0.360** | -0.554*** |
| | (0.154) | (0.182) | (0.161) | (0.196) |
| Trade openness | -0.268 | -0.642 | -0.156 | -0.525 |
| | (0.398) | (0.432) | (0.429) | (0.487) |
| Terms of tradevolatility | 0.209 | 0.391*** | 0.389** | 0.551*** |
| | (0.128) | (0.127) | (0.146) | (0.121) |
| Inflation volatility | 0.404*** | 0.380*** | 0.363*** | 0.144 |
| | (0.0844) | (0.102) | (0.100) | (0.124) |
| Financial development | 0.176* | 0.0691 | 0.0392 | 0.343* |
| | (0.0981) | (0.137) | (0.130) | (0.187) |
| GDP per capita | -1.119** | -1.478*** | -0.883** | -1.799*** |
| | (0.446) | (0.484) | (0.411) | (0.545) |
| Size of government spending | -0.383 | -0.537 | -0.475 | -1.551*** |
| | (0.450) | (0.418) | (0.358) | (0.401) |
| Population | -0.381 | -0.957* | -0.501 | -1.195** |
| | (0.461) | (0.494) | (0.464) | (0.541) |
| Agriculture | -1.162*** | -1.194*** | -0.836*** | -1.159*** |
| | (0.309) | (0.299) | (0.301) | (0.368) |
| Polity2 | -0.0574*** | | | |
| | (0.0171) | | | |
| PoliticalRights | | -0.152*** | | |
| | | (0.0449) | | |
| Civil Liberties | | | -0.269*** | |
| | | | (0.0623) | |
| **institutions** | | | | **-0.576*** ** |
| | | | | **(0.191)** |
| | | | | |
| Constant | 10.43** | 16.14*** | 12.95*** | 24.49*** |
| | (4.891) | (4.816) | (4.082) | (5.793) |
| Observations | 176 | 185 | 185 | 187 |
| Countries | 38 | 40 | 40 | 41 |
| Instruments | 32 | 32 | 32 | 32 |
| AR (1) (P-Value) | 0.021 | 0.030 | 0.064 | 0.361 |
| AR (2) (P-Value) | 0.867 | 0.597 | 0.277 | 0.155 |
| Hansen (P-Value) | 0.455 | 0.289 | 0.175 | 0.850 |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

## V. CONCLUSION

In the context of recurrent crises and attention to the resilience of economies, this work contributes to the literature by analyzing the effect of institutional quality on growth volatility in Sub-Saharan Africa. The descriptive analysis shows that, on average, economic growth in SSA has been relatively low and volatile compared to other regions of the world. Also, SSA countries have an institutional deficit and have much to do to improve their institutional framework. The econometric analysis uses the residual method of an econometric regression as a measure of volatility. Using a panel of 44 countries by system GMM estimators, the results argue that the quality of institutions reduces the volatility of economic growth in Sub-Saharan Africa. This suggests that better institutions reduce the volatility of a country's growth. Thus, countries with better institutions have their growth rates less prone to volatility. Because of these results, improving the quality of institutions should be among the priorities of economic policy in Sub-Saharan African countries to strengthen economies' resilience.

## REFERENCES


[1] Acemoglu, D., Gallego, F. A., & Robinson, J. A. Institutions, human capital, and development. Annu. Rev. Econ., 6(1) (2014) 875-912.

[2] Acemoglu, D., Johnson, S., Robinson, J., & Thaicharoen, Y. Institutional causes, macroeconomic symptoms: Volatility, crises, and growth. Journal of monetary economics, 50(1) (2003a) 49-123.

[3] Acemoglu, D., Johnson, S., Robinson, J., & Thaicharoen, Y. Institutional causes, macroeconomic symptoms: Volatility, crises, and growth. Journal of monetary economics, 50(1) (2003b) 49-123.

[4] Afonso, A., & Furceri, D. Government size, composition, volatility, and economic growth. European Journal of Political Economy, 26(4) (2010) 517-532.

[5] Aghion, P., Angeletos, G.-M., Banerjee, A., & Manova, K. Volatility and growth: Credit constraints and productivity-enhancing investment. National Bureau of Economic Research Cambridge, Mass., USA. (2005).

[6] Aghion, P., Angeletos, G.-M., Banerjee, A., & Manova, K. Volatility and growth : Credit constraints and the composition of investment. Journal of Monetary Economics, 57(3) (2010) 246-265.

[7] Aghion, P., Banerjee, A., & Piketty, T. Dualism and macroeconomic volatility. The Quarterly Journal of Economics, 114(4) (1999) 1359-1397.

[8] Almeida, H., & Ferreira, D. Democracy and the variability of economic performance. Economics & Politics, 14(3) (2002) 225-257.

[9] Arellano, M., & Bover, O. Another look at the instrumental variable estimation of error components models. Journal of econometrics, 68(1) (1995) 29-51.

[10] Balavac, M., & Pugh, G. The link between trade openness, export diversification, institutions, and output volatility in transition countries. Economic Systems, 40(2) (2016) 273-287.

[11] Beck, T., & Levine, R. Legal institutions and financial development. In Handbook of new institutional economics (2005) 251-278. Springer.

[12] Béjar, S., & Mukherjee, B. Electoral institutions and growth volatility : Theory and evidence. International Political Science Review, 32(4) (2011) 458-479.

[13] Blundell, R., & Bond, S. Initial conditions and moment restrictions in dynamic panel data models. Journal of econometrics, 87(1) (1998) 115-143.

[14] Bobbo, A. Volatilité de l'inflation, gouvernance et investissements directs étrangers entrants en Afrique sub-saharienne. African Development Review, 30(1) (2018) 86-99.

[15] Cariolle, J. Measuring macroeconomic volatility. FERDI Working Paper Series, 114 (2012) 1-49.

[16] Chandra, S. Democratic institutions and economic growth. The University of Pittsburgh. (1998).

[17] Chandra, S., & Rudra, N. Reassessing the links between regime type and economic performance : Why some authoritarian regimes show stable growth and others do not. British Journal of Political Science, 45(2) (2015) 253-285.

[18] Combes, J.-L., & Guillaumont, P. Commodity price volatility, vulnerability, and development. Development Policy Review, 20(1) (2002) 25-39.

[19] Cuberes, D., & Jerzmanowski, M. Democracy, diversification, and growth reversals. The Economic Journal, 119(540) (2009) 1270-1302.

[20] Easterly, W., Islam, R., & Stiglitz, J. Explaining growth volatility. Annual World Bank Conference on Development Economics. (2000a).

[21] Easterly, W., Islam, R., & Stiglitz, J.. Explaining growth volatility. Annual World Bank Conference on Development Economics, (2000b) 28159.

[22] Edwards, J. A., & Thames, F. C. Growth volatility and the interaction between economic and political development. Empirical Economics, 39(1) (2010) 183-201.

[23] Furceri, D., & Ribeiro, M. P. Government spending volatility and the size of nations. (2008).

[24] Giavazzi, F., & Tabellini, G. Economic and political liberalizations. Journal of monetary economics, 52(7) (2005) 1297-1330.

[25] Guillaumont, J. S., & Kpodar, K. Développement financier, instabilité financière, croissance et pauvreté. Revue économique. (2004).

[26] Guillaumont, P. La vulnérabilité macroéconomique des pays à faible revenu et les réponses de l'aide. Revue d'économie du développement, 14(4) (2006) 21-77.

[27] Guillaumont, P. An economic vulnerability index : Its design and use for international development policy. Oxford Development Studies, 37(3) (2009) 193-228.

[28] Henisz, W. J. The institutional environment for multinational investment. The Journal of Law, Economics, and Organization, 16(2) (2000) 334-364.

[29] Hnatkovska, V. Volatility and growth (Vol. 3184). World Bank Publications. (2004).

[30] Imbs, J. Growth and volatility. Journal of Monetary Economics, 54(7) (2007) 1848-1862.

[31] Jones, B. F., & Olken, B. A. The anatomy of start-stop growth. The Review of Economics and Statistics, 90(3) (2008) 582-587.

[32] Klomp, J., & De Haan, J. Political institutions and economic volatility. European Journal of Political Economy, 25(3) (2009) 311-326.

[33] Kpodar, K., Le Goff, M., & Singh, R. J.. Financial Deepening, Terms of Trade Shocks and Growth in Low-Income Countries Countries. (2019).

[34] Ky, Y., & Cabral, F. J. Innovation and volatility of the GDP growth rate : Case of the economies of sub-Saharan Africa. Journal of African Development, 19(1) (2017) 88-112.

[35] Loayza, N., & Hnatkovska, V. V. Volatility and growth. Available at SSRN 636604. (2004).

[36] Malik, A., & Temple, J. The Geography of Output Volatility'CEPR Discussion Paper 5516. (2006).

[37] Martin, P., & Rogers, C. A. Long-term growth and short-term economic instability. European Economic Review, 44(2) (2000) 359-381.

[38] Mathonnat, C., & Minea, A. Forms of democracy and economic growth volatility. Economic modeling, 81 (2019) 594-603.

[39] Mawussé, O. K. Institutions and scientific research in Africa. Economics Bulletin, 33(2) (2013) 1487-1503.

[40] Mekonnen, J. L., & Dogruel, A. S. Growth and Volatility Nexus in Sub-Saharan Africa. African Development Review, 30(2) (2018) 175-186.
[41] Mobarak, A. M. Determinants of volatility and implications for economic development. Review of Economics and Statistics, 87(2) (2005) 348-361.
[42] Mujahid, H., & Alam, S. The Impact of Sectors Performance and Quality of Institutions on Economic Volatility: In Case of Asia. Asian Journal of Economic Modelling, 8(4) (2020) 260-269.
[43] Nooruddin, I. Coalition politics and economic development : Credibility and the strength of weak governments. Cambridge University Press. (2010a).
[44] Nooruddin, I. Coalition politics and economic development : Credibility and the strength of weak governments. Cambridge University Press. (2010b).
[45] Persson, T., Roland, G., & Tabellini, G.. How do electoral rules shape party structures, government coalitions, and economic policies? National Bureau of Economic Research Cambridge, Mass., USA. (2003).
[46] Persson, T., & Tabellini, G. The economic effects of constitutions: What do the data say. Cambridge, MA: MIT Press. (2003).
[47] Przeworski, A., Alvarez, R. M., Alvarez, M. E., Cheibub, J. A., Limongi, F., & Neto, F. P. L. Democracy and development: Political institutions and well-being in the world, (2000) 1950-1990. Cambridge University Press.
[48] Quinn, D. P., & Woolley, J. T. Democracy and national economic performance: The preference for stability. American journal of political science, (2001) 634-657.
[49] Ramey, G., & Ramey, V. A. Cross-country evidence on the link between volatility and growth. The American Economic Review, (1995) 1138-1151.
[50] Rodrik, D. Where did all the growth go? External shocks, social conflict, and growth collapse. Journal of economic growth, 4(4) (1999a) 385-412.
[51] Rodrik, D. Where did all the growth go? External shocks, social conflict, and growth collapse. Journal of economic growth, 4(4) (1999b) 385-412.
[52] Rodrik, D. Participatory Politics, social cooperation, and economic stability. American Economic Review, 90(2) (2000) 140-144.
[53] Roodman, D. How to do xtabond2 : An introduction to difference and system GMM in Stata. The state journal, 9(1) (2009) 86-136.
[54] Sahay, R., Čihák, M., N'Diaye, P., & Barajas, A. Rethinking financial deepening: Stability and growth in emerging markets. Revista de Economía Institucional, 17(33) (2015) 73-107.
[55] Weede, E. Political regime type and variation in economic growth rates. Constitutional political economy, 7(3) (1996) 167-176.
[56] Williams, A. The effect of transparency on output volatility. Economics of Governance, 15(2) (2014) 101-129.
[57] Yang, B. Does democracy lower growth volatility? A dynamic panel analysis. Journal of Macroeconomics, 30(1) (2008) 562-574.
[58] Yang, B. Political democratization, economic liberalization, and growth volatility. Journal of Comparative Economics, 39(2) (2011) 245-259.
[59] Yougbare, L. Effets macroéconomiques des régimes de change : Essais sur la volatilité, la croissance économique et les déséquilibres du taux de change réel [PhD Thesis]. Université d'Auvergne-Clermont-Ferrand I. (2009).

## Appendix

**Table 2. Data and data sources**

| Type of variables | | Variables | Description | Sources |
|---|---|---|---|---|
| **Explained variable** | | Growth volatility (in the log) | The standard deviation of the residual information of the log of real GDP lagged by the time trend (assuming an AR (1) process with a trend), calculated over 5 years | WDI |
| **Explanatory variables** | **Institutional variable** | Democracy Index (Polity2) | Polity2 is a combined index of democracy and autocracy ofPOLITY IV project, ranged from -10 (strongly autocratic) to +10 (strongly democratic) | Polity IV |
| | | Civil liberties | Index Civil liberties measured on a one-to-seven scale, with seven (7)representing the highest degree of Freedom and one (1) the lowest | Freedom House |
| | | Political right | Index Political right measured on a one-to-seven scale, with seven (7)representing the highest degree of Freedom and one (1) the lowest | Freedom House |
| | **Other explanatory variables** | Terms of trade volatility (in logs) | The standard deviation of the residual information of the terms of trade index lagged by the time trend calculated over 5 years. The terms of trade index are calculated as a % of the value indices of export units over the value indices of import units, measured against the base year 2000 | WDI |
| | | GDP per capita (USD) (In log) | The ratio of nominal GDP divided by population size | WDI |

| | | | | |
|---|---|---|---|---|
| | | Trade openness (log) | Sum of exports and imports of goods and services over GDP | WDI |
| | | The ratio of bank credit to the private sector (% of GDP) -in log | The total amount of credit granted by deposit banks to the private sector divided by GDP | WDI |
| | | Populations (log) | The total population in dwelling | WDI |
| | | Agricultural value-added as % of GDP (log) | Value added is the net output of the agricultural sector after adding up all outputs and subtracting intermediate inputs. | WDI |

*Source: Author*

**Table 3. List of countries and averages of some variables.**

| Country | Polity2 | Growth volatility |
|---|---|---|
| South Africa | 7.45 | 0.02 |
| Angola | -3.43 | 0.04 |
| Botswana | 7.4 | 0.03 |
| Burkina Faso | -2.3 | 0.02 |
| Burundi | -0.88 | 0.03 |
| Benin | 2.95 | 0.02 |
| Cabo Verde | 5.83 | 0.03 |
| Cameroon | -5.18 | 0.02 |
| Comoros | 2.8 | 0.02 |
| Congo. DRC | -4.13 | 0.03 |
| Congo. Republic | -1.37 | 0.03 |
| Ivory Coast | -2.63 | 0.02 |
| Gabon | -3.38 | 0.04 |
| Gambia | -0.43 | 0.02 |
| Ghana | 2.1 | 0.02 |
| Guinea | -2.23 | 0.02 |
| Equatorial Guinea | . | 0.1 |
| Guinea-Bissau | 0.35 | 0.04 |
| Kenya | 0.83 | 0.02 |
| Lesotho | . | 0.02 |
| Liberia | 0.73 | 0.06 |
| Madagascar | 2.78 | 0.03 |
| Malawi | 0.65 | 0.03 |
| Mali | 2.33 | 0.03 |
| Maurice | 9.95 | 0.01 |
| Mauritania | -4.8 | 0.03 |

| | | |
|---|---|---|
| Mozambique | 0.73 | 0.04 |
| Namibia | 6 | 0.02 |
| Niger | 1.09 | 0.04 |
| Nigeria | 0.98 | 0.03 |
| Uganda | -2.43 | 0.02 |
| Rwanda | -5 | 0.07 |
| Central African Republic | -0.73 | 0.06 |
| Sao Tome and Principe | . | 0.01 |
| Seychelles | . | 0.03 |
| Sierra Leone | 0.28 | 0.07 |
| Sudan | -4.48 | 0.03 |
| Senegal | 3.15 | 0.02 |
| Tanzania | -2.3 | 0.01 |
| Chad | -2.88 | 0.07 |
| Togo | -3.73 | 0.03 |
| Zambia | 1.29 | 0.02 |
| Zimbabwe | -1.55 | 0.06 |
| Ethiopia | . | 0.05 |

*Source: Author*