

Political Regime and Economic Growth in Côte d'Ivoire: A Complex Relationship between Institutions and Economic Performance

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Abstract

From 1960 to the present day, Côte d'Ivoire has experienced two political systems: the single-party system from 1960 to 1989, and the multi-party system from 1990 onward. In light of this rich experience under both of these systems, the present study aims to conduct a comparative analysis of the relationship between political regime and economic growth. It uses four models from the Generalized Linear Models class, each based on one of the following distributions: Normal, Inverse Normal, Gamma, and Exponential mean. The main results are presented in several points. First, the transition from a single-party system to a multiparty system led to an increase in real GDP of between 16% and 18%, depending on the model. However, alternation, which remains an important feature of multiparty systems, has a significant negative effect on economic growth. Indeed, the transition to a new alternation leads to a decline in GDP of 9.4 to 10.5% depending on the model for the period 1960-2021 and a 13% decline in GDP for the multiparty period alone. Thus, all other things being equal, the strong economic performance of multiparty systems compared to single-party systems can be explained solely by the contributions of the factors labor (elasticity of GDP compared to labor equal to 1) and trade openness (elasticity of GDP compared openness to equal to 0.57) during this period. Over the same period, the capital factor was found to be insignificant, and official development assistance had a significant negative effect on GDP formation. Furthermore, although economic performance was lower under a single-party system than under a multi-party system, the elasticities of capital, labor, trade openness, and official development assistance in relation to GDP were all significant for this period. One explanation could be the political instability that arises around election periods. Therefore, in order to take full ad-

vantage of the democratic process that began in 1990, democratic institutions need to be improved and consolidated with a view to creating an economic environment conducive to economic growth.

Keywords

Economic Growth, Gross Domestic Product, Political Regime, Single-Party System, Multiparty System, Alternation of Power, Côte d'Ivoire

1. Introduction

The role of governance and institutions in the process of economic growth and development has been the subject of particular attention within the academic community and among policymakers, especially in developing countries, since the early 1990s. Political institutions, which determine how society is governed and the extent of political participation, are an important aspect of the study of the role of governance and institutions in a country's economic development. There is a wealth of literature on the subject, including the relationship between political regime and economic growth and, more specifically, the relationship between democracy and economic growth, which is a key area of study in this field.

The political system of a state refers to the institutional architecture that frames the rules of the political game. It structures the way leaders are chosen, decisions are made, and conflicts are arbitrated (Sartori, 1976). Thus, the political regime refers to the set of institutions, rules, and practices that organize political power, define how it is exercised, and structure the relationship between the rulers and the ruled. Lijphart (1999) and Diamond & Morlino (2004) analyze the political regime from several angles: the method of appointing those who govern, the degree of separation of powers, the level of political pluralism, respect for civil and political liberties, and the role of the armed forces in the political system. There are several types of political regime, including democracy and single-party rule (Juan & Linz, 2000).

Democracy can be defined as a political system in which citizens have the effective opportunity to participate in political decisions through free, fair, and frequent elections (Dahl, 1989). It is based on popular sovereignty, separation of powers, political pluralism, and the protection of fundamental freedoms (Linz, 2000; Diamond & Morlino, 2004). In contrast, the single-party system, widespread in Africa in the post-independence decades, is characterized by the monopolization of power by a single party, the absence of meaningful electoral competition, and tight control of society and the media (Bratton & Van de Walle, 1997).

Analysis of the relationship between political regime, democracy, and economic growth suggests different results that remain very mixed. Some authors, such as North (1990) and Acemoglu & Robinson (2012), argue that democracy promotes growth by strengthening institutions, protecting property rights, and reducing political instability. Others argue that this relationship is not direct. They argue that

democracy promotes growth by improving human capital accumulation, reducing income inequality, reducing inflation and political instability, and increasing economic freedoms (Tavares & Wacziarg, 2001; Doucouliagos & Ulubasoglu, 2008). The analysis by Wade (1990) relativizes the idea that democracy is necessary for growth. Indeed, she argues that East Asian countries and regions such as Taiwan region and South Korea have experienced periods of strong growth thanks to interventionist and strategic states that have pursued policies in non-democratic contexts. She even suggests that in some contexts, democracy could reduce growth. Sandalcilar (2013), while distinguishing between economic democracy and political democracy, believes that political democracy indirectly influences growth by improving economic democracy. In line with this idea, others show that democracy acts more through political stability and the improvement of economic institutions and therefore that in the case of weak institutions or compromised stability, democracy may have no effect on growth or even be slightly restrictive for growth (Ben Doudou & Rahali, 2018). According to Kouotou & Epo (2019), the number of changes in a country's leadership has a positive effect on long-term economic growth, and being in a year of change tends to penalize growth because of the costs associated with political change.

Côte d'Ivoire is a prime example for exploring this complex relationship, as its history combines political change, sociopolitical crisis, institutional instability, and various periods of growth. Indeed, since gaining independence in 1960, it has experienced two major political regimes: the single-party system that lasted from independence until 1990, and the multiparty system that began in 1990 and continues to this day, marking the beginning of the country's democratic process, not to mention the military coups and socio-political crises that punctuated these periods. In view of the different results achieved in terms of economic growth under these two regimes, one may wonder about the link between political regime and economic growth. Has multiparty politics led to better economic performance than a single-party system? What were the most important factors contributing to wealth creation under each of the regimes? With the democratic process underway, what conditions are necessary for the country to maximize its economic growth?

The objective of this study is twofold: (i) first, to empirically analyze the relationship between political regime and economic growth in Côte d'Ivoire, taking into account the country's political trajectory since 1960; (ii) second, to identify the institutional, economic, and social mechanisms through which democracy can influence economic performance.

This study is justified first and foremost by the fact that Côte d'Ivoire remains a young democracy after some 30 years of multiparty rule. Thus, unlike in the major democratic powers, efforts to effectively practice democracy are still hampered by multiple problems. Indeed, constitutional amendments aimed at maintaining power, the lack of consensus and transparency in the electoral process, election rigging, post-election conflicts, the strong tribalization of politics, and the

lack of complete independence of the judiciary are all problems that can undermine political life in Côte d'Ivoire, as in most young democracies. After years of effort, it is therefore important to measure the contribution of this transition to democracy to economic growth. To our knowledge, no study of this kind aimed at establishing links between democracy and economic growth has been conducted for the specific case of Côte d'Ivoire. This study is interesting in that it makes a quantitative comparison of the performance of the two political regimes that have existed in Côte d'Ivoire to date. These main points do not seem to have been sufficiently taken into account in studies seeking to establish a link between democracy and economic growth. Indeed, most of these studies use panel data that do not allow for the type of political regime to be taken into account. Furthermore, panel data ignore variables specific to each country in their democratic process in order to integrate variables that are aggregate indicators. In addition, this study highlights the specific nature of Côte d'Ivoire in the search for a link between democracy and economic growth. This will make it possible to establish the specific criteria in terms of democracy that are necessary for stronger growth in Côte d'Ivoire.

Based on a generalized linear model (GLM) applied to the Cobb-Douglas growth model, the study first aims to test the significance of the relationship between political regime and economic growth. It then determines the factors that contribute most significantly to the formation of gross domestic product (GDP) according to the type of regime. Finally, it conducts a simulation and then compares GDP between single-party and multiparty systems.

This study is organized into three sections. Section 1 reviews the literature on the link between political institutions and growth. The methodological approach is presented in Section 2. Section 3 discusses the results and findings.

2. Literature Review

Analysis of the link between political systems and economic growth remains dominated by the relationship between democracy and economic growth. Studies on the latter show, on the one hand, a positive and significant relationship between democracy and economic growth and, on the other hand, a negative and significant relationship, whether theoretical or empirical.

Pioneering work on the general framework of the relationship between institutions and economic performance dates back to [North \(1990\)](#). He developed an analytical framework to explain how institutions and institutional changes influence the performance of economies at a given point in time and over time.

Thus, following his work, several studies support the idea of a positive, direct or indirect effect between democracy and economic growth. [Inkeles & Sirowy \(1990\)](#), in a summary of studies on the relationship between democracy and growth, indicate that some empirical studies show that democracy promotes growth. These include [Bollen \(1979\)](#), who argues that democracy facilitates modernization and growth, and [Burkhart & Lewis-Beck \(1994\)](#), who point to a positive link between

democracy and development. This is because democracy, when it promotes political competition, encourages leaders to adopt economic policies that are conducive to economic growth (Mesquita, Morrow, Siverson, & Smith, 2001). Indeed, any government in a democratic country that adopts inappropriate regulations is removed by citizens through the electoral process (North, 1990). Another explanation for the positive relationship between democracy and growth is that democracy, as a factor of institutional quality, improves the ability to adapt to shocks, stability, predictability (Rodrik, 1999; Heo & Tan, 2001) and promotes more stable, inclusive, and sustainable growth (Rodrik, 2000). In addition, the effects of democracy on growth are mediated by an increase in life expectancy for poor countries and secondary education for non-poor countries (Baum & Lake, 2003).

For other authors, the effect of democracy on economic performance is not direct. Tavares and Wacziarg (2001) highlight the indirect nature of the institutional framework's impact on growth. In their view, the institutional form of a regime is not a priori linked to the rate of production accumulation, but it does seem essential in determining the efficiency of certain factors of production and establishing a climate conducive to growth. In the same vein, Doucouliagos & Ulubasoglu (2008) show that democracy has no direct effects on economic growth, but it does have robust, significant, and positive indirect effects thanks to higher human capital, lower inflation, less political instability, and higher levels of economic freedom. For Persson & Tabellini (2009), the positive effect of democracy on growth comes through democratic capital, i.e., the accumulation of experiences, practices, and institutions related to democracy that reinforce its stability and impact on growth. However, this positive effect is only observable after a certain period of time, as during the democratic transition period growth declines before stabilizing in the medium and long term at a high level thanks to better protection of property rights, reduced social tensions, improved economic policies, and greater openness to trade and investment (Papaioannou & Siourounis, 2008). Freund & Jaud (2014) show that political regime change leads to a long-term increase in the economic growth rate of 1 percentage point regardless of the direction, but that a gradual transition to democracy has no significant effect on growth.

Finally, for other authors, such as Sandalcilar (2013), Heo & Tan (2001), and Przeworski & Limongi (1993), there is no robust relationship to support the claim that democracy systematically guarantees economic growth. Democracy can even have negative effects on the economy. Ben Doudou & Rahali (2018) show that the effect of democracy on growth is statistically insignificant in the absence of a stable political framework and that, ultimately, it is democracy in a politically stable environment that has a significantly positive effect on growth. For Asiedu & Lien (2011), democracy can have a negative effect on foreign direct investment for countries dependent on natural resources, thereby slowing growth, as Wade (1990) shows in certain cases. Indeed, as Alesina & Rodrick (1994) show, forcing redistribution by allowing low-income individuals to vote in favor of income redistribution policies can be detrimental to growth.

To our knowledge, no study of this kind aimed at establishing links between democracy and economic growth has been conducted for the specific case of Côte d'Ivoire. Furthermore, the vast majority of these studies use panel data that do not allow for the type of political regime (single-party versus multiparty) to be taken into account. This makes it impossible to carry out a comparative analysis between the different regimes. Furthermore, panel data ignore variables specific to each country in their democratic process in order to integrate variables that are aggregate indicators based on specific variables. This study therefore provides a clearer picture of the specific characteristics of Côte d'Ivoire in the search for a link between democracy and economic growth. This will make it possible to establish the specific criteria in terms of democracy that are necessary for stronger growth in Côte d'Ivoire.

3. Methodology

3.1. Data

This study uses data from Côte d'Ivoire on the following variables: real gross domestic product (GDP), gross fixed capital formation (Cap), openness measured by the sum of imports and exports (Open), labor force (Lab) measured by the active population, and official development assistance (ODA) obtained by the ratio of official development assistance to GDP; the political regime (PolReg), which is a binary variable: it takes the value 0 for the single-party period from 1960 to 1989 and the value 1 for the multiparty period from 1990 to the present day, and the alternation of power (Alt) measured by the number of alternations since 1960. By construction, the variable Alternation evolves cumulatively from 1 to 5. 1 corresponds to the period of the first President, 2 to that of the second President, and so on up to 5 for fifth President. All data related to the different variables cover the period from 1960 to 2021, for a total of 62 observations. Apart from the political regime and alternation of power variables compiled according to the political configuration in Côte d'Ivoire, the data for the other variables are all derived from the World Bank Development Indicators (WDI).

3.2. Econometric Model: The Generalized Linear Model

The econometric model on which this study is based is the Generalized Linear Model (GLM). This model is a unified generalization of linear regression (Nelder & Wedderburn, 1972). It was chosen because it does not require validation of the normality hypothesis of the response variable (in this case, GDP) or the normality of errors, which conditions significance tests following an Ordinary Least Squares estimation. Furthermore, the dependent variable, GDP, is strictly positive. Thus, GLM allows the model to be adapted to the distribution of the dependent variable through a distribution belonging to an appropriate distribution family (Nelder & Wedderburn, 1972; McCullagh & Nelder, 1989).

Let N independent response variables Y_i ($i = 1, \dots, N$) have a conditional mean that depends on k vectors of explanatory variables X_i and unknown

coefficients β . The variables Y_i can be decomposed as follows:

$$Y_i = \mu_i + \varepsilon_i$$

where μ_i is a systematic mean component and ε_i is a stochastic component. The conventional linear regression model assumes that the component μ_i is a linear predictor formed from the explanatory variables and coefficients β such that $\mu_i = \beta X_i$ and that the stochastic component ε_i is normally distributed with mean 0 and constant variance σ^2 .

The generalized linear model (GLM) is a class of models that extends linear regression by taking into account non-normal stochastic components ε_i as well as non-linear systematic components (Nelder & Wedderburn, 1972; McCullagh & Nelder, 1989). It allows the linear model to be linked to the response variable by a link function and allows the amplitude of the variance of each measurement to be a function of its predicted value according to the chosen distribution (McCullagh & Nelder, 1989). More specifically, the specification of a GLM takes into account the following three quantities:

- A distribution of Y belonging to the linear exponential family;
- A linear predictor $\eta_i = X_i' \beta + o_i$ where o_i is an optional term;
- An invertible link function $g(\mu_i) = \eta_i$ linking the expectation of the response variable and the linear combination of predictors.

With regard to the response variable Y , the GLM assumes a sequence Y_i of independent random variables that follow a distribution family known as exponential, whose density function is given by:

$$f(y_i, \theta_i, \phi, w_i) = \exp\left(\frac{y_i \theta_i - b(\theta_i)}{\phi / w_i} + c(y_i, \theta_i, w_i)\right)$$

Where b and c are functions specified according to the type of exponential law. $\theta_i = \theta(\mu_i)$, called the canonical parameter, fully configures the distribution in terms of conditional mean. ϕ , which indicates a measure of dispersion, is a nuisance parameter of possibly known scale, and w_i is a known prior weight that corrects for unequal scaling between observations with an otherwise constant value of ϕ (McCullagh & Nelder, 1989).

The assumption regarding the exponential distribution family implies that the mean and variance of Y can be formulated as follows:

$$E(Y_i) = b'(\theta_i) = \mu_i$$

$$Var(Y_i) = (\phi / w_i) b''(\theta_i) = (\phi / w_i) V_\mu(\mu_i)$$

Where $b'(\theta_i)$ and $b''(\theta_i)$ are respectively the first and second derivatives of the function b , and V_μ is a variance function specific to the distribution and dependent only on μ (McCullagh & Nelder, 1989).

The expression of the exponential structure then takes the canonical form:

$$f(y, \theta) = a(\theta) d(y) \exp[yQ(\theta)]$$

$$\text{avec } Q(\theta) = \frac{\theta}{\phi}, a(\theta) = \exp\left(-\frac{b(\theta)}{\phi}\right) \text{ et } d(y) = \exp[c(y, \phi)]$$

There are several distributions in the exponential family (IHS Global Inc, 2022). In the case of this study, the distributions of interest are the Gaussian, inverse Gaussian, and Gamma distributions. To these three distributions in the exponential family, we add the exponential mean distribution from the family of quasi-likelihood distributions (McCullagh, 1983). The aim of this approach is to compare the classical likelihood used for the three distributions of the exponential family with the exponential mean quasi-likelihood, which allows models to be estimated consistently and efficiently when the exact distribution of the response variable is unknown (McCullagh, 1983).

Distribution	θ	$b(\theta)$	$\gamma(\theta)$	$E(Y) = b'(\theta)$	$Var(Y) = b''(\theta)$
Gaussian $\mathcal{N}(\mu, \sigma^2)$	μ	$\frac{\theta^2}{2}$	$\phi = \sigma^2$	$\mu = \theta$	σ^2
Gamma $\mathcal{G}(\mu, \nu)$	$-\frac{1}{\mu}$	$-\ln(-\theta)$	$\frac{1}{\nu}$	$\mu = -\frac{1}{\theta}$	$\frac{\mu^2}{\nu}$
Inverse Gaussian $IG(\mu, \sigma^2)$	$-\frac{1}{2\mu^2}$	$-\sqrt{-2\theta}$	σ^2	$\mu = (\sqrt{-2\theta})^{-1}$	$\mu^3 \sigma^2$

Source: IHS Global Inc (2022).

Thus, by retaining these three distributions from the exponential family, according to IHS Global Inc (2022), the density function of the response variable for each of them becomes:

Gaussian distribution

$$f(y_i, \mu_i, \sigma^2, w_i) = (2\pi\sigma^2/w_i)^{-1/2} \exp\left(\frac{-(y_i^2 - 2y_i\mu_i + \mu_i^2)}{2\sigma^2/w_i}\right) \text{ with } -\infty < y_i < +\infty$$

Gaussian inverse distribution

$$f(y_i, \mu_i, \lambda, w_i) = (2\pi y_i^3 \lambda/w_i)^{-1/2} \exp\left(\frac{-(y_i - \mu_i)^2}{2y_i \mu_i^2 (\lambda/w_i)}\right) \text{ with } y_i > 0$$

Gamma distribution

$$f(y_i, \mu_i, r_i) = \frac{(y_i r_i / \mu_i)^{r_i} \exp(-y_i / (\mu_i / r_i))}{y_i \Gamma(r_i)} \text{ with } y_i > 0 \text{ and } r_i = w_i / \nu$$

The response variable y_i in this study is real GDP. For the link function $g(\mu_i)$, we will use the identity link function. This choice is explained by the nature of the dependent variable (in this case, GDP), which is a continuous quantitative variable. Furthermore, the identity link allows for a direct and simplified interpretation of the coefficients, even if the identity link is not always the canonical link, which in our case facilitates the economic interpretation of the coefficients. The distribution will be adjusted respectively by a Gaussian, inverse Gaussian, and gamma distribution with respect to the real GDP values, which belong to the set of real numbers and, moreover, take strictly positive values. These choices are made with a view to comparing the results of the estimates that will be made

using the normal distribution for the identity link function, which yields exactly the same result as an ordinary least squares estimate.

The various explanatory variables in the model are as follows:

$$\eta_i = \beta_0 + \beta_1 \log(Cap) + \beta_2 \log(Lab) + \beta_3 \log(Open) + \beta_4 Oda + \beta_5 PolReg + \beta_6 Alt$$

The link function g , assumed to be monotonic and differentiable according to [McCullagh & Nelder \(1989\)](#), which allows the linear predictor η_i to be functionally linked to the mean μ_i , is as follows:

$$g(\mu_i) = \eta_i = \beta_0 + \beta_1 \log(Cap) + \beta_2 \log(Lab) + \beta_3 \log(Open) + \beta_4 Oda + \beta_5 PolReg + \beta_6 Alt$$

Where $\mu_i = E(Y_i); i = 1, \dots, N$ is the mathematical expectation of GDP.

The canonical link is defined as the function that equates the canonical parameter θ_i of the exponential family distribution and the linear predictor

$\eta = g(\mu) = \theta(\mu)$ ([McCullagh & Nelder, 1989](#)). In this work, we use the canonical link, identity ($\theta(\mu) = \mu$) for the three distributions of the exponential family selected, namely the Gaussian distribution, the inverse Gaussian distribution, and the gamma distribution, and the quasi-likelihood of the exponential mean.

3.3. Model Estimation

The estimation of GLM models focuses on three basic components: the β coefficients, the variance-covariance matrix of the coefficients Σ , and the dispersion parameter ϕ .

The coefficients are estimated using the maximum likelihood method, which consists of maximizing the log-likelihood of the generalized linear model. It involves finding $\hat{\beta}$ and possibly $\hat{\phi}$ by maximizing the likelihood ([Nelder & Wedderburn, 1972](#); [McCullagh & Nelder, 1989](#)) using iterative numerical methods (IRLS: Iteratively Reweighted Least Squares) introduced by [Nelder & Wedderburn \(1972\)](#).

Once the parameters have been estimated, the dispersion parameter ϕ is estimated. To do this, we distinguish between the distribution family with a free dispersion parameter and the distribution family where the dispersion is fixed ([IHS Global Inc, 2022](#)). For the distribution family with a free dispersion parameter, such as a normal, gamma, or inverse Gaussian distribution, ϕ must be estimated. In the case of this study, ϕ can be estimated using Person's generalized statistic following a chi-square distribution:

$$\hat{\phi}_p = \frac{1}{N - k} \sum_{i=1}^N \frac{w_i (y_i - \hat{\mu}_i)^2}{V_{\mu}(\hat{\mu}_i)}$$

Where k is the number of estimated parameters. In the case of a linear exponential family, ϕ can also be estimated by the unscaled deviance statistic D ([McCullagh, 1983](#)). We obtain:

$$\hat{\phi}_p = \frac{D(\mu, y, w)}{N - k} \text{ avec } D = \phi D^* = -2\phi(l(\mu, y, \phi, w) - l(y, y, \phi, w))$$

D^* , known as scaled deviance, is the difference between the saturated log like-

likelihood (unconstrained) and the log likelihood calculated for arbitrary μ (McCullagh, 1983).

There are a variety of estimators for the variance-covariance matrix Σ of the $\hat{\beta}$ coefficients. The most commonly used are the Fisher estimator, the Pearson estimator, the deviance-based estimator, and the Huber-White estimator (McCullagh & Nelder, 1989). However, these different approaches to estimating the variance-covariance matrix of the coefficients depend on an information matrix, which can be the observed information matrix, the expected information matrix, the quasi-information matrix, or the robust information matrix (McCullagh & Nelder, 1989; IHS Global Inc., 2022). Their choice depends on the type of estimator used. In the case of the present study, the variance-covariance estimator method is Pearson's estimator, where the dispersion ϕ_p is assumed to be free. Consequently, the information matrix is the expected Fisher information but rescaled by $\hat{\phi}_p$ (McCullagh & Nelder, 1989; Agresti, 2002).

3.4. Statistical Tests and Diagnostics

Various statistical tests always accompany the estimation of a generalized linear model. These include tests of significance for the various estimated coefficients and tests relating to the quality of fit of the estimated model. With regard to the tests of significance for the coefficients, the aim is to test the influence of the various explanatory variables on the response variable. Under the null hypothesis of coefficient equality at zero ($\theta_j = 0$), we define the test statistic which, in the case of a GLM model estimated using the maximum likelihood method, follows a normal distribution and not a Student's distribution as in the case of OLS (McCullagh & Nelder, 1989; Kouotou & Epo, 2019; IHS Global Inc., 2022).

The likelihood ratio (LR Test) allows us to evaluate the contribution of additional explanatory variables in adjusting the model. It allows us to determine whether the various explanatory variables in the model are able to explain the dependent variable. It is measured by the difference in deviance between two nested models with q_1 and q_2 ($q_2 > q_1$) explanatory variables, respectively (McCullagh & Nelder, 1989; IHS Global Inc., 2022).

4. Results, Analysis, and Discussion

4.1. Descriptive Statistics

Table 1 reports the results of descriptive statistics performed on time series of 62 observations each, collected between 1960 and 2021. The Jarque-Bera normality test indicates that only the GDP and Openness variables follow a normal distribution at the 5% threshold. The Labor variable is normal at a 5% significance level but loses normality at a 10% risk level. All the others, namely Capital, Official Development Assistance, Political Regime, and Number of Changes in Government, do not follow a normal distribution even at a 10% risk level (**Table 1**). This configuration of the normality test results for the GDP, Capital, Labor, and Openness variables remains identical for log-normality (**Table 2**). Furthermore, given

the difference between the maximums and minimums, or even the standard deviations calculated in **Table 1** and **Table 2**, the data appear to be highly volatile for all variables, except for the multiparty variable, which is binary (equal to 0 for the single-party period, i.e., from 1960 to 1989, and 1 for the period after 1990, when the process of multiparty politics began).

Table 1. Descriptive statistics for the variables.

	GDP	Capital	Labor	Openness	ODA	Political Regime	Alternation
Mean	282221929.61	53544069.91	5171205.89	162320665.97	3.20	0.52	2.39
Median	258032490.87	40301982.94	4556638.50	152682586.99	2.38	1	1
Maximum	586302874.39	137046214.60	8805622.00	288871516.18	19.17	1	5
Minimum	98258604.66	14641714.77	3347664.85	50748980.34	0.02	0	1
Std. Dev.	112429537.91	32582504.79	1634590.71	61510490.15	2.93	0.50	1.68
Skewness	0.65	0.86	0.60	0.18	3.10	-0.06	0.58
Kurtosis	3.00	2.55	2.09	2.01	16.04	1.00	1.56
Jarque-Bera	4.35	8.15	5.91	2.86	538.35	10.33	8.88
Probability	0.114	0.017	0.052	0.239	0.000	0.006	0.012
Observations	62	62	62	62	62	62	62

Source: Authors' calculations.

Table 2. Descriptive statistics for the logarithm of various economic variables.

	log(GDP)	log(CAP)	log(LAB)	log(OPEN)
Mean	19.38	17.62	15.41	18.83
Median	19.37	17.51	15.33	18.84
Maximum	20.19	18.74	15.99	19.48
Minimum	18.40	16.50	15.02	17.74
Std. Dev.	0.41	0.60	0.31	0.42
Skewness	-0.33	0.12	0.31	-0.53
Kurtosis	2.81	1.96	1.71	2.67
Jarque-Bera	1.20	2.94	5.30	3.23
Probability	0.550	0.230	0.071	0.199
Observations	62	62	62	62

Source: Authors' calculations.

These initial results relating to the descriptive statistics of the model variables justify the choice of Generalized Linear Models (GLM), which are less restrictive in terms of stochastic assumptions (mainly that errors must be normally distributed and that the variance of the error is constant) than the OLS method applied to a multiple linear model.

4.2. Results Relating to the Various Model Estimates

The results of the generalized linear model estimation concern four density functions of the response variable (real GDP), three of which belong to the exponential family and the quasi-likelihood distribution with exponential mean. The link function is the identity function (**Table 3**). The estimated coefficients are all sig-

nificantly different from 0 at the 5% threshold regardless of the model considered. Thus, capital, labor, openness, political regime, and alternation in power are all highly significant for the formation of gross domestic product. For the identity function, the coefficient estimates indicate that capital, labor, openness, and political regime are positively related to real GDP. On the other hand, official development assistance and political alternation are negatively related to real GDP. This configuration (significance of the coefficients and direction of the relationship) does not change regardless of the density function of the GDP response variable for the identity function.

Table 3. Results of the different generalized Linear models estimated for the identity link function.

Exponential family link function:	Gaussian distribution		Gaussian inverse distribution		Gamma distribution		Mean exponential	
	Coefficients (Std. Error)	p-value	Coefficients	p-value	Coefficients	p-value	Coefficients	p-value
Constant	-5.107* (1.909)	7.48E-03	-4.908** (1.912)	1.03E-02	-4.974* (1.911)	9.25E-03	-3.857** (1.943)	4.71E-02
Log (Capital)	0.215* (0.037)	6.73E-09	0.210* (0.037)	1.75E-08	0.212* (0.037)	1.28E-08	0.187* (0.039)	2.10E-06
Log (Labor)	0.711* (0.145)	8.66E-07	0.694* (0.146)	1.86E-06	0.700* (0.145)	1.45E-06	0.601* (0.152)	7.46E-05
Log (Openness)	0.528* (0.051)	9.22E-25	0.535* (0.052)	3.16E-25	0.533* (0.052)	4.47E-25	0.577* (0.053)	3.46E-27
ODA	-0.013* (0.004)	2.15E-03	-0.013* (0.004)	1.53E-03	-0.013* (0.004)	1.72E-03	-0.014* (0.004)	1.97E-04
Political Regime	0.161** (0.053)	2.42E-03	0.165* (0.053)	1.77E-03	0.164* (0.053)	1.97E-03	0.183* (0.052)	4.08E-04
Alternation	-0.105* (0.022)	2.66E-06	-0.104* (0.023)	4.88E-06	-0.104* (0.023)	3.99E-06	-0.094* (0.024)	1.12E-04

Source: Authors' estimates. Notes: * denotes significance at 1% level, ** at 5% level, and *** at 10% level.

With the canonical identity link i.e. $\theta(\mu) = \mu = \eta$ equating the canonical parameter of the exponential family distribution ($\theta(\mu) = \mu$) and the linear predictor ($\eta = \beta_0 + \beta_1 \log(Cap) + \beta_2 \log(Lab) + \beta_3 \log(Open) + \beta_4 Oda + \beta_5 PolReg + \beta_6 Alt$), the different Generalized Linear Models estimated are presented below:

- Normal distributional

$$\log(Gdp) = -5.107 + 0.215 \log(Cap) + 0.711 \log(Lab) + 0.528 \log(Open) - 0.013 Oda + 0.161 PolReg - 0.105 Alt$$

- Inverse Normal distribution

$$\log(Gdp) = -4.908 + 0.210 \log(Cap) + 0.694 \log(Lab) + 0.535 \log(Open) - 0.013 Oda + 0.165 PolReg - 0.104 Alt$$

Gamma distribution

$$\log(Gdp) = -4.974 + 0.212 \log(Cap) + 0.700 \log(Lab) + 0.533 \log(Open) - 0.013 Oda + 0.164 PolReg - 0.104 Alt$$

- Exponential Mean

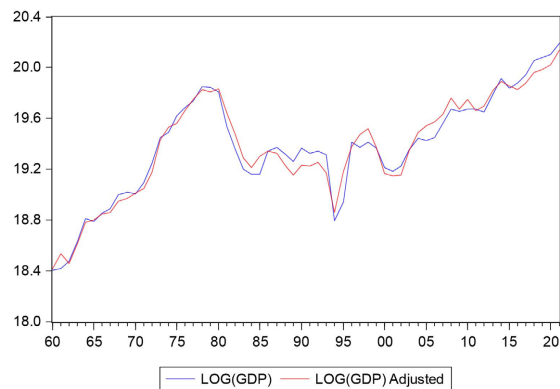
$$\log(Gdp) = -3.857 + 0.187 \log(Cap) + 0.601 \log(Lab) + 0.577 \log(Open) - 0.014 Oda + 0.183 PolReg - 0.094 Alt$$

Table 4. Results of statistical tests related to the estimation of the GLM model.

	Gaussian	Gaussian Inverse	Gamma	Exponential Mean
Mean dependent var	19.3775	19.3776	19.3775	19.3775
Sum squared resid	0.3517	0.3519	0.3518	0.3603
Akaike info criterion	-2.1015	39.7270	-2.0984	
Hannan-Quinn criter.	-2.0072	39.8213	-2.0041	
Deviance statistic	0.0064	0.0000	0.0000	0.0000
LR statistic	1585.5356	1593.2600	1590.5821	1647.7630
Pearson SSR	0.3517	0.0000	0.0009	0.0000
Dispersion	0.0064	0.0000	0.0000	0.0000
S.D. dependent var	0.4147	0.4147	0.4147	0.4147
Log likelihood	72.1469	-1224.5370	72.0512	10076.9297
Schwarz criterion	-1.8614	39.9672	-1.8583	
Deviance	0.3517	0.0000	0.0009	0.0000
Restr. deviance	10.4906	0.0015	0.0281	0.0000
Prob(LR statistic)	0.0000	0.0000	0.0000	0.0000
Pearson statistic	0.0064	0.0000	0.0000	0.0000

Source: Authors' calculations.

The results also indicate that the model is significant overall (**Table 4**). Indeed, the LR test reveals that the model variables are all jointly significant at the 1% threshold. Furthermore, the model appears to be very well adjusted to the data, as the deviance relative to the degree of freedom remains very low (0.0064), meaning that the adjustment is almost perfect.



Source: Authors' calculations.

Figure 1. Adjustment of the dependent variable using the GLM model—Gaussian—for the Identity link function.

The model seems closer to reality for the period before 1990, i.e., the single-party period, than for the subsequent period of multiparty politics (**Figure 1**). This is evident from an examination of the graphical representation of the Log (GDP) series and the adjusted Log (GDP) series obtained by maximum likelihood estimation of the GLM model with the normal family and the identity link function. Furthermore, the model is well specified. The results of the Ramsey RESET tests (**Table 5**) confirm this stability.

Table 5. Results of the Ramsey specification test.

Normal-Identity			
	Value	df	Probability
t-statistic	0.8704	54	0.3879
F-statistic	0.7576	(1, 54)	0.3879
Likelihood ratio	0.7576	1	0.3841
Normale Inverse-Identity			
	Value	df	Probability
t-statistic	0.6928	54	0.4914
F-statistic	0.4799	(1, 54)	0.4914
Likelihood ratio	0.4799	1	0.4885
Gamma-Identity			
	Value	df	Probability
t-statistic	0.7520	54	0.4553
F-statistic	0.5655	(1, 54)	0.4553
Likelihood ratio	0.5655	1	0.4520
Exponentielle moyenne-Identity			
	Value	df	Probability
t-statistic	0.2385	54	0.8124
F-statistic	0.0569	(1, 54)	0.8124
Likelihood ratio	0.0569	1	0.8115

Source: Authors' calculations.

The various Ramsey RESET tests indicate that the different models estimated are all very well specified at the 5% threshold. The various probabilities are all above the 5% threshold regardless of the test considered.

4.3. Economic Variables and Economic Growth

The economic variables, as shown above in **Table 3**, were all found to be significant for the formation of gross domestic product. Capital is positively linked to GDP. According to the model, when it increases by 10%, GDP increases by 1.87% to 2.15% on average, all other things being equal. With regard to labor, a 10% increase in labor leads to an average increase of 6.01% to 7.11% in GDP according to the model. Opening up the country to the outside world leads to an increase in GDP of between 5.28% and 5.77% when it increases by 10%. Finally, there is a negative correlation between official development assistance and GDP; a 1% increase in the rate of official development assistance leads to a decline in GDP of between 1.3% and 1.4%.

4.4. Political Regime, Alternation of Power, and Economic Growth

The political regime is a statistically significant variable at the 1% threshold for all GLM models estimated in this study (Table 3). All other things being equal, the transition from a single-party to a multiparty system leads to an average increase in GDP ranging from 16.1% to 18.3% according to the GLM models estimated in Table 3. In a multiparty system, labor and openness are the variables that contribute most to GDP growth. All other things being equal, a 1% increase in labor leads to an increase in GDP of approximately 1% for multiparty systems, compared to 0.65% for single-party systems (Table 6). Thus, labor contributes nearly 1.5 times more to wealth creation in a multiparty system than in a single-party system. On the other hand, capital is not significant in GDP formation in a multiparty system, but remains very significant in a single-party system (Table 6). Indeed, a 1% increase in capital leads to a 0.21% increase in GDP. Furthermore, regardless of the political system, openness remains significant for GDP formation: a 1% increase in openness leads to a 0.52% increase in GDP for single-party systems, compared to 0.57% for multiparty systems (Table 6). Similarly, official development assistance does not seem to have a positive impact on GDP in a multiparty system, since a 1% increase in the rate of development assistance leads to a 1.6% decline in GDP. On the other hand, GDP increases by 1.8% following a 1% increase in the case of a single-party system (Table 6).

Table 6. Results of the Normal GLM Identity estimation according to political regime.

Variables	Coefficients	
	Single Party	Multi-Party System
C	-4.4240	-8.992243
Log (Cap)	0.2143*	0.1527
Log (Lab)	0.6532*	0.9956**
Lrog (Open)	0.5297*	0.5709*
Oda	0.0181***	-0.0164*
Alt		-0.1313*

Source: Authors' estimates. Notes: * denotes significance at 1% level, ** at 5% level, and *** at 10% level.

However, the variable of political alternation has a negative effect on gross domestic product formation in Côte d'Ivoire. When the number of alternations increases by 1, GDP falls by 9.4 to 10.5% according to the model for the entire study period (Table 6) and by 13% for the multiparty period alone (Table 3).

The results of a GDP simulation under multiparty rule for the single-party period (1960-1989) and a GDP simulation under single-party rule for the multiparty period (1989-2021) are summarized in Figure 2.

An examination of Figure 2 of the simulations indicates that, all other things being equal, if there had been a multiparty system during the period 1960-1989, the country's GDP performance would have been better than that of the single-party system. And the difference in performance over this period would have been

significant at the 5% threshold (**Table 7**).

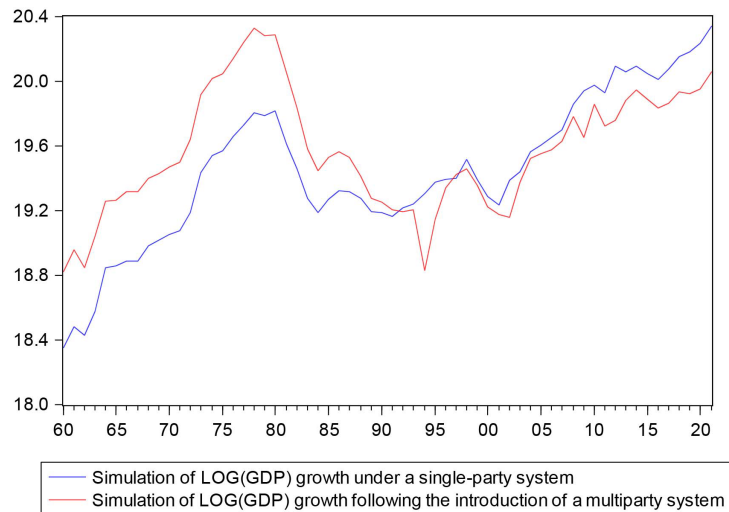


Figure 2. Simulation of LOG(GDP) using a Normal GLM with an Identity link function.

Table 7. Comparison of economic performance based on multiparty systems.

Method	df	Statistics	<i>p</i> -values
t-test	58	-3.613	0.0006
Satterthwaite-Welch t-test*	57.846	-3.613	0.0006
Anova F-test	(1, 58)	13.058	0.0006
Welch F-test*	(1, 57.846)	13.058	0.0006

Source: Authors' calculations. Notes: *Test allows for unequal cell variances.

Conversely, examination of the figure shows that after 1989, if there had been a single party, the results would have been apparently better in terms of GDP. This difference in performance between single-party and multiparty systems after 1989 is not significant at the 5% threshold, regardless of the assumption made about variance, as shown by the results of the mean comparison tests (**Table 8**).

Table 8. Comparison of economic performance based on the single-party system.

Method	df	Statistics	<i>p</i> -values
t-test	62	1.573970	0.1206
Satterthwaite-Welch t-test*	60.678	1.573970	0.1207
Anova F-test	(1, 62)	2.477382	0.1206
Welch F-test*	(1, 60.6781)	2.477382	0.1207

Source: Authors' calculations. Notes: *Test allows for unequal cell variances.

5. Discussions and Recommendations

GDP growth remains heavily dependent on traditional variables such as labor, capital formation, and openness to the outside world through international trade. However, the contributions of these different variables to wealth creation vary significantly depending on the type of political system. In general, when moving

from a single-party to a multiparty system, GDP growth is 2% higher for multiparty systems (18%) than for single-party systems (16%), meaning that national wealth increases faster in multiparty systems than in single-party systems. According to the study's findings, this can be explained by a greater contribution from labor and trade openness in a multiparty system than in a single-party system. On the one hand, the elasticity of GDP with respect to labor is almost equal to 1 in a multiparty system, compared to 0.65 in a single-party system. On the other hand, the elasticity of GDP with respect to trade openness is 0.57 for multiparty systems, compared to 0.52 for single-party systems. Explanations for such relationships between democracy and GDP could be provided by [Rodrik \(1999\)](#) and [Tavares & Wacziarg \(2001\)](#). [Rodrik \(1999\)](#) indicates that democratic countries pay higher real wages in the manufacturing sector than authoritarian regimes. Indeed, paying higher wages in a democratic regime improves labor market conditions and promotes greater wealth creation. For [Tavares & Wacziarg \(2001\)](#), multiparty politics, through the accumulation of human capital, has a positive and robust effect on growth. Indeed, the labor market is stimulated, which reduces unemployment and promotes economic growth.

Furthermore, unlike labor and trade liberalization, which have a greater impact on growth in multiparty systems than in single-party systems, capital contributes more to wealth creation in single-party systems than in multiparty systems. Several explanations can be put forward to support this observation. The first is that multiparty systems are characterized by political instability and a certain degree of economic unpredictability. In such a situation, long-term capital investment is hampered. [Acemoglu & Robinson \(2012\)](#) show that the transition to democracy can lead to institutional instability and affect capital investment. [North \(1990\)](#) argued that political institutions have a direct effect on investment, depending on the level of predictability associated with the rules of the game. Another explanation is that decision-makers in single-party regimes may choose to direct resources toward strategic investments, thereby boosting growth ([Amsden, 2001](#); [Rodrik, 1999](#)).

Official development assistance does not generally contribute to GDP growth based on the data as a whole. However, during the single-party period, it had a significant positive effect on GDP. In fact, a 1 percentage point increase in the rate of development assistance led to a 1.8% increase in GDP. During the multiparty period, however, a 1% increase in the rate of official development assistance led to a significant decline of 1.6%. Thus, contrary to many studies that argue that official development assistance has a positive effect on growth ([Burnside & Dollar, 2000](#)), the case of Côte d'Ivoire shows otherwise. Several mechanisms could explain such a relationship. On the one hand, aid dependence tends to reduce efforts to mobilize domestic resources as well as incentive for structural reforms, whereby creating a situation of chronic vulnerability ([Easterly, 2006](#); [Moyo, 2009](#)). On the other hand, some authors highlight the Dutch disease effect according to which massive inflows external aid lead to an appreciation of the real exchange rate, thus

reducing export competitiveness and hindering productive diversification (Rajan & Subramanian, 2011). Moreover, weak institutions and poor governance can divert aid from intended objectives, thereby limiting its impact on growth (Boone, 1996; Burnside & Dollar, 2000; Chauvet & Collier, 2006). Finally, misallocation of resources (Brender & Drazen, 2005; Clemens et al., 2004), the nature of the aid itself (Rajan & Subramanian, 2008), and the sectorial orientation of aid (Clemens et al., 2004) may also explain the negative effect of official development assistance on economic growth.

A comparison of economic performance results between single-party and multiparty systems shows that, overall, multiparty systems seem to yield better results in terms of economic growth. The transition from a single-party to a multiparty system led to a significant increase in GDP of between 16.1% and 18.1%. It therefore appears that multiparty systems, and even democracy, remain necessary if the country wishes to achieve better performance. However, this performance cannot be attributed to political change, since in the case of Côte d'Ivoire, the study indicates that political change has a significant negative effect on growth. In fact, when the number of changes in government increases by one, real GDP falls by 10.4%, all other things being equal. This result contradicts that of Kouotou & Epo (2019), according to which the number of changes in government has a positive effect on long-term growth. Such a contradiction could raise the question of the conditions under which political alternation takes place in a multiparty system and the consequences of alternation. Koffi et al. (2024), in their study of the characterization of economic growth, show that breaks in growth in Côte d'Ivoire occurred in 1971, 1981, 1990, 1999, and 2010 for six regimes, including 1999-2009 and 2010-2021. The latter two periods are those in which political and military factors appear to have had a severe impact on Côte d'Ivoire's growth (Koffi et al., 2024). Both periods were marked by political change accompanied by serious socio-political crises, including the coup d'état of 1999, the rebellion of 2002, and the post-election crises of 2010 and 2020. Consequently, the significant negative relationship between the number of changes in government and growth could be explained by the political instability created around election years. This is all the more true given that, during its 36 years of democratic transition, Côte d'Ivoire has experienced a coup d'état and a series of post-election crises: the coup d'état of 1999, the crisis of 2000 and that of 2002, which led to the partition of Côte d'Ivoire into two parts, one under government control and the other under rebel control; and those arising from the contested elections of 2010 and 2020. Such a situation is likely to discourage capital formation and therefore investment, thereby slowing economic growth. This would undoubtedly explain why, according to this study, capital has not been significant in GDP formation over the past 30 years of the democratic process. However, although the analysis clearly establishes a link between negative effect of political alternation and instability, it should be noted that the alternation variable remains a proxy variable and that the use of the political instability index could be an interesting direction for future research.

Furthermore, the fact that capital investment proved insignificant for growth during the multiparty period suggests that democratization alone does not guarantee economic attractiveness. In the current democratic context of Côte d'Ivoire, it appears necessary to strengthen the credibility of economic and political institutions, ensure the stability of the regulatory framework, and guarantee legal security for investors. Public policies should therefore prioritize the consolidation of economic governance, transparency in public markets, and the promotion of a predictable business climate in order to translate democratic gains into opportunities for sustainable investment.

Moreover, the study shows that while the multiparty system appears to be generally beneficial for economic growth, episodes of political alternation seem to have short-term adverse effects. This apparent contradiction, which should not occur in a well-functioning multiparty system, can be explained by the distinction between the democratic institutional framework—characterized by political competition and accountability of leaders—and the contextual events of power transfer, which are often accompanied by tensions and uncertainties. When consolidated, multiparty system promotes transparency, citizen participation, and stability of the rules of the game, thereby creating a favorable environment for investment and growth (Acemoglu & Robinson, 2012). Conversely, non-institutionalized political alternations may lead to policy discontinuities, cautious behavior among economic agents, and temporary institutional instability (Alesina et al., 1996). The challenge for Côte d'Ivoire is therefore not to avoid changes in political leadership, but to strengthen mechanisms that ensure peaceful and predictable transitions of power, so that democracy becomes a lasting source of confidence and economic performance.

Thus, in the case of Côte d'Ivoire, in order to take full advantage of democracy, everything must be done to avoid political instability. This requires strengthening the rule of law and justice, ensuring electoral transparency, improving institutional transparency, and promoting the effective emergence of countervailing power to prevent democracy from being hijacked by economic and political elites. Such improvement and consolidation of democratic institutions will create an economic environment conducive to economic growth.

6. Conclusion

The objective of this study was to show that the choice of political regime has an impact on economic growth in Côte d'Ivoire. Using a Generalized Linear Model, it appears that traditional economic variables such as capital, labor, and trade openness are significant for GDP formation at the 1% threshold.

When capital increases by 10%, GDP increases by 1.87% to 2.15% on average according to the model, all other things being equal. With regard to labor, a 10% increase in labor leads to an average increase in GDP of 6.01% to 7.11% according to the model. Opening up the country's trade to the outside world leads to an increase in GDP of between 5.28% and 5.77% when trade increases by 10%. Fi-

nally, there is a negative correlation between official development assistance and GDP; a 1% increase in the rate of official development assistance leads to a decline in GDP of between 1.3%.

Furthermore, the political regime has been found to be positively linked to economic growth at the 1% threshold. The transition from a single-party to a multi-party system in Côte d'Ivoire has led to an average increase in GDP of between 16.1% and 18.3%, all other things being equal.

However, the various contributions of the main economic variables in the model change depending on the political regime in place. Thus, with a multiparty system, capital proved to be insignificant for GDP formation even at the 10% threshold, whereas it remains very significant in the case of a single-party system, where a doubling of capital leads to a 21% increase in GDP. The opening up of the country through trade has approximately the same effect on GDP in both single-party and multiparty systems. Indeed, the elasticities of GDP in relation to the volume of trade in goods and services are 0.53 and 0.57 for single-party and multiparty systems, respectively. Labor remains the most contributory variable, whether in a single-party or multi-party system. However, the elasticity of GDP with respect to labor in the case of a multi-party system (0.996) is about 1.5 times higher than that of a single-party system (0.653).

As for official development assistance, it does not have a positive impact on GDP in a multiparty system, since a 1 percentage point increase in the rate of development assistance leads to a 1.3% decline in GDP. On the other hand, GDP increases by 1.8% following a 1 percentage point increase in the rate of development assistance in a single-party system. The alternation of power has a negative effect on gross domestic product formation in Côte d'Ivoire. Indeed, each transition to a new alternation of power leads to a fall in GDP of between 9.4% and 10.5% according to the model for the entire period of the study, and 13% for the period of multiparty politics alone. Finally, the simulation results indicate that, in terms of GDP growth, the performance of multiparty systems is superior to that of single-party systems. However, this is not due to alternation, as the number of alternations has a significant negative effect on GDP. This could undoubtedly be explained by the political instability surrounding election periods, in this case post-election crises, which discourage capital formation and investment and lead to a decline in economic growth.

At the conclusion of this study, rather than comparing the merits of the two political regimes experienced in Côte d'Ivoire, we emphasize that multiparty systems or democracy alone cannot be a panacea for achieving economic growth objectives. Thus, in the Ivorian case, even though multiparty politics or democracy allows for better economic performance than a one-party system, it nevertheless remains an insufficient condition for ensuring sustainable growth as long it continues to be marked by frequent political instability. It is therefore necessary to take all appropriate measures to prevent political instability if the country is fully benefit from the democratic process initiated since 1990. The State must therefore

strengthen the rule of law and justice, ensure electoral transparency, ensure institutional transparency, and promote the effective emergence of counter-powers in order to prevent from being taken hostage by economic and political elites. This will help to improve and consolidate democratic institutions and, consequently, create an economic environment conducive to sustainable economic growth.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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