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Quality of Institutions and Economic Growth in Mali

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Abstract: The aim of this article is to analyze the effect of institutions on Mali's per capita economic growth rate over the period 1996-2022, based on data from the World Bank, Freedom House and Polity IV, using a general linear model. With regard to this objective, the results reveal that, apart from government effectiveness, which negatively affects growth, the other five WB governance indicators, namely "voice and accountability", "political stability", "regulatory quality", "rule of law" and "corruption control", positively influence economic growth in GDP per capita. Furthermore, among these five indicators, the Voice and Accountability and Political Stability variables have a positive and significant influence on growth. As for the other governance variables, there is a significant negative influence between political freedom and civil liberty and the rate of economic growth, while the democracy variable affects economic growth positively and non-significantly. Overall, these results provide ample evidence that institutions are necessary for promoting economic growth in Mali. The use of a quadratic model highlights the possibility of a non-linear relationship through the existence of a threshold effect at the level of certain governance indicators, in relation to the economic growth rate of GDP per capita. Thus, of the six WB indicators, only political stability has a threshold effect, i.e., a non-linear relationship with growth. There is also a non-linear relationship between political freedom, civil liberty, democracy and the GDP per capita growth rate in Mali. This result confirms that for a number of these governance indicators, their influence on growth changes when they reach a certain threshold.

Keywords: *The quality of institutions, Economic growth, Linear and quadratic model, Mali*

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1. Introduction

The economic analysis of institutions was marked at the beginning of the Twentieth century by works generally classified as heterodox, such as those by [1] and [2]. The most important precursor of the New Institutional Economics (NIE) is the institutionalist school, made up of the German historical school and the American institutionalists.

Today, we are witnessing a new vision of standard economics, or a reorientation of standard economics [3], with the recognition of the notions of transaction costs and imperfect information in economics. Lower transaction costs are an important factor for growth, and can vary according to the institutions in place in a country. [4] has shown that increased economic growth can be achieved by lowering transaction costs, and that this is mainly due to the system of property rights, more or less efficient, put in place by governments according to their own interests. He emphasizes that it is the institutional framework, through the rules of the game in force in societies, that shapes behavior and expectations and contributes to growth.

These rules of the game, this system of incentives, constitute institutions, whether formal or informal. These rules create the essential framework that enables an agent to enter into a transaction with others, to commit to a long-term project - acts that are at the heart of wealth creation. This discovery of the institutional dimension of the growth process cannot be overlooked. The World Bank (WB) has responded to the question of the importance of institutions for development by proposing an operational tool: "good governance". Governance is presented as the solution for ensuring the security of transactions necessary for economic growth. Developing countries are asked to adopt this tool, formulated as a set of technical measures, so that the development process can get underway.

In sub-Saharan African countries such as Mali, the notion of governance was introduced under the leadership of international organizations such as the World Bank and the Organization for Economic Cooperation and Development (OECD). It followed the failure of structural adjustment programs (SAPs). It was in 1989, in a study entitled "*Sub-Saharan Africa: from crisis to sustainable development, a long-term perspective" [5]*, that the WB first introduced the notion of good governance, a concept it would later take up with greater force in a 1992 document entitled "*Governance and Development*" [6]. For the [5], governance is defined as "*the manner in which power is exercised in the management of a country's economic and social resources, and with a view to development*". This definition highlights the three axes of

governance: the form of the political regime, the way in which authority is exercised in the management of a country, and the government's ability to determine and apply policies.

Indeed, the WB recommends more efficient and transparent public sector management in developing countries. As a result, the concept has completely dominated the field of economic, political and social analysis. Good governance has become a commonplace expression in the publications of researchers, the injunctions of donors and the speeches of governments. Not only is it presented as a criterion of good management that easily opens up access to certain IFI resources, but it is gradually being made an element of a probable conditionality in partnership relations with almost all donors. Economists agree that governance is one of the main factors explaining performance disparities in developing countries. However, they differ on the type of governance, and more specifically, on the importance of the role of the state in accelerating development.

Since 2012, Mali has been experiencing one of the most serious multidimensional crises in its history, the consequences of which have shaken all the fundamentals of the economy. The Malian economy has structurally evolved little in recent years, with real GDP growth averaging 5.7% between 2015 and 2017. It is essentially driven by the primary and tertiary sectors, with little industrialization and little creation of decent jobs [7].

The security situation and the COVID-19 pandemic, combined with a coup d'état in August 2020, have taken the Malian economy from strong real GDP growth of 5.1% in 2019 to a recession during which real GDP fell by 2% in 2020, corresponding to a total loss of growth of 7.1 percentage points. This sharp recession is linked to a 3.5% contraction in growth in the secondary sector (-1.6%) and a 5.5% contraction in growth in the tertiary sector (0.8%). This was compounded by a fall in net exports due to weak global demand and a contraction in public investment, as resources from public programs were reallocated to the social sectors. This recession is also attributable to a decline in investment and private consumption. According to the [8], by 2022, GDP growth had slowed to 1.8%, and inflation had risen to an average of 9.7%, due to limited investment and higher world food and energy prices. Also, low growth and high inflation in 2022 are linked to persistent insecurity and limited domestic agricultural production, which have disrupted agri-food processing activities. While the country is experiencing difficulties linked to sanctions imposed by the Economic Community of West African States (ECOWAS), the outbreak of war in Ukraine is adding further uncertainty to the economic and budgetary situation.

Indeed, this crisis is partly due to a cumulative deficit in good governance over the years (weakness of the State, insufficient attention to the needs of the population, social injustice, political instability...) [7]. This finding is corroborated by the results of the WB's governance indicators in Mali, which are shaky, in other words, these indicators are all negative over the period 1996-2022, [8]. According to the same source, democracy as represented by the Polity2 index is relative over the 1996-2022 period. On the other hand, the state of freedom represented by the combination of Civil Freedom and Political Freedom shows that Mali is a partially free country.

Overall, these results show that Mali's governance performance is weak. Overall, Mali's economic growth in recent years has remained below the rates required for sustainable poverty reduction. This situation has prompted the search for alternative solutions, notably good governance. Good governance is presented as the solution for ensuring the security of transactions required for economic growth. For this reason, the present investigation focuses on the relationship between institutional quality and economic growth in Mali over the period 1996-2022, and at what threshold can institutional factors drive economic growth in Mali?

The general objective of this work is to analyze the effect of institutional factors on economic growth in Mali. Specifically, we aim to determine the effect of the WB, Freedom House and Polity governance indicators on Mali's per capita economic growth, under the hypothesis that these governance indicators positively influence the per capita GDP growth rate. Finally, to determine the existence of a threshold effect in the governance variable that would explain the economic growth variable.

This study therefore contributes to a better understanding of the existing empirical literature on the issue of institutional quality, governance and economic growth in general and in Mali in particular.

The article is structured as follows: after the introduction, the second section deals with a review of the literature on the link between governance and economic growth. The third section presents the estimation models, while the fourth presents the results. The final section concludes.

2. Literature Review

Growth theories, while addressing very important themes such as structural change, the role of the state, technical progress and human capital etc., remain silent on the role of institutional and political factors, replaced today by the notion of governance.

2.1. Place of Governance and Institutions in Growth Theory

The reference theoretical models for economic growth are those of [9] and [10]. However, interest in growth analysis stagnated for some twenty years, largely because neoclassical theory, in its standard formulation, proved incapable of describing empirical trends based on the data that had emerged in recent years, but also because of the unsatisfactory nature of the exogenous justification of growth. It was against this backdrop that the second generation of growth analysis began in the mid-1980s, with the integration of the concept of human capital as one of the drivers of growth. The emphasis shifted from an exogenous explanation of economic growth, with no reference to agents' behaviour, to an endogenous explanation of growth, directly derived from these behaviours and the evolution of economic variables. Despite this revival of growth theory, there are still differences in growth between developed and developing countries, and even within developing countries

themselves. This has led to a focus on institutional and political determinants to explain growth.

2.1.1. Traditional Growth Theories and Institutions

In an article published in 1956, Solow presented a simple growth model that was to give rise to the neo-classical analysis of long-term growth. His aim was to present a model in which it is possible to achieve a stable, self-sustaining growth process. Solow's model could be said to be the starting point for growth economics. Until the 1980s, this dominant growth model limited the explanation of growth to demographic and technological phenomena, and emphasized the role of investment, and therefore capital accumulation, in helping developing countries catch up with industrialized countries. The model was later supplemented by the introduction of neutral exogenous technical progress in Harrod's sense, which by definition increases the efficiency of the labor factor. Despite its popularity, Solow's model accorded a marginal role to the state and institutions. The basic assumptions of the neoclassical model - the framework of pure and perfect competition, perfect flexibility of adjustment variables and growth of basic variables - are independent of any state intervention and therefore of any economic policy.

The state intervenes only through its policies to correct the imperfections that characterize the functioning of the market. Neoclassicists refer to this as the "policeman state", meaning that the state does not intervene in the economic sphere. As for institutions, they do not exist in the neoclassical analysis of growth. The assumption that production is determined by the availability of factors of production and technology implicitly assumes the optimality of institutions and governance. Indeed, standard neoclassical theory neglects social relationships and all forms of institutional arrangement. Neoclassical analyses of growth focused on identifying the specifically economic mechanisms involved in the growth process, thus relegating the political and institutional dimensions to the margins of economic reflection. On the other hand, other traditional branches of economics place greater emphasis on the contribution of non-economic factors to economic growth. Despite this total ignorance of institutions in the neoclassical model of growth, the founder of this model began to recognize a certain role for institutions.

Indeed, [11] defines institutions as "regular, codified patterns of behavior, which, depending on the case, may arise endogenously or from social norms". It's only recently that standard economics has begun to pay serious theoretical attention to the place of institutional infrastructure in modern market economies. The exogeneity of the long-run growth rate in the neoclassical model is the main shortcoming behind the drive to overcome it. The emergence of the new theories initiated by [12] is part of this problematic. By attempting to overcome this limit and thus endogenize technical progress, the new growth models will renew the debate on the sources of growth and specify endogenous growth dynamics. However, this theoretical renewal calls for a parallel questioning of whether or not to introduce a role for institutions and governance in the long-term growth process. Ultimately, it could be said that, despite its limitations and shortcomings, Solow's model is the starting point for growth economics. More than half a century later, it is still used in empirical studies to understand the determinants of growth.

2.1.2. Endogenous Growth Theory and Institutions

After thirty years of reign, Solow's standard model was overtaken, and new contributions responded to its limitations. The rate of growth would henceforth be endogenous, and new models were emerging, giving rise to a new paradigm of economic growth theory: "endogenous growth theories". In the 1980s, certain economists developed the new concept of "endogenous growth", according to which long-term growth is now determined within the model: technical progress is no longer exogenous, but endogenous. The proponents of endogenous growth addressed new determinants of growth (human capital, technical progress, capital accumulation, etc.), setting aside those of exogenous growth. The main contribution of the new growth theory lies in the recognition of institutional factors through the rehabilitation of the role of the state in growth, an actor totally ignored by traditional theory.

Unlike the various growth theories presented earlier, where institutional factors played a marginal or even absent role, the endogenous growth paradigm pays less attention to the institutions that accompany the growth process. Indeed, institutions have not been the subject of modeling, but theorists support the proposition of the relevance of an institutional environment for economic activity [13]. In particular, the idea that the effect of the accumulation of productive factors is carried by an implicit institutional environment. Moreover, it must be recognized that, by acknowledging the role of the state, endogenous growth theory implicitly accounts for the importance of political and institutional factors in economic growth.

However, the role of the state is understood through public spending on consumption and investment, not through its institutions. Institutional and political factors are not formally integrated into growth models. These factors are only considered implicitly. Aware of the importance of institutions in the analysis of growth and development, empirical work on the relationship between institutions or governance and growth has multiplied. In the following section, we summarize the existing empirical literature on this relationship.

2.2. Summary of Empirical Work on the Relationship Between Institutions and Economic Growth

The aim of this section is to examine the results of empirical work on the relationship between institutions and economic growth, while discussing its validity and limitations. Indeed, although the role of institutions is not a new theme in economic theory, empirical work has lagged behind. It only accelerated in the 1990s, with the emergence of a growing number of subjective indicators for measuring the various dimensions of governance. Despite the difficulty of classifying empirical studies, not least due to the use of different methods and databases, in

this summary we attempt to list these studies, distinguishing between "first-generation studies" and "second-generation studies".

2.2.1. First-generation Empirical Studies

The first category of studies aims to explain why the quality of institutions varies from country to country, and what type of factors may be responsible for such disparity. More specifically, they aim to test North's (1990) hypothesis on the importance of property rights and transaction costs in determining economic performance. Indeed, following [14], a number of recent studies have examined the determinants of growth using conditional convergence regressions estimated on cross-sectional and spatio-temporal data. This work uses economic data to attempt to justify growth differences between countries. For example, [15] introduces tariff barriers as a determinant of long-term income; [16], use public investment; [17], take into account public consumption expenditure; [18], consider trade openness.

However, the limitations of the estimates made have prompted economists to turn to the various components of governance (institutional and political) in an attempt to find a justification for the differences between countries unexplained by economic data alone. This work has also been motivated by the emergence of a major problem in empirical estimates of the determinants of growth, namely the inadequacy of economic variables alone to explain differentials in economic performance between countries. These studies also use proxy variables to measure property rights and test their effects on economic performance. Given the inadequacy of measures of the security of property rights, researchers generally employ three types of indicators, linked to democracy (the nature of the political regime, the guarantee of political rights, civil liberties, etc.). Two important aspects characterize the empirical results concerning the relationship between democracy and economic growth: the abundance of work and the heterogeneity of the results obtained.

Indeed, while several studies confirm the positive impact of democracy on the growth process, including [14,19,20,21,22] [23,24,25,26,27] and others have reported a negative effect. But, in general, empirical findings on the relationship between democracy and economic growth remain contradictory and non-comparable. There is a consensus on the negative effect of political instability (political unrest, the number of coups d'état, etc.) on growth, as in the work of [19,28,29,30,31,32]. Corruption (bureaucratic quality, quality of the judicial system, etc.) significantly reduces the level of growth in an economy [33,34,35]. In short, recent studies on the impact of corruption on the economy point to negative effects [36]. A common feature of all these studies is that they examine the impact of institutions on economic performance, without explicit reference to the concept of governance. Indeed, these "first generation" studies did not yet speak of governance but of institutions, and it was not until the work of [37] that we began to speak of the relationship between governance and growth.

Unfortunately, certain dimensions of governance were ignored in studies on the determinants of growth and, when represented by proxies, are probably incapable of fully representing the notion of governance. The finding of this synthesis of "first-generation" studies is that one or more governance variables are integrated into a Solow-type growth equation (1956); [38]. However, a second type of study analyzes the effects of these variables through "informal regressions", as [39] calls them. Using other econometric approaches, the authors of these studies attempt to identify the factors of production that influence growth through the quality of governance.

In sub-Saharan Africa, on the basis of an analysis of dynamic panel data over the period 1996-2015, [40] show that the interaction between governance indicators and public consumption and investment expenditure has a significant effect on the growth rate of GDP per capita. They also find that, the direct effect of governance indicators on economic growth, results in a positive and significant effect. [41], for a sample of 20 sub-Saharan African countries, over a period from 1980 to 2015, show, through estimates by FMOLS and DOLS, that the quality of institutions has an impact on financial development. Causality tests carried out using the vector error correction model reveal different results for two groups of countries: for countries with more advanced financial systems, it is financial development that induces growth; on the other hand, for the group of countries with poorly structured financial markets, it is growth that induces financial development.

In WAEMU countries, using a random-effects model over the period 2000 to 2020, [42] shows that political instability, violence and corruption are significant for economic growth at the 1% and 10% thresholds respectively. The rule of law is not.

In Mali, [43] analyzed the relationship between governance and economic growth. They find that, the rule of law negatively impacts Malian economic growth i.e. if this indicator increases by 100%, Malian economic growth decreases by 18%. The authors prove that government efficiency also has a significant and positive impact on economic growth in Mali, i.e., a 100% increase in this indicator translates into a simultaneous 10% increase in GDP per capita in Mali. Finally, their results show that regulatory quality has no impact on economic growth in Mali.

Despite their diversity, in terms of the methods and variables used, the multidimensional nature of the concept of governance, the failure to take account of the endogenous nature of institutional variables in growth regressions, etc., first-generation empirical work concludes that the quality of institutions and the components of good governance are important for economic growth. Thus, governance alone cannot promote growth, and these effects must operate through their impact on factor accumulation (indirect effect). Indeed, a new generation of empirical studies is attempting to investigate how institutions affect growth, but these studies are marred by limitations in terms of the method used, the governance indicators employed and the channels used.

2.2.2. Second Generation of Empirical Studies

The second series of empirical studies was undertaken with the aim of taking into account the indirect aspects of the impact of governance and institutional quality on economic growth. This "second generation of studies" seeks to identify the various transmission channels

through which governance quality affects growth. This second generation of studies differs from the first generation for at least two main reasons. Firstly, it will attempt to provide a theoretical framework for the impact of institutional quality on economic performance, via its effects on the various components of the production function, namely productivity and the accumulation of physical and human capital [44,45]. Secondly, some of these empirical works attempt to introduce synthetic measures that represent the concept of governance in general.

Empirical studies seeking to determine the transmission channels through which governance affects growth are heterogeneous in terms of the method and governance indicator used. Indeed, some use the accounting approach to growth, according to which differences in output per capita stem from differences in capital (physical and human) or from differences in productivity levels [44], while others use simultaneous equation models [46,47]. As for the measure of governance employed, some studies employ an aggregate indicator of governance [44,48]; while others employ a measure of one of its components through an analysis of the production function. In other words, the aim is to study, on the one hand, the relationship between governance and productivity and, on the other, the relationship between governance and capital accumulation (physical and human). These are the works of [1] [49,50,51,53].

All in all, it can be said that empirical studies are relatively homogeneous as regards the impact of governance on economic performance, but largely heterogeneous as regards the identification of transmission channels. They are also heterogeneous in terms of the governance indicators used and the estimates applied. The heterogeneity of the results allows us to draw two main conclusions. The first is that institutions alone cannot promote growth, and that their effects must be mediated through their impact on factor accumulation (indirect effect) and/or productivity (direct effect). The second is that the conclusions of these studies are heterogeneous and do not point in the same direction. This is largely due to the main assumption adopted in these studies, which is that of an identical production function for all countries.

The literature on the link between institutions and economic growth is very rich, but to our knowledge very few studies have addressed the threshold at which the various governance indicators can boost a nation's economic development, especially in the case of countries like Mali. For this reason, we are going to determine the effect of governance indicators on per capita GDP growth, while verifying the presence or absence of threshold effects between their relationship.

3. Presentation of Estimation Models

3.1. Theoretical Model

We draw on the growth model of [54] and [38]. The model generally used explains GDP per capita by two basic variables (capital and labor) to which we add institutional variables (governance indicators) and control variables. We use the following functional form:

$$gpib_t = f(IG_t, X_t) \qquad (1)$$

Where $gpib_t$, IG_t, X_t respectively represent the growth rate of gross domestic product per capita, the governance indicators (voice and accountability, Political stability and absence of violence, Government efficiency, Quality of regulation, Rule of law, Control of corruption. The state of freedom and democracy), and a set of control variables (Exports, official development assistance, inflation and foreign direct investment). t represents the periods. Thus, two econometric methods can be used in this work. On the one hand, a general linear model is used to explain the link between GDP per capita growth, which is the dependent variable, and governance and control variables, which are the independent variables. On the other hand, using a quadratic model, integrating the square of the governance variable, would make it possible to determine the existence of a threshold effect at the level of the governance variable that would explain the economic growth variable. The formulation of the various specifications is summarized as follows:

$$gpib_t = \alpha_0 + a_j IG_t + b_j X_t + \varepsilon_t \qquad (2)$$

$$gpib_t = \alpha_0 + a_j IG_t + \theta_j IG_t^2 + b_j X_t + \varepsilon_t \qquad (3)$$

With $gpib_t$ as endogenous variable, α_0 the constant, IG_t the variable representing the governance indicators, X_t designating the set of control variables and ε_t the disturbance.

To determine the threshold, the existence of non-linearity is explored through a quadratic regression between economic growth and governance. This analysis is carried out by introducing the square of the governance variable into the econometric models used. The threshold effect is observable only if in the last specification of each model, i.e., the equation (3) the coefficients of the governance variables (IG and IG^2) are of opposite signs. The value of the threshold could be determined by the solution of the equation of the partial derivative of the endogenous variable with respect to the governance variable equalized to zero. This is expressed by solving the equation:

$$\frac{\partial gpib_t}{\partial IG_t} = 0$$

So,

$$\frac{\partial gpib_t}{\partial IG_t} = 0 \Rightarrow a + 2\theta IG_t = 0 \qquad (4)$$

$$IG_t^* = -\frac{a}{2\theta}$$

Where IG_t^* the threshold value of the governance variable used.

3.2. Data and Choice of Variables

The variable of interest or endogenous variable is the growth rate of GDP (gross domestic product) per capita. It is one of the best indicators of economic activity. For good governance indicators, we use the six WB indicators, the Freedom House indicators and the polity2 political governance index from the polity IV project. The average

of the six WB indicators is a measure of the quality of governance. They can be grouped into three sets: - political governance, measured by the two indicators Voice and Accountability (VR) and Political Stability and Absence of Violence (SP), represents the process by which governments are appointed, monitored and replaced; - economic governance, measured by Regulatory Quality (QR) and Government Efficiency (EG), refers to the government's ability to formulate sound policies and implement them; finally, - institutional governance, measured by Compliance with Rules and Laws (RD) and Control of Corruption (CC). It represents the State's and citizens' respect for the institutions that govern their economic and social interactions.

Each country receives a score ranging from -2.5 to +2.5. A higher score corresponds to a better quality of governance. The choice of these indicators is particularly justified by their ability to influence a country's economic growth. We use Freedom House's civil and political freedom indicators. They rate each country on respect for political rights and civil liberties. The country surveyed is assigned two ratings, one for political rights, and one for civil liberties, on a scale of 1 to 7. A score of 1 indicates the highest degree of freedom, and 7 the lowest. These political rights and civil liberties ratings are combined to determine an average of the overall "state of freedom" for each country and territory. Countries with a combined rating with an average score of 1 to 2.5 are considered "free", 3 to 5 "partly free", and 5.5 to 7.0 "not free". Finally, we use the *polity2* political governance index from the polity IV project, which takes values between -10 (less democracy) and +10 (more democracy).

Despite the frequent use of governance indicators, the majority of the indicators presented above suffer from methodological problems, subjectivity, opacity, the impossibility of making comparisons over time, sampling bias, and so on. Beyond the WB governance indicators, the model is reinforced by certain control variables that we believe have a greater capacity to influence Mali's economic growth. These include exports, official development assistance, inflation and foreign direct investment. In addition, these additional variables have been introduced for better model specification, and are all related to GDP. In fact, all these variables come from the WB database [8] and are used in this work over the period 1996-2022.

3.3. The Empirical Model

In this section, two types of econometric model are used to explain the link between GDP per capita growth, which is the dependent variable, and governance and control variables, which are the independent variables. The first type, a non-quadratic model, consists of relating economic growth in GDP per capita to each governance indicator plus control variables. As for the second type of quadratic model, its role will be to determine the existence of a threshold effect at the level of each governance variable, which would explain the growth variable. The formulation of the different specifications is summarized in equations 5 to 22.

$$\begin{cases} gpib_t = \alpha + a_0 VR_t + b_1 EXP_t + b_2 Infl_t + b_3 APD_t + b_4 IDE_t + \mu_{1t} \end{cases} \quad (5)$$

$$\begin{cases} gpib_t = \alpha + a_0 VR_t + a_1 VR_t^2 + b_1 EXP_t + b_2 Infl_t + b_3 APD_t + b_4 IDE_t + \mu_{1t} \end{cases} \quad (6)$$

$$\begin{cases} gpib_t = \beta + c_0 EG_t + d_1 EXP_t + d_2 Infl_t + d_3 APD_t + d_4 IDE_t + \mu_{2t} \end{cases} \quad (7)$$

$$\begin{cases} gpib_t = \beta + c_0 EG_t + c_1 EG_t^2 + d_1 EXP_t + d_2 Infl_t + d_3 APD_t + d_4 IDE_t + \mu_{2t} \end{cases} \quad (8)$$

$$\begin{cases} gpib_t = \rho + h_0 SP_t + i_1 EXP_t + i_2 Infl_t + i_3 APD_t + i_4 IDE_t + \mu_{3t} \end{cases} \quad (9)$$

$$\begin{cases} gpib_t = \rho + h_0 SP_t + h_1 SP_t^2 + i_1 EXP_t + i_2 Infl_t + i_3 APD_t + i_4 IDE_t + \mu_{3t} \end{cases} \quad (10)$$

$$\begin{cases} gpib_t = \gamma + j_0 QR_t + k_1 EXP_t + k_2 Infl_t + k_3 APD_t + k_4 IDE_t + \mu_{4t} \end{cases} \quad (11)$$

$$\begin{cases} gpib_t = \gamma + j_0 QR_t + j_1 QR_t^2 + k_1 EXP_t + k_2 Infl_t + k_3 APD_t + k_4 IDE_t + \mu_{4t} \end{cases} \quad (12)$$

$$\begin{cases} gpib_t = \delta + l_0 RD_t + m_1 EXP_t + m_2 Infl_t + m_3 APD_t + m_4 IDE_t + \mu_{5t} \end{cases} \quad (13)$$

$$\begin{cases} gpib_t = \delta + l_0 RD_t + l_1 RD_t^2 + m_1 EXP_t + m_2 Infl_t + m_3 APD_t + m_4 IDE_t + \mu_{5t} \end{cases} \quad (14)$$

$$\begin{cases} gpib_t = \theta + n_0 CC_t + o_1 EXP_t + o_2 Infl_t + o_3 APD_t + o_4 IDE_t + \mu_{6t} \end{cases} \quad (15)$$

$$\begin{cases} gpib_t = \theta + n_0 CC_t + n_1 CC_t^2 + o_1 EXP_t + o_2 Infl_t + o_3 APD_t + o_4 IDE_t + \mu_{6t} \end{cases} \quad (16)$$

$$\begin{cases} gpib_t = \sigma + p_0 LP_t + q_1 EXP_t + q_2 Infl_t + q_3 APD_t + q_4 IDE_t + \mu_{7t} \end{cases} \quad (17)$$

$$\begin{cases} gpib_t = \sigma + p_0 LP_t + p_1 LP_t^2 + q_1 EXP_t + q_2 Infl_t + q_3 APD_t + q_4 IDE_t + \mu_{7t} \end{cases} \quad (18)$$

$$\begin{cases} gpib_t = \pi + r_0 LC_t + s_1 EXP_t + s_2 Infl_t + s_3 APD_t + s_4 IDE_t + \mu_{8t} \end{cases} \quad (19)$$

$$\begin{cases} gpib_t = \pi + r_0 LC_t + r_1 LC_t^2 + s_1 EXP_t + s_2 Infl_t + s_3 APD_t + s_4 IDE_t + \mu_{8t} \end{cases} \quad (20)$$

$$\begin{cases} gpib_t = \varepsilon + t_0 Polity2_t + v_1 EXP_t + v_2 Infl_t + v_3 APD_t + v_4 IDE_t + \mu_{9t} \end{cases} \quad (21)$$

$$\begin{cases} gpib_t = \varepsilon + t_0 Polity2_t + t_1 Polity2_t^2 + v_1 EXP_t + v_2 Infl_t + v_3 APD_t + v_4 IDE_t + \mu_{9t} \end{cases} \quad (22)$$

4. Econometric Results

Before presenting the various econometric results concerning the effect of governance indicators on economic growth, we review the descriptive statistics of the variables of interest.

4.1. Descriptive Statistics

Table 1. Descriptive statistics (mean, standard deviation, min and max) for the various variables in Mali over the study period (1996-2022)

Variables	Obs.	Mean	Std. dev.	Min	Max
CC	27	-0.619	0.162	-0.888	-0.320
VR	27	-0.162	0.459	-0.902	0.686
EG	27	-0.841	0.435	-1.491	1
SP	27	-0.745	1.098	-2.479	0.656
QR	27	-0.420	0.203	-0.674	0.126
RD	27	-0.570	0.246	-0.999	-0.026
g	27	1.93	2.709	-4.211	9.644
EXP (%GDP)	27	26.241	3.188	20.034	33.297
INFL	27	2.178	3.362	-3.099	9.621
ODA (%GDP)	27	11.748	2.601	7.694	18.695
FDI (%GDP)	27	2.636	1.573	0.085	7.293
LP	27	3.481	1.695	2	7
LC	27	3.407	1.009	2	5
Polity2	27	5.815	1.468	0	7

Source: Authors based on World Bank data (WGI, 2023)

Table 1 shows that GDP per capita growth averaged 1.93% over the study period. The shares of exports, official development assistance and foreign direct investment in GDP averaged 26.241%, 11.748% and 2.636% respectively over the period. Inflation stood at 2.178%. In Mali, the WB governance indicators are all negative, confirming the poor performance of governance indicators in this country over the study period. For political stability and absence of violence, the average

value over the period is -0.745, for government effectiveness -0.75, for quality of regulation -0.841, for control of corruption -0.420, for voice and accountability -0.619, and for rule of law -0.570. The results of the political freedom (3.481) and civil freedom (3.407) indicators result in an average state of freedom over the period of 3.444. This shows that, on average, Mali is a partially free country over the period. Finally, the *polity2* political governance index of the polity IV project (5.815) is positive on average over the period, indicating that Mali is relatively democratic.

Figure 1 shows the evolution of Mali's WB, Freedom House and Polity2 governance indicators over the period 1996-2022. This graph shows that almost all governance indicators have a score below 0, especially those of the WB. The majority oscillate between -2 and 0. This result confirms that of Table 1, according to which the World Bank's governance indicators are on average negative for Mali over the study period. This demonstrates Mali's poor performance in terms of governance. Only a handful of governance indicators are positive, ranging from 0 to 10. These are mainly Freedom House and Polity2 indicators.

4.2. Results of Econometric Estimations

4.2.1. Econometric Tests of the Empirical Model

Among the various appropriate econometric tests, we have used unit root tests. These tests enable us not only to identify the stationarity of a series, but also to stationarize it. Among unit root tests, the improved Dickey-Fuller test, known as Augmented Dickey-Fuller (ADF), seems to us the most appropriate. The assumptions of this test are:

$H_{0:}$ unit root (non-stationarity)

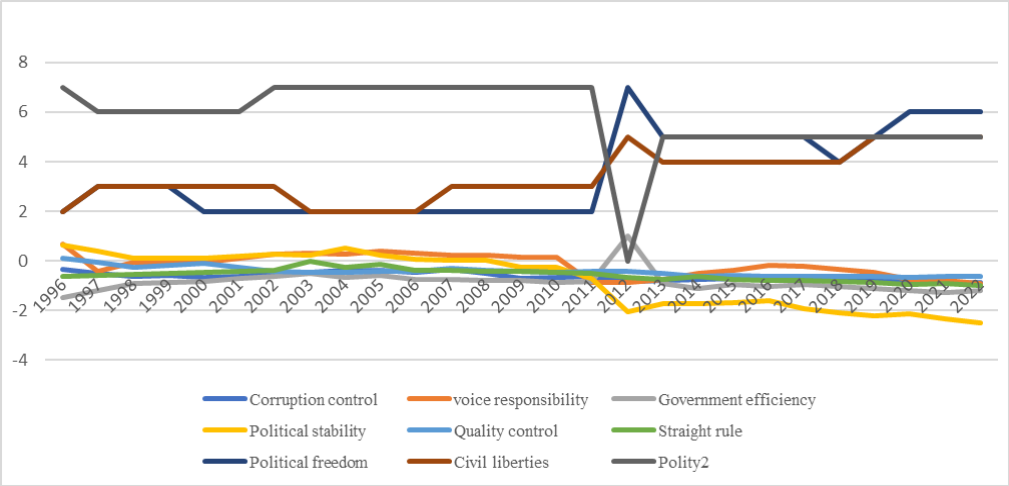
$H_{1:}$ non-unity root (stationarity)

The decision process is as follows, using STATA.16:

If |ADF statistic| ≥ |critical value|, then we accept H_1: the x series is stationary.

If |ADF statistic| ≤ |critical value|, then we accept $H_{0:}$ the series is non-stationary.

Stationarity analysis shows that GDP per capita growth rate, inflation, exports, official development assistance and government efficiency are stationary at level. The other variables are stationary in first difference. For further details, the test results are summarized in Table 2, and decisions are taken at the 5% threshold.



Source: Authors based on World Bank data (WGI, 2023)

Figure 1. Evolution of governance indicators by Kaufmann et al., of Freedom House and Polity2: 1996 to 2022

Table 2. Results of stationarity tests

Var.	Level					Primary difference					Conclusion
	ADFcal	ADFth	trend	Cste	NR	ADFcal	ADFth	Trend	Cste	NR	
Tc_pib	-3.916	-3.000	no	yes	0						I (0)
EXP	-3.647	-3.000	no	yes	0						I (0)
INF	-5.277	-3.000	no	yes	0						I (0)
APD	-3.330	-3.000	no	yes	0						I (0)
IDE	-2.881	-3.000	no	yes	0						I (0)
CC	-1.979	-3.000	no	yes	0	-4.592	-3.000	no	yes	0	I (1)
VR	2.281	-3.000	no	yes	0	-3.216	-3.000	no	yes	0	I (1)
EG	-4.178	-3.000	no	yes	0						I (0)
SP	-0.401	-3.000	no	yes	0	-3.280	-3.000	no	yes	0	I (1)
QR	-2.713	-3.000	no	yes	0	-3.948	-3.000	no	yes	0	I (1)
RD	-1.436	-3.000	no	yes	0	-4.781	-3.000	no	yes	0	I (1)
LP	-1.801	-3.000	no	yes	0	-4.030	-3.000	no	yes	0	I (1)
LC	-1.918	-3.000	no	yes	0	-3.082	-3.000	no	yes	0	I (1)

NB: *ADF_{cal} = calculated Dickey-Fuller-Augmented, ADF_{th} = theoretical Dickey-Fuller-Augmented, Cste = constant, NR = number of delays*
Source: *Authors based on STATA.16 results*

4.2.2. Presentation of Econometric Estimation Results

The results of the model estimations show that, in terms of WB governance indicators, apart from government effectiveness, which has a negative impact on economic growth in Mali, the other governance indicators (Voice and Accountability, Political Stability, Rule of Law, Regulatory Quality, Corruption Control) have a positive impact on growth (Table 3). However, in terms of significance, only the Voice and Accountability and Political Stability variables significantly influence growth at the 10% threshold, while the other variables (Government Effectiveness, Rule of Law, Regulatory Quality, Corruption Control) have no significant influence on growth. The state of democracy (Polity2) has a positive and non-significant effect on economic growth, while the state of freedom has a negative and significant effect at the 10% threshold. The results also show that there are no thresholds for any of the WB governance indicators except political stability, with a threshold of 0.435. We note the presence of thresholds for the state of freedom [(LC, 2.994), (LP, 3.633)] and democracy (Polity2, 5.186).

Table 3. Estimation results between per capita growth rate and governance indicators over the period 1996-2022

Variables	Coefficients	Thresholds
VR	2.487*	-
SP	1.488*	0.435
EG	-1.409	-
QR	3.276	-
RD	3.952	-
CC	5.155	-
LC	-1.298*	2.994
LP	-0.738*	3.633
Polity2	0.643	5.186

*The significance levels for the coefficients are: *** 1%, ** 5%, * 10%.*
***Source**: Authors based on World Bank data (WGI, 2023)*

In the following, we interpret the results of the estimates presented in the above table.

4.2.3. Discussion of Results

The results of the model's estimations show that, in terms of the WB's governance indicators, only government efficiency has a negative impact on economic growth in Mali. Indeed, the effectiveness of public action, defined by the quality of public services, the performance of the civil service and its level of independence from political pressures, has a negative impact on economic growth in Mali, even if its effect is not significant. This result is not surprising; it could be explained by the fact that in Mali, the quality of public services is affected by a number of ills, notably red tape, political capture of public structures, affinities in recruitment and in the processing of files, absenteeism and delays in services, and the low level of human resources, etc. Mali must therefore do more to strengthen the quality of public services. Mali therefore needs to further strengthen economic governance by improving government efficiency through its ability to formulate sound policies and implement them.

As for the other WB governance indicators (Voice and Accountability, Political Stability, Rule of Law, Regulatory Quality, Corruption Control), they have a positive effect on economic growth. This result confirms the working hypothesis that the majority of governance indicators, notably those of the WB, have a positive effect on the growth of the Malian economy, even if some have a non-significant effect. Among these indicators, only the variables Voice and Responsibility and Political Stability have a significant influence. This is sufficient proof that institutions are necessary to promote economic growth in Mali. These results confirm those of [35] and [55] etc.

The variable Voice and responsibility, expressing the political and individual rights (voting, choice and continuation of government) enjoyed by citizens in a country, has a positive and significant influence on growth in Mali. Indeed, from the advent of democracy in Mali in 1991 until the coup d'état of 2012, Mali was cited by several sources as an example of democracy in Africa through the participation of Malians in several democratic elections, freedom of expression, association and press exploded. These results confirm those of [56], who considers that the political regime determines the quality of governance of the economy in question. [57] consider that the nature of the political regime determines the quality of political governance. We also note that political stability and the absence of violence have a positive and significant influence on growth in Mali, with a threshold effect. This result is likely in the Malian context, as from the advent of democracy until the 2012 coup d'état, apart from the security crisis in northern Mali, this period was marked by relative political stability favoring economic growth. However, from the 2012 coup to the present day, Mali has experienced political, social and security instability, leading to periods of recession. These results confirm those of [58], who show that political instability and violence lead to a deterioration in investment and low growth.

The impact of the insignificance of the WB's governance variables on growth is relatively consistent with the realities experienced by Mali over the last three decades. Corruption is endemic and has remained a major challenge for the country since the advent of democracy in 1991. It is virtually pervasive in the socio-economic sector, compromising the integrity of public services and equity in the distribution of resources and economic and social development. Embezzlement of public funds, clientelist practices, etc. are commonplace, undermining citizens' confidence in government institutions and impeding social justice. Indeed, the consequences of corruption are devastating for a poor country like Mali. It discourages foreign investment, hampers economic growth and exacerbates poverty by diverting resources intended for social programs and development. What's more, corruption fuels popular discontent, contributing to political instability and mistrust of democratic institutions [59]. To overcome this scourge, the State must strengthen its institutions, improve transparency and accountability, and promote a culture of integrity at all levels of society.

The quality of regulation (QR), which measures the ability of public authorities to draw up and apply sound policies and regulations conducive to private sector development, remains a matter of concern in Mali. In recent years, Mali has introduced a number of regulatory reforms to public services, and developed sound economic and social policies. However, the expected economic growth is struggling to significantly reduce poverty. This is due to deficiencies in the functioning of the State, leading to poor implementation of these policies. These include corruption, overlapping jurisdictions in the

implementation of certain public policies, the interweaving of the social and political spheres, the downward trend in professionalism in the administration, and the significant weakness in the quality of State services. These shortcomings are concordant indicators of the weak functionality and declining credibility of the State in Mali [60]. Meeting these challenges requires a state capable of developing and implementing sound policies and regulations.

For decades, access to justice and the legitimacy of the justice sector in Mali has been a major concern for the population. Indeed, justice in Mali is an essential cog in the wheel of regulating human relations and living together. For several years now, it has been facing challenges in terms of access, distribution and operation, which arouse the mistrust of citizens and increase the risks of impunity [61]. According to [62], challenges related to the transparent, equitable and legitimate governance of the justice system were already emerging as one of the main obstacles to peace. Otherwise, justice is perceived as distant, inaccessible and tainted by suspicions of bias and corruption, despite the efforts made by public authorities. To restore the image of the Malian justice system and achieve lasting peace (a factor in development), the State needs to strengthen trust between the players in the justice system and the population**.**

The use of a quadratic model revealed the possibility of a non-linear relationship through the existence of a threshold effect at the level of certain governance indicators, in relation to the economic growth rate of Mali's GDP per capita. Thus, there is no threshold effect for certain WB governance indicators. These include voice and accountability, regulatory quality, corruption control, government effectiveness and the rule of law. Indeed, it should be noted that the relationship between these five governance indicators and the growth rate of gross domestic product per capita is linear.

On the other hand, there is a threshold for political stability of 0.435, i.e., a non-linear relationship between political stability and growth. This threshold indicates that political stability has a positive and significant influence on economic growth in Mali at levels below 0.435, but above this threshold, it has a negative effect on growth.

The other governance variables, notably the state of freedom (political freedom and civil liberty) and democracy represented by the polity2 variable, have a significant influence at the 10% threshold. However, these two variables have a negative impact on GDP per capita growth when their effect is below the respective thresholds of 3.633 and 2.994, but above these thresholds, they have a positive effect on growth. This result indicates that the transition from a state of freedom (political and civil) to less freedom reduces the growth rate of GDP per capita below the indicated thresholds. Note that this reduction is more marked for the civil freedom index. This situation shows that growth rates are relatively higher in countries with more freedom. The democracy variable positively and non-significantly affects economic growth. This positive, non-significant influence of democracy on the growth rate occurred below the threshold of 5.186. But above this threshold, it affects growth negatively. These results confirm those of [21,22,23] and [24,58].

In sum, these results confirm that for a number of these governance indicators, their influence on growth changes when these indicators reach a certain threshold or value.

5. Conclusion

The aim of this article is to determine the influence of institutional factors, and more specifically governance indicators, on GDP per capita growth in Mali over the period 1996-2022. Analysis of the descriptive statistics for the variables of interest shows that governance indicators as a whole are negative on average over the study period. This demonstrates Mali's poor governance performance and its inability to initiate real positive change in terms of improving the quality of its institutions.

The results of the various model estimations reveal that, apart from government effectiveness, which has a negative impact on growth, the other five WB governance indicators, namely "voice and accountability", "political stability", "regulatory quality", "rule of law" and "corruption control", have a positive influence on economic growth in GDP per capita. This result confirms the working hypothesis that governance indicators, in particular those of the World Bank, have an impact on the growth of the Malian economy, even if the majority of their effects are not significant. Among these indicators, only the variables Voice and Responsibility and Political Stability have a positive and significant influence on growth.

Indeed, it should be emphasized that the relationship linking the majority of these governance indicators to the per capita GDP growth rate is linear. However, there is a non-linear relationship between political stability, the state of freedom (political and civil liberty), democracy and the growth rate of GDP per capita in Mali, through the existence of respective thresholds of 0.435; 2.994; 3.633 and 5.186. This non-linear relationship shows that political stability has a positive and significant influence on economic growth in Mali for a level below 0.435, but above this threshold, it affects growth negatively. Also, political freedom and liberty have a negative and significant impact on GDP per capita growth when their effect is below the respective thresholds of 2.994 and 3.633, but above these thresholds, they have a positive effect on growth. The democracy variable positively affects economic growth below the threshold of 5.186.

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