



# Institutional Quality and Economic Growth in Morocco: Unveiling a Nonlinear Nexus

Fahd MOUFID<sup>1</sup>, Faouzi BOUSSEDRA<sup>2</sup>

<sup>1</sup>PhD student

University of Legal, Economic, and Social Sciences -FSJES- in El Jadida  
Chouaib Doukkali University

Research Laboratory in Management, Economics and Social Sciences (LARGESS)

<sup>2</sup>Teacher - researcher

University of Legal, Economic, and Social Sciences -FSJES- in El Jadida  
Chouaib Doukkali University

Research Laboratory in Management, Economics and Social Sciences (LARGESS)

**Abstract:** Institutional quality plays a pivotal role in driving economic development, particularly in emerging economies such as Morocco. Institutional weaknesses, including corruption and government inefficiency, obstruct economic progress and deepen social inequalities. This study explores the impact of institutional quality—measured through the World Governance Indicators (WGI)—on Morocco's economic growth from 1996 to 2022, shedding light on the nonlinear dynamics between governance and economic performance. The analysis employs an econometric approach, integrating both linear and quadratic regressions to assess the influence of institutional indicators on economic growth. The findings reveal a negative short-term relationship between institutional quality and economic performance. However, this relationship follows a nonlinear pattern: initial institutional improvements yield temporary economic gains, while sustained reforms create the conditions for long-term, more substantial growth effects. These results highlight the critical need to deepen institutional reforms, ensuring a more robust governance framework that can unlock sustained economic development and dismantle structural barriers to growth in Morocco.

**Keywords:** Institutional quality; Economic growth; Governance; WGI; Non-linearity.

**Digital Object Identifier (DOI):** <https://doi.org/10.5281/zenodo.15019493>

**Published in:** Volume 4 Issue 2



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## 1. Introduction

The governance of institutions, or institutional quality (IQ), is a central concept in debates on economic and social development, although its interpretation varies among scholars and organizations. The World Bank (1992) adopts a restrictive definition focused on public sector management, while its 2002 version broadens the perspective by incorporating all rules and mechanisms that ensure the proper functioning of markets. This conception has since evolved into a multidimensional approach, as highlighted by Kaufmann, Kraay, and Zoido-Lobaton (1999), who include political, administrative, and legal dimensions, defining governance as "the traditions and institutions by which authority is exercised in a country."

North (1990), on the other hand, emphasizes institutions as "the rules of the game" that structure human interactions. Rodrik et al. (2004) stress the influence of institutions on economic incentives, while Glaeser et al. (2004) highlight their role in shaping incentive structures that foster growth.

Other approaches assess IQ through government performance and anti-corruption efforts. La Porta et al. (1999) associate it with the efficiency of public services and political stability, while Rothstein and Teorell (2008) emphasize bureaucratic impartiality and the absence of clientelism. Finally, from an inclusive perspective, Acemoglu et al. (2001) view institutions as structures that promote economic participation and maximize human potential.

This diversity of definitions illustrates the complexity of the concept and the importance of a contextualized approach to its assessment. In practical terms, indices such as the Worldwide Governance Indicators (WGI) measure institutional quality across various dimensions. This approach is particularly relevant in the Moroccan context, where challenges related to transparency, public administration efficiency, and legal security persist. In this regard, the WGI serves as a crucial tool for evaluating the impact of institutional quality on economic performance. This study thus examines the effects of the three main WGI dimensions—control of corruption, government effectiveness, and rule of law—on Morocco's economic performance, particularly in terms of growth and investment.

## 2. Literature review and hypothesis development

The relationship between institutional quality and economic growth has been widely debated in economic literature. A significant body of research argues that weak institutions, particularly corruption, hinder economic development. Aidt (2009) posits that corruption constitutes a major obstacle to growth, a claim supported by a strong negative correlation between corruption and GDP growth. However, other perspectives suggest that this relationship may be nonlinear. Trabelsi (2024) asserts that a certain degree of tolerance for corruption could, up to an optimal threshold, foster economic growth. Nevertheless, studies such as those by Fisman and Svensson (2007) and Kaufmann et al. (1999) refute any long-term positive relationship between corruption and development.

The complexity of this relationship has also been highlighted by scholars such as Pellegrini and Gerlagh (2004), who identify multiple channels through which corruption affects growth, including reduced investment, inefficient trade and education policies, and political instability. Similarly, Swaleheen (2011) observes that the effect of corruption on growth is nonlinear and strongly influenced by contextual factors, emphasizing the diverse impacts of corruption across different settings.

Although some studies suggest that, in specific contexts, corruption may yield short-term benefits, the majority of the literature agrees that corruption is broadly detrimental to sustainable economic development. Delbianco et al. (2016) argue that while corruption may temporarily boost growth, its long-term negative effects—such as hampering investment and depleting human capital—are predominant. Additionally, Cieslik and Goczek (2018) demonstrate that corruption discourages international investment, a key driver of economic growth, confirming that corruption creates uncertainty that deters foreign investors. Lastly, Chang-Qing and Chun-Ping (2021) assert that

corruption also undermines financial development, a crucial factor for economic growth, particularly in developing countries.

Against this backdrop, this study examines the impact of institutional quality on economic growth in Morocco. It focuses on two key variables: GDP per capita as a measure of economic growth and the Worldwide Governance Indicators (WGI), widely recognized for their methodological robustness and ability to capture various dimensions of governance. The selection of three main WGI components—Control of Corruption (CC), Government Effectiveness (GE), and Rule of Law (RL)—is motivated by their particular relevance to the Moroccan context.

- **Control of Corruption (CC)** is a key determinant of investor confidence, as corruption distorts resource allocation and reduces the effectiveness of economic policies (Jain, 2001).
- **Government Effectiveness (GE)** assesses the ability of institutions to provide public services efficiently and implement economic reforms (Kaufmann et al., 2010).
- **Rule of Law (RL)** reflects the predictability and security of the legal framework, essential for sustaining long-term private investment (Kaufmann et al., 2010).

Building upon previous findings, this study hypothesizes that institutional quality plays a crucial role in fostering economic growth in Morocco. Specifically, corruption, public sector efficiency, and the rule of law are fundamental to investor confidence and economic performance. Accordingly, the study formulates the following hypotheses:

- **H1:** Improvements in institutional quality, as measured by the WGI components, enhance economic growth in Morocco.
- **H2:** The relationship between institutional quality and economic growth follows a quadratic form.

These hypotheses rely on an extensive literature demonstrating that high-quality institutions—by curbing corruption, improving government efficiency, and ensuring legal security—can create an environment conducive to economic growth.

### 3. Research methodology

#### 3.1 Model presentation

To analyse the impact of the different dimensions of institutional quality on economic growth in Morocco, we estimate a series of multiple linear regressions, where each regression separately examines the effect of a specific WGI component on GDP per capita.

The general specification of the model is as follows:

$$GDP_t = \alpha + \beta X_t + \varepsilon_t$$

Where:

- $GDP_t$  represents economic growth measured by real GDP per capita;
- $X_t$  corresponds to one of the components of the WGI (CC: Control of Corruption, GE: Government Effectiveness, RL: Rule of Law);
- $\varepsilon_t$  is the error term, assumed to be normally distributed

We estimate the model using the Ordinary Least Squares (OLS) method, ensuring efficient estimation under the classic assumptions of linearity, no autocorrelation, and homoscedasticity. The model's fit is assessed using the adjusted coefficient of determination ( $R^2$ ), while the overall and individual significance of the coefficients is tested using the F-statistic and t-statistics, respectively. We use the Akaike Information Criterion (AIC) and Schwarz Criterion (BIC) to compare different model

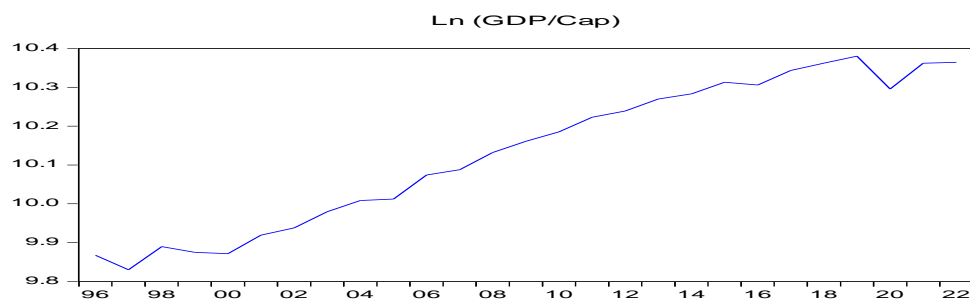
specifications, and we employ the Durbin-Watson (DW) statistic to detect the presence of autocorrelation in the residuals.

### 3.2 Variable analysis

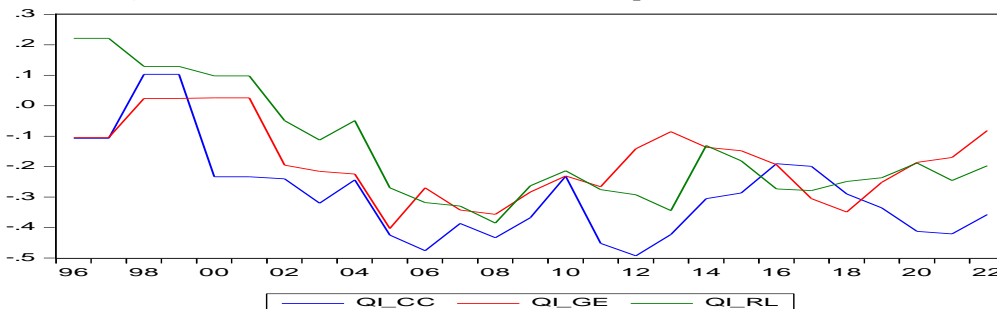
#### 3.2.1 Graphical analysis

This study examines the impact of institutional quality on economic growth in Morocco over the period 1996-2022, corresponding to the availability of the WGI indicators published by the World Bank. This time span allows for the analysis of the evolution of institutions and their influence on the country's economic performance.

The selected variables are the logarithm of GDP per capita ( $\text{Ln}(\text{GDP}/\text{Cap})$ ) to measure economic growth, as well as three components of the WGI – Control of Corruption (CC), Government Effectiveness (GE), and Rule of Law (RL) – which are used to quantify institutional quality.



**Figure 1.** Evolution of Moroccan GDP. (Adapted from (HCP, 2022))



**Figure 2.** Evolution of Institutional Governance (CC, GE, and RL) in Morocco. (Adapted from (Kaufmann et al., 2010))

The evolution of  $\text{Ln}(\text{GDP}/\text{Cap})$  in Morocco between 1996 and 2022 reveals a generally upward trend, with several distinct phases. The period from 1996 to 2000 is marked by moderate growth, reflecting the structural adjustments of the preceding years. From 2000 to 2008, the economy experiences sustained expansion, driven by increased public investment and a favourable macroeconomic environment. The impact of the global financial crisis in 2009 leads to a temporary slowdown, followed by a moderate recovery until 2019. The Covid-19 pandemic in 2020 causes a sharp contraction, but growth resumes in 2021-2022, although the momentum seems to wane towards the end of the period (Boussedra and Moufid, 2022).

The indices for Control of Corruption (CC), Government Effectiveness (GE), and Rule of Law (RL) reflect the institutional dynamics in Morocco. Until 2008, their trend is generally negative, indicating challenges related to corruption, government effectiveness, and the rule of law. Between 2008 and 2015, fluctuations are observed, reflecting the mixed effects of the reforms undertaken. After 2016, a gradual improvement emerges, suggesting institutional advancements, although the levels remain relatively low

compared to international standards. This trajectory underscores the importance of a robust institutional framework in ensuring an economic climate conducive to growth.

### 3.2.2 Analysis of the statistical characteristics of the variables

After examining the dynamic evolution of the studied variables, a descriptive statistical analysis provides a clearer understanding of their distribution and key characteristics. The following table summarizes the key indicators for the variables of interest:

**Table 1.** Descriptive statistics of the variables. (Author)

	<b>LN_GDP_Cap</b>	<b>QI_CC</b>	<b>QI_GE</b>	<b>QI_RL</b>
<b>Mean</b>	10,13235	-0,28759	-0,18314	-0,14761
<b>Median</b>	10,16096	-0,305043	-0,193648	-0,213534
<b>Maximum</b>	10,38079	0,103346	0,026066	0,221231
<b>Minimum</b>	9,829689	-0,49313	-0,403398	-0,385673
<b>Standard Deviation</b>	0,188009	0,15481	0,122751	0,181946
<b>Skewness</b>	-0,205862	1,048142	0,214203	0,823082
<b>Kurtosis</b>	1,552391	3,803208	2,272194	2,364326
<b>Jarque-Bera</b>	2,548224	5,669491	0,802388	3,503181
<b>Observations</b>	27			

Economic growth, measured by the logarithm of GDP per capita, exhibits a consistent and moderate trajectory with a mean of 10.13 and low dispersion (standard deviation of 0.19). The negative skewness indicates a concentration of values towards the upper end, while the low maximum value (10.38) reflects the impact of recent policies. In contrast, the minimum value (9.83) is linked to the challenges of the Structural Adjustment Program.

Regarding institutional quality, the governance indices (QI\_CC, QI\_GE, QI\_RL) reveal low scores (averages around -0.20), reflecting persistent institutional challenges. The moderate standard deviations (ranging from 0.12 to 0.18) and the positive skewness suggest a slight tendency towards improvement, although this trend is marginal. The maximum values reflect periods of improvement, while the minimum values are associated with phases of institutional regression. These findings emphasize the need for more robust governance to support economic development.

### 3.2.3 Analysis of the Correlation matrix

The analysis of the correlation matrix highlights the interdependencies between the economic and institutional dimensions:

**Table 2.** Correlation matrix of the variables. (Author)

	<b>LN_GDP_Cap</b>	<b>QI_CC</b>	<b>QI_GE</b>	<b>QI_RL</b>
<b>LN_GDP_Cap</b>	1	-0,532827	-0,391782	-0,752274
<b>QI_CC</b>	-0,532827	1	0,56491	0,779712
<b>QI_GE</b>	-0,391782	0,56491	1	0,71432
<b>QI_RL</b>	-0,752274	0,779712	0,71432	1

The institutional indices (QI\_CC, QI\_GE, QI\_RL) exhibit negative correlations with GDP. Specifically, the rule of law (QI\_RL) is negatively correlated with GDP per capita (-0.75), suggesting that institutional advancements do not immediately lead to increased growth, which may reflect specific structural

challenges. Furthermore, the indices related to governance effectiveness (-0.39) and control of corruption (-0.53) indicate that institutional improvement is necessary for better public resource allocation. Finally, the governance indices show moderate to strong positive correlations among themselves (0.56 to 0.78), indicating an interdependence between these dimensions. Improving one of these components typically leads to progress in the others, indicating a more cohesive governance structure.

#### 4. Results and discussion

##### 4.1 Impact of the CC component (Control of Corruption)

The analysis of the linear regression between the logarithm of GDP per capita and the control of corruption component (CC) revealed a negative and significant relationship:

**Table 3.** EViews Results of the Ln GDP/CC Regression. (Author)

Dependent Variable: LN_GDP_Cap				
Method: Least Squares				
Sample: 1996 2022				
Included observations: 27				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.94625	0.06685	148.78150	0.00000
QI_CC	-0.64709	0.20554	-3.14827	0.00420
R-squared	0.28391	Mean dependent variable		10.13235
Adjusted R-squared	0.25526	S.D. dependent variable		0.18801
S.E. of regression	0.16225	Akaike info criterion		-0.72819
Sum squared resid	0.65812	Schwarz criterion		-0.63220
Log likelihood	11.83051	Hannan-Quinn criterion		-0.69964
F-statistic	9.91157	Durbin-Watson statistic		0.29020
Prob. (F-statistic)	0.004217			

The estimated coefficient for CC is -0.64709, with a probability of 0.00420, making it significant at the 1% level. This suggests that a one-unit increase in the control of corruption is associated with a decrease of 0.64709 units in the logarithm of GDP per capita. However, this relationship is counterintuitive, as the dominant economic literature typically supports a positive correlation between corruption control and economic growth.

The regression model equation is as follows:

$$\text{LN\_GDP\_Cap} = 9.94625 - 0.64709 * \text{QI\_CC}$$

The adjusted R<sup>2</sup> is 0.25526, indicating that the model explains approximately 25.5% of the variability in GDP per capita. The low value of the Durbin-Watson statistic (0.29020) suggests the presence of residual autocorrelation, which may indicate an incomplete model specification. Furthermore, the information criteria (AIC, BIC, Hannan-Quinn) show that the model provides a relatively satisfactory fit.



#### 4.2 Impact of the GE Component (Government Effectiveness)

The results of the linear regression between the logarithm of GDP per capita and government effectiveness (QI\_GE) reveal a significant negative relationship, with a coefficient of -0.600065 and a probability of 0.0433, making it significant at the 5% threshold. This finding contradicts economic theories, which posit that an improvement in government effectiveness should stimulate growth.

**Table 4.** EViews Results of the Ln GDP/GE Regression. (Author)

Dependent Variable : LN__GDP_Cap				
Method : Least Squares				
Sample : 1996 2022				
Included observations : 27				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.02245	0.061780	162.2286	0.0000
QI_GE	-0.600065	0.281838	-2.129117	0.0433
R-squared	0.153493	Mean dependent variable		10.13235
Adjusted R-squared	0.119633	S.D. dependent variable		0.188009
S.E. of regression	0.176405	Akaike info criterion		-0.560881
Sum squared resid	0.777969	Schwarz criterion		-0.464893
Log likelihood	9.571889	Hannan-Quinn criterion		-0.532338
F-statistic	4.533140	Durbin-Watson statistic		0.142843
Prob. (F-statistic)	0.043275			

The regression model equation is as follows:

$$\text{LN\_GDP\_Cap} = 10.02245 - 0.600065 * \text{QI\_GE}$$

The adjusted R<sup>2</sup> of 0.119633 is relatively low, indicating that only 11.96% of the variability in GDP per capita is explained by government effectiveness. The low adjusted R<sup>2</sup> suggests that a better model specification may be needed to capture other factors influencing economic growth. The Durbin-Watson statistic (0.142843) also indicates the presence of positive autocorrelation in the residuals, reinforcing the notion of an incomplete specification.

#### 4.3 Impact of the Rule of Law Component (RL)

The regression of the logarithm of GDP per capita on the Rule of Law indicator (QI\_RL) reveals a negative and significant relationship, with an estimated coefficient of -0.777342. This result indicates that an increase in the respect for the rule of law is associated with a reduction in GDP per capita, which contradicts theoretical expectations, where a stronger rule of law is generally anticipated to foster economic growth.

**Table 5.** EViews Results of the Ln GDP/RL Regression. (Author)

Dependent Variable : LN__PIB_HAB				
Method : Least Squares				
Sample : 1996 2022				
Included observations : 27				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.01761	0.031543	317.5828	0.0000
QI_RL	-0.777342	0.136161	-5.708994	0.0000
R-squared	0.565917	Mean dependent variable		10.13235
Adjusted R-squared	0.548553	S.D. dependent variable		0.188009

S.E. of regression	0.126323	Akaike info criterion	-1.228762
Sum squared resid	0.398938	Schwarz criterion	-1.132774
Log likelihood	18.58829	Hannan-Quinn criterion	-1.200220
F-statistic	32.59262	Durbin-Watson statistic	0.288175
Prob. (F-statistic)	0.000006		

The regression model equation is as follows:

$$\text{LN\_GDP\_Cap} = 10.01761 - 0.777342 * \text{QI\_RL}$$

The model explains 56.59% of the variability in GDP per capita, as indicated by the  $R^2$  of 0.565917, a relatively high result suggesting that the rule of law is a key factor in explaining economic growth. However, the Durbin-Watson statistic (0.288175) again indicates the presence of residual autocorrelation, suggesting a possible incorrect specification of the model. The information criteria (AIC, BIC, Hannan-Quinn) indicate that the model fits the data well.

#### 4.4 Comparison of the three governance components

The regression analysis reveals that the model incorporating the rule of law indicator (QI\_RL) provides the best explanatory power for economic growth, with an adjusted  $R^2$  of 0.5486, significantly surpassing the models using corruption control (QI\_CC, 0.2553) and government effectiveness (QI\_GE, 0.1196). This result suggests that the rule of law is the most influential institutional dimension in explaining the variability of GDP per capita.

The model selection criteria (AIC, BIC, HQ) further confirm this superiority, with the QI\_RL model displaying the most optimal scores (AIC = -1.2288, BIC = -1.1328, HQ = -1.2002), demonstrating its superior parsimony. However, the Durbin-Watson statistic reveals positive autocorrelation of residuals across all specifications, suggesting potential specification issues that may require the inclusion of additional variables or a reformulation of the model.

In conclusion, these findings highlight the predominant role of the rule of law in explaining Morocco's economic performance, while other institutional dimensions appear to play a less significant role in this empirical framework.

#### 4.5 Non-linear effect of the RL component

The assessment of the quadratic impact of the rule of law (QI\_RL) on economic growth allows for the examination of whether its effect varies according to its level. The estimation of a model incorporating a quadratic term confirms the previously observed negative relationship, while suggesting a non-linear dynamic:

**Table 6.** EViews Results of the Non-Linear Effect of RL Regression. (Author)

Dependent Variable : LN_PIB_HAB_				
Method : Least Squares				
Sample : 1996 2022				
Included observations : 27				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.06927	0.041070	245.1705	0.0000
QI_RL	-1.018335	0.184039	-5.533268	0.0000
QI_RL_SQUARED	-1.625433	0.878588	-1.850052	0.0767
R-squared	0.620096	Mean dependent variable	10.13235	



Adjusted R-squared	0.588437	S.D. dependent variable	0.188009
S.E. of regression	0.120614	Akaike info criterion	-1.288005
Sum squared resid	0.349145	Schwarz criterion	-1.144023
Log likelihood	20.38807	Hannan-Quinn criterion.	-1.245192
F-statistic	19.58689	Durbin-Watson statistic	0.219745
Prob. (F-statistic)	0.000009		

The regression model equation is as follows:

$$\text{LN\_PIB\_HAB} = 10.06927 - 1.018335 * \text{QI\_RL} - 1.625433 * \text{QI\_RL\_SQUARED}$$

The results show that the variable QI\_RL remains highly significant (coefficient = -1.0183,  $p = 0.0000$ ), indicating a robust negative relationship between the rule of law and economic growth. The inclusion of the quadratic term, QI\_RL\_SQUARED, although marginally significant (coefficient = -1.6254,  $p = 0.0767$ ), suggests that the negative effect of the rule of law intensifies as its level deteriorates. However, this non-linearity remains moderate and does not reach the 5% significance threshold, indicating a trend rather than a systematic effect.

The inclusion of the quadratic term slightly improves the model fit (adjusted  $R^2 = 0.5884$ , compared to 0.5658 for the linear model). Furthermore, the information criteria (AIC = -1.2880, BIC = -1.1440) suggest a better overall specification.

The Ramsey RESET test<sup>1</sup> confirms the relevance of this specification, with a t-statistic of 2.7345 and an F-statistic of 7.4773 ( $p = 0.0118$ ), validating the inclusion of the quadratic term. Moreover, the log-likelihood test ( $p = 0.0058$ ) further supports this conclusion, emphasizing that accounting for the non-linear effect enhances the understanding of the relationship between the rule of law and economic growth.

## 5. Conclusion

The results of the linear regressions challenge the initial hypotheses by highlighting a negative relationship between the three components of global governance (CC, GE, and RL) and economic growth. Although counterintuitive, this observation is consistent with economic literature, which suggests that, under certain conditions, a dysfunctional institutional framework can exert a “lubricating” effect on economic activity.

In institutionally fragile environments, corruption and the lack of a strict rule of law can paradoxically stimulate short-term economic activity by reducing bureaucratic rigidities and accelerating certain administrative processes, thus facilitating immediate investment and trade exchanges (Aidt, 2009). However, this dynamic remains unsustainable in the medium and long term, as it undermines the viability of investments and hinders economic development. Mendez and Sepulveda (2006) highlight a non-linear relationship between corruption, growth, and investment, suggesting that a low level of corruption can, under certain conditions, generate positive effects, but beyond a critical threshold, it becomes a major obstacle to development. Similarly, Trabelsi (2024) identifies an optimal threshold beyond which corruption significantly impedes economic growth.

In the case of Morocco, a non-linear effect may explain the observed negative relationship between governance and economic growth. In the short term, fragile institutions may appear to offer flexibility

<sup>1</sup> See Appendix

by reducing certain administrative constraints, but these immediate gains are unsustainable. In the long term, an unstable institutional environment leads to increasing inefficiency in investments, slows economic development, and heightens uncertainty for economic agents. These results thus confirm the conclusions of the literature, which assert that quality governance remains a key lever for ensuring sustained and inclusive growth.

To deepen the analysis of institutional dynamics over the long term, it is essential to adopt an econometric approach based on autoregressive models. These models will allow for the examination of interactions between institutional quality and economic growth by incorporating dynamic effects and gradual adjustments over time. By capturing delayed responses to institutional shocks and modelling causal relationships, these approaches will provide a more robust analytical framework for understanding the impact of institutions on the trajectory of economic growth.

#### Appendix

##### EViews Results of the RESET Test for the RL Component

Ramsey RESET Test				
Specification: LN_PIB_HAB C QI_RL QI_RL_SQUARED				
Omitted Variables: Squares of fitted values				
	Value	df	Probability	
t-statistic	2.734470	23	0.0118	
F-statistic	7.477326	(1, 23)	0.0118	
Likelihood ratio	7.600198	1	0.0058	
F-test summary :				
	Sum of Sq.	df	Mean Squares	
Test SSR	0.085660	1	0.085660	
Restricted SSR	0.349145	24	0.014548	
Unrestricted SSR	0.263486	23	0.011456	
LR test summary :				
	Value			
Restricted LogL	20.38807			
Unrestricted LogL	24.18817			
Dependent Variable : LN_PIB_HAB				
Method : Least Squares				
Sample : 1996 2022				
Included observations : 27				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-482.1508	180.0057	-2.678531	0.0134
QI_RL	97.90155	36.17553	2.706292	0.0126
QI_RL_SQUARED	154.6333	57.14939	2.705774	0.0126
FITTED^2	4.853998	1.775115	2.734470	0.0118
R-squared	0.713302	Mean dependent variable		10.13235
Adjusted R-squared	0.675906	S.D. dependent variable		0.188009
S.E. of regression	0.107032	Akaike info criterion		-1.495420

Sum squared resid	0.263486	Schwarz criterion	-1.303444
Log likelihood	24.18817	Hannan-Quinn criterion	-1.438335
F-statistic	19.07455	Durbin-Watson statistic	0.622141
Prob. (F-statistic)	0.000002		

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