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Dynamic Analysis of the Relationship Between Governance and Economic Growth in Algeria: An Empirical Study Using the Harvey Unobserved Components Model (UCM), 2000–2024

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Abstract. This study aims to analyze the relationship between governance and economic growth in Algeria over the period 2000–2024. The study utilizes Harvey's Unobserved Components Model (UCM) to separate the long-term trend from short-term fluctuations. Governance is measured using Kaufmann's Worldwide Governance Indicators (WGI), which include government effectiveness, political stability, regulatory quality, rule of law, control of corruption, and voice and accountability. The results reveal a limited role for most governance indicators in explaining economic growth, with the exception of regulatory quality, which exerts a positive and statistically significant impact. Additionally, the findings show that control of corruption has a positive effect, albeit at a lower significance level, whereas the remaining indicators show no statistically significant impact. The results also indicate that growth dynamics in Algeria are influenced by long-term structural shocks and short-term fluctuations. Robustness checks confirm the stability of the regulatory quality results across two different sub-periods. Furthermore, model diagnostic tests support the adequacy of the estimation, indicating that the residuals are free from autocorrelation and normally distributed. The study highlights the importance of enhancing the regulatory framework as a key entry point to support economic growth in Algeria.
Keywords: Governance, Economic Growth, Unobserved Components Model, Harvey Model, Regulatory Quality, Institutional Economics.
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I- Introduction:

Economic growth has been a cornerstone of public policy in Algeria, particularly since the turn of the millennium. This focus has been closely linked to the expanding debate on institutional reforms, where the role of governance has emerged as a key determinant of economic performance. Between 2000 and 2024, the Algerian economy underwent recurrent transformations, heavily influenced by oil price volatility and shifting fiscal trajectories. These dynamics were accompanied by continuous efforts to strengthen institutional frameworks to sustain growth and ensure macroeconomic stability. Indeed, governance plays a pivotal role in shaping economic pathways, as it directly impacts the

efficiency of public policies, enhances the investment climate, stabilizes economic expectations, and defines the institutional framework for economic decision-making.

Kaufmann's Worldwide Governance Indicators (WGI) provide a quantitative assessment of institutional quality across multiple dimensions, including government effectiveness, political stability, regulatory quality, the rule of law, control of corruption, and voice and accountability. These indicators enable an empirical, quantifiable analysis of the relationship between governance and economic growth. However, despite the availability of time-series data for both economic growth and governance indicators in Algeria, empirical literature on this nexus remains limited. Most existing studies rely on traditional econometric models that fail to decompose the long-term growth trend from short-term fluctuations, thereby complicating the identification of the true impact of governance.

To address this methodological limitation, this study utilizes Harvey's Unobserved Components Model (UCM). This approach explicitly distinguishes between the long-term trend and transitory shocks, offering a deeper understanding of growth dynamics and providing a more precise framework to analyze the role of governance in the Algerian economy.

Research Problem

This study addresses a core research problem regarding the extent to which Kaufmann's governance indicators influence economic growth in Algeria during the period 2000–2024, while explicitly accounting for the distinction between the long-term trend and short-term fluctuations using the UCM framework. Accordingly, the central research question is formulated as follows:

Do governance indicators contribute to explaining the long-term trend of economic growth in Algeria, or is their impact confined to short-term fluctuations?

Research Hypothesis

To answer the research question, the following hypothesis is proposed:

"Governance indicators exert heterogeneous effects on economic growth in Algeria during the period 2000–2024. While some governance dimensions influence the long-term growth trend, others affect only short-term economic fluctuations."

Research Objectives

The significance of this study stems from its multi-dimensional contribution to both empirical literature and macroeconomic policy formulation in Algeria. Subject-wise, it addresses a critical gap by providing a comprehensive, updated evaluation of the governance-growth nexus during a highly volatile period (2000–2024), marked by structural transitions and oil price shocks. Methodologically, the study departs from traditional, static econometric approaches by pioneer-introducing Harvey's Unobserved Components Model (UCM) to this specific context. This framework offers unique analytical value, as it successfully isolates the unobserved long-term trend of growth from transitory, short-term cyclical components, allowing for a more nuanced and accurate identification of which governance dimensions genuinely drive sustainable development versus those that merely react to short-term shocks. Ultimately, by shifting the analytical

lens toward structural dynamics, this study provides actionable, evidence-based insights for policymakers in Algeria, helping to design targeted institutional reforms and identify key regulatory entry points capable of fostering long-term, resilient economic growth.

1. The theoretical framework of the study

1.1 Governance (Kaufmann Indicators) and Economic Growth

The relationship between governance and economic growth has garnered increasing attention in contemporary economic literature, driven by a growing recognition of the role that institutions play in explaining cross-country differentials in economic performance. The New Institutional Economics (NIE) pioneered this paradigm shift. Notably, institutions represent the "rules of the game" that shape economic incentives and dictate the efficiency of resource allocation (North, 1990). In the same vein, variations in institutional quality serve as a primary explanatory factor for international differences in productivity and output per worker (Hall and Jones, 1999, p. 95).

Empirical literature has substantially reinforced these theoretical premises by demonstrating a direct impact of governance on economic growth. Institutional quality constitutes the fundamental cause of long-run differences in economic development across countries (Acemoglu et al., 2001, p. 1370). Furthermore, robust institutions are essential for sustaining long-term economic growth, outweighing geographic or cultural factors (Acemoglu et al., 2005, p. 389). Similarly, institutions exert a dominant influence on economic growth, prevailing over integration (trade) and geography (Rodrik et al., 2004, p. 132).

Within this framework, the Worldwide Governance Indicators (WGI) have emerged as one of the most widely utilized instruments for quantifying institutional quality globally. These indicators encompass six core dimensions: government effectiveness, regulatory quality, political stability and absence of violence/terrorism, rule of law, control of corruption, and voice and accountability (Kaufmann et al., 2010, p. 4). A strong positive correlation exists between institutional improvements and higher levels of per capita income and economic growth (Kaufmann and Kraay, 2002, p. 172).

However, the literature indicates that the effects of these governance dimensions are far from homogeneous. The rule of law and property rights protection contribute directly to stimulating investment and productivity growth (Knack and Keefer, 1995, p. 220). Furthermore, corruption acts as a severe impediment to economic growth by dampening both private and public investment (Mauro, 1995, p. 690). Aligning with this view, high-quality institutional regimes minimize transaction costs and enhance market efficiency (Aidt et al., 2008, p. 201).

On a regional level, the impact of governance often interacts with country-specific structural characteristics. The effect of governance in the Middle East and North Africa (MENA) region is heavily conditioned by the nature of rentier economies and their level of reliance on oil revenues (Mehanna et al., 2010, p. 128). Conversely, there is a positive and statistically significant impact of governance on economic growth across African nations,

primarily channeled through enhanced government effectiveness and institutional stability (Fayissa and Nsiah, 2013, p. 96).

In recent years, the academic debate has shifted toward analyzing the asymmetric and heterogeneous effects of governance indicators. The impact of governance varies significantly across Asian economies depending on their baseline economic and institutional profiles (Huang and Ho, 2017, p. 266). Additionally, a bidirectional causal relationship exists between governance and economic growth, suggesting that superior economic performance can, in turn, facilitate institutional capacity building (Boţa-Avram et al., 2018, p. 7).

Similarly, institutional optimization yields positive growth dividends in the MENA region (Boukhatem and Moussa, 2018, p. 229). More recently, governance quality remains a critical determinant of future economic growth, particularly for economies actively seeking to diversify their growth engines and reduce dependence on natural resources (Lopes et al., 2023, p. 178).

Despite this rich body of knowledge, empirical evidence remains inconclusive regarding which specific dimension of governance holds the greatest sway over economic growth. Results continue to vary based on the structural nature of the economy under study, the time horizon, and the econometric methodologies deployed. This lingering ambiguity underscores the vital importance of continuing research into this nexus, particularly within the context of resource-dependent rentier economies such as Algeria.

1.2 Applications of the Unobserved Components Model (UCM) in Developing Countries

Unobserved Components Models (UCM) have undergone significant development since the pioneering work of Harvey (1989), who introduced a flexible framework for time-series analysis by decomposing series into latent components, including the long-term trend, cyclical movements, and random fluctuations. A defining characteristic of these models is their capacity to distinguish between permanent structural changes and transitory shocks, making them highly suitable for investigating economic growth.

Crucially, UCM frameworks provide a more realistic alternative to traditional detrending methods because they allow the long-term trend to vary stochastically over time rather than assuming a deterministic path (Harvey and Jaeger, 1993, p. 233). Furthermore, these models offer powerful tools for extracting latent economic signals and understanding the underlying dynamics of macroeconomic time series (Harvey and Koopman, 2000, p. 86).

Empirical literature has widely adopted this methodology to analyze economic growth and business cycles. For instance, the cyclical component of US economic activity was successfully estimated using an unobserved components framework (Clark, 1987, p. 801). Subsequent econometric advancements demonstrated that UCM specifications yield highly precise estimates of long-term trends compared to conventional detrending approaches (Morley et al., 2003, p. 1087).

In the context of developing countries, the relevance of these models is further amplified due to the frequent exposure of these economies to external shocks and profound structural

transformations. Consequently, several studies have leveraged the state-space framework to estimate potential output and output gaps in emerging markets. These applications have confirmed the robust capacity of the UCM approach to capture structural shifts driven by economic reforms and external volatility (Durbin and Koopman, 2012, p. 18).

Moreover, this methodological framework has been increasingly employed to study the nexus between institutional variables and economic growth by decomposing long-term structural impacts from short-term dynamics. Literature underscores that this decomposition capacity represents a primary econometric advantage over traditional regression models, which typically impose time-invariant relationships (Commandeur and Koopman, 2007, p. 122).

Despite the widespread proliferation of UCM configurations in macroeconomic research, their application to analyzing the impact of governance on economic growth remains remarkably scarce, particularly within developing and rentier economies. The vast majority of governance-related empirical studies continue to rely on panel data configurations or traditional dynamic regression models. In contrast, Harvey's unobserved components framework is rarely utilized to examine the long-term structural effects of governance indicators.

1.3 Positioning of the Current Study within the Literature

The current study is situated at the intersection of two primary strands in contemporary economic literature. The first strand comprises empirical investigations that evaluate the nexus between governance and economic growth using Kaufmann's Worldwide Governance Indicators (WGI). The second strand encompasses macroeconomic literature focusing on Unobserved Components Models (UCM) to analyze economic growth dynamics.

Despite the extensive volume of research exploring the impact of governance on economic growth, the vast majority of existing studies rely on cross-sectional data or international panel data configurations. Consequently, these approaches tend to estimate the average global or regional impact of governance without explicitly disentangling long-term structural trends from short-term transitory fluctuations (Gani, 2011; Fayissa & Nsiah, 2013; Lopes et al., 2023). Furthermore, empirical literature targeting the Middle East and North Africa (MENA) region remains relatively scarce, particularly regarding the Algerian economy, which exhibits unique structural characteristics as a rentier economy heavily reliant on hydrocarbon revenues.

On the other hand, the methodological literature utilizing UCM frameworks has predominantly focused on analyzing business cycles or estimating potential output. Conversely, these models have seldom been deployed to explore the direct influence of institutional and governance variables on economic trajectories (Harvey, 1989; Harvey & Koopman, 2000; Durbin & Koopman, 2012).

Against this background, the current study seeks to address two critical research gaps. The first gap is the scarcity of country-specific empirical studies investigating the individual effects of various governance dimensions on economic growth in Algeria, particularly using

recent data extending through 2024. The second gap resides in the limited deployment of Harvey's Unobserved Components Model to analyze the governance-growth relationship by separating the long-term trend from short-term fluctuations.

Accordingly, this study provides a dual contribution—both methodological and empirical. Methodologically, it utilizes the Harvey UCM framework to estimate the dynamic, time-varying impact of governance indicators on economic growth. Empirically, it delivers fresh insights into the governance-growth nexus in Algeria, identifying which governance dimensions are structurally capable of explaining the long-term economic growth trajectory. This, in turn, provides a robust scientific foundation for formulating more effective institutional reform policies.

2. Methodology

2.1 Mathematical Framework of Harvey's Unobserved Components Model (UCM)

The structural time series model provides a flexible framework for analyzing time series by decomposing an observed series into its fundamental latent components. The general mathematical formulation of the structural model can be expressed as follows (Harvey, 1989, pp. 10–11):

$$yt = \mu t + \gamma t + \psi t + \sum j = 1 m \beta j x j t + \grave{o} t, t = 1, \ldots, n$$

where:

- **yt** : denotes the observed value of the time series at time (t).
- **μt** : represents the trend component, capturing the long-term evolution of the series.
- **γt** : denotes the seasonal component, reflecting regular recurring patterns.
- **ψt** : represents the cyclical component, capturing medium-term economic fluctuations.
- $\sum_{j=1}^{m} \beta_j x_{jt}$: represents the regression effects, corresponding to the contribution of explanatory variables.
- varepsilon_t is the irregular disturbance term. State Space Framework

Unobserved Components Models (UCM) are formulated as a specific case of the more general and robust state-space framework. This mathematical framework consists of two primary equations:

The Observation Equation: This equation links the observed time series **(y_t)** to the unobserved state vector **(α_t)** (Pelagatti, 2015, pp. 85–90):

$$y_t = Z_t \alpha_t + \grave{o}_t$$

The State Equation: This equation describes how the unobserved state vector **(α_t)** evolves stochastically over time (Durbin and Koopman, 2012, pp. 8–10):

$$\alpha_t + 1 = T_t \alpha_t + R_t \eta_t$$

where:

- η_t represents the state disturbances.

- Mathematical Specification of the Main Components

Each unobserved component is governed by its own distinct transitional equations. For instance, within the Basic Structural Model (BSM), the primary components are specified as follows:

First: Trend Component (μ_t)

The trend is typically modeled as a Local Linear Trend (LLT), which allows both the level (μ_t) and the slope (β_t) of the trend to vary stochastically over time. This dynamic behavior is expressed as follows (West and Harrison, 1999, pp. 48–51):

$$\mu_t = \mu_t - 1 + \beta_{t-1} + \eta_t, \eta_t \sim N(0, \sigma_\eta^2)$$

$$\beta_t = \beta_{t-1} + \zeta_t, \zeta_t \sim N(0, \sigma_\zeta^2)$$

Here η_t and ζ_t are independent random disturbances (noise terms)

Second: Seasonal Component γ_t (Harvey, 2001)

One of the most common approaches to modeling seasonality is the **dummy variable formulation**, which can be expressed as follows:

$$\gamma_t = -\sum_{j=1}^{s-1} \gamma_{t-j} + \omega_t, \omega_t \sim N(0, \sigma_\omega^2)$$

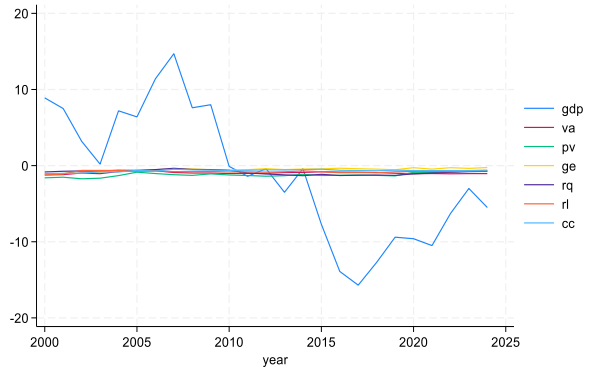
Where s denotes the length of the seasonal period.

2.2 Data Description (2000–2024)

Prior to estimating the econometric model, this section reviews the fundamental descriptive statistics of the variables under consideration for the period 2000–2024. The objective is to evaluate the distributional characteristics, central tendencies, and degree of dispersion of the series, thereby establishing the empirical context of the variables. The descriptive statistical properties are summarized in the table below:

Table 1. Descriptive Statistics of the Study Variables

Var	Obs	Mean	Std. dev.	Min	Max
gdp	25	-1	8.480075	-15.7	14.7
va	25	-.9588	.1343602	-1.22	-.67
pv	25	-1.2032	.2779646	-1.73	-.69
ge	25	-.532	.2150581	-1.08	-.25
rq	25	-.88	.2947032	-1.32	-.35
rl	25	-.8056	.1382052	-1.23	-.63
cc	25	-.6672	.1554166	-1.04	-.47



Source: Authors' calculations based on Stata 19.2 output.

The descriptive statistics reveal that the mean values for all governance indicators are negative, with political stability and absence of violence (PV) recording the lowest average (-1.2032), while government effectiveness (GE) registered the highest average (-0.532). Regarding dispersion, the economic growth rate (GDP) exhibits the highest standard deviation (Std. Dev. = 8.480), reflecting relatively high volatility compared to the remaining variables. Conversely, the governance indicators demonstrate low standard deviations, ranging between 0.134 and 0.295, which indicates relative homogeneity within

their respective series. Furthermore, the minimum and maximum values underscore the degree of internal variance across the variables; GDP displays the widest range (from -15.7\% to 14.7\%), whereas the governance indicators are distributed within narrower bounds, reflecting a state of relative stability over the studied horizon.

2.2 Stationarity Testing

Although Harvey's Unobserved Components Model (UCM) possesses a distinct econometric advantage in handling non-stationary time series directly within its state-space framework without requiring differencing, conducting unit root tests remains essential. These tests are performed to empirically detect the presence of a unit root and identify the integration order of the variables. The table below presents the empirical results of the Phillips-Perron (PP) unit root test for the six governance indicators and the economic growth rate over the period 2000–2024:

Table 2. Phillips–Perron (PP) Unit Root Test Results for the Study Variables

Variable	Test Statistic (Z(t))	Critical Value (5%)	MacKinnon p-value	Result
Va	-2.646	-3.000	0.0838	Stationary at 10%
Pv	-1.479	-3.000	0.5439	Non-stationary
Ge	-2.760	-3.000	0.0643	Stationary at 10%
Rq	-1.252	-3.000	0.6507	Non-stationary
Rl	-4.041	-3.000	0.0012	Stationary at 1%
Cc	-2.797	-3.000	0.0587	Stationary at 10%
Gdp	-1.468	-3.000	0.5495	Non-stationary

Source: Authors' calculations based on Stata 19.2 output.

The empirical results of the Phillips-Perron (PP) unit root test, as summarized in the table above, reveal notable heterogeneity in the integration properties of the variables under study. Specifically, the rule of law (*RL*) indicator is found to be stationary at the level, demonstrating statistical significance at the 1% level. Meanwhile, voice and accountability (*VA*), government effectiveness (*GE*), and control of corruption (*CC*) exhibit stationarity at the level at a 10% significance level. Conversely, political stability (*PV*), regulatory quality (*RQ*), and the economic growth rate (*Growth*) are found to be non-stationary (possessing a unit root) at conventional significance levels.

This divergence in the orders of integration provides strong empirical justification for employing Harvey's Unobserved Components Model (UCM) framework. Unlike traditional regression configurations that strictly require non-stationary variables to be transformed via first-differencing—a process that often eliminates valuable long-term structural information—the state-space formulation of the UCM directly handles non-stationary time series. Consequently, this methodology preserves the critical long-term relationship and dynamics between governance dimensions and economic growth in Algeria.

3. Model Estimation and Discussion of Results

3.1 Estimation of the Baseline Model

To establish a benchmark for analysis, the unobserved components model for economic growth in Algeria was estimated within a state-space framework following Harvey's methodology. In this baseline specification, real gross domestic product (GDP) growth is modeled as a composite of a latent (unobserved) structural trend and an irregular random component. The structural trend is modeled as a Stochastic Random Walk process, allowing it to adapt dynamically to permanent structural shocks. The model estimation and the extraction of the latent components were executed using the Kalman Filter algorithm via maximum likelihood estimation.

The empirical properties of the estimated baseline structural model are summarized in the table below:

Table 3. Long-Term Trend Analysis of Economic Growth in Algeria Using Harvey's Unobserved Components Model

growth	Coefficient	Std. err.	Z	P>z	[95% conf.	interval]
var(slope)	6.13089	4.70018	1.30	0.096	0	15.34307
var(growth)	5.038201	2.762141	1.82	0.034	0	10.4519

Source: Authors' calculations based on Stata 19.2 output.

The Unobserved Components Model (UCM) was estimated to analyze the dynamics of economic growth in Algeria and identify its primary sources of volatility—specifically differentiating between long-term structural trend shocks and short-term irregular disturbances. The estimation utilized annual time-series data from 2000 to 2024 (a total of 25 observations) under a stochastic trend specification *ucm growth, model(strend)*,with the maximum iterations preset to 100 to ensure numerical convergence.

The estimation achieved convergence rapidly after only 8 iterations, with the log-likelihood function stabilizing at -71.0777. This swift convergence indicates excellent model stability and parameter optimization. To evaluate the model's performance and facilitate comparison with alternative specifications, the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC) were computed, yielding values of 146.1556 and 148.5933, respectively. These criteria serve as an empirical benchmark for model selection, balancing explanatory power against parsimony (Harvey, 1989, pp. 48–50).

The core contribution of the UCM framework lies in decomposing the variance components to isolate latent economic signals. The empirical results for the variance parameters are detailed below:

The variance of the trend slope was estimated at 6.1309 and found to be statistically significant at the 10% level (z = 1.30$, p = 0.096). This significant variance confirms that the long-term structural trend of Algerian economic growth is time-varying rather than deterministic, capturing the profound impact of long-run structural economic transformations.

The variance of the irregular random component was estimated at 5.0382, exhibiting statistical significance at the 5% level (z = 1.82, p = 0.034). This reflects the persistent

presence of substantial short-term cyclical fluctuations around the long-run path, driven by transitory macroeconomic shocks.

Overall, these findings reveal that economic growth dynamics in Algeria are shaped by a combination of permanent structural shocks and temporary random disturbances, with structural shifts exercising a slight dominance over the growth trajectory. Furthermore, the diagnostics confirm that the underlying growth series is non-stationary—a standard and expected characteristic in time-varying structural trend specifications. Consequently, these results reinforce the necessity of employing state-space models capable of simultaneously capturing shifting trends and cyclical fluctuations to accurately understand growth dynamics and generate reliable forecasts.

3.2 Estimation of the Extended Models

Following the estimation of the baseline reference model, the econometric analysis proceeds to estimate the augmented models. In this stage, the six Worldwide Governance Indicators (WGI) are introduced sequentially as explanatory variables (regressors) within the state-space UCM framework. This step-by-step sequential estimation is designed to isolate and test the individual dynamic impact of each specific governance dimension on economic growth in Algeria, thereby avoiding potential multicollinearity issues.

Estimation of the VA Model

Table 4. Testing the Effect of Voice and Accountability (VA) on Economic Growth within the UCM Framework

growth	Coefficient	Std. err.	z	P>z	[95% conf.	interval]
va	4.756046	9.004154	0.53	0.597	-12.89177	22.40386
var(slope)	6.094503	4.64328	1.31	0.095	0	15.19516
var(growth)	4.957955	2.713927	1.83	0.034	0	10.27715

Source: Authors' calculations based on Stata 19.2 output.

Based on the state-space estimation of the first augmented model, the empirical regression equation representing the dynamic relationship can be formulated as follows:

$$growtht = \mu_t + 4.756 VA_t + \grave{o}_t, \grave{o}_t \sim N(0, 4.958)$$

$$\mu_t = \mu_{t-1} + \beta_{t-1} + \eta_t, \quad \eta_t \sim N(0, 6.094)$$

The empirical results indicate that the coefficient for the Voice and Accountability (*VA*) variable equals 4.756. However, this coefficient is statistically insignificant at conventional levels (z = 0.53, p = 0.597), implying that this specific governance dimension exerts no statistically detectable impact on economic growth in Algeria over the studied period. This conclusion is further corroborated by a Wald chi-square statistic of 0.28 with a corresponding probability value of 0.5974., confirming the weak explanatory power of the augmented *VA* specification in accounting for variations in growth.

Regarding the latent variance components (hyperparameters), the trend slope variance *var(slope)* was estimated at 6.094, remaining statistically significant at the 10% level. Concurrently, the irregular component variance (growth) was found to be 4.958, demonstrating statistical significance at the 5% level. These variance parameters indicate

that the growth series continues to be governed by continuous long-term structural shifts alongside short-term transitory fluctuations.

Finally, the model selection metrics yielded an AIC of 147.878 and a BIC of 151.535. Taken together, these findings strongly suggest that the voice and accountability mechanism does not structurally influence economic growth in the Algerian context; instead, economic growth dynamics are primarily dictated by underlying structural and random macroeconomic shocks.

Estimation of the PS Model

Table 5. Testing the Effect of Political Stability and Absence of Violence (PS) on Economic Growth within the UCM Framework

growth	Coefficient	Std. err.	z	P>z	[95% conf.	interval]
pv	6.715147	13.29197	0.51	0.613	-19.33664	32.76693
var(slope)	2.227474	10.30859	0.22	0.414	0	22.43195
var(growth)	7.529021	12.02955	0.63	0.266	0	31.10651

Source: Authors' calculations based on Stata 19.2 output.

The empirical findings reveal that the coefficient for the Political Stability (*PS*) indicator is 6.715. However, this parameter is statistically insignificant at conventional levels ($z = 0.51$, $p = 0.613$), indicating that political stability does not exert a statistically detectable effect on economic growth in Algeria for the selected sample. This lack of significance is further confirmed by the overall model fit diagnostics, where the Wald chi-square statistic is 0.26 with a probability value of 0.6134. This underscores the weak explanatory power of the augmented *PS* specification in explaining variations in the dependent variable.

Regarding the latent variance components, the trend slope variance *var(slope)* was estimated at 2.227 and was statistically insignificant ($z = 0.22$, $p = 0.414$). Similarly, the irregular component variance (growth) was found to be 7.529, which also lacked statistical significance ($z = 0.63$, $p = 0.266$). These findings imply that under this specific configuration, the model is unable to capture statistically significant variations either in the long-term structural trend or in the short-term random fluctuations.

The model selection criteria registered an AIC of 146.999 and a BIC of 150.656, which serve as reference metrics for cross-model evaluation. Synthesizing these results, it is evident that political stability has no statistically significant impact on Algerian economic growth over the studied horizon. Furthermore, the insignificance of the variance hyperparameters suggests that this specific specification fails to adequately isolate latent structural dynamics, thereby justifying substantial caution when interpreting the empirical nexus between these two variables.

Estimation of the GE Model

Table 6. Testing the Effect of Government Effectiveness (GE) on Economic Growth within the UCM Framework

growth	Coefficient	Std. err.	z	P>z	[95% conf.	interval]
ge	3.914421	6.904004	0.57	0.571	-9.617178	17.44602
var(slope)	5.995541	4.879292	1.23	0.110	0	15.55878

var(growth)	4.995117	2.865043	1.74	0.041	0	10.6105

Source: Authors' calculations based on Stata 19.2 output.

The empirical findings indicate that the coefficient for the Government Effectiveness (*GE*) indicator is 3.914. However, this parameter is statistically insignificant at conventional levels (z = 0.57, p = 0.571), implying that government effectiveness does not exert a statistically detectable effect on economic growth in Algeria over the sampled period. This outcome is further supported by the joint significance diagnostics, where the Wald test statistic yields chi-square = 0.32 with a probability value of 0.5707, confirming the weak explanatory power of the augmented *GE* specification in accounting for variations in the dependent variable.

Regarding the latent variance components, the trend slope variance *var(slope)* was estimated at 5.995 and found to be statistically insignificant at the 5% level (z = 1.23, p = 0.110). Conversely, the variance of the irregular random component *var(growth)* was found to be 4.995, demonstrating statistical significance at the 5% level (z = 1.74, p = 0.041). This pattern indicates that the time series of Algerian economic growth is heavily influenced by short-term transitory fluctuations rather than shifting long-term trends under this specification.

The model selection metrics registered an AIC of 147.833 and a BIC of 151.490. Synthesizing these results, it is evident that government effectiveness has no statistically significant structural impact on economic growth in Algeria. Instead, variations in growth are predominantly driven by short-term irregular macroeconomic shocks rather than institutional effectiveness factors.

Estimation of the RQ Model

Table 7. Testing the Effect of Regulatory Quality (RQ) on Economic Growth within the UCM Framework

growth	Coefficient	Std. err.	z	P>z	[95% conf.	interval]
rq	16.228	2.966421	5.47	0.000	10.41393	22.04208
var(slope)	9.60e-16	.	.	.	.	.
var(growth)	13.15199	3.877822	3.39	0.000	5.551594	20.75238

Source: Authors' calculations based on Stata 19.2 output.

The empirical findings reveal that the coefficient for the Regulatory Quality (*RQ*) indicator is 16.228, demonstrating high statistical significance at the 1% level (z = 5.47, p = 0.000). This indicates a powerful and positive structural impact of regulatory quality on economic growth in Algeria. This robust relationship is further validated by the overall model fit diagnostics, where the Wald test statistic yields Wald chi-square = 29.93with an associated probability value of 0.0000. This confirms the high statistical significance of the overall model and its superior capacity to explain variations in the dependent variable.

Regarding the latent variance components, the trend slope variance *var(slope)* drops to 9.60×10^{-16} which is statistically indistinguishable from zero. This phenomenon indicates that the long-term structural trend becomes deterministic and stable, with no further unobserved structural variance remaining after controlling for regulatory quality. Conversely, the

variance of the irregular random component *var(growth)* was estimated at 13.152, exhibiting high statistical significance at the 1% level (z = 3.39, p = 0.000), which reflects the presence of short-term transitory fluctuations around this stabilized trend.

Crucially, the model selection metrics registered an AIC of 142.600 and a BIC of 145.038. These values are the lowest among all previously estimated augmented specifications (*VA, PS, GE*), demonstrating that the regulatory quality model is the most optimal specification, successfully balancing explanatory power with econometric parsimony.

Synthesizing these empirical outcomes, it is evident that regulatory quality serves as a critical determinant of economic growth in Algeria. A one-unit improvement in the quality of laws, market-friendly regulations, and governmental procedures is associated with a substantial growth dividend of approximately 16.228 percentage points. Remarkably, the inclusion of this variable completely absorbs the unobserved structural shifts in the trend (reducing the slope variance to zero). This implies that regulatory quality almost entirely explains the long-term structural transitions within the Algerian growth trajectory over the studied horizon.

Estimation of the RL Model

Table 8. Testing the Effect of Rule of Law (RL) on Economic Growth within the UCM Framework

growth	Coefficient	Std. err.	z	P>z	[95% conf.	interval]
rl	2.39099	8.235812	0.29	0.772	-13.7509	18.53288
var(slope)	6.532994	4.93232	1.32	0.093	0	16.20016
var(growth)	4.798316	2.706301	1.77	0.038	0	10.10257

Source: Authors' calculations based on Stata 19.2 output.

The empirical findings reveal that the coefficient for the Rule of Law (*RL*) indicator is 2.391. However, this parameter is statistically insignificant at conventional levels (z = 0.29, p = 0.772), demonstrating that the rule of law does not exert a statistically detectable direct impact on economic growth in Algeria for the selected sample. This lack of significance is further substantiated by the joint significance diagnostics, where the Wald test statistic yields = 0.08 with an associated probability value of 0.7716. This underscores the weak overall explanatory power of the augmented *RL* specification in accounting for variations in the dependent variable.

Regarding the latent variance components, the trend slope variance *var(slope)* was estimated at 6.533 and found to be statistically significant at the 10% level (z = 1.32, p = 0.093). This indicates that the long-term structural trend continues to be time-varying, driven by unobserved permanent shocks. Concurrently, the variance of the irregular random component var(growth) was found to be 4.798, exhibiting statistical significance at the 5% level (z = 1.77, p = 0.038), which reflects the ongoing presence of short-term transitory fluctuations around the trend.

Furthermore, the model selection metrics registered an AIC of 148.072 and a BIC of 151.728. These information criteria are noticeably higher than those of the previously

estimated Regulatory Quality (*RQ*) model, reinforcing that the *RQ* specification remains the superior and most optimal model.

Synthesizing these outcomes, it is evident that the rule of law had no statistically significant direct impact on economic growth in Algeria over the studied horizon. Instead, variations in growth are predominantly explained by underlying structural shifts in the long-term trend and short-term irregular macroeconomic shocks. This finding contrasts with theoretical institutional expectations, which conventionally posit the rule of law as a fundamental prerequisite for economic activity. This divergence may reflect the structural specificities of the Algerian rentier economy, the nature of the sampled period, or the potential presence of indirect transmission channels whose effects were not captured within this direct linear framework.

Estimation of the CC Model

Table 9. Testing the Effect of Control of Corruption (CC) on Economic Growth within the UCM Framework

growth	Coefficient	Std. err.	z	P>z	[95% conf.	interval]
cc	22.9431	12.50509	1.83	0.067	-1.566422	47.45263
var(slope)	1.527945	1.779884	0.86	0.195	0	5.016454
var(growth)	7.791036	3.404517	2.29	0.011	1.118306	14.46377

Source: Authors' calculations based on Stata 19.2 output.

The empirical findings reveal that the coefficient for the Control of Corruption (*CC*) indicator is 22.943, demonstrating statistical significance at the 10% level (z = 1.83, p = 0.067). This indicates a substantially large and positive economic impact of anti-corruption efforts on Algerian economic growth, albeit at a relatively weak level of statistical significance. The joint parameter diagnostics confirm the model's overall validity at the 10% level, with a Wald chi-square statistic = 3.37 and an associated probability of 0.0665, verifying its capacity to account for a meaningful portion of the variations in the dependent variable.

Regarding the latent variance components, the trend slope variance (slope) was estimated at 1.528 and found to be statistically insignificant (z = 0.86, p = 0.195). This implies that the long-term structural trend stabilizes and experiences no significant unobserved shifts once the control of corruption is controlled for. Conversely, the irregular component variance (growth) equals 7.791, which is highly significant at the 5% level (z = 2.29, p = 0.011), capturing the active presence of short-term transitory shocks around the trend.

The model evaluation metrics registered an AIC of 145.538 and a BIC of 149.194. These information criteria are lower than those of nearly all previously estimated models, with the sole exception of the Regulatory Quality (*RQ*) specification. This confirms that the *CC* model yields a robust explanatory fit.

Synthesizing these outcomes, the control of corruption emerges as an economically vital determinant of economic growth in Algeria. A one-unit improvement in the anti-corruption index is associated with an impressive growth dividend of approximately 22.943 percentage points. Methodologically, the inclusion of this variable successfully absorbs unobserved

structural trend shocks (rendering the slope variance insignificant), meaning that anti-corruption dynamics effectively explain key structural transformations in the growth path. Meanwhile, short-term irregular disturbances remain the primary driver of transitory volatility. These empirical insights strongly substantiate the theoretical consensus positioning anti-corruption frameworks as a cornerstone for enhancing the investment climate and fostering sustainable economic activity.

3.3 Comparison of the Estimated Models

To establish a rigorous synthesis of the empirical findings, this section provides a comprehensive comparative evaluation across the estimated baseline and the six augmented Kaufmann governance models. The comparative framework relies on cross-referencing three core dimensions: the estimated regression coefficients, the unobserved component variance hyper parameters var(slope) and var(growth)), and the model selection fit benchmarks via the Akaike Information Criterion (AIC).

The consolidated comparative diagnostics are structured in the table below:

Table 10. Comparison of the Six Kaufmann Governance Indicator Models

Rank	Model	AIC	BIC	Assessment
1st	**Model_RQ (Regulatory Quality)**	142.60	145.04	Best-performing model (lowest AIC)
2nd	**Model_CC (Control of Corruption)**	145.54	149.19	Second-best model
3rd	**Model_PV (Political Stability and Absence of Violence)**	147.00	150.66	Moderate fit
4th	**Model_VA (Voice and Accountability)**	147.88	151.53	Moderate fit
5th	**Model_GE (Government Effectiveness)**	147.83	151.49	Moderate fit
6th	**Model_RL (Rule of Law)**	148.07	151.73	Lowest-performing governance model
Reference	**Baseline Model**	146.16	148.59	Benchmark specification

Source: Authors' calculations based on Stata 19.2 output.

The empirical estimation of the Unobserved Components Model (UCM) utilizing the Regulatory Quality (*RQ*) indicator demonstrates a powerful, positive, and statistically significant structural impact on economic growth in Algeria over the 2000–2024 period. The estimated coefficient of RQ = 16.23, which is statistically significant at the 1% level, implies that a one-unit improvement in Kaufmann's regulatory quality index is associated with a substantial expansion in the annual economic growth rate of approximately 16.23 percentage points. This exceptionally strong magnitude underscores the critical vitality of the regulatory framework in steering macroeconomic activity, particularly within an

economic landscape characterized by state-led investment and an overarching dependence on the hydrocarbon sector.

Methodologically, the inclusion of the *RQ* indicator yields a pronounced improvement in model specification and fit relative to the baseline model. This optimization is evidenced by the reduction in the Akaike Information Criterion (AIC) from 146.16 in the benchmark model to 142.60 in the augmented *RQ* configuration, confirming that regulatory dynamics substantially enhance the model's capacity to explain growth fluctuations. In contrast, the trend slope variance var(slope) collapsing close to zero suggests a highly stabilized long-term structural trend. Concurrently, the estimated irregular variance var(growth) of 13.15, which is highly significant, captures the persistent cyclical fluctuations around this trend, driven in part by structural shifts in the regulatory landscape.

From an institutional perspective, these findings can be contextualized within the structural and economic reforms undertaken by Algeria over the past two decades. These national efforts have progressively focused on enhancing the business climate, mitigating administrative burdens, and updating legislative frameworks. Although these reforms are often critiques as being relatively bounded, the empirical evidence demonstrates that they have successfully fostered a more predictable institutional environment for economic agents, thereby generating positive growth dividends. Furthermore, the dominant impact of regulatory quality over purely political governance dimensions indicates that the Algerian macroeconomic trajectory is inherently more responsive to functional regulatory rules than to political governance metrics a feature that aligns seamlessly with the structural nature of rentier economies, where the precise institutional rules governing resource allocation play a foundational role.

3.4 Robustness Analysis

To validate the reliability, consistency, and structural stability of the previous empirical findings, a rigorous robustness check was executed. The baseline *RQ* augmented model was re-estimated by bifurcating the total temporal horizon into two distinct sub-periods. This temporal split is structurally justified by the profound socio-political shifts and global economic shocks experienced by Algeria during and after the 2011 global transition phase, which altered the country's macroeconomic and institutional dynamics.

Table 11. Comparison of the Regulatory Quality Coefficient, Variance Components, and Model Fit across Sub-Periods

Variable / Component	First Period (2000–2010)	Second Period (2011–2024)
RQ Coefficient	40.71**	20.40***
	(10.16)	(6.45)
var(slope)	5.89	0.00
	(5.90)	(0.00)
var(growth)	1.24	13.55***
	(1.60)	(5.53)
Model Fit Statistics		
Log Likelihood	-25.66	-38.54

AIC	57.31	81.07
BIC	58.51	82.35
Number of Observations	11	14

Source: Authors' calculations based on Stata 19.2 output.

To thoroughly evaluate the temporal stability of the relationship between regulatory quality and economic growth in Algeria, the augmented UCM model was re-estimated across two distinct sub-periods: 2000–2010 and 2011–2024. The selection of 2011 as a structural break is justified by the profound socio-political shifts and institutional transitions that cascaded across the MENA region during this phase, potentially altering the baseline dynamics between institutional performance and macroeconomic outcomes.

The sub-period empirical estimates consolidated in the robustness matrix above demonstrate that the impact of regulatory quality (*RQ*) on economic growth remains positive, resilient, and statistically significant across both sub-temporal horizons, thereby confirming the robust consistency of our baseline findings. During the first sub-period (2000–2010), the *RQ* coefficient was estimated at 40.71, exhibiting high statistical significance at the 1% level. In the second sub-period (2011–2024), the coefficient registered at 20.40, maintaining its statistical significance at the same 1% level. This persistent alignment in the direction and significance of the parameter over time confirms that the growth dividends yielded by regulatory optimizations are not a transitory statistical artifact, but rather reflect a well-established structural dynamic within the Algerian economy.

However, a notable divergence in magnitude is observed, with the *RQ* coefficient being considerably larger during the initial sub-period. This inflation can be attributed to either of two factors: methodologically, it may stem from the small sample size of the first window (11 observations), which occasionally tends to yield over-estimated parameters; or from an economic standpoint, it reflects the high marginal returns of the foundational institutional reforms initiated by Algeria during that decade, where initial regulatory improvements triggered a disproportionately larger positive shock on economic performance.

Conversely, the second sub-period reveals a substantial advancement in the model's capacity to isolate short-term volatility. The irregular component variance var(growth) became highly significant at 13.55, demonstrating that the structural nexus between regulatory regimes and growth paths has grown more stable, capturing systematic fluctuations more clearly in recent years.

This evolutionary trajectory can be contextualized by the intensifying focus of the Algerian authorities on executing strategic regulatory reforms over the past decade, aimed closely at upgrading the business environment and stimulating economic diversification away from hydrocarbon rent dependence. The transition of the irregular variance parameter into high statistical significance signals a structural maturation of the institutional transmission mechanism—moving from an ad-hoc, circumstantial interaction to a deeply embedded structural relationship. This temporal robustness heavily strengthens the empirical validity of our primary conclusions.

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4. Model Diagnostic Tests

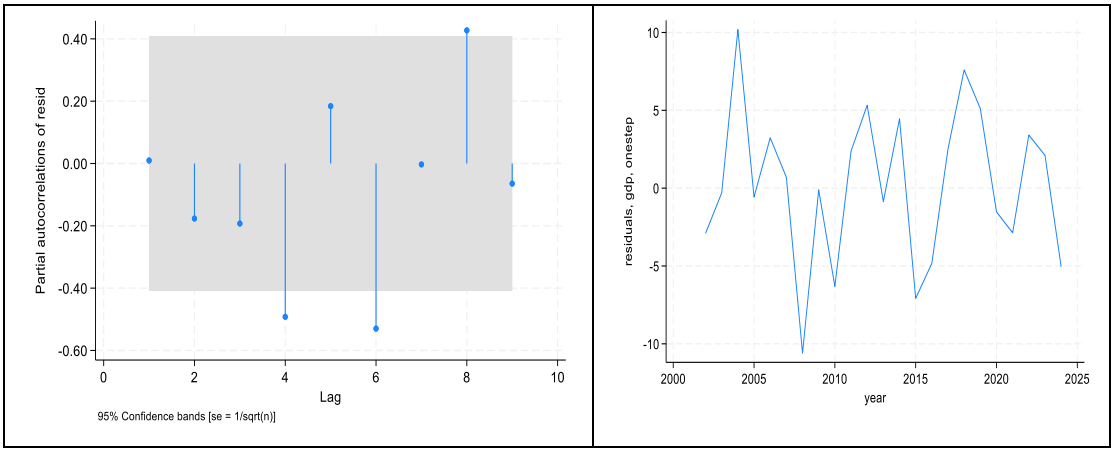
Following the maximum likelihood estimation of Harvey's state-space Unobserved Components Model, a comprehensive suite of post-estimation diagnostic checks was conducted on the standardized residuals. This step is methodologically imperative to verify the structural validity, statistical adequacy, and specification correctness of the estimated state-space framework. The diagnostic framework specifically evaluated:

1. Residual serial independence via the Autocorrelation Function (ACF), Partial Autocorrelation Function (PACF), and the formal Ljung-Box Q-test.
2. Residual normality utilizing the joint Skewness and Kurtosis test (sktest).

4.1 Serial Correlation Test

As an initial diagnostic layer, the structural behavior of the residuals was examined visually. Figure (02) illustrates the empirical distribution of the standardized residuals alongside the Partial Autocorrelation Function (PACF) bounds:

Figure 2. Residual Distribution and Partial Autocorrelation Function (PACF) Plot



Source: Authors' calculations based on Stata 19.2 output.

The visual analysis of the standardized residuals from the Unobserved Components Model (UCM) demonstrates that the residual values fluctuate symmetrically around a zero mean without exhibiting any discernible temporal trend. This behavior indicates the absence of systematic estimation bias and confirms the model's robust capacity to capture the long-term structural trend of the time series. Furthermore, the residuals display a purely stochastic pattern, lacking any regular formation or cyclical behavior, which strongly supports the econometric assumption that the unexplained component effectively isolates purely random, short-term macroeconomic shocks.

Concurrently, evaluating the Partial Autocorrelation Function (PACF) plot indicates that the vast majority of the autocorrelation coefficients fall strictly within the 95% confidence intervals. Although minor boundary transgressions may occur at isolated lag intervals, they do not form a systematic or persistent pattern over time. Consequently, this empirical behavior verifies the absence of significant serial correlation within the estimated residuals, validating the structural specification of the model.

Second: Ljung–Box (Portmanteau) Test

To rigorously complement the graphical diagnosis with an exact statistical inference, the Ljung-Box Q-test (also known as the Portmanteau test) was executed. This test formally evaluates the joint hypothesis of zero serial correlation up to a designated number of temporal lags (h). The empirical results of the Ljung-Box autocorrelation test across various lag intervals are structured in the table below:

Table 12. Ljung–Box (Portmanteau) Test for Residual Autocorrelation

Portmanteau test for white	**noise**
Portmanteau (Q) statistic	= 11.4742
Prob > chi2(9)	= 0.2446

Source: Authors' calculations based on Stata 19.2 output.

The Portmanteau test results indicate the absence of statistically significant serial correlation in the model residuals (Prob = 0.2446 > 0.05). This finding supports the null hypothesis of no autocorrelation and suggests that the residuals behave as white noise. Consequently, the results reinforce the adequacy and validity of the estimated model in capturing the underlying dynamics of the series.

4.2 Normality Test

Table 13. Normality Test Results

Variable	**Obs**	**Pr(skewness)**	**Pr(kurtosis)**	**Adj chi2(2)**	**Prob>chi2**
Resid	23	0.7257	0.9063	0.14	0.9338

Source: Authors' calculations based on Stata 19.2 output.

The null hypothesis of residual normality was evaluated using the Skewness and Kurtosis test (*sktest*). The empirical results indicate that the probability values associated with both skewness, (Pr(Skewness)) = 0.7257, and kurtosis, (Pr(Kurtosis)) = 0.9063, are greater than the 5% significance threshold Furthermore, the joint structural metric of the test registers an adjusted chi-squared value of Adj $chi^2(2)$ = 0.14 with an overall asymptotic probability value of Prob > chi^2 = 0.9338.

These diagnostic findings indicate a failure to reject the null hypothesis (H_0), which formally posits that the model's residuals follow a normal distribution. Consequently, this demonstrates that the distribution of estimation errors within the model is well-behaved, symmetrical, and completely free from excessive skewness or distortive kurtosis anomalies.

Conclusion

This study aimed to analyze the relationship between governance and economic growth in Algeria during the period 2000–2024, by adopting the Unobserved Components Model (UCM) in Harvey's formulation, which allows for the decomposition of long-term permanent trends and short-term transitory fluctuations. The analysis focused on evaluating the extent to which governance indicators contribute to explaining the dynamics of economic growth within the context of a rentier economy characterized by a dependence on oil revenues and high vulnerability to external shocks.

The results revealed that economic growth in Algeria is determined by the interaction between long-term structural shocks and short-term fluctuations, reflecting the nature of an economy linked to oil price volatility. Furthermore, the baseline model indicated significant shifts in the permanent trend alongside stochastic fluctuations, confirming the necessity of adopting dynamic models capable of capturing this duality in economic behavior.

Regarding the governance indicators, the findings showed a distinct variance in their impact. Regulatory quality emerged as the most influential institutional factor on economic growth, registering a strong, positive, and statistically significant effect. The inclusion of this variable also contributed to explaining the structural changes in the long-term trend. Conversely, the remaining indicators—namely Political Stability, Government Effectiveness, the Rule of Law, and Voice and Accountability—did not exhibit a statistically significant impact, while the Control of Corruption recorded a positive effect at a bounded level of significance. This suggests that the transmission channels of governance within the Algerian economy remain selective and are more closely tied to regulatory dimensions.

These results provide an answer to the study's central problem, as it becomes clear that the impact of governance on economic growth is not confined to short-term fluctuations but can extend to the long-term trend. However, this impact remains anchored to a specific dimension, which is regulatory quality, implying that governance does not influence macroeconomic performance uniformly across all its dimensions. Consequently, it can be stated that the study's hypothesis is partially validated; specific components of governance successfully account for the long-term evolutionary path of growth, while the effect of the remaining indicators remains weak or statistically non-significant.

Furthermore, robustness tests confirmed the temporal stability of the relationship between regulatory quality and growth across the two sub-periods, enhancing the credibility of the findings. Concurrently, post-estimation econometric diagnostics supported the structural safety of the estimation, as the residuals exhibited a stochastic white-noise behavior, characterized by the absence of serial correlation and adherence to a normal distribution, validating the specification adequacy of the employed model.

Despite these findings, the study remains limited in several aspects, including the small annual sample size, and the reliance on separate sequential estimations for each governance indicator, which may obscure the joint interactions or complementarities among them. Additionally, the model did not incorporate explicit stochastic cyclical components that might be relevant to the specific business cycles of the Algerian economy.

Bibliography :

1. Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). *The colonial origins of comparative development: An empirical investigation*. *American Economic Review, 91*(5), 1369–1401. https://doi.org/10.1257/aer.91.5.1369
2. Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). *Institutions as a fundamental cause of long-run growth*. In P. Aghion & S. Durlauf (Eds.), *Handbook of Economic*

Growth (Vol. 1A, pp. 385–472). Elsevier. https://doi.org/10.1016/S1574-0684(05)01006-3

3. Aidt, T. S., Dutta, J., & Sena, V. (2008). *Governance regimes, corruption and growth: Theory and evidence*. *Journal of Comparative Economics, 36*(2), 195–220. https://doi.org/10.1016/j.jce.2007.11.004
4. Boţa-Avram, C., Grosanu, A., Răchișan, P. R., & Gavriletea, M. D. (2018). *The bidirectional causality between country-level governance, economic growth and sustainable development*. *Sustainability, 10*(2), 502. https://doi.org/10.3390/su10020502
5. Boukhatem, J., & Moussa, F. B. (2018). *The effect of institutions on economic growth in MENA countries: Empirical investigation and analysis*. *Economic Systems, 42*(2), 226–237. https://doi.org/10.1016/j.ecosys.2017.08.002
6. Clark, P. K. (1987). *The cyclical component of U.S. economic activity*. *Quarterly Journal of Economics, 102*(4), 797–814. https://doi.org/10.2307/1884282
7. Commandeur, J. J. F., & Koopman, S. J. (2007). *An introduction to state space time series analysis*. Oxford University Press.
8. Durbin, J., & Koopman, S. J. (2012). *Time series analysis by state space methods* (2nd ed.). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199641178.001.0001
9. Fayissa, B., & Nsiah, C. (2013). *The impact of governance on economic growth in Africa*. *Journal of Developing Areas, 47*(1), 91–108.
10. Gani, A. (2011). *Governance and growth in developing countries*. *Journal of Economic Issues, 45*(1), 19–40. https://doi.org/10.2753/JEI0021-3624450102
11. Hall, R. E., & Jones, C. I. (1999). *Why do some countries produce so much more output per worker than others? Quarterly Journal of Economics, 114*(1), 83–116. https://doi.org/10.1162/003355399555954
12. Harvey, A. C. (1989). *Forecasting, structural time series models and the Kalman filter*. Cambridge University Press. https://doi.org/10.1017/CBO9781107049994
13. Harvey, A. C. (2001). *Testing in unobserved components models*. *Journal of Forecasting, 20*(1), 1–19.
14. Harvey, A. C., & Jaeger, A. (1993). *Detrending, stylized facts and the business cycle*. *Journal of Applied Econometrics, 8*(3), 231–247. https://doi.org/10.1002/jae.3950080302
15. Harvey, A. C., & Koopman, S. J. (2000). *Signal extraction and the formulation of unobserved components models*. *Econometrics Journal, 3*(1), 84–107. https://doi.org/10.1111/1368-423X.00040
16. Huang, C. J., & Ho, Y. H. (2017). *Governance and economic growth in Asia*. *North American Journal of Economics and Finance, 39*, 260–272. https://doi.org/10.1016/j.najef.2016.10.010
17. Kaufmann, D., & Kraay, A. (2002). *Growth without governance*. *Economia, 3*(1), 169–229.

18. Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). *The worldwide governance indicators: Methodology and analytical issues* (World Bank Policy Research Working Paper No. 5430). World Bank.
19. Knack, S., & Keefer, P. (1995). *Institutions and economic performance: Cross-country tests using alternative institutional measures*. *Economics and Politics, 7*(3), 207–227. https://doi.org/10.1111/j.1468-0343.1995.tb00111.x
20. Lopes, H., Packham, N., & Walther, T. (2023). *Governance quality and long-term economic growth: New evidence from emerging economies*. *Economic Systems, 47*(3).
21. Mauro, P. (1995). *Corruption and growth*. *Quarterly Journal of Economics, 110*(3), 681–712. https://doi.org/10.2307/2946696
22. Mehanna, R. A., Yazbeck, Y., & Sarieddine, L. (2010). *Governance and economic development in MENA countries: Does oil affect the presence of a virtuous circle? Topics in Middle Eastern and African Economies, 12*.
23. Morley, J. C., Nelson, C. R., & Zivot, E. (2003). *Why are the Beveridge–Nelson and unobserved-components decompositions of GDP so different? Journal of Monetary Economics, 50*(5), 1081–1105. https://doi.org/10.1016/S0304-3932(03)00074-9
24. North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge University Press. https://doi.org/10.1017/CBO9780511808678
25. Pelagatti, M. M. (2015). *Time series modelling with unobserved components*. CRC Press.
26. Rodrik, D., Subramanian, A., & Trebbi, F. (2004). *Institutions rule: The primacy of institutions over geography and integration in economic development*. *Journal of Economic Growth, 9*(2), 131–165. https://doi.org/10.1023/B:JOEG.0000031425.72248.85
27. West, M., & Harrison, J. (1999). *Bayesian forecasting and dynamic models* (2nd ed.). Springer.