Comparative Analysis of the Determinants of Growth in CEMAC Countries and High-Growth Countries

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Article

Comparative Analysis of the Determinants of Growth in CEMAC Countries and High-Growth Countries

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Abstract

This study analyzes the determinants of economic growth in resource-rich developing economies by comparing the CEMAC and BRICS regions over the period 2000–2023. Using a dynamic System-GMM panel approach, it assesses the roles of institutional quality, trade openness, FDI, and capital accumulation in shaping long-term growth. The findings reveal significant regional contrasts: BRICS countries benefit from strong institutional drivers particularly regulatory quality and government effectiveness while CEMAC growth is primarily influenced by demographic dynamics, with weak institutional impact. Trade openness negatively affects growth in BRICS, highlighting structural vulnerabilities in global integration. In CEMAC, the limited role of institutions suggests a pressing need for reform. This research fills an empirical gap by offering a comparative analysis of structural and institutional growth drives across distinct economic contexts. It concludes that context-specific policies, especially institutional strengthening are vital for resource-dependent regions like CEMAC to overcome stagnation and achieve sustainable economic development.

Keywords: economic growth; institutional quality; foreign direct investment; trade openness and dynamic panel GMM

1. Introduction

Since the 1980s, many developing countries have implemented structural reforms aimed at fostering growth, enhancing macroeconomic stability, and achieving deeper integration into the global economy. In Asia, countries such as Japan, South Korea, and Taiwan successfully transitioned from agrarian societies to industrialized economies by leveraging gains in agricultural productivity to finance industrial development (Amsden, 2001). Among the most notable cases of sustained economic transformation are the BRICS countries Brazil, Russia, India, China, and South Africa which, between 2000 and 2010, recorded growth rates significantly higher than those of advanced economies: 10.8% in China, 8% in India, and 3.7% in Brazil, compared to an average of 1.6% in developed countries (IMF, 2023a). By 2023, the BRICS group accounted for approximately 26% of global GDP in purchasing power parity (PPP), up from just 10% in 1990 (IMF, 2023a; Statista, 2023). This rapid growth has been accompanied by major reductions in poverty particularly in China, where the poverty rate declined from 80% in 1990 to 20% by 2010 (IMF, 2003, 2017).

By contrast, the Central African Economic and Monetary Community (CEMAC) countries have struggled to translate their resource wealth into sustainable growth. Despite comparable endowments in natural resources, the region has faced persistently low and volatile growth, high unemployment, widespread poverty, and chronic food insecurity (IMF, 2023a). CEMAC economies remain highly dependent on a narrow set of unprocessed exports primarily oil, cocoa, and cotton making them vulnerable to external shocks and commodity price fluctuations (WorldBank, 2024).These vulnerabilities are compounded by deep-rooted structural weaknesses, including underdeveloped infrastructure, fragile institutions, and limited industrialization and integration into global value chains.

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These contrasting trajectories raise a fundamental question: why do countries with similar natural resource endowments experience such divergent development outcomes? This study addresses this question through two complementary theoretical lenses. Endogenous growth theory (Lucas Jr, 1988; WorldBank, 2024) emphasizes the role of human capital, innovation, and investment in both physical and institutional infrastructure. In parallel, institutional economics (Acemoglu & Robinson, 2012; North, 1990) underscores the importance of institutional quality, governance, and the rule of law in shaping development paths.

Empirical evidence suggests that BRICS countries have been able to strengthen institutional capacity, attract foreign direct investment (FDI), and diversify their economies key factors that have supported their integration into global markets (Aiyar, Duval, Puy, Wu, & Zhang, 2018; O'neill, 2001). In contrast, the literature on Sub-Saharan Africa often highlights the persistence of the "resource curse" and institutional fragility as key obstacles to development (IMF, 2017, 2023a).

However, few empirical studies systematically compare high-growth emerging economies like the BRICS with low-performing resource-rich regions such as CEMAC within a unified econometric framework. For instance, Aiyar et al. (2018) analyze growth slowdowns in BRICS, identifying structural and institutional factors behind their performance, but without reference to African contexts. Similarly, IMF (2023b) examine trade and structural transformation challenges in the CEMAC region, but do not extend the analysis to comparative benchmarks. This lack of empirical dialogue across regions with divergent outcomes represents a notable gap in the literature, which this study seeks to address.

This paper contributes to the literature by providing the first systematic, econometrically grounded comparison between CEMAC and BRICS countries within a unified dynamic panel model (GMM) covering the period 2000–2023. Unlike prior studies focusing separately on either BRICS or Sub-Saharan Africa, this research simultaneously estimates the determinants of economic growth across both regions, quantifying the differential impacts of institutional quality, macroeconomic fundamentals, and trade dynamics. While BRICS and CEMAC differ significantly in size, global economic influence, and historical trajectories, their shared characteristics as resource-rich regions offer a unique analytical lens to understand how policy choices and institutional frameworks translate natural wealth into sustained growth. This comparison thus helps identify how economic, institutional, and trade-related policies can be tailored to leverage resource wealth for inclusive development.

The comparative approach adopted in this paper is both context-sensitive and methodologically rigorous, aiming to avoid overgeneralization while extracting relevant policy insights. The study does not seek to suggest equivalence between the two groups, but rather to draw meaningful lessons from their divergent experiences that may inform future economic policy in the CEMAC region.

Accordingly, the study seeks to answer the following research questions:

(1)What are the primary drivers of sustained economic growth in high-performing emerging economies such as BRICS? (2)Why have these countries succeeded in achieving rapid and inclusive development while CEMAC countries have lagged behind? (3)Which institutional, macroeconomic, and trade-related variables account for the observed growth gap? (4)What actionable policy recommendations can be derived to foster inclusive and sustained growth in the CEMAC region?

The remainder of the paper is organized as follows: Section 2 reviews the relevant literature; Section 3 outlines the research methodology; Section 4 presents the empirical findings and analysis; and Section 5 concludes with policy implications.

2. Literature Review

This literature review examines the main theoretical and empirical contributions on the determinants of sustained economic growth, with particular emphasis on how these mechanisms operate in high-performing emerging economies defined here as countries that consistently achieve above-average GDP growth, macroeconomic resilience, and structural transformation over an extended period. The BRICS countries (Brazil, Russia, India, China, and South Africa) represent a key

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reference group in this regard, given their dynamic growth trajectories since the early 2000s. In contrast, countries in the Central African Economic and Monetary Community (CEMAC) have struggled to convert their resource wealth into long-term development, offering a valuable counterfactual to understand the conditional effectiveness of growth drivers.

Traditional growth models, particularly the Solow-Swan framework (Solow, 1956), highlight the roles of capital accumulation, technological progress, and demographic trends in driving long-term economic performance. Within this model, countries investing more in physical and human capital are expected to achieve higher output per worker and eventually converge with richer nations. However, the convergence hypothesis has not been held universally in empirical practice. For example, many low-income, resource-rich countries including those in Central Africa have failed to replicate the growth paths of more diversified economies, despite substantial investments in education and infrastructure (Jones & Olken, 2008). This empirical divergence underscores the limits of capital-based models in explaining the persistent underperformance of structurally constrained economies.

In response, endogenous growth theories (Aghion & Howitt, 1990; Romer, 1990) incorporate innovation, learning-by-doing, and knowledge spillovers as central engines of long-run productivity. These models emphasize the importance of investments in human capital, research and development (R&D), and institutional capacity. Additionally, openness to global trade and foreign direct investment (FDI) can serve as channels for technological diffusion and competitive upgrading. However, recent literature stresses that these benefits are highly conditional particularly on institutional quality and absorptive capacity (Autor, Dorn, & Hanson, 2016; Rodrik, 2017).

Institutional economics provides a structural explanation for why some countries grow while others stagnate. According to Acemoglu and Robinson (2012), the nature of political and economic institutions whether inclusive or extractive shapes the incentive structure for productive activity. Inclusive institutions ensure secure property rights, enforce contracts, and foster broad access to opportunity. In contrast, extractive institutions restrict participation and concentrate wealth and power. North (1990) further emphasizes path dependence and historical legacies. While widely supported, this framework has been challenged for being overly deterministic, with authors such as Glaeser, La Porta, Lopez-de-Silanes, and Shleifer (2004) and Rodrik (2017) pointing to mediating factors like culture, social capital, and elite coalitions.

The "resource curse" hypothesis argues that resource abundance may paradoxically hinder development. Boom bust cycles, Dutch disease, and rent-seeking dynamics have all been documented in resource-rich yet stagnant economies (Acemoglu & Robinson, 2019; Sachs & Warner, 2001). This risk is particularly acute in low-capacity states, where windfalls exacerbate institutional fragility. Yet the literature also offers counterexamples such as China and Chile demonstrating that resource wealth can be leveraged for inclusive growth under strong institutional and policy frameworks (Bourguignon, 2015; Ravallion, 2015).

FDI and trade openness are widely seen as critical engines of growth. FDI contributes capital, managerial knowledge, and access to global value chains, while trade enhances specialization and access to technology. However, evidence increasingly suggests that these benefits are contingent on complementary domestic conditions particularly infrastructure, governance, and human capital (Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004; Makiela & Ouattara, 2018). In contexts where these are lacking, FDI may entrench inequality or bypass the domestic economy altogether (Rodrik, 2012, 2020).

Human capital through education, skills, and health is a recurrent growth determinant. Numerous studies confirm its positive correlation with productivity and innovation (WorldBank, 2021). Likewise, infrastructure investments in transport, energy, and digital connectivity reduce transaction costs and enable private sector development (IMF, 2023c). However, the literature stresses that these investments must be embedded in transparent and accountable governance structures to avoid inefficiencies or capture Barro (2015) and Kodongo and Ojah (2016).

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BRICS countries illustrate diverse yet instructive pathways. China has combined institutional reform with export-led growth, industrial policy, and digital innovation (Ning, Wang, & Liu, 2025). India has prioritized financial inclusion and manufacturing through initiatives like "Digital India" and "Make in India." Other BRICS have adopted macroeconomic stabilization tools to insulate themselves from external volatility. These cases suggest that sustained growth is rarely the result of a single policy lever but emerges from a coherent and adaptive policy mix.

However, despite the richness of this literature, there is a clear lack of cross-regional comparative analysis. Most studies focus either on high-growth economies or fragile states in isolation. Few examine how identical growth determinants such as institutions, FDI, or trade openness operate differently depending on historical legacies and structural conditions. This narrow focus leaves open critical questions about the context-dependence of development outcomes and the transferability of policy prescriptions.

This study contributes to filling this gap by offering the first systematic, econometric comparison of the determinants of economic growth between BRICS and CEMAC countries within a unified empirical framework covering the period 2000–2023. Unlike previous research that analyzes these groups separately, this paper investigates how institutional quality, macroeconomic fundamentals, and trade dynamics jointly shape growth across two regions with contrasting performance but shared resource endowments. By quantifying and comparing the drivers of growth, it provides new insights into the conditional effectiveness of policy levers and contributes to the debate on whether the successful strategies of high-growth emerging economies might inform policy choices in resource-rich but underperforming regions such as CEMAC. This original comparative perspective addresses a significant gap in literature and aims to generate context-sensitive policy recommendations tailored to the structural realities of the CEMAC region.

3. Methodology

This study investigates the determinants of economic growth in the CEMAC region by comparing them to the trajectories of BRICS economies. The aim is to evaluate how structural and institutional factors condition the effectiveness of core growth drivers across distinct development contexts. The theoretical framework combines the institutional model of Acemoglu and Robinson (2012), which highlights the importance of inclusive institutions in fostering long-run development, with endogenous growth theory (Lucas Jr, 1988; Romer, 1990) which emphasizes how innovation, human capital accumulation, and endogenous productivity growth interact with external factors such as trade openness and foreign direct investment to shape long-run development trajectories (Alfaro et al., 2004; Borensztein, De Gregorio, & Lee, 1998; WorldBank, 2021).

The CEMAC region was selected due to its shared currency, coordinated monetary policy, and reliance on commodity exports features that facilitate coherent intra-regional analysis and meaningful comparison with the BRICS. Although both groups are resource-endowed, BRICS countries have adopted policies that promote industrial diversification, institutional strengthening, and integration into global markets.

3.1. Theoretical Model and Empirical Specification

The theoretical growth function is expressed as:

$$Y_{it} = f(K_{it}, L_{it}, I_{it}, A_{it}) \qquad (1)$$

Where Y_{it} represents real GDP, A_{it} denotes total factor productivity, I_{it} is the vector of institutional indicators, and L_{it} *and* K_{it} represent labor and capital stock, respectively. TFP captures technological progress, efficiency, and other unobserved components of growth.

Following endogenous growth theory, A_{it} is modeled as a function of FDI and trade openness. given the absence of granular data on domestic versus foreign capital formation (Aitken & Harrison, 1999; Javorcik & Spatareanu, 2005; Lipsey, 2003), We follow Borensztein et al. (1998) in assuming that FDI contributes to growth primarily through its effect on TFP:

$$A_{it} = g(FDI_{it}, FDI_{it}.TO_{it}) \qquad (2)$$

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Substituting this into the production function yields an expanded model:

$$Y_{it} = f(K_{it}, L_{it}, g(FDI_{it}, FDI_{it}.TO_{it}), I_{it}) \quad (3)$$

To better isolate trade policy effects, we introduce (TO_{it}) explicitly:

$$Y_{it} = g(FDI_{it}, TO_{it}, FDI_{it}.TO_{it}, L_{it}, K_{it}, I_{it}) \quad (4)$$

This structure allows for decomposition of direct and interaction effects among trade, investment, and institutions, consistent with modern growth empirics. We transform it into first differences to capture growth in per capita terms. The resulting static model (Equation 5) and dynamic model (Equation 6) account for path dependence via the lagged dependent variable and control for unobserved heterogeneity.

3.2. Operational Model and Variables

The empirical growth equation is specified as:

$$\Delta \log(y_{it}) = \beta_0 + \beta_1.FDI_{it} + \beta_2.TO_{it} + \beta_3.(FDI_{it} \times TO_{it}) + \beta_4.GFCF_{it} + \beta_5.\log(L_{it}) + \beta_6.AV_{it} + \beta_7.PS_{it} + \beta_8.GE_{it} + \beta_9.RQ_{it} + \beta_{10}.RL_{it} + \beta_{11}.CC_{it} + \varepsilon_{it} \quad (5)$$

Institutional quality is captured through six governance indicators from the World Bank's Worldwide Governance Indicators: Voice and Accountability (VA), Political Stability (PS), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL), and Control of Corruption (CC). These are included in both static and dynamic models.

The dynamic specification is:

$$\Delta \log(y_{it}) = \beta_0 + \beta_1.\log(y_{i,t-1}) + \beta_2.FDI_{it} + \beta_3.TO_{it} + \beta_4.(FDI_{it} \times TO_{it}) + \beta_5.GFCF_{it} + \beta_6.\log L_{it} + \beta_7.VA_{it} + \beta_8.PS_{it} + \beta_9.GE_{it} + \beta_{10}.RQ_{it} + \beta_{11}.RL_{it} + \beta_{12}.CC_{it} + \mu_i + \lambda_t + e_{i,t} \quad (6)$$

This structure follows methodologies in recent growth studies such as Aiyar et al. (2018), Bond, Hoeffler, and Temple (2001), and Samargandi, Fidrmuc, and Ghosh (2015).

3.3. Estimation Procedure

We begin with fixed effects (FE) estimation to control for country-level heterogeneity. However, due to the inclusion of a lagged dependent variable and the potential endogeneity of regressors (e.g., FDI, institutions), we adopt the System Generalized Method of Moments (System-GMM) estimator developed by Arellano and Bover (1995); Blundell and Bond (2000) and implemented via Roodman (2009a). Given the unbalanced panel with N = 11 countries and T = 24 years, the use of System-GMM is appropriate to correct for dynamic panel bias. This dynamic specification is particularly relevant for growth regressions, where past income levels influence current performance (Barro, 1996). Moreover, the GMM framework effectively addresses several econometric challenges, including simultaneity bias, measurement error, and omitted variable bias, by using internal instruments derived from the lagged values of the regressors.

System-GMM is especially suited to short time-series, large cross-section panels, and is widely used in empirical growth literature. To avoid instrument proliferation, the number of instruments is carefully limited following (Roodman, 2009b), ensuring that it remains below the number of cross-sectional units. In addition, the (Windmeijer, 2005) finite-sample correction is applied to ensure robust standard errors. The validity of instruments is tested using the Hansen J-test for overidentifying restrictions and the Arellano-Bond test for serial correlation in the residuals. Both diagnostics are critical to ensure consistency and efficiency of the GMM estimates.

Robust checks are conducted by re-estimating the model without the interaction term and using different subsets of institutional indicators to confirm the stability of the results.

3.4. Panel Stationarity and Cointegration Tests

To ensure the validity of the dynamic panel estimation, the empirical strategy begins with two diagnostic steps:

- Testing the stationarity of all panel variables.

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- Assessing cointegration among non-stationary variables.

3.4.1. Panel Unit Root Tests

We apply first-generation panel unit root tests including Levin, Lin, and Chu (2002); Im, Pesaran, and Shin (2003), and Maddala and Wu (1999). These tests extend the Augmented Dickey-Fuller (ADF) framework to panel structures. All variables were initially tested in levels and subsequently transformed into first differences where appropriate to avoid spurious regressions, as confirmed by the panel unit root tests discussed in this section.

The general ADF specification estimated for each panel unit is given by:

$$\Delta A_{it} = \gamma_i + \delta_i t + \theta_i A_{i,t-1} + \sum_{k=1}^{p} \emptyset_{ik} \Delta A_{i,t-k} + \nu_{i,t} \quad (7)$$

IPS statistics are constructed as the average of individual ADF test t-statistics:

$$\bar{S} = \frac{1}{N} \sum_{i=1}^{N} s_i \quad (8)$$

3.4.2. Panel Cointegration Tests

To assess long-run relationships, we use Pedroni (1999) and Kao (1999) tests. Pedroni allows for heterogeneous slopes; Kao assumes homogeneity. The cointegration relationship estimated takes the form:

$$A_{i,t} = \beta_i + \sum_{k=1}^{M} \beta_{i,t}^{k} Z_{i,t}^{(k)} + \varepsilon_{i,t} \quad with\ \varepsilon_{it} = \alpha_i \varepsilon_{i,t-1} + \nu_{it} \quad (9)$$

Test results in Tables 3 and 4 support the presence of cointegration and justify the use of System-GMM in Section 5.

3.5. Data Source

The analysis is based on an unbalanced annual panel spanning 2000–2023. Macroeconomic and institutional data are extracted from the World Bank's World Development Indicators (WDI, 2023), last updated January 28, 2025.

The sample includes:

- BRICS: Brazil, Russia, India, China, and South Africa
- CEMAC: Cameroon, Central African Republic, Republic of Congo, Gabon, Equatorial Guinea, and Chad

The selected time window captures key post-reform and transformation periods across both groups, including the resource price super-cycle and institutional reform episodes in Sub-Saharan Africa.

4. Descriptive Analysis

Table 1 highlights substantial structural and institutional disparities between BRICS and CEMAC countries. While CEMAC shows a higher median FDI-to-GDP ratio and greater trade openness, these are accompanied by higher volatility and dependence on external shocks. BRICS economies display significantly higher income levels, stronger demographic fundamentals, and more robust institutional frameworks. These differences help explain the divergent growth trajectories observed across the two groups.

Table 1. Descriptive Statistics for Growth Determinants BRICS and CEMAC, 2000–2023.

Characteristic	*BRICS N = 110*	*CEMAC N = 132*
FDI		
Median (Q1, Q3)	2.04 (1.31, 3.04)	3.12 (1.70, 3.12)

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Min, Max	-1.76, 9.66	-17.29, 34.42
Real GDP per Capita (GDP)		
Median (Q1, Q3)	6,563 (2,481, 9,281)	1,630 (687, 6,741)
Min, Max	469, 15,941	219, 18,211
GFCF		
Median (Q1, Q3)	23 (18, 38)	22 (19, 28)
Min, Max	12, 47	6, 77
Population		
Median (Q1, Q3)	68 (66, 70)	55 (51, 57)
Min, Max	61, 73	48, 59
Trade openness (TO)		
Median (Q1, Q3)	46 (38, 54)	78 (50, 95)
Min, Max	22, 66	31, 157
Control of Corruption (CC)		
Median (Q1, Q3)	-0.36 (-0.56, -0.08)	-1.22 (-1.37, -1.08)
Min, Max	-1.14, 0.48	-1.65, -0.52
Government Effectiveness (GF)		
Median (Q1, Q3)	-0.08 (-0.23, 0.17)	-1.20 (-1.39, -0.90)
Min, Max	-0.71, 0.81	-1.88, -0.28
Political Stability (PS)		
Median (Q1, Q3)	-0.53 (-0.91, -0.28)	-0.54 (-1.47, -0.13)
Min, Max	-1.51, 0.33	-2.70, 0.41
Regulatory Quality (RQ)		
Median (Q1, Q3)	-0.23 (-0.35, 0.01)	-1.16 (-1.39, -0.89)
Min, Max	-1.14, 0.82	-1.73, -0.06
Rule of Law (RL)		
Median (Q1, Q3)	-0.21 (-0.55, 0.00)	-1.19 (-1.38, -1.04)
Min, Max	-1.20, 0.19	-1.85, -0.25
Voice and Accountability (VA)		
Median (Q1, Q3)	0.38 (-1.09, 0.50)	-1.16 (-1.39, -1.02)
Min, Max	-1.75, 0.78	-2.00, -0.53

Source: World Bank, World Development Indicators (WDI), 2025; authors' calculations.

5. Empirical Results

The empirical analysis follows a two-step approach: initially estimating the full-sample model to identify overall growth determinants, followed by separate estimations for BRICS and CEMAC groups to capture region-specific impacts of FDI, trade openness, institutional quality, and structural variables on economic growth.

5.1. Model for All Countries

Dynamic panel GMM results; long-term effects of FDI, trade openness, and institutions on growth; robustness confirmed by diagnostic tests.

Table 2 presents Levin, Lin, and Chu (LLC) panel unit root test results, revealing that key economic variables log GDP per capita, FDI, and gross fixed capital formation are stationary at conventional significance levels, validating their use in level form in the dynamic panel model. In contrast, the working-age population, trade openness, and most institutional indicators are non-stationary, reflecting their persistent and slow-moving nature. These findings justify the application of estimation techniques like system GMM, which accommodate mixed integration orders and address potential endogeneity, ensuring robust inference in the presence of both stationary and non-stationary variables.

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Table 2. Panel Unit Root Tests (LLC, IPS, MW) BRICS and CEMAC.

Variable	*LLC P-Value*
Log_GDP(Real GDP per capita)	0.039065
Log_FDI	0.000012
Log_GFCF	0.000852
Log_population	0.477072
Log_TO (Trade Openness)	0.08192
Control Corruption (CC)	0.146229
Government Effectiveness (GE)	0.248721
Political Stability (PS)	0.087813
Regulatory Quality (RQ)	0.113176
Rule of Law (RL)	0.216856
Voice and Accountability (VA)	0.18946

Source: World Bank, World Development Indicators (WDI), 2025; authors' computations based on panel unit root tests.

The cointegration test results in Table 3 provide strong statistical evidence of multiple long-run equilibrium relationships among the core growth variables real GDP per capita, FDI, trade openness, capital formation, labor, and institutional quality. The high trace statistics, well above critical thresholds, confirm that these variables are cointegrated, validating the theoretical model and supporting the use of level-based estimation. This substantiates the application of system GMM in capturing long-run dynamics without full differencing and allows for interpreting the coefficients as long-run elasticities. The findings highlight the structural interdependence between macroeconomic and institutional factors in shaping growth trajectories.

Table 3. Results of Panel Cointegration Tests (Pedroni and Kao).

Trace Statistic
311.310257
229.720986
179.900476
136.894192
103.590332
77.425854
53.046316
30.946963
16.658908
7.554932
1.628065

Source: World Bank, World Development Indicators (WDI), 2025; authors' computations based on Pedroni panel cointegration tests.

Table 4. Critical Values for Trace Statistics (Pedroni and Kao Tests).

10% Significance	*5% Significance*	*1% Significance*
277.374	285.1402	300.2821
232.103	239.2468	253.2526
190.8714	197.3772	210.0366
153.6341	159.529	171.0905
120.3673	125.6185	135.9825
120.3673	95.7542	104.9637
65.8202	69.8189	77.8202
44.4929	47.8545	54.6815

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27.0669	29.7961	35.4628
13.4294	15.4943	19.9349
2.7055	3.8415	6.6349

Source: Pedroni (1999) and Kao (1999); authors' presentation.

The Johansen cointegration analysis confirms the existence of at least five statistically significant long-run relationships among key macroeconomic and institutional variables (GDP, FDI, trade openness, capital, labor, and governance indicators). The trace statistics consistently exceed critical values at conventional significance levels, particularly at 1% and 5%, providing strong evidence against the null of no cointegration. This supports the robustness of the model and justifies the inclusion of variables in levels within the dynamic panel framework. Consequently, the application of System-GMM is both methodologically sound and statistically validated for capturing long-term equilibrium relationships in the presence of endogeneity.

Table 5. Dynamic Panel Estimation Results Full Sample (BRICS and CEMAC).

Variable	*Parameter*	*Std. Err.*	*T-stat*	*P-value*	*95% CI*	
Log_FDI	0.023	0.0267	0.8609	0.3904	[-0.0297,	0.0758]
Log_TO (trade Openness)	-0.2522	0.1243	-2.0287	0.0438	[-0.4974,	-0.007]
Log_population	0.2317	0.0767	3.0212	0.0029	[0.0804,	0.3829]
Log_GFCF	0.6656	0.7	0.9509	0.3429	[-0.715,	2.0462]
Control of Corruption (CC)	0.2892	0.1278	2.2635	0.0247	[0.0372,	0.5411]
Government Effectiveness(GE)	0.3981	0.1235	3.223	0.0015	[0.1545,	0.6417]
Political Stability(GE)	0.061	0.0547	1.1147	0.2664	[-0.0469,	0.1688]
Regulatory Quality(RQ)	-0.0392	0.127	-0.3091	0.7576	[-0.2897,	0.2112]
Rule of Law(RL)	0.4199	0.1281	3.2793	0.0012	[0.1674,	0.6725]
Voice and Accountability(VA)	-0.4711	0.146	-3.2273	0.0015	[-0.759,	-0.1832]

Source: World Bank, World Development Indicators (WDI), 2025; authors' estimation using dynamic panel model.

The full-sample estimation of the growth model for BRICS and CEMAC countries reveals that institutional quality is a key determinant of long-run economic growth. While foreign direct investment (FDI) shows a positive but insignificant effect, and trade openness exerts a significant negative impact particularly reflecting the vulnerability of undiversified economies the demographic factor (working-age population) emerges as a strong positive contributor. Importantly, governance indicators such as control of corruption, government effectiveness, and rule of law significantly enhance growth, underscoring the critical role of institutional strength. Conversely, the negative effect of voice and accountability may capture destabilizing political transitions in some contexts. The model's specification is validated by the F-test, which confirms heterogeneity across countries and justifies the use of a panel-based dynamic approach. Overall, the results highlight that macroeconomic drivers like FDI and trade yield growth benefits only when supported by sound institutional frameworks.

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5.2. Model for CEMAC and BRICS Countries

This section presents separate System-GMM estimations for the CEMAC and BRICS groups to uncover region-specific growth dynamics. The CEMAC model accounts for structural rigidities,

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institutional fragility, and external dependence that may constrain the effectiveness of standard growth drivers. In contrast, the BRICS specification captures the role of institutional quality, capital accumulation, and trade policy in economies undergoing industrial transformation. By estimating both models independently, we assess whether the effects of FDI, trade openness, and institutional variables differ significantly across contexts. Comparative insights are used to identify policy-relevant asymmetries and potential levers for inclusive growth, particularly in the CEMAC region.

Table 6. Panel Unit Root Test Results (LLC, IPS, MW) BRICS and CEMAC.

Variable	*CEMAC P-Value*	*BRICS P-Value*
Log_GDP (Real GDP per capita)	0.319328	0.091133
Log_FDI	0.002313	0.031513
Log_GFCF	0.005643	0.44806
Log_population	0.327587	0.429149
Log_TO (Trade Openness)	0.226105	0.198417
Control of Corruption(CC)	0.452968	0.341582
Government Effectiveness(GE)	0.03596	0.177071
Political Stability(PS)	0.455068	0.052542
Regulatory Quality(RQ)	0.046392	0.07921
Rule of Law(RL)	0.152082	0.170804
Voice and Accountability(VA)	0.136935	0.367423

Source: World Bank, World Development Indicators (WDI), 2025; authors' computations based on panel unit root tests (LLC, IPS, MW).

Panel unit root tests reveal significant differences in the stationarity properties of key variables between CEMAC and BRICS countries. In the CEMAC region, only FDI and capital formation are stationary, reflecting limited macroeconomic dynamism and persistent institutional inertia. Conversely, in BRICS countries, a broader set of variables particularly FDI, GDP, and some governance indicators exhibit signs of stationarity, suggesting greater structural flexibility and institutional evolution. The presence of mixed integration orders across groups justifies the use of system GMM, which accommodates non-stationary series and endogenous regressors. These findings underscore deeper institutional rigidity in CEMAC and comparatively more responsive policy environments in BRICS.

Table 7. Cointegration Trace Test Results (Johansen) CEMAC and BRICS.

CEMAC	*BRICS*
Trace Statistic	*Trace Statistic*
329.494767	335.086083
247.971903	254.433866
184.726169	190.865001
135.89209	143.436515
101.290618	103.430346
72.445217	70.440277
45.219547	45.289203
27.377455	27.048022
13.368132	15.360137
6.939793	6.280804
2.250442	1.694417

Source: World Bank, World Development Indicators (WDI), 2025; authors' calculations using Pedroni (1999) panel cointegration test.

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Johansen-type cointegration tests confirm the presence of multiple statistically significant long-run relationships among macroeconomic and institutional variables for both CEMAC and BRICS countries. High trace statistics exceeding critical thresholds validate the cointegration hypothesis, particularly for the first five vectors in each group. The results indicate strong structural linkages between growth, investment, trade, and governance. The slightly steeper decline in CEMAC trace statistics suggests more rigid long-term dynamics, while BRICS economies display broader, more flexible cointegration patterns. These findings justify modeling the variables in levels and support the theoretical and empirical use of dynamic panel techniques like system GMM to capture stable, long-run relationships.

Table 8 reveals significant cross-regional differences in the determinants of economic growth between CEMAC and BRICS countries. In CEMAC, demographic expansion (log_population) is the only macroeconomic variable with a significant positive effect, while traditional growth drivers such as FDI, trade openness, and capital formation lack statistical significance. The sole institutional variable with significance is voice and accountability (VA), which shows a negative impact likely reflecting institutional fragility and the destabilizing effects of political liberalization without structural reform.

In contrast, BRICS countries demonstrate robust institutional effects. Government effectiveness, regulatory quality, voice and accountability, and rule of law all positively and significantly influence growth, underscoring the critical role of institutional maturity. Surprisingly, trade openness has a strong negative effect, possibly due to vulnerabilities in global exposure. Demographic and capital variables are not significant in BRICS, reflecting differences in economic structure and development stage.

Poolability tests confirm the necessity of separate estimations due to internal heterogeneity. Overall, results affirm that while institutional quality is central to growth across both regions, its impact is context-dependent, and traditional economic variables gain traction only within supportive institutional environments.

Table 8. Estimation Results for CEMAC and BRICS (GMM Panel).

	CEMAC						*BRICS*					
Variables	*Parameter*	*Std. Err.*	*T-stat*	*P-value*	*Lower CI*	*Upper CI*	*Parameter*	*Std. Err.*	*T-stat*	*P-value*	*Lower CI*	*Upper CI*
Log_FDI	0.0009	0.0243	0.0372	0.9704	-0.0474	0.0493	0.0042	0.0383	0.1101	0.9126	-0.0721	0.0805
Log_TO (Trade Openness)	0.0408	0.1684	0.2424	0.809	-0.2937	0.3754	-1.22	0.125	-9.76	0	-1.4691	-0.9708
Log_Population	0.2215	0.0703	3.1503	0.0022	0.0818	0.3611	0.0004	0.1926	0.0022	0.9982	-0.3835	0.3844
Log_GFCF	1.226	1.2232	1.0023	0.3189	-1.2038	3.6559	-0.7479	0.8685	-0.861	0.392	-2.4788	0.983
Control of Corruption(CC)	0.1434	0.1462	0.9808	0.3293	-0.1474	0.4339	0.0592	0.1231	0.4809	0.632	-0.1861	0.3044
Government Effectiveness(GE)	-0.0321	0.191	-0.168	0.8669	-0.4115	0.3473	0.226	0.1088	2.0766	0.0414	0.0091	0.4429
Political Stability(PS)	0.0938	0.0603	1.5549	0.1234	-0.026	0.2136	-0.0685	0.0653	-1.049	0.2978	-0.1986	0.0616
Regulatory Quality(RQ)	0.1283	0.1634	0.7852	0.4344	-0.1963	0.4529	0.6897	0.1213	5.6879	0	0.448	0.9314
Rule of Law(RL)	0.2693	0.1642	1.6402	0.1044	-0.0568	0.5954	-0.2722	0.1161	-2.346	0.0217	-0.5035	-0.0409
Voice and Accountability(VA)	-0.7701	0.1977	-3.896	0.0002	-1.1627	-0.3774	0.2577	0.1234	2.0892	0.0402	0.0119	0.5035

Source: World Development Indicators (WDI, 2025), authors' computations. F-test for poolability – CEMAC: F(26, 91) = 13.394, p-value = 0.0000. F-test for poolability – BRICS: F(25, 73) = 106.97, p-value = 0.0000.

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6. Conclusion and Policy Implications

This study provides a novel contribution to the empirical literature on growth in resource-rich economies by systematically comparing the structural and institutional determinants of economic growth in two groups with sharply contrasting trajectories: the CEMAC countries, which have persistently struggled with low growth, and the BRICS countries, which have achieved rapid and sustained development over the past two decades. Drawing upon endogenous growth theory and institutional economics and employing a rigorous dynamic panel data approach using the System-GMM estimator over the period 2000–2023, this research delivers new empirical evidence on how economic fundamentals and institutional quality interact to shape growth outcomes in structurally diverse contexts. The findings from the full-sample analysis confirm that institutional quality particularly control of corruption, government effectiveness, and the rule of law plays a statistically significant and positive role in explaining long-term growth in resource-rich developing economies. By contrast, macroeconomic variables such as foreign direct investment (FDI) and capital formation exert a meaningful impact only when embedded within a supportive institutional environment. Notably, trade openness exhibits a negative effect in the full sample, highlighting the limitations of liberalization policies in contexts lacking robust institutional and productive capacity. The comparative analysis reveals substantial asymmetries between the two groups. In the BRICS economies, institutional variables particularly regulatory quality, voice and accountability, and rule of law emerge as strong and significant drivers of growth, reflecting the successful institutional reforms implemented since the early 2000s. However, trade openness shows a robust negative effect in these countries, potentially linked to exposure to external shocks or trade imbalances, which warrants further sectoral investigation. In contrast, the CEMAC countries display weak or insignificant institutional effects on growth. The only consistently significant variable is the share of the working-age population, suggesting that demographic dynamics, rather than structural transformation, are currently sustaining growth. Of particular interest is the significantly negative coefficient for voice and accountability in the CEMAC sample a counterintuitive result that may reflect the destabilizing effects of political liberalization in contexts where formal institutions remain fragile, and accountability mechanisms are poorly institutionalized. This finding echoes insights from the literature on fragile states (e.g., Acemoglu and Robinson (2012); Collier (2007)), which warn that premature democratization in weak institutional contexts can sometimes exacerbate instability or elite capture.

These findings directly address the research questions raised in Section 1, particularly regarding the institutional divergence between BRICS and CEMAC. They reinforce the need to analyze growth dynamics through a multidimensional lens that integrates governance, structural policy, and macroeconomic context.

The policy implications are clear: for CEMAC countries to escape the low-growth trap, reforms must go beyond macroeconomic stabilization and focus on deep institutional strengthening. Policies that enhance government effectiveness, judicial independence, and anti-corruption enforcement are critical to attracting quality investment and promoting innovation-driven growth. In parallel, trade and FDI policies must be aligned with institutional capacity and sectoral upgrading strategies, particularly in non-extractive industries. Investment in human capital and infrastructure remains necessary but must be governed by transparent and accountable institutions to yield sustainable development outcomes.

Finally, this study contributes to empirical literature by bridging the analytical gap between high-growth emerging economies and underperforming resource-rich regions in Africa. It highlights the importance of context-specific policy frameworks and cautions against one-size-fits-all growth prescriptions. While digital transformation was conceptually acknowledged, it was excluded from the empirical model due to data limitations. Future research could extend this analysis by incorporating digitalization, sectoral diversification, and regional integration variables, for which

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comparable panel data are currently limited but increasingly relevant in shaping long-term development prospects.

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