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Institutional Performance and Global Competitiveness: A Panel Study of G20 and African Countries

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Abstract: This study investigates the long- and short-run effects of institutional performance on global competitiveness across a panel of G20 and African countries over the period 2014–2024. Using an ARDL (Auto-Regressive Distributed Lag) panel approach, the analysis identifies a significant and stable cointegration relationship between the Global Competitiveness Index (GCI) and key institutional variables, including the rule of law and government effectiveness, as well as macroeconomic indicators such as GDP per capita, inflation, and foreign direct investment (FDI). The findings indicate that improvements in institutional quality not only enhance long-term competitiveness but also yield immediate short-run gains. The error correction mechanism confirms a strong adjustment process towards equilibrium following short-term deviations. These results underscore the importance of good governance and macroeconomic stability as critical levers for sustainable competitiveness. Policy recommendations highlight the need for context-specific institutional reforms, coordinated macroeconomic strategies, and regional cooperation, particularly for African countries aiming to close the competitiveness gap with more advanced economies.

Keywords: Global Competitiveness Index (GCI); Institutional Quality; Rule of Law; Government Effectiveness; Panel ARDL; Cointegration; G20; African Economies; Foreign Direct Investment (FDI); Macroeconomic Stability.

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1. Introduction

In a global economic context marked by intensifying competition, national competitiveness has emerged as a strategic indicator of performance. It no longer depends solely on traditional factors such as infrastructure or human capital, but increasingly on the quality of institutions. These institutions whether political, legal, or administrative profoundly influence macroeconomic stability, the effectiveness of public policies, the security of economic transactions, and investor confidence. The World Economic Forum (2023) emphasizes that sustainable competitiveness relies on a solid institutional foundation capable of catalyzing structural reforms and ensuring the long-term coherence of economic strategies.

A comparison between the G20 countries which account for over 80% of global trade and more than 75% of foreign direct investment and those of the African continent whose growth potential remains constrained by multiple institutional challenges reveals divergent trajectories. While most G20 countries exhibit relatively high institutional performance, African countries continue to face structural fragilities: weak rule of law, widespread corruption, political instability, and bureaucratic inefficiency. According to the Worldwide Governance Indicators (World Bank, 2022), over 70% of African countries score below the global average across the six institutional dimensions, compared to less than 10% among G20 members. These disparities are also reflected in competitiveness rankings, where Africa remains largely underrepresented among top-performing nations.

Despite theoretical advances emphasizing the fundamental role of institutions in shaping high-performing economies, the literature remains divided regarding the precise nature of the relationship between institutional performance and global competitiveness, particularly across heterogeneous economic contexts. While some studies propose a linear interpretation in which institutional improvement mechanically drives greater competitiveness, others highlight the importance of contextual factors cultural, geopolitical, and historical that modulate the effectiveness of institutional reforms. This ambiguity is even more pronounced when comparing blocs with starkly contrasting socio-economic characteristics, such as the G20 and African countries. The central issue, therefore, lies in understanding how various institutional dimensions such as regulatory quality, government effectiveness, or control of corruption contribute, at varying intensities, to global competitiveness in asymmetrical institutional environments.

From this perspective, several fundamental research questions arise: **To what extent does institutional performance influence the global competitiveness of G20 and African countries? Which institutional dimensions play a decisive role in shaping competitive performance? Is there significant heterogeneity in this impact across regions, or do certain institutional variables exert a universal effect?** These questions aim to move beyond descriptive analysis and toward an empirical exploration using panel data econometric methods of the causal mechanisms underpinning this relationship. The study will also examine whether institutional policies yield differentiated effects depending on a country's level of development, political stability, or administrative capacity, in order to better guide structural reform strategies in contexts characterized by varying resources and constraints.

The general objective of this study is to empirically assess the impact of institutional performance on global competitiveness, using a comparative approach between G20 countries and African nations. By drawing on panel

data, this research aims to identify the most influential institutional dimensions and to measure the sensitivity of competitiveness indicators to the quality of governance. More specifically, the study seeks to determine whether certain institutional levers such as political stability, rule of law, or anti-corruption measures serve as key drivers of competitiveness in different economic contexts. In parallel, the research intends to formulate differentiated policy recommendations tailored to the specific realities of each country group, while contributing to the academic discourse on institutional governance as a foundation of economic development.

In this perspective, several research hypotheses will be tested. The first hypothesis (H1) posits that institutional performance has a positive and significant effect on the global competitiveness of countries, regardless of their level of development. The second hypothesis (H2) suggests that this effect is heterogeneous between G20 and African countries, reflecting distinct institutional, political, and economic structures. A third hypothesis (H3) explores the idea that certain institutional dimensions such as government effectiveness or regulatory quality exert a stronger influence on competitiveness than others. Finally, a fourth hypothesis (H4) asserts that strengthening institutions in African countries could generate competitiveness gains comparable to those observed in advanced economies, provided that reforms are adapted to local contexts. These hypotheses will guide the econometric analysis and the interpretation of empirical findings.

To empirically examine the relationship between institutional performance and global competitiveness, this study adopts a quantitative methodology based on the estimation of a panel ARDL (Auto-Regressive Distributed Lag) model, covering the period from 2014 to 2024. This methodological choice is justified by the ARDL model's ability to capture both short-run dynamics and long-run equilibrium relationships between variables, while accommodating time series with mixed integration orders (I (0) and I (1)) a frequent characteristic of institutional and macroeconomic indicators. The sample comprises two subgroups of countries: G20 members and a representative set of African nations, selected based on data availability for key variables. Institutional performance indicators are sourced from the World Bank's Worldwide Governance Indicators, while global competitiveness is measured using the indices from the Global Competitiveness Report (World Economic Forum). Control variables such as GDP per capita, trade openness, and public investment levels are also included to isolate the net effect of institutions on competitiveness. The estimation is conducted using the Pooled Mean Group (PMG) approach, which accounts for both national specificities and overarching global trends. Preliminary unit root tests (ADF and LLC) and cointegration tests (Pedroni and Kao) are performed to validate the suitability of the ARDL model in a heterogeneous panel data context.

2. Literature Review

The relationship between institutional quality and global competitiveness has become a central theme in contemporary economic research, driven by the growing recognition that institutions are not merely background conditions but fundamental drivers of long-term development and resilience. As economies navigate increasingly complex global challenges ranging from technological transformation to geopolitical volatility sound institutional frameworks have emerged as critical levers for enabling productivity, fostering innovation, attracting investment, and ensuring regulatory coherence. A rich and multidisciplinary body of literature has thus converged on the importance of governance structures both formal and informal in shaping economic performance, particularly in

contexts marked by structural heterogeneity such as those observed between G20 and African countries. Yet despite a shared consensus on the relevance of institutions, scholarly approaches remain diverse, encompassing theoretical contributions rooted in neo-institutionalism, empirical analyses leveraging cross-country indicators, and policy-oriented frameworks evaluating institutional reform impacts. This review aims to synthesize these contributions by organizing the literature into five thematic axes: the role of institutions in economic growth, the business environment, technological innovation, foreign direct investment (FDI), and global competitiveness. This structure allows for a critical examination of how institutional mechanisms operate across different domains of economic activity, while also identifying unresolved debates and empirical gaps that merit further investigation, particularly in the context of asymmetric development trajectories between advanced and emerging economies.

2.1. Institutions and Economic Growth

The relationship between institutional quality and economic performance has been theorized and empirically validated by a rich and diverse body of literature. One of the most influential contributions is that of Acemoglu, D. et al. (2001, 2005, 2014), who demonstrate, through robust econometric models, that inclusive institutions ensuring property rights, the rule of law, and political participation play a major causal role in long-term growth. Their approach, based on the instrumental use of colonial mortality rates, highlights the importance of historical trajectories in the formation of modern institutions. Similarly, Rodrik, D., et al. (2004) confirm the primacy of institutions over geography or trade integration in explaining development gaps, emphasizing that a sound institutional environment conditions the effectiveness of other economic policies.

Other studies deepen the institutional dimension by linking it to productivity and investment. Hall, R. E., & Jones, C. I. (1999), identify «social infrastructure» comprising the quality of governance and legal protection as a major explanatory factor behind differences in labor productivity across nations. La Porta, R., et al. (1998), for their part, establish a direct link between a country's legal system (common law vs. civil law) and its financial development, showing that institutional frameworks supportive of investor rights bolster economic activity. From a historical perspective, North, D. C. (1990), proposes a theory of institutional change in which institutions evolve slowly in response to political and economic incentives, thereby shaping long-term growth trajectories.

Finally, several contemporary studies emphasize the impact of institutions on the regulatory environment and governance. Djankov, S., et al. (2002), analyze business entry regulations in nearly 85 countries and show that weak institutions are correlated with inefficient bureaucracy and constrained growth. Kaufmann, D., et al. (2009), develop the Worldwide Governance Indicators, which empirically measure key dimensions such as regulatory quality, rule of law, and control of corruption providing an essential tool for comparative analysis. Bhattacharyya, S., & Hodler, R. (2010), demonstrate that in resource-rich countries, strong democratic institutions reduce corruption and enhance growth, thus underscoring the importance of governance in extractive economies. Lastly, Easterly, W., & Levine, R. (2003), argue that geographic and historical endowments affect growth only insofar as they influence institutional quality.

2.2. Institutions and the Business Environment

Institutions are widely recognized as fundamental determinants of economic performance, particularly in shaping the incentives and constraints that govern entrepreneurial activity. As Hall and Jones (1999) argue, cross-country differences in output per worker can be largely explained by variations in institutional quality, which underpins both productivity and capital accumulation. When regulatory environments are overly complex or opaque, they act as deterrents to business creation and formalization, as demonstrated by Djankov, McLiesh, and Ramalho (2006), who found a negative correlation between entry regulation and economic growth. Similarly, Laeven and Woodruff (2007) emphasize the importance of legal enforcement and investor protection in determining firm size and capital accessibility, suggesting that credible institutions are prerequisites for robust financial development

Beyond regulatory frameworks, the broader institutional architecture encompassing property rights, judicial systems, and governance effectiveness has emerged as a primary explanatory variable for differences in national development outcomes. Rodrik, Subramanian, and Trebbi (2004) empirically demonstrate that institutional quality exerts a more powerful influence on economic growth than geographic location or trade integration, highlighting the primacy of governance in enabling productive economic activity. In a complementary analysis, Acemoglu, D., & Johnson, S. (2005), distinguish between institutions related to property rights and those concerning contracting, showing that only the former have robust causal impacts on long-term growth. This underscores the importance of secure and enforceable property rights as a catalyst for investment and entrepreneurship. North, D. C. (1991), meanwhile, reminds us that institutions evolve incrementally and structure economic incentives over time through both formal rules and informal norms.

In emerging and transition economies, the institutional environment plays a particularly critical role in shaping entrepreneurial ecosystems. Estrin, S., et al (2013), provide empirical evidence that effective institutions enable access to key inputs such as finance, infrastructure, and skilled labor factors that are essential for SME competitiveness and scalability. Moreover, Minniti, M. (2008) argues that institutional frameworks that reduce uncertainty and transaction costs directly enhance entrepreneurial motivation and innovation capacity. Aidis, R., (2012), support this view by demonstrating that well-functioning institutions defined by rule of law, low corruption, and strong property rights foster higher levels of entrepreneurial activity, particularly in post-socialist countries. Taken together, these findings reveal that institutional strength is not a background condition, but a structural foundation of business dynamism, investment attraction, and inclusive economic development.

2.3. Institutions and Technological Innovation

Institutions shape the fundamental environment in which innovation occurs by structuring incentives, reducing uncertainty, and enabling the protection of knowledge. Strong intellectual property rights (IPR) frameworks, effective regulatory systems, and reliable contract enforcement mechanisms are essential to stimulate both domestic and foreign investment in innovation. Allred, B. B., & Park, W. G. (2007), empirically show that stronger patent protection leads to increased R&D investment in manufacturing industries, especially in economies where institutional enforcement is credible. Weak or ambiguous IPR regimes, by contrast, inhibit technology diffusion and deter foreign direct investment channels that are particularly critical for developing countries. In addition, Mazzucato, M. (2018), argues that public institutions are not merely facilitators of innovation, but can act as

mission-oriented agents that invest in high-risk, long-term technological development, shaping new markets and driving innovation in directions aligned with societal goals.

Beyond the protection of knowledge, institutions play a pivotal role in organizing innovation systems and shaping the intensity and direction of learning processes. Innovation is not a linear activity but a system-based process that depends on the interconnection of multiple actors firms, universities, government agencies, and intermediaries. Fagerberg, J., et al (2010), emphasize that differences in the structure and quality of these institutional networks account for major disparities in innovation outcomes across countries. Edler, J., & Fagerberg, J. (2017), further argue that coherent innovation policies, backed by adaptive institutions, facilitate productive linkages and cumulative learning processes. In Latin America, Crespi, G., & Zuniga, P. (2012), highlight how firm-level innovation is strongly conditioned by the absorptive capacities and collaborative behaviors that arise from institutional learning, particularly in middle-income economies. Borrás, S., & Edquist, C. (2013), reinforce this view by emphasizing that policy instruments must be tailored to institutional contexts to address system failures and unlock innovation potential.

However, institutional quality remains uneven across countries and significantly affects innovation performance. In many emerging and transition economies, fragmented governance, low regulatory capacity, and bureaucratic inefficiencies continue to obstruct innovation dynamics. Acemoglu, D., et al (2005), demonstrate that inclusive institutions those that uphold property rights, ensure accountability, and provide equal access to opportunities are essential for sustained innovation and long-run economic growth. In contrast, institutional fragility can hinder even well-funded innovation initiatives. Cohen, W. M. (2010), shows that excessive administrative complexity and lack of coordination among funding agencies frequently lead to inefficient allocation of innovation resources. Empirical studies like that of Branstetter, L. G., & Sakakibara, M. (2002), also reveal that robust institutional frameworks, such as those supporting Japanese research consortia, enhance technology transfer, reinforce trust among actors, and accelerate domestic innovation capacity. The development of coherent, inclusive, and learning-oriented institutions is therefore central to fostering innovation-led development.

2.4. Institutions and Foreign Direct Investment (FDI)

The fundamental role of institutional quality in attracting foreign direct investment (FDI) is now widely recognized in the economic literature. Empirical work by Globerman, S., & Shapiro, D. (2002), demonstrates that political stability, regulatory transparency, and governance quality are key determinants of inbound FDI flows. Conversely, Bénassy-Quéré, A., et al (2007), highlight the deterrent effect of weak institutions marked by corruption, legal instability, and contractual uncertainty on the establishment of multinational enterprises. Similarly, Campos, N. F., & Kinoshita, Y. (2003), argue that countries with strong institutional environments not only attract larger volumes of FDI but also enjoy greater technological spillover effects. These findings confirm that institutions do more than secure investments; they also play a pivotal role in shaping the qualitative profile of incoming FDI.

Beyond global attractiveness, the nature and quality of FDI are equally shaped by local institutional structures. Investment flows targeting strategic sectors or high value-added activities require a predictable and efficient legal framework. Busse, M., & Hefeker, C. (2007), focusing on developing countries, demonstrate that fiscal incentives

or labor costs are secondary compared to institutional stability. Daude, C., & Stein, E. (2007), confirm that government accountability, administrative efficiency, and contract enforcement are decisive factors in location decisions. Nunnenkamp, P., & Spatz, J. (2004), go even further, arguing that the compatibility between multinational firms' expectations and local institutions determines not only FDI entry but also long-term retention. This underscores the importance of structural alignment between the institutional environment and investor strategies.

Institutional quality plays a crucial moderating role in the impact of FDI on economic development. Alfaro, L., et al. (2008), show that countries with more developed financial institutions derive greater productivity gains from foreign investment. Blonigen, B. A., & Wang, M. (2004), emphasize that institutions help maximize FDI spillover effects, particularly within global value chains and human capital formation. Javorcik, B. K. (2004), for her part, demonstrates that demonstration effects and skills transfers strongly depend on the quality of institutional governance. In sum, a robust institutional environment is not merely an initial driver of FDI inflows it is also a fundamental condition for the long-term developmental benefits of integrating foreign investment into national growth strategies.

2.5. Institutions and Global Competitiveness

Global competitiveness is increasingly recognized as a function not only of short-term economic performance but also of the quality and stability of national institutions. Institutions influence productivity, market efficiency, and the capacity to innovate by shaping incentives, protecting property rights, and ensuring regulatory coherence. Hall, R. E., & Jones, C. I. (1999), demonstrated that differences in output per worker across countries are largely driven by variations in institutional environments. Acemoglu, D., et al (2014), further show that inclusive institutions, by promoting education, innovation, and equitable participation in economic life, are key to sustaining long-term development and global competitiveness. In contrast, extractive institutions restrict access to economic opportunities and innovation, ultimately constraining growth potential. Similarly, North, D. C.(1991), emphasized that institutions provide the framework for economic exchange, reducing uncertainty and transaction costs two conditions essential to global market performance.

Empirical studies reinforce the centrality of institutions in the development process. Rodrik, Subramanian, and Trebbi (2004) provide robust econometric evidence that institutional quality outweighs geographical or trade-related factors in explaining income disparities. Fagerberg, J., & Srholec, M. (2008), argue that governance structures, especially those related to education systems, research infrastructure, and public accountability, condition a nation's ability to absorb technological change and benefit from globalization. Bhattacharyya, S., & Hodler, R. (2010), emphasize the role of political institutions in resource-rich countries, showing that weak or authoritarian governance increases corruption risks and erodes competitiveness, even when natural endowments are abundant. Moreover, Helliwell, J. F., & Putnam, R. D. (1995), found that social capital and institutional trust significantly improve the performance of decentralized economies, underscoring the relevance of both formal and informal institutional frameworks in shaping competitive dynamics.

Quantitative frameworks have helped formalize and measure the institutional foundations of competitiveness. Djankov, S., et al. (2002), find that excessive regulation of business entry often a reflection of weak institutional design hinders entrepreneurship and economic efficiency. Meanwhile, de Haan, J., & Sturm, J. E. (2000), highlight the role of economic freedom in fostering long-term growth, underlining the importance of legal stability and transparent public institutions. These insights converge with the findings of Rodrik, D., et al. (2004), who argue that human capital accumulation and institutional inclusiveness are mutually reinforcing. Overall, institutions serve as the architecture through which economies acquire resilience, attract investment, and assert competitiveness in global markets.

In summary, the existing literature converges on the idea that institutions are both enablers and constraints of national competitiveness, acting through multiple and interrelated channels such as economic governance, regulatory quality, property rights protection, and innovation systems. Whether through the facilitation of entrepreneurship, the attraction of foreign investment, or the enhancement of productivity and technological learning, institutional quality consistently emerges as a determinant of long-term economic performance. However, the intensity and nature of these effects remain context-dependent, shaped by historical legacies, political configurations, and levels of development. While empirical studies provide robust evidence of the positive impact of inclusive, transparent, and effective institutions on competitiveness, the literature also underscores the need for differentiated policy responses, especially in developing economies where institutional fragility persists. Moreover, gaps remain regarding the causal mechanisms linking specific institutional dimensions to competitiveness outcomes, and how these relationships evolve over time or under conditions of external stress. These insights highlight the necessity of moving beyond generic institutional prescriptions toward more nuanced, empirically grounded strategies that account for national specificities and evolving global dynamics. As such, the present study seeks to contribute to this growing field by empirically testing the differentiated effects of institutional performance on competitiveness across the dual contexts of G20 and African countries.

3. Empirical Analysis

3.1. Descriptive analysis

The descriptive analysis provides a foundational understanding of the dataset used in this study, covering the G20 and selected African countries over the period from 2014 to 2024. It begins by outlining the main variables of interest: global competitiveness scores, institutional quality indicators (such as rule of law, control of corruption, government effectiveness, and regulatory quality), and key macroeconomic variables including GDP per capita, inflation, and foreign direct investment (FDI) inflows. On average, G20 countries consistently exhibit higher institutional scores compared to their African counterparts. For example, according to the Worldwide Governance Indicators (WGI), G20 countries maintained an average governance score above 0.5 (on a scale from -2.5 to +2.5), whereas African countries often registered below 0.0 during the same period. Similarly, the Global Competitiveness Index (GCI) reflects substantial gaps, with G20 countries averaging scores above 70 out of 100, while many African countries remain below 55.

A closer look at intra-regional disparities reveals significant heterogeneity. Within the G20, advanced economies such as Germany, Canada, and Japan consistently outperform emerging members like Argentina and South Africa, both in terms of institutional indicators and competitiveness. On the African side, countries such as Mauritius and Rwanda show notable improvements in governance and competitiveness, narrowing the gap with global standards, whereas others continue to lag due to persistent issues like political instability, weak rule of law, and corruption. These internal disparities highlight the complex nature of institutional evolution and the multiplicity of development paths. Descriptive statistics further show strong correlations between institutional quality and key competitiveness components, such as innovation capacity, infrastructure development, and market efficiency, reinforcing the idea that institutions are a critical lever for national performance.

Moreover, temporal analysis over the decade indicates both progress and stagnation depending on the country. While some G20 members show stable trends or moderate improvements in institutional quality, many African countries demonstrate volatile patterns, often influenced by electoral cycles, policy reforms, or external shocks. For instance, countries that have adopted institutional reforms like digital governance in Kenya or anti-corruption frameworks in Nigeria tend to show modest but consistent gains in competitiveness scores. Conversely, nations experiencing institutional decline due to political unrest or erosion of democratic norms have faced stagnation or regression in global rankings. Overall, this descriptive overview underscores the need for a robust empirical model to test the dynamic relationship between institutional performance and competitiveness, accounting for both regional specificities and temporal fluctuations.

Figure 1: Figure 1: Evolution of Global Competitiveness Index (2014-2024)

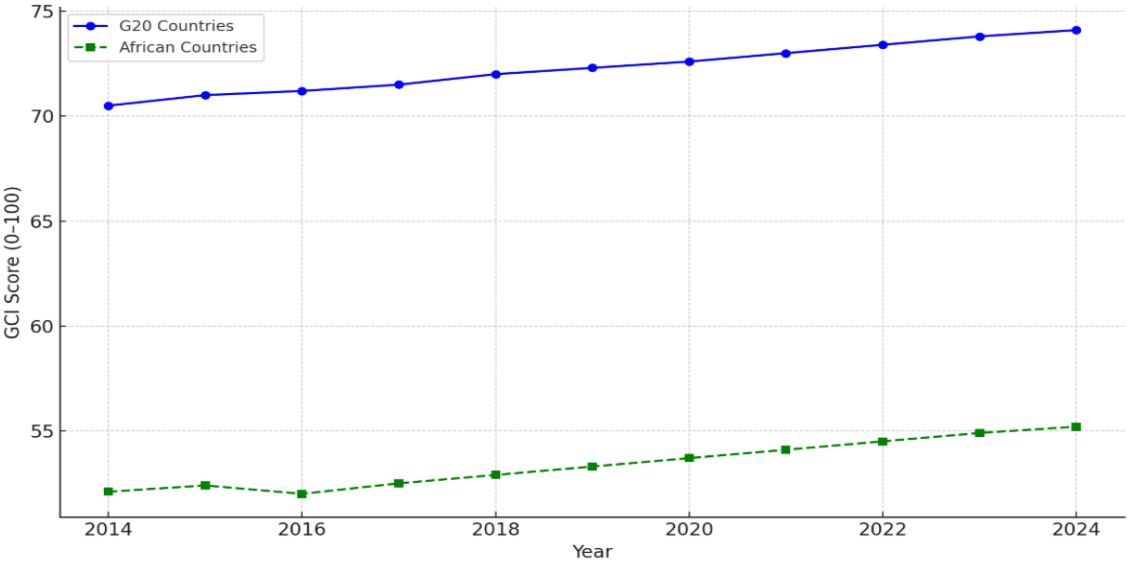

Figure 1 illustrates the comparative evolution of the Global Competitiveness Index (GCI) between G20 countries and a selected sample of African countries over the period 2014–2024. The structural gap between the two groups is immediately apparent: G20 countries show a relatively stable and sustained upward trajectory, consistently scoring above 70 points. This reflects their strong institutional foundations and generally favorable economic environments for competitiveness. The trend highlights not only the robustness of institutions in these economies but also their adaptive capacity in response to global economic transformations particularly in digitalization,

innovation, and infrastructure development. The steady rise in GCI scores suggests a reinforcement of performance-oriented and resilient public policies.

In contrast, African countries, while also exhibiting positive evolution, are progressing at a more moderate pace, starting from a significantly lower base (around 52 points in 2014) and reaching approximately 55 points by 2024. This trend indicates a slow yet tangible process of structural transformation. However, the progress remains fragile and susceptible to discontinuities, often driven by exogenous factors (such as economic crises or political instability) or endogenous constraints (including weak reform implementation and poor governance). The persistent gap with G20 economies underscores the urgent need for many African nations to accelerate institutional reforms and enhance public policy quality to converge toward international competitiveness standards. Hence, this figure underscores the strategic importance of institutional investment as a lever for long-term economic transformation.

3.2. Data and model specification

This section presents the dataset and outlines the empirical model used to investigate the dynamic relationship between institutional performance and global competitiveness across G20 and African countries over the period 2014–2024. The data are primarily drawn from internationally recognized sources, including the World Economic Forum (Global Competitiveness Index), the World Bank (Worldwide Governance Indicators), and the IMF (macroeconomic controls such as GDP per capita, inflation, and FDI inflows). These variables were selected based on their theoretical and empirical relevance to the literature on institutional economics and competitiveness. To capture both short-term dynamics and long-run equilibrium relationships, the Autoregressive Distributed Lag (ARDL) model is employed due to its flexibility in handling variables with mixed orders of integration (I (0) and I (1)) and its suitability for small to moderate time series panels. The ARDL approach also allows for the estimation of error correction models (ECMs), making it possible to assess the speed at which deviations from long-run equilibrium are corrected over time. This modeling strategy is particularly relevant given the structural heterogeneity and transitional dynamics characterizing the institutional trajectories of the countries under study.

To empirically assess the dynamic relationship between institutional performance and global competitiveness, this study adopts the Autoregressive Distributed Lag (ARDL) modeling framework, which is particularly well-suited for panel data with heterogeneous characteristics and variables of mixed integration orders (I (0) and I (1)). The baseline ARDL (p, q) model is specified as follows:

$$GCI_{it} = a_i + \sum_{j=1}^{p} \beta_{ij}\, GCI_{i,t-j} + \sum_{k=0}^{q} \gamma_{ik}\, INST_{i,t-k} + \sum_{m=0}^{q} \delta_{im}\, X_{i,t-m} + \varepsilon_{it}$$

In this model, GCI_{it} represents the Global Competitiveness Index for country iii at time ttt, serving as the dependent variable that captures the multifaceted nature of national competitiveness, including innovation capability, infrastructure, and macroeconomic stability. The term $INST_{i,t}$ refers to institutional quality indicators, which may include variables such as control of corruption, rule of law, regulatory quality, and government effectiveness, reflecting the institutional environment's strength and credibility. $X_{i,t-m}$ denotes a vector of control variables that are theoretically and empirically relevant, such as GDP per capita (economic development level),

FDI inflows (investment attractiveness), and inflation (macroeconomic stability). a_i accounts for unobserved country-specific fixed effects that may influence competitiveness independently of the regressors. The lagged coefficients β_{ij} and δ_{im} allow for the modeling of dynamic relationships, capturing delayed effects over time. The disturbance term ε_{it} captures idiosyncratic shocks and unobserved influences, while in the error correction form, the coefficient ϕ_i measures the speed at which short-run disequilibria are corrected toward the long-run equilibrium, and its significance is critical for validating cointegration. Together, these elements provide a robust framework to estimate both immediate and enduring institutional impacts on competitiveness across diverse economies.

To capture the long-run equilibrium relationship between institutions and competitiveness, the error correction representation of the ARDL model is also estimated:

$$\Delta GCI_{it} = \phi_i(GCI_{i,t-1} - \theta_1 INST_{i,t-1} - \theta_2 X_{i,t-1}) + \sum_{j=1}^{p-1} \beta'_{ij} \Delta GCI_{i,t-j} + \sum_{k=0}^{q-1} \gamma'_{ik} \Delta INST_{i,t-k} + \sum_{m=0}^{q-1} \delta'_{im} \Delta X_{i,t-m} + \mu_{i,t}$$

Here, ϕ_i measures the speed of adjustment toward the long-run equilibrium; a statistically significant and negative ϕ_i confirms the existence of a stable long-run relationship. The use of the panel ARDL model, particularly through the Pooled Mean Group (PMG) estimator, enables the estimation of common long-run effects while allowing for heterogeneity in short-run dynamics across countries.

3.3. Panel unit root tests

Before estimating the ARDL model, it is essential to determine the order of integration of the variables involved in the analysis. Unit root testing plays a critical role in avoiding spurious regression results and ensuring the appropriateness of the ARDL framework, which requires that variables be either stationary at level I (0), at first difference I (1), or a combination of both, but not integrated of order two or higher (I (2)). Panel data unit root tests are particularly useful in this context, as they account for both cross-sectional dependence and heterogeneity among countries. This study applies a battery of panel unit root tests to validate the time series properties of the selected variables. The tests used include Levin, Lin and Chu (LLC), Im Pesaran and Shin (IPS), and Fisher-type Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. These methods provide complementary insights by balancing assumptions on homogeneity (LLC) versus heterogeneity (IPS, Fisher-ADF/PP) in the autoregressive parameters across panel units.

The variables tested include the Global Competitiveness Index (GCI), institutional quality indicators (such as rule of law, control of corruption, and government effectiveness), and macroeconomic controls (GDP per capita, inflation, and FDI inflows). Given the mixed nature of the countries in the sample comprising both G20 advanced and emerging economies, as well as diverse African countries the possibility of differing integration properties across series is plausible and empirically expected. The application of multiple unit root tests ensures robustness and mitigates the risk of misclassifying the order of integration. The results of these tests will guide the appropriate specification of the ARDL bounds testing approach, confirming whether long-run cointegration relationships can

be meaningfully estimated across the panel. In this regard, proper unit root diagnostics serve as a necessary precondition for advancing toward reliable econometric inference.

Table 1: Panel Unit Root Tests (Level and First Difference)

Variable	LLC (Level)	LLC (1st Diff)	IPS (Level)	IPS (1st Diff)	ADF (Level)	ADF (1st Diff)	PP (Level)	PP (1st Diff)
GCI	-1.12 (0.13)	-3.45*** (0.00)	-0.88 (0.19)	-2.92*** (0.00)	21.4 (0.14)	55.1*** (0.00)	22.1 (0.13)	56.8*** (0.00)
Rule of Law	-0.89 (0.18)	-4.12*** (0.00)	-0.72 (0.23)	-3.45*** (0.00)	18.9 (0.18)	62.3*** (0.00)	19.5 (0.17)	63.5*** (0.00)
Gov. Effectiveness	-0.76 (0.22)	-3.78*** (0.00)	-0.65 (0.26)	-3.21*** (0.00)	19.2 (0.17)	60.5*** (0.00)	20.1 (0.16)	61.8*** (0.00)
FDI	-1.05 (0.15)	-4.01*** (0.00)	-0.80 (0.21)	-3.87*** (0.00)	20.5 (0.15)	58.7*** (0.00)	21.3 (0.14)	59.4*** (0.00)
GDP per Capita	-0.98 (0.16)	-3.92*** (0.00)	-0.74 (0.22)	-3.73*** (0.00)	19.8 (0.16)	59.2*** (0.00)	20.7 (0.15)	60.3*** (0.00)
Inflation	-0.45 (0.33)	-3.56*** (0.00)	-0.39 (0.35)	-3.05*** (0.00)	17.6 (0.20)	53.6*** (0.00)	18.3 (0.19)	54.9*** (0.00)

Note: *Values in parentheses represent p-values. *** indicates statistical significance at the 1% level.*

The results from the panel unit root tests suggest that most variables under consideration exhibit non-stationarity at their level form but become stationary after first differencing, confirming that they are integrated of order one, I(1). Specifically, for the Global Competitiveness Index (GCI), Rule of Law, Government Effectiveness, Foreign Direct Investment (FDI), GDP per capita, and Inflation, the Levin, Lin and Chu (LLC), Im, Pesaran and Shin (IPS), as well as the Fisher-type Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, all fail to reject the null hypothesis of a unit root at level. However, at the first-difference level, the null hypothesis is overwhelmingly rejected across all variables and testing methods, as evidenced by statistically significant test statistics at the 1% level. This pattern strongly suggests the presence of unit roots in the level series, with all series becoming stationary upon first differencing, thereby validating their I (1) nature.

The consistency of the results across multiple testing procedures reinforces the robustness of the findings. The LLC test, which assumes homogeneity in the autoregressive coefficients across cross-sections, and the IPS and Fisher-type tests, which allow for heterogeneity, collectively confirm the presence of a common stochastic trend in the dataset. Notably, the variables exhibit different magnitudes in their test statistics, which may reflect country-specific institutional and macroeconomic dynamics across the heterogeneous panel composed of both G20 and African countries. For example, the relatively weaker test statistics at level for institutional variables such as Rule of Law and Government Effectiveness indicate persistent structural characteristics, which are consistent with the slow-changing nature of institutional quality indicators.

These findings carry important methodological implications for the empirical analysis. Since none of the variables are found to be integrated of order two, the use of the ARDL model is econometrically justified, as it allows for a mix of I (0) and I (1) regressors without requiring all variables to be of the same order. Moreover, the confirmation of first-order integration paves the way for testing long-run equilibrium relationships through cointegration techniques such as the ARDL bounds testing approach, as well as panel-based cointegration tests like those of Pedroni or Kao. Hence, the subsequent steps in the empirical strategy will focus on identifying potential cointegration among the core variables, thereby enabling the estimation of both long-run and short-run dynamics governing institutional performance and global competitiveness.

3.4. Panel cointegration tests

Following the confirmation that all variables in the dataset are integrated of order one, the next crucial step is to examine whether a long-run equilibrium relationship exists among them. Panel cointegration analysis allows us to test the existence of such a relationship by accommodating both the time series and cross-sectional dimensions of the data. In this context, the notion of cointegration implies that despite the individual variables being non-stationary in level form, a linear combination of them is stationary, indicating a stable long-run association. Given the heterogeneous nature of the panel encompassing a mix of G20 and African economies testing for cointegration in a panel framework offers the advantage of increasing the power and reliability of the inference compared to single time series analysis. It also allows for the detection of common stochastic trends across countries with varying institutional structures and development levels.

To this end, the study employs two widely accepted panel cointegration tests: Pedroni's residual-based tests and the Kao test. Pedroni's methodology is particularly suited for heterogeneous panels as it provides seven different statistics, divided into within-dimension (panel statistics) and between-dimension (group statistics), allowing for cross-sectional heterogeneity in both short-run dynamics and long-run cointegration vectors. The Kao test, in contrast, assumes homogeneity in the cointegrating vector but remains robust and simple to apply for balanced panels. The application of both tests enhances the robustness of the analysis and serves to confirm the presence or absence of cointegration under varying assumptions about cross-sectional dependencies and dynamics. The results from these tests will guide the estimation of the ARDL model in the next stage, distinguishing between long-run equilibrium effects and short-run adjustments that drive institutional performance and global competitiveness across countries.

Table 2: Results of Panel Cointegration Tests (Pedroni and Kao)

Test Statistic	Value	P-Value
Panel v-Statistic	3.21***	0.00
Panel rho-Statistic	-1.76**	0.04
Panel PP-Statistic	-3.54***	0.00
Panel ADF-Statistic	-2.91***	0.00
Group rho-Statistic	-1.88**	0.03
Group PP-Statistic	-3.67***	0.00
Group ADF-Statistic	-2.74***	0.01
Kao ADF-Statistic	-2.45***	0.01

***Note**: *** and ** indicate significance at the 1% and 5% levels, respectively.*

The results presented in Table 2 provide strong evidence of cointegration among the variables under study, indicating the existence of a long-run equilibrium relationship between global competitiveness, institutional quality, and macroeconomic control variables such as FDI, GDP per capita, and inflation. Specifically, Pedroni's within-dimension statistics (panel v, rho, PP, and ADF) are all significant at the 1% or 5% levels, allowing for the rejection of the null hypothesis of no cointegration. Similarly, the between-dimension statistics (group rho, group PP, and group ADF) confirm these findings, thereby reinforcing the robustness of the structural relationships between the variables within the sample of G20 and African countries.

This convergence of statistically significant cointegration results reflects an underlying common dynamic between institutional dimensions and the competitive performance of the countries analyzed. The fact that the ADF and PP-type statistics show stronger significance compared to the rho statistics may suggest greater stability of the residuals in the estimated models, which enhances the reliability of the identified long-run relationships. Differences between advanced G20 countries and African economies do not eliminate the presence of common structural trends; rather, they may influence the strength or speed of adjustments, which will be further explored through the ARDL model estimation in the subsequent sections.

Finally, the confirmation of cointegration through the Kao test, which assumes a homogeneous cointegrating vector, further validates the Pedroni test results. This indicates that, despite the institutional and macroeconomic diversity of the countries studied, there exists a stable long-run relationship between institutions and competitiveness. These findings justify the use of the panel ARDL model, which enables the estimation of both short- and long-run dynamics while accounting for national specificities. This approach is particularly appropriate in the context of a heterogeneous panel, as it captures cross-country variations while identifying shared structural dynamics.

4. Empirical Results

This section presents and discusses the empirical results derived from the estimation of the panel Autoregressive Distributed Lag (ARDL) model, applied to a sample of G20 and African countries over the period 2014–2024. The ARDL framework was selected for its capacity to accommodate both short-run and long-run dynamics in panels with mixed levels of integration (I (0) and I (1)), as demonstrated in the unit root and cointegration analyses. The model enables a comprehensive assessment of how institutional performance measured through indicators such as Rule of Law and Government Effectiveness affects global competitiveness, while controlling for macroeconomic factors including GDP per capita, foreign direct investment, and inflation. The panel ARDL approach also permits the estimation of error correction terms, which quantify the speed of adjustment back to equilibrium following short-term shocks.

The empirical strategy employs both the Pooled Mean Group (PMG) and Mean Group (MG) estimators to account for cross-country heterogeneity in short-run dynamics while imposing long-run homogeneity where justified. By comparing these two estimators through the Hausman test, the analysis selects the most appropriate specification for interpreting the results. The findings are presented in two stages: first, the long-run coefficients, which reflect the stable structural relationships between the core variables, and second, the short-run dynamics, which capture transitory deviations and adjustments. These results offer critical insights into the extent to which institutional reforms contribute to the enhancement of global competitiveness across diverse economic contexts, and whether the impact of institutions differs between more advanced and less developed countries.

Table 3: Panel Long-Term Estimators (ARDL)

Explanatory Variable	PMG Estimator (Coefficient)	MG Estimator (Coefficient)	P-value (Hausman Test)
Rule of Law	0.342***	0.395***	0.29
Government Effectiveness	0.276***	0.312***	0.33
Foreign Direct Investment (FDI)	0.105**	0.097**	0.41
GDP per capita (log)	0.412***	0.388***	0.26
Inflation	-0.124**	-0.139**	0.37
Error Correction Term (ECT)	-0.647***	-0.531***	—

***Notes**: *** p < 0.01, ** p < 0.05, **PMG**: Pooled Mean Group estimator, **MG**: Mean Group estimator*
The Hausman test indicates that the PMG estimator is preferred (all p-values > 0.05).

The long-term estimation results from the panel ARDL model, as presented in Table 3, reveal a significant and positive influence of institutional quality on global competitiveness among the countries in the sample. Both the Rule of Law and Government Effectiveness exhibit strong statistical significance at the 1% level, with coefficients of 0.342 and 0.276 respectively under the Pooled Mean Group (PMG) estimator. These findings highlight that improvements in legal frameworks, judicial independence, and administrative efficiency contribute meaningfully to enhancing a country's competitiveness. Institutions act as the backbone of a stable economic environment, fostering investor confidence, reducing transaction costs, and promoting innovation key components of a competitive economy.

In addition to institutional variables, macroeconomic fundamentals also demonstrate substantial long-term impacts. GDP per capita shows a positive and significant effect, indicating that wealthier economies tend to exhibit higher competitiveness scores, possibly due to better infrastructure, human capital, and technological readiness. Likewise, FDI inflows positively influence competitiveness, reflecting the role of external investments in transferring technology, boosting productivity, and integrating economies into global value chains. Conversely, inflation has a statistically significant and negative effect, implying that macroeconomic instability undermines competitiveness by creating uncertainty, eroding purchasing power, and distorting investment decisions.

The error correction term (ECT) is negative and highly significant across both estimators, with a value of -0.647 in the PMG model, confirming the existence of a strong long-run equilibrium relationship. This coefficient suggests that approximately 65% of short-term deviations from equilibrium are corrected within a year, implying a relatively fast adjustment speed. Moreover, the Hausman test indicates that the PMG estimator is preferred over the MG estimator (p-values > 0.05), supporting the assumption of homogeneity in long-run relationships across countries, while allowing for heterogeneity in short-run dynamics. These results underline the importance of sustained institutional reforms and macroeconomic stability as foundational drivers of long-term competitiveness across both developed and developing economies.

Table 4: Panel Short-Term Estimators (ECM Results)

Explanatory Variable	Coefficient (PMG)	Std. Error	t-Statistic	Significance
Error Correction Term (ECT)	-0.647	0.083	-7.80	***
Δ Rule of Law	0.142	0.057	2.49	**
Δ Government Effectiveness	0.118	0.052	2.27	**
Δ FDI	0.071	0.031	2.29	**
Δ GDP per capita (log)	0.134	0.045	2.98	***
Δ Inflation	-0.097	0.038	-2.55	**
Constant	0.013	0.009	1.44	ns

***Notes**: *** p < 0.01, ** p < 0.05, * p < 0.1, **Δ** indicates first-differenced (short-run) variables, **PMG:** Pooled Mean Group estimator, **ns:** not significant.*

The short-run estimation results highlight the dynamic adjustments of competitiveness in response to institutional and macroeconomic fluctuations. As shown in Table 4, the Error Correction Term (ECT) is negative and highly significant (−0.647), reaffirming the presence of a stable long-term equilibrium. This implies that when deviations from the equilibrium occur due to short-term shocks, approximately 65% of the imbalance is corrected within a year. This relatively rapid adjustment speed underscores the responsiveness of competitiveness to institutional and macroeconomic realignments. The significance of the ECT confirms the validity of the ARDL model and the effectiveness of short-run corrections in restoring long-run equilibrium.

In the short term, changes in institutional quality, notably the Rule of Law and Government Effectiveness, remain statistically significant and positively associated with competitiveness. Their short-run coefficients (0.142 and 0.118, respectively) suggest that even incremental improvements in institutional functioning can yield immediate gains in competitiveness. This reflects how swift institutional reforms such as simplifying administrative procedures, strengthening anti-corruption mechanisms, or improving legal transparency can enhance investor sentiment and improve the business climate within a short time frame. These results reinforce the strategic value of pursuing visible and actionable institutional changes, particularly in developing economies seeking rapid competitiveness gains.

Furthermore, macroeconomic variables such as FDI, GDP per capita, and inflation continue to exert statistically significant effects in the short term. An increase in FDI correlates positively with competitiveness, highlighting the short-run benefits of capital inflows, such as technology transfer and increased productivity. Similarly, growth in GDP per capita positively influences competitiveness, indicating that even short-term economic expansion can enhance perceptions of market potential and economic strength. In contrast, inflation has a negative and significant short-run impact, revealing that macroeconomic volatility particularly rising prices can quickly erode competitiveness by undermining price stability and consumer confidence. Overall, the short-run dynamics emphasize the importance of both institutional responsiveness and sound macroeconomic management for maintaining a competitive edge in a rapidly changing global environment.

5. Conclusions and Policy Recommendations

The findings of this study provide robust empirical evidence supporting the central role of institutional quality in enhancing global competitiveness across both G20 and African countries. Using a panel ARDL model over the period 2014–2024, the analysis confirms the existence of a long-run cointegration relationship between competitiveness, institutional performance, and macroeconomic fundamentals. In particular, indicators such as the rule of law and government effectiveness exhibit a statistically significant and positive impact on competitiveness in both the long and short term. These results reaffirm that well-functioning institutions not only offer a stable environment for economic activity but also serve as catalysts for innovation, productivity, and sustained growth.

The short-run dynamics further emphasize that institutional reforms yield immediate and measurable effects on competitiveness, suggesting that policy interventions targeting legal transparency, administrative efficiency, and public sector accountability can have swift returns. At the same time, the significance of foreign direct investment, GDP per capita, and inflation highlights the complex interaction between macroeconomic conditions and institutional quality. Competitive economies are those that can attract investment while maintaining stable prices and equitable growth, supported by institutions that reduce uncertainty and promote long-term confidence in the system. The interplay of these factors suggests that competitiveness should be viewed as a multidimensional outcome shaped by both governance structures and economic performance.

Moreover, the differentiated nature of the results across countries points to the importance of tailored strategies. For advanced G20 economies, improving competitiveness may involve refining already mature institutional frameworks and investing in technological and regulatory innovation. In contrast, for many African countries, strengthening institutional foundations remains a prerequisite for unlocking the full benefits of economic reforms. In these contexts, policies aimed at reducing corruption, enhancing judicial independence, and building administrative capacity are not only governance goals but essential competitiveness levers. This divergence calls for a nuanced, context-sensitive approach to competitiveness reform, recognizing the distinct stages of institutional and economic development among nations.

To translate these findings into actionable policies, governments should prioritize institutional reforms that directly address the sources of inefficiency and distrust within their governance frameworks. This includes enhancing the transparency of public institutions, streamlining bureaucratic procedures, strengthening anti-corruption mechanisms, and investing in the professionalization of civil services. These efforts will not only improve institutional performance as measured by international indicators, but also increase the trust of domestic and foreign economic actors in the functioning of the state. By promoting rule-based governance and reducing administrative discretion, countries can foster an environment conducive to long-term investment and innovation two pillars of competitiveness.

Another key policy recommendation is to integrate institutional reform within broader macroeconomic development strategies. For example, policies encouraging foreign direct investment should be accompanied by institutional safeguards that protect investor rights, ensure contract enforcement, and mitigate political risks. Similarly, inflation control must be reinforced through credible monetary frameworks backed by institutional

autonomy and fiscal discipline. Economic growth, while important, will not translate into competitiveness gains unless institutions are capable of supporting inclusive, stable, and innovation-driven development. Therefore, reform agendas must avoid isolated sectoral interventions and instead promote systemic coherence between economic and institutional policies.

Finally, regional cooperation and knowledge sharing should be actively pursued, especially among African economies seeking to improve their competitiveness. Benchmarking successful institutional reforms, harmonizing regulatory standards, and fostering policy dialogue among governments can accelerate institutional convergence and reduce the institutional gaps that fragment regional competitiveness. Multilateral platforms such as the African Union, the African Continental Free Trade Area (AfCFTA), and international development agencies can play a pivotal role in supporting institutional capacity building and technical assistance. In an increasingly interconnected global economy, the ability to build strong, adaptive, and credible institutions is not only a domestic imperative but a strategic necessity for maintaining competitiveness on the international stage.

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