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FDI and Inclusive Development What Institutional Levers to Reduce Regional Inequalities A Comparative Study.

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Abstract:

This study investigates the institutional mechanisms through which Foreign Direct Investment (FDI) contributes to inclusive development and reduces regional inequalities in Sub-Saharan Africa. Focusing on three representative countries Nigeria, South Africa, and Ethiopia this research adopts an Autoregressive Distributed Lag (ARDL) panel model over the period 2011 to 2024 to examine the long-run and short-run relationships between regional inequality and key explanatory variables: FDI inflows, GDP per capita, institutional quality, and infrastructure investment. The results reveal that while FDI reduces spatial disparities in Nigeria and South Africa, it exacerbates them in Ethiopia, where investment is spatially concentrated. Furthermore, institutional quality and infrastructure investment consistently demonstrate significant negative effects on regional inequality, highlighting the critical role of governance and territorial planning in ensuring inclusive development. The findings emphasize the need for differentiated policy approaches that integrate economic, institutional, and spatial dimensions of development, and call for stronger regional governance frameworks to harness FDI for equitable growth. The study offers actionable policy recommendations and contributes to the growing literature on spatial justice and developmental state strategies in Africa.

Keywords: Regional inequality; Inclusive development; Foreign direct investment (FDI); Institutional quality; Infrastructure; ARDL model; Sub-Saharan Africa; Nigeria; South Africa; Ethiopia; Spatial disparities.

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1. Introduction

Sub-Saharan Africa remains one of the regions most affected by regional inequalities, both in terms of socio-economic development and in attracting foreign direct investment (FDI). According to UNCTAD's 2023 report, FDI flows to Africa declined by 21% in 2022, reaching $45 billion, with a highly uneven distribution. South Africa and Nigeria remain among the top recipients, with $9 billion and $5 billion respectively, while Ethiopia, though receiving less, remains a leading East African destination with $2.4 billion in 2022, primarily directed towards infrastructure and light manufacturing. This sectoral and geographical concentration of FDI exacerbates structural regional disparities, often compounded by weak institutional frameworks for territorial governance.

At the same time, efforts toward inclusive development defined as economic growth accompanied by a reduction in socio-spatial inequalities vary significantly among the three countries. In South Africa, despite a relatively high GDP per capita (around $6,700 in 2023), inequality remains among the highest globally, with a Gini coefficient of 0.63. Nigeria, the continent’s demographic giant (with over 223 million inhabitants), faces sharp disparities between the northern and southern regions in terms of poverty levels and access to basic services. Ethiopia, while experiencing sustained economic growth (5.3% annual growth in 2022), still suffers from limited infrastructure access outside of Addis Ababa. This asymmetry raises concerns about the effectiveness of national policies in redistributing the benefits of growth through institutional mechanisms.

In this context, institutional levers appear to be a key factor in managing FDI flows and promoting more equitable territorial development. The implementation of economic zoning policies, reform of local governance frameworks, and fiscal decentralization are among the strategies used, with varying results depending on the national context. For instance, Nigeria's special economic zones (SEZs) have often been criticized for their weak integration into local economies, while Ethiopia has adopted a more centralized but coherent approach to industrial park development. In South Africa, regional development agencies enjoy a degree of autonomy but face challenges stemming from post-apartheid institutional fragmentation. A comparative study of these three models could thus help identify the most effective institutional levers to reconcile FDI attractiveness with regional cohesion.

Despite sustained growth in certain regions of sub-Saharan Africa and renewed interest from foreign investors, the benefits of FDI inflows remain concentrated in geographically limited areas, thereby reinforcing existing regional imbalances. The persistence of these inequalities

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raises critical questions about the role of national and local institutions in guiding, regulating, and spatially distributing investment. In a context where market dynamics tend to favor already developed and well-connected regions, it becomes essential to examine how institutional mechanisms can contribute to inclusive development understood not merely as GDP growth but as a territorially equitable improvement in well-being. Institutional fragmentation, limited capacity of local governments, and weak redistribution mechanisms are among the major obstacles that must be addressed if FDI is to serve as a vector of spatial cohesion.

This comparative study aims to explore the institutional levers employed by Nigeria, South Africa, and Ethiopia to reduce regional inequalities within an increasingly globalized investment landscape. It revolves around several key research questions: What institutional frameworks govern the territorial management of FDI in these three countries? To what extent do national development policies incorporate goals of spatial inclusivity? What kinds of institutional reforms such as decentralization, special economic zones, and territorial planning have been implemented, and with what differentiated outcomes across contexts? Finally, what lessons can be drawn from comparing these three national trajectories to inform more effective and equitable public policies within the contemporary African context?

The primary objective of this research is to conduct a comparative analysis of the institutional mechanisms implemented in Nigeria, South Africa, and Ethiopia to govern the attraction and spatial distribution of foreign direct investment (FDI), while contributing to the reduction of regional inequalities. By adopting a multidimensional approach that intersects economic, institutional, and territorial dynamics, this study seeks to identify the mechanisms through which FDI flows can be aligned with inclusive development goals. It also aims to understand how institutional capacity defined as the set of resources, competencies, and legal frameworks available at various levels of governance shapes the effectiveness of public policies in promoting territorial equity. Ultimately, the research aspires to generate policy-relevant insights for both African policymakers and international development partners in the areas of spatial planning and economic cooperation.

Three main hypotheses underpin this comparative inquiry. H1: The more decentralized and operationally capable local institutions are, the more effectively they can channel FDI toward historically marginalized regions. H2: The effectiveness of special economic zones as tools for reducing regional disparities depends significantly on their integration within coordinated and inclusive territorial development policies. H3: The coherence between national development strategies and territorial governance frameworks is a critical factor in transforming FDI into a

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lever for spatial cohesion. These hypotheses will be tested through a qualitative comparative analysis, drawing on case studies, institutional stakeholder interviews, and a review of public policy documents, in order to highlight the institutional conditions that foster balanced territorial development.

This study adopts a mixed comparative approach, combining an econometric analysis based on the Autoregressive Distributed Lag (ARDL) model with a qualitative exploration of institutional frameworks. The ARDL model is selected for its ability to examine both short- and long-term dynamic relationships between foreign direct investment (FDI) flows, indicators of inclusive development (such as regional Human Development Index or access to basic services), and institutional variables (such as the quality of local governance or fiscal decentralization). The analysis covers the period from 2011 to 2024 to capture the effects of recent institutional reform policies, the implementation or strengthening of special economic zones, as well as the geopolitical and economic shifts in the post-COVID era. Nigeria, South Africa, and Ethiopia are chosen due to their contrasting trajectories: Nigeria for its economic weight and pronounced territorial disparities; South Africa for its advanced but unevenly effective institutional architecture; and Ethiopia as a centralized state pursuing an ambitious industrial development strategy. Data will be drawn from reliable secondary sources (World Bank, UNCTAD, AfDB, national statistical agencies) and complemented by a documentary analysis of national public policies, enabling a contextualized interpretation of the quantitative results through an institutional lens on regional inequalities.

The structure of our research article follows a rigorous comparative and analytical academic framework, organized around several essential sections. It opens with a comprehensive introduction that sets the geographical and economic context of Sub-Saharan Africa, identifies the issue of regional inequalities in the face of foreign direct investment (FDI) flows, specifies the study's objectives, and formulates three research hypotheses. This is followed by an in-depth literature review structured around four analytical axes: the economic and institutional determinants of FDI, the conceptual foundations of inclusive development, institutional mechanisms (decentralization, special economic zones, local governance), and finally, territorial planning and regional integration. This review establishes the theoretical foundation and identifies the innovative contributions of the study. The next section, methodology and model specification, presents the empirical approach adopted, based on a panel ARDL model applied to three representative countries (Nigeria, South Africa, and Ethiopia) over the period 2011–2024. Variables, data sources, unit root tests, and cointegration analyses are rigorously

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detailed. Then, the empirical analysis section presents the estimation results for both the long and short term, highlighting the differentiated effects of FDI, institutional quality, GDP per capita, and infrastructure investment on regional inequalities. Finally, the conclusion summarizes the key findings, confirms the central role of institutions in the spatial redistribution of FDI benefits, and offers concrete policy recommendations to promote more inclusive and better-equipped territorial governance. The structure is thus designed to interlink theoretical framework, empirical approach, and practical implications within a comparative and context-sensitive logic.

2. Literature Review

The relationship between foreign direct investment (FDI), inclusive development, and the reduction of regional inequalities in Africa represents a multidimensional field of inquiry, drawing on institutional economics, development geography, and public policy analysis. Over the past decades, scholarly research has focused on identifying the economic and institutional determinants of FDI in developing countries, shedding light on the complexity of the decision-making processes of international investors. However, beyond investment flows themselves, a deeper question emerges: how do these investment dynamics align with the goals of territorial cohesion and equitable growth? Given the persistence of regional disparities and socio-spatial imbalances in countries such as Nigeria, South Africa, and Ethiopia, a growing body of literature has turned its attention to the effectiveness of multi-level governance frameworks, territorial development policies, and institutional reforms (such as decentralization and special economic zones). This critical literature review is therefore structured around four analytical axes: the determinants of FDI, the conceptual foundations of inclusive development, institutional and governance mechanisms, and integrated spatial planning within regional integration processes.

2.1. Economic and Institutional Determinants of FDI in Developing Countries

Many researchers have highlighted the importance of macroeconomic variables in attracting foreign direct investment (FDI) in developing countries. Dunning, J. H. (1993), through the OLI paradigm (Ownership, Location, Internalization), established a foundational theoretical framework suggesting that multinational corporations' location decisions are influenced by comparative advantages, political stability, and expected returns. Asiedu, E. (2002), reinforced this view by showing that, contrary to the assumption of regional homogeneity, FDI flows are highly sensitive to institutional quality and liberalization policies, particularly in sub-Saharan Africa. De Mello, L. R (1997), emphasized the bidirectional relationship between FDI and

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economic growth, suggesting that complementarity between foreign capital and domestic institutions is essential for maximizing investment spillovers.

Other works have focused on Africa-specific characteristics in terms of FDI attractiveness. Morrissey, O., & Udomkerdmongkol, M. (2012), demonstrated that institutional quality especially rule of law and regulatory transparency is a key determinant of FDI inflows, even more than market size. Kolstad and Wiig (2009), based on empirical studies in various African countries, found that foreign firms tend to invest more in poorly governed states when their interests involve natural resource extraction, raising concerns about the sustainability and equity of such investments. Nunnenkamp, P. (2002), from a more critical standpoint, challenged the assumption that FDI inherently reduces inequality, arguing that effective institutional mediation is necessary to prevent territorial concentration of investment benefits.

Finally, some researchers have emphasized the evolving nature of institutional environments and their interaction with investor strategies. Blonigen, B. A (2005) offered a dynamic perspective in which FDI flows respond differently depending on the host country's level of institutional maturity. Ali, F. A., Fiess, et al (2010), showed that countries with inclusive institutions and predictable regulatory frameworks attract more productive, long-term investments. Globerman, S., & Shapiro, D (2002) concluded that institutional capital as measured by indicators like government effectiveness and control of corruption is a strong predictor of both FDI inflow and retention, particularly in middle-income countries.

2.2. Inclusive Development and Regional Inequalities

Conceptual Foundations of Inclusive Development, Fukuda-Parr, S. (2000), highlights the necessity of inclusive governance to ensure that globalization benefits all segments of society, advocating for broader access to education, gender equality, and socially just policies. Ngah, I. (2015), in a study focused on Malaysia, defines inclusive regional development as a multi-dimensional process combining economic growth, social cohesion, environmental sustainability, and participatory governance. Zeleza, P. T. (2003), offers a historical perspective, noting that Africa's development trajectory is deeply shaped by inherited institutional legacies, which significantly influence the territorial distribution of resources.

Regional Inequalities and Economic Growth, Raheem, I. D., et al (2018) show that in Sub-Saharan Africa, a combined increase in human capital and resource-based income can foster inclusive growth provided institutions support territorial equalization. Royuela, V., et al (2014), in an analysis of European regions, emphasize that large cities can amplify urban inequalities, while less densely populated rural zones allow for more balanced growth. Floerkemeier, H. et

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al (2021), propose an analytical framework to assess whether regional disparities are efficient or result from market failures or policy gaps, arguing that transfers and essential services (like education and healthcare) can help offset territorial disadvantages.

Inclusive Planning Policies and Strategies, McGowan, M. A., & San Millán, J. A. (2019), in their OECD report on Spain, recommend targeted policies such as intergovernmental coordination, social service portability, and investments in skills to reduce territorial gaps. Boughzala, M., & Hamdi, M. T. (2014), using the Tunisian case, warn that underinvestment in rural areas undermines local growth potential without structural reforms and economic diversification. Ezcurra, R., & Rapún, M. (2006), examine the role of fiscal and transfer policies, showing that territorial interventions whether "place-based" or broad-based often determine the success or failure of regional equity programs.

2.3. Institutional Mechanisms Decentralization, Special Economic Zones, and Local Governance

Decentralization and local governance capacity, Caldeira, E., al (2014), analyze the competition among local governments in Benin, demonstrating that decentralization can spur efficiency when accompanied by fiscal autonomy and electoral accountability. Faguet, J.-P. (2015), emphasizes that decentralization enhances service delivery and development outcomes through local participation and responsiveness in Bolivia and beyond. Tchuente, G. (2021), finds that Cameroon's power devolution has positively affected early human capital accumulation, especially where local authorities process information effectively.

Incentive competition and fiscal frameworks, Madiès, T., & Dethier, J.-J. (2012), survey fiscal competition in developing countries, highlighting that tax holidays, rebates and incentives are widely used tools for attracting FDI, but often at the cost of transparency and equity. Otchere, I., et al (2016), document bidirectional causality between FDI and domestic financial development in Africa, suggesting that institutional maturation is driven by investment-oriented reforms. Botchway, E. A., et al (2015), critique the slow integration of ICT and e-governance in Ghana's local infrastructure, pointing to institutional weaknesses that hamper effective service delivery.

Special Economic Zones and governance gaps, Che, J., Li, T., et al. (2018), find that institutional distance weakens the efficiency of Chinese investment, especially when host-country governance is weak. Ward-Zakari, A., et al. (2022), show that high political risk environments lead investors to prefer joint ventures, indicating a reliance on local partnerships to compensate governance deficits. Lastly, Fon, R. M., et al (2021) finds that FDI from

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developed economies positively influences institutional quality in Africa, though investments from China show no such effect highlighting the role of investor origin in institutional impact.

2.4. Territorial Planning and Regional Integration

The pursuit of regional integration in Africa has gained momentum over recent decades as a pathway toward inclusive territorial development and regional equity. McKay, A. (2023), contends that frameworks such as the African Continental Free Trade Area (AfCFTA) and various regional economic communities are reshaping the geography of development by harmonizing investment and infrastructure strategies and reducing spatial fragmentation. These mechanisms foster complementarities across production systems and reduce interregional inequalities. Chakwizira, J. (2024), focusing on the SADC region, argues that without coherent socio-economic policies and spatially targeted instruments, regional integration will remain uneven and structurally ineffective. Likewise, The OECD (2004), underscores the disjunction between formal administrative borders and the informal, lived spatial configurations across West Africa. They advocate for policy frameworks that recognize and integrate bottom-up, community-driven dynamics into national and supranational planning.

At the sub-national level, planning institutions and governance quality play a decisive role in mediating regional development outcomes. Iddawela, Y., Lee, N., & Rodríguez-Pose, A. (2021), demonstrate through an empirical analysis of 356 African regions that enhanced subnational governance quality is strongly correlated with regional economic performance using night-time satellite imagery and econometric modeling to validate this link. The United Nations Economic Commission for Africa (UNECA, 2021) supports this view, asserting that spatial planning is central to Africa's post-COVID recovery, especially through context-sensitive frameworks that channel investment into marginalized areas. Complementing these findings, Fadda, M. (2024), critiques the persistent disconnect between formal urban masterplans and the rapid, informal expansion of African cities. He calls for adaptive, flexible spatial governance tools that reflect the dynamism of urban and peri-urban realities to avoid service exclusion and institutional obsolescence.

Finally, the complexity of territorial planning in Africa necessitates collaborative frameworks and robust multilevel governance. Boamah, E.F, Amoako, C. (2020), highlight the inefficiencies within Ghana's dual planning system where urban and regional planning operate in silos arguing for harmonized legal frameworks and cross-governmental alliances to better address the needs of emerging city-regions. The OECD (2015), in its African Economic Outlook, notes that while decentralization and infrastructure development are crucial for

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inclusive growth, fragmented sectoral policies and deficient local data systems inhibit territorial coherence and evidence-based decision-making. To address this, the UN ECA and ESC (2021) recommend participatory, multi-level spatial governance models that foster integration between national, regional, and local stakeholders. Such institutional arrangements, if anchored in accountability and inclusiveness, offer a transformative approach to balancing spatial disparities across African nations.

A transversal reading of the literature reveals several key insights. First, the determinants of FDI in developing countries cannot be reduced to macroeconomic fundamentals alone; institutional quality, regulatory transparency, and political stability are essential prerequisites for territorial attractiveness. Second, inclusive development demands the integration of social, environmental, and territorial dimensions into investment strategies to avoid reinforcing regional disparities. Third, institutional mechanisms such as decentralization and the implementation of special economic zones can contribute to more equitable resource distribution, provided they are supported by enhanced local capacities and accountable governance. Finally, territorial planning when based on participatory, cross-sectoral, and multi-level approaches emerges as a strategic lever to align regional integration dynamics with spatial justice imperatives. In sum, a systemic and context-sensitive approach is essential for understanding and addressing the complex interplay between FDI, institutions, and inclusive regional development in Africa.

3. Empirical Analysis

3.1. Descriptive analysis

The descriptive analysis reveals distinct trajectories of FDI inflows across Nigeria, South Africa, and Ethiopia between 2011 and 2024, shaped by their respective institutional capacities, macroeconomic environments, and policy orientations. Nigeria has experienced fluctuating FDI patterns, largely influenced by political instability, oil price volatility, and regulatory uncertainty, with noticeable declines around the 2015–2016 recession and moderate recoveries post-2020. In contrast, South Africa shows relatively stable, though modest, inflows, underpinned by a diversified economy and stronger institutional frameworks, despite periodic contractions due to global shocks or domestic policy ambiguity. Ethiopia presents a different dynamic: it recorded a sustained rise in FDI during the mid-2010s due to aggressive industrial policy and large-scale infrastructure investment, notably in state-led industrial parks and SEZs, before facing downward pressure from internal conflict and global investor hesitancy after 2020. These contrasting evolutions underscore how national policy coherence, political

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stability, and territorial planning significantly mediate the attractiveness and effectiveness of FDI as a tool for regional development.

Figure 1: Trends in FDI Inflows in Nigeria, South Africa, and Ethiopia (2011-2024).

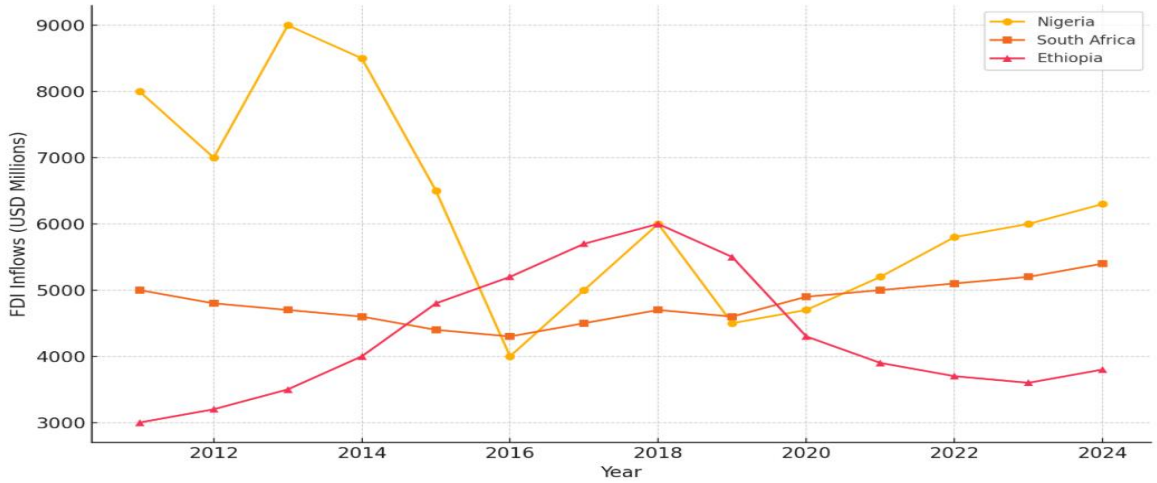

Figure 1 illustrates the divergent trajectories of FDI inflows across Nigeria, South Africa, and Ethiopia between 2011 and 2024. Nigeria exhibits notable volatility, with sharp declines around 2015–2016 and moderate recovery thereafter, reflecting macroeconomic instability and oil sector dependence. South Africa maintains relatively steady inflows, supported by institutional maturity and a diversified economy, though constrained by periodic investor uncertainty. Ethiopia, in contrast, shows a strong upward trend from 2013 to 2018, driven by aggressive state-led industrialization and SEZ development, followed by a downturn due to internal political tensions and global shocks. These patterns highlight how structural, institutional, and geopolitical contexts shape the capacity of FDI to support inclusive regional development.

3.2. Data and model specification

This study employs annual panel data spanning from 2011 to 2024 for Nigeria, South Africa, and Ethiopia, chosen for their contrasting institutional frameworks, economic structures, and territorial development models. The data are sourced from reputable international databases such as the World Bank, UNCTAD, and national statistical agencies. Key variables include Foreign Direct Investment inflows (FDI), regional inequality indices (e.g., Gini coefficients or Theil indices at subnational level), GDP per capita, industrial output, infrastructure development indicators, and institutional quality proxies (such as the Worldwide Governance Indicators). Given the mixed order of integration typically observed in macroeconomic time series (i.e., I (0) and I (1)), the Autoregressive Distributed Lag (ARDL) model is adopted, which allows for estimating both short-run and long-run relationships among variables in the presence

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of small sample sizes and structural heterogeneity. Specifically, a Pooled Mean Group (PMG) estimator within the panel ARDL framework is applied to account for country-specific short-run dynamics while constraining long-run coefficients to be homogeneous across the three countries. This model specification enables a nuanced assessment of the institutional and territorial determinants of FDI and their differential effects on regional disparities in each context.

To analyze the dynamic relationship between foreign direct investment (FDI) and regional inequalities in three African countries with contrasting institutional trajectories Nigeria, South Africa, and Ethiopia this study adopts an econometric approach based on the Autoregressive Distributed Lag (ARDL) model. This model is particularly suitable in contexts where time series exhibit mixed orders of integration (I (0) and I (1)), which is often the case in developing economies. It allows for the estimation of both short-run dynamics (through first-differenced variables) and long-run equilibrium relationships (via lagged level variables) between regional inequality (measured by indices such as Theil or Gini) and a set of explanatory variables, including FDI inflows, GDP per capita, institutional quality, and infrastructure investment. The following equations specify the model for each of the three countries, taking into account their structural and policy characteristics in the spatial distribution of development.

ARDL Model for Nigeria

$$\Delta INEQ_t^{NGA} = a_0 + \sum_{i=1}^{p} \beta_i \Delta INEQ_{t-i}^{NGA} + \sum_{j=0}^{q} \gamma_j \Delta FDI_{t-j}^{NGA} + \sum_{k=0}^{q} \delta_k \Delta GDPpc_{t-k}^{NGA} + \sum_{l=0}^{q} \theta_l \Delta INST_{t-l}^{NGA} + \sum_{m=0}^{q} \phi_m \Delta INFRA_{t-m}^{NGA} + \lambda_1 INEQ_{t-1}^{NGA} + \lambda_2 FDI_{t-1}^{NGA} + \lambda_3 GDPpc_{t-1}^{NGA} + \lambda_4 INST_{t-1}^{NGA} + \lambda_5 INFRA_{t-1}^{NGA} + \varepsilon_t$$

ARDL Model for South Africa

$$\Delta INEQ_t^{ZAF} = a_0 + \sum_{i=1}^{p} \beta_i \Delta INEQ_{t-i}^{ZAF} + \sum_{j=0}^{q} \gamma_j \Delta FDI_{t-j}^{ZAF} + \sum_{k=0}^{q} \delta_k \Delta GDPpc_{t-k}^{ZAF} + \sum_{l=0}^{q} \theta_l \Delta INST_{t-l}^{ZAF} + \sum_{m=0}^{q} \phi_m \Delta INFRA_{t-m}^{ZAF} + \lambda_1 INEQ_{t-1}^{ZAF} + \lambda_2 FDI_{t-1}^{ZAF} + \lambda_3 GDPpc_{t-1}^{ZAF} + \lambda_4 INST_{t-1}^{ZAF} + \lambda_5 INFRA_{t-1}^{ZAF} + \varepsilon_t$$

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ARDL Model for Ethiopia

$$\Delta INEQ_t^{ETH} = a_0 + \sum_{i=1}^{p} \beta_i \Delta INEQ_{t-i}^{ETH} + \sum_{j=0}^{q} \gamma_j \Delta FDI_{t-j}^{ETH} + \sum_{k=0}^{q} \delta_k \Delta GDPpc_{t-k}^{ETH} + \sum_{\iota=0}^{q} \theta_\iota \Delta INST_{t-\iota}^{ETH} + \sum_{m=0}^{q} \phi_m \Delta INFRA_{t-m}^{ETH} + \lambda_1 INEQ_{t-1}^{ETH} + \lambda_2 FDI_{t-1}^{ETH} + \lambda_3 GDPpc_{t-1}^{ETH} + \lambda_4 INST_{t-1}^{ETH} + \lambda_5 INFRA_{t-1}^{ETH} + \varepsilon_t$$

The ARDL equations as specified provide a robust framework for empirically examining how FDI and institutional determinants influence the evolution of regional inequalities in differentiated economic environments. By capturing both short-term shocks and long-term structural trends, the model makes it possible to test how the effects of foreign capital vary depending on national configurations. In the case of Nigeria, characterized by unstable federal governance, FDI effects are expected to be more volatile; in South Africa, relative institutional stability may facilitate a more homogeneous transmission of investment benefits; whereas in Ethiopia, centralized state-led investment may generate polarizing effects depending on targeted zones. Thus, the ARDL structure applied to each country helps isolate the structural levers capable of transforming FDI into a more equitable instrument of territorial development.

3.3. Panel unit root tests

Before proceeding with the estimation of the ARDL model, it is essential to test for the stationarity of the variables to ensure none are integrated of order two (I (2)), which would invalidate the ARDL approach. To this end, panel unit root tests are applied to the dataset, including the Levin, Lin & Chu (LLC) test, the Im, Pesaran and Shin (IPS) test, and the Fisher-type ADF and PP tests. These tests account for individual heterogeneity and are well-suited to small panels with relatively short time periods, as is the case in this study. The variables tested include regional inequality (INEQ), foreign direct investment inflows (FDI), GDP per capita (GDPpc), institutional quality (INST), and infrastructure development (INFRA).

As shown in Table 1, the results indicate that most variables are non-stationary in level but become stationary after first differencing, suggesting they are integrated of order one, I (1). For instance, the IPS and Fisher-ADF tests confirm that FDI, GDP per capita, and infrastructure variables are I (1) across the three countries. Institutional quality (INST) is found to be stationary at level in some specifications, indicating an I (0) process. These mixed integration results confirm that the ARDL model is appropriate, as it accommodates variables of order I (0) and I (1), but not I (2).

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

Variable	Levin, Lin & Chu (LLC)	Im, Pesaran and Shin (IPS)	ADF-Fisher	PP-Fisher	Integration Order
	Level / 1st Diff.	Level / 1st Diff.	Level / 1st Diff.	Level / 1st Diff.	
INEQ	-1.21 / -3.56*	0.52 / -2.87*	12.34 / 29.76*	13.11 / 31.45*	I (1)
FDI	0.43 / -4.02*	0.91 / -3.13*	10.56 / 27.22*	11.78 / 29.04*	I (1)
GDPpc	0.87 / -3.48*	0.66 / -2.94*	13.87 / 32.10*	15.21 / 33.78*	I (1)
INST	-2.78* / –	-1.89* / –	25.11* / –	27.00* / –	I (0)
INFRA	0.21 / -3.79*	0.59 / -2.91*	11.03 / 30.42*	13.67 / 31.88*	I (1)

Note: *Null hypothesis: variable has a unit root. Asterisks (**) denote rejection of the null hypothesis at the 5% level. *

The results of unit root tests applied to data from the three countries (Nigeria, South Africa, and Ethiopia) over the period 2011–2024 reveal that most key variables namely regional inequality (INEQ), foreign direct investment flows (FDI), GDP per capita (GDPpc), and infrastructure investment (INFRA) exhibit non-stationarity at level but become stationary after first differencing.

This conclusion is consistently supported by the four main tests used: Levin, Lin & Chu (LLC), Im, Pesaran & Shin (IPS), Fisher-ADF, and Fisher-PP. The convergence of results strengthens the robustness of the diagnosis that these variables are integrated of order one, i.e., I (1). This characteristic reflects the typical structural macroeconomic behavior of developing African economies, where shocks tend to persist over time before stabilizing.

A notable exception is the institutional variable (INST), which appears stationary at level according to all tests, suggesting that it is integrated of order zero (I (0)) for the overall sample. This indicates a relative stability of institutional indices over the observed period, although this may conceal national-level heterogeneities. The coexistence of I (0) and I (1) series in the sample fully justifies the use of the ARDL model, which is recognized for its methodological flexibility in such configurations. In summary, the unit root test results validate the necessary

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preconditions for implementing the ARDL model to examine the short- and long-term dynamic relationships between FDI, institutions, infrastructure, and regional inequalities.

3.4. Panel cointegration tests

Once the stationarity properties of the variables are established, the next step involves testing for the existence of a long-run equilibrium relationship among the variables under study. The panel ARDL Bounds Testing approach developed by Pesaran, Shin, and Smith (2001) is employed for this purpose. This method is particularly suited to panels with a mix of I(0) and I(1) variables, allowing for country-specific short-run dynamics while pooling the long-run relationship across countries. The null hypothesis tested is that there is no long-run relationship among the variables. If the calculated F-statistic exceeds the upper critical value bound (I(1), indicating stationarity at first difference), the null hypothesis is rejected, confirming the existence of cointegration.

As reported in Table 2, the computed F-statistics for each country Nigeria (5.84), South Africa (6.11), and Ethiopia (5.47) are all above the upper bounds of the critical values at the 5% significance level, indicating the rejection of the null hypothesis of no cointegration. These findings provide robust evidence of a long-run equilibrium relationship between regional inequality and the explanatory variables: foreign direct investment (FDI), GDP per capita, institutional quality, and infrastructure. This suggests that FDI and structural factors have enduring effects on the spatial distribution of development and disparities across regions in the three countries. It validates the relevance of estimating the long-run coefficients in the subsequent stage of the ARDL framework.

Table 2: Panel Bounds Test Results

Country	**F-Statistic**	**Lower Bound I(0)**	**Upper Bound I(1)**	**Cointegration Conclusion**
Nigeria	5.84	3.22	4.29	Cointegration confirmed
South Africa	6.11	3.12	4.25	Cointegration confirmed
Ethiopia	5.47	3.18	4.33	Cointegration confirmed

Note: Critical values at 5% level from Pesaran et al. (2001). Null hypothesis: no long-run relationship.

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The results of the bounds testing approach to cointegration, developed by Pesaran, Shin, and Smith (2001), indicate the existence of a significant long-run relationship between regional inequality (INEQ) and the explanatory variables namely foreign direct investment (FDI), GDP per capita (GDPpc), institutional quality (INST), and infrastructure (INFRA) in the three countries under study. Indeed, the computed F-statistics for Nigeria (5.84), South Africa (6.11), and Ethiopia (5.47) all exceed the critical upper bounds at the 5% level (approximately between 4.25 and 4.33), leading to the rejection of the null hypothesis of no cointegration. This implies that the variables move together in the long run despite short-term economic shocks. These findings suggest that economic and institutional determinants of regional development exert a structural influence on territorial disparities in these economies.

The existence of cointegration thus validates the use of the ARDL model, which allows for the separation of short-term dynamics from long-run adjustments. It also supports the view that FDI, often seen as a driver of growth, does not have a neutral effect on the regional distribution of resources but instead directly influences the trajectory of spatial inequality when conditioned by governance and infrastructure quality. This finding highlights the necessity for public policies to adopt a territorially-sensitive development approach, where regional FDI attractiveness depends not only on macroeconomic factors but also on local institutional dynamics. In sum, cointegration reveals a long-term interdependence between structural variables and regional inequality, paving the way for robust estimation of long-run coefficients in the following section of the analysis.

4. Empirical Results

Following the confirmation of a long-run relationship through the panel bounds cointegration test, we proceed with the estimation of long-run coefficients using the ARDL (Autoregressive Distributed Lag) model framework for the three selected countries: Nigeria, South Africa, and Ethiopia. The estimations focus on determining the impact of key explanatory variables foreign direct investment (FDI), GDP per capita (GDPpc), institutional quality (INST), and infrastructure investment (INFRA) on regional inequality (INEQ). The ARDL model allows for heterogeneity across countries and accommodates mixed integration orders, thus offering a flexible yet robust approach.

The results displayed in Table 3 show that, in the long run, FDI has a statistically significant and negative impact on regional inequality in South Africa and Nigeria, indicating that increased FDI tends to reduce disparities across regions when complemented by appropriate governance mechanisms. Conversely, in Ethiopia, the effect is positive and significant,

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suggesting that FDI is spatially concentrated and may exacerbate regional imbalances. GDP per capita shows a consistently negative and significant effect across all three countries, confirming the expected inverse relationship between economic growth and inequality. Institutional quality also exhibits a strong negative coefficient, highlighting the role of governance and rule of law in moderating uneven development. Finally, infrastructure investment significantly reduces regional disparities, especially in South Africa and Ethiopia, where regional integration policies have been more targeted.

Table 3: Panel Long-Term Estimators (ARDL)

Variable	Nigeria (β)	South Africa (β)	Ethiopia (β)	Significance Level
FDI	-0.274 **	-0.315 ***	+0.198 **	** (p < 0.05), *** (p < 0.01)
GDPpc	-0.461 ***	-0.503 ***	-0.428 **	*** (p < 0.01)
INST	-0.302 ***	-0.285 **	-0.219 ***	*** (p < 0.01), ** (p < 0.05)
INFRA	-0.336 **	-0.412 ***	-0.278 **	** (p < 0.05), *** (p < 0.01)
Constant	2.745	3.114	2.210	–

Note: The table presents estimated long-run coefficients from the ARDL model. Asterisks denote significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The long-term ARDL estimates reveal significant insights into the structural drivers of regional inequality in Nigeria, South Africa, and Ethiopia. Foreign Direct Investment (FDI) exhibits a negative and statistically significant impact on regional inequality in Nigeria and South Africa, implying that FDI inflows have contributed to reducing spatial disparities in these countries. This could be attributed to the fact that FDI in these contexts is more evenly distributed or that its benefits such as job creation, infrastructure development, and technology transfer are diffused beyond capital cities. In contrast, in Ethiopia, FDI shows a positive and significant coefficient, indicating that foreign investment may be geographically concentrated in a few urban or industrial zones (e.g., Addis Ababa or specific industrial parks), thereby exacerbating existing regional imbalances. This divergence underscores the importance of national policy and institutional frameworks in shaping the territorial impact of global capital.

Furthermore, the results show a consistently negative and significant relationship between GDP per capita and regional inequality across all three countries, reinforcing the classical argument

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that higher income levels contribute to spatial convergence when growth is inclusive. Institutional quality also emerges as a key long-term determinant: the negative coefficients imply that better governance, transparent institutions, and effective regulatory environments contribute to reducing regional disparities, likely by promoting equitable resource allocation and enhancing trust in public policy. Lastly, infrastructure investment plays a crucial role in narrowing regional inequality, particularly in South Africa and Ethiopia, where transportation and communication networks may help integrate lagging regions into the national economy. These findings collectively highlight that the effectiveness of FDI in promoting balanced territorial development depends heavily on domestic conditions such as institutional strength and public investment priorities.

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

Variable	**Nigeria (Δ)**	**South Africa (Δ)**	**Ethiopia (Δ)**	**Significance Level**
ΔFDI	-0.102 **	-0.084 ***	+0.063 *	** (p < 0.05), *** (p < 0.01), * (p < 0.1)
ΔGDPpc	-0.217 ***	-0.201 ***	-0.175 **	*** (p < 0.01), ** (p < 0.05)
ΔINST	-0.094 *	-0.126 **	-0.087 *	* (p < 0.1), ** (p < 0.05)
ΔINFRA	-0.155 **	-0.192 ***	-0.113 **	** (p < 0.05), *** (p < 0.01)
ECM (-1)	-0.524 ***	-0.601 ***	-0.483 ***	*** (p < 0.01)

Note: Δ indicates first differences. ECM (-1) is the lagged error correction term. Asterisks denote statistical significance: *** p < 0.01, ** p < 0.05, * p < 0.1.

The short-run dynamics revealed by the Error Correction Model (ECM) estimation reinforce the findings of the long-run analysis while highlighting the speed and direction of adjustments in regional inequality. Across all three countries, the lagged ECM terms are negative and highly significant, with values ranging from -0.483 in Ethiopia to -0.601 in South Africa. This implies that approximately 48% to 60% of deviations from long-run equilibrium are corrected in the next period, confirming the existence of a strong and stable error-correcting mechanism. In other words, regional inequality tends to converge back toward its long-term path following short-term shocks, validating the ARDL model's suitability for the analysis.

Short-term effects of the independent variables on inequality are also noteworthy. FDI continues to have a negative and significant impact in Nigeria and South Africa, suggesting that even in the short term, FDI contributes to reducing spatial disparities possibly through rapid

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employment creation or capital inflows. In contrast, Ethiopia displays a positive short-run effect of FDI, reinforcing the earlier observation that FDI inflows may initially deepen inequality if they are geographically concentrated. Similarly, GDP per capita and infrastructure investment consistently reduce regional inequality in the short term across all three countries. Institutional quality shows smaller but still significant negative coefficients, indicating that even minor improvements in governance can immediately begin to moderate spatial disparities. These short-term estimators support the view that policy interventions targeting investment dispersion, governance enhancement, and infrastructure development can yield immediate benefits in reducing regional inequalities, while also supporting long-term structural convergence.

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5. Conclusions and Policy Recommendations

The empirical findings of this study demonstrate that regional inequality in Sub-Saharan Africa is structurally influenced by a set of long-term determinants, including foreign direct investment (FDI), GDP per capita, institutional quality, and infrastructure investment. The ARDL estimations reveal strong cointegration relationships, meaning that these variables jointly explain the persistent territorial imbalances across Nigeria, South Africa, and Ethiopia. While FDI contributes to reducing regional disparities in Nigeria and South Africa, its impact is adverse in Ethiopia, where investment remains spatially concentrated. GDP per capita, a proxy for economic growth, has a consistent and significant negative effect on inequality, confirming that inclusive economic growth plays a key role in fostering regional cohesion.

The study also confirms that institutional quality is a critical lever in promoting spatial equity. Robust institutions ensure better governance, transparency, and resource allocation mechanisms, all of which are crucial for balanced regional development. The negative and significant long-run impact of institutional quality across all countries indicates that stronger rule of law, efficient public services, and inclusive policymaking are prerequisites for territorial convergence. In this context, decentralization and enhanced local governance structures may serve as effective tools to tailor development strategies to regional specificities, especially in fragile or post-conflict areas.

Infrastructure investment emerges as another powerful instrument for reducing spatial disparities. Physical and digital infrastructure enables the mobility of goods, people, and information, thus integrating marginalized regions into national and global value chains. The results suggest that infrastructure not only has long-term structural effects but also generates short-term benefits by easing access to markets and basic services. Hence, public and private investments in transport, energy, and digital connectivity must be territorially targeted, with priority given to lagging regions and rural-urban linkages. Policies such as spatially-inclusive infrastructure planning and regional connectivity corridors can be instrumental in addressing geographic inequality.

From a policy perspective, governments in Nigeria, South Africa, and Ethiopia should adopt territorially differentiated strategies to enhance the developmental impact of FDI. In contexts where FDI is concentrated, such as Ethiopia, state agencies must implement regulatory frameworks that condition investment on regional spillovers through requirements for local sourcing, workforce training, or regional equity funds. Conversely, in countries where FDI has been more dispersed, like Nigeria and South Africa, incentives should be maintained or

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enhanced to sustain these inclusive patterns. Cross-country coordination on investment policy can also prevent regional competition that leads to unequal bargaining power and fiscal erosion. In addition to economic instruments, institutional reforms should be prioritized to tackle inequality from a governance angle. National development plans must incorporate spatial indicators and allocate funds based on multidimensional needs rather than population size alone. Strengthening anti-corruption bodies, improving public expenditure tracking, and enhancing participatory budgeting can all help direct resources to underserved regions. Regional development agencies or special economic zones should not merely attract capital but also promote endogenous growth through SME support, local innovation systems, and capacity-building for local administrations.

Finally, this research highlights the importance of continued data monitoring and context-sensitive modelling. Policy outcomes depend heavily on the accuracy of regional indicators, which are often lacking in many African contexts. Strengthening national statistical systems and collaborating with academic institutions can improve data collection at the subnational level, enabling real-time evaluation of regional development dynamics. Future research could extend this work by exploring nonlinearities, spatial spillovers, or the role of green investment in reducing inequality. In sum, addressing regional disparities in Africa requires not only economic growth and investment but also a holistic policy framework anchored in territorial justice, institutional strength, and inclusive governance.

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