Iranian Economic Review, 29(4), 1423-1442
DOI: https://doi.org/10.22059/ier.2024.369602.1007883

RESEARCH PAPER

Foreign Capital Flows and Industrial Output in Selected African Countries

Abubakar Sule[*,a], Raymond Liambee Aor[b], Naomi Onyeje Doki[b], Ibrahim Danlami Mohammed[c]

a. Department of Economics, Faculty of Social Sciences, Kogi State University, Anyigba, Nigeria.
b. Department of Economics, Faculty of Social Sciences, State University, Makurdi, Nigeria.
c. Monetary Policy Department, Central Bank of Nigeria, Abuja, Nigeria.
* Corresponding author.

Received: 14 December 2023, Revised: 26 March 2024, Accepted: 15 April 2024, Published: 15 December 2025
Publisher: The University of Tehran Press.

Abstract

African nations grapple with limited domestic resources due to low tax revenues and savings levels. This necessitated the need to examine the cause of the negative implications and then enhance the positive areas of the impact. The study aims to investigate how institutional quality moderates the impact of foreign financial flows on industrial output, focusing on these top recipients of foreign flows in Africa from 1992 to 2022. We use a panel autoregressive distributed lag modeling approach, which is relevant in evaluating large cross-sections and periods. This allows us to account for both short and long-run dynamics as well as the interaction of capital flows variables and institutional quality. We find that institutional quality has a mediating positive impact on foreign inflows to the industrial performance of the selected countries. For instance, the PMG result for the model without interaction shows that an increase in FDI will lead to a 3.473unit increase in industrial output in the long run. The PMG model with interactions reveals that FDI and FPI exert 13.04unit and 125.4unit impact on industrial output. However, the impact appears to vary based on short and long-run dynamics. The ECM for both models without and with interactions is negatively significant at -0.246% and -0.241%. We equally documented the dynamics of the relationship using country-specific analysis and found similar outcomes, exhibiting mixed outcomes across both short and long-run periods. The findings show that foreign capital flows perform better in an environment of quality institutions with a higher predictive power in the long run.

Keywords: Foreign Direct Investment, Foreign Financial Flows, Foreign Portfolio Investment, Industrialization, Institutional Quality, Official Development Assistance.
JEL Classification: F21, F30, F35, L60, O43.

1. Introduction

Industrial development or industrialization has been identified as a critical component for economic growth. Industrialization enhances productivity, creates

employment opportunities by introducing new equipment and technologies, and creates new and stronger sectoral linkages within and among economies. Firms and industries benefit from this as output and earnings increase. There are expected fallouts also of poverty reduction, economic resilience boost, and better responses to external shocks. These ideals are recognized by African leaders, evidenced by the commemoration of African Industrialization Day on the 20th of November, as declared in their 25th Ordinary session held in 1989. Similarly, Agenda 2063, adopted by Heads of States and Governments of the African Union AU in January 2015, is Africa's blueprint to evolve into the powerhouse of the future. The agenda is based on seven aspirations, which include a Prosperous Africa, based on Inclusive Growth and Sustainable Development. The goals and priority areas of this particular aspiration make special room for industrialization, just as the Sustainable Development Goals also do. Further, the AfDB lists the Banks' "High Five" for transforming Africa as Feed Africa, Improve the quality of lives of the people, Industrialize Africa, Integrate Africa, and Light up and Power Africa. The goals do not leave any doubts about the importance that the Bank places on industrialization (Abbasian et al., 2019). The industrialized Africa project recognizes that Africa is at the bottom of the global value chain, with a global share of 1.9 percent in 2015 (AfDB) and World Manufacturing Value Added of 2 percent in 2019 (UNIDO, 2020), and efforts to support industrialization are central to building and sustaining the wealth of the continent.

Along these lines, the African Development Bank AfDB proposed six flagship programs to accelerate industrialization of key sectors, which are to foster successful industrial policies by providing policy advisory services and technical assistance to governments and funding key PPP projects, and to support funding of infrastructure and industry projects, thereby increasing and channeling funds into GDP catalytic programs. The third is to grow liquid and effective capital markets by improving access to market finance for African enterprises. Fourth, promote and drive enterprise development by facilitating access to financing by expanding SME-focused lines of credit, providing technical assistance to SME development institutions (e.g., incubators, SME-focused financial institutions, and those targeting underserved demographics such as women), and building SMEs' capacity via linkage programs with private sector investment. Fifth, is to promote strategic partnerships in Africa by linking African enterprises and major projects with potential partners and investors through promotional activities, notably the African Investment Forum; and, finally, develop efficient industry clusters by

supporting governments in developing efficient industry clusters across Africa, through technical assistance and funding in implementation and monitoring.

The implication of the fourth and especially the fifth programs is that the continent will need to seek finance and other partnerships to pursue this, making a case for foreign financial flows. This may also mean that the financial resources that need to be mobilized internally are not sufficient to drive the industrialization agenda of either individual countries or the continent as a whole. This scenario does not come as a shock because the region and, by that, the nations in Africa have been bedeviled with several phenomena that constrain the human and financial resource mobilization. Slow economic growth rates, the inability to sustain periods of growth for up to two or three decades, political instability, social unrest, terrorism, and communal and other social conflicts, to mention a few.

Domestic resources are limited because of poor tax revenue and low savings levels, among others. Specifically, Nigeria, Ethiopia, DR Congo, Egypt, Kenya, Morocco, and South Africa's tax-to-GDP ratios in 2020 were 5.5%, 6.2%, 9.1%, 12.5%, 15.3%, 19.5%, and 25.2% respectively. Set against the IMF and African Countries in Revenue Statistics in Africa benchmarks of 15% and 16% (IMF, 2022), only Kenya and Morocco meet both. Similarly, Egypt, DR Congo, South Africa, Kenya, Ethiopia, Morocco, and Nigeria's savings to GDP ratios at 11%, 16%, 16.7%, 14%, 26%, 29% and 34% all fall below the IMFs criteria of 30 percent (Aslam et al., 2022, Global Economy.com, World Bank) except Nigeria's.

Oqubay (2015), in his book Made in Africa, shares a lot of remarkable insights on Industrial policy in Africa, based on elaborate qualitative research on Ethiopia. His experience in research and policy makes his insights very convincing, such that they would justify including Ethiopia as part of the cases under study, even if it were not one of the top recipients of foreign capital flows. Oqubay's account of the economic transformation in Ethiopia is christened "Ethiopia rising", from an economy once synonymous with impoverishment. The 2015 record of industrialization's success story in Ethiopia captured some of the major players. They included Castel, a French company that established a winery, the Turkish Textile and Garment plants had a significant presence, the Tanneries and the Floriculture industries established by foreigners, as well as indigenes were also key players. UNCTAD reports that Ethiopia received the highest volumes of financial flows in 2021 as it became a central hub for China's Belt and Road Initiative. Foreign Direct Investment flows rose by 79% to $4.3 billion in 2021.

The World Investment Report 2016 reported that in spite of weakening global economic growth and a decline in both demand and price for minerals, the

DRC's economy was expected to remain resilient. The expectation was based on the increase in public and private investments, particularly in infrastructure, that accompanied the mineral boom in the country. Specifically, the report estimated the annual average foreign direct investment in the DRC to be about $2.07 billion, rising after the decline to $1.7 billion in 2015. In 2021, UNCTAD reported that investment flows to Congo fell by 8% to $3.7 billion, but two international project finance deals were announced later in the country. The largest involved the construction of an oil facility for $166 million. This makes Congo the highest recipient in Central Africa. UNCTAD also reported that investment flows to Morocco rose by 52% to $2.2 billion in 2021, while Egypt saw its FDI drop by 12% to $5.1 billion. The decline notwithstanding, Egypt was still Africa's second-largest FDI recipient. Egypt also received pledges from Gulf States to invest about $22 billion in various economic sectors in 2023. The Report also confirmed that Greenfield projects in these countries more than tripled to $5.6 billion in 2021, making Egypt and Morocco the top gainers in North Africa. This evidence shows that foreign capital inflows can be advantageous because they open up new opportunities for capital accumulation and firm productivity, which can speed up economic development in countries with inadequate capital. This is anticipated to assist the growth of infrastructure, technology, and human capital, as well as the development of a knowledge-based economy with the ability to expand export goods (Phimmavong, 2017; Rakhshani et al., 2021; Shahraki et al., 2023).

African economies have attracted significant capital inflows over the years (Nyang`oro, 2017; IMF, 2019; Olaoye et al., 2022). The top recipients on the continent in 2020, according to the World Investment Report (2021*)*, were Nigeria, South Africa, and Egypt. Despite these inflows, the continent and these countries still grapple with high levels of poverty, weak development of human capital, structural imbalances, weak institutions, and inadequate infrastructure (Ogbonna et al., 2021). For instance, infrastructural stock as a percentage of GDP amounted to 23.73%, 80.19%, and 88.74% in Nigeria, South Africa, and Egypt in 2021 (Statista, 2021). However, only Nigeria falls short of the international benchmark of 70% set by the World Bank. As it stands, Africa's economic growth rate was 4.8% in 2021, falling to 3.8% in 2022 (AfDB, 2023). Also in 2021, about 37.9% of the sub-Saharan Africa population lived on less than $1.90 a day (UNSTATS, 2022). For Egypt, it stood at 31.9%, Nigeria at 42.0%, and South Africa at 32.63% in 2020.

Another important argument that Oqubay (2015) puts forward about industrialization is that the state can and must play an activist and developmental

role beyond being merely a facilitating actor. He argues that states must be willing to take risks that businesses will not, and should not bow down easily to interest groups who are rent-seeking and/or seeking privileges that obstruct the priority. This argument puts the searchlight on the quality of institutions and how they work to ensure that foreign capital flows achieve the desired outcomes. This study is an effort to investigate, in Nigeria, Morocco, DR Congo, South Africa, Egypt, and Ethiopia, how institutional quality can influence the way that foreign financial flows influence industrialization in Africa. Specifically, it will examine the moderating effect of institutions on capital inflows and their impact on industrial output. The choice of these countries is justified by their being the top recipients of foreign flows across the regions in the continent.

2. Review of Literature

Some of the extant literature on the role of quality institutions in the nexus between capital inflows and industrialization is reviewed. Adekunle et al. (2020) used a two-step Engle-Granger estimation procedure and the Granger Causality to investigate some drivers of industrial output. They found that labor participation, gross fixed capital formation, FDI, and portfolio investment all have a significant positive relationship with industrial performance in Nigeria. Igan et al. (2020) employed a panel-based fixed effects method to examine the relationship between equity inflows and long-term growth. The results indicated that private capital inflows are related to better growth in industries that are more reliant on external finance. The study also demonstrated that equity inflows and long-term growth are positively connected, particularly with well-functioning banks with evidence of higher institutional quality. The ARDL-bound approach was adopted by Sule (2019) on the dynamics of foreign capital flows and industrial growth. Findings showed that external loans exert a positive and significant impact on industrial growth, whereas foreign direct investment and remittances have a negative impact and are not significantly correlated.

Similarly, Ndiweni and Bonga-Bonga (2021) employed threshold regression analysis to investigate the impact of capital inflows on economic growth in Sub-Saharan Africa and found a positive and significant relationship once a defined threshold level of institutional quality has been exceeded. The result implies that the relationship between capital inflows and growth is dependent on the level of institutional development in sub-Saharan Africa. Equally, Adams et al. (2017) adopted ARDL and Granger causality in their analysis of the effects of capital flows on economic growth in Senegal, but their results, however, did not show

cointegration between aid and growth or between FDI and growth. However, remittance caused economic growth in Senegal in the long run, while debt exerted a negative effect on growth**.** Foreign portfolio investment and industrial growth are analyzed by Okonkwo (2016) in Nigeria, using the Ordinary Least Squares estimation, and it is found that there is a positive relationship between foreign portfolio investment and industrial growth. Hossain and Rahman (2017) investigated the implications of governance in facilitating foreign direct investment in developing countries. Using pooled OLS results, they showed that improved governance increases FDI inflows. Regression analysis was utilized by Murdipi et al. (2023), and their results showed that the benefits of portfolio investments for boosting the economy are still fairly responsive to various institutional measures. Adams et al. (2017) employed the ARDL and Granger causality techniques in their analysis of the effects of capital flows on economic growth in Senegal, but their results, however, did not show cointegration between aid and growth or between FDI and growth. However, remittance caused economic growth in Senegal in the long run, while debt exerted a negative effect on growth. Keji (2023) adopted the Autoregressive Distributed Lags (ARDL) and Cointegration and Error Correction Mechanisms (ECM) techniques, and results pointed to the existence of a long-term relationship between foreign direct investment and industrial output growth in Nigeria. However, FDI followed a negative time-path link with industrial output growth in Nigeria.

Recent studies have utilized various empirical techniques to analyze the role of institutional quality on economic resilience and growth outcomes across different contexts. Igan et al. (2020) found private investment tended to spur more growth in external finance-dependent industries, highlighting this transmission channel using panel data models. Rios and Gianmoena (2020) concluded that regional government quality is strongly influential for resilience based on Bayesian approaches. Ezcurra and Ríos (2019) revealed positive spatial spillovers of institutional development onto resilience among European regions applying spatial econometrics. Similarly, Sondermann (2018) established institutional quality as enhancing resilience in Europe, combining time series and regression methods. Despite differences in specific methodologies and samples, these papers consistently demonstrate strong linkages between higher quality institutions and frameworks and improved resilience and growth performance. The findings are geographically robust across European economies at both regional and national levels of analysis.

The preceding reviews indicate that the findings are not unanimous about the impacts of the different forms of foreign capital flows on growth and on industrialization. It is therefore not clear how foreign direct investment, portfolio investment, and official development assistance explain the diversity and progress in these countries' industrial sectors. The continent continues to seek capital to industrialize, and the effects, as moderated by institutions on the continent, have not received as robust a focus within the scope of literature engaged. The disaggregated impacts of these flows will provide insights into their individual potentials. Studies on the top recipients of capital flows have not empirically validated the moderating effect of governance quality on these flows, i.e., the capital-inflow-industrial output growth nexus in selected African countries.

3. Methods and Materials

We apply the Panel Autoregressive Distributed Lag (PARDL) model of Peseran and Smith (1995) and Peseran et al. (1997; 1999) to analyze the nexus between foreign capital flows and industrial output in selected African countries (Egypt, Nigeria, Ethiopia, South Africa, Morocco and DR. Congo) aimed at teasing out both the short and long-run dynamics of the relationship. This model is considered plausible for the study due to the following reasons. First, the model allows for nonstationary variables to be introduced in the model, which is envisaged given the nature of the economic series under investigation. Second, it allows for a degree of heterogeneity in the slope coefficient, which is inevitable considering the nature of the cross-sections being considered. We argue that economies may not experience homogeneous responses in the event of capital flows, which necessitates modeling any inherent heterogeneity in the beta or factor loading. Third, the model is suitable for large N and large T panels. On the theoretical front, the study is grounded in the neoclassical growth model of the Cobb-Douglas approach, which emphasizes capital accumulation (capital inflows) as a key driver of economic growth. This framework is further augmented to capture issues of governance quality. Hence, the generic representation of the panel ARDL model following Peseran and Smith (2014) and Peseran et al. (1997; 1999) is expressed below:

$$\sum_{k=1}^{p} \lambda_{ik} y_{it_{-k}} + \sum_{j=0}^{q} \psi_{ij} X_{i,t_{-j}} + \mu_i + \varepsilon_{it}; i = 1,...,N; t = 1,...,T \quad (1)$$

where i is the number of countries (Cross-Sections); t is the number of periods (time dimension);

μ_i is the country-specific effect; ε_{it} is the panel disturbances term; X_{it} is a K×1 vector of explanatory variables; ψ_{ij} are the coefficients of vectors; and λ_{ij} are scalers for the cointegrated series of order 1. Hence, the error correction for equation 1 can be written as:

$$\Delta y_{it} = \rho_i (y_{it_{-1}} - \phi_i X_{it}) + \sum_{j=1}^{p-1} \lambda_{ij} \Delta y_{it_{-1}} + \sum_{j=0}^{q-1} \psi_{ij} \Delta X_{it_{-j}} + \mu_i + \varepsilon_{it} \quad (2)$$

where $\rho_i = -(1 - \Sigma_{j=1} \lambda_{ij})$ is the speed of adjustment, $\phi_i = \Sigma_{j=1} \rho \lambda_{ij} / (1 - \Sigma_k \lambda_k)$ is the vector of long-run parameters, while $\lambda_{ij} = -\Sigma_m = j+1 \rho \lambda_m$ and $\psi_{ij} = \Sigma_m = j+1 \psi_{im}$ are the short-run parameters. In accordance with equation 2, we can write the estimable linear PARDL for the study as follows:

$$\begin{aligned}
&\Delta IND_{it} = \alpha_{0i} + \beta_{1i} IND_{t_{-1}} + \beta_{2i} FDI_{t_{-1}} + \beta_{3i} FPI_{t_{-1}} + \beta_{4i} ODA_{t_{-1}} + \\
&\beta_{5i} GOV_{t_{-1}} + \beta_{6i} EXR_{t_{-1}} + \\
&\sum_{j=1}^{N1} \lambda_{1ij} \Delta IND_{i,t-j} + \sum_{j=0}^{N2} \lambda_{2ij} \Delta FDI_{i,t-j} + \\
&\sum_{j=0}^{N3} \lambda_{3ij} \Delta FPI_{i,t-j} \sum_{j=o}^{N4} \lambda_{4ij} \Delta ODA_{i,t_{-j}} + \sum_{j=0}^{N5} \lambda_{5ij} \Delta GOV_{i,t_{-j}} + \sum_{j=0}^{N6} \lambda_{6ij} \Delta EXR_{i,t_{-j}} + \\
&\mu_i + \varepsilon_{it}, where, i = 1.2, N; t = 1, 2, ..., T
\end{aligned} \quad (3)$$

where IND_{it} is the industrial output of each unit i at time t; *FDI, FPI, ODA, GOV, EXR* denote the foreign direct investment, foreign portfolio investment, official development assistance, governance quality, which are all measured in current US dollars and exchange rate measured in local currency units respectively, μ_i is the country-specific effect; i is the sampled units; and t is the number of periods. β and λ factors account for both the long and short-run dynamics of the relationship. We further account for the relevance of the error correction mechanism in the relationship, and the model is further specified as follows:

$$\Delta IND_{it} = \sum_{j=1}^{N1} \lambda_{1ij} \Delta IND_{i,t-j} + \sum_{j=0}^{N2} \lambda_{2ij} \Delta FDI_{i,t-j} + \sum_{j=0}^{N3} \lambda_{3ij} \Delta FPI_{i,t-j} \sum_{j=o}^{N4} \lambda_{4ij} \Delta ODA_{i,t_{-j}} + \sum_{j=0}^{N5} \lambda_{5ij} \Delta GOV_{i,t_{-j}} + \sum_{j=0}^{N6} \lambda_{6ij} \Delta EXR_{i,t_{-j}} + \gamma ECT_{t-1} + \varepsilon_{it} \quad (4)$$

However, for robustness of our analysis, we equally conducted country-specific analysis using the conventional ARDL modeling framework to tease out salient unique dynamics that may not be expressly accounted for by applying the panel framework. We used annual time series data for indices of capital flows and industrial value added from 1992 to 2022. The choice of countries was guided by the desire to explain the effectiveness of capital inflows into these economies within the period. This analysis was also influenced by the availability of credible data on aggregates of capital inflows and their associated implications. The choice and measure of capital inflows (foreign direct investment, official development assistance, and portfolio equity) were based on empirical studies (Keji, 2023; Adekunle et al., 2020). However, industrial output growth was measured utilizing industry value added as in Bezić et al. (2016); Filer and Stanišić (2016); Galović et al. (2018); Adekunle et al. (2020); Keji (2023). The analysis relied on data from the World Bank Database (World Bank, 2017).

4. Results

The applicability of heterogeneous panel data models previously constructed in the context of this study was primarily informed by the variable under consideration's likely non-stationarity feature. To that purpose, we employ the traditional method for modeling panel data with large time series (T) dimensions by subjecting the relevant variables to the unit root test. The current study analyzes four different types of panel unit root testing for robustness. As shown in Table 1, the first type involves panel unit root with the null hypothesis of unit root with common process (Harris and Tzavalis, 1999; Breitung, 2000; Levin et al., 2002; Im et al., 2003), the second assumes unit root with individual unit root process (Im et al., 2003; Maddala and Wu, 1999), while the third also assumes unit root in the null hypothesis but in the presence of cross-sectional dependence (Peseran, 2007), which is relevant in addressing if the cross-sections are homogenous or heterogeneous. It assumes homogenous non-stationary against the alternative of possible heterogeneous alternatives. The results affirm that the cross-sections are

heterogeneous among all the variables except for foreign portfolio investment. The fourth category, however, tests the hypothesis of no unit root with a common unit root process; Hadri's (2000) Lagrange multiplier test. For the unit root results, we find industrial output is integrated of order one I(1) for all the test specifications except Hadri (2000); equally, foreign direct investment, foreign portfolio investment, official development assistance, and the measure of governance indicator all indicated a mixed order of integration with the maximum order of I(1). Nominal exchange rate, however, consistently across all test options, is integrated of order one [I(1)]. Since the underlying framework for estimation allows for the combination of both I(0) and I(1) as long as the level of integration does not exceed I(1), mixed order of integration of some variables in the model is not expected to bias our estimates.

Table 1. Panel Unit Root Test

Methods	IND	FDI	FPI	ODA	GOV	EXR
Null Hypothesis: Unit Root with common process						
Harris-Tzavalis [rho]	-13.920***b	-13.369***a	-11.698***b	-6.670***a	-14.935***a	-13.518***b
Breitung [t-stat.]	-6.115***b	-8.856***b	-4.062***a	-8.260***b	-5.042***b	-3.694***b
Levin, Lin & Chu [t*]	-3.776***b	-3.275***b	-2.359***a	-6.701***b	-4.742***b	-2.869***b
Null Hypothesis: Unit Root with Individual Process						
Im, Pesaran & Shin [Z-t-tilde]	-5.213***b	-7.649***b	-3.912***a	-7.619***b	-7.499***b	-3.537***b
ADF Fisher [Chi-square]	2.5649***b	6.4041***b	2.5761***a	6.3076***b	8.572***b	3.235***b
Null Hypothesis: Unit Root with cross-sectional dependence						
Pesaran CD test [z[t-bar]] (lag 2)	-4.600***b	-3.728***b	-2.973***a	-5.888***b	-4.468***b	-1.729**b
Null hypothesis: No unit root with a common unit root process						
Hadri [Z-stat.]	34.921***a	6.9431***a	5.1969***a	10.816***a	14.348**a	2.733***b
Number of Cross-Sections	6	6	6	6	6	6
Number of Periods	27	27	27	27	27	27
Total Number of Observations	162	162	162	162	162	162

Source: Research finding, using Eview 12.

Note: a and b denote stationarity at level and at first difference, respectively; *p < 0.01; **p < 0.05; ***p <0.001.

Table 2. Panel ARDL Results

Panel A: Panel Regression without Interaction		**Panel B: Panel Regression with Interactions**	
Short-run	PMG	Short-run	PMG
Variables	Estimates	Variables	Estimates
ECM	-0.246*** {0.0817}	ECM	-0.241*** {0.0792}
Δ_{FDI}	-0.184 {0.206}	$\Delta_{FDI*GOV}$	0.535 {0.478}
Δ_{FPI}	-19.53 {19.62}	$\Delta_{FPI*GOV}$	12.42 {11.88}
Δ_{ODA}	-0.707 {0.588}	Δ_{GOV}	6.110 {0.0751}
Δ_{GOV}	0.008137 {0.171}	Δ_{EXR}	-1.183** {5.436}
Δ_{EXR}	-1.241* {0.064}		
Long-run	PMG	Long-run	PMG
FDI	3.473*** {1.245}	FDI*GOV	13.04* {7.163}
FPI	108.6 {76.18}	FPI*GOV	125.4** {60.55}
ODA	-7.371 {9.380}	ODA	-7.371 {9.380}
GOV	-9.720 {7.270}	GOV	-3.356 {4.713}
EXR	-3.810 {2.982}	EXR	-2.302 {1.604}
Constant	-1.616 {2.357}	Constant	-7.386 {1.612}
Hausman χ^2	0.127 (0.9802)	Hausman χ^2	0.912 (0.1038)

Source: Research finding, using Eview 12.

Note: Values in parentheses represent standard errors; *p < 0.01; **p < 0.05; ***p <0.001 reflect the level of significance, respectively.

The two main techniques used in the estimation of a dynamic heterogeneous panel data model are the pooled mean group (PMG) estimator and the mean group (MG) estimator. While the mean group estimator relies on estimating N time series regressions and averaging the coefficients, the PMG involves the combination of pooling and averaging of coefficients. Hence, we first estimated the equations using both the MG and PMG estimators; thereafter, we subjected the results from these estimators to the Hausman test to establish if there is a systematic difference between the two estimators. A non-rejection of the null hypothesis implies the adoption of the PMG estimator, which in our case is applicable. The Hausman result, as shown in Table 2, indicates the adoption of PMG, and we report and interpret only the estimates from the PMG model.

First, we seek to account for the impact of capital inflows on industrial output in the selected African countries. Second, we account for the intermediating/interaction role of governance infrastructure (institutional quality) and how it further impacts the industrial output. The result highlights that in the short-run all the three main sources of capital inflow (foreign direct investment, foreign portfolio investment, and official development assistance) maintain a negative and non-significant association with industrial output within the study period, implying the short-run dynamics of foreign capital inflows hinders industrial output growth; however, in the long-run foreign direct investment exudes a positive and significant nexus with industrial output growth. This affirms that the positive impact of foreign direct investment in these economies is long-term, and it holds important implications for business investors and policymakers. Equally relevant are the long-run positive but non-significant effects of foreign portfolio investment on the selected economies, implying the limited long-run effect of the inflow on industrial output. Overall, FPI fails to render a significant impact on industrial output both in the short and long run. Also of note is the consistent negative, albeit non-significant, association between official development assistance and industrial output. This may not be unconnected with the nature of development assistance that is not connected with the industrial structure of these economies in terms of its use.

Next, focus is shifted to the intermediating role of institutional quality by way of its interaction effect with the foreign capital flows variables. The result reveals that in the short run, the interaction terms render a positive but non-significant nexus with industrial output. This suggests that the interaction effect plays a role in a change from a negative impact to a positive impact, albeit non-significant. This further implies that institutional quality plays a critical role in

transmitting the desired economic impact of foreign capital on industrial output in the selected economies. Furthermore, the results hold similar implications for the outcome of the long-run result.

Table 3. Country-Specific ARDL Results

Panel A: Short-Run Estimates					
Country	FDI*GOV	FPI*GOV	ODA*GOV	EXR	ECM
Egypt	0.942519* **(**0.0000)	-0.360906* (0.0017)	0.053657 (0.2318)	0.012383* (0.0295)	-0.257773* (0.0000)
Ethiopia	-0.218903* (0.0366)	-	0.231218* (0.0231)	0.198258 (0.1190)	-0.195977* (0.0000)
Nigeria	0.157593* (0.0204)	-0.003441 (0.9365)	-0.357787* (0.0329)	-0.375006 (0.1606)	-0.627957* (0.0001)
South Africa	0.381120 (0.1137)	8.125010* (0.0000)	-0.433708 (0.1179)	0.246801 (0.3933)	-0.920847* (0.0014)
Panel B: Long-Run Estimates					
Egypt	0.777010* (0.0091)	-1.400091* (0.0007)	0.208154 (0.2443)	0.048039* (0.0016)	
Ethiopia	-1.116982* (0.0110)	-	1.179823* (0.0069)	1.011641 (0.0643)	
Nigeria	0.250962* (0.0161)	-0.005480 (0.9375)	-0.569763* (0.0007)	-0.597184 (0.0964)	
South Africa	0.413880* (0.0550)	-0.055268 (0.3784)	-0.470988* (0.0537)	0.268015 (0.2799)	

Source: Research finding, using Eview 12.

Note: Values in parentheses represent standard errors; *p < 0.01; **p < 0.05; ***p <0.001 reflect the level of significance, respectively.

For robust analysis, we equally present ARDL results for some country-specific analysis as presented in Table 3. The result shows a mixed nexus among the countries, both in the short and long-run dynamics. It is interesting to note that the significant effect of these interactions appears when considering using single-country analysis. It further reveals that in the interaction of governance quality with foreign direct investment, Egypt, Nigeria, and South Africa show a positive and significant relationship on industrial activities in both the short-run and long-run, except for South Africa's short-run result, which is insignificant. However, FDI*GOV on the industrial sector of Ethiopia reveals a negative but significant relationship in both the short-run and long-run. These findings across the sampled countries agree with earlier studies on the mediating role of governance quality to foreign investment (Hossain and Rahman, 2017; Igan et al., 2020; Ndiweni and

Bonga-Bonga, 2021). With respect to foreign portfolio investment, it demonstrates negative and significant relationship with industrial growth in Egypt in the short-run and long-run, while that of Nigeria is insignificant in both the short-run and long-run, which agrees with the findings of Agbloyor et al. (2014). For South Africa, it is only positive and significant in the short run, which is in line with the findings of Baharumshah et al. (2017). The negative and insignificant effect in the long run for South Africa could be linked to its susceptibility to externals (Cockeran, 2016). The negative effect of portfolio investment, collaborates to McKinnon and Pill (1997) , is that unrestricted capital inflows have a negative impact on economic activities because the banks face moral hazard when the capital market has moral hazard. Griffin (1970) argued that portfolio investment increases the propensity for consumption, rather than the investment ratio.

5. Conclusion

This study demonstrates the nexus between foreign capital inflows and industrial performance in selected African countries using a non-stationary heterogeneous panel modelling framework to account for both the short and long-run dynamics. For emphasis, we employ the foreign direct investment, foreign portfolio investment, and official development assistance as main predictors and interact these variables with institutional quality to account for the interaction effects with industrial performance. The study conveys that, on average, institutional quality holds a positive impact on industrial output when interacted with foreign capital flow variables, and that the impact appears to be more significant in the long run relative to short-run dynamics. We equally documented the dynamics of the relationship using country-specific analysis and found similar outcomes, exhibiting mixed outcomes across both short and long-run periods. It is evident clear as shown that foreign capital flows perform better in an environment of quality institutions in the selected African countries, with a higher predictive power in the long run. This study suggests that African governments should prioritize and invest in institutional reforms that improve governance, which will enable foreign capital inflows like FDI to more effectively spur industrial performance and output. Beyond broad institutional capacity building, governments also need sector-specific agencies and frameworks regulating and supporting priority industries in order to leverage foreign capital for those sectors.

Statements and Declarations

- Disclaimer: The expressions and outcomes do not represent the position of the CBN but those of the authors.
- Funding: This work does not receive any funding.
- Conflict of interest: The authors declare that there is no conflict of interest.

References

Abbasian, M., Shahraki, A. S., & Tabar, M. H. (2019). The relationship between financial development and international trade in countries selected for Outlook 1404. *Quarterly Journal of the Macro and Strategic Policies, 7*(27), 396-409. Retrieved from https://doi.org/10.32598/jmsp.7.3.4.

Adams, S., Klobodu, E. K. M., & Lamptey, R. O. (2017). The Effects of Capital Flows on Economic Growth in Senegal. *The Journal of Applied Economic Research, 11*(2), 121–142. Retrieved from https://doi.org/10.1177/0973801016687869.

Adekunle, I. A., Ogunade, A. O., Kalejaiye, T. G., & Balogun, A. M. (2020). Capital Inflows and Industrial Performance in Nigeria: Including the Excluded. *Jurnal Ekonomi & Studi Pembangunan, 21*(1), 37-52. Retrieved from https://doi.org/10.18196/jesp.21.1.5030.

Agboloyor, E. K., Abor, J. Y., Adjsai, C. K. D., & Yawson, A. (2014). Private capital flows and economic growth in Africa: The role of domestic financial markets. *Journal of International Financial Markets, Institutions and Money, 30*, 137-152. Retrieved from https://doi.org/10.1016/j.intfin.2014.02.003.

Ahlerup, P., Baskaran, T., & Bigsten, A. (2016). Government Impartiality and Sustained Growth in Sub-Saharan Africa. *World Development, 83*, 54–69. Retrieved from https://doi.org/10.1016/j.worlddev.2016.03.006.

Baharumshah, A. Z., Slesman, L., & Devadason, E. S. (2017). Types of foreign capital inflows and economic growth: new evidence on the role of financial markets. *Journal of International Development, 29*(6), 768-789. Retrieved from https://doi.org/10.1002/jid.3093.

Bezić, H., Galović, T., & Mišević, P. (2016). The impact of terrorism on foreign direct investment (FDI) of EU and EEA countries. Proceedings of the Faculty of Economics in Rijeka. *Journal of economic theory and practice/časopis za ekonomsku teoriju i praksu*, *34*(2), 333–362. [In Bosnian]. Retrieved from https://urn.nsk.hr/urn:nbn:hr:192:332919.

Brandl, B., & Traxler, F. (2010). Labour conflicts: A cross-national analysis of economic and institutional determinants, 1971-2002. *European Sociological Review, 26*(5), 519-540. Retrieved from https://doi.org/10.1093/esr/jcp036.

Cockeran, H. J. (2016). South Africa's macroeconomic resilience to external shocks: A comparison to its BRICS partners. *International Journal of Economics and Finance Studies, 8*(1), 145-160. Retrieved from https://dergipark.org.tr/en/pub/ijefs/issue/26144/275328.

Edo, S. (2018). Private capital inflows and stock market interface in Sub-Saharan Africa. *International Review of Economics, 65*(4), 507-538. Retrieved from https://doi.org/10.1007/s12232-018-0313-z.

Filer, R. K., & Stanišić, D. (2016). The effect of terrorist incidents on capital flows. *Review of Development Economics, 20*(2), 502-513. Retrieved from https://doi.org/10.1111/rode.12171.

Galović, T., Bezić, H., & Mišević, P. (2018). Terrorist activities and capital flows of developed countries. *Economic Journal/Acta Oeconomica, 68*(3), 337-352. Retrieved from https://doi.org/10.1556/032.2018.68.3.2.

Griffin, K. (1970). Foreign capital, domestic savings, and economic development. *Oxford Bulletin of Economics and Statistics, 32*(2), 99-112. Retrieved from https://doi.org/10.1111/j.1468-0084.1970.mp32002002.x.

Griffin, K. (1978). Foreign capital, domestic savings, and economic development. In *International Inequality and National Poverty* (57-80). London: Palgrave Macmillan UK. Retrieved from https://doi.org/10.1007/978-1-349-04069-8_4.

Keji, S. A. (2023). Industrial output growth and foreign direct investment in Nigeria. *Future Business Journal, 9*(58), 1-13. Retrieved from https://doi.org/10.1186/s43093-023-00225-0.

Hossain, M. S., & Rahman, M. Z. (2017). Does governance facilitate foreign direct investment in developing countries? *International Journal of Economics and Financial Issues, 7*(1), 164-177. Retrieved from Retrieved from https://www.econjournals.com/index.php/ijefi/article/view/3370.

Haggard, S. (2004). Institutions and growth in East Asia. *Studies in Comparative International Development, 38*(4), 53-81. Retrieved from https://www.econbiz.de/Record/institutions-and-growth-in-east-asia-haggard-stephan/10002086636.

Markusen, A. (1996). Sticky places in slippery space: A typology of industrial districts. *Economic Geography, 72*(3), 293-313. Retrieved from https://doi.org/10.2307/144402.

Murdipi, R., Baharumshah, A. Z., & Law, S. H. (2023). Portfolio capital flows and economic growth: Do institutional factors matter? *Research in International Business and Finance, 66*, 102019. Retrieved from https://doi.org/10.1016/j.ribaf.2023.102019.

Imoudu, E. C. (2012). The impact of foreign direct investment in Nigeria's economic growth, 1980–2009: Evidence from Johansen's cointegration approach. *International Journal of Business and Social Science, 3*(6), 122-134. Retrieved from https://ijbssnet.com/journals/Vol_3_No_6_Special_Issue_March_2012/16.pdf.

Prasad, E. S., Rogoff, K., Wei, S. -J., & Kose, M. A. (2003). Effects of financial globalization on developing countries: Some empirical evidence. *IMF Occasional Paper, 220*. Retrieved from https://www.imf.org/external/pubs/nft/op/220/.

Sule, A. (2019). External financing and industrial growth in Nigeria. *International Journal of Economics, Business and Management Studies, 6*(1), 180-193. Retrieved from https://doi.org/10.20448/802.61.180.193.

Shahraki, A. S., Panagopoulos, T., Ashari, H. E., & Bazrafshan, O. (2023). Relationship between Indigenous Knowledge Development in Agriculture and the Sustainability of Water Resources. *Sustainability, 15*(7), 5665. Retrieved from https://doi.org/10.3390/su15075665.

Okafor, I. G., Ugochukwu, U. S., & Chijindu, E. H. (2016). Foreign capital inflows and Nigerian economic growth nexus: A Toda-Yamamoto approach. *European Journal of Accounting, Auditing and Finance Research, 4*(3), 16-26. Retrieved from https://eajournals.org/ejaafr/vol-4-issue-3-march-2016-2/foreign-capital-inflows-and-nigerian-economic-growth-nexus-a-toda-yamamoto-approach/.

McKinnon, R. I., & Pill, H. (1997). Credible economic liberalizations and over-borrowing. *American Economic Review, 87*(2), 189-193. Retrieved from https://ideas.repec.org/a/aea/aecrev/v87y1997i2p189-93.

Pesaran, M. H., & Shin, Y. (1999). An autoregressive distributed-lag modelling approach to cointegration analysis. In S. Strøm (Ed.), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium* (371-413). Cambridge: Cambridge University Press. Retrieved from https://doi.org/10.1017/CCOL521633230.011.

Prasad, E. S., Rajan, R. G., & Subramanian, A. (2007). Foreign capital and economic growth. *Brookings Papers on Economic Activity*, *38*(1), 153-230. Retrieved from https://doi.org/10.1353/eca.2007.0016.

Rakhshani, B., Shahraki, A. S., & Aliahmadi, N. (2021). Cooperative business development problems in the Sistan region villages. *Co-Operation and Agriculture, 10*(38), 211-239. Retrieved from https://doi.org/10.22034/ajcoop.2021.289311.1696.

Okonkwo, O. N. (2016). Foreign portfolio investment and industrial growth in Nigeria (1986–2013). *International Journal of Innovative Finance and Economics Research, 4*(3), 31-38. Retrieved from https://seahipaj.org/journals-ci/sept-2016/IJIFER/full/IJIFER-S-5-2016.pdf.

Kose, M. A., Prasad, E., Rogoff, K., & Wei, S.-J. (2010). Financial globalization and economic policies. In D. Rodrik & M. Rosenzweig (Eds.), *Handbook of Development Economics*, 5 (4283-4359). Retrieved from https://ideas.repec.org/h/eee/devchp/v5y2010icp4283-4359.

Ndiweni, Z. L., & Bonga-Bonga, L. (2021). Capital inflows and economic growth nexus in Sub-Saharan Africa: Evidence on the role of institutions. *MPRA Paper*, *107392*, Retrieved from https://mpra.ub.uni-muenchen.de/107392/1/MPRA_paper_107392.pdf.

Shahraki, A. S., Panagopoulos, T., Ashari, H. E., & Bazrafshan, O. (2023). Relationship between Indigenous Knowledge Development in Agriculture and the Sustainability of Water Resources. *Sustainability, 15*(7), 5665. Retrieved from https://doi.org/10.3390/su15075665.

Sule, A. (2020). Institutional quality and economic growth: Evidence from Nigeria. *African Journal of Economic Review, 8*(1), 48-64. Retrieved from https://doi.org/10.22004/ag.econ.301050.

Solow, R. M. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics, 70*(1), 65-94. Retrieved from https://EconPapers.repec.org/RePEc:oup:qjecon:v70y1956i1p65-94.html.

Pesaran, M. H., & Shin, Y. (1999). An autoregressive distributed-lag modelling approach to cointegration analysis. In S. Strøm (Ed.), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*, *11* (371-413). Cambridge University Press. Retrieved from https://doi.org/10.1017/ccol521633230.011.

Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy, 98*(5, 2), S71-S102. Retrieved from https://doi.org/10.1086/261725.

Obichukwu, U. I. (2013). The impact of industrial output on the economy of Nigeria, 1980–2010 (Unpublished Project, Caritas University, Enugu State).

Yıldırım, A. (2015). Institutional Structure and International Competitiveness: Turkey as a Case Study (PhD Dissertation, Muğla Sıtkı Koçman University). Retrieved from https://tez.yok.gov.tr/UlusalTezMerkezi/tezDetay.jsp?id=NErrvhRK4TL6qcln0elYVA&no=CDhvotZZ09gKke6Qlh9dRA.

Wang, Q., & Wu, N. (2012). Long-run covariance and its applications in cointegration regression. *Stata Journal, 12*(3), 515-542. Retrieved from https://doi.org/10.1177/1536867X1201200312.

World Bank. (2003). A user's guide to poverty and social impact analysis. Washington, DC: World Bank. Retrieved from https://searchlibrary.ohchr.org/record/19919.

---------- (2017). World Development Indicators 2017. Washington, DC: World Bank. Retrieved from https://openknowledge.worldbank.org/entities/publication/382524c1-c957-56f8-8b19-ef74d7001e70/full.

---------- (2016). World Development Report 2016: Digital Dividends. Washington, DC: World Bank. Retrieved from https://www.worldbank.org/en/publication/wdr2016.

Cite this article: Sule, A., Liambee Aor, R., Onyeje Doki, N., & Danlami Mohammed, I. (2025). Foreign Capital Flows and Industrial Output in Selected African Countries. *Iranian Economic Review, 29(4)*, 1423-1442.