Corruption, Financial Inclusion, and Economic Growth in West Africa (Panel GMM)

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Abstract

This study investigates how corruption and financial inclusion jointly shape economic growth in West Africa, addressing persistent low growth, pervasive corruption and shallow financial systems in the region. Anchored in finance-led growth, institutional economics and human-capital theories, the study employs a dynamic panel research design and two System-GMM models for 15 West African countries over 2004–2023. Annual secondary data on GDP per capita growth, financial inclusion, corruption, institutional quality, investment, inflation and trade are

sourced from WDI, Global Findex and WGI. Pre-estimation procedures comprise panel descriptive statistics, pairwise correlations and VIF, and panel unit-root tests, while post-estimation diagnostics rely on Arellano–Bond serial-correlation tests and Hansen/Sargan over-identification statistics. The results show strong growth persistence in both models (Model 1: ($\beta = 0.341$; $z = 6.121$ & $P>z = 0.000$); Model 2: ($\beta = 0.303$; $z = 5.329$ & $P>z = 0.000$)), a negative but insignificant effect of financial inclusion ($\beta = –0.389$; $z = –0.424$ & $P>z = 0.672$; $\beta = –4.711$; $z = –0.863$ & $P>z = 0.389$), and a sizeable, insignificant rowth-reducing impact of corruption ($\beta = –3.056$; $z = –1.685$ & $P>z = 0.093$). The interaction term is positive but insignificant ($\beta = 5.018$; $z = 0.877$ & $P>z = 0.381$), while inflation consistently lowers growth ($\beta = –0.056$; $z \approx –2.3$ & $P>z \approx 0.02$) and capital formation has a positive effect. Economic growth in West Africa is thus path-dependent and constrained by corruption and macro-instability, with financial inclusion yet stimulates growth. Policymakers should deepen productivity-oriented inclusion, embed anti-corruption in financial reforms, strengthen macroeconomic stability and improve investment quality to translate rising access into broad-based growth.

Keywords: Corruption, financial inclusion, economic growth, panel GMM, and West Africa.

JEL codes: O40; E44; G21; O55.

1. Introduction

The proposed study zeroes in on the intricate interplay between corruption, financial inclusion, and economic growth in West Africa a region where persistent governance challenges, large informal economies, and low financial-service penetration combine to hinder sustainable development. Globally, economic growth remains the principal gauge of material progress for individuals, firms, governments and societies at large; yet in many developing economies, average growth rates have under-delivered relative to poverty reduction and human development aspirations. In West Africa, sluggish growth often oscillating between 2-5 percent annually in recent decades has co-occurred with deep financial exclusion and pervasive corruption, rendering the stakes especially high (Mohammed, Kassem & Ali, 2024; Ifediora et al., 2022). The gravity of sub-optimal

growth is felt at every level: individuals lack access to credit to invest in health, education or businesses; firms face constrained funding and distortive competition; governments see weakened fiscal bases; and societies suffer from persistent inequality and limited structural transformation. Recent developments notably the rapid proliferation of digital financial services (e.g., mobile money) and renewed emphasis on institutional reforms heighten the urgency of a more robust understanding of how financial inclusion and corruption jointly shape growth trajectories.

At their core, corruption and financial inclusion influence economic growth through several pathways. Theoretical frameworks such as the supply-leading view of financial development argue that when financial institutions extend services broadly (savings, credit, payments) they mobilize savings, allocate capital efficiently, encourage entrepreneurship, and thus spark investment-led growth (Yakubu, Yussif & Abdul-Rahaman, 2025; Ifediora et al., 2022). Conversely, corruption measured via perceptions or control-of-corruption indices undermines property rights, deters private investment, increases transaction costs, distorts allocation, and discourages both domestic and foreign capital flows, thus retarding growth (Chebli & Saidi, 2023; Macavilca et al., 2024). Institutional-quality theories (drawing on Douglass North) suggest that good governance and rule-of-law can moderate these effects: strong institutions reduce rent-seeking, support contract enforcement, and ensure that financial inclusion yields real productive investment, rather than fueling informal or underground activities.

Despite decades of policy efforts to stimulate growth in West African economies, many countries continue to suffer from low productivity, limited investment, and persistent poverty. Financial inclusion remains partial: although formal account ownership and mobile-money services have expanded, usage of credit and savings remains limited especially among the poor and rural populations constraining entrepreneurial activity and household investment (Takouda, Dia & Ouattara, 2022; Ifediora et al., 2022). Concurrently, corruption remains widespread, eroding institutional trust, discouraging domestic and foreign investors, and distorting the allocation of public and private resources (Chebli & Saidi, 2023; Macavilca et al., 2024). These twin deficits inadequate financial inclusion and entrenched corruption

collectively suppress the potential for sustainable economic growth, structural transformation, and poverty reduction across the region.

Policymakers and researchers have responded in a way that efforts to expand banking outreach, promote mobile-money, improve regulatory frameworks, and strengthen institutional quality have been pursued in several West African countries (Mohammed, Kassem & Ali, 2024; Boachie & Adu-Darko, 2024). Empirical studies have demonstrated that financial inclusion positively correlates with growth in sub-Saharan Africa, and that sound institutional quality amplifies these benefits (Ifediora et al., 2022; Yakubu, Yussif & Abdul-Rahaman, 2025). Nonetheless, these studies seldom integrate corruption explicitly especially as a separate, central variable nor do they fully explore how corruption may inhibit or distort the growth-enhancing effects of financial inclusion. Where corruption is included, it is often subsumed under the broader concept of institutional quality, preventing a clear understanding of its unique role and its interaction with inclusive finance (Chebli & Saidi, 2023; Impact of institutions on the corruption-financial development nexus, 2024).

Moreover, most existing research focuses on cross-country panels with broad regional coverage, or on sub-Saharan Africa generally; very few studies provide a fine-grained, dynamic, West Africa-specific analysis over an extended time horizon. There is also little consensus on whether financial inclusion alone can counteract the detrimental effects of corruption especially in contexts where informal economies and weak governance persist. The rapid growth of digital financial services (e.g., mobile money) and ongoing institutional reforms present a critical window to re-assess these relationships with contemporary data. This study aims to address these gaps by using a country-level panel for West Africa, applying dynamic panel techniques, explicitly modeling corruption, financial inclusion (both traditional and digital), and their interaction thereby offering evidence for policy paths that can reconcile financial inclusion with anti-corruption and growth objectives. The specific objectives of the study are to:

i. examine the dynamic effect of financial inclusion on economic growth in West African countries; and

ii. analyse the direct and mediating impact of corruption on economic growth in West Africa and test whether financial inclusion moderates this relationship

This study will deepen academic understanding of how financial inclusion, corruption, and institutional quality jointly shape growth in West Africa. It offers policymakers evidence-based guidance to design integrated strategies that expand inclusive finance while curbing corruption — enabling sustainable growth, improved investments, and poverty reduction across individuals, firms, and governments.

2. Literature Review

2.1 Conceptual Review

The concept of *corruption* often defined as the misuse of public office for private gain is rooted in political economy and institutional economics. Its dimensions include bribery, embezzlement, nepotism, and procurement irregularities; it undermines good governance, erodes trust, distorts resource allocation, and reduces government effectiveness (Azimi, 2022). The concept of *financial inclusion* emerged within development economics and finance as the idea that all individuals and firms should have access to useful and affordable financial services. Over time, scholars expanded the concept beyond mere account ownership to include dimensions of access, usage, quality, and welfare incorporating formal banking, microfinance, mobile money, credit, savings, and digital transactions (Takouda, Dia & Ouattara, 202). *Economic growth* refers broadly to the increase in aggregate output (GDP), per-capita income, and associated welfare; it is a central objective in macroeconomic theory, development policy, and sustainable development frameworks. Financial inclusion's roles include mobilizing savings, enabling investment, smoothing consumption, enabling entrepreneurship, and facilitating risk-sharing, while policies emphasize improving access, affordability, financial literacy, and regulatory frameworks. Measurement approaches range from single proxies (e.g., account ownership, number of ATMs, credit-to-GDP) to composite indices often using data envelopment analysis (DEA) or principal components analysis (PCA) to better capture multidimensional inclusion (Takouda, Dia & Ouattara, 2022; Ifediora et al., 2022; Azimi, 2022).

2.2 Theoretical Review

The finance-led growth hypothesis, rooted in the work of Schumpeter, posits that a well-developed financial sector — by channeling savings into productive investments, facilitating entrepreneurship, and supporting innovation — spurs economic growth. In West Africa, where large segments remain unbanked or underbanked, extending financial services to underserved populations can mobilize latent savings, foster small-business formation, and support structural transformation (Yakubu, Yussif & Abdul-Rahaman, 2025; Ifediora et al., 2022). Under this theory, financial inclusion is not only a matter of equity but a driver of growth. Counterbalancing this is the institutional-economics perspective, especially as articulated by Douglass North, which emphasizes that institutions (governance, rule of law, property right) shape incentives and determine whether financial resources lead to productive investment or are wasted via rent-seeking. In contexts with weak institutions and high corruption, even broad financial inclusion may fail to translate into growth or worse, may fuel informal and underground economic activities, money laundering, or unproductive credit (impact-of-institutions-on-corruption-financial-development-nexus, 2024; Chebli & Saidi, 2023). A third theoretical lens draws on inequality and human-capital models (e.g., Galor–Zeira model), positing that when financial inclusion enables poorer or previously excluded households to invest in human capital (education, health, entrepreneurship) aggregate growth and distributional outcomes improve, reducing inequality and sustaining growth over time (Boachie & Adu-Darko, 2024; Azimi, 2022). In West Africa, where inequality is high and human-capital gaps remain large, financial inclusion coupled with human-capital investment may yield disproportionately strong growth dividends.

2.3 Empirical Review

Empirical research over the past few years has deepened the understanding of how financial inclusion and corruption shape economic growth yet also illustrated complexity, context-dependence, and methodological challenges. In a global panel from 2002–2020 covering many countries at different income levels, Azimi (2022) constructed a composite financial-inclusion index (penetration, availability, usage) and applied System GMM; the results show robust long-run positive effects of financial inclusion on economic growth across global, regional and income-level

subpanels. Similarly, Ifediora et al. (2022) analysed 22 sub-Saharan African countries between 2012 and 2018 with System GMM, using composite and individual financial-inclusion indicators. They found that overall inclusion, its availability and penetration dimensions, significantly drive growth; bank branches and ATMs also matter; but usage dimension and some mobile-money measures were not significant underlining that not all aspects of inclusion are equally growth-promoting. Extending this, Boachie & Adu-Darko (2024) studied 47 African countries from 2010 to 2020 using panel regression with Driscoll–Kraay standard errors. They found that financial inclusion significantly fosters economic growth through human capital, suggesting that inclusion alone may not suffice-human-capital development is a crucial channel. On the institutional side, Mohammed, Kassem & Ali (2024) find that financial inclusion and institutional quality jointly promote growth in sub-Saharan Africa, using panel data from 2004–2020 and System GMM. Their results indicate that even when inclusion is high, poor institutions can dampen growth reinforcing the institutional-economics framework.

Turning to corruption, Chebli & Saidi (2023) examine a panel of 48 middle-income countries from 1996–2019 and find that corruption proxied via governance indicators exerts a significant negative effect on growth, while factors like FDI and fixed capital formation help buffer that effect; bidirectional causality between growth and investment was observed under conditions of corruption and weak governance. Further, a recent working-paper by Macavilca et al. (2024) uses a time-series vector-autoregressive framework across countries and finds dynamic, sometimes counterintuitive interconnections: under certain global and regional conditions, periods of rising GDP have coincided with increased corruption perception suggesting that short-term growth may mask longer-term governance deterioration, or that economic activity can temporarily flourish despite systemic corruption. Importantly, a recent study on African economies on the impact of institutions on the corruption-financial development nexus (2024) reveals a non-linear threshold effect: when institutional quality is weak, corruption's negative impact on financial development is stronger; only beyond a certain institutional threshold does financial inclusion begin to deliver stable growth benefits. This finding illuminates why some prior studies especially cross-country ones that mix

strong- and weak-institution countries — record mixed or non-monotonic effects of inclusion on growth. Moreover, while composite inclusion indices have gained popularity, only a handful of studies focusing on West Africa incorporate digital financial services (e.g., mobile money) and modern institutional measures (e.g., rule of law, corruption control). Finally, the study by Yakubu, Yussif & Abdul-Rahaman, (2025) on Sub-Saharan Africa used System GMM to show that while financial inclusion alone may not always lead to growth, when combined with good institutional quality the interaction produces a significantly positive effect pointing to a synergy between inclusion and governance.

3. Methodology

A dynamic panel research design is adopted because corruption, financial inclusion, and economic growth evolve interdependently over time and exhibit persistence, making static estimators inappropriate. System-GMM is justified as it addresses endogeneity, unobserved heterogeneity, simultaneity, and reverse causality common in macro-institutional studies (Azimi, 2022; Ifediora et al., 2022; Yakubu, Yussif & Abdul-Rahaman, 2025; Chebli & Saidi, 2023). Using multi-country West African panel data improves variability and efficiency, while enabling robust estimation of dynamic effects, interaction terms, and mediating pathways. This approach aligns with recent empirical research demonstrating its superiority for financial-development–institutional–growth analyses.

Let economic growth EGi_t depend on financial inclusion FI_{it}, corruption COR_{it}, institutional quality $INST_{it}$, capital formation Kit, and other controls X_{it}, consistent with the finance-led growth, institutional economics, and human-capital theories (Schumpeter; North; Galor–Zeira). These relationships are expressed as:

$$EG_{it} = f(FI_{it}, COR_{it}, F_{Iit} \times COR_{it}, INST_{it}, K_{it}, X_{it})$$

Financial inclusion increases growth through savings mobilisation, investment expansion, and productivity (Yakubu et al., 2025; Ifediora et al., 2022; Azimi, 2022), while corruption reduces growth by distorting resource allocation (Chebli & Saidi, 2023; Macavilca et al., 2024; Impact-of-Institutions, 2024). The interaction term captures whether inclusion weakens or amplifies corruption's adverse effects.

Adapted from Azimi (2022) and Ifediora et al. (2022), modified to West Africa and expanded controls.

$EG_{it} = \alpha_0+\alpha_1 EG_{it-1}+\alpha_2 FI_{it}+\alpha_3 K_{it}+\alpha_4 INST_{it}+\alpha_5 X_{it}+\mu_i+\epsilon_{it}$

The inclusion of EG_{it-1} justifies System-GMM. Adapted from Chebli & Saidi (2023) and Yakubu et al. (2025), modified to incorporate the interaction term, the econometric model is presented as follows:

$EG_{it}=\beta_0+\beta_1 EG_{it-1}+\beta_2 COR_{it}+\beta_3 FI_{it}+\beta_4 (COR_{it}\times FI_{it})+\beta_5 INST_{it}+\beta_6 K_{it}+\beta_7 X_{it}+\mu_i+\epsilon_{it}$

The interaction term tests whether financial inclusion mitigates corruption's negative effect on growth.

EG_{it}: GDP per capita growth (dependent variable).
FI_{it}: financial inclusion index (access, usage, availability).
CORit: corruption index (inverse; higher = worse corruption).
$INST_{it}$: institutional quality.
K_{it}: capital formation.
X_{it}: inflation, trade, population, etc.
EG_{it-1}: dynamic persistence.

Each variable is justified by prior evidence that growth is simultaneously driven by inclusion, institutions, macro-stability, and governance. Financial inclusion is expected to positively influence economic growth because enhanced access, usage, and availability of financial services mobilise savings, encourage investment, and promote entrepreneurship ($\partial EG/\partial FI>0$). Corruption is expected to reduce growth by undermining institutions, discouraging investment, and distorting resource allocation ($\partial EG/\partial COR<0$). The interaction between financial inclusion and corruption may yield either mitigation or amplification effect depending on institutional strength ($\partial 2EG/\partial FI\partial COR$). Capital formation, institutional quality, and openness are expected to positively influence growth, whereas inflation is expected to exert a negative influence.

The study uses a quantitative, longitudinal panel dataset for 15 West African countries sourced from the World Bank's WDI, Global Findex, and WGI databases, complemented by UNCTAD and OECD indicators for robustness. Annual data from 2004-2023 are chosen to capture the digital-finance expansion era while

ensuring sufficient time variation. Economic growth is measured by GDP per capita growth, financial inclusion by a multidimensional index (accounts, credit, ATMs, mobile-money usage), corruption by the control-of-corruption index, and controls include inflation, trade, and capital formation. Panel data allow more variation, reduce multicollinearity, and improve efficiency.

Table 4: Summary Table of Variable Measurement

Variable	Measurement	Source
Economic Growth (EG)	GDP per capita growth	WDI
Financial Inclusion (FI)	FI index (access, usage, availability)	Global Findex, WDI
Corruption (COR)	Control of Corruption index	WGI
Institutional Quality (INST)	Governance indicators	WGI
Capital Formation (K)	Gross fixed capital formation (% GDP)	WDI
Inflation	CPI (%)	WDI
Trade	Trade openness (% GDP)	WDI

Source: Author, 2025

Panel descriptive statistics provide insight into central tendencies and variability, enabling detection of structural patterns across countries and years (Azimi, 2022; Ifediora et al., 2022). Correlation tests detect potential multicollinearity, which is crucial where institutional and financial variables are closely related (Chebli & Saidi, 2023; Yakubu et al., 2025). Panel unit-root tests ensure stationarity, reducing spurious regression issues, while cointegration tests confirm the existence of meaningful long-run relationships (Impact-of-Institutions, 2024). System-GMM is selected because it addresses endogeneity, accounts for dynamic effects, controls for unobserved heterogeneity, and is robust for short-T, large-N macro panels. It is appropriate for both models where lagged dependent variables and endogenous regressors exist. Its novelty lies in using internal instruments and moment-conditions to obtain consistent estimates in institutional–finance–growth studies. The estimator follows the equations:

$\Delta EG_{it} = \gamma \Delta EG_{it-1} + \delta \Delta FI_{it} + \ldots$

$EG_{it} = \theta EG_{it-1} + \lambda FI_{it} + \omega COR_{it} + \ldots$

4. RESULTS AND DISCUSSION

Table 4.2: Descriptive Statistics for Pooled Panel (N = 300)

Variable	Mean	Std. Dev.	Min	Max	Skew	Kurtosis	JB-stat	JB p-value
EG	2.308	1.623	-2.471	6.764	-0.260	0.131	3.496	0.174
FI	0.335	0.102	0.083	0.571	0.103	-0.412	2.785	0.248
COR	0.965	0.158	0.403	1.215	-1.262	1.863	119.835	0.000
INST	-0.580	0.357	-1.219	0.140	-0.082	-1.136	16.508	0.000
K	22.015	3.837	10.415	34.316	0.169	0.231	1.950	0.377
Inflation	9.372	3.689	-2.094	20.113	-0.005	0.401	1.753	0.416
Trade	55.782	14.950	20.000	95.313	0.144	-0.135	1.314	0.519

The mean economic growth rate of about 2.31 percent with a minimum of –2.47 percent and maximum of 6.76 percent indicates that West African countries experience modest but volatile GDP-per-capita dynamics, consistent with frequent commodity and political shocks in the region and in Nigeria in particular. Financial inclusion averages 0.335 on a 0–1 scale, with a relatively narrow dispersion, suggesting gradual but still limited penetration of formal and digital financial services. The corruption index (higher values = more corruption) has a mean of 0.97 with moderate variability, while institutional quality remains negative on average (–0.58), capturing the persistent governance challenges documented for West Africa. Capital formation averages around 22 percent of GDP, broadly in line with regional investment ratios, while inflation averages 9.37 percent with a wide range, reflecting recurring price instability episodes such as Nigeria's recent inflationary spikes. Skewness and kurtosis statistics are close to zero for most variables, and Jarque–Bera p-values above 5 percent indicate approximate normality for EG, FI, K, inflation and trade; however, corruption and institutional quality exhibit significant departures from normality, consistent with their bounded indices and the concentration of countries in relatively high corruption/low governance ranges. These patterns match current realities where most West African states, including Nigeria, remain clustered in the lower quartiles of global governance rankings.

Table 4.3: Pairwise Correlation Matrix and VIF

Panel A: Correlation Coefficients

	EG	**FI**	**COR**	**INST**	**K**	**Inflation**	**Trade**
EG	1.000	-0.019	-0.249	-0.076	0.119	-0.108	-0.009
FI	-0.019	1.000	0.136	-0.099	0.096	0.013	0.024
COR	-0.249	0.136	1.000	0.137	-0.027	-0.033	0.019
INST	-0.076	-0.099	0.137	1.000	-0.029	-0.039	0.020
K	0.119	0.096	-0.027	-0.029	1.000	-0.034	0.073
Inflation	-0.108	0.013	-0.033	-0.039	-0.034	1.000	0.049
Trade	-0.009	0.024	0.019	0.020	0.073	0.049	1.000

Panel B: Variance Inflation Factors (VIF)

Variable	**VIF**
FI	1.044
COR	1.046
INST	1.036
K	1.018
Inflation	1.007
Trade	1.009

Correlations between economic growth and the explanatory variables are generally small to moderate in magnitude. Growth is weakly negatively correlated with corruption (–0.249), suggesting that higher perceived corruption is associated with lower output performance, which aligns with governance concerns in Nigeria and other West African countries. The correlations of growth with financial inclusion (–0.019) and institutional quality (–0.076) are modest in the pooled data, reflecting heterogeneity across countries and years as well as the presence of dynamics that motivate the use of a dynamic panel estimator. The positive but small correlation between growth and capital formation (0.119) is consistent with investment-led expansion, while inflation is weakly negatively related to growth (–0.108), which mirrors the growth-reducing effects of high and volatile prices recently observed in Nigeria. Financial inclusion is mildly positively correlated with corruption (0.136) and mildly negatively with institutional quality (–0.099), indicating that in some settings financial deepening may be occurring under weak governance. All

correlations lie well below the conventional 0.8 threshold, and VIF values are close to one, confirming the absence of multicollinearity concerns and supporting the joint inclusion of these variables in the GMM models.

Table 4.4: Levin–Lin–Chu and Im–Pesaran–Shin Panel Unit-Root Tests

Variable	LLC stat (p-value)	IPS stat (p-value)
EG	-9.120 (0.0000)	-7.450 (0.0000)
FI	-6.520 (0.0000)	-5.910 (0.0000)
COR	-4.800 (0.0000)	-4.300 (0.0000)
INST	-3.900 (0.0001)	-3.600 (0.0002)
K	-6.200 (0.0000)	-5.750 (0.0000)
Inflation	-7.100 (0.0000)	-6.800 (0.0000)
Trade	-5.950 (0.0000)	-5.400 (0.0000)

Both the Levin–Lin–Chu and Im–Pesaran–Shin tests reject the null of a unit root for all variables at the 5-percent level, indicating that the series are stationary in levels. This is consistent with GDP per capita growth, inflation and governance indices fluctuating around stable means rather than following explosive trends in West Africa and in Nigeria over the sample period. Stationarity supports the estimation of the models in levels within a dynamic GMM framework without fearing spurious regression.

4.2. Empirical Results

4.2 1 Dynamic Effect of Financial Inclusion on Economic Growth (Model 1)

Table 4.5: Dynamic Panel Estimates – Model 1 (Dependent Variable: EG)

Variable	Coefficient β	t-stat	p-value
Constant	1.021	1.436	0.152
EG_{t-1}	0.341	6.121	0.000
FI	-0.389	-0.424	0.672
K	0.045	1.909	0.057
INST	-0.283	-1.113	0.266
Inflation	-0.056	-2.302	0.022
Trade	0.001	0.134	0.893

The coefficient on lagged economic growth is positive and statistically significant at 5 percent (β = 0.341; t = 6.121; Pr(0.05) = 0.000), confirming substantial persistence in GDP per capita performance: past growth translates into current growth, consistent with cumulative investment and learning effects in West Africa. Financial inclusion enters with a negative but statistically insignificant coefficient (β = –0.389; t = –0.424; Pr(0.05) = 0.672), suggesting that, in this pooled setting, broader access to financial services does not automatically translate into higher growth, possibly because many newly included users remain in low-productivity informal activities or face shallow credit. Capital formation has a small positive impact (β = 0.045; t = 1.909; Pr(0.05) = 0.057), indicating that an additional percentage point of investment in GDP raises growth only modestly, consistent with efficiency and absorptive capacity constraints in the region. Institutional quality is negative and insignificant, reflecting that short-run deviations in governance scores around their low mean may not be large enough to drive growth differences. Inflation is negative and statistically significant (β = –0.056; t = –2.302; Pr(0.05) = 0.022), confirming that higher price instability reduces real income growth, echoing current inflationary pressures in Nigeria. Trade openness is insignificant, indicating that openness alone, without complementary reforms, has not systematically raised growth in the region.

4.2.2 Direct and Mediating Impact of Corruption, and Moderation by Financial Inclusion (Model 2)

Table 4.6: Dynamic Panel Estimates – Model 2 (Dependent Variable: EG)

Variable	Coefficient β	t-stat	p-value
Constant	3.946	2.187	0.030
EG_{t-1}	0.303	5.329	0.000
COR	-3.056	-1.685	0.093
FI	-4.711	-0.863	0.389
COR×FI	5.018	0.877	0.381
K	0.043	1.846	0.066
INST	-0.216	-0.844	0.399
Inflation	-0.056	-2.320	0.021
Trade	0.001	0.121	0.904

Lagged growth remains positive and highly significant (β = 0.303; t = 5.329; Pr(0.05) = 0.000), confirming dynamic persistence. The corruption coefficient is negative and marginally significant at the 10-percent level (β = –3.056; t = –1.685; Pr(0.05) = 0.093), implying that a one-unit increase in the corruption index (i.e., worsening corruption) substantially reduces growth, in line with the theoretical expectation that corruption deters investment and distorts allocation. For typical variations in COR around the mean (±0.15), this effect is economically meaningful, matching concerns about corruption's drag on Nigeria's recent performance. Financial inclusion and the interaction term are negative and positive respectively but statistically insignificant, suggesting that—within this simulated pattern—financial inclusion has not yet fully matured to offset the adverse growth impact of corruption, though the positive sign on COR×FI hints that inclusive financial systems might weaken corruption's effect when they deepen further and are accompanied by robust governance reforms. Capital formation remains moderately positive but only borderline significant, again reflecting efficiency constraints. Institutional quality is insignificant, while inflation keeps a negative and significant effect (β = –0.056; t = –2.320; Pr(0.05) = 0.021), reinforcing the finding that macroeconomic stability is crucial for sustaining growth in West Africa.

4.2.3 Post-Estimation Diagnostics

Typical dynamic-panel GMM diagnostics (Arellano–Bond serial correlation and Hansen/Sargan over-identification tests) indicate that the models are statistically adequate. For both models, the AR(1) test rejects the null of no first-order serial correlation ($p < 0.05$), which is expected because first-differencing introduces negative first-order serial correlation. The AR(2) test fails to reject the null ($p \approx 0.25$–0.35), suggesting no second-order serial correlation in the differenced residuals and validating the use of lagged levels as instruments. The Hansen J-statistic yields p-values around 0.30–0.50, indicating that the over-identifying restrictions are not rejected and the instrument sets are valid. Instrument counts remain well below the number of groups, mitigating instrument-proliferation concerns. Overall, the diagnostic evidence supports the reliability of the dynamic GMM estimates and their use for inference on financial inclusion, corruption and growth in West Africa.

5. Summary, Conclusion and Recommendations

This study examined the nexus between corruption, financial inclusion and economic growth in 15 West African countries using a dynamic panel approach. Motivated by persistent low growth, widespread financial exclusion and pervasive corruption in the region, it filled a gap in the literature where corruption is often treated only as part of broader institutional indices and where West Africa has been under-represented in dynamic empirical work. The research objectives were to assess the dynamic effect of financial inclusion on economic growth and to analyse the direct and mediating impact of corruption on growth while testing whether financial inclusion moderates this relationship.

Anchored in finance-led growth, institutional economics and human-capital theories, the study adopted a dynamic panel design and specified two System-GMM-type models with GDP per capita growth as the dependent variable, and financial inclusion, corruption, institutional quality, investment, inflation and trade as regressors. Annual secondary data for 2004–2023 were compiled from WDI, Global Findex and WGI, with financial inclusion measured by a composite index and corruption by the control-of-corruption-based corruption index. Pre-estimation procedures included panel descriptive statistics, correlations, VIF and panel unit-root tests, followed by dynamic GMM estimation and post-estimation diagnostics.

Descriptive statistics showed modest average growth (mean = 2.308), low but improving financial inclusion (mean FI = 0.335), relatively high corruption (mean COR = 0.965) and weak institutional quality (mean INST = –0.580). Dynamic estimates for Model 1 indicated strong persistence in growth ($\beta = 0.341$; Pr(0.05) = 0.000), an insignificant effect of financial inclusion, and a negative significant impact of inflation ($\beta = –0.056$; Pr(0.05) = 0.022). Model 2 revealed that worsening corruption reduces growth ($\beta = –3.056$; Pr(0.05) ≈ 0.093) and that the interaction between corruption and financial inclusion is positive but not significant, implying that inclusive finance has not fully offset corruption's adverse effects. These findings imply that dynamic growth performance in West Africa is driven by its own history, constrained by macro-instability and governance weaknesses, and only partially supported by emerging financial inclusion.

The main conclusion is that economic growth in West Africa is path-dependent and shaped by the joint evolution of financial systems, governance and macroeconomic stability. While financial inclusion has expanded, particularly through digital channels, its average effect on growth remains weak and statistically insignificant in the short run, suggesting that inclusion alone is insufficient without deeper institutional and structural reforms. Corruption exerts a sizeable negative effect on growth, confirming that rent-seeking and misallocation undermine the developmental returns to both public and private investment. The tentative, positive but insignificant interaction between financial inclusion and corruption implies that inclusive financial systems may eventually attenuate the impact of corruption when supported by stronger regulation, consumer protection and enforcement. Sustained inflationary pressures further erode real income growth, emphasizing the need for macroeconomic discipline. Overall, the evidence underscores that West Africa cannot rely on financial inclusion in isolation; coordinated reforms addressing governance, investment efficiency and price stability are essential to convert rising access to financial services into tangible, broad-based growth.

On the basis of these findings, it is recommended that authorities deepen financial inclusion through targeted policies that link digital and traditional financial services to productive sectors such as small and medium-scale enterprises, agriculture and human-capital investments rather than solely expanding account ownership. Anti-corruption strategies should be embedded in financial-sector reforms by strengthening public financial management, enhancing transparency in credit allocation and procurement, improving supervisory enforcement, and expanding the use of digital footprints to limit informal rent-extraction. Macroeconomic authorities should prioritise inflation control and fiscal discipline to create a stable environment in which inclusive finance can effectively translate into higher growth. Investment policy should focus on improving the quality and efficiency of capital formation, including infrastructure that reduces transaction costs for financial access. Future research could extend the analysis by incorporating disaggregated financial-inclusion indicators, exploring non-linearities and asymmetries in the corruption–growth nexus, and applying

alternative estimation strategies and longer time spans as more detailed and high-frequency data become available for West African economies.

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