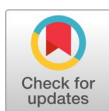


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Trade Liberalization and Inclusive Growth in West Africa: Investigating the Moderating Role of Financial Deepening

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Abstract

The current study aimed to investigate the effect of trade liberalization (TRL) and financial deepening (FID) on inclusive growth in West Africa. The study proxied inclusive growth using the framework advanced by UNCTAD (2022). Furthermore, these measures were aggregated through Principal Component Analysis (PCA) to generate inclusive growth index. Similarly, FID was also generated by PCA. The current study employed System Generalized Method of Moments (SGMM) to address the issues of endogeneity and unobserved heterogeneity. The empirical findings revealed that TRL has a positive effect on inclusive growth. This implies that, liberalizing trade enhances access to the market, increased efficiency, and technology diffusion in the region. However, FID exerts a negative effect on inclusive growth. This suggests that, increased FID tends to benefit higher income class rather than ensuring that the benefits are evenly/widely distributed. Notably, the interaction results revealed that FID positively affects the relationship between TRL and inclusive growth in the region through increased access to credit, export diversification, and technological adoption. This study concluded that while TRL serves as a catalyst for inclusive growth in the region, its full benefits depend on the structure and accessibility of financial system. Therefore, there is a clear need for targeted financial reforms that prioritize inclusion, particularly by expanding access to credit for small and medium-sized enterprises (SMEs) and underserved populations within the region.

Keywords: financial deepening, inclusive growth, system generalized method of moments, trade liberalization, West Africa

JEL Codes: F13, G21, O55, C23

Introduction

In recent years, inclusive growth has increasingly emerged as a central

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theme globally and among the scholars as a measure which goes beyond traditional indicator, such as Gross Domestic Product (GDP) (Agyei & Idan, [2022](#)). Unlike conventional growth metrics that measures aggregate output, inclusive growth emphasizes broader developmental objectives. These include improved human welfare, reduction of inequalities, and the promotion of social cohesion. Inclusive growth emphasizes the need to ensure that the benefits of economic growth are widely distributed across all segments of the society, especially among the vulnerable populace including the marginalized groups and rural communities (Agyei & Idan, [2022](#); Afolabi, [2020](#)). In developing economies, several factors tend to influence inclusive growth. These factors include unequal distribution of benefits from economic growth, limited access to finance, and restrictive trade policies (Olanrewaju et al., [2019](#); Ayinde & Yinusa, [2016](#)).

Trade liberalization (TRL), broadly defined as the reduction of trade barriers in order to enhance economic integration among nations, has been a major driver of structural transformation globally. Over time, TRL has significantly shaped global trade patterns and economic structures (Yang et al., [2023](#)). The progressive dismantling of trade barriers through General Agreement on Tariffs and Trade (GATT) and its successor World Trade Organization (WTO) has stimulated cross-border trade in goods, services, and capital. Additionally, these developments have enabled firms to have access to international markets and benefit from economies of scale, thereby increasing efficiency and competitiveness (Bacchetta et al., [2021](#)).

However, the effect of TRL on inclusive growth is not automatic and is often mediated by financial deepening (FID), as greater FID may facilitate access to capital. This enables small and medium-sized enterprises (SMEs) to leverage trade opportunities more effectively. Conversely, structural weaknesses in financial systems, such as financial market volatility and capital flight, may undermine the potential benefits of TRL, particularly in contexts characterized by weak institutional frameworks and regulatory capacity (Usman, [2023](#)).

A growing body of empirical studies has explored the relationships among TRL, FID, and inclusive growth across various regions including Asia and Africa. This highlights the complex interactions among these factors in shaping socio-economic outcomes. Nonetheless, important gaps persist. Firstly, many existing studies relied on conventional proxies, such as GDP per capita and poverty indices to assess inclusive growth which may

inadequately capture its multidimensional nature (Nabi et al., [2022](#); Bacchetta et al., [2021](#)). Secondly, previous empirical studies on the relationship between TRL and inclusive growth or FID and inclusive growth often overlooked the potential effects that FID may have on the relationship between TRL and inclusive growth. Thirdly, empirical evidence focusing on the relationship among TRL, FID, and inclusive growth, specifically in West Africa remains limited, particularly with respect to dynamic panel analyses and recent data coverage.

In light of these gaps, this study contributed to the literature by advancing the inclusive growth discourse through integrating TRL and FID within a unified analytical framework. Secondly, by focusing on West Africa, it provided a region-specific evidence that is often underrepresented in global empirical analyses. Thirdly, the study employed a dynamic estimation technique to address endogeneity and persistence in inclusive growth, thereby enhancing the robustness of the empirical findings that informs relevant policies.

Study Objectives

The current study aimed to examine the effect of TRL and FID on inclusive growth in West Africa. Specific objectives included to:

- Investigate the effect of TRL on inclusive growth in West Africa; and
- Examine the moderating effect of FID on the relationship between TRL and inclusive growth in West Africa

The remaining part of the study is structured as follows: section 2 reviews the relevant literature, section 3 presents the research methodology, and section 4 discusses the empirical results. Whereas, section 5 concludes with policy recommendations.

Literature Review

Inclusive growth is commonly discussed alongside the concept, such as “broad-based growth”, “shared growth”, and “pro-poor growth”, which together underscore its inherently multidimensional nature (Ianchovichina & Lundstrom-Gable, [2009](#)). Ravallion and Chen ([2003](#)) argued that growth is inclusive when income gains among the poorer households outpace the aggregate average, thereby contributing directly to inequality reduction. Ali and Son ([2007](#)) extended this perspective by arguing that inclusive growth goes beyond income distribution to encompassing the expansion of access

to economic and social opportunities captured through improvements in the social opportunity function. Thus, inclusive growth can be more precisely defined as a process that enables broad participation in economic activities while ensuring that its benefits are evenly distributed across different segments of the society.

According to Saçık (2009), TRL is conceptualized as the degree of openness achieved through the removal of restrictions, such as tariffs and quotas that impede the free flow of goods and services across borders. Kumari and Singh (2023) defined TRL as a deliberate policy trajectory aimed at deepening the economic integration and enhancing the global welfare through increased openness. FID, according to Ndebbio (2004), is defined in terms of increased availability and diversification of financial assets within the economy. From the institutional perspective, Zafar (2019) defined FID as a mechanism to stimulate the activities of financial institutions including banking systems, capital markets, and both domestic and foreign investment channels. Okafor et al. (2021) complemented the discourse by emphasizing that FID involves both the expansion and strengthening of financial intermediaries and markets, with the aim of improving resource mobilization and enhancing the overall performance.

Theoretically, the relationship among the study variables is anchored in the Finance–Growth nexus, as articulated by McKinnon (1973) and Shaw (1973) in the early 1970s. This framework posits that a well-developed financial system plays a critical role in facilitating investment, fostering entrepreneurship, and ensuring efficient allocation of resources. By widening access to credit, savings instruments, and risk management mechanisms, financial systems can stimulate productive economic activity, encourage innovation, and support long-term development outcomes, including poverty reduction.

Empirically, there are studies that have examined the interconnections among TRL, FID, and inclusive growth. Purnamawati (2021) analyzed the effects of FID, trade openness, green technology, and foreign direct investment (FDI) on carbon emissions across The Organization for Economic Co-operation and Development (OECD) economies. This was done using the annual data from 1991-2016 via employing augmented mean group and group-mean estimators. The findings from the study revealed that while green technology, FDI inflows, and trade openness mitigated the emissions, FID and income per capita exerted an upward pressure.

Similarly, Belazreg and Mtar ([2019](#)) utilized a Panel Vector Autoregressive (PVAR) framework to explore the dynamic interactions among trade openness, innovation, financial development, and economic growth in OECD countries over the period 2001–2016. The results revealed largely neutral linkages involving innovation, alongside unidirectional causality running from economic growth to financial development and from financial development to trade openness.

Focusing on a country-specific context, Usman ([2023](#)) investigated the nexus between trade, financial openness, and economic growth in China from 1992–2021 using an Autoregressive Distributed Lag (ARDL) bounds testing approach. Integrating Granger causality analysis within an Error Correction Model (ECM) framework, the study provided evidence in support of the export-led growth hypothesis. This highlights the central role of exports in driving China’s economic expansion. The findings further point to the output-enhancing role of broad money, reinforcing the importance of financial sector dynamics in sustaining growth. In the African context, Sarpong and Nketiah-Amponsah ([2022](#)) provided evidence of the growth-enhancing role of FID using panel data for 46 sub-Saharan African countries over the period 2004–2018. The empirical analysis focused on examining the quantitative relationship between financial inclusion and inclusive growth. This was done by employing the Arellano–Bover/Blundell–Bond System Generalized Method of Moment (GMM) estimator. Specifically, the study found that increased usage of financial products and services positively influenced the inclusive growth, with a unit increase in usage corresponding to a 0.03-unit improvement in inclusive growth. Additionally, Cui et al. ([2022](#)) determined that FID exerts a positive impact on inclusive growth. The study employed a Spatial Durbin model (SDM) to analyze the relationship between financial inclusion, renewable energy consumption, and inclusive growth based on panel data from 40 countries spanning from 2010–2020. Nketia et al. ([2022](#)) also found a positive relationship between FID and inclusive growth via employing panel quantile regression with fixed effects estimations. Bandura ([2020](#)) employed Dumitrescu and Hurlin causality tests to examine the relationship between the interaction of FID and governance indicators on inclusive growth in 48 African economies from 2000 to 2019. The countries were categorized into low-income and middle-income countries. The study found that the interaction of FID with corruption control is crucial for inclusive growth in middle-income countries specifically.

The literature on the trade–growth nexus has evolved significantly from its classical foundations to more contemporary frameworks that incorporate financial frictions and distributional outcomes. Recent evidence underscores the importance of financial systems in mediating the impact of trade on economic outcomes. For instance, Manova (2013) demonstrated that credit constraints significantly limit firms’ participation in export markets, particularly in developing economies where financial markets are imperfect. This finding suggests that TRL alone is insufficient to generate inclusive growth in the absence of financial sector development. Similarly, Beck et al. (2000) showed that financial development enhances firms’ access to external finance, thereby facilitating trade expansion and improving resource allocation efficiency. However, the relationship between FID and inclusive growth is not unambiguously positive. High lending rates and weak financial intermediation may constrain productive investment and limit the distributive benefits of trade. This introduces a critical non-linearity in the trade–finance nexus that remains insufficiently explored in the empirical literature. In terms of measurement, Anand et al. (2013) argued that inclusive growth should capture both the pace and distribution of economic expansion. They caution that composite indices constructed using Principal Component Analysis (PCA) must report factor loadings and robustness checks to ensure transparency and validity.

Despite these advances, a major gap persists. The existing studies largely examine trade, financial development, and growth independently, with limited attention to their interactive effects. Moreover, the underlying mechanisms through which FID influences the inclusiveness of trade outcomes remain underexplored. The current study addressed these gaps by integrating trade, financial development, and inclusive growth within a unified empirical framework.

Methodology

The theoretical framework of this study is anchored in the McKinnon–Shaw hypothesis, which posits that financial liberalization enhances savings mobilization and investment efficiency, thereby promoting economic growth. Within an open economy framework, TRL expands market opportunities and fosters productivity gains. However, its distributional impact depends critically on the level of financial development.

$$ICG = f(TRL, FID, X)$$

where ICG indicates inclusive growth, TRL represents trade openness, FID financial deepening, and X a vector of control variables. Drawing from endogenous growth theory (Romer, [1990](#); Aghion et al., [1998](#)), financial systems facilitate innovation, human capital accumulation, and technological diffusion. When combined with trade openness, these mechanisms can generate inclusive growth by expanding access to economic opportunities.

$$ICG = f(TRL, FID, TRL * FID, X)$$

The econometric is presented as:

$$ICG_{it} = \beta_0 + \beta_1 TRL_{it} + \beta_2 FID_{it} + \beta_3 (FID * TRL)_{it} + \mu_i + \varepsilon_{it}$$

ICG_{it} represents the dependent variable, the composite index of inclusive growth in West African countries at time t ; TRL_{it} represents trade liberalization, how opened the trade policies are in country i at time t ; FID_{it} represents composite index of FID, in country i at time t ; $FID_{it} * TRL_{it}$ denotes the interaction between FID and TRL, capturing the combined effect when both FID and TRL interact in country i at time t ; μ_i represents country-specific fixed effects capturing unobserved heterogeneity that is constant over time and ε_{it} representing random shocks or disturbances specific to country i at time t . β_0 is the intercept, β_1 measures the effect of TRL_{it} on ICG_{it} , β_2 measures the effect of FID_{it} on ICG_{it} , and β_3 measures the marginal effect of the interaction between FID_{it} and TRL_{it} on ICG_{it} .

The study employed annual data spanning over the time period 2000-2023 from the Financial Access Survey of the International Monetary Fund (IMF) and World Development Indicators (WDI) of the World Bank. The study considered 15 countries in West Africa. The variables were measured as illustrated in Table 1.

Table 1

Measurement of Variables

Variables Description	Measurement	Source
Inclusive Growth Index (ICG)	Aggregates economic and social inclusions measures using Principal Component Analysis (PCA)	WDI (2023)

Variables Description	Measurement	Source
	GDP per capita	
Economic inclusion	Agriculture, forestry, and	WDI (2023)
GPC	fishing, value added (% of	WDI (2023)
AGRO	GDP)	WDI (2023)
EAGR	Employment in agriculture (% of total employment)	
Social Inclusion	Literacy rate, adult total (% of people ages 15 and above)	WDI (2023)
LITE	Life expectancy at birth, total	WDI (2023)
LIFE	(years)	WDI (2023)
INEQ	Gini index	
Trade openness (TRL)	Trade (% of GDP)	WDI (2023)
Financial Deepening (FID) index	Aggregates of money supply, credit to private sector, gross national savings and lending rate	WDI (2023)
Money supply (MS)	MS/GDP ratio using Principal Component Analysis (PCA)	WDI (2023)
Credit to private sector (DOC)	Domestic credit provided by financial sector (% of GDP)	WDI (2023)
Gross national savings (SAV)	Gross savings (% of GDP)	IMF (2023)
Lending rate (LEND)	Lending interest rate (%)	IMF (2023)

Multicollinearity, panel unit root test, and cross-sectional dependence tests were conducted. This study employed the System Generalised Method of Moments (SGMM) estimator developed by Arellano and Bond ([1991](#)) and extended by Blundell and Bond ([1998](#)) to address potential endogeneity and dynamic panel bias. This estimator is particularly suitable for panels with a small-time dimension and a larger cross-section. Trade openness, FID, and their interaction terms are treated as endogenous variables due to potential simultaneity and reverse causality. The instrument set is constructed using lagged values of the endogenous variables. Specifically, lagged levels dated $t-2$ and $t-3$ are used as instruments for the differenced equations, while lagged differences were used for the level equations. To avoid instrument proliferation, the instrument matrix is made to collapse and the lag depth is restricted (Roodman, [2009](#)). Furthermore, the

Windmeijer (2005) finite-sample correction is applied to ensure robust standard errors.

Results and Discussion

The PCA results in Table 2 indicate that the first principal component captures approximately 58.56% of the total variation, while the second component accounts for 16.27% and the third explains 9.17% of the total variation. The cumulative proportion of variance explained by the first three components is 84.00%, suggesting that they encompass most of the information contained in the original variables. Considering the high proportion of variance captured by the first principal component and exceeding the commonly accepted Kaiser criterion threshold of eigenvalues greater than 1 for component retention, this study utilized the eigenvector values of the first principal component as weights to construct the Inclusive Growth Index, denoted as ICG.

Table 2

Principal Component Analysis (PCA) Results for Inclusive Growth Index (ICG)

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	3.5135	2.5372	0.5856	3.5135	0.5856
2	0.9764	0.4261	0.1627	4.4899	0.7483
3	0.5503	0.0619	0.0917	5.0402	0.8400
4	0.4884	0.2455	0.0814	5.5286	0.9214
5	0.2429	0.0143	0.0405	5.7715	0.9619
6	0.2285	---	0.0381	6.0000	1.0000

Instead of including the individual financial indicators as separate regressors, a composite index of FID was generated using PCA. This methodological approach aligns with the study conducted by Ilemona and Ome (2021) on FID and inclusive growth nexus in Nigeria. The FID index aggregates key indicators which are credit to the private sector (DOC), money supply to GDP (MS), gross national savings (SAV), and lending rates (LEND), capturing the depth, accessibility, and efficiency of the financial system. The PCA for the FID index in Table 3 revealed that the first two components had eigenvalues greater than 1. However, only the first component was retained for FID index as it accounted for approximately

54.5% of the total variance across indicators.

Table 3

Principal Component Analysis (PCA) Results for Financial Deepening (FID) Index

Number.	Eigenvalue.	Difference.	Proportion.	Cumulative Value	Cumulative Proportion
1	2.1809	1.1690	0.5452	2.1809	0.5452
2	1.0119	0.3214	0.2530	3.1928	0.7982
3	0.6905	0.5738	0.1726	3.8833	0.9708
4	0.1167	---	0.0292	4.0000	1.0000

Correlation analysis is essential to understand the relationships between variables in a dataset. The results of the correlation analysis are presented in Table 4.

Table 4

Pairwise Correlation Matrix

	ICG	TRL	FID
ICG	1		
TRL	0.488	1	
FID	0.761	0.411	1

Note. ICG: inclusive growth; TRL: trade liberalization; FID: financial deepening; GPC:

The results show that the correlations are below the 0.8 threshold, indicating no severe multicollinearity issues, the variables used in the model.

Table 5

Unit Root Results

Variables	Levin, Lin & Chu t*				Im, Pesaran and Shin W-stat				Order
	Level		First Diff.		Level		First Diff.		
	Stats.	Prob.	Stats.	Prob.	Stats.	Prob.	Stats.	Prob.	
ICG	-2.425	0.007	-9.429	0.000	1.772	0.961	-8.821	0.000	I(1)
TRL	-1.771	0.038	-7.198	0.000	-1.388	0.082	-9.305	0.000	I(1)
FID	-0.661	0.254	-11.02	0.000	1.126	0.870	-11.326	0.000	I(1)

The unit root test results reveal that all the variables exhibit non-stationarity at level but become stationary after first differencing,

suggesting that they are integrated of order one, $I(1)$. The Levin, Lin & Chu t^* , and Im, Pesaran and Shin W -stat tests provide consistent evidence for this conclusion across the majority of variables.

Table 6

Cross-section Dependence Test

Variables	CD-te.st.	p	Correlation	Absolute Correlation
ICG	41.079	0.000	0.82	0.82
TRL	2.907	0.004	0.06	0.38
FID	19.439	0.000	0.39	0.64

Note. ICG: inclusive growth; TRL: trade liberalization; FID: financial deepening; FDI: foreign direct investment; INF: inflation; COC: control of corruption

The cross-sectional dependence test results revealed strong evidence of cross-sectional dependence among the variables, as CD-test statistic was significantly positive for all variables, with p -values below 0.05.

Table 7 presents the regional specific interactive effect of TRL and FID on inclusive growth.

Table 7

Interactive Effect of TRL and FID on Inclusive Growth

SGMM Estimates	
ICG (-1)	-0.184*** [-6.119]
TRL	0.003*** [5.748]
D(FID)	-0.134*** [-4.322]
D(TRL*FID)	0.001*** [3.317]
SGMM Diagnostic Tests	
AR(1)	-2.457
AR(2)	-0.554
F-statistic	37.449***
J-stats	7.551
Difference-in-Hansen	6.125

Periods included	22
Number of cross-sections	15
Number of instruments	28

Note. ICG: inclusive growth; TRL: trade liberalization; FID: financial deepening . ***, ** & * denotes significance at 0.01, 0.05 and 0.10 critical values, respectively.

The SGMM estimates provided in Table 7 revealed that TRL exhibits a positive and statistically significant effect on inclusive growth (0.003 at 1% level). In magnitude terms, a 1% increase in TRL increases inclusive growth by approximately 0.003%. Although the coefficient appears small, it is economically meaningful given the structural nature of trade variables. The positive effect suggests that openness enhances access to markets, promotes efficiency, and facilitates technology diffusion, which collectively contribute to broader participation in economic gains. This result is consistent with Agyei and Idan (2022), who found that trade openness significantly promotes inclusive growth in Sub-Saharan Africa. Similarly, Bacchetta et al. (2021) argued that trade can foster inclusive growth when accompanied by supportive policies, particularly through employment generation and productivity improvements. However, the relatively small magnitude indicates that trade alone may not be sufficient to drive substantial inclusiveness without complementary domestic policies.

In contrast, FID exerts a negative and statistically significant effect on inclusive growth (−0.134 at 1% level). This implies that a 1% increase in FID reduces inclusive growth by 0.134%. Economically, this suggests that financial sector expansion is disproportionately benefiting higher-income groups or urban sectors, thereby exacerbating inequality rather than promoting inclusiveness. This outcome reflects the structural inefficiencies and access constraints in developing financial systems, particularly in Nigeria and similar economies. The finding contrasts with Afolabi (2020) and Purnamawati (2021), who reported a positive role of FID in promoting inclusive growth. However, it is consistent with Ayinde and Yinusa (2016), who argued that the effect of financial development on inclusiveness may be threshold-dependent, becoming beneficial only after a certain level of institutional quality and financial access is achieved.

The interaction term between TRL*FID is positive and statistically significant. This indicates that FID enhances the positive effect of TRL on inclusive growth. In magnitude terms, a 1% increase in the combined effect

of TRL and FID leads to a 0.001% increase in inclusive growth. Economically, FID moderates the trade–inclusive growth relationship, the analysis considers several transmission mechanisms. Firstly, financial development enhances export diversification by relaxing credit constraints faced by firms, thereby enabling entry into international markets (Manova, [2013](#)). Secondly, access to finance facilitates technology adoption, which improves productivity and competitiveness (Aghion et al., [2005](#)). Thirdly, financial inclusion promotes SME participation in trade, thereby broadening the distributional benefits of globalization. This finding is in line with Usman ([2023](#)), who highlighted the endogenous relationship between financial and trade openness, and Bandura (2020), who emphasized that financial systems play a critical role in maximizing the gains from trade openness.

The diagnostic statistics further validate the reliability of the model, as the AR(1) test is negative and statistically significant, consistent with the expected properties of a correctly specified SGMM model. The AR(2) test fails to reject the null hypothesis, confirming the absence of second-order serial correlation. The Hansen test indicates that the instruments are valid, while the Difference-in-Hansen test confirms the exogeneity of the instrument subsets.

Conclusion

The aim of this study was to examine the effect of TRL and FID on inclusive growth in West Africa. The study showed that TRL exerted a positive effect on inclusive growth across, while FID estimate indicated that expanding financial services hinders inclusive growth. Moreover, the study provided evidence that the interaction of FID in the relationship between TRL and inclusive growth proved to be beneficial.

Future Recommendations

Based on the findings of the study, the following policy recommendations were proposed to enhance inclusive growth in West African region:

- Inclusive growth should be the central focus of both trade and financial policies in the region.
- Policymakers should create opportunities for marginalized groups to participate in the economy, ensuring that the benefits of growth are

widely shared. These include targeted support for SMEs, investment in education and training, and social safety nets to protect vulnerable populations.

- Lastly, government should prioritize financial sector reforms aimed at deepening the financial system. This includes expanding access to financial services, improving financial infrastructure, and fostering financial literacy to ensure that a broader segment of the population can benefit from the economic growth.

Author Contribution

Oluwatoba Oyedele Adeniwura: methodology, formal analysis, writing – initial draft. **Abayomi Toyin Onanuga:** conceptualization, writing – initial draft. **Oluwaseyi Adedayo Adelowokan:** supervision, writing – review & editing.

Conflict of Interest

The authors of the manuscript have no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

Data Availability Statement

Data supporting the findings of this study will be made available by the corresponding author upon request.

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