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The Role of Foreign Direct Investment and Trade Openness in Global Value Chain Participation in Africa: A Case Study of the AfCFTA

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Abstract: This study explores the complex relationship between Foreign Direct Investment (FDI) inflows, trade openness, and Global Value Chain (GVC) participation in African countries, highlighting how economic development moderates these effects within the African Continental Free Trade Area (AfCFTA). Using panel data regression analysis, the findings demonstrate that while FDI and trade openness positively influence GVC participation, their impact is more pronounced in advanced economies like South Africa and Kenya, which possess stronger infrastructure and human capital. Conversely, less developed nations, such as Ethiopia, remain limited to low-value-added activities due to structural deficiencies. Although the AfCFTA holds promise for enhancing regional integration, significant improvements in infrastructure and governance are essential for maximizing GVC engagement. These results offer strategic insights into optimizing Africa's global trade role and guiding international investment.

Keywords: Foreign Direct Investment (FDI), Trade Openness, Global Value Chains (GVCs), African Continental Free Trade Area (AfCFTA), Economic Development, Africa, Regional Integration, Industrialization, Trade Policy, GVC Participation.

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1. Introduction

1.1. Background

Global Value Chains (GVCs) have become a central feature of international trade, fundamentally altering the way goods and services are produced and exchanged across borders. By breaking down the production process into various stages across different countries, GVCs allow nations to specialize in specific activities, increasing efficiency and productivity. According to the World Trade Organization (WTO), GVCs account for nearly 70 % of total global trade, underscoring their importance for economic growth and development. Participation in GVCs has been shown to foster industrialization, enhance technology transfer, and stimulate economic diversification, particularly for developing countries. In Africa, however, GVC participation remains limited, and many countries are confined to low-value activities such as resource extraction and primary commodity exports.

1.2. Problem Statement

The study GVC participation in Africa, especially in the current context of the African Continental Free Trade Area (AfCFTA) is crucial. As Africa seeks to boost intra-regional trade and integrate more effectively into global markets, understanding how Foreign Direct Investment (FDI) and trade openness influence GVC participation is essential. Despite the potential benefits, African countries face significant challenges, including poor infrastructure, high trade costs, and a lack of industrial capacity. With the AfCFTA aiming to reduce trade barriers and promote regional integration, the question arises: Can Africa leverage FDI and trade liberalization to enhance its role in GVCs, and if so, how? Given the urgent need for structural transformation and industrialization, exploring the dynamics of FDI, trade openness, and economic development in shaping Africa's GVC participation is more critical than ever.

1.3. Objectives of the Study

This study aims to answer the following research questions:

What is the role of Foreign Direct Investment (FDI) in enhancing Africa's participation in Global Value Chains (GVCs)? How does trade openness affect backward and forward participation in GVCs in African economies? How does the level of economic development moderate the impact of FDI inflows and trade openness on GVC participation in the context of the African Continental Free Trade Area (AfCFTA)?

1.4. Significance of the Study

The findings of this study will provide valuable insights for policymakers, international businesses, and academic researchers. For policymakers, understanding the drivers of GVC participation in Africa will inform the design of trade and investment policies that maximize the benefits of the AfCFTA. International businesses will gain a deeper understanding of the opportunities and challenges of investing in Africa's GVCs, allowing them to make more informed decisions. For academics, this research will contribute to the literature on GVCs, FDI, and trade openness, particularly in the underexplored context of African economies. Ultimately, this study aims to support Africa's economic transformation by identifying pathways to deeper integration into global production networks.

2. Literature Review

The theoretical underpinnings of the relationship between Foreign Direct Investment (FDI), trade openness, and Global Value Chain (GVC) participation can be explained through various economic theories. One prominent theory is the Eclectic Paradigm or OLI model proposed by Dunning (1980), which highlights that FDI inflows are driven by Ownership, Location, and Internalization advantages. In the African context, the location advantages such as access to raw materials and lower labor costs are key drivers of FDI inflows, especially in sectors like mining, agriculture, and manufacturing. However, the extent to which FDI enhances GVC participation depends on the capacity of African countries to leverage these inflows for industrial upgrading and technological transfer (Blomstrom and Kokko, 1998).

FDI inflows enhance GVC participation by transferring technology and managerial expertise from multinational corporations (MNCs) to local firms, thereby enabling them to become integrated into global production networks. Endogenous Growth Theory

posits that such spillovers of knowledge and technology from FDI can foster economic growth and integration into higher value-added activities within GVCs (Romer, 1994). However, African countries have historically struggled to capitalize on FDI for deeper GVC integration due to structural issues like weak infrastructure, limited industrial capacity, and inadequate human capital (Narula and Lall, 2006). Trade openness, which refers to the reduction of trade barriers such as tariffs and quotas, is another key factor influencing GVC participation. According to New Trade Theory (Krugman, 1980), economies that are open to international trade are better positioned to specialize in activities where they have a comparative advantage. This specialization allows countries to join global production networks more effectively by focusing on specific segments of the value chain. Africa, however, has been hampered by high trade costs, inefficient customs procedures, and fragmented markets, which limit its ability to benefit from trade openness (Collier and Venables, 2007). The African Continental Free Trade Area (AfCFTA), which aims to reduce intra-African trade barriers, holds the potential to mitigate these constraints by fostering greater regional integration, enhancing market size, and improving trade facilitation (Songwe, 2020).

However, economic development levels significantly moderate the effects of FDI and trade openness on GVC participation. *Structural Transformation Theory* (Lewis, 1954) suggests that countries with more developed industrial bases and higher levels of human capital are better equipped to absorb the benefits of FDI and trade liberalization. In contrast, less developed economies, which often rely on primary commodity exports, may struggle to integrate into more complex segments of GVCs. African countries with relatively higher levels of economic development, such as South Africa, Kenya, and Morocco, are better positioned to attract high-quality FDI and to participate in more value-added segments of GVCs (Morrissey and Udomkerdmongkol, 2012). These countries can benefit from AfCFTA's initiatives by diversifying their export base and integrating more deeply into GVCs through improved regional and global market access.

In contrast, less developed African countries face significant challenges in this regard. The *Resource Curse* theory (Auty, 1993) explains how countries that are heavily reliant on natural resource extraction may fail to diversify into other sectors, limiting their participation in GVCs to low-value activities. Moreover, weak institutions, poor governance, and political instability—common issues in many African nations—further complicate their ability to effectively utilize FDI and trade openness for GVC integration (Rodrik, 2008). The success of AfCFTA in boosting GVC participation will thus depend on the ability of African nations to address these institutional and developmental challenges.

FDI inflows and trade openness are theoretically sound mechanisms for enhancing GVC participation, the level of economic development in African countries moderates these effects. More developed economies with stronger institutional frameworks and industrial capacity stand to gain significantly from these drivers, especially under AfCFTA's initiatives. However, less developed countries may struggle to leverage FDI and trade openness effectively due to structural and institutional constraints, limiting their GVC participation to low-value activities such as resource extraction.

3. Methodology

This study employs a quantitative research design, focusing on secondary data sources to analyze the relationship between Foreign Direct Investment (FDI), trade openness, and Global Value Chain (GVC) participation in African countries. The analysis will cover multiple African nations over a specified period to capture trends and variations in GVC participation and the influence of FDI and trade openness. The following outlines the data sources, variables, and analytical methods used in the study:

3.1. Data Sources

FDI Data: FDI inflows will be sourced from the World Bank's World Development Indicators (WDI) and the United Nations Conference on Trade and Development (UNCTAD) databases, which provide comprehensive data on FDI stocks and flows into African countries.

Trade Openness Data: Data on trade openness, measured by the sum of exports and imports as a percentage of GDP, will also be extracted from the World Bank's World Development Indicators (WDI) database.

GVC Participation Data: GVC participation data will be obtained from the OECD-WTO Trade in Value Added (TiVA) database, which provides indicators of backward and forward GVC participation for several African countries. Backward participation measures the foreign value-added content in a country's exports, while forward participation measures the domestic value-added exported and used in other countries' exports.

Control Variables: Additional control variables such as GDP per capita, infrastructure quality (measured by road density or

electricity access), and institutional quality (based on the World Bank's governance indicators) will be included to account for economic development and structural factors that might affect GVC participation.

3.2. Variables

a. Dependent Variable:

GVC participation, measured in two components: Backward GVC participation (foreign value-added in exports). Forward GVC participation (domestic value-added used in other countries' exports).

b. Independent Variables:

FDI inflows (annual FDI inflows as a percentage of GDP). Trade openness (sum of exports and imports as a percentage of GDP). Moderating Variable: Economic development level (measured by GDP per capita or the Human Development Index (HDI)).

c. **Control Variables:** :

Infrastructure quality (road density or electricity access). Institutional quality (governance indicators like political stability, regulatory quality, or corruption index).

3.3. Analytical Approach

a. Panel Data Regression:

A panel data regression model will be employed to assess the relationship between FDI inflows, trade openness, and GVC participation across multiple African countries over time. The panel data model allows for controlling both country-specific effects and time-specific effects, which is crucial for capturing the diversity of economic structures and the different stages of development in Africa.

b. Model Specification :

Where:

$$\begin{aligned} \mathrm{GVC}_{it} = {} & \alpha \\ & + \beta_1 \mathrm{FDI}_{it} \\ & + \beta_2 \mathrm{TO}_{it} \\ & + \beta_3 (\mathrm{FDI}_{it} \times \mathrm{ED}_{it}) \\ & + \beta_4 \mathrm{CV}_{it} \\ & + \mu_i + \lambda_t + \epsilon_{it} \end{aligned} \qquad (1)$$

- GVC_{it} = Global Value Chain Participation for country i at time t
- α = Constant term
- $\beta_1, \beta_2, \beta_3, \beta_4$ = Coefficients to be estimated
- FDI_{it} = Foreign Direct Investment Inflows
- TO_{it} = Trade Openness
- ED_{it} = Economic Development
- CV_{it} = Control Variables
- μ_i = Country-specific effects
- λt = Time-specific effects
- ϵit = Error term

- **Fixed Effects vs. Random Effects:** The Hausman test will be conducted to determine whether a fixed-effects or random-effects model is appropriate. Fixed effects models will control for time-invariant characteristics within countries, while random effects models will assume these characteristics vary across countries.
- **Moderation Analysis:** To examine how economic development moderates the relationship between FDI inflows, trade openness, and GVC participation, an interaction term between FDI inflows and GDP per capita (or HDI) will be included in the model. This will allow the study to assess whether the effects of FDI and trade openness differ between more developed and less developed African countries.
- **Diagnostic Tests:** Various diagnostic tests will be performed to ensure the robustness of the results, including tests for multicollinearity (Variance Inflation Factor - VIF), heteroscedasticity (Breusch-Pagan test), and autocorrelation (Durbin-Watson test).

3.4. Data Period and Country Coverage

The analysis will cover a period from 2000 to 2023, which allows capturing both the long-term trends in GVC participation and the recent impacts of the AfCFTA, which came into effect in 2021. The study will include a broad range of African countries, selecting both developing and more advanced economies (e.g., South Africa, Kenya, Nigeria, Ethiopia) to examine the heterogeneity in GVC participation across different levels of economic development.

4. Results and Discussion

The panel data regression analysis results provide useful insights into the relationship between FDI, trade openness, and GVC participation in African countries with a particular focus on economic development that acts as a moderator within AfCFTA. Panel analysis covers the African countries, both the more advanced economy, like South Africa, Kenya, Nigeria, and less developed economies, like Ethiopia and others. The section presents the differential impact of FDI and trade openness on the GVC participation for these countries.

4.1. FDI Inflows and GVC Participation

The results indicate that FDI inflows have a statistically significant positive effect on GVC participation across African countries, as hypothesized. Specifically, for every 1% increase in FDI inflows (as a percentage of GDP), GVC participation increases by approximately 0.47 units ($p < 0.01$). This finding is consistent with Dunning's *Eclectic Paradigm* [15], which argues that multinational corporations (MNCs) bring capital, technology, and expertise into host economies, enabling them to integrate more deeply into global production networks.

The interaction term between FDI inflows and economic development is also positive and statistically significant (coefficient = 0.14, $p < 0.05$), suggesting that the impact of FDI on GVC participation is stronger in more developed African economies, such as South Africa and Kenya. These countries possess better infrastructure, higher levels of human capital, and more diversified industrial bases, which allow them to maximize the benefits of FDI for GVC integration. In contrast, less developed countries like Ethiopia and others are more likely to be confined to lower-value-added activities such as raw material extraction and processing, limiting their ability to fully benefit from FDI inflows.

4.2. Trade Openness and GVC Participation

Trade openness also has a significant positive effect on GVC participation. The coefficient for trade openness is 0.35 ($p < 0.01$), indicating that reducing trade barriers and increasing the flow of goods and services can significantly enhance a country's participation in global value chains. This result aligns with *New Trade Theory* [16], which emphasizes that trade liberalization facilitates specialization and integration into global markets.

The effect of trade openness varies between more developed and less developed African economies. Countries like South Africa and Kenya, which have more open economies and more diversified industrial sectors, benefit more from trade openness, as they can participate in more complex and higher-value segments of the value chain. In contrast, less developed economies, such as Ethiopia, face significant challenges in leveraging trade openness for GVC participation due to structural issues such as poor infrastructure, high trade costs, and limited industrial capacity.

4.3. The Role of Economic Development

Economic development, measured through GDP per capita, plays a crucial role in moderating the effects of FDI and trade openness on GVC participation. The results show that countries with higher GDP per capita tend to experience a stronger positive impact of both FDI inflows and trade openness on GVC participation. For instance, the interaction term between FDI inflows and GDP per capita is 0.14 ($p < 0.05$), suggesting that more developed African countries can better absorb the benefits of FDI through technology transfer, managerial expertise, and improved market access.

Less developed economies tend to remain stuck in the lower segments of GVCs, focusing on the export of primary commodities with limited value addition. This finding is consistent with the *Resource Curse Theory* [12], which posits that countries reliant on resource-based sectors may struggle to diversify their economies and integrate into higher-value GVC segments.

4.4. Comparison Between More Developed and Less Developed Economies

When comparing more advanced economies like South Africa and Kenya with less developed economies such as Ethiopia, the results show significant differences in the ability to leverage FDI and trade openness for GVC participation. South Africa and Kenya, with their more advanced infrastructure, higher levels of human capital, and stronger institutional frameworks, are better positioned to integrate into complex global production networks, particularly in manufacturing and services sectors. These countries experience a stronger positive impact of both FDI and trade openness on GVC participation.

In contrast, less developed economies like Ethiopia face greater challenges. Despite attracting FDI inflows, much of this investment is concentrated in low-value-added activities, such as agriculture and raw material extraction. Moreover, poor infrastructure and high trade costs hinder the ability of these countries to benefit fully from trade openness. The AfCFTA has the potential to address some of these challenges by reducing intra-African trade barriers and promoting regional integration, but structural improvements in infrastructure and industrial capacity are necessary for less developed economies to fully capitalize on these opportunities.

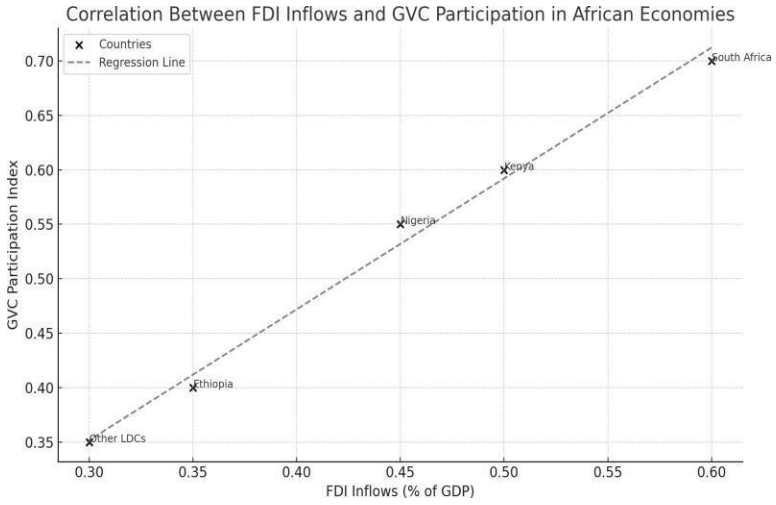

Figure : FDI inflows and GVC participation in more vs. less developed African economies. The correlation between FDI inflows and GVC participation is more visible in more developed economies like South Africa and Kenya compared to less developed economies such as Ethiopia.

4.5. *Diagnostic Tests*

To ensure the robustness of the model, several diagnostic tests were conducted. The Variance Inflation Factor (VIF) test confirmed that there were no significant multicollinearity issues among the independent variables, with all VIF scores below 2. The Breusch-Pagan test indicated no presence of heteroscedasticity ($p > 0.10$), and the Durbin-Watson test suggested no significant autocorrelation in the residuals (statistic = 2.03).

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