

Oyelami, Lukman Oyeyinka; Odularu, Gbadebo; Dunmade, Emmanuel O.

## Article

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West African Journal of Monetary and Economic Integration

## Provided in Cooperation with:

West African Monetary Institute (WAMI), Accra

*Suggested Citation:* Oyelami, Lukman Oyeyinka; Odularu, Gbadebo; Dunmade, Emmanuel O. (2025) : Investigating the determinants of regional value chains in African countries: A gravity model analysis, West African Journal of Monetary and Economic Integration, ISSN 0855-594X, West African Monetary Institute (WAMI), Accra, Vol. 24, Iss. 1, pp. 1-21

This Version is available at:

<https://hdl.handle.net/10419/336915>

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## INVESTIGATING THE DETERMINANTS OF REGIONAL VALUE CHAINS IN AFRICAN COUNTRIES. A GRAVITY MODEL ANALYSIS

Lukman O. Oyelami, PhD<sup>1</sup>, Gbadebo Odularu, PhD<sup>2</sup> and Emmanuel O. Dunmade, PhD<sup>3</sup>

### Abstract

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*This study investigates the determinants of regional value chains (RVCs) in African countries using gravity model analysis. This approach allows for bilateral characteristics of the gravity model and gives room for introducing policy variables in the augmented version. To that effect, RVCs were modelled as a dependent variable in our estimation, and apart from the gravity variables, relevant policy and non-policy variables based on guidance from the literature were introduced to provide policy directions to government and non-government actors in policy space towards efforts to promote RVCs participation on the continent. The results from our model have demonstrated the importance of gravity variables such as distance and colonial experience as crucial factors for RVC participation. However, the place of policy variables such as tariffs, industrialisation, accession to regional trade agreements and strategic FDI inflows cannot be overemphasised.*

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**Keywords:** Regional Value Chains, Trade, Gravity Model, Africa

**JEL Classification:** L67; F1, F14, J1

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<sup>1</sup> University of Lagos, Lagos, Nigeria, Corresponding author's email: loyelami@unilag.edu.ng

<sup>2</sup> Howard University, Washington, D.C., USA

<sup>3</sup> Department of Industrial Relations & Personnel Management, Faculty of Management Sciences, University of Ilorin, Ilorin, Nigeria

## **1. INTRODUCTION**

African participation in Global Value Chains (GVCs) has garnered significant empirical attention at both the sectoral and aggregate levels (Kowalski, Lopez-Gonzalez et al 2015; Tinta, 2017; Obasaju, Olayiwola, Okodua, Adediran et al, 2021). The growing significance of GVCs as an effective mechanism for the internationalisation of African firms, particularly Micro, Small, and Medium Enterprises (MSMEs), underscores the need for ongoing exploration of the relationship between GVC participation and trade performance in Africa. GVCs, as interconnected global production networks, offer a pathway for many developing countries to engage in international production activities without requiring the resources or technical capacity to manage the entire production process. This model allows developing countries to specialise in specific stages of production, capture value added from those stages, and build a comparative advantage in targeted segments of the global market.

The need for increased attention to regional value chains stems from the inability of many African countries to compete favourably on the global stage and the danger of being perpetually locked into the lower level of GVC with little or no possibility for innovation or technology transfer (Baldwin, 2012). Remarkably, African countries have witnessed progress in global trade and participation in GVCs (Foster-McGregor, Kaulich et al, 2015). However, much of Africa's participation in GVCs is in upstream production, which invariably requires African firms to provide primary products and simple manufactures to firms in developed economies that are strategically positioned further down the value chain. Except for countries like Mauritius, Botswana, Ethiopia, Kenya, and Tanzania, Africa's downstream participation in GVCs is considered relatively low, with insignificant signs of improvement since 1995 (Foster-McGregor, Kaulich & Stehrer, 2015). This may be part of the missing link in Africa's GVCs-development nexus.

Additionally, the manufacturing space in many African countries is dominated by Micro, Small, and Medium Enterprises (MSMEs), which often lack the sophisticated technology and innovation necessary to gain a global competitive advantage. The domination of MSMEs may necessitate, among other factors, giving greater priority to Regional Value Chains (RVCs) as part of the efforts to prepare African firms for global competition. RVCS may be the path to upgrading African participation in GVCs. Given this background, it is crucial to investigate the predictors

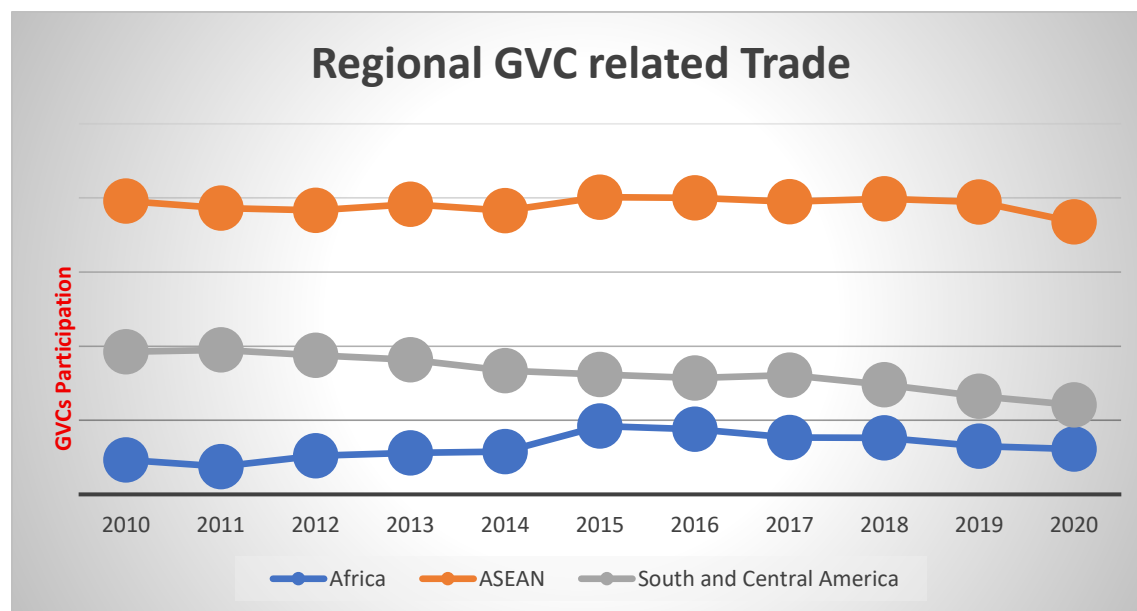
and drivers of RVCs in Africa. The study's main contribution is to unearth variables, specifically policy and non-policy variables, that can stimulate participation in Regional Value Chains (RVCs) among African countries. This will substantially assist the policymakers in narrowing their policy actions around a few important and effective variables. The study will also play a significant role in bridging the gap between effective policy actions and theoretical explanations of the critical role of RVCs in trade development. In essence, this will encourage more debate about the crucial role of RVCs in the industrialisation of African nations in both policy discourse and the theoretical literature.

Apart from this introductory part, the paper consists of four fundamental sections. Section two presents the stylised facts about GVCS and RVCS in Africa, and this section provides information about critical issues around GVCs and RVCs on the continent. Section three discusses the empirical literature review, while Section four focuses on methods and the discussion of the results. The last section presents the conclusions and recommendations emanating from the study.

## **2. STYLISED FACTS OF GVCS AND RVCS IN AFRICA**

Based on 34 countries with comprehensive Regional GVC data from 2010 to 2020, Figure 1 displays the average value of regional GVC-related trade for African nations. The percentage of intermediate goods exported to neighbouring countries served as the specific variable of reference for this measure. This primarily acts as a stand-in for backward RVCs. A comparable indicator was computed for the Association of Southeast Asian Nations (ASEAN) and the South and Central America regions to provide benchmarking for our findings. According to Figure 1, the developing region of Asia performs better in terms of regional GVC involvement than both Africa and Latin America. In 2010, the African region recorded a dismal performance in regional GVC-related trade, accounting for only 2.3%, compared to 9.6% in South and Central America and 19.7% in ASEAN. However, by 2015, there was a noticeable increase of 2.3%. This was followed by a gradual 1.3% decline over the next four years. Notably, other regions also experienced a similar decline during this period.

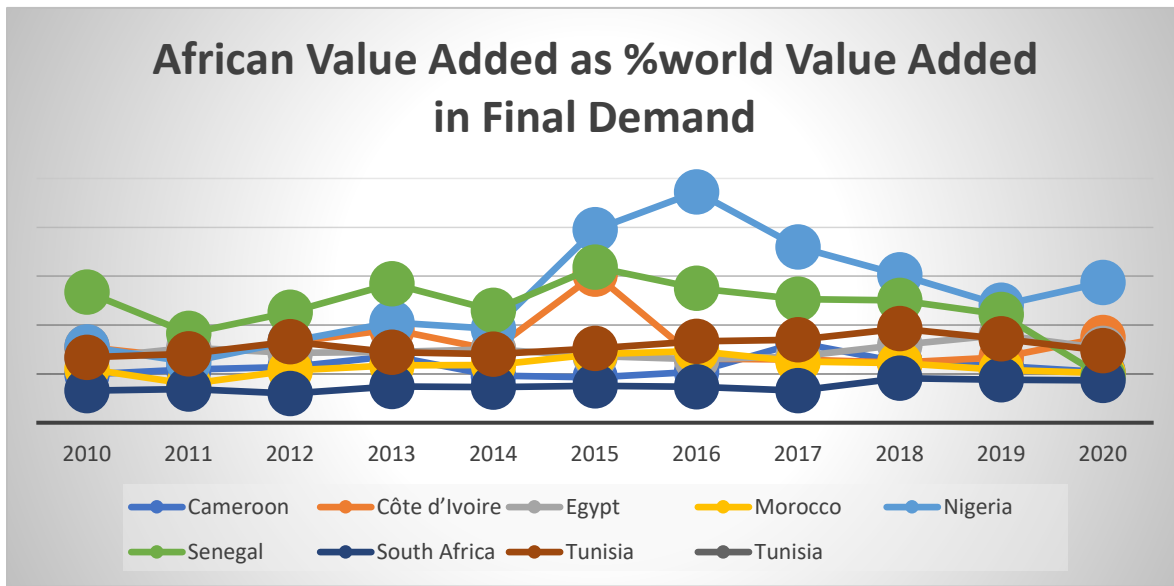
Figure 1: Regional GVCs Related Trade



Source: The author's computation based on data from TiVA in Millions of US Dollars

Figure 2 illustrates the performance of nine African countries across different sub-regions in Regional Value Chains (RVCs) from 2010 to 2020. In 2010, Senegal led with 5.3% RVC participation, surpassing all other countries in both the West African sub-region and Africa as a whole. In contrast, South Africa recorded the lowest performance at 1.3%. This trend remained consistent for four years until Nigeria emerged as the leading country at both the sub-regional and continental levels, achieving 7.9% RVC participation in 2015. Nigeria reached its peak of 9.4% in 2016 but experienced a gradual decline thereafter. Despite this, Nigeria maintained a narrow lead over other countries in the region, even as countries like Tunisia and Morocco showed a resurgence in performance.

Figure 2: Performance of selected Africans Countries in RVC 2010-2020



Source: Author's computation based on data from TiVA in Millions of US dollars

### 3. LITERATURE REVIEW

In an attempt to present a robust literature review for this study, the global approach to GVCs and similar research efforts on RVC in other regions of the world will be reviewed due to the dearth of empirical activities in this area in SSA.

Qualitative country case studies by ADB, OECD and UNDP (2014), and Bamber, Fernandez-Stark, Gereffi and Guinn (2014) identified productive capacity, infrastructure, and investment policy environment as the most critical drivers of a country's ability to participate in GVCs. A more robust survey by Allard, Kriljenko, Gonzalez-Garcia, et al. (2016) investigated the extent of trade integration of SSA countries in the global economy. As part of this intensive effort, the study closely examined the depth of involvement of SSA countries in GVC participation using both descriptive and gravity model analysis. The survey's plethora of evidence points to heterogeneity in GVC participation across sub-Saharan African countries, with some countries performing much better than others. In addition, the study established that deeper integration in GVCs is associated with improved human capital, while higher tariff levels and complex business environments serve as potent threats to GVCs' participation. However, at the sub-regional level, a study by Farole (2016) identified port congestion and access to rail and port services as the most critical challenges to GVC competitiveness based on his analysis of the value chain trade of the Southern African Customs Union (SACU) countries.

In the empirical study by Fernandes, Kee, and Winkler (2020), an array of factors driving GVC participation was unearthed. The study specifically examined the determinants of GVC participation using a panel data set comprising more than 100 countries, including some African countries, that spanned three decades. Using the least squares between effect (LS-BE) estimation technique, the evidence showed that variables such as factor endowments, geography, political stability, liberal trade policies, foreign direct investment inflows, and domestic industrial capacity are critical drivers for GVCs participation. This, in essence, aggregates various factors hitherto advanced in previous studies. Nevertheless, the study emphasised the relevance of these factors to GVCs' participation rather than traditional export activities. Urata and Baek (2020) investigated the determinants of GVC participation using cross-country and firm-level analysis in a new empirical dimension. The study covers 111 countries and 38,966 firms for the 2009–2018 period to identify the firm and country-related factors determining a firm's GVC participation probability. The study produced micro-based evidence as expected to support variables such as labour productivity, firm size, foreign ownership, and technological capability as critical factors influencing GVCs participation of firms.

In a new perspective, a specific study by Yameogo and Jammeh (2019) focusing on GVCs in the manufacturing sector emphasised the roles of skills, human capital endowment, and migration in GVC participation for African countries. Although this may be sector-specific, the introduction of backward and forward global value chain participation as the explanatory variables in their model suggests that skills, human capital endowment, and migration may be essential drivers of GVC participation across sectors. Despite the array of policy prescriptions emanating from extensive empirical activities in Africa and specifically SSA, descriptive analysis by Van Biesebroeck and Mensah (2019) suggests that the average engagement of SSA countries in GVCs over the period studied (1995–2018) is not positive across countries for several indicators. This may necessitate a fresh perspective, such as regional value chains, to redesign the strategy and create a more enabling environment for the effective participation of GVCs. Focusing on regional value chains, a study by Banga, Kumar and Cobbina (2015) identified the potential benefits of RVCs if designed around the leather and leather products industry in three sub-regional trading blocs in SSA (COMESA, ECOWAS, and SACU). The dynamic gravity model estimates generated demonstrable evidence to show intra-regional trade and employment opportunities inherent in RVCs. Barnes, Black, Markowitz, and Monaco's (2021) study produced similar evidence in the

automotive industry. However, they identified the political geography of the subcontinent as a significant hindrance to participation in RVCs.

In a string of related studies, especially regarding objectives and methodology, Kowalski, Gonzalez, Ragoussis and Ugarte (2015) provided an in-depth analysis of determinants of GVC participation across different regions, focusing on policy variables. Using data from OECD TiVA and EORA inter-country input-output data, the study examined the relative importance of non-policy and policy factors influencing backwards and forward integration to GVCs in Africa and other regions. The remoteness and cost of cross-border trading are critical factors hindering GVC participation in sub-Saharan African countries. This position aligns with a sub-regional study by Farole (2016). Another survey by Allard, Kriljenko, Gonzalez-Garcia, Kitsios, et al. (2016), adopting a similar approach and method, arrived at a similar conclusion but added that oil-exporting countries are lagging behind GVCs participation, while many other countries, both commodity and non-commodity exporters, are showing progress. Unlike many previous studies, a study by Slany (2019) focused on the role of trade costs in building RVCs in Africa, using UNCTAD-Eora GVC from 2006 to 2012 for 37 African countries. These efforts mark a significant improvement in data coverage in African countries. Furthermore, the study employed the gravity model and attempted to introduce regulatory variables to capture non-tariff measures. The study revealed the negative effect of tariffs charged on capital goods on foreign value added. However, higher regulatory quality and a more substantial telecommunication infrastructure enhance RVCs' participation.

By using the gravity model to investigate the influence of both policy and non-policy variables on RVC participation in SSA nations, our study primarily builds upon the current literature. Classifying RVC drivers into policy and non-policy variables gives room for targeted policy decisions as part of the general efforts to promote RVC participation in SSA countries. Our study will also benefit immensely from the updated UNCTAD-Eora GVC data, which includes more SSA countries, potentially impacting the quality of outcomes from our analysis.

## **4. METHODOLOGY**

### **4.1 Model Specification**

Gravity model estimation is employed to empirically investigate the determinants of regional value chains (RVCs) in SSA, as is usually obtained in the literature of trade flow analysis.

This approach allows our analysis to benefit from the bilateral characteristics of the gravity model. It gives room for introducing policy variables in the augmented version. Our model specification begins with the standard gravity model equation as expressed in Equation 1.

$$\ln RVC_{ij,t} = \beta_0 + \beta_1 \ln Dist_{ij} + \beta_2 CNTG_{ij} + \beta_3 LANG_{ij} + \beta_4 CLNY_{ij} + \beta_5 RTA_{ij,t} + \beta_6 \tilde{\tau}_{ij,t} + \varepsilon_{ij} \quad (1)$$

In equation 1,  $\ln RVC_{ij,t}$  is the dependent variable and represents the logarithm of the total value of Domestic Value Added and Regional Value Added embodied in the SSA country's export to other SSA countries. Similarly,  $\ln Dist_{ij}$  is the logarithm of the bilateral distance between trading partners  $i$  and  $j$  and  $CNTG_{ij}$  represents the presence of contiguous borders between countries  $i$  and  $j$ .  $LANG_{ij}$  and  $CLNY_{ij}$  are language and colonial ties dummy variables that take the value of one in the presence of these socio-cultural variables.  $RTA_{ij,t}$  and  $\tilde{\tau}_{ij,t}$  are proxies for trade policy variables.  $RTA_{ij,t}$  is a dummy variable that recognises regional trade agreements (RTA) between trading partners  $i$  and  $j$  at time  $t$  by taking a value of one and zero otherwise. Similarly,  $\tilde{\tau}_{ij,t}$  accounts for bilateral tariffs and is defined as  $\tilde{\tau}_{ij,t} = \ln(1 + tariff_{ij,t})$ , where  $tariff_{ij,t}$  is the tariff country  $j$  imposes on imports from the country  $i$  at time  $t$ .

Estimating with equation 1 as specified is often referred to as the naïve gravity equation. As a result of the inherent limitation highlighted by Baldwin and Taglioni (2007) and Head and Mayer (2014), it is crucial to control for exporter and importer unvarying factors as this will guard against a specification bias towards zero. Based on this, the new specification, considering the exporter and importer's unvarying factors, yields the following.

$$\ln RVC_{ij,t} = \beta_0 + \beta_1 \ln Dist_{ij} + \beta_2 CNTG_{ij} + \beta_3 LANG_{ij} + \beta_4 CLNY_{ij} + \beta_5 RTA_{ij,t} + \beta_6 \tilde{\tau}_{ij,t} + \varepsilon_{ij} + f_o + f_d + f_t \quad (2)$$

where  $f_o$  and  $f_d$  are country-fixed effects of country of origin and destination, and  $f_t$  is a time-effect. The degree of industrialisation and border procedures has been identified in the GVC literature as a significant driver due to the unique characteristics of GVC/RVC as a distinct trade type. As a stand-in for industrialisation, manufacturing value addition and border procedures were

incorporated into the model. Consequently, manufacturing value addition and border procedures were added to equation 2 to produce equation 3.

$$\begin{aligned} \ln RVC_{ij,t} = & \beta_0 + \beta_1 \ln Dist_{ij} + \beta_2 CNTG_{ij} + \beta_3 LANG_{ij} + \beta_4 CLNY_{ij} + \beta_5 RTA_{ij,t} + \\ & \beta_6 MAN_{ij,t} + \beta_7 BRDP_{ij,t} + \beta_8 \tilde{\tau}_{ij,t} + \varepsilon_{ij} + f_o + f_d + f_t \end{aligned} \quad (3)$$

#### 4.1.1 A Priori Expectations (Sign Restrictions)

Distance ( $\ln Dist_{ij}$ ) expected sign is negative ( $\beta_1 < 0$ ) implying that greater geographical distance raises transport, coordination, and information costs, which weaken production sharing and value chain linkages. Distance effects are typically stronger for value-chain trade than for final goods.

Contiguity ( $CNTG_{ij}$ ) expected sign is positive ( $\beta_2 > 0$ ) implying that sharing a common border reduces trade costs, facilitates logistics, and promotes cross-border production networks, thereby enhancing regional value chain integration.

Common Language ( $LANG_{ij}$ ) expected sign is positive ( $\beta_3 > 0$ ), meaning that shared official or commercial language lowers communication and contract-enforcement costs, supporting coordination across fragmented stages of production.

Colonial Ties ( $CLNY_{ij}$ ) expected sign is positive ( $\beta_4 > 0$ ), implying that historical colonial links often reflect persistent institutional, legal, and cultural similarities that facilitate trade relationships and long-term value-chain participation.

Regional Trade Agreement ( $RTA_{ij,t}$ ) expected sign is positive ( $\beta_5 > 0$ ), meaning that RTAs reduce tariff and non-tariff barriers, harmonise standards, and improve market access, all of which are particularly important for intermediate goods and value-chain trade.

Manufacturing Capacity ( $MAN_{ij,t}$ ) expected sign is positive ( $\beta_6 > 0$ ), implying that higher manufacturing capacity increases a country's ability to supply and absorb intermediate inputs, strengthening its position in regional production networks.

Broad Domestic Production / Economic Size expected sign is ( $\beta_7 > 0$ ), meaning larger or more diversified production bases support scale economies and deeper inter-industry linkages, enhancing bilateral value-chain participation.

Trade Costs / Trade Barriers ( $\tilde{\tau}_{ij,t}$ ) expected sign is positive ( $\beta_8 > 0$ ), implying that higher trade costs, capturing tariffs, logistics inefficiencies, border frictions, or regulatory barriers, discourage fragmentation of production across borders.

To create a robust space for empirical analysis and ease of variable incorporation, we specified and estimated two-panel models for Backwards and Forward RVC participation. Following the guidance of Kowalski, Gonzalez, Ragoussis, and Ugarte (2015). Consequently, determinants of GVCs are classified into non-policy and policy variables. Non-policy variables include market size, while policy variables include tax policy, institutional quality, Tariff regime and FDI attraction. In line with this approach, the model estimated is specified in equations 4 and 5.

$$\ln BRVC_{ij} = \beta_0 + \beta_1 GDP_{ij} + \beta_2 RTAs_{ij} + \beta_3 TAX_{ij} + \beta_4 FDI_{ij} + \beta_5 QLTY_{ij} + \varepsilon_{ij} \quad (4)$$

In equation 4, BRVC is Backwards RVC participation, which is Foreign Value Added embodied in a country's exports, and GDP which is a proxy for the market size and the current Gross Domestic Product of the destination country. RTAs is a dummy variable that takes the value of one if there are Regional Trade Agreements (RTAs) between countries and zero otherwise. Similarly, TAX represents the prevalent corporate tax regime in the destination country, while the FDI represents openness to inward FDI, and QLTY stands for institutional quality in the destination country. For ease of analysis and to provide an opportunity to incorporate commercial variables such as FDI, tax and tariff, panel regression was employed to unearth the role of these investment and commercial variables on RVCs. This approach divides RVCs into backward participation in RVCs and forward participation in RVCs using the TiVA data. Backward participation in RVCs refers to the foreign value-added share of gross exports by value-added origin country, while backward participation in RVCs represents the domestic value added in foreign exports as a share of gross exports by the foreign exporting country in Africa. Table 4 shows the effect of investment and commercial variables on RVC participation.

$$\ln FRVC_{ij} = \beta_0 + \beta_1 GDP_{ij} + \beta_2 RTAs_{ij} + \beta_3 TAX_{ij} + \beta_4 FDI_{ij} + \beta_5 QLTY_{ij} + \varepsilon_{ij} \quad (5)$$

In Equation 5, all variables are the same except *FRVC* which is Forward RVCs Participation that accounts for the Domestic Value Added of a country, which is embodied in the exports of other countries.

#### 4.2 . Data

The RVCs used in this empirical study are essentially extracted GVCs for African nations, which represent the total value of regional and domestic value added in exports from SSA nations to other countries. Thus, RVCs as employed in this study are localised GVCs. GVC measurement has been somewhat contentious; however, for this analysis, we used the standardised inter-country input-output table (ICIO) systems included in the OECD (2013) and UNCTAD (2013b), which broke down total trade flows into different forms of domestic and foreign value added. This method divides GVCs into two main categories: forward participation and backward participation. The degree to which domestic businesses in a particular nation use foreign intermediate value added for exporting operations is measured by the backward participation index. The degree to which businesses in partner nations use a nation's exports as inputs for their exports is measured by the forward GVC participation index.

##### Gravity Variables

The gravity theory of trade posits that trade volumes are positively related to the economic mass of trading partners and negatively to the distance between them (Anderson, 1979). As in the case of gross trade, market size is expected to have a strong positive influence on the volume of GVC trade, while distance is expected to have an exactly opposite effect. Similar to what was obtained from many other studies in this area, market size is a proxy for Gross Domestic Product (GDP). Similarly, distance as employed in the study is the bilateral distance between countries. These are either simple distances, measured by the distance between either the most populated city (*dist*) or the capital city in each country (*distcap*), or weighted distances (*distw\_harmonic* and *distw\_arithmetic*). A contiguity dummy is a dummy variable that takes the value of 1 if contiguous borders exist between countries and takes the value of 0 otherwise. Similarly, cultural variables such as common language and shared colonial experiences are dummy variables that take a value of 1 if the condition is met and 0 otherwise.

Other variables, industrialisation was measured by the share of manufacturing value added in GDP. This indicator measures the level of industrial activity in a nation and shows the

contribution of the manufacturing sector to the broader economy. Since manufacturing significantly contributes to economic output, a larger MVA share in GDP denotes a higher level of industrialisation. This metric is frequently used to assess a nation's progress in transitioning from an economy reliant on resources or agriculture to one driven by industrial production and technological advancement. On the other hand, border procedures refer to the regulations, procedures, and administrative requirements associated with the transportation of commodities across international borders. These include tariffs, inspection procedures, documentation requirements, customs laws, and non-tariff policies such as licensing or quotas. Facilitating commerce and increasing participation in regional and global value chains depend heavily on effective and simplified border processes.

#### 4.2.1. Sources of Data

Global Value Chains (GVCs) data were sourced from OECD TiVA and EORA databases. Similarly, gravity data were sourced from the CEPII database, and other variables were sourced from the World Integrated Trade Solution (WIT) and World Development Indicators (WDI). This covered the period between 2010 and 2020.

## 5. PRESENTATION AND DISCUSSION OF RESULTS

### 5.1 Results of the Gravity Model Estimation

*Table 1: Gravity Descriptive Statistics*

| Variable | Obs  | Mean      | Std. Dev. | Min    | Max    |
|----------|------|-----------|-----------|--------|--------|
| ManVA    | 5431 | 6.075(\$) | 3.714     | -6.908 | 15.175 |
| RVCs     | 7220 | 4.927(\$) | 2.318     | -2.31  | 18.258 |
| Dist     | 7030 | 7.901(Km) | .858      | 2.079  | 9.177  |
| GDP_d    | 6903 | 1.386(KM) | .937      | -.405  | 3.421  |
| LANG     | 7030 | .452(DM)  | .498      | 0      | 1      |
| CNTG     | 7030 | .085(DM)  | .279      | 0      | 1      |
| RTA_M    | 6030 | .075(DM)  | .179      | 0      | 1      |
| BORD_P   | 7215 | 7.557(Hr) | 2.933     | 3      | 14     |

*Source: Author's Computation based on EORA and CEPII data*

Table 1 presents the descriptive statistics of the data used in estimating the gravity model. They include Regional Value Chains participation (RVCs), Industrialisation (ManVA), Distance (Dist), Market size (GDP\_d), Boundary sharing (CNTG), Regional Trade Agreement (RTA\_M) and Border processing. RVCs have the highest number of observations, with a mean value of 4.927 and a standard deviation of 2.318 out of all the variables. In this regard, a proxy for border processing with a mean value of 7.557 and a standard deviation of 2.933 comes next. Similarly, Industrialisation (ManVA) has the lowest number of observations with a mean value of 6.075 and a standard deviation of 3.714. As expected, all variables introduced as dummy has a minimum value of zero and a maximum value of one. Excluding the variables introduced as dummies, all other variables were introduced in logarithmic form.

**Table 2. Gravity Model Results**

| Variables               | RVCs Africa (OLS) | RVCs Africa (Fixed effect) |
|-------------------------|-------------------|----------------------------|
| ManVA                   | 0.075 (0.389)     | 0.002(0.816)               |
| Dist.                   | -0.804(0.07)*     | -0.092(0.07)*              |
| GDP_d                   | 0.313(0.00)***    | 0.316(0.00)***             |
| RTA_M                   | 0.435(0.00)***    | 0.46(0.00)***              |
| CNTG                    | 0.261(0.00)***    | 0.366(0.00)***             |
| LANG                    | 0.821(3.11)       | 0.084(0.94)                |
| CLNY                    | 0.323(0.00)***    | 0.325(0.00)                |
| BORD_p                  | -0.225(0.06)*     | -0.182(0.04)**             |
| Con.                    | 4.133(0.00)***    |                            |
| Exporter (fixed effect) |                   | 0.441(0.08)*               |

Note: \* significant at 10%, \*\* significant at 5% and \*\*\* significant at 1%. Source: Author's Computation based on EORA and CEPII data.

The results in Table 2 highlight the key factors influencing Regional Value Chain (RVCs) participation in Africa. Like regular trade flows, regional value chain participation is influenced by factors such as market size, Language, Common colonial experience, Boundary sharing and Distance. Distance has a negative and statistically significant effect on Africa's regional value

chain participation in both the OLS and fixed-effects specifications. Because distance is expressed in logarithmic form, the estimated coefficients are interpreted as elasticities. The OLS estimate ( $-0.804$ ) suggests that a 1 per cent increase in bilateral distance reduces RVC engagement by about 0.8 per cent, indicating a sizable distance penalty. Although the magnitude of the coefficient declines substantially in the fixed-effects model ( $-0.092$ ), it remains statistically significant, implying that distance continues to constrain RVC participation even after controlling exporter-specific heterogeneity. The size reduction is consistent with gravity-model evidence that pooled estimates partly capture unobserved country characteristics. Overall, the result is in line with value-chain and gravity literature, which finds distance to have a particularly strong negative effect on intermediate and production-sharing trade due to higher sensitivity to transport costs, time delays, and coordination frictions. Participation is positively affected by the destination country's market size, as measured by GDP. Language and common colonial history are examples of gravity characteristics that favour RVC participation in Africa. This illustrates how the participation of RVCs can be influenced by underlying variables that are typically out of the nation's control. The degree of industrialisation in the destination nation is one of the core GVCs/RVCs characteristics that favourably influence RVC participation in Africa.

Regional Trade Agreements (RTAs) play a significant role in fostering participation in Regional Value Chains (RVCs) and serve as critical policy variables influencing such participation. This suggests that policies like the African Continental Free Trade Agreement (AfCFTA) have the potential to promote RVC involvement. However, contrary to initial expectations, inefficient border procedures associated with such agreements may hinder RVC participation, highlighting the need for further investigation. As anticipated, streamlined and effective border procedures should enhance participation in RVCs. Additionally, factors such as geographic distance, shared language, colonial history, and market size—variables largely beyond the immediate control of policymakers in the short to medium term—play a more influential role in RVC participation compared to core variables like industrialisation. These factors naturally place some countries at an advantage. Nevertheless, evidence indicates that advancing industrialisation can further amplify these advantages and enhance participation in RVCs.

Despite the intermediate nature of the commodities involved in RVCs, the study found that they are also influenced by variables that direct the movement of other commodities, as

demonstrated by the results of the gravity model. Gravity characteristics, including market size, distance, shared colonial history, and language, are therefore important indicators of RVCs. This essentially confirms that the gravity model is a reliable tool for calculating trade flows, irrespective of the type of trade. As a result, this study supports the conclusions of prior studies, which show that trade costs are a key factor in determining trade flows, as noted by Head and Mayer (2014) and Baier and Standaert (2020).

More precisely, this study generally supports a vast number of earlier research projects in this field, particularly those about GVC participation. Our stance on the importance of non-policy factors in influencing RVC participation, in particular, is consistent with the findings of the Kowalski, Gonzalez, Ragoussis, and Ugarte (2015) survey. In a similar vein, our findings support the submission of a study by Fernandes, Kee, and Winkler (2022) highlighting the significance of FDI and trade liberalisation as critical elements for RVC participation. A survey by Lwesya (2022) highlights the importance of domestic credit, foreign direct investment, and institutional quality to the East African Community's (EAC) bloc's prospects for economic upgrading. These findings are somewhat consistent with our findings, with the exception that institutional quality harms regional value chains.

## 5.2 Results of the Panel Model Estimation.

*Table 3. Panel Descriptive Statistics*

| Variable    | Obs | Mean   | Std. Dev. | Min    | Max    |
|-------------|-----|--------|-----------|--------|--------|
| logFRVCs    | 208 | 5.661  | 1.157     | 3.52   | 8.439  |
| logGDP      | 208 | 7.576  | .626      | 6.203  | 9.075  |
| Logman      | 204 | 22.945 | 1.128     | 20.949 | 24.864 |
| logBRVCs    | 208 | 5.95   | .907      | 3.122  | 7.947  |
| Logtariff   | 159 | 2.386  | .455      | 1.411  | 4.514  |
| Logtax      | 112 | 2.897  | .394      | 2.175  | 3.661  |
| logFDI      | 206 | .375   | .79       | -2.58  | 2.243  |
| Reg_quality | 40  | 4.048  | .155      | 3.732  | 4.296  |

Source: Author's computation based on TiVA data

Table 3 presents the descriptive statistics of the data employed in the estimation of the two-panel models. Most of the variables were included in the estimation of the gravity model; however, variables such as Foreign Direct Investment (FDI), Corporate Tax (Tax) and Regulatory Quality are new variables. They were introduced to reflect the peculiar nature of goods involved in RVCs. All variables were introduced in their logarithmic forms.

**Table 4. Panel Data Results (Backwards Participation RVCs)**

| Variables          | RVCs Africa (OLS) | RVCs Africa (Fixed effect) |
|--------------------|-------------------|----------------------------|
| <b>LogGDP</b>      | 1.706(0.00)***    | 0.698(0.00)***             |
| <b>Logtariff</b>   | -0.751(0.02)**    | -0.855(0.02)***            |
| <b>Logtax</b>      | -0.053(0.776)     | 0.326(0.01)***             |
| <b>logFDI</b>      | 0.310(0.06)**     | 0.083(0.254)               |
| <b>Reg_quality</b> | -1.187(0.00)***   | -0.313(0.57)               |
| <b>Con.</b>        | -6.374(0.00)***   | 1.935(0.05)                |
| <b>R-Square</b>    | 0.6218            | 0.580                      |

Note: \* significant at 10%, \*\* significant at 5% and \*\*\* significant at 1%. Source: Author's Computation based on EORA and CEPII data.

Market size is a strong driver of Africa's RVC participation: the coefficient on LogGDP representing market size is positive and highly significant in both specifications, implying elasticities of 1.71 (OLS) and 0.70 (fixed effects). Tariffs exert a robust negative effect, with elasticities between  $-0.75$  and  $-0.86$ , confirming the high sensitivity of value-chain trade to trade policy barriers. Domestic taxation is insignificant in OLS but becomes positive and significant under fixed effects, suggesting that within-country improvements in fiscal capacity may support RVC engagement. FDI is positive but only weakly significant in OLS and loses significance with fixed effects, indicating that its role is driven mainly by cross-country differences. Regulatory quality is negative and significant in OLS but not under fixed effects, pointing to the importance of controlling for unobserved heterogeneity. Overall, the results align with gravity and value-chain literature, emphasising scale effects and trade costs as key determinants of RVC participation.

The results indicate that market size is a critical and crucial variable in the model, positively influencing backward RVC participation in Africa. Variables like tariff proxy by weighted average

tariff conform to a priori expectations, negatively affecting backward RVC participation. This suggests that high tariffs hinder trade and the participation of RVCs. The variable exhibits a consistent negative sign under both estimation approaches. Apart from the tariff, we also examined the implications of the corporate tax regime on RVCs' participation. The evidence from the estimation shows that a high corporate tax rate can discourage RVCs' participation, as the coefficient has a negative sign. However, this result does not show consistency under the OLS and estimation with fixed effects. The investment variable in the model FDI demonstrates its positive contribution to RVCs' participation. This suggests that an inflow of FDI in a country can spur RVC participation, maybe due to the technology transfer inherent in FDI. The results from the model show that the regulatory environment hinders RVC participation, which is worrisome as it suggests that RVCs are more attracted to countries with poor regulatory environments.

**Table 5. Panel Data Results (Forward Participation RVCs)**

| Variables          | RVCs Africa (OLS) | RVCs Africa (Fixed effect) |
|--------------------|-------------------|----------------------------|
| <b>LogGDP</b>      | .942(0.00)***     | 0.987(0.00)***             |
| <b>Logtariff</b>   | -0.349(0.012)***  | -0.020(0.919)              |
| <b>Logtax</b>      | -0.272(0.332)     | -1.22(0.003)***            |
| <b>logFDI</b>      | 0.085(0.04)***    | 0.051(0.411)               |
| <b>Reg_quality</b> | -0.136(0.271)     | -0.351(0.06)**             |
| <b>Con.</b>        | 0.97(0.947)       | 1.935(0.05)                |
| <b>R-Square</b>    | 0.529             | 0.580                      |

*Note: \* significant at 10%, \*\* significant at 5% and \*\*\* significant at 1%. Source: Author's computation based on TiVA data*

Economic size remains a robust determinant of Africa's RVC participation: LogGDP is positive and highly significant in both models, with elasticities close to unity (0.94 in OLS and 0.99 under fixed effects), indicating that a one per cent increase in GDP raises RVC engagement by about one per cent. Tariffs have a negative and statistically significant effect in the OLS

specification ( $-0.35$ ), but the effect disappears once fixed effects are included, suggesting that the tariff–RVC relationship is largely driven by cross-country differences rather than within-country variation. Domestic taxation is insignificant in OLS but becomes negative and highly significant under fixed effects ( $-1.22$ ), implying that increases in tax burden within countries may hinder RVC participation, possibly through higher production costs. FDI shows a positive but small effect in OLS and loses significance in the fixed-effects model, indicating limited within-country impact over time. Regulatory quality is insignificant in OLS but negative and weakly significant under fixed effects, pointing to a nuanced relationship once unobserved heterogeneity is controlled for. Overall, the results confirm the central role of market size, while the effects of policy and institutional variables are sensitive to model specification, consistent with findings in the value-chain literature

Similarly, variables like tariff proxy by weighted average tariff conform to a priori expectations, showing a negative effect on forward RVC participation. The variable shows a consistent negative sign under the two estimation approaches. The study investigated the implications of the corporate tax regime on forward RVC participation. The evidence from the estimation shows that a high corporate tax rate can reduce RVCs' forward participation, as the coefficient shows negative signs consistently across the two estimations. In addition, the FDI demonstrates its positive contribution to forward RVCs' participation. This indicates that an inflow of FDI in a country can increase RVC participation regardless of whether it is forward or backwards. Similar to the results obtained in the other estimation, the regulatory environment hurts the participation of forward RVCs. This shows that, irrespective of the RVC's direction, they are more likely to be attracted to a weak regulatory environment.

## 6. CONCLUSIONS AND RECOMMENDATIONS

The study aimed to investigate the determinants of Regional Value Chains (RVCs) in Africa using data from OECD TiVA and EORA databases. Gravity data from the CEPII database were utilised as independent variables, and other policy variables were sourced from the World Integrated Trade Solution (WITS) and World Development Indicators (WDI). The observation from the participation data of GVCs/RVCs shows that African countries are underperforming compared to other developing regions. Similarly, many African countries are locked down at the lower level of GVC, implying that many are more active in forward GVC participation. The results from the

gravity model and panel data estimations emphasise the dominant roles of non-policy variables in determining RVCs' participation in Africa. This implies that some countries naturally excel in RVC participation due to their locational advantage, colonial experience, population and language. Thus, countries that do not use non-policy variables can leverage policy variables to promote participation in RVCs.

Reducing intra-African trade barriers, particularly tariffs, is essential for enhancing Africa's participation in Regional Value Chains (RVCs). Lower trade costs can stimulate cross-border production, encourage specialisation, and deepen regional integration. Alongside trade liberalisation, African countries should pursue coherent policies that promote industrialisation, attract foreign direct investment (FDI), and ensure effective accession to and implementation of regional trade agreements such as the AfCFTA. These measures are critical for strengthening regional production networks and improving competitiveness. Countries that lack strong natural advantages must be more proactive, leveraging policy instruments such as infrastructure development, human capital investment, regulatory reforms, and targeted industrial policies to position themselves within RVCs. At the regional level, bodies such as SADC have a vital role to play by harmonising trade and industrial policies, improving cross-border infrastructure, and facilitating regional investment frameworks that support value-chain integration. Despite robust empirical evidence, further research using more recent data at sub-regional levels is recommended to inform more context-specific and effective policy.

## REFERENCES

- Allard, C., Kriljenko, J. I., Gonzalez-Garcia, J. R., Kitsios, E., & others. (2016). *Trade integration and global value chains in sub-Saharan Africa: In pursuit of the missing link*. International Monetary Fund.
- Baldwin, R. (2012). *Global supply chains: Why they emerged, why they matter, and where they are going* (CEPR Discussion Paper No. 9103). Centre for Economic Policy Research.
- Baldwin, R., & Taglioni, D. (2007). Trade effects of the euro: A comparison of estimators. *Journal of Economic Integration*, 22(4), 780–818.
- Bamber, P., Fernandez-Stark, K., & others. (2014). *Connecting local producers in developing countries to regional and global value chains* (OECD Development Policy Papers No. 160). OECD Publishing.
- Banga, R., Kumar, D., & Cobbina, P. (2015). *Trade-led regional value chains in Sub-Saharan Africa: A case study of the leather sector*. United Nations Economic Commission for Africa.
- Barnes, J., Black, A., & others. (2021). Regional integration, regional value chains and the automotive industry in sub-Saharan Africa. *Development Southern Africa*, 38(1), 57–72. <https://doi.org/10.1080/0376835X.2020.1812091>
- Farole, T. (2016). Do global value chains create jobs? *IZA World of Labour*, 291. <https://doi.org/10.15185/izawol.291>
- Fernandes, A. M., Kee, H. L., & others. (2022). Determinants of global value chain participation: Cross-country evidence. *The World Bank Economic Review*, 36(2), 329–360. <https://doi.org/10.1093/wber/lhab012>
- Fofack, H., & Mold, A. (2021). The AfCFTA and African trade: An introduction to the special issue. *Journal of African Trade*, 8(Suppl. 2), 1–11.
- Foster-McGregor, N., Kaulich, F., & others. (2015). *Global value chains in Africa* (Working Paper No. 2015-024). United Nations University–Maastricht Economic and Social Research Institute on Innovation and Technology (UNU-MERIT).
- Head, K., & Mayer, T. (2014). Gravity equations: Workhorse, toolkit, and cookbook. In G. Gopinath, E. Helpman, & K. Rogoff (Eds.), *Handbook of international economics* (Vol. 4, pp. 131–195). Elsevier.

- Kowalski, P., Gonzalez, J. L., Ragoussis, A., & Ugarte, C. (2015). *Participation of developing countries in global value chains: Implications for trade and trade-related policies* (OECD Trade Policy Papers No. 179). OECD Publishing.
- Lwesya, F. (2022). Integration into regional or global value chains and economic upgrading prospects: An analysis of the East African Community (EAC) bloc. *Future Business Journal*, 8(1), Article 33. <https://doi.org/10.1186/s43093-022-00142-4>
- Mayer, T., & Thoenig, M. (2016). *Regional trade agreements and the pacification of Eastern Africa* (Working Paper). International Growth Centre.
- Obasaju, B. O., Olayiwola, W. K., Okodua, H., & others. (2021). Regional economic integration and economic upgrading in global value chains: Selected African cases. *Heliyon*, 7(2), e06112. <https://doi.org/10.1016/j.heliyon.2021.e06112>
- Slany, A. (2019). The role of trade policies in building regional value chains: Some preliminary evidence from Africa. *South African Journal of Economics*, 87(3), 326–353. <https://doi.org/10.1111/saje.12229>
- Tinta, A. A. (2017). The determinants of participation in global value chains: The case of ECOWAS. *Cogent Economics & Finance*, 5(1), 1389252. <https://doi.org/10.1080/23322039.2017.1389252>
- Urata, S., & Baek, Y. (2020). *The determinants of participation in global value chains: A cross-country, firm-level analysis*. Asian Development Bank Institute.
- Van Biesebroeck, J., & Mensah, E. B. (2019). *The extent of GVC engagement in sub-Saharan Africa* (World Bank Policy Research Working Paper No. 8937). World Bank.
- Yameogo, N. D., & Jammeh, K. (2019). *Determinants of participation in manufacturing global value chains in Africa: The role of skills, human capital endowment and migration* (World Bank Policy Research Working Paper No. 8938). World Bank.