ADVANCED MASTER IN INTERNATIONAL AND DEVELOPMENT ECONOMICS

Global fragmentation of production and its effects on developing countries

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Award date:
2023

Awarding institution:
University of Namur

Title: Global fragmentation of production and its effects on developing countries

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Academic year 2022-23

Project presented as part of the requirements for the award of the
Specialized Master in International and Development Economics
Jointly organized by the ESLN and the ESL

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Abbreviation

OECD: Organisation for Economic Co-operation and Development

DVX: Domestic added value on the other countries export

ECOWAS: Economic Community of West African States

FDI: Foreign Direct Investment

FVA: Foreign Added Value

GDP: Gross Domestic Product

GVC: Global Value Chains

HDI: Human Development Index

MNC: Multinational Company

NPISHs: Non-Profit Institutions Serving Households

OEC: Observatory of Economic Complexity

UNCTAD: United Nations Conference on Trade and Development

UNSTATS: United Nations Statistics

WDI: World Development Indicators

Abstract

This study examines the effects of global production fragmentation, driven by the expansion of Multinational Companies (MNCs), on developing countries, with a focus on the Economic Community of West African States (ECOWAS). Using the UNCTAD-Eora database, the research reveals that ECOWAS is integrated into global value chains, yet largely relies on domestic added value. While integration exists, the benefits are not maximized, emphasizing the need for policies and further research to enhance this integration's effectiveness.

Introduction

The international economy has undergone significant transformations over the past decades, largely influenced by the expansion of trade in parts and components since the 1960s [Jones (2005); Rigo (2021)]. This trend has gained further momentum during the last three decades, characterized by two distinct phases known as hyperglobalization and slowbalization (Xing et al., 2021). The traditional trade of finished products, as highlighted by the OECD, now constitutes only 30 percent of global trade. Subsequently, the conventional notion of a product's origin, denoted by the "made in X country" label, is becoming obsolete, making way for a new phenomenon qualified "Made in the World" spotting a new patter of the global production.

To understand this evolving global economy, Jones et al. (2004; 2005) introduced the concept of "fragmentation" in their study, which explains the growth of service sectors following the expansion of international trade (Xin T., 2017). This concept provides insights into the changing dynamics of trade and the increasing interdependence of nations in the production process. Over time, various terminologies, including "offshoring," "vertical specialization," and "externalization," have emerged to describe and classify this phenomenon. One important concept linked to this phenomenon is Global Value Chains which seizes the breaking down process of the world production and how it fosters the economic development.

The creation of Global Value Chains (GVCs) has enabled firms to take comparative advantage of different countries and reduce production costs. But they have also risen concerns about the impact of fragmentation on the development prospects mainly for poorer countries. One of the concerns raised is their participation in the global value chains and its effects on economic growth, employment, poverty, etc. Indeed, participating in global value chains contributes to development process by facilitating the transfer of competencies, technologies, and foreign direct investment (Kummritz et al., 2017). However, this transformation does not always occur uniformly in developing countries such as in the case of Economic Community of West African States (ECOWAS) a subset of western African countries.

According to the Observatory of Economic Complexity (OEC), the ECOWAS member states accounted for only 0.62 percent of global exports and 0.77 percent of global imports in 2019, indicating their limited role in world trade. Furthermore, the economic development benefits derived from their participation in global trade are mitigated. For instance, Odularu et al. (2020) have found no persistent correlation between trade openness and the Human Development Index of ECOWAS countries. However, some authors have found that the participation in the international trade impacts positively the reduction of poverty in this region.

Understanding the involvement of countries in Global Value Chains integration is crucial for unveiling patterns of trade's impact on development and gaining insights into the trade-based economy. This study aims to centrally assess the participation and effect of GVC integration on poverty within the ECOWAS community. Two secondary objectives are addressed:

- ✓ To which extent are ECOWAS countries participating in the global fragmentation of production?
- ✓ What is the effect of this participation on the development within the community?

To addressing these questions, traditional statistical measures used in international economics do not adequately suit this study's requirements. Indeed, conventional trade measurements suffer from double counting of goods and services due to the fact they’re crossing multiple countries as inputs (Del Prete et al., 2018). Additionally, capturing this reality at the country level shows challenges in identifying and accounting for the origin and destination of inputs crossing borders. To obtain a more accurate view of a country's contribution to global output, an alternative approach developed by Koopman et al. (2010; 2014) is employed. This approach, based on Multi-Regional Input-Output (MRIO) analysis, allows for the disaggregation of domestic and foreign value-added components of gross exports and imports.

To accomplish this, we utilize the latest release of the UNCTAD-Eora database on Global Value Chain (GVC), offering global coverage of 189 countries, including the ECOWAS countries. These GVC indicators serve as proxies to capture the level of integration of countries in the global fragmentation of production. To examine the effect of global value

chain participation on poverty, we employ quantitative methods, including descriptive statistics and graphical analysis within the framework of the international economy.

This document is structured around two main points. The first point emphasis a literature review, exposing the concept of Global Value Chains and its development. Additionally, we spot evidence provided by previous scholars, particularly regarding the gains and challenges associated with the trade of intermediate goods. The second point utilizes data from UNCTAD, WDI and other sources to describe the evolution of global fragmentation production integration within the ECOWAS community. Furthermore, statistical analysis is employed to emphasize the significance of this integration on poverty in developing countries.

I. Literature Review

Over the past few decades, globalization has been subject to massive changes fostered by the evolution of multinational firms and their outsourcings patterns. Historically, the outsourcing of production has been led by the US economy regarding its competition vis-à-vis to Europe (Jones et al., 2005). By externalizing part of their production, the US firms have been able to supply a competitive product. Understanding then the evolution of the global fragmentation of production needs a glance on the mainstream of international economy field led by the school of comparative advantage theories. The following lines give a literature review pointing out the main theories behind global fragmentation, the difficulties to capture it and the implication of global fragmentation for developing countries.

I.1 global fragmentation and measurements

a. Global fragmentation of production

The theory of international economy found its debuts in the Ricardian model as shown by Krugman et al. (2018). In this classical model, the differences of productivity between countries attributed to the labour market characteristics give a comparative advantage in producing some goods vis à vis to the Rest of the World. This basic prediction has been confirmed by empirical studies whereas some predictions are still argued [Golub et al.,

(2000); Yap et al., (2018)]. Along with the Ricardian model, we understand that countries have interest to focus on the segments of the value chain in which they have comparative advantages and then supply the rest of the world. However, this model doesn't clarify how this comparative advantage is obtained and why firms decide to scatter their production process through the world (Xin T., 2017).

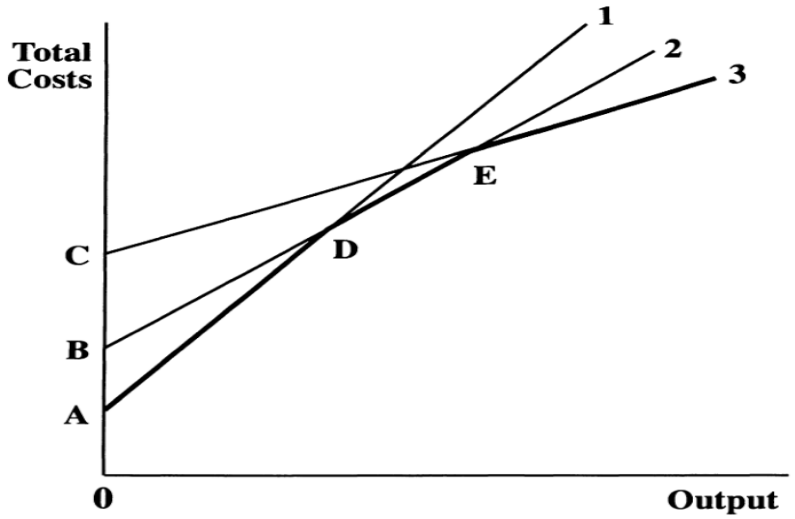
Following the Ricardian model, Heckscher-Ohlin model provides a framework for understanding why countries are better off in suppling some goods. This model unveils that differences in factor endowments between countries might explain their respective advantages. And then, countries will concentrate on goods that relatively consume largely the factors in which the country is well endowed. This theory delivers significant view to understanding the movement of foreign direct investment from developed countries to developing countries (Faeth I., 2009). Indeed, firms may decide in their production process to externalise some part of their production process regarding the abundance of production factor meaning lower cost of those factors (Chen, 2003). Nevertheless, this model failed to explain how behaviour of firms may be affected by microeconomics patterns, which are also very deterministic.

This gap found in Ricardian and H-O models is addressed by the imperfect competition model developed by Elhanan Helmand and Paul Krugman (Hummels D et al. 1995). In fact, this model emphasizes the crucial role of international scale economy in the decision of firms and the place of the consumers preferences in this puzzle. By using the case of monopolists' firms Krugman uncovers that the penetration of the market by another firms breaks up the monopoly profit. However, the equilibrium is affected by the size of the market and international trade gives access to large market which permits to support a larger number of firms. This large market combined with the love of variety by consumers give more incentive to firms in producing at a larger scale and thus a lower average cost.

Yet, outsourcing has a cost and this cost should be low comparatively to the gain resulting from that. Jones & Kierzkowski (2001) are well known for their pioneering works on understanding the link between the change of service costs and notably vertical fragmentation. By using the figure below (fig.1), those authors explain how fragmentation

materialized by different cost lines (1, 2 and 3) can break down the total cost of the firm. The first line (1) hypothetically gives the cost of producing in one block. The following lines 2 and 3 respectively show the cost resulting to splitting out the domestic market on 1 and 2 different locations. One of the key aspects of this figure is the consideration of scale effect. Truly, at a certain level the first line allows lower cost; but more the firm wants to increase its output more it's opportune to scatter some of the production outside of the country.

Figure 1. Total costs and output lines



Source : Jones et al. (2001)

Moreover, they stressed that the noticeable fact allowing the cost reduction in fragmentation is the technology advance in communication and transport, a deeper knowledge of international legal systems and continuous diminishing of risks in co-ordinating production (Jones et al., 2004).

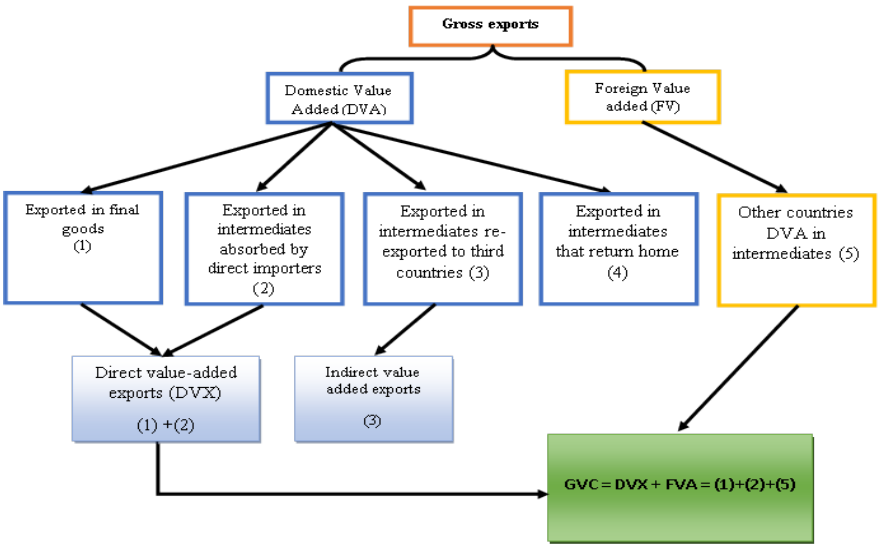
b. Measurement of global fragmentation of production

Measuring the level of fragmentation of production can be challenging, mainly when trusting on conventional trade statistics (Del P. et al., 2018). The main limitation of classical indicators is their inability to discern between types of trade that constitute global value Chains (GVCs) activities and those that do not (Dollar, D. R., et al. 2017). To counter this limitation, Dollar et al. adopted a new approach based on National Accounting

Standards proposed by Wang et al. (2017). This method classifies embedded factor content as either GVC or non-GVC based on whether they cross or not national borders. This information is extracted from the regional matrix input-output table obtained from global Leontief inverse matrix. By using this decomposition and considering the backward and the forward position in the global production, those authors end up with four indicators capturing respectively pure domestic production, traditional trade production, simple GVC and complex GVC.

Koopman et al. (2010, 2014) in their turn developed a unified measure for sources of valued added in gross exports which is well known and used today (Borin et al., 2019). This measure also relies on the block-matrix structure of an inter-country IO model. This concept described below (fig. 2) allowed those authors to end up with two major indicators, domestic value added, and foreign value added which have a significant pattern with development outcome (Taglioni et al., 2016). The usefulness of this measures is that they permit to see at which level a given country contributes to the global value chains of the World and reversely what is the contribution of the world to the export this country.

Figure 2. Global value chain as gross exports component



Source: by the author, from Koopman W. et al (2010)

I.2 Global value chains and economic development

Dollar et al. (2017) identified three potential benefits that developing countries may derive by integrating the global value chains (GVC), including opportunities for economic integration, job creation, and technology transfer. To assess that, subsequent research has been conducted by a diverse range of empirical studies.

a. Global value chains and economic integration

The development of global value chains made that developing countries don't need any more to develop all the value chain which hinder their trade participation. According to Brenton et al., (2022) GVCs enabled low- and middle- incomes countries to enhancing their participation in global export from 16 percent to 30 percent between 1990 and 2017. Johnson et al. (2012) by using a sample of 94 countries, computed and analysed the contribution of value added in gross trade and found a significant contribution which is created in the framework of global value chains. Previously to this finding, Hummels et al. (1998) by analysing OECD input-output tables demonstrated that vertical fragmentation has significantly increased international trade over time, with some countries experiencing up to a 50% contribution to their total trade. The authors also identified lower trade barriers and transportation improvements as key factors explaining this trend towards vertical specialization, which is expected to continue growing in importance.

Raei, M. F. et al. (2019) by using Eora-MRIO database found that GVCs related to trade impact positively income per capita and productivity. However, this study pointed out the heterogeneity of this impact accordingly to the level of development. Upper-income and higher-income countries would benefit more from this GVCs participation. Constantinescu et al. (2019) investigated the impact of global value chains (GVCs) participation on productivity using panel estimation across 40 countries and 13 sectors and found a positive impact. Specifically, the study found that a 10% increase in GVCs participation led to an average productivity increase of nearly 1.6%. Hence, global fragmentation of production enhances the economic participation of countries. Nevertheless, this effect may depend on the framework of the economy.

b. Global value chains and labour market

Developing the production of intermediaries' goods contributes to boost the manufacturing subsector and may provide more jobs in the economy. Jiang and Milberg (2013) used data from world input-output data to assess the impact of the Global Value Chains (GVC) on the labour market between 1995-2009. Their study found that during this period, the GVCs created demand for labour of 88 million. Additionally, by analysing data on hours worked by skill type, the authors discovered that the GVCs consume significantly medium-and low-skilled labour content than high-skilled labour content. This finding pointed out one of the concerns related to the shift in labour market occurring over different sectors.

Banga K. (2016) in their turn used econometrical methodologies of fixed effects and generalized method by focusing on the manufacturing, services, and agricultural sectors in India. They concluded that the integration of the global value doesn't have significant impact on employment in India. In addition, the backward integration in the Global value chains has negative impact on the employment rate. This negative relationship shows again the relevance of the position in GVCs the Global value and chain. Nevertheless, the variable used by the authors to assess the effect on the global valued chain on the labour market must be consider in interpreting this result.

Moreover, the effect on labour market is not exclusively limited on job creation but extended to wage and the distribution. Evidence from Hollweg C. H. (2019) pointed out the biased effect toward skilled workers in developing countries. In fact, integration in the global value raised more demand for skilled workers than unskilled workers. This result counter one of the predictions of trade theory arguing the reverse relationship. Furthermore, the author stressed the distributional effect occurring due the jobs' creation domination around the export sector.

c. Global value chains and technology transfer

Standardization, modularity, and digitalization made technology more diffusible (Inomata et al., 2019). Therefore, the development of global fragmentation creates avenue for technology transfers. By assessing the role of foreign value added and offshoring index, Tajoli et al., (2018) found that global value chains involvements lead to deepen innovation

outcome by spillover effect. However, this positive effect occurred when developing countries are importing inputs from advanced economies.

Rigo, D. (2021) used propensity score matching combined with a difference-in-differences approach to draw conclusions on the contribution of global value chains (GVCs) integration to technology transfers. The study covering 18 developing countries noticed that firms involving in GVCs were more likely to experience an increase productivity compared to firms that only started importing or exporting.

Upgrading plays a key role in the GVCs framework (Gereffi, G. 2019). The concept of upgrading refers to the process by which firms and economies improve their capabilities and move up into higher-value activities within the chain (Kummritz et al., 2017). Several studies have been trying to estimate the contribution of GVCs to this upgrading. Pahl et al., (2020) discovered evidence that the formal manufacturing sector experienced significant improvements in productivity growth resulting for the long-run effects of GVCs integration. However, this upgrading effect is not always evident and may depend on many factors.

I.3 Global value chains' challenges for developing countries.

The participation of developing countries into global value chains has been a crucial locomotive for poverty alleviation over the past decade. However, while GVC integration presents significant benefits, it also poses numerous challenges for these nations.

a. Environment challenges

The participation of developing countries in the global value chains requires the establishment of institutional frameworks to ease the inflow of horizontal foreign direct investment. Though, several studies have examined the impact of these inflows on dioxide carbon emissions. Ren et al. (2014) investigated the effects of FDI and trade openness in China and found that instead of reducing dioxide carbon emissions, global economic integration worsened the situation. The study suggests that trade openness, combined with environmental regulation and the use of appropriate technology, could mitigate the growth of industrial dioxide carbon emissions in China.

By using a panel and fixed effects model across 27 countries, Neequaye et al. (2015) found similar effect partly attributed to foreign direct investment inflows on the emission of carbon. This paper also further shows that the consideration of the quality of environment as normal goods may justify the attraction of polluting FDI in developing countries which worsen off the environmental issues in these economies. In fact, due to low regulation and tax system developing countries may be more exposed to more pollution following global value chains integration. However, it emphasizes that this pollution follows the environmental Kuznets curve meaning that the negative effect can be perceptible at the first stage and then with more development the recipient countries could adapt and use more efficient technology which pollute less.

More recently, Wang et al. (2021) by focusing on the dual relationship between technology and environment pollution after global value chains development found consistent result with Neequaye et al. (2015). Indeed, they document the existence of a threshold above which the negative relationship between trade development and environment pollution will be inverse. This is due to spillover effect and therefore the authors advocate more participation of developing countries in the global production. However, they stressed several measures capable of alleviating environmental issues and accelerating the positive gains of the global value chains.

b. Global value chains and vulnerabilities to shocks

The integration in the global value chains have been a key policy driver for developing countries during the last decade to alleviating poverty and unemployment. Notwithstanding the fact this GVCs may possibly open to more shocks. In this line, Soyres et al., (2021) unveiled the crucial role that intermediate goods' production have on the elasticity of export volume through the exchange rate channel. This study highlighted that the position in the GVCs either upstream or downstream undermine this transmission of shocks. The result uncovered that more the country is on the upstream level and more it's vulnerable to external exchange rate fluctuations. Additionally, Camatte and al., (2021) by studying the impact of exchange rate shocks on consumer prices from 1995 to 2018 notice a significant role of the global value chains in the transmission of shock on domestic price. In fact,

according to them, the household consumption expenditure deflator elasticity to a shock on the domestic currency ranges from 0.05 to 0.35 depending to the level of integration in the GVCs.

Besides the previous pattern the occurrence of conjunctural shocks have also questioned the vulnerability of GVCs integration. The covid 19 pandemic for instance largely contributes to surge the preoccupation of globalization. This disease disrupted the global value chains and created an unprecedented contraction on the global supply and demand. The major role of developing countries in the GVCs worsened the transmission of this shock. Espitia et al., (2022) used a sector-level gravity model to assess this transmission in 28 countries including developing countries. Their findings effectively reveal that fragmentation increased the vulnerability to foreign shock during the pandemic crisis. Moreover, this vulnerability was higher for the sector that are consuming or supplying intermediaries' goods in the economy. Nevertheless, the GVCs involvements decrease the vulnerability to domestic shocks.

II. ECOWAS in the global fragmentation of production

This paper dives into the implications of ECOWAS' involvement in the global fragmentation of production, which significantly impact various development outcomes, as shown by previous studies. To accomplish this objective, this study uses the latest data on Global Value Chains (GVCs) sourced from the UNCTAD-Eora database, encompassing 189 countries, and spanning the period from 1998 to 2018. This extensive dataset provides ample data points for comprehensive comparisons. Also, it offers valuable insights into key aspects such as Foreign Value Added (FVA), Domestic Value Added embodied in the exports of other countries (DVX), Total Value Added embodied in this country's exports (VA_exp), and the Global Value Chain (GVC) participation index derived from aggregating FVA and DVX. These indicators enable a comprehensive analysis of ECOWAS' integration into the global value chains and its ramifications on regional and global economic development.

ECOWAS is a regional bloc within the Western African established on May 28, 1975, following the signature of the treaty of Lagos and accounting 15 members of which Benin,

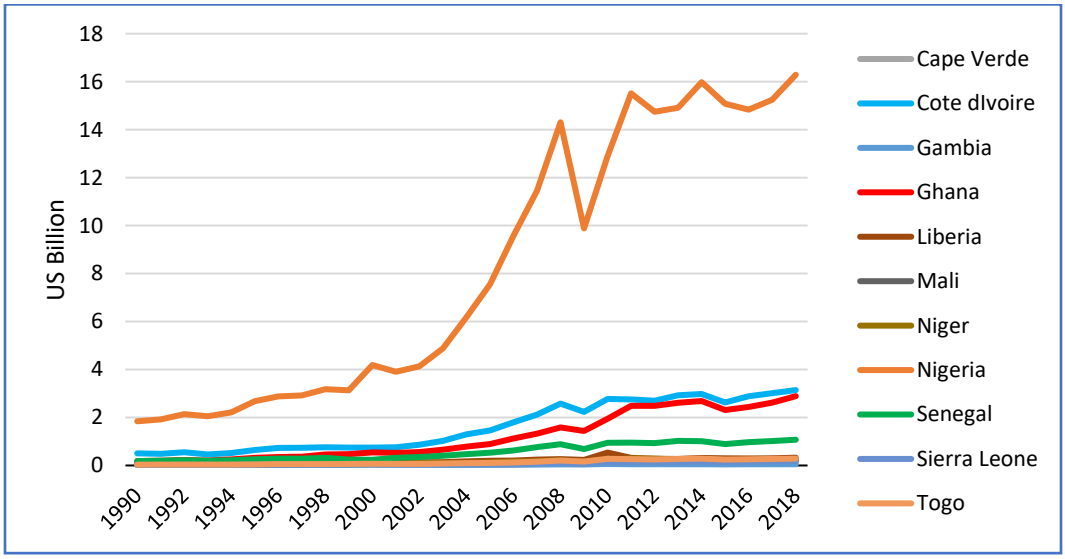
Burkina Faso, Cape Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. The main goal of this organization is to promote the economic integration and the development within the Region. The last resealed of UNCTAD-Eora on the GVC provides data for 11 countries over 15 countries members and thereof excluding Burkina Faso, Benin, Guinea-Bissau, and Gambia form this analysis.

II.1 ECOWAS involvements in the Global value chains

a. Participation in the GVCs

The evolution of the global value chain for ECOWAS countries, as illustrated on Figure 3, shows an overall upward trend over the past three decades, with Nigeria exhibiting a surprisingly strong evolution. In average, the overall growth rate of the GVC in terms of gross value during this period was 8.5%. Remarkably, Ghana, Liberia, and Nigeria have achieved the greatest growth rates, with an average of 11%, 10.4%, and 9.1%, respectively. However, these trends have been somehow volatile, with declines becoming more visible during 2009, following the global financial crisis. This year shown a significant drop on the global value chain of ECOWAS countries, with Nigeria being the most affected, experiencing a drop down of 30.9%, which may confirm its vulnerability to external shocks associated with global value chain integration (Soyres et al., 2021; Espitia et al., 2022).

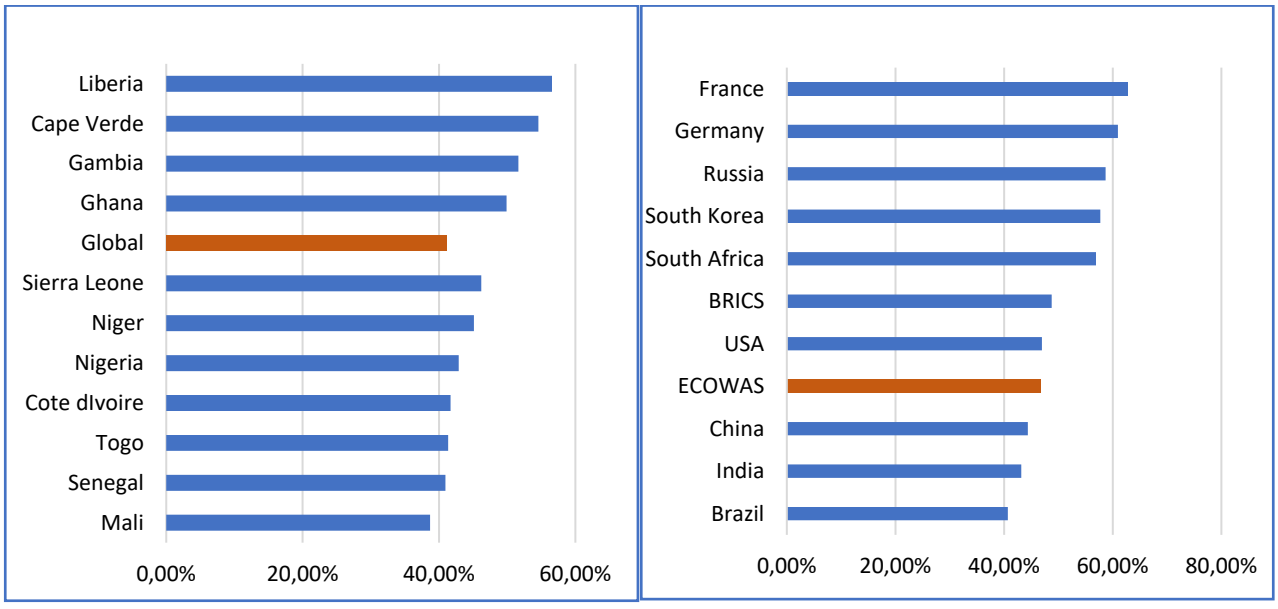
Figure 3. ECOWAS members GVC's evolution from 1990 to 2018



Source: by authors, from UNCTAD-Eora database

When examining the available data from the last five years (see figure 4), it appears that ECOWAS countries have made significant strides in GVC integration, demonstrating similarities with some industrialized nations such as the USA and China. However, they are still lagging compared to economies like France, Germany, and South Korea. The analysis reveals that GVC contributed an average by 46.3% to their gross export products. Interestingly, Liberia, Cape Verde, and Gambia are ranked highest in terms of GVC integration, with 56.6%, 54.6%, and 51.7% of their exports, respectively, attributed to GVC. This suggests that the level of integration into global chains is not necessarily linked to international economic integration. For example, Nigeria, which has the largest amount of GVC in the region, ranks eighth in this ranking, with Togo, Senegal, and Mali ranking at the bottom.

Figure 4. Share of GVC in countries exports added value



Source: by authors, from UNCTAD-Eora database

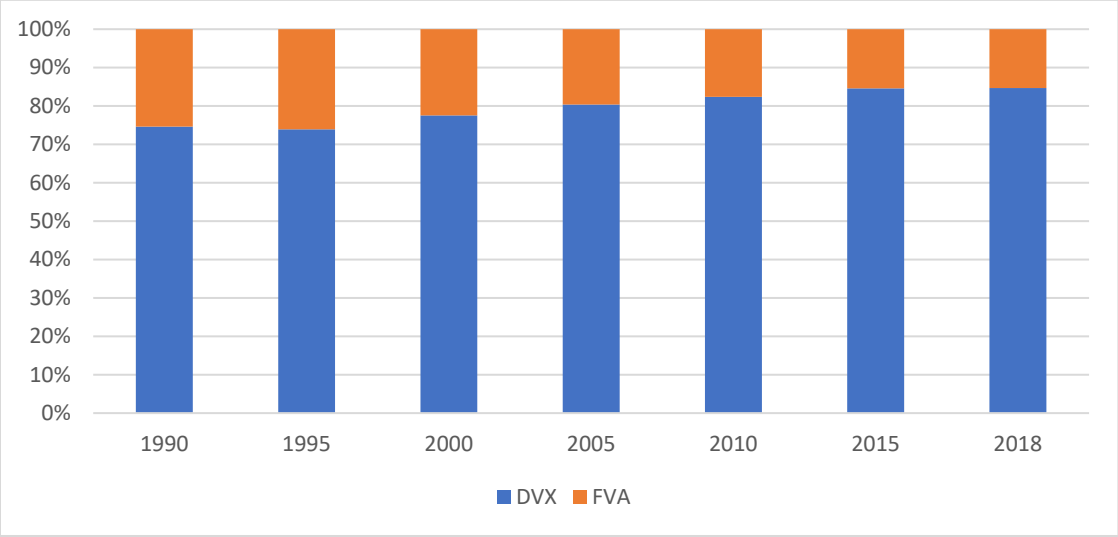
b. Upstream and downstream participation

By developing the concept of upstreamness and downstreaness which explain the position in the global value chain, authors discovered that this positioning matter. Upstreamness is seen as the fact that the country activities that are leading to exportation are more located at the beginning (backward) position of the value chain. Downstreaness is the opposite

complying the forward positioning in the value chain. Therefore, upstream integration is done when the DVX is created and the downstream when the FVA is fostered. In the case of ECOWAS an analysis of the trade of intermediate goods by ECOWAS countries shows an interesting trend, with the overall regional bloc showing a more dominant presence of DVX, accounting for a significant 84.66% in 2018 (see figure 5).

This remarkable dominance of DVX within the ECOWAS trade suggests a strong reliance exporting raw materials, highlighting the region's role as a supplier of raw materials in the global supply chain network. While this position can bring advantages in terms of economic integration and specialization, it also raises considerations regarding the region's vulnerability to external factors and potential disruptions in the supply chain.

Figure 5. Upstream and downstream participation



Source: by authors, from UNCTAD-Eora database

The dominance of domestic added value embodied in the exports of ECOWAS countries can be attributed to the trade structure of the regional bloc, with Nigeria playing a prominent role, showing a slight contribution of FVA in its GVC. This concentration of economic activity in Nigeria may overshadow the overall contribution of FVA in the ECOWAS regional bloc over time. However, it's important to recognize that policy evolution also significantly influence these trends. Indeed, the 1990s, many Western African countries, like other developing nations, underwent structural programs aimed at addressing balance and budget deficits. Some of these reforms resulted in a vague

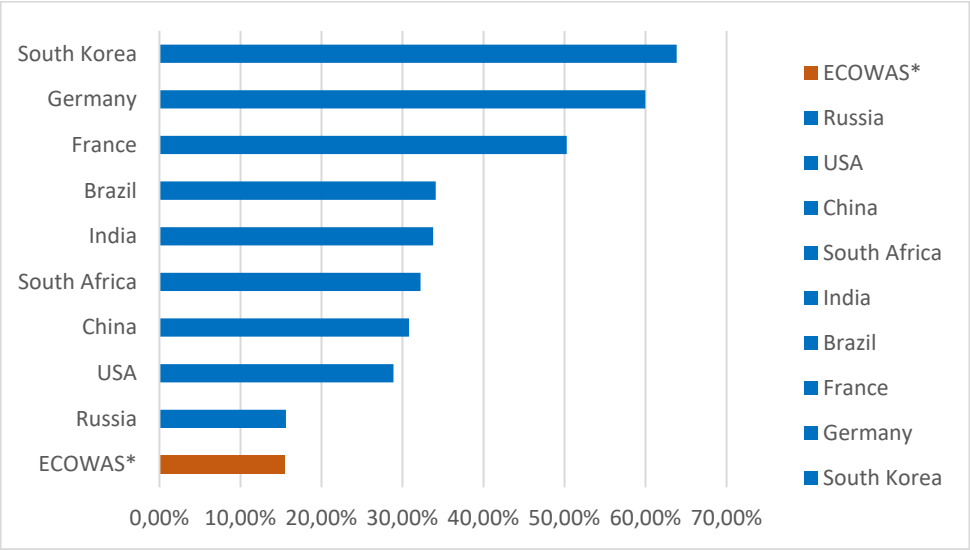
campaign of deindustrialization in certain industries that were perceived as unproductive and burdened with foreign exchange consumption.

When focusing on the most recent five-year period (2014-2018), the share between FVA and DVX becomes highly volatile across countries. Cape Verde and Sierra Leone stand out as examples where foreign added value dominates their GVC, with shares of 62.82% and 52.50%, respectively. On the other hand, countries like Cote d'Ivoire, Nigeria, and Ghana surprisingly display lower shares of FVA compared to other ECOWAS countries, with percentages of 15.75%, 12.47%, and 17.24%, respectively.

This disparity may be attributed to the export structure of these countries, which heavily relies on products involving natural resources with little or weak transformation (commodities like cotton, coffee, cocoa nut, etc.). As a result, they require fewer foreign inputs to process these goods. Hence, to enhance economic development and resilience within the region, it becomes crucial for policymakers to consider the delicate balance between FVA and DVX and the impact of their trade structures on the overall GVC integration. By fostering a diverse and sustainable industrial landscape, these countries can improve their positions within the global supply chain network and achieve more balanced economic growth in the long run.

The comparison of ECOWAS countries to industrialized economies indicates a significant gap in terms of foreign value added (FVA) contribution to their global value chain (GVC) (see figure 6). Only 15.65% of ECOWAS countries' GVC is embodied by foreign added value, while countries like South Korea, Germany, and France have GVCs with over 50% reliance on foreign added value. However, it is worth noting that high levels of FVA contribution are not universal among industrialized countries. Surprisingly, economies such as Russia, China, and the USA, while ranking higher than ECOWAS countries, reveal a share of FVA to GVC close to those of some ECOWAS countries at 15.45%, 56.98%, and 98%, respectively.

Figure 6. The downstream participation of ECOWAS and comparison



Source: by authors, from UNCTAD-Eora database

In overall, the descriptive analysis gives evidence to the well integrations of ECOWAS countries in the global value chain even though this integration presents disparities across countries. Moreover, by leaning on this global value chain following the definition given Koopman (2010) reveals a weakly foreign added value in their GVCs. This from the viewpoint of many authors can undermine the effect of global value chain in developing countries.

c. Correlation with economic indicators

This study aims to see the potential effect of global fragmentation of production in developing countries, with a specific focus on the Economic Community of West African States (ECOWAS). To measure this fragmentation, we utilize Global Value Chain (GVC) indicators as proxies and try to assess its potential effects on the poverty level within the ECOWAS community. However, due to data constraints, our empirical analysis is restricted to 10 countries over the period 2009-2018, resulting in a panel data set of 100 observations. The data, including information on global value chain integration, are collected from various sources, with the primary source being the EORA database. Additionally, we consult other reliable sources such as World Bank WDI, United nation (UNSTATS and UNCTAD) for economical data, including GDPC.

Table 1. Definition of variables

VARIABLE	DEFINITION	SOURCE
HHC	Households and NPISHs Final consumption expenditure per capita	WDI
GVC	Global value chain as percentage of GDP	UNCTAD-Eora
FVA	Foreign added value as percentage of GDP	UNCTAD-Eora
DVX	Domestic added value on export as percentage of GDP	UNCTAD-Eora
FDI	Net foreign direct investment as percentage of GDP	WDI
CRED	Credit to private sector as percentage of GDP	WDI
INV	Gross formation of capital as percentage of GDP	WDI
GDPC	Gross domestic product per capita	UNSTATS

Source: author

The table below (table 2) reports descriptive statistics that offer valuable insights into our sample data. On average, the households and NPISHs Final consumption expenditure per capita0 stands at 984.47, with a minimum value of 299.5 and a maximum of 2445.78. Turning our attention to the independent variables of interest, we observe that the Global Value Chain (GVC) constitutes, on average, 4.23% of the gross domestic product (GDP), ranging from 1.24% to 10.55%. This emphasizes the significant role that the commerce in intermediate goods plays in ECOWAS economies, as discussed in the descriptive section. This role can be seen when comparing the level of GVC with the net foreign direct investment demonstrating an average value of 4.45%.

Additionally, focusing on Foreign Added Value (FVA) and Domestic added value on export as percentage of GDP (DVX), we find their respective averages to be 1.43% and 2.8%. These results align with our prior analysis, reinforcing the conclusion that the domestic value on export plays a more profound role in the formation of the global value chain compared to the foreign added value.

Table 2 : descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
HHC	100	984.471	590.693	299.499	2445.778
GVC	100	4.229	1.748	1.247	10.551
FVA	100	1.434	.904	.371	4.037
DVX	100	2.796	1.496	.856	8.655
FDI	100	4.456	4.384	-2.575	32.414
INV	100	22.702	7.085	9.941	44.957
CRED	100	19.07	14.683	.005	59.509
GDPC	100	1312.51	842.104	403.768	3171.665

Source: author' computation using *Stata 14.2*

The correlation table (Table 3) indicates the presence of statistically significant positive correlations even at 1% level between GVCs variables and the chosen economic indicators.

Table 3. Correlation table

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) GVC	1.000							
(2) FVA	0.518*	1.000						
	(0.000)							
(3) DVX	0.856*	0.001	1.000					
	(0.000)	(0.995)						
(4) HHC	0.334*	0.224*	0.256*	1.000				
	(0.001)	(0.025)	(0.010)					
(5) FDI	-0.072	0.254*	-0.237*	-0.176	1.000			
	(0.479)	(0.011)	(0.017)	(0.080)				
(6) INV	0.079	0.364*	-0.127	0.130	0.418*	1.000		
	(0.432)	(0.000)	(0.209)	(0.198)	(0.000)			
(7) CRED	0.235*	0.556*	-0.061	0.539*	-0.136	0.514*	1.000	
	(0.018)	(0.000)	(0.547)	(0.000)	(0.179)	(0.000)		
(8) GDPc	0.348*	0.245*	0.259*	0.985*	-0.171	0.219*	0.610*	1.000
	(0.000)	(0.014)	(0.009)	(0.000)	(0.090)	(0.028)	(0.000)	

**** p<0.01, ** p<0.05, * p<0.1*

Source: author' computation using *Stata 14.2*

The Global Value Chain as a percentage of GDP exhibits a correlation of 0.235 with the credit to private sector (CRED) and 0.334 with the Households and NPISHs Final consumption expenditure per capita use as poverty proxy (HHC). Both correlations are statistically significant at the 5% level. Also, the Gross Domestic Product per capita (GDPC) demonstrates a notably correlation of 0.348. Furthermore, it's evident that the global value chain within the community displays a stronger correlation with DVX than with FVA values. This reinforces our earlier conclusion that the community GVC is significantly influenced by the DVX.

The foreign added value (FVA), which gauges the degree of upstream integration into the global value chain shows positive correlations with key economic indicators such foreign direct investment, credit to the private sector, and GDP per capita. The most pronounced correlation emerges with the credit to private sector variable, registering a robust correlation of 0.556. Subsequently, GDP per capita and foreign added value follow suit, showcasing correlations of 0.245 and 0.254, respectively. Importantly, all these correlations are statistically significant at the 5% level, underscoring that foreign added value potentially plays a role in explaining or influencing critical development outcomes in developing countries.

The downstream indicator of the Global Value Chain (GVC) presents distinct patterns. Notably, this indicator displays correlations exclusively with foreign direct investment, the household consumption indicator (HHC), and GDP per capita. Interestingly, there exists a negative correlation between this variable and FDI, marked at -0.237. Moreover, its correlations with HHC and GDP per capita surpass those with the FVA variable. Specifically, the relationships are 0.256 and 0.259 for the former two variables, as opposed to 0.224 and 0.245 for the foreign added value.

II.2 ECOWAS in Global value chain: determinants and effects

a. Determinants of the participation

Few studies have investigated the determinant of Global Value Chains (GVC) within the ECOWAS community. Tinta, A. A. (2017) conducted a comprehensive analysis utilizing a gravity model based on panel data with fixed effects. The findings indicated that intra-regional trade does not significantly contribute to explaining GVC participation. However, the study revealed that structural factors and the competitiveness of trade structures play a crucial role in influencing GVC participation. Consequently, these results emphasize the importance of achieving better diversification within ECOWAS.

Furthermore, the author highlights the positive impact of intra-community trade and foreign direct investment (FDI) inflows on enhancing the backward integration of ECOWAS countries into the GVC. Overall, these findings suggest that ECOWAS stands to benefit from improved diversification strategies and increased intra-community trade and FDI inflows, which can facilitate greater integration of member countries into the GVC. For the authors tariffs rate is welcome to enhance the intra-community trade and then discourage the foreign supply.

In their study, Mamba, E., and Balaki, A. (2023) utilized the fractional logit regression method to examine the impact of deepening regional trade agreements (RTAs) on backward linkages and forward integration within the context of Global Value Chain (GVC) participation. Diverging from Tinta's (2017) focus on different factors, the authors specifically investigated how the deepening of regional trade agreements, through protocols and ratified conventions (IPCR), affects GVC participation. Their findings were supported by robust results obtained using an instrumental variable approach. Notably, the

main finding of the study indicated that deepening RTAs significantly increase backward linkages (FVA) while decreases in forward integration (DVX) with a 10% significance level.

Additionally, the study uncovered an intriguing association between control of corruption and DVX (Domestic Value-Added Exports). The evidence suggested that a reduction in corruption can lead to amplified benefits derived from GVC participation. Consequently, the study recommends policy measures aimed at fostering an environment characterized by lower levels of corruption. Such policies would contribute to enhancing the advantages obtained from participating in GVCs, thereby maximizing the potential gains for all stakeholders involved.

In a recent study Gniniguè, M et al. (2023), which encompassed 44 developing countries, including those within the ECOWAS region, it was found that Information and Communication Technologies (ICTs) have a positive impact on the competitiveness of economies, thereby enhancing their participation in the Global Value Chain (GVC). This positive relationship holds true for both backward and forward integration. The study's findings highlight the significance of ICTs in facilitating and improving the competitiveness of economies, leading to increased involvement in GVCs. By leveraging ICTs, countries can enhance their productivity, efficiency, and connectivity, thus gaining a competitive edge in the global market. The positive effects of ICTs extend to both upstream (backward integration) and downstream (forward integration) activities within the GVC, indicating their broad-reaching benefits across different stages of production and distribution.

Globally, trade diversification, economy structure and competitiveness, institutions patterns and regional agreements are deemed to be the main drivers of the GVC chain participation. Thereof, an effective public intervention to foster those drivers may deepen the integration and the gains from integrating the trade of intermediaries' goods.

b. Effects of the participation

Very limited research has been conducted to examine the impact of the global value chain on the development outcomes of countries in the Economic Community of West African States. In a study by Titan et al. (2018), the authors provide valuable insights into the

comparative effects of integration, global value chain (GVC) participation, and international trade on the economic growth and food security of ECOWAS countries. The findings of this study reveal compelling evidence in favor of GVC integration.

By employing a panel fixed-effect model, the authors demonstrate that enhancing domestic value trade positively influences trade volume, thereby enhancing competitiveness and export diversification. Consequently, this improvement in domestic value trade has a greater impact on economic growth compared to solely engaging in international trade. Furthermore, the study indicates that backward integration positively contributes to per capita dietary energy supply, with statistical significance at the 5% level. This finding underscores the crucial role of GVC integration in achieving food security objectives within ECOWAS.

Besides the previous authors, through their empirical research, Gyeke-Dako et al. (2017) examined the impact of Ghana's integration into the global value chain (GVC) on employment. The study adopted a comprehensive approach, utilizing both quantitative and qualitative methods to provide a nuanced understanding of the subject. The findings of the study indicate that firms engaged in GVC exports and possessing a strong governance structure tend to offer higher-quality employment opportunities.

Overall, Titan et al. (2018) and Gyeke-Dako et al. (2017) studies provide important empirical evidence supporting the positive effects of GVC integration on the development outcomes of ECOWAS countries. However, further research in this area is warranted to deepen our understanding of the specific mechanisms through which GVC integration can be harnessed to promote sustainable economic growth, food security in the region and employment in ECOWAS members. And it’s very important to see at which extent this GVC integration may be harmful for those countries.

II.3 Policy recommendation

The recent shocks, notably the pandemic of covid 19 and the Ukraine invasion spurred disruptions in the world trade and triggered from policy makers the perspective of settling strategies for better resilience of their economies by reallocation of firms that are deeply involved and exposed to those shocks. Despite the difference between the viewpoints of policymakers and private sector concerning their perspective vis à vis to GVCs, the first

group looking for resilience and the second group for efficiency, the current data on trade shows that GVCs still have good days in front of.

However, in the case of ECOWAS integration as previously seen the GVCs don't fully yield all the potential outcomes as similarly as some industrialized countries. Following the findings of Tinta (2017), strategies and policies which aim to develop the intra community trade could foster more gains for the community. Thereof, it's essential to reconsider the economy structure, the institutional frame, and the quality of infrastructure to reach this intra-community trade development.

a. Economy structure

The economic structure of ECOWAS countries highlights a predominant reliance on the primary and tertiary sectors, while advancements in the industrial sector remain limited. Moreover, their international trade is primarily centered around the export of raw materials, including commodities like cotton, crude petroleum, and cocoa nuts. To effectively address this issue and enhance value added, a range of strategic measures can be implemented:

- Foster economic diversification: The formulation of policies aimed at attracting Foreign Direct Investment (FDI) stands as a pivotal driver for achieving economic diversification. Moreover, policymakers should persist in crafting incentives that encourage the private sector to invest and innovate, supported by judicious fiscal measures.
- Set transformative production: It is imperative to mitigate barriers hindering the importation of capital and technologies, critical components for augmenting productivity. By addressing trade tariffs and reducing transportation costs, access to essential inputs can be made more affordable, subsequently invigorating productivity.
- Foster the development of private sector: The facilitation of conducive policies, including the expansion and strengthening of financial markets, holds the potential to amplify investments in sectors demanding substantial capital infusion.

b. Institutional reforms

One crucial aspect of successful and effective integration into GVCs is the presence of strong institutions. The ECOWAS organization, comprising 15 member states, operating

as a common market. However, currently only small amount of their trades involves intra-community trade. To promote and enhance this trade, the following measures should be considered:

- Harmonize the implementation of different instruments among all ECOWAS members: Currently, there are divergences in the adoption and implementation of certain instruments within the ECOWAS region. It is essential to encourage all member states to harmonize their ratification processes and align with regional agreements. For instance, Nigeria, as one of the countries lagging in this area, should prioritize the ratification of outstanding agreements to ensure uniformity and coherence in the region.
- Address corruption issues: Corruption poses a significant challenge to effective integration into GVCs [Tinta, 2017]. To tackle this issue, transparent frameworks and judiciary systems should be established to counter corruption at all levels. Additionally, involving the private sector as key actors in the GVC transformation can help promote transparency and accountability.
- Accelerate the creation of the ECO currency: ECOWAS project to use a common currency within the intra-community. Unfortunately, the ECO currency previously expected for 2020 the creation of this common currency has been postponed for 2027. This project is expected to enhance the intra regional trade within the community, to bring more discipline to the macroeconomic and structural policies (IFM, 2021). However, the huge divergence among their economies is seen as an impediment for this project and considering those divergences are essential for the better benefit from this common currency.

c. Quality of infrastructure

The lack of infrastructure in many areas of the continent hinders the potential gains from GVC integration. The following measures should be taken to improve infrastructure network:

- Increase the connectivity to global and regional markets: The lack of infrastructure hampers exchanges within the community and with the rest of the world. Efforts

should be made to promote the construction of railways and other means of transportation, particularly in landlocked countries, to facilitate trade.

- Developing digitalization within the community: Digitalization presents a significant opportunity for Africa's economy, but the continent still lags advanced countries in this regard. For example, in 2019, only 28.2% of people in Africa had access to the internet, and the quality and reliability of network services are also important considerations. In contrast, Europe, as the continent's largest partner, boasts the highest internet access rate of 82.5% in the world [source: International Telecommunication Union]. For ECOWAS, found that information and communication technologies (ICTs) are key determinants for leveraging member integration into the global value chain.

By undertaking these proactive strategies, ECOWAS countries can progressively steer their economies towards greater resilience, fostering sustainable growth, and reducing overreliance on raw material exports.

Conclusion

The international trade has not fully delivered all its promises for developing countries, including those within the ECOWAS region. Despite years of trade liberalization, these countries continue to face significant development challenges such as poverty, food security, and unemployment (Tinta, 2018). This study aimed to analyse the participation of ECOWAS countries in the global fragmentation of production by looking on the different indicators delivering by GVCs concept, data, and evidence.

In conclusion, the participation of ECOWAS countries in the global value chain (GVC) reveals both progress and challenges. While these countries demonstrate a significant involvement in the trade of intermediaries' goods, their integration into the GVC remains primarily upstream with 84.66 percent of the GVC relying on domestic added value on other countries exports. This highlights the need for further development in terms of foreign value incorporation, as countries like South Korea, France, and Germany have achieved higher levels of foreign value added in their global value chains. The extent of ECOWAS participation in the GVCs is influenced by institutional frameworks, economic competitiveness, foreign direct investment, and diversification efforts.

Although ECOWAS' integration into the GVCs has positive effects on economic growth, trade volume, and the labor market, there are still significant development challenges that persist in the region, such as poverty, food security, and unemployment. It is crucial to continue conducting research to deepen our understanding of GVC integration and effectively address any potential risks or challenges that may arise. By doing so, policymakers can design and implement targeted interventions that enhance ECOWAS countries' participation in the GVC, thereby fostering sustainable economic development and addressing the pressing social and economic issues faced by these nations.

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