Review Article

Structural Transformation of Economies of the Economic Community of West African States: An Empirical Analysis

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Abstract: This paper analyses the structural transformation process of ECOWAS economies through an exploratory approach of stylized facts analysis on added value, employment, productivity and intra- and inter-sectoral mobility of labour factor, followed by an econometric approach in balanced panel data from 1991 to 2017 for the 15 countries in the region. The analysis revealed the beginnings of a structural transformation process in some ECOWAS economies, especially Ghana, Nigeria and Senegal, and more or less Burkina Faso and Guinea. The positive effects of the mobility of labour factor, albeit timid and at slow pace, from the agricultural sector to the industrial (manufacturing industry mainly) and services sectors, could be limited, on the one hand, by the low level of human capital development and on the other hand by a reverse itinerary characterized by the hegemony of the activities of the service sector, in terms of the proportion of value added and employment. In this regard, it appears that reforms aimed at strengthening the development of human capital could contribute to the acceleration of the productivities of industrial sector activities in general and manufacturing in particular through the channel of the accumulation of knowledge, know-how and technology. Economies could thus benefit from the growing prospects of attracting FDI in relation to the growing economic and geopolitical interests of foreign investors for Africa in general and ECOWAS in particular.

Keywords: Economic Structural Transformation, Productivity, Labor Mobility, Capital Intensity, Economic Complexity

1. Introduction

The ambitions of African political authorities and development actors and their commitments to promote sustainable development, driven by sustainable and inclusive economic growth are increasingly becoming widespread. The enthusiasm towards this goal, generally described as voluntarist by non-State development actors (researchers, civil society, etc.), has been reinforced since 2015 by the strong mobilization of regional and international development institutions around the 2030 agenda for sustainable development, which has, as one of its fundamental principles, "Leave No One Behind", and the 2063 agenda of the African Union, "the Africa we want". In addition, the good macroeconomic performance, particularly in terms of economic growth, recorded since the 2000s by African economies in general, and those of ECOWAS countries in particular, has led to mixed progress in improving the living conditions of the people. Indeed, from 2002 to 2015, the proportion of the population living on less than US$1.90 a day fell by only 27 points of percentage during the overall period (fourteen years), to reach more than 40% of the population still living in extreme poverty in West Africa. In addition, an average of 33% of individuals among people employed, aged 25 and over, lived in extreme poverty in 2017 compared to an average of 37.3% in Africa [3].

Our previous research on the sources of the paradox of economic growth in West Africa [1], concluded on the presumption that the deficit of structural transformation in

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1 The paper is entitled "Economic growth in the Economic Community of West African States: durability, sustainability and inclusiveness" published in Africa Development, Vol. XLIII, No 1, 2018.

ECOWAS economies is the reason for the discrepancy between sound macroeconomic performance and progress in the key social development indicators [17]. For [10], structural transformation of the economy is characterized by a process of reallocation or mobility of production inputs, including labour, from traditionally low productivity and value-added sectors (agriculture) to high productivity and value-added sectors (industry and manufacturing).

The main aim of this paper is to conduct a detailed and in-depth analysis of the trajectory of the structural transformation of ECOWAS economies. This analysis will allow us to answer two major questions related to the enthusiasm and widespread willingness of ECOWAS States to join the group of emerging economies: Are ECOWAS countries on the right track toward the structural transformation of their economies? Are ECOWAS countries fulfilling the conditions or are they in the process of fulfilling the conditions required to begin the process of structural transformation of their economies definitively and sustainably?

This research work, based on stylized and quantitative analyses, is intended to support economic policy decision-making in ECOWAS countries in particular, and in Africa in general, in order to formulate and implement effective policies and development plans to unleash the structural transformation of their economies. According to [8], structural transformation in the African context requires the implementation of proactive policies and strong and enlightened leadership of national institutions, coupled with strategic capacities, developmentalist macroeconomic policies to effectively address the challenges related to the three fundamental pillars of human capital, institutional infrastructure and virtuous governance.

Labour mobility from low productivity sectors such as agriculture to high productivity sectors (industry and manufacturing) is accompanied by economic growth, even in the absence of intra-sectoral productivity growth, driven by the influence of total factor productivity (TFP). This component of the economy's overall productivity growth, driven exclusively by the mobility of labour input, the essence of structural transformation, is the specific feature of economies with high levels of economic growth. The difference between the current growth of Asian economies, and that of African economies in general, and ECOWAS in particular, is the structural transformation component in the productivity growth of the labour factor of the economy as a whole. Thus, our research work will attempt to find an explanation for this peculiarity of African economies by exploring the existence of labour mobility between sectors as well as find out what the typology and influence of this mobility on economic growth really are.

For [9], since 1990, the effects of the growth of the structural transformation component on the overall productivity of the economy have, on the contrary, produced a diminishing effect on economic growth. They also argue that ingenious economies have been able to take advantage of the opportunities offered by the advent of globalization, particularly in terms of facilitating technology transfer as a contribution to increasing labour productivity, thereby enhancing the contribution of structural transformation to economic growth. These include China, India and many other Asian economies. African economies, for their part, have been received the reverse effects of this globalization, with employment migrating in the wrong direction from high productivity and value-added sectors of activity to low productivity sectors, including the informal sector.

According to the main findings of [9], structural transformation or intersectoral labour mobility produced positive effects on economic growth in half of the African countries considered in the study, albeit the magnitude these effects is very weak. They also point out that this period coincides with the expansion of the manufacturing sector in these African countries. [10] concluded that three factors determine whether or not a country's structural transformation process is moving in the right direction and contributing to economic growth. First, economies that have demonstrated a comparative advantage in primary commodities are at a disadvantage. The higher the share of natural resources in exports, the less the contribution of structural transformation to the overall productivity of the economy. Second, countries with competitive economies or whose currency is undervalued tend to demonstrate pro-economic growth structural transformation, it being understood that the devaluation of a currency has the same effects for an economy as a subsidy policy for industrial and manufacturing units. Lastly, economies that are more flexible in the labour market tend to develop a structural transformation component (effects of intersectoral labour mobility) that contributes to strengthening growth in the economy as a whole.

The rest of the article is organized into two main sections. The first section presents an analysis of stylized facts related to the evaluation of economic structural transformation process. The second section deepens the analysis of stylized facts findings, with an econometric analysis in balanced panel. A conclusion on the main findings and proposals for economic policy recommendations concludes the paper.

2. Analyses of Stylized Facts

2.1. Overview of Data and Some Factual Information on ECOWAS Economies

The analyses in this research paper are based on national accounts data for the ECOWAS countries. For the sake of comparability and harmonization of processing and estimation methodologies and techniques, these statistics from the national accounts systems are drawn from international databases, including those of the United Nations, the World Bank, the Organisation for Economic Co-operation and Development (OECD), the Groningen Growth and Development Centre (GGDC) and UNCTAD. The sectoral data constructed according to the ISIC 10 sector classification have been reorganized into four sectors: Agriculture, industry, manufacturing and services. This reorganization enables us to conduct an in-depth analysis of structural transformation in the context of African economies by isolating the

manufacturing sector from the industrial sector. It also enables us to circumvent the eternal problem of the availability of detailed sectoral data by branch of activity.

In order to capture the specific nature of the post-2000 period, characterized by periods of strong economic growth in Africa, the composition of the sub-periods of analysis took this into account, in particular by allowing the comparison of the pre and post-2000 period performance.

In 2017, in decreasing order of current GDP (Table 1), Nigeria, Ghana, Côte d'Ivoire and Senegal generated more than 87% of ECOWAS region wealth. in this regards, the needs for in-depth analysis are focused on these four countries.

Burkina Faso, Mali, Cabo Verde, Liberia and Benin are the ECOWAS countries that experienced the largest average annual increase in labour productivity over the period 1970-2017, ranging from 4.5% to 5.3%. Moreover, with the exception of Liberia, these same countries have recorded the fastest average annual growth rate of GDP per capita, between 4.3% and 5.8%. Among these countries, Cabo Verde's current position as a middle-income country since January 2008 is corroborated by the dynamics of its productivity and, consequently, its GDP per capita. On the other hand, Burkina Faso, Mali and Liberia, ranked among the poorest countries in the subregion, could justify accelerating their productivity and GDP per capita by their profile as leading mining countries. This economic typology could partly explain the fact that their macroeconomic performance has not generated a significant improvement in monetary and non-monetary poverty indicators, as in Cabo Verde. In mining countries, very few people are generally employed at very high levels of productivity, but the distribution of this high level of productivity (for a very small number of employees) throughout the economy is quite insignificant, as evidenced by

the lower level of the human capital index in these countries (Table 1). However, Cabo Verde, Nigeria, Côte d'Ivoire, Ghana and Senegal have the highest level of labour productivity, which confirms their position as the ECOWAS economic leaders. For example, Cabo Verde's productivity level in 2017 is more than four times that of Benin, Burkina Faso, Mali and Liberia.

In terms of efficiency in the productive combination, in 2017 most countries recorded a share of more than 20% (about 45% in Nigeria) to economic growth which does not stem from an increase in the volume of traditional production factors (labour and capital). This is rather due to technological and innovative advances in production techniques and methods, as evidenced by the contribution of total factor productivity. However, a dynamic analysis shows that countries such as Burkina Faso, Niger and Sierra Leone were more efficient in combining production in 1970 than in 2017. An in-depth analysis by economic activity branch in these countries would provide further explanation for these counter-intuitive results. However, Benin, Nigeria, Senegal and Togo have significantly increased the technicality and innovation of their production methods.

The existence of large labour productivity gaps (productivity differences) between sectors is a feature of persistent poverty combined with high income inequalities in ECOWAS countries. This situation confirms the higher levels of the coefficient of variation of the Log of sectoral labour productivity (more than 16%) in Côte d'Ivoire, Guinea, Mali and Niger. These countries are among the group of countries in the sub-region with the highest levels of poverty and income inequality, reflecting the pro-poor and non-inclusive nature of the strong economic growth recorded in West Africa upon the post 2000 period [17].

Table 1. Selected indicators of ECOWAS economies.

	1970					
	Population (million)	GDP per capita ($US)	Courant GDP (million $US)	Labor total productivity	contribution of TFP to growth (%)	Human capital index
Benin	2.9	111	322.1	221.0	11.2	1.09
Burkina Faso	5.6	80	450.1	161.5	53.4	1.01
Cabo Verde	0.3	270	72.9	861.6	..	..
Cote d'Ivoire	5.2	286	1500.9	799.7	15.2	1.04
Gambia, The	0.4	326	145.7	842.9	..	1.06
Ghana	8.6	546	4697.7	1532.9	..	1.27
Guinea	4.2	182	766.5	473.4	..	..
Guinea-Bissau	0.7	395	280.9	935.7	..	..
Liberia	1.4	223	316.5	223.4	..	1.14
Mali	5.9	54	320.4	196.0	..	1.03
Niger	4.5	95	426.8	228.6	51.8	1.01
Nigeria	56.0	427	23922.2	1057.4	4.2	1.15
Senegal	4.3	289	1231.8	1323.1	12.4	1.05
Sierra Leone	2.7	169	455.5	379.5	32.8	1.08
Togo	2.1	145	307.6	264.3	10.8	1.07

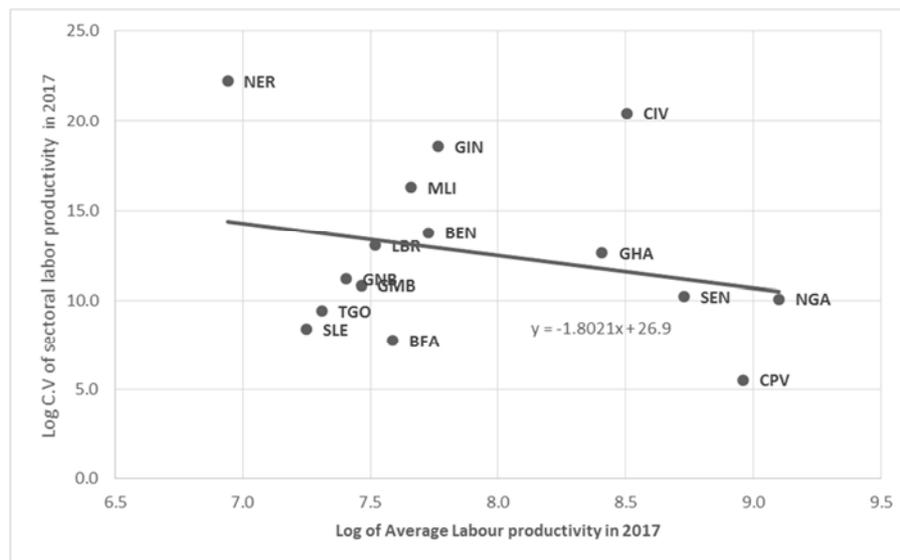|	2017							
	Population (million)	GDP per capita ($US)	Courant GDP (million $US)	Labor total productivity	contribution of TFP to growth (%)	Log C.V of sectoral labor productivity (%)	Human Capital index	GDP per capita annual growth
Benin	11.2	826	9236.4	2085.0	17.1	13.8	1.84	4.3
Burkina Faso	19.2	642	12324.8	1970.1	12.9	7.7	1.26	4.4
Cabo Verde	0.5	3245	1772.8	8564.5	..	5.5		5.3
Cote d'Ivoire	24.3	1566	38054.9	4822.9	15.8	20.5	1.66	3.6
Gambia, The	2.1	709	1489.5	2418.0	..	10.8	1.62	1.6
Ghana	28.8	2046	58996.3	4135.6	..	12.6	2.46	2.8
Guinea	12.7	803	10208.5	2266.5	..	18.6	..	3.1
Guinea-Bissau	1.9	724	1346.9	1840.0	..	11.2	..	1.3
Liberia	4.7	584	2762.6	1846.7	..	13.0	1.81	2.0
Mali	18.5	822	15235.8	2110.9	..	16.3	1.34	5.8
Niger	21.5	378	8120.0	867.0	21.0	22.2	1.21	2.9
Nigeria	190.9	1969	375769.7	5767.2	44.8	10.1	1.92	3.2
Senegal	15.9	1333	21126.1	4002.8	27.2	10.2	1.58	3.2
Sierra Leone	7.6	495	3739.6	1544.6	21.3	8.4	1.61	2.3
Togo	7.8	614	4785.9	1380.0	24.8	9.4	1.79	3.0

Source: Author's calculations and database PWT 9.1; www.ggdc.net/pwt.

The presence of a large labour productivity gap between sectors in an economy reflects the existence of high margins for labour productivity growth in all sectors of economic activity in West Africa. In other words, the process of economic development or sustainable productivity growth in a country should be accompanied by a reduction in sectoral labour factor productivity gaps, as shown in Figure 1. The negative relationship between the reduction of the inter-sector productivity gap (measured by the Log of the coefficient of variation of sector labour productivity) and the aggregate labour factor productivity in the economy, shows that ECOWAS economies are broadly in line with an upward convergence of inter-sector productivity, and thus towards a process of structural transformation of their economies. Although, the weakness of the slope of the overall trend could reflect the importance of the gaps despite their overall convergence with the reduction led by countries such as Cabo Verde, Nigeria, Ghana, Senegal, Côte d'Ivoire and to a lesser extent Burkina Faso. Niger has a level of sectoral productivity gap that is not conducive to increasing the productivity of its economy.

The migration of labour from low productivity sectors to high productivity sectors leads to an increase in aggregate productivity of the economy as a whole with a decrease in marginal products.

Source: Authors, 2019.

Figure 1. Relationship between the inter-sectoral productivity gap and income level in 2017.

As shows in [17], the post-2000 period, described as the gold period of economic growth in Africa in general and West Africa in particular, was sustained by the performance of the activity branch of transport, telecoms, construction and public works, trade (wholesale and retail) and other market services (restaurants and hotels), agriculture and manufacturing. Compared to the pre-2000 period, the post-2000 period was marked by a substantial change in the structure of the

ECOWAS economy with a repositioning in performance of the construction, telecoms and manufacturing branches of activity. Also, in addition to orchestrating sectoral restructuring, all branches of activity excelled in their growth performance in the post-2000 period: telecoms, construction, trade and other market services more than tripled their annual growth, while manufacturing and agriculture only doubled it (Figure 2).


Source: Based on authors calculations from UNSTAT, 2019.

Figure 2. ECOWAS average annual growth of sectoral aggregated value added, 1970-1999 and 2000-2017, percentage.

The sectoral performances recorded in the post-2000 period are partly explained by the growth in intra-sectoral productivity in line with the improvement of production technologies and innovations.

Moreover, efforts to improve the management of macroeconomic frameworks in many of the countries of the sub-region have also contributed to innovations in the various sectors of activity (Figure 3). Indeed, inflation and the average debt level have been reduced by more than half between the period before and after 2000. Fiscal and current account balances have generally started to improve, although structuring investment efforts in the countries of the region, coupled with the expansion of security spending in the Sahel countries, have increased budget deficits over the past five years.
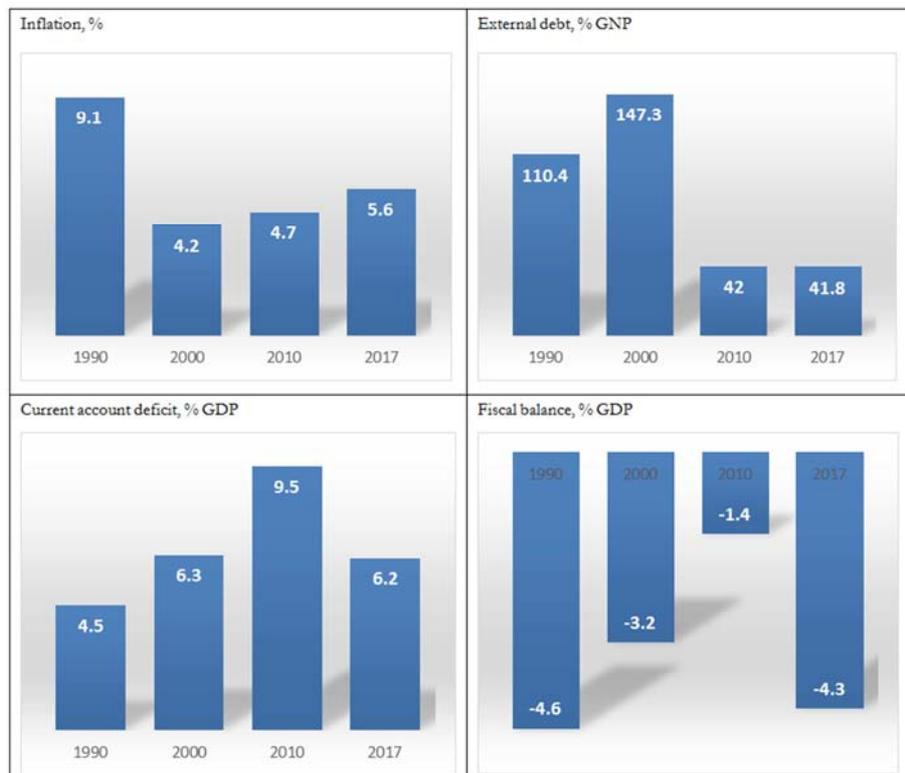
Source: Authors, based on WDI data, 2019.

Figure 3. Macroeconomic stability trend in ECOWAS.

2.2. Structural Change in Line with the Dynamics of Value Added, Employment and Sectoral Productivity

The analysis of the change in the contribution of sectoral value added to GDP and the sectoral distribution of employment over time facilitates assessment of the change in the structure of the economy, in favour or against a process towards the economic structural transformation ([19, 20]).

The post-2000 period was generally characterised by higher average annual growth rates (Table 2). This increase is more noticeable for the agricultural, industrial and services sector over the period 2000-2010 and for industry and services over the period 2010-2017. This trend confirms the results of [17], which showed the predominant role of the service sector (telecoms, retail trade and transport) and that of industry (mining, construction and public works) in the strong economic growth recorded by ECOWAS over the two last decades.

Moreover, there has been a trend, in recent years, towards strengthening the manufacturing in the economics activities of the sub-region, as evidenced by the increase in value added over the period 2010-2017 in almost all countries, except the Gambia and Liberia. What Ghana has achieved in terms of strengthening the manufacturing sector is quite illustrated in the Table 2 and Figure 4, both in terms of value added and employment.

This revitalization is partly due to the race towards emergence, initiated in recent years by the authorities of the subregion, with bold reforms and the implementation of measures to boost investor confidence and improve the business climate, including the facilitation and acceleration of procedures for creating small and medium-sized enterprises (SMEs), and the creation of financing opportunities, albeit they still remain at embryonic stages.

Table 2. Annual average growth of sectoral value added, percentage.

	1970-1990				1991-2000				2001-2010				2011-2017			
	AG	IND	SERV	MAN	AG	IND	SERV	MAN	AG	IND	SERV	MAN	AG	IND	SERV	MAN
Benin	2.9	3.4	2.6		4.8	3.5	4.2	5.3	3.1	0.1	4.9	-1.2	3.3	5.8	4.3	5.3
Burkina Faso	1.6	3.0	4.8	3.5	4.9	4.7	3.4	3.6	3.3	5.4	6.0	1.8	1.5	3.2	8.0	4.5
Cabo Verde					11.3	8.1	12.3	8.4	3.6	5.4	3.9	3.3	-1.7	2.1	1.9	3.1
Côte d'Ivoire													5.4	6.7	4.5	6.6
Gambia, The	2.0		3.9	5.4	3.4		3.9	1.1	3.0		3.5	2.3	0.5	4.3	3.1	-2.0
Ghana													2.9	5.6	5.1	2.8
Guinea									3.3	1.9	2.0		4.0	6.4	5.2	5.5
Guinea-Bissau									2.4	2.8	2.1		0.7	4.7	3.7	3.5
Liberia									4.0	15.0	14.6	5.4	-3.3	16.2	5.5	0.9
Mali	3.2	1.9	3.5		1.2	6.5	3.4		4.7	3.6	4.9		4.8	1.7	4.0	
Niger								2.6			2.5		5.8	9.2	4.8	10.1
Nigeria					3.0	0.0	2.9	-3.3	10.0	1.8	10.7	1.6	3.6	0.2	3.1	5.9
Senegal	0.5	2.8			2.2	3.5	2.9		3.7	3.8	3.9		6.0	5.1	4.7	3.9
Sierra Leone	6.0	2.3			-0.6	-2.5		-0.7	8.7	6.7	5.3	3.6	3.0	4.9	4.0	1.2
Togo	3.4	3.6	1.5		3.0	0.4	2.6	1.8	-0.6	8.7	0.8	1.6	5.4	-2.9	7.6	2.8

Source: Author's calculations, from WID, 2019.

In terms of the sectoral distribution of employment, agriculture remains the sector that absorbs most of the employment. Its proportion has moved on average from 59% in 1991 to 54% in 2017. This proportion reaches more than 67% in Guinea, Guinea-Bissau and Niger in 2017. Services are the second most important employment sector in the subregion. The proportion of that sector moved from 31% in 1991 to an average of 36% in 2017. The average share of employment in the subregion remained almost stable over the period at 6.5% for the manufacturing sector and 3.5% for the industrial sector.

This general overview of the evolution of employment distribution suggests the presumption of labour mobility from the agricultural sector to the predominantly informal service sector in the ECOWAS region. This presumption will be confirmed by an in-depth analysis on labour mobility.

A detailed analysis by country confirms the regional trend in intersectoral labour mobility. The share of employment in the agricultural sector has declined substantially in the four leading ECOWAS economies (Cote d'Ivoire, Ghana, Niger and Senegal). This decrease could be offset by an increase in the service sector.

Burkina Faso and Ghana have a specifically similar situation in terms of intersectoral labour mobility: a contraction in agriculture of 3.6% and 3.1% respectively, with an annual average increase in the manufacturing sector of 5.3% and 7.1% respectively over the 2012-2017 period (Table 3). The trend is also observed over the period 2001-2010 for Burkina Faso. In addition, Sierra Leone has the highest level of mobility towards its manufacturing sector in the post-2000 period: an annual average increase of 15.3% over the period 2001-2010 and 9.0% over the period 2011-2019.

Apart from Côte d'Ivoire, which faced a decade of socio-political crisis, and Mali, where the insecurity could partly justify their poor performance, all ECOWAS countries recorded an increase in employment in the manufacturing sector in the post-2000 period, which could be due to a contraction or slowdown in the flow of jobs in the agricultural sector. Efforts in the subregion on industrial and trade reforms

as well as on strengthening regional integration and financial development in the post-2000 period are, inter alia, initiatives

that could strengthen this sectoral change.
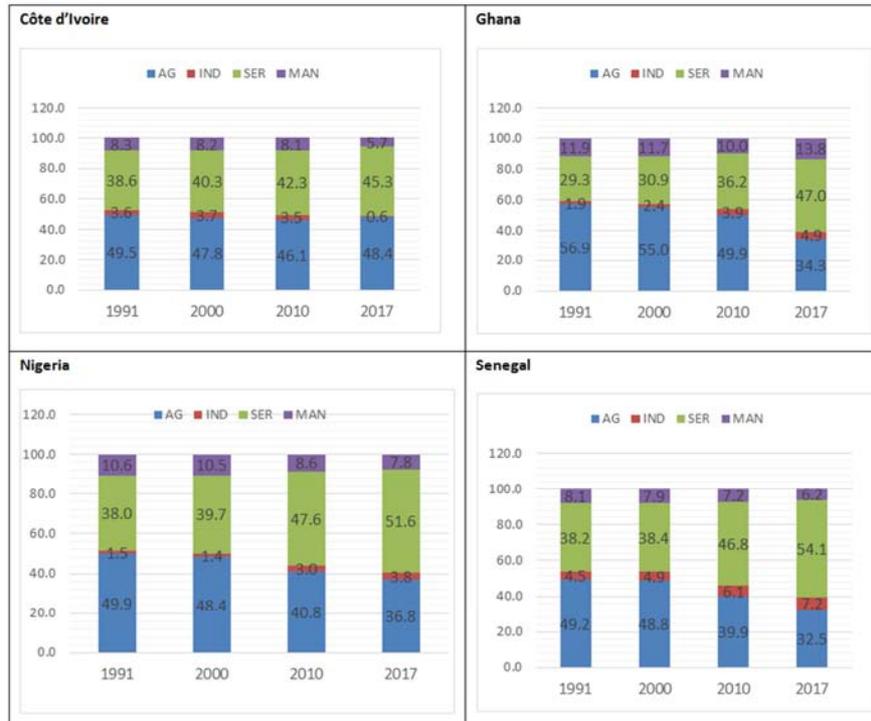
Source: Authors, from ILO database, 2019.

Figure 4. *Dynamics of the distribution of sectoral employment in the ECOWAS region, percentage.*

Table 3. *Annual average growth of employment by sector, percentage.*

	1991-2000				2001-2010				2011-2017			
	AG	IND	SERV	MAN	AG	IND	SERV	MAN	AG	IND	SERV	MAN
Benin	2.4	5.4	2.6	5.9	2.5	3.2	3.4	1.7	2.2	4.3	3.2	3.1
Burkina Faso	0.9	13.0	7.4	8.3	-3.2	19.9	9.8	9.7	-3.6	8.7	4.5	5.3
Cabo Verde	0.4	6.5	3.6	0.6	1.1	5.7	3.5	1.7	1.0	1.0	2.3	2.1
Cote d'Ivoire	2.6	3.1	3.4	2.9	0.6	0.5	1.3	0.8	3.1	-21.3	3.8	-2.6
Gambia, The	2.8	3.2	2.4	2.4	3.3	2.6	3.3	3.0	2.6	4.2	3.2	2.7
Ghana	1.6	4.3	2.5	1.8	1.5	7.4	4.1	1.0	-3.1	3.9	5.1	7.1
Guinea	3.1	4.5	3.0	3.2	1.8	1.6	2.3	3.8	2.0	7.0	2.8	2.4
Guinea-Bissau	2.0	-2.4	1.7	3.0	2.6	3.8	2.3	2.3	2.5	3.1	2.8	3.2
Liberia	3.7	3.1	3.7	2.1	3.3	2.4	2.9	2.6	2.4	2.6	2.6	2.5
Mali	2.0	3.6	2.7	3.2	2.5	4.1	3.1	3.2	1.9	0.1	3.5	-2.3
Niger	3.6	0.8	2.5	2.1	3.1	4.8	3.4	3.7	3.0	5.9	3.8	4.7
Nigeria	2.0	2.2	2.7	2.3	0.7	10.2	4.0	0.4	0.8	4.2	3.1	0.8
Senegal	2.4	3.4	2.5	2.3	-0.3	4.0	3.7	0.2	0.2	4.9	4.4	0.7
Sierra Leone	1.6	-3.3	-1.4	-4.0	1.8	-0.2	5.1	15.3	0.8	-1.1	3.3	9.0
Togo	2.8	2.5	3.3	2.1	2.5	3.1	2.2	2.1	1.6	3.7	2.9	2.9

Source: Author calculations from ILO database, 2019.

The analysis of sectoral productivity dynamics should strengthen our perception of the existence of a manifestation of structural transformation in almost all ECOWAS countries, it being understood that migration takes place from less productive to more productive sectors.

Labour productivity in the industrial sector is by far the highest in the subregion, followed by manufacturing and the service sector. On the other hand, the agricultural sector, which absorbs more than half of employment, has the lowest labour productivity. Aggregately, the leading economies in the

subregion (Nigeria, Ghana, Côte d'Ivoire and Senegal), plus Cabo Verde, have the highest levels of labour productivity over all periods of analysis. Niger, on the other hand, recorded the lowest aggregate productivity.

The dominance of the industrial sector in terms of labour productivity is linked to its highly capital-intensive nature, especially in the mining, oil and gas industry. Indeed, the mining sector is known for its very low level of job creation in Africa. This limits the potential of the diffusion of the positive effects of its productivity throughout the overall economy,

resulting in low structural change gains compared to the manufacturing sector [21].

Table 4. Annual growth in aggregate labour productivity by sector, percentage.

	1991-2000					2001-2010					2011-2017				
	AG	IND	SERV	MAN	Total	AG	IND	SERV	MAN	total	AG	IND	SERV	MAN	Total
Benin	2.3	-1.8	1.6	-0.6	1.2	0.6	-3.0	1.5	-2.8	-0.3	1.1	1.4	1.1	2.1	1.7
Burkina Faso	4.0	-7.4	-3.7	-4.3	2.2	6.7	-12.1	-3.5	-7.2	2.9	5.3	-5.1	3.3	-0.8	2.6
Cabo Verde	10.9	1.5	8.4	7.7	7.9	2.4	-0.2	0.4	1.5	0.9	-2.7	1.0	-0.4	1.0	-0.2
Cote d'Ivoire	…	…	…	…	…	…	…	…	…	…	2.3	35.7	0.7	9.5	2.8
Gambia, The	0.6		1.4	-1.2	0.9	-0.4		0.1	-0.6	1.3	-2.1	0.1	-0.1	-4.6	-0.5
Ghana	…	…	…	…	…	…	…	…	…	…	6.2	1.6	0.1	-4.0	2.7
Guinea	…	…	…	…	…	1.5	0.2	-0.3	…	1.3	2.0	-0.6	2.3	3.0	2.9
Guinea-Bissau	…	…	…	…	…	-0.3	-1.0	-0.2	…	0.9	-1.7	1.6	0.8	0.3	…
Liberia	…	…	…	…	…	0.6	12.3	11.4	2.7	5.2	-5.6	13.4	2.8	-1.6	0.7
Mali	-0.8	2.8	0.7		1.0	2.2	-0.5	1.8	…	1.7	2.8	1.6	0.5	…	1.6
Niger	…	…	0.1	…	-0.7			-0.9	…	9.7	2.7	3.1	0.9	5.2	2.9
Nigeria	1.0	-2.1	0.1	-5.5	-1.4	9.2	-7.6	6.4	1.2	4.5	2.8	-3.8	0.0	5.0	0.7
Senegal	-0.3	0.0	0.3		0.3	4.0	-0.2	0.1	…	3.7	5.8	0.1	0.3	3.2	2.1
Sierra Leone	-2.1	0.8	…	3.4	-1.3	6.8	7.0	0.2	-10.2	4.3	2.2	6.1	0.7	-7.1	1.7
Togo	0.2	-2.0	-0.7	-0.3	-0.4	-3.0	5.4	-1.4	-0.5	-1.1	3.7	-6.4	4.5	-0.1	2.8

Source: Author's calculations from ILO and WDI databases, 2019.

Over the post-2000 period, high levels of annual average growth rates in aggregate labour productivity were recorded (in order of importance) by Liberia, Nigeria, Sierra Leone, Senegal, Ghana, Burkina Faso and Guinea. All these countries have quite a similar economic model: focusing on natural resources such as oil, mining and gas. Industry and agriculture sectors were the largest contributors to aggregate labour productivity growth over this period, and more or less the manufacturing sector (Table 4).

Before 2000 period, for countries where data are available, Cabo Verde recorded the highest annual average increase in aggregate labour productivity, with significant contributions from the services and manufacturing sectors. These performances earned it upgrading in the group of middle-income countries in 2008.

An analysis targeting the four leading ECOWAS economies confirms the structural dominance of labour productivity in the industrial sector compared to other sectors of activity. However, there is a trend towards higher labour productivity in the agricultural and manufacturing sector. This trend in the post-2000 period can be clearly seen in Ghana, Senegal, Nigeria, Côte d'Ivoire and Burkina Faso.

The trend towards increased productivity in manufacturing in ECOWAS economies over the post-2000 period could express the gradual establishment of a structural transformation process through an ongoing development of manufacturing sector activities. This perception will be confirmed later by the analysis of the decomposition of labour productivity into "intra-sectoral change effect" and "intersectoral change effect".

However, with regard to the trend towards increased productivity in the agricultural sector, there is a need for further analysis to understand this change. Two combined effects could account for this change. The first is the improvement of technicality and the development of intelligent agriculture in agricultural production methods. This strong hypothesis is evidenced by the increase in total factor productivity demonstrated earlier. The second is the gradual increase in capital intensity in the agricultural sector, in particular through the mechanization and modernization of

farming techniques and the progressive development of agribusiness in the subregion, although the start of this new economic dynamic is still very timid.

Moreover, the new trend in the world economy in the post-2000 period, particularly under the influence of the positive effects of economic globalization, has generated positive externalities for African economies in general and ECOWAS economies in particular. Indeed, the rise in global commodity prices (including food) coupled with the trend towards macroeconomic and political stability in the region increasingly encouraged local and foreign investors to invest in agribusiness [14]. As a result, this new dynamic has led to an increase in agricultural productivity in line with the increase in capital intensity in this sector. The increase in capital intensity in agricultural production is confirmed in almost all countries [2] of ECOWAS (Table 5), notably in Burkina Faso, Côte d'Ivoire, Ghana, Mali and Nigeria.

Table 5. Dynamic of capitalistic intensity in agriculture sector in ECOWAS.

Country	1995	2000	2010	2016
Benin	23.2	35.7	20.4	36.3
Burkina Faso	11.4	21.7	62.9	115.1
Cabo Verde	225.0	442.6	596.3	559.4
Côte d'Ivoire	95.7	88.2	138.5	154.1
Gambia, The	…	…	…	..
Ghana	66.8	105.3	149.3	180.1
Guinea	20.9	18.9	57.3	146.2
Guinea-Bissau	…	…	…	..
Liberia	33.6	41.1	37.5	74.6
Mali	19.1	24.7	55.8	109.9
Niger	18.6	14.5	20.6	12.7
Nigeria	52.3	54.5	184.6	189.8
Senegal	…	…	…	..
Sierra Leone	23.8	20.5	36.5	46.2
Togo	41.4	40.7	36.5	46.9

Source: Author's calculations, from FAO and ILO databases, 2019.

2 Analysis based on countries where data are available.

2.3. Structural Change by Labour Mobility

Productivity growth in an economy can come from three sources, the first two of which are the most important. First, through increasing intra-sectoral productivity by capital accumulation, technological change and the exploitation of economies of scale. This source is referred to as an intra-sectoral productivity effect or direct effect. Secondly, through the mobility of workers from low productivity sectors to higher productivity sectors. This channel is called the structural change effect or reallocation effect. Third, through a change in the relative prices of production between the different sectors. The effects of the last channel on aggregate productivity growth in the economy are very marginal ([21, 4]). These two main effects are estimated through the decomposition of aggregate labour productivity growth. This decomposition is done using the shift-share method also called the Shapley method used by [4] and estimated through the expression below.

$$\Delta Y_t = \sum_{i=1}^{n} \theta_{i,t-k}\, \Delta y_{i,t} + \sum_{i=1}^{n} y_{i,t}\, \Delta \theta_{i,t}$$

Where Y_t et $y_{i,t}$ refer to aggregate and sectoral labour productivity respectively with $\theta_{i,t}$ denoting the share of labour in sector i in period t. $\Delta y_{i,t}$ et $y_{i,t}\Delta$ refer to the change in productivity and employment share between period t-k and t respectively.

The results of the decomposition of aggregate labour productivity growth in each of the ECOWAS country where data are available are presented in Table 6.

Table 6 analysis shows that in the post-2000 period, eight countries of ECOWAS record a positive contribution of structural change to aggregate productivity growth. Contributions are highest in Ghana, Guinea, Burkina Faso, followed by Nigeria and Senegal. This dynamic confirms the gradual increase in employment and productivity in the manufacturing sectors in these countries over the post-2000 period, reflecting the mobility of workers from the agricultural sector to the manufacturing sector, although the extent of this migration remains low for the time being. With the momentum of ongoing industrial and trade reforms in the subregion towards the creation of emerging economies, one might expect a strengthening of the process of the economic structural change over the next decade in the subregion. This trend bodes for a promising future in making good progress towards achieving the Sustainable Development Goals, particularly in Goals 1, 8 and 9.

Table 6. Decomposition of productivity growth into intra-sectoral growth effect and in structural change effect, percentage.

	1991-2000			2000-2010			2010-2017		
	intra-sectoral change	structural change	Productivity growth	intra-sectoral change	structural change	Productivity growth	intra-sectoral change	structural change	Productivity growth
Benin	0.4	0.8	1.2	-0.4	0.3	-0.2	1.3	0.4	1.7
Burkina Faso	-2.3	4.5	2.2	-3.9	6.8	2.9	1.5	1.2	2.7
Cabo Verde	7.1	0.8	7.9	0.2	0.3	0.5	-0.1	0.0	-0.1
Cote d'Ivoire	…	…	..	…	…	…	10.6	-8.9	1.7
Gambia, The	…	…	..	…	…	…	-1.4	0.1	-1.3
Ghana	…	…	..	…	…	…	2.5	1.3	3.8
Guinea	…	…	..	…	…	…	1.4	1.5	2.9
Guinea-Bissau	…	…	..	…	…	…	0.9	0.3	1.2
Liberia	…	…	..	4.5	0.0	4.5	1.2	0.1	1.3
Mali	…	…	..	…	…	..	…	…	..
Niger	…	…	..	…	…	..	1.7	0.6	2.3
Nigeria	-1.4	0.0	-1.4	2.0	2.4	4.4	0.3	0.7	1.0
Senegal	…	…	..	…	…	..	1.1	0.7	1.8
Sierra Leone	…	…	..	…	…	..	2.1	0.0	2.1
Togo	-0.5	0.1	-0.4	-1.4	0.0	-1.4	2.7	0.2	2.9

Source: Author's calculations.

Moreover, labour productivity growths within sectors (intra-sectoral effect) contributes significantly to improving productivity in all ECOWAS economies. This is potentially due to capital accumulation, coupled with the effects of changes in production technologies, particularly in agricultural, service and manufacturing production, as reflected in the substantial level of TFP contribution to economic growth in many ECOWAS countries. Table 7 presents a ranking of countries by level of contribution in terms of intra-sectoral effect and structural change effect. The Ghana confirms its emerging position both in terms of structural change and technology innovation of the production systems.

Table 7. Ranking of countries by level of components of labour productivity growth over the period 2010-2017, percentage.

Rank	Country	Intra-sectoral effect (%)	Rank	Country	Structural change effect (%)
1	Cote d'Ivoire	10.6	1	Guinea	1.5
2	Togo	2.7	2	Ghana	1.3
3	Ghana	2.5	3	Burkina Faso	1.2
4	Sierra Leone	2.1	4	Nigeria	0.7
5	Niger	1.7	5	Senegal	0.7

Rank	Country	Intra-sectoral effect (%)	Rank	Country	Structural change effect (%)
6	Burkina Faso	1.5	6	Niger	0.6
7	Guinea	1.4	7	Benin	0.4
8	Benin	1.3	8	Guinea-Bissau	0.3
9	Liberia	1.2	9	Togo	0.2
10	Senegal	1.1	10	Gambia, The	0.1
11	Guinea-Bissau	0.9	11	Liberia	0.1
12	Nigeria	0.3	12	Cabo Verde	0.0
13	Cabo Verde	-0.1	13	Sierra Leone	0.0
14	Gambia, The	-1.4	14	Cote d'Ivoire	-8.9

Source: Author's calculations from ILO and WDI, 2019 databases.

In the aim to confirm the trend towards the contribution of structural transformation to economic growth in West Africa, notably in Ghana, Nigeria and Senegal, we will deepen our analysis by focusing on labour mobility dimension. We assume that in the context of structural change enhancing economic growth, the direction of labour migration is positively correlated (at the end of the period) with labour productivity in each sector. In Côte d'Ivoire's specific case, labour mobility negatively impacts aggregate productivity, and therefore deserves more in-depth analysis of production sectors in terms of branches of production to understand the real causes.
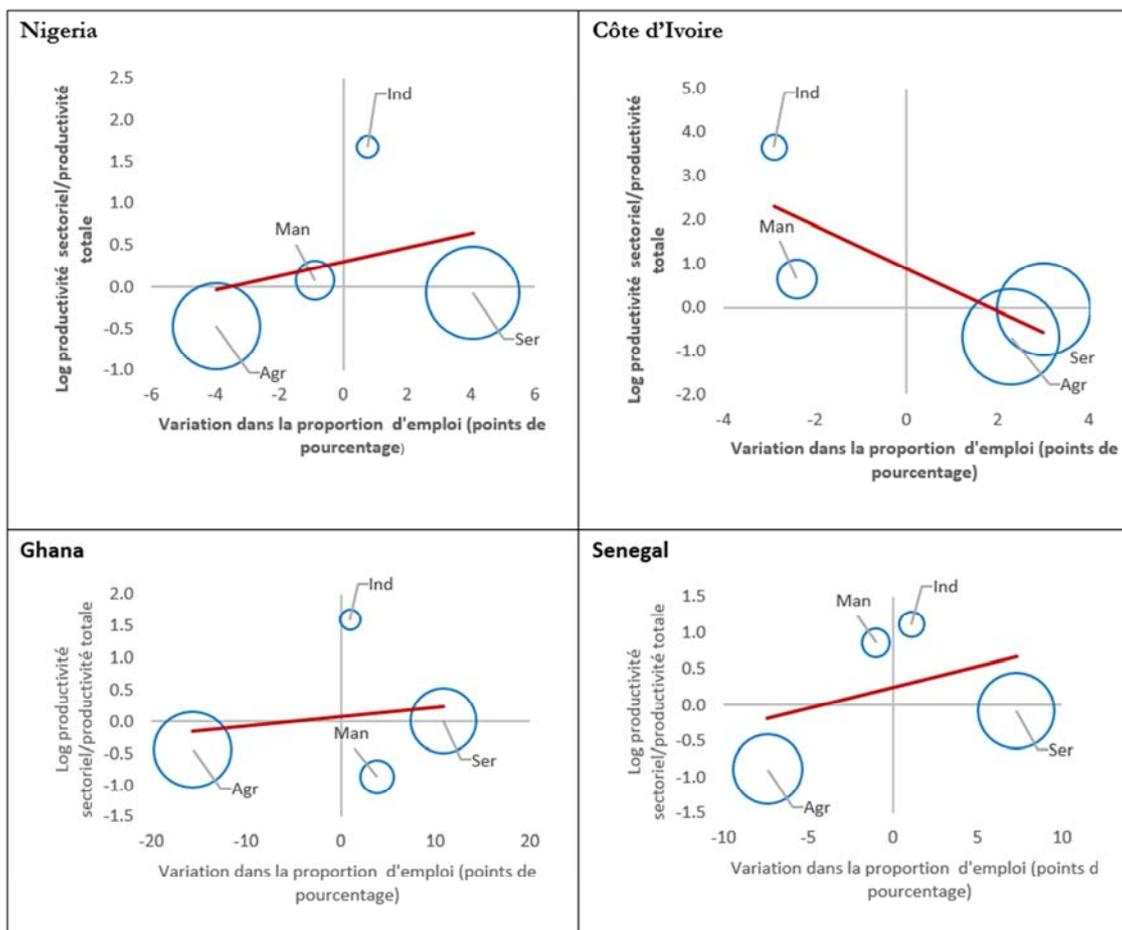
Source: Author's calculations, 2019

Source: Author's calculations, 2019.

Figure 5. Correlation between sectoral productivity and change in sectoral shares of employment.

Analysis of the graphs in Figure 5 shows a positive correlation between the direction of intersectoral labour migration and the increase in sectoral labour productivity in West Africa, particularly in Ghana, Nigeria and Senegal, with the specific situation of Côte d'Ivoire confirmed.
The country-by-country analysis shows that in Nigeria and Ghana, the services sector has taken in the most workers from the agricultural sector. There is also labour mobility from the agricultural sector to the manufacturing sector, although it remains lower compared to the service sector. The agriculture sector recorded a sharp contraction in its workforce over the period 2010-2017. Despite the positive influence of the

reallocation of work on economic growth, Senegal's situation is slightly different, because in addition to the agricultural sector, the manufacturing sector has also suffered a loss of workers, primarily in the service sector and then in industry. The development of the telecom, finance, transport, hotel and retail sectors, which are predominantly informal, and that of mining and petroleum products over the last decade could justify Senegal's situation for the service and industrial sectors respectively.

The situation of Côte d'Ivoire is counter-intuitive because the industrial and manufacturing sectors have experienced a contraction in the number of workers, while the agriculture and services sectors have benefited more from worker mobility, receiving a larger workforce. This could exacerbate the decline in productivity in the agricultural sector as the sector is known for its low productivity. This could be partly explained by the strong expansion of rubber and cashew nut cultivation in the last decade for the agricultural sector, telecoms and retail trade, which are particularly dominated by the informal sector.

2.4. Structural Transformation and Economic Diversification

Structural transformation is a continuous and sustainable process, driven by industrial and manufacturing activities development through the diversification and sophistication of exported products.

Diversification impacts income via two main channels [7]. First, diversification is considered as a factor of production which induces an increase in the productivity of labour and capital. Second, it allows investment risk sharing across several portfolios. In other words, better diversification will lead to an improvement in average capital productivity in the long term by offering investment opportunities at low risk. Lack of diversification will lead economic operators to invest in traditional, secure, low-yield projects, rather than in modern, risky projects with high growth potential. The absence of risk sharing opportunities by investing in diversified, high-growth portfolios will tend to inhibit capital productivity in the short term and capital accumulation in the long term. [6] argue that a country's level of product and export sophistication is a function of its economic growth and level of development. In other words, a country cannot produce a good for which it does not have the technology and expertise. This puts learning, skills and technological change in production systems at the centre of the structural transformation process, notably in terms of modernizing agriculture to support the development of a productive and competitive industrial and manufacturing fabric.

The level of sophistication of a country's exported products determines the level of complexity of its economy. This complexity is in turn linked to the multiplicity of knowledge that has been used to produce exported goods. The combination of goods manufactured and exported by a country can serve as a vector for tracking the complexity of the economy. The Economic Complexity Index [3] (ECI) developed by the Centre for International Development at Harvard University provides an insight into the level of economic complexity of a country. It measures the relative knowledge intensity of an economy by taking into account the knowledge intensity used in the manufacture of exported goods.

The leading economies of the subregion (Côte d'Ivoire, Ghana, Nigeria, Senegal), in line with the structural change efforts previously demonstrated, recorded an increase in the number of products exported in the post-2000 period (Figure 6). In addition to these leading ECOWAS economies, the diversification efforts also recorded in Benin, Burkina Faso, Guinea, Mali and Togo corroborate the possibility of structural transformation demonstrated in these countries, particularly through phased development of the manufacturing and industrial sector.

In terms of economic complexity, reflecting the level of sophistication of manufactured and exported goods, there is a trend towards sophistication of exported goods by the subregion's economic leaders, as part of export diversification and structural transformation efforts (Figure 7). Senegal, Ghana and Côte d'Ivoire stand out in the group, but much work remains to be done by the leading economies of the subregion to converge towards the performance of emerging economies as illustrated here by the level of economic complexity of India and Brazil.

In sum, since the beginning of the post-2000 period, most ECOWAS countries have recorded a beginning of economic structural change, characterized by the beginning of labour mobility in favour of the gradual establishment (albeit slow) of an increasingly productive and employment attractive manufacturing sector. This trend, given the potential bonus of structural transformation in the manufacturing sector, has certainly contributed to the era of strong economic growth in the subregion over the past decade. Apart from the dominance of informal activities in the services sector, the high mobility of workers towards the services sector would also be supported by the high profitability of the financial and telecom sector, which has also experienced remarkable growth in most countries of the subregion in the post-2000 period. To this end, Ghana, Nigeria, Senegal, Burkina Faso and Guinea are the economies that have made significant progress. Their efforts in changing their economic production structure are also perceived through their tendency to the diversification and the sophistication of manufactured and exported goods. These results back up those of ([9, 1, 7]).

The thorny issue and challenge to be addressed is the enhancing the skills and qualifications of this labour force that is migrating to the manufacturing and services sector, hence the eternal challenge of human capital in the continent in general and in ECOWAS countries in particular. Moreover, the trend towards an increase in capital intensity in agriculture reflects an increase in investment in this sector, which augurs well for the modernization of agriculture in West Africa in
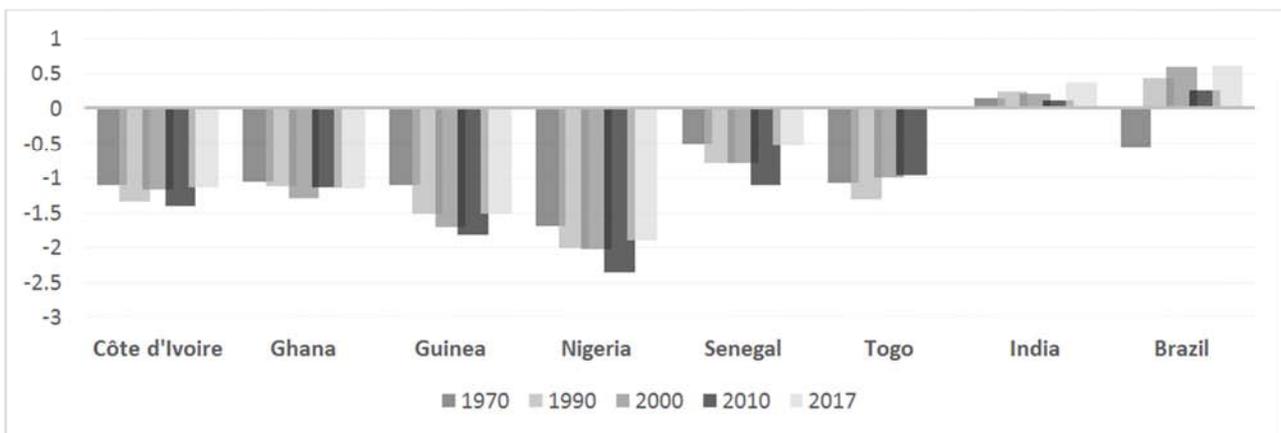
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3 https://oec.world/en/rankings/country/eci/.

accordance with the African Union's Maputo Declaration in 2003 and the Malabo Declaration on Agriculture and Food

Security in 2014.
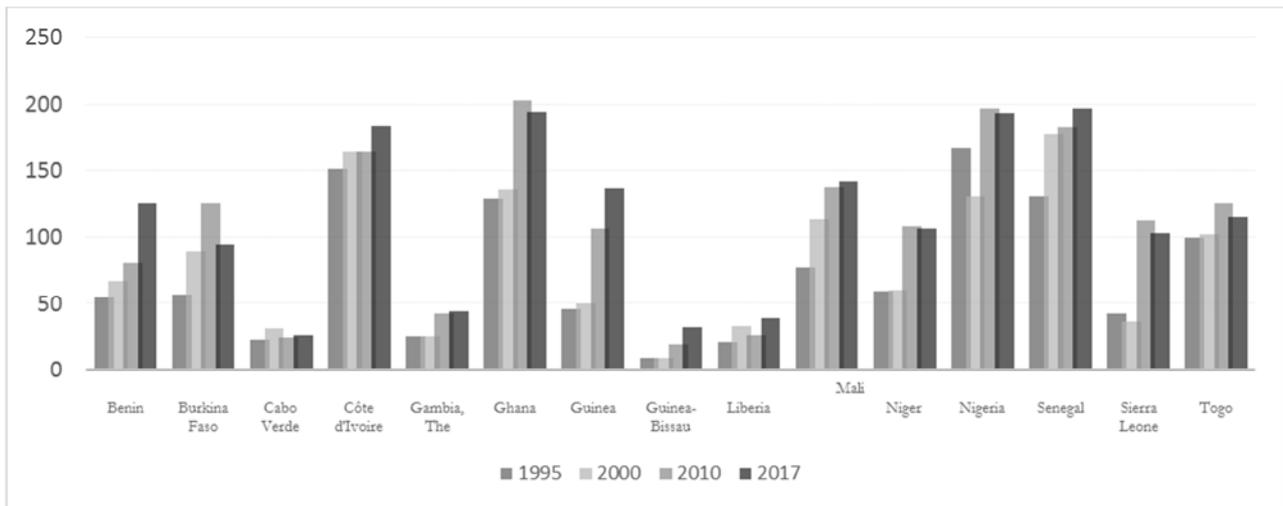
Source: Author, from UNCTAD, 2019

Figure 6. Dynamic in number of goods exported, by unit.

Source: Author, from the Center for International Development data, Harvard University; http://atlas.cid.harvard.edu/rankings/, consulted on 26 July 2019.

Figure 7. Trend in the economic sophistication index of ECOWAS economies (where data are available).

3. Empirical Analysis of the Structural Transformation Process of the Economy

This section, which focuses on the use of quantitative analysis tools and methods, aims to improve and fine-tune the findings from the stylized facts analysis developed in the first part of this paper. Emphasis is placed on time series econometric analysis in panel data based on available data.

3.1. Econometric Approach and Data

The specification of our econometric analysis model based on exploratory regressions is drawn from three main sources:

[11] On the estimation of structural transformation coefficients by regressing per capita income on sectoral value added and employment over the 1950-1983 period based on panel data from 108 countries (including 38 African countries);

[9] On the estimation of determinants that contributed to structural transformation over the period 1990-2005 using panel data from 38 countries (including nine African countries);

Our knowledge of the structure of ECOWAS economies.

Our specification tempts to answers two research questions: (i) what is the profile and extent of the beginning of the process of structural transformation in ECOWAS countries? (ii) What are the main determinants that contribute to strengthening the structural transformation process in ECOWAS countries?

This quantitative approach, which aims to confirm or refute the preliminaries answers to the afore-mentioned research questions derived from the stylized facts analysis, focuses on the regression of the following equation:

$$LnX_{it} = \alpha_i + \beta LnPIB_{it} + \delta LnZ_{it} + \varepsilon_{it}$$

Where $X_{i,t}$ is value added and sectoral employment (agriculture, industry, service and manufacturing) of country i at time t, $PIB_{i,t}$ denoting the per capita income of country i at time t and $Z_{i,t}$ referring to a vector of variables that are potentially determinant to strengthening the structural transformation process of country i in period t. The variables of this vector also act as a control variable of the model. The individual (v_i) and time-specific effects (u_t) are captured by the perturbation or error term $\varepsilon_{i,t}$ with $\varepsilon_{i,t} = v_i + u_t$. The parameter β refers to the coefficient of the structural change, the sign and magnitude of which make it possible to assess the traceability of the structural transformation and its extent respectively. Since the equation is a log function, β and δ are parameters analyzed in terms of elasticities with α_i, which refers to the constant term associated with country i in the case of estimates in individual time series. The parameters estimated in panel data analysis are weighted averages (by the variance of the explanatory variables) of the estimates in individual time series.

The available data cover the 15 ECOWAS countries for the period 1990-2017. Most of the data comes from the United Nations databases (UNSTAT) and the World Bank's World Development Indicators (WDI). The variables of the parsimonious model and their measurement used in the regressions are presented in the appendix table A1.

The vector of dependent variables could be strictly limited to sectoral employment shares (agriculture, industry, manufacturing and services) in order to capture the direction and scope of cross-sectoral migration of labour. However, additional regressions on sectoral value added are intended to ensure that the results converge with the regressions on sectoral employment.

The coefficient β associated with our variable of interest, which is per capita income, measures the effect of structural change. Regarding the agricultural sector, a negative β sign would mean that an increase in per capita income would result in a decrease in GDP or employment in the sector. This could mean that reallocation of labour factor from the agricultural sector to another, more productive sector led to the decline in agricultural value added or employment. This other sector could be the industrial or manufacturing sector if at the same time β in the case of the regression of the industrial or manufacturing sector is positive. In the context of ECOWAS zone economies, a negative β sign could be potentially expected for the agricultural sector in order to confirm the traceability of a beginning mobility of employment from agriculture to manufacturing and services sectors.

For regressions in industry and services, one would expect a positive β sign following the increase in per capita income. This stems from the strong contributive dynamism to growth in activities relating to natural resources, construction, retail trade, telecoms and transport in the post-2000 period, previously demonstrated.

The usage variables related to exports and imports of goods and services in the parsimonious model aim the regression on the industrial and manufacturing sectors for imports and regression on agriculture for exports. Imports variable aim to capture the impact of imported products competition on industrial and manufacturing development in ECOWAS zone [9].

Moreover, considering the important role technology transfer plays in increasing productivity through innovation and know-how, and thus in strengthening the structural transformation process of the economy, notably in all four sectors of economic activity, we introduce foreign direct investment (FDI) as a channel for the transmission of technology and know-how in production.

***Table 8.** Statistical descriptions of variables in the parsimonious model.*

Variables	Unit	Average	Standard deviation	Obs.	Min.	Max.
GDP per capita	US $	814.43	523.17	216	271.69	2563.09
Agriculture value added	% GDP	31.09	10.71	216	13.16	60.28
Industry value added	% GDP	21.38	6.63	216	4.56	38.81
Value added in manufacturing	% GDP	11.33	6.08	216	1.53	26.06
Services value added	% GDP	41.02	8.98	216	12.44	62.12
Share of agriculture employment	% of total employment	53.14	15.60	216	29.20	89.10
Share of industry employment	% of total employment	3.58	2.70	216	0.50	16.30
Share of manufacturing employment	% of total employment	9.07	4.83	216	0.40	17.30
Share of services employment	% of total employment	34.21	11.69	216	7.60	54.10
Goods & services imports	% GDP	32.38	11.28	216	9.51	68.32
Goods & services exports	% GDP	24.88	10.16	216	7.84	53.82
Human capital index	N/A	1.41	0.23	216	1.03	1.92
FDI	% GDP	2.46	3.80	216	-2.14	32.30
Investments (FGCF)	% GDP	15.19	7.15	216	2.04	32.74
Total factor productivity	N/A	0.98	0.15	216	0.43	1.37

Source: Author's calculations.

Regarding the choice of the appropriate estimators, the Ordinary Least Squares (OLS) is mainly used. However, in order to ensure the robustness, stability and convergence of the parameters estimated by OLS, the Generalized Moments Method (GMM) is concomitantly used as a control estimator. The GMM estimator has the advantage of correcting endogeneity biases, it being understood that variables such as GDP per capita, human capital and FDI modeled here as exogenous variables for analysis purposes are potentially determined as endogenous variables, both economically and statistically.

In the case of this research, past values (lagged variables) of all explanatory variables in each model, considered effective in correcting endogeneity biases, were used as instrumental

variables with the GMM estimator. The introduction of instrumental variables with the GMM estimator makes also possible to absorb the effects of possible correlation on the one hand between the explanatory variables and the terms of errors and on the other hand between the terms of error. The GMM estimator also has the specificity of revealing the structural parameters of the economy. In addition, the specificity of GMM as a first difference estimator, ensure regressions on stationary variables. Moreover, the equations were transformed with the Logarithm function to ensure that the heteroscedasticity effects of the residuals were eliminated, and the impacts captured through elasticities for easy interpretation and analysis.

3.2. Results

The regressions whose results have been presented in the tables below were calculated by ensuring the compliance of the elementary assumptions associated with the error terms, notably the homoscedasticity of residuals by the logarithmic transformation of the variables. The autocorrelation effects between residuals on the one hand and between residuals and regressors on the other hand as well as endogeneity effects were taken into account.

Since we are working on panel data and because the control of unobservable differentiated phenomena of each individual (country) over time is complex in reality, we have chosen to isolate unobservable effects related to the characteristics peculiar to each individual (country) over time by modeling both the individual (country) and the time dimension ($\varepsilon_{i,t} = v_i + u_t$) with fixed effects. The random effects modeling does not change the results because we are more interested in estimating the parameters associated with the regressors than in estimating the constant terms in each equation.

Moreover, since the panel data analysis has a time series component, taking into account the phenomenon of stationarity variable helps to improve the quality of the results from the regressions. The Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) unit root tests were used for the stationarity analysis of the variables. As a result, the first difference of the variables relating to the share of sectoral employment (agriculture, industry, manufacturing and services), value added in the manufacturing and service sectors, GDP per capita and exports of goods and services are stationary at first difference. The remaining variables used in the modeling, such as value added in the agricultural and industrial sectors, imports of goods and services, human capital and FDI are stationary at level (see Unit Root Test in the appendix Table A2). The various regressions whose results are presented below take into account these individual characteristics of the variables.

Since we are interested in analyzing a long-term phenomenon called structural transformation, it will not be appropriate to estimate an error-correction model. Given the very marginal influence of the 1991-2000 sub-period on the regression results over the entire analysis period (1990-2017), it was not appropriate to present and analyze the results of the sub-periods 1990-2000 and 2000-2017.

Econometric estimations confirm the beginning of structural transformation process in ECOWAS zone economies. This is shown by the negatively significant sign of the parameter β, which measures structural change in relation to per capita income. The increase in per capita income was accompanied by a significant and high magnitude of decline in employment in the agricultural sector (columns 1). The robustness and the stability of the results is reflected in the convergence of the parameter β estimated with OLS and GMM estimators. The results from the regression of the effects of the increase in per capita income on the share of employment in the agricultural sector converge with the results of the regressions on agricultural value added (columns 2). These results are consistent with those of [9].

Moreover, exports of ECOWAS countries, which consist almost entirely of agricultural commodities and are considered as export-oriented employment, have a significantly negative impact on employment creation. Processing agricultural products into finished or semi-finished products locally has a two-fold benefit: job creation through the development of the industrial sector in general and manufacturing in particular, and the export of processed products with higher added value and, in turn, the creation of individual and national wealth. In this regard, exporting primary products negatively affects the economy in terms of job creation and in terms of individual and national income increasing.

Also, the current increasingly development of agribusiness in ECOWAS subregion has attracted foreign direct investment, resulting in a significantly positive influence on employment, albeit this influence remains very low in terms of scope because of the limited characteristic of FDI financing for agribusiness development. This gradual attraction of FDI by the agricultural sector also stems from the increasingly capital-intensive characteristic of agricultural development activities, demonstrated earlier in this paper (Table 5). These results should encourage political and development actors to intensify their efforts and actions to promote agribusiness through the implementation of incentive reforms that would attract investors and foreign capital.

Table 9. Results of regressions on the agricultural sector.

Dependent variable: Employment in agriculture (1) value added in agriculture (2)				
	OLS		**GMM**	
	(1)	**(2)**	**(1)**	**(2)**
GDP per capita	-0.52 (0.06)*	-0.29 (0.09)*	-0.60 (0.07)*	-0.36 (0.10)*
Exports	-0.14 (0.03)*	0.0006 (0.04)	-0.16 (0.04)*	0.03 (0.05)
Human Capital	0.21 (0.23)	-0.06 (0.34)	0.48 (0.28)***	0.02 (0.37)

Dependent variable: Employment in agriculture (1) value added in agriculture (2)				
	OLS		GMM	
	(1)	(2)	(1)	(2)
FDI	0.004 (0.002)**	0.004 (0.003)	0.01 (0.004)*	0.007 (0.006)
Constant	7.77 (0.34)*	5.33 (0.55)*	8.22 (0.46)*	5.65 (0.62)*
Observation	270	270	260	260
R²	0.88	0.83	0.87	0.84

Source: author estimates.
(1)=regression on sectoral employment, (2)=regression on sectoral value added; standard deviation in brackets; (*) (**) (***) indicates a significance at (1%) (5%) (10%).

The decline in employment in the agricultural sector following the increase in per capita income is the result (traceability) of a migration of workers from the agricultural sector to other sectors (industrial, manufacturing and services) with higher levels of productivity and value added. This presumption of traceability, albeit weak, demonstrated in our stylized facts analyses is significantly confirmed by econometric regressions. The increase in per capita income was accompanied by a more than proportional increase in the share of employment in the industrial sector (columns 1 of Table 9), in the manufacturing sector (columns 1 of Table 10) and in the service sector (columns 1 of Table 11): the increase in per capita income of a unit was reflected in an increase in the share of employment in these sectors by more than one unit. Depending on the magnitude of the significant influence, this increase in employment was in decreasing order of importance in favour of the industrial, manufacturing and services sector.

These results from the regressions on sectoral employment shares converge with those from the regressions on value added shares of the industrial and service sectors, but diverge from that of the manufacturing sector. This convergence is partly explained by the dominance of the extractive and construction industries (for the industrial sector) and the predominance of trade, telecoms and transport (for the services sector) as contributors to the economic growth of ECOWAS zone countries over the past two decades. On the other hand, the divergence recorded in the manufacturing sector is partly attributable to the process of deindustrialization in manufacturing in connection with the ageing of production equipment that began in the early 1980s in the region in general and in West Africa in particular. The effects of the ageing of the productive capital stock on economic growth are exacerbated by the effects of strong competition from imported products on local manufacturing products, leading to the gradual closure of local manufacturing firms over the past two decades.

Table 10. Regression results for industry.

Dependent variable: Employment in industry (1) Value added in industry (2)				
	OLS		GMM	
	(1)	(2)	(1)	(2)
GDP per capita	1.94 (0.25)*	0.51 (0.15)*	2.26 (0.33)*	0.32 (0.19)
Import	0.006 (0.15)	-0.04 (0.09)	0.12 (0.35)	-0.29 (0.20)
Human capital	-2.95 (0.94)*	-2.72 (0.58)*	-4.05 (1.11)*	-2.70 (0.66)*
FDI	-0.03 (0.009)*	-0.02 (0.006)*	-0.07 (0.02)*	-0.01 (0.01)
Constant	-10.50 (1.78)*	0.85 (1.10)	-12.48 (2.77)*	2.94 (1.64)***
Observation	270	270	260	260
R²	0.81	0.51	0.79	0.51

Source: author estimates.
(1)=regression on sectoral employment, (2)=regression on sectoral value added; standard deviation in brackets; (*) (**) (***) indicates a significance at (1%) (5%) (10%).

The consensus on the contribution of foreign direct investment to economic growth in developing countries remains highly controversial although it has been the subject of policy debates and research over the past two decades. FDI is seen as a major contributor to economic growth in recipient countries, particularly at the macroeconomic level through increased investment, employment and tax revenues and at the microeconomic level through the transfer of knowledge and technology to recipient countries ([5, 13]). In addition, FDI positively impacts economic growth by increasing total factor productivity and improving aggregate efficiency in the usage of production resources [12].

In the case of our analysis, FDI and human capital, as measured by average duration in the formal education system, have significantly negative effects on employment and value added in the industrial and manufacturing sectors. These counter-intuitive results reflect the potential implications of the reality of economic development models in ECOWAS countries, notably in relation with the challenges of human capital. These results confirm those of [23, 18, 17] who have worked on panels from more than 32 countries in Sub-Saharan Africa.

Moreover, in the manufacturing sector (Table 11), FDI alone has a non-significant positive and negative effect on employment and value added respectively. However, the entry of the human capital variable into the model produces a significantly positive and negative effect of FDI on employment and value added respectively, albeit the magnitudes remain weak. This shows the crucial role that a minimum level of endogenous human capital capacity

development plays in taking advantage of the positive externalities associated with the inflows and absorption of FDI in the beneficiary country, especially by increasing productivity through the accumulation of knowledge, know-how and technology. Also, according to [15], the negative relationship between FDI and value added through interaction with human capital could also be explained by the non-linear relationship between FDI and productivity growth.

The effects of FDI on economic growth are strongly influenced by the quality of the country's human capital. Moreover, according to Sun [18], political and

macroeconomic instability and high financial and transfer risks are the main factors that negatively influence the inflows of FDI in the region and, consequently on economic growth. Although the contribution of mining or extractive industries has been profitable to economic growth in countries with high natural resource endowments, their contributions to poverty reduction through job creation have been generally very weak or negative. This is justified by the fact that mining or extractive industry activities, which have received the bulk of FDI in the region, are capital intensive and therefore offer very limited employment creation opportunities.

Table 11. Results of regressions on the manufacturing sector.

Dependent variable: Employment in manufacture (1) Value added in manufacture (2)				
	OLS		GMM	
	(1)	(2)	(1)	(2)
GDP per capita	1.12 (0.16)*	-0.22 (0.16)	1.53 (0.20)*	-0.24 (0.21)
Import	0.45 (0.09)*	-0.28 0.09)*	0.78 (0.21)*	-0.48 (0.21)**
Human capital	-2.54 (0.59)*	-2.15 (0.60)*	-3.05 (0.67)*	-2.62 (0.68)*
FDI	0.01 (0.006)**	-0.01 (0.006)***	0.003 (0.11)	-0.01 (001)
Constant	-6.07 (1.11)*	5.57 (1.13)*	-9.72 (1.69)*	6.53 (1.70)*
Observation	270	270	260	260
R²	0.92	0.82	0.92	0.83

Source: Author estimates.
(1)=regression on sectoral employment, (2)=regression on sectoral value added; standard deviation in brackets; (*) (**) (***) indicates a significance at (1%) (5%) (10%).

In addition to macroeconomic and political instability, and the limited capacity of the extractive industry to create employment, the quality of human capital is a prerequisite determinant condition in attracting FDI and positively influencing its impact on economic growth. This is because FDI inflows impact economic growth by promoting knowledge and technology transfer to local enterprises and production firms, leading to an increase in productivity. This characteristic of ECOWAS zone economies partly explains the significantly negative effects of FDI and human capital on the share of employment and sectoral value added.

According to [2, 22], FDI tends to have a negative impact on economic growth or generates a low level of economic

growth when the country receiving the FDI has not developed a minimum level of human capital capacity. Thus, according to the work of [18], which covers a panel of 25 African countries, an average of at least 6.94 school years duration is necessary for FDI inflows to have a positive impact on economic growth in Africa. As illustration, in 2010, the average duration was less than 4.0 years in West Africa compared to 5.23 years in Sub-Saharan Africa, 7.25 years in North Africa and 11.30 years in OECD zone countries. This could partly explain why FDI and human capital contribute negatively to value added and employment in the industrial and manufacturing sectors in West Africa.

Table 12. Results of regressions on the service sector.

Dependent variable: Employment in the services sector (1) Value added in the services sector (2)				
	OLS		GMM	
	(1)	(2)	(1)	(2)
GDP per capita	1.02 (0.09)*	0.20 (0.10)***	1.15 (0.11)*	0.22 (0.12)***
Human capital	-1.58 (0.34)*	1.94 (0.39)*	-2.03 (0.39)*	2.20 (0.46)*
FDI	-0.003 (0.003)	0.01 (0.003)*	-0.01 (0.006	0.02 (0.007)*
Constant	-2.73 (0.57)*	1.55 (0.66)**	-3.41 (0.69)*	1.28 (0.79)
Observation	270	270	260	260
R²	0.89	0.66	0.89	0.65

Source: Author estimates.
(1)=regression on sectoral employment, (2)=regression on sectoral value added; standard deviation in brackets; (*) (**) (***) (***) indicates a significance at (1%) (5%) (10%).

With regard to the regression of the other control or policy variables on employment and value added in the service sector (Table 12), the significantly negative impact of human capital is only kept at the level of the employment share function. However, it has a positive and significant influence on value added, in conjunction with the enormous

contribution of services sector activities to economic growth in ECOWAS countries, although its activities remain predominantly informal. On the other hand, FDI has a positive and significant impact on the value added of the service sector, albeit the magnitude of the impact is not very different from zero (0.01) for a 1% growth in FDI. This

significantly positive impact of FDI is linked to the activities of the telecoms & transport branch and those of other merchant services (hotels & restaurants), which have experienced massive expansion over the past two decades, contributing significantly to economic growth in the ECOWAS countries [17].

FDI has been the main source of financing for the development of telecom and hotel activities in ECOWAS countries during the post-2000 period. The contribution of these activities to the economic growth of ECOWAS countries would be more noticeable if States had good capacity to prepare and negotiate contracts with multinational firms and if profits made by multinationals were reinvested in their countries of activity. However, with the liberalization of capital accounts in most ECOWAS countries, States no longer have control over the repatriation of profits by multinational firms located within the ECOWAS economic space.

4. Conclusion and Policy Recommendations

Econometric analysis confirms the traceability of labour mobility from agricultural activities to industrial, manufacturing and service sector activities, as seen in ECOWAS economies through our stylized facts analysis. The econometric evaluation was carried out using panel data concomitantly with OLS and GMM estimators. With magnitude levels in decreasing order of importance attributed to the industrial, manufacturing and services sector, these results (estimated coefficients) are illustrated at the individual level by Ghana, Nigeria and Senegal.

This demonstration of the traceability of the mobility of labour from less productive and weak value-added sectors of activity (agriculture) to high productivity and high value-added sectors of activity (industry, manufacturing and services) informs and supports political and scientific discussions on the active presence of ECOWAS countries on the path towards the economic structural transformation, although the effects are still not very noticeable or difficult to perceive, thereby suggesting that countries are at the beginning of the process, or that they are progressing slowly, or that a smaller number of countries are more active in structural change.

To this end, reforms aimed at strengthening human capital development may help to accelerate the productivity of industrial sector activities in general and manufacturing in particular, through the accumulation of knowledge, know-how and technology in production functions. Productivity in the manufacturing sector has significant potential to generate positive externalities in the economy's overall productivity. This proactive stance will make it possible to take advantage of the growing prospects for attracting FDI in Africa in general and in ECOWAS countries in particular in the coming decades, in line with the growing economic and geopolitical interests of foreign investors in Africa. Also, there is the need to strengthen political stability and security in ECOWAS countries so as to improve the business climate in order to reassure and consolidate the good prospects for attracting FDI. However, the inflows of FDI alone without a certain minimum level of human capital development in ECOWAS countries will not be of any benefit to the process of economic structural transformation.

Moreover, measures and reforms to beef up the protection of local start-ups and industrial units, particularly in the face of massive imports of competing products, should restore greater willingness on the part of local investors to revamp and develop industrial and manufacturing units. Manufacturing industries downstream of agricultural production are said to be in a favorable strategic and timely position with regard to the region's productive potential in the agricultural sector. This strategic move to improve agricultural productivity in response to the development of the manufacturing industry should also strengthen and consolidate the ongoing upward trend in capital intensity in the agricultural sector.

Statement

Opinions expressed in this article are personal. They do not in any way represent those of the UNECA and UNESCO and or its subsidiary bodies.

Appendix

Table A1. List of Parsimonious Model Variables and Their Measurement.

#	Variables	Measurement	Nature of the variable	Number of countries	Period
1	GDP agriculture	Value added as a % of GDP	Dependent	15	1990-2017
2	GDP industry	Value added as a % of GDP	Dependent	15	1990-2017
3	GDP manufacturing	Value added as a % of GDP	Dependent	15	1990-2017
4	GDP services	Value added as a % of GDP	Dependent	15	1990-2017
5	Employment in agriculture	Total employment	Dependent	15	1990-2017
6	Employment in industry	Total employment	Dependent	15	1990-2017
7	Employment in manufacturing	Total employment	Dependent	15	1990-2017
8	Employment in services	Total employment	Dependent	15	1990-2017
9	Human capital	Human capital index	Independent	12	1990-2017
10	Innovation and know-how in production	Total factor productivity (TFP)	Independent	08	1990-2017
11	Investment	GFCF investment as % of GDP	Independent	15	1990-2017
12	B&S Exports	% of GDP	Independent	14	1990-2017
13	B&S Import	% of GDP	Independent	14	1990-2017

#	Variables	Measurement	Nature of the variable	Number of countries	Period
14	Income per capita	GDP per capita	Independent	15	1990-2017
15	Characteristics of non-CFA franc countries	Regional dummy	Independent	15	1990-2017
16	Post-2000 period	Dummy period	Independent	15	1990-2017
17	Foreign Direct Investment	FDI received as a % of GDP	Independent	13	1990-2017

Source: Author.

Table A2. Unit Root Test Results.

Variables	Statistical value (Individual Const.)				Decision
		At level		In first difference	
Employment in agriculture	ADF	39.8		163.4*	I (1)
	PP	38.5		179.8*	
Employment in industry	ADF	60.3*		175.2*	I (1)
	PP	32.1		180.5*	
Employment in manufacture	ADF	40.2		168.8*	I (1)
	PP	33.6		186.5*	
Employment in services	ADF	35.7		179.8*	I (1)
	PP	32.6		216.6*	
Value added in agriculture	ADF	59.8*		N/A	I (0)
	PP	60.4*		N/A	
Value added in industry	ADF	56.5*		N/A	I (0)
	PP	49.9*		A/A	
Value added in manufacturing	ADF	37.2		157.3*	I (1)
	PP	23.3		231.6*	
Value added in services	ADF	35.3		257.9*	I (1)
	PP	36.7		288.5*	
GDP per capita	ADF	11		185.7*	I (1)
	PP	11.7		211.9*	
Export	ADF	40.7**		248.0*	I (1)
	PP	40.0**		273.4*	
Import	ADF	58.3*		N/A	I (0)
	PP	58.1*		N/A	
Human capital	ADF	8.7		N/A	I (0)
	PP	53.4*		A/A	
FDI	ADF	80.8*		N/A	I (0)
	PP	76.0*		A/A	

Source: Author's estimate.
(*), (**) denotes a level of significance at 1% and 5%.

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Biography

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