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Ecowas Member Countries Trade with China: Analysis of Structural Transformation

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ABSTRACT: This paper examines the structural transformation in the trade relation between Ecowas member countries and China, using the flying geese model. We used data set on exports and imports as published by the United Nations Commodity Trade Statistics Database (UN-COMTRADE) for the period 1998-2010. We conferred the study to three-digit of the standard international trade classification (SITC) Revision 2 and we focus on 173 groups of products SITC. The results of our investigation revealed Nigeria, Ghana, Cote d'Ivoire and Benin to be the first Ecowas countries to join the flying geese model led by China. Afterward, countries such as Senegal, Burkina Faso, Gambia and Togo followed the geese model. China, being a transitioning economy, has helped too in leading the structural transformation in natural-resource intensive products in West African countries. However, the process of the structural transformation in Ecowas countries as led by China was found to have been slow. The trade pattern was predominantly that of inter-industry trade.

KEYWORDS: Comparative Advantage, Inter-Industry Trade, Intra-Industry Trade, Value chain, Flying Geese model.

1 INTRODUCTION

In the present economic rearrangement, there is absolutely no doubt that globalisation has urged countries not only to cooperate and to trade more than in the past, but to integrate in all other activities that would ensure economic growth and development. Trade is a vehicle through which technological innovations, knowledge and other economic beneficiary activities are transmitted between trading partners ([1], [2]). Therefore, both the developed, transitioning and developing countries are increasingly involved in the International trade in order to create economic activities for growth. The classical economists predicted that all participants in the international trade will gain. Then, the less developed countries through trade may gain the structural transformation that is the transformation of the production system from agriculture to manufacture sector. How the developing countries in trade can get the much needed structural transformation remains the crucial question. African countries have adopted different patterns of trade or trade strategies with developed countries so as to acquire structural transformation. On the other side of the world, Pacific-Asian with Japan, the leading country has clustered their economy mainly to the North American economy through trade to attain the structural transformation [3]. It is argued that the structural transformation from the developed countries to the Pacific Asian economies even China through Japan due to trade and globalisation of economic activities. This was made faster as a result of regional economic and integration. Since going through structural transformation of its economy, China has been increasingly developing trade with Africa in an effort to ensure sustainability of its activities. Consequently, this paper attempts to find out whether through trade, Ecowas member countries economies have undergone structural transformation as witnessed by other countries in the world.

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In the available literature on international trade, "Hecksher (1919) and Ohlin (1933) [4], [5] argued that countries have to trade according to their difference in the factor endowment". The theory explains the inter-industry trade but failed to explain the intra-industry trade which is a new form of trade developed since 1960s. The intra-industry trade is defined as two ways trade (export and import) of products that belong to the same statistical product category. Economist such as "Dixit and Stiglitz (1977), Lancaster (1980), Krugman (1980, 1981), Helpman and Krugman (1985), Falvey and Kierzkowski (1987) [6], [7], [8], [9], [10], [11] developed the theories that underpin the intra-industry trade". "Hakura and Jaumotte (1999) [12] argued that international trade is important in transferring technology from more developed to less developed countries". In addition, they found that intra-industry trade played more significant role in transferring technology than inter-industry trade. But they failed to demonstrate how the intra-industry trade will contribute to the structural transformation of the developing countries. "(Akamatsu, 1961, 1962) [13] has developed the flying geese model of development that describes the processes through which a less developed country can get structural transformation by trading with the developed country". The main factors of the flying geese model is centered most on foreign direct investment (FDI). According to the model the less developed countries have to move on the ladders of the value chain from primary products export to un-skills labour products export and gradually up to technology and human capital products export as long as the developed countries are giving up the export of a certain category of product through the shifting of comparative advantage. This paper uses the flying geese model to investigate whether China is contributing to the structural change of Ecowas member countries.

From the empirical literature on the issue of trade and structural transformation, "Teignier (2013) [14] in his study on the role of trade in structural transformation found that international trade in agricultural goods can accelerate the structural transformation of countries with low agricultural productivity. He went further to show that trade played an important role in the structural transformations of the United Kingdom and South Korea". "Mo Choi and Ma (2011) [15] employed a two-sector growth model with learning-by-doing externalities at the country level in the non-agricultural sector, a knowledge spillover from the non-agricultural to the agricultural sector, and labor frictions and pointed out the importance of trade to accelerate urbanization and to generate growth like the one observed in some East Asian economies". In another related studies, "Widodo (2008) [16] employed the index of comparative advantage and the trade balance to demonstrate that the shift in comparative advantage or specialisation support the Flying Geese (FG) model in the East Asian region". The result of his study revealed that the FG pattern explains the structural transformation of East Asia region. Also, "Fukasaku (1992) [3] in his study of economic regionalisation and intra-industry trade: pacific-Asian perspectives, used the index of revealed comparative advantage, spearman correlation and Grubel-Lloyd index of intra-industry trade to show that, the industrial development observed in Pacific-Asian is consistent with the flying geese model". "Dettmer et al., (2009) [17] has used the different measures of comparative advantage and GL index of intra-industry trade according to factor intensity to approach the trade relation between European Union and China during the period 1999-2008". They found that China structural change is faster than European Union. Talking about the structural changed in Ecowas member countries we agree with "Schiere and Rugamba (2013) [18] that, China is one of the main drivers of structural transformation in Africa" since according to "Lin and Wang (2014) [19], China is ahead of Africa in term of structural transformation". Lin and Wang (2014) [19] in their study on China-Africa co-operation found that, China financed infrastructure projects do address Africa's infrastructure bottlenecks and hence contribute to structural transformation. However, we observed that their study concentrated on one part and failed to examine the structural transformation of African countries economies through the angle of trade relation.

Contributing to the existing literature, this paper attempts to answer the following questions:

Is China as an advanced country in term of technology, leading to the structural transformation of Ecowas member countries through the flying geese model?

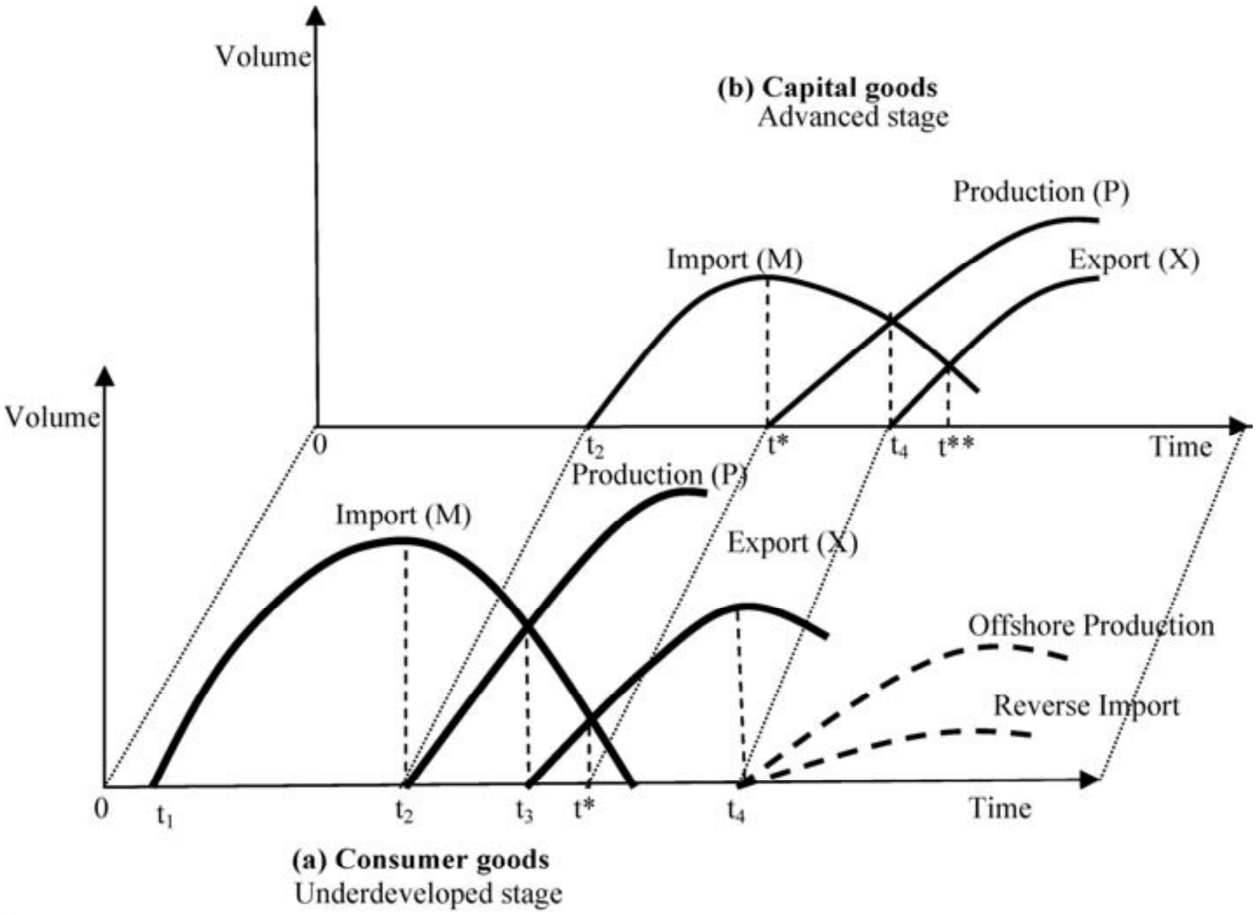
What's the trade pattern between China and Ecowas member countries?

To this end, we organize the rest of the paper as follows: In section 2, we present the structural transformation model. While section3 is devoted to the methodology, section 4 presents the results and the discussion. Finally, we conclude with our policy recommendations in the section 5.

2 STRUCTURAL TRANSFORMATION MODEL: FLYING GEESE MODEL

Kaname Akamatsu introduced the original model in 1930s called in Japanese, ganko keitai (a flock of Flying Geese) since his paper was published in Japanese language. The concept which later changed to Flying Geese paradigm after his publication in English in 1960 has been widely referenced in the literature. It is also referred as the ''multi-sequentialist'' FG model.

Akamatsu presented in four levels the structural transformation process like the wild-geese-flying in the form of an inverse curve. “Kojima (2000) [20] explained the four levels of Akamatsu flying geese model of the structural transformation in the figure1 below where the Euro-American represents the developed countries, the leaders and Asian countries the less developed countries, the followers”.



Source: *author's modification*, Kojima (2000)

Fig. 1. Flying Geese Model

The figure1 shows the different levels of the flying geese model of structural transformation for a less developed country in trade with the developed country. The model assumes two goods such as consumer goods and capital goods. Basically, while consumer goods refer to the goods that are made to be consumed directly, capital goods are the goods (machineries) that are made to produce other goods. The model assumes also that the industries are classified into several categories.

- Level 1: It started from t1 in panel a) to t2)

The less advanced countries in trade with the advanced countries exported primary products while importing consumer goods. In this level, imported consumer goods increases from time t1 to time t2 and may hamper the local handicraft industry of the less-advanced countries due to the substitution effect.

- Level 2: It started from time t2 in panel a) and in panel b)

The less developed country has adopted the import-substitution strategy to produce the consumer goods and to develop the infant industry which needs to be protected. So, from time t2 in panel b) the country started importing the capital goods in order to produce the consumer goods. The production of the consumer goods started from time t2 in the panel a). At the same time t2 in panel a) the production of consumer goods hampered the importation which started to decrease.

- Level 3: It started from time t3 in panel a)

Since the country can produce the consumer goods at homogenized level with that of advanced countries, it started to export from time t3 in panel a). The trade in consumer goods reached the equilibrium at time t*a) where export=import. At this level the less developed country completed the structural transformation in consumer goods and has caught up the developed country in production of consumer goods. It means that the completed sequential path of the structural transformation of the Flying Geese model is import-production-export (MPE). Also at time t*b) the import of the capital goods decreased since the country started to produce the capital goods.

- Level 4. It started from t4 in panel a) with the decreasing of the export of the consumer goods

The country at this level has reached the advanced level in the consumer good and has also transferred the technology to other less developed country. However, the country has moved on the ladders in the value chain. At t4 in panel b) the production of capital goods is equal to the import of capital goods. From t4 in panel b) the country started to export capital goods and reached equilibrium in capital goods at time t**b). The decrease in export of consumer goods means that the country has off shored the production in panel a). In addition, it is possible that the reverse import exists.

3 METHODOLOGY

3.1 BALASSA (1965) INDEX OF COMPARATIVE ADVANTAGE AND GL INDEX

In this paper, to analyse the trade specialisation between Ecowas countries and China, we follow the works of Widodo (2008) [16] and Dettmer et al (2009) [17] to use the revealed comparative advantage of Balassa (1965) [21].

- The revealed comparative advantage is presented as follow:

$$RCA_{ij} = (X_{ij}/X_i) / (X_{wj}/X_w) = (X_{ij}/X_{wj}) / (X_i/X_w)$$

Where:

RCAij = country *i*'s revealed comparative advantage for good *j*
Xij = *i*th country's exports of commodity (or industry) *j*
Xi = *i*th country's total exports
Xwj = world exports of commodity (or industry) *j*
Xw = total world exports

If a country has RCA>1 then the country is said to have a comparative advantage in good j but if the country has RCA<1 then the country is said to have comparative disadvantage in good j".

Furthermore, to analyse the intra-industry trade between Ecowas member countries and China we follow Dettmer et al., (2009) [17] to employ the Intra-Industry Trade formula developed by Grubel-Lloyd (1975) [22] and the formula is presented as follow;

$$IIT_i = 100\left[1 - \frac{\sum_k \left|X_{ik} - M_{ik}\right|}{\sum_k (X_{ik} + M_{ik})}\right]$$

A weighted IIT index measures the degree of intra-industry trade across industries taking into account the flows in each sub-sectors *k* at a given level of aggregation.

The index assumes values between 0 and 100, with lower values indicating a low level of IIT (or high level of inter-industry specialization) and high values indicating a high level of IIT. A low level of intra-industry trade between two countries means that their bilateral trade is not actively competing with each other, but rather specialising in goods from different industries.

3.2 DATA AND CLASSIFICATION OF INDUSTRIES

This paper applies data on exports and imports as published by the United Nations Commodity Trade Statistics Database (UN-COMTRADE) for the period 1998-2010. We use three-digit of the standard international trade classification (SITC) Revision 2 and focus on 173 groups of products SITC. As a result of data availability, we could not calculate the statistics for the countries such as Guinea-Bissau, Liberia, Sierra Leone, Cape Verde and Guinea-Bissau for the period under review. Thus, the final countries in this study are Nigeria, Ghana, Senegal, Benin, Burkina Faso, Cote d'Ivoire, Togo, Gambia, Mali and Niger.

Also this paper uses the classification of industries by the empirical trade analysis (ETA). On the basis of the United Nations Conference on Trade and Development/World Trade Organization classification using the SITC Rev. 3, the ETA distinguished the following five products or industries according to the three digits SITC Rev2 in the table1 below

Table 1: Factor intensity classification

Products classification	Three-digit SITC Rev. 2
1. Primary products	001, 011, 012, 014, 022, 023, 024, 025, 034, 035, 036, 037, 041, 042, 043, 044, 045, 046, 047, 048, 054, 056, 057, 058, 061, 062, 071, 072, 073, 074, 075, 081, 091, 098, 111, 112, 121, 122, 211, 212, 222, 223, 232, 233, 244, 245, 246, 247, 248, 251, 261, 263, 264, 265, 266, 267, 268, 269, 271, 273, 274, 277, 278, 281, 282, 286, 287, 288, 289, 291, 292, 322, 323, 333, 334, 335, 341, 351, 411, 423, 424, 431, 941
2. Natural-resource intensive products	524, 611, 612, 613, 633, 634, 635, 661, 662, 663, 667, 671, 681, 682, 683, 684, 685, 686, 687, 688, 689
3. Unskilled-labor intensive products	651, 652, 653, 654, 655, 656, 657, 658, 659, 664, 665, 666, 793, 812, 821, 831, 842, 843, 844, 845, 846, 847, 848, 851, 894, 895
4. Technology-intensive products	511, 512, 513, 514, 515, 516, 522, 523, 541, 562, 572, 582, 583, 584, 585, 591, 592, 598, 711, 712, 713, 714, 716, 718, 721, 722, 723, 724, 725, 726, 727, 728, 736, 737, 741, 742, 743, 744, 745, 749, 751, 752, 759, 764, 771, 772, 773, 774, 775, 776, 778, 792, 871, 872, 873, 874, 881, 882, 883, 884, 893, 951
5. Human capital-intensive products	531, 532, 533, 551, 553, 554, 621, 625, 628, 641, 642, 672, 673, 674, 675, 676, 677, 678, 679, 691, 692, 693, 694, 695, 696, 697, 699, 761, 762, 763, 781, 782, 783, 784, 785
6. Others	911, 931, 961, 971, 999

Source: The ETA, available at: http://people.few.eur.nl/vanmarrewijk/eta/

4 RESULTS AND DISCUSSION

In this part of the paper, we present and discuss the results relative to the trade structure and specialisation between Ecowas member countries and China.

The table 2 below shows the trade structure between Ecowas member countries and China according to factor intensities for 1998 and 2010 on the three-digit SITC 2 level.

Table 2: ECOWAS member countries trade structure with China according to factor intensities

	1998		2010	
	Export	Import	Export	Import
Primary Products	47.5%	7.3%	36.0%	14.0%
Natural-Resource Intensive Products	2.5%	5.7%	7.6%	6.1%
Unskilled-Labour Intensive Products	17.5%	23.6%	10.9%	17.5%
Technology Intensive Products	15.0%	36.0%	24.8%	36.0%
Human-Capital Intensive Products	17.5%	27.4%	19.6%	26.1%
Digit sectors not classified			1.2%	0.3%
Total	100.0%	100.0%	100.0%	100.0%

Source: UN Comtrade database, own compilation and calculation.

Generally, in 1998 Ecowas member countries have high export share in primary products over China who has high export share over Ecowas member countries in the manufacture products with more concentration in technology intensive products.

The table 3 below shows the revealed comparative advantage RCA and intra-industry trade IIT of Ecowas member countries while the table 4 depicts the revealed comparative advantage of China according to the factor intensities.

Table 3: Revealed Comparative Advantage and IIT for ECOWAS member countries and China according to factor intensities in 1998 and 2010

Benin	RCA		IIT	
	1998	2010	1998	2010
Primary Products	3.1	3.1	42	19.2
Natural Resource intensive Products	0.1	0	0	32.6
524 Radio-active and associated	0	0		
612 Manufactures of leather	0	0		
634 Veneers, plywood	0.07	0.1		
635 Wood manufactures	0	0		
661 Lime, cement	0	0		
662 Clay construct. Materials	0.51	0		
663 Mineral manufactures,N.E.S	0.1	0		
671 Pig iron, spiegeleisen, sponge	0	0.1		
682 Copper	0	0		
684 Aluminium	0	0		
685 Lead	0	0		
Unskilled-Labour Intensive Products	0.3	0.1	0.6	38.1
Technology intensive products	0.2	0.1	2.6	4.9
Human capital intensive products	0.2	0.1	2.8	8.7

	RCA		IIT	
Cote D'Ivoire	**1998**	**2010**	**1998**	**2010**
Primary Products	1.1	1.9	0.3	0.3
Natural Resource intensive Products	0.7	0.8	78.8	14
524 Radio-active and associated	0	0.8		
612 Manufactures of leather	1.13	0		
634 Veneers, plywood	2.9	1.5		
635 Wood manufactures	1.1	0.2		
661 Lime, cement	1.93	0.8		
662 Clay construct. Materials	0.52	0		
663 Mineral manufactures, N.E.S	0.19	0		

671 Pig iron, spiegeleisen, sponge	0	5		
682 Copper	0.04	0		
684 Aluminium	0.12	0		
685 Lead	0	0.1		
Unskilled-Labour Intensive Products	0.7	0.3		5.8
Technology intensive products	0.6	0.3		0.3
Human capital intensive products	0.9	0.6		0.2

	RCA		IIT	
Burkina Faso	**1998**	**2010**	**1998**	**2010**
Primary Products	1.9	3.6		0.8
Natural Resource intensive Products	0.5	0.2		42.2
524 Radio-active and associated	0	0		
612 Manufactures of leather	0	0.3		
634 Veneers, plywood	0	0		
635 Wood manufactures	2.35	0		
661 Lime, cement	0	1.2		
662 Clay construct. Materials	0.32	0.6		
663 Mineral manufactures, N.E.S	0	0.2		
671 Pig iron, spiegeleisen, sponge	0	0		
682 Copper	0	0.2		
684 Aluminium	2.93	0		
685 Lead	0	0		
Unskilled-Labour Intensive Products	0.1	0.6		
Technology intensive products	0.6	0.5	6.5	1.8
Human capital intensive products	1.4	0.4	6.9	0

	RCA		IIT	
Ghana	**1998**	**2010**	**1998**	**2010**
Primary Products	4.5	6.5	10.5	6.5
Natural Resource intensive Products	9.4	6		0.7
524 Radio-active and associated	0	0		
612 Manufactures of leather	2.26	0		
634 Veneers, plywood	9.35	35.5		
635 Wood manufactures	9.76	0.7		
661 Lime, cement	0.69	1.1		
662 Clay construct. Materials	0.1	0		
663 Mineral manufactures, N.E.S	0.7	0.1		
671 Pig iron, spiegeleisen, sponge	41.83	3.7		
682 Copper	0.15	0.4		
684 Aluminium	38.13	11.7		
685 Lead	0	13.2		
Unskilled-Labour Intensive Products	1.4	0.3	5.1	
Technology intensive products	0.8	1.6	71.2	0.3
Human capital intensive products	1.9	0.7		2.1

	RCA		IIT	
Nigeria	**1998**	**2010**	**1998**	**2010**
Primary Products	0.3	1.1		11.8
Natural Resource intensive Products	0	1.1		7.8
524 Radio-active and associated	0	6.1		
612 Manufactures of leather	0	0.2		

634 Veneers, plywood	0	0		
635 Wood manufactures	0	0		
661 Lime, cement	0	0		
662 Clay construct. Materials	0	0		
663 Mineral manufactures, N.E.S	0	0		
671 Pig iron, spiegeleisen, sponge	0	0		
682 Copper	0	1.5		
684 Aluminium	0	0		
685 Lead	0	4.2		
Unskilled-Labour Intensive Products	0.1	0		
Technology intensive products	0	0		3.7
Human capital intensive products	0	0		0.4

	RCA		IIT	
Gambia	**1998**	**2010**	**1998**	**2010**
Primary Products	8.9	20.7		7.4
Natural Resource intensive Products	0.8	0.1		0
524 Radio-active and associated	0	0		
612 Manufactures of leather	0	0		
634 Veneers, plywood	0.86	0		
635 Wood manufactures	0	0.9		
661 Lime, cement	3.57	0		
662 Clay construct. Materials	2.27	0.3		
663 Mineral manufactures, N.E.S	0.93	0		
671 Pig iron, spiegeleisen, sponge	0	0		
682 Copper	0	0		
684 Aluminium	1.41	0.2		
685 Lead	0	0		
Unskilled-Labour Intensive Products	0.3	0.3	1.1	0
Technology intensive products	0.9	0.5		0
Human capital intensive products	1	0.8		32.5

	RCA		IIT	
Senegal	**1998**	**2010**	**1998**	**2010**
Primary Products	2.6	3		2.4
Natural Resource intensive Products	1.3	2.3		3.7
524 Radio-active and associated	0	0		
612 Manufactures of leather	0	0.1		
634 Veneers, plywood	0	0.2		
635 Wood manufactures	0	0.33		
661 Lime, cement	0.33	12.9		
662 Clay construct. Materials	0	0		
663 Mineral manufactures, N.E.S	0.27	0		
671 Pig iron, spiegeleisen, sponge	0	0		
682 Copper	12.43	6.4		
684 Aluminium	1.03	0		
685 Lead	0	5.1		
Unskilled-Labour Intensive Products	0.6	0.6		0.1
Technology intensive products	2.5	1		0.1
Human capital intensive products	1.4	1.3	92.6	2.7

	RCA		IIT	
Togo	**1998**	**2010**	**1998**	**2010**
Primary Products	6.1	2.4		12.1
Natural Resource intensive Products	1.6	1.6		16.3
524 Radio-active and associated	0	0		
612 Manufactures of leather	2.06	0		
634 Veneers, plywood	0.58	0		
635 Wood manufactures	1	0.3		
661 Lime, cement	13.56	17.7		
662 Clay construct. Materials	0.54	0		
663 Mineral manufactures, N.E.S	0	0		
671 Pig iron, spiegeleisen, sponge	0.15	0		
682 Copper	0.03	0		
684 Aluminium	0.2	0		
685 Lead	0	0		
Unskilled-Labour Intensive Products	1.1	1.1	28.7	1
Technology intensive products	0.8	0.5	9.15	0.3
Human capital intensive products	1.6	1.3	19.7	5.6

	Mali				Niger			
	RCA		IIT		RCA		IIT	
	1998	**2010**	**1998***	**2010**	**1998**	**2010**	**1998***	**2010**
Primary Products	0.9	4.8		2.6	0.7	2.9		11.5
Natural resource intensive products	0	0		0	0	0		0
Unskilled-labour intensive products	0	1		1.1	0.7	0.7		7.23
Technology intensive products	0.3	0.8		2.4	0.3	0.1		0.9
Human capital intensive products	0.2	0.5		15.2	0.8	0		0.3

Source: UN Comtrade database, own compilation and calculation.

** indicates no data available*

Table 4: Revealed Comparative Advantage of China according to factor intensities in 1998 and 2010

	1998	2010
Primary Products	0.4	0.4
Natural resource intensive products	1.8	0.8
524 Radio-active and associated	3.5	0.2
612 Manufactures of leather	2	1.4
634 Veneers, plywood	0.01	0.2
635 Wood manufactures	1.3	1.4
661 Lime, cement	0.21	0.2
662 Clay construct. Materials	2.8	1.4
663 Mineral manufactures, N.E.S	3.2	1.4
671 Pig iron, spiegeleisen, sponge	0.8	0.6
682 Copper	1.8	0.8
684 Aluminium	0.65	1.1
685 Lead	3.5	0
Unskilled-labour intensive products	2.2	1.3
651 Textile yarn	1.8	1.3
652 Cotton fabrics, woven	2.6	1.4
653 Fabrics, woven, of man-made fibres	3	1.5
654 Textil. fabrics, woven, oth.than cotton	3.5	1.5
655 Knitted or crocheted fabrics	3.4	1.5
656 Tulle, lace, embroidery, ribbons&other small wares	1.9	1.5
657 Special textile fabrics and related products	1.2	1.4
658 Made-up articles, wholly/chiefly of text.materials	0.9	1.2
659 Floor coverings, etc.	0.03	0.7
664 Glass	3.1	1.5
665 Glassware	1.6	1.4
666 Pottery	3.4	1.5
793 Ships, boats and floating structures	2.3	1.2
812 Sanitary, plumbing, heating, lighting fixtures	3.3	1.5
821 Furniture and parts thereof	0.28	1.4
831 Travel goods, handbags, brief-cases, purses	3.4	1.4
842 Outer garments, men of textile fabrics	1.7	1.4
843 Outer garments, women of textile fabrics	2.9	1.4
844 Under garments of textile fabrics	3.1	1.4
845 Outer garments and other articles, knitted	2.3	1.4
846 Under garments, knitted or crocheted	3.1	1.4
847 Clothing accessories of textile fabrics	1.9	1.3
848 Art. Of apparel &clothing accessories, no textile	3.3	1.4
851 Footwear	2.3	1.2
894 Baby carriages, toys, games and sporting goods	2.9	1.4
895 Office and Stationery supplies, N.E.S	1.3	1.2
Technology intensive products	2.1	1.3
Human capital intensive products	1.8	1.2

Source: UN Comtrade database, own compilation and calculation.

From the tables 3 and 4 above, we found that Ecowas member countries have comparative advantage (RCA> 1) in primary products while China is specialised in manufacture products with RCA>1. This is consistent with the first level of Akamatsu's flying geese development model in which the less developed countries have to export primary products and import manufacture products including consumer and capital products from the advanced countries. This trade structure between Ecowas member countries and China was also observed in Pacific-Asian trade comprised China. In this regional

trade, at the beginning, China's main export items are predominantly natural resource-based products such as food and mineral products such as crude petroleum and coal [23].

Furthermore, the table 2 shows that in 2010 Ecowas member countries still have high share in primary products over China (36% against 15%) but this share has decreased through the period 1998 and 2010 from 47.5% to 36%. Whereas, China is still keeping its dominant share position in the manufacture products but this export share of China is decreasing in unskilled labour products and, in natural resource intensive products where its export share is becoming very low due to the presence of the production in ecowas member countries. The results of our investigation revealed Ecowas member countries still import manufactured products in order to satisfy the domestic demand which has to increase enough to induce the economies of scale. These countries are also found to have started producing as their export has been diversified slightly in 2010. Thus, they have increased slightly their export share in manufacture products compare to 1998 especially in natural-resource intensive products where in 2010 the export shares for both parties are balanced even Ecowas countries' shares have been over China's share. Also the result shows that china export of primary product has double in 2010. China's importation of primary products can be justified by the case of Japan who imported not only machinery but also primary products from the leader country in order to start producing the manufacture goods (Akamatsu, 1962) [13]. This fact has highlighted that the followers countries in the process of the structural transformation may not have the necessary raw material needed to produce a manufactured good. Therefore, we can conclude that Ecowas member countries are getting structural transformation through the bilateral trade with China.

The table 5 below shows the export structure of Ecowas member countries and China through the period 1998- 2010 by factor intensities.

Table 5: ECOWAS member countries Exports structure with China according to factor intensities

	China		Mali	
	1998	**2010**	**1998***	**2010**
Primary Products	7.3	14		21.4
Natural-Resource Intensive Products	6.1	5.7		4.8
Unskilled-Labour Intensive Products	23.6	15.4		14.2
Technology Intensive Products	36	35.9		28.6
Human-Capital Intensive Products	27.4	26.1		28.6
Total	100	97.4		100

	Nigeria		Senegal		Ghana	
	1998	**2010**	**1998**	**2010**	**1998**	**2010**
Primary Products	100	33.7		38.7	85.7	35.2
Natural resource intensive products		10.5		6.4		9.3
Unskilled-Labour Intensive Products		8.1		16.1	14.3	7.4
Technology Intensive Products		26.7		16.1		29.6
Human-Capital Intensive Products		19.8	100	19.3		18.5
Total	100	100	100	100	100	100

	Benin		Burkina Faso		Gambia	
	1998	**2010**	**1998**	**2010**	**1998**	**2010**
Primary Products	50	40		55.6	20	57.1
Natural resource intensive products	0	6.7		22.2		
Unskilled labour intensive products	12.5	6.7		11.1	80	
Technology Intensive Products	37.5	20	66.7	11.1		
Human-Capital Intensive Products	0	26.7	33.3	0		28.6
Total	100	100	100	100	100	100

	Niger		Togo		Cote d'Ivoire	
	*1998	2010	1998	2010	1998	2010
Primary Products		21	14.3	52.3	87.5	57.7
Natural-resource intensive products		2.6	0	4.3	12.5	7.7
Unskilled-labour intensive products		21	14.3	13	0	0
Technology intensive products		37	42.8	13	0	23.1
Human capital intensive products		18.4	28.6	17.4	0	11.5
Total		100	100	100	100	100

Source: UN Comtrade database, own compilation and calculation.
** no data available*

As presented in table 5 above, China's export of natural resource intensive products and un-skills labour intensive products are decreasing from 1998 to 2010. Also, from the table 4 above, we found that China is basically focusing on the export of manufacture products such as technology, human capital products and unskilled products but has been losing its specialisation in natural resource intensive products and un-skills labour intensive products. China's comparative advantages in the two sectors have started to decrease from 1998 to 2010 especially in natural resource intensive products where its comparative advantage has shifted from 1.8 (RCA=1.8) in 1998 to RCA =0.8 in 2010. Thus, China has lost its comparative advantage in the natural resource intensive products as follow: SITC 524 radio-active, 682 copper, 685 lead. This implies that China may have shifted its comparative advantage by attempting to transfer its known-how to Ecowas member countries. We conclude that China is slowly drawing back from the specialisation of the natural resource products in the advantage of Ecowas member Countries who have to climb the ladder of the value chain. Concerning the un-skills labour intensive products, the decreasing nature of export share as well as its comparative advantage can be explained by the fact that there is production in the Ecowas member countries which is hampering slightly the importation from China. Also this fact can be explained by the increasingly specialisation of China in the technology and human capital product. However, China still maintains its' dominant export share in the un-skills labour products and is not ready to shift its comparative advantage. This finding is consistent with "Dettmer et al., (2009) [17] who found that China is slowly reducing its level of specialisation in labor intensive sectors. The import share from China decreased by around 10% while imports of labor-intensive products in EU total external trade has slightly increases since 1999. Still, China's dominant position in these industries is obvious in trade with Europe as evident in the relatively high negative RCA-values".

The results in table 5 above depicts that among Ecowas member countries in 1998, Nigeria, Cote d'Ivoire, Ghana and Benin have constituted their export of primary products which accounts for 50 % and above. Though in 2010, they have decreased their export of primary products but it still remained their high export specialisation. From this, we can say that the flying geese have just started in Ecowas member countries namely in Nigeria, Cote d'Ivoire, Ghana and Benin. Later in 2010, the four Ecowas countries have decreased their export in primary products in order to diversify the economy. Thus, they have switched to the production and exportation of the manufacture products. The four ecowas countries have comparative advantage in the primary products but in manufacturing products their comparative advantage is differently appreciated. The main sectors are natural resource intensive products and the un-skilled labour intensive products since in those sectors, China export share and comparative advantage has decreased through the study period and have represented an opportunity of structural change for Ecowas member countries. Whereas, in the technology and human capital sectors, the export share of china and its comparative remained higher. For the natural resource intensive products, the comparative advantage of China has shifted to Ecowas member countries as follow: SITC 524, 682 have shifted to Nigeria and SITC 685 has shifted to Ghana, Nigeria. We also found that Nigeria and Ghana have increased their specialisation in this sector from 1998 to 2010. While Benin has not even started specialisation in this sector, Cote d'Ivoire has been specialised but did not benefited the shift from China. Nigeria and Ghana have undergone structural transformation led by China in the natural resource products. They have climbed the ladder of the value chain from the primary products to natural resource intensive products. About the un-skilled labour intensive products, since China is still maintaining its comparative advantage, there is no structural change yet in this sector. We can notice in the table 3, the four ecowas member countries has not specialised in un-skilled labour products derived from China. It is been only Ghana who specialised in that sector in 1998 but it has lost the specialisation in 2010.

Regarding the intra-industry trade in the table 3, the level of intra industry trade (IIT) in the four countries is overall low. In 1998, the level of IIT in Cote d'Ivoire and Ghana is 78.8 in natural resource products and 71.2 in technology intensive products respectively but these high levels have decreased in 2010 to 14 and 0.3 respectively. Except those two cases, the overall bilateral trade between the four ecowas countries and China is predominantly of inter-industry trade. "Fukasaku (1992) [3] points out that under the FG model it is assumed that trade expansion among the Pacific-Asian economies takes

the form of inter-industry specialisation. However, developments since the mid-1980s appear to have added a new dimension to the regional division of labour in Pacific Asia. It is widely believed among trade economists and regional experts that enhanced trade and investment linkages in the region since the mid-1980s have provided ample opportunities for intra-industry trade among Pacific-Asian economies". From 1979 to 1988, the pacific Asian has changed trade pattern from inter-industry trade to intra-industry trade. Although, in the case of Ecowas member countries under the flying geese model, we found that the trade pattern between Ecowas member countries and China was in 1998 in the form of inter-industry trade but up to 2010 the results show that the trade pattern remains in the form of inter-industry trade. The trade structure has not changed into intra-industry trade. This implies that the process of structural transformation led by China in Ecowas member countries is slower than it was in Pacific-Asia.

Other Ecowas countries such as Togo, Burkina Faso, Gambia and Senegal as reported in the table 5, have at first in 1998 focused their export in technology and human capital products, the same sectors as China. In 2010, they have changed their structure by specialising their export in primary products while decreasing their former export share. From intra-industry trade they have moved to inter-industry trade with a slight diversification. Since they have started exporting primary products to china in 2010 and importing the manufacture products then, they have been switched to the flying geese development. Under the process of the flying geese model, only Senegal and Burkina Faso have made progress by producing and exporting the natural resource intensive products and un-skills labour intensive products. We found that their exports in the natural resource products have balanced the export of China which is very low for the period under review. Burkina Faso and Senegal exports are 22.2% and 6.4% respectively and the export of China is 6.1%. Moreover as stated earlier, China comparative advantage has started to decrease in natural resource products. In the case of Burkina Faso, Senegal, Gambia and Togo, the table 5 reports that Senegal has comparative advantage in natural resource products SITC 682, 685 where China has lost its comparative advantage. This means, China has shifted its comparative advantage in the products SITC 682, 685 to Senegal who has undergone structural transformation. Burkina Faso, Gambia and Togo had not been competitive in the products that China has lost its comparative advantage. So, Burkina Faso, Togo and Gambia are in the lower level than Senegal in the process of the flying geese model.

About the Intra-industry trade, it is low in the four countries except in Senegal where it is high in human capital products IIT= 92.6 in 1998 but it has decreased up to 2.7 in 2010. This means that, the overall bilateral trade between these four Ecowas member countries is in the form of inter-industry trade.

In the case of Mali and Niger, and based on the data availability, we can say that they have concentrated their export in manufacture products rather than in primary products. Their trade is not consistent with the flying geese model. They are not included in the flying geese led by China. The table 3 reports that the IIT of Mali and Niger is low in each sector. Thus, the bilateral trade pattern between Mali, Niger and China is explained by the inter-industry trade.

5 CONCLUSION

In this study, we have used the flying geese model to analyse the bilateral trade between ecowas member countries and China in order to find out if there exist any form of structural transformation in Ecowas member countries. The results show that China has brought flying geese development in Ecowas member countries. The countries such as Nigeria, Ghana, Cote d'Ivoire, and Benin were the first countries in the Ecowas region to join the flying geese development and followed by Senegal, Burkina Faso, Gambia and Togo. Mali and Togo did not join the flying geese model. Also, the results show China to have led to structural transformation in natural-resource intensive products in Nigeria, Ghana and Senegal. However, the structural transformation in Ecowas member countries as led by China is seen to have been slow and the trade pattern is predominantly that of inter-industry trade.

In order to reinforce the trade relation between Ecowas member countries and China on one hand and to contribute to the impact of this trade relation on the structural transformation of the Ecowas member countries on the other hand, we suggest the promotion of trade policies that aimed at openness between Ecowas member countries and China as well as within Ecowas region. Also, we suggest for the speedy up the process of structural transformation through flying geese model led by China.

The trade pattern between the two regions is taking time to shift from the inter-industry trade to intra-industry trade and consequently affects the process of the structural transformation of the ecowas member countries. Therefore, this paper in order to quick the shift of the trade pattern, suggests future researches to deepen the analysis of the intra-industry trade between ecowas member countries and China.

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