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Regional Characteristics Effects on Intra-Industry Trade in Residues and Wastes from Food Mill Industry

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Abstract

The Economic Community of West African States (ECOWAS) has been enforcing sub-regional integration through such interventions like free international trade, common external tariff wall, consolidation or freezing of custom duties, non-tariff barriers to intra-trade and gradual phasing out of duties on industrial products from community projects over a period of 6-10 years at 10-16.6% annual rates of reduction, depending on the classification of member states based on the level of development, location and importance of customs revenue. The trade co-operation Agreements of ECOWAS was aimed at expanding the volume of intra-Community trade to ensure the integration of the sub-region through trade on goods originating from member countries. The objectives of this study are to: (i) review the pattern of regional trade in prepared foodstuffs at the instance of Nigeria (ii) assess intra-industry trade in residue and wastes from food industry sub-sections (iii) evaluate the share of intra-industry trade in the total trade of residue and wastes from food industry among ECOWAS member nations (iv) determine the effects of regional characteristics on the intra-industry trade of the product sub-section. The results revealed that intra-industry trade in residues and wastes are influenced partners' (GDP), population, and national value added by manufacturing. Efforts to employ efficient methods in production of raw materials for food mill industry is recommended, while regional stakeholders should increase output as well as add value in terms of packaging to improve the trade and integration within the sub-region.

Keywords: Horizontal Intra-industry Trade, Regional Characteristics, Effects, Residues and Wastes subsection of prepared foodstuffs.

1.0 Introduction

Residues and wastes are widely used in compounding animal feeds. Residues and wastes from food mill industry is the sub-section 23 of the HS section IV (Prepared foodstuffs). The subsection consists of products like flours of meat, fish, etc; brans, sharps and residue from cereals; residues of starch manufacture, brewing dregs and waste; oil cake and other solid residues of Soya-bean; oil cake and other solid residues of groundnut; oil cake and other solid residues of vegetable fats among others. Other subsections of prepared foodstuffs include, preparation of Cereals, Miscellaneous edible preparations, Beverages and Tobacco, sugar and Sugar confectionary, Cocoa and cocoa preparations, and preparation of vegetable fruit and nut. Intra-industry trade involves a simultaneous export and import of goods produced in the same industry. In this scenario, intra-industry trade in residues and wastes from food industry refers to simultaneous exports and imports of these products between Nigeria and partner nations within ECOWAS sub region.

Irrespective of the implementation of the ECOWAS trade liberalization scheme, which aimed at boosting intra-regional trade, evidence abound that the issue of low intra-regional trade in ECOWAS has always been of concern to the regional policy makers. Foroutan and Pritchett, (1993; 1995) opined that notwithstanding the efforts towards liberalizing internal trade, ECOWAS intra-community trade has been shown to have remained low over the years. Also, Ogunkola (1998) carried out a comparative analysis of the determinants of sub regional trade by considering pre-integration (1970-1972), and post-integration (1978-1980) regimes. It was inferred from the study's estimation results that the intra-ECOWAS trade remained very weak in spite of the integration efforts in the sub region during the periods of reference. Explanations provided for low performance include the inability and/or the unwillingness of member states to carry out trade liberalization measures and limited potential for trade expansion. ECOWAS intra-regional trade moved from 11.6% of total regional trade in 1999 to 12.7% in 2003 before it declined to 12.5% in 2006 (ECOWAS Statistical Bulletin, 2010). This means that ECOWAS member nations engage in little trade among themselves, but without sufficient intra-regional trade, economic integration might be limited and the need for a common currency might not be justifiable.

The theoretical basis for the study of international agricultural trade is specialization, and the doctrine of comparative advantage, which is made possible by the exchange mechanism, was based on the theory of comparative costs (Ricardo, 1817; Arene, 2008). The theory postulates that each nation or region will gain if it specializes in producing those goods and services for which its opportunity costs (in terms of the value of the goods and services foregone) are lowest, that is, where its comparative advantages are most marked or its comparative disadvantages least marked, and exchanges them for other nations'/regions' goods and services for which their opportunity costs are highest, that is, where their comparative advantages are least marked and their comparative disadvantages most marked. Intra-industry trade is therefore conceptualized as a pattern of trade

influenced by similarity in factor endowment, economic structure and preferences. Thus, the presence of demand similarities between countries and diversities between consumers, distribution of income; population, labour force; incidence of foreign investment; colonial experience; availability of raw materials and arable land; and overall geography (which may give rise to a peculiar infrastructure that in turn may generate a specific industrial complex), could interact to generate intra-industry trade among ECOWAS sub-regional trading partners. So, the problems include, which factors are responsible for the occurrence of intra-industry trade in residues and wastes from food mill industry? Will increased intra-industry trade especially in residues and wastes help in deepening regional integration in ECOWAS? What policy options should be offered in a bid to improve intra-industry in the products within ECOWAS sub-region?

The justification of the study is linked to Grubel-Lloyd (1975), Helpman (1985), Davis (1999), Ruffin (1999), Otshow and Jouq (2002), opinions that intra-industry trade is more beneficial than inter-industry trade because it stimulates innovation and exploits economies of scale. This and more are required by ECOWAS among other sub regional groupings in Africa, given that residue and waste products abound in the prepared foodstuffs industry within the sub region and trade in them would help to deepen economic integration. More so, productive factors do not switch from one industry to another, but within industry; hence, making intra-industry trade less disruptive than inter-industry trade and both constitute important segments of international trade (Ruffin, 1999; Vani and Gandhi, 2004).

2.0 Theoretical Foundation

Over the last three decades when economists tried to examine the complexities of world trade, it was found that countries with related factor endowments engaged in more trade than countries with different factor endowments as predicted by Hecksher-Ohlin-Sasmuelson's classical model of comparative advantage in 1933. Again, standard customs union theory, as articulated by Viner (1950), predicted increased inter-industry specialization, and trade, and its wake brought serious adjustment frictions. Essentially the intra-industry trade research programme was initiated by several researchers probing for the effects of the establishment of the (then) European Economic Community on trade patterns. Notable among these authors were Verdoorn (1960), Dreze (1961), and Balassa (1965). This surprising discovery led to the prediction (Balassa, 1966) that adjustment to European integration would be smoother than expected, because frictions associated with reallocating resources within as opposed to between industries would be less. This deficiency in factor endowment theory caused substantial literature to emerge attempting to explain the new trend in international specialization and trade pattern. The central point in those studies was the abandonment of factor endowment assumption and the adoption of the concept of intra-industry trade. Intra-industry trade occurred horizontally when industries produced different varieties of a

given good which were close substitute in consumption and production, while vertical intra-industry trade occurred when different qualities of a given variety were produced (Krugman, 1979; Lancaster, 1980; Greenaway, Lloyd and Milner, 2001). In our own scenario, intra-industry trade occurs between Nigeria and ECOWAS trading partners, especially in prepared foodstuffs product subsections-residue and wastes from food mill industry given the similarities in their factor endowments. This is because the existence of intra-industry trade, especially in bilateral exchange between countries is determined by nations with similar economic structures e.g. similar relative factor endowments, income per capita, consumer behaviour, income, and similarity of taste (Grubel Lloyd, 1975). It is hypothesized that in a situation where the pattern of trade reflects comparative advantages based on dissimilarities of economic structures, the scope for intra-trade is limited in relation to that in which there is also trade based on similarities of factor endowments. Put differently, the scope and rate of inter-trade expansion are augmented by intra-industry trade which reflects a similarity of economic structures exists side by side with inter-industry trade reflecting differences in economic structure.

Stone (1997) maintained that the determinants of intra industry-trade have two facets namely, regional characteristics and industrial based. The regional characteristics are macroeconomic which according to him include income level and relative capital/labour ratio, as well as similarity in per capita income, total income among others. The effect(s) of regional characteristics such as Nominal GDP, per capita income, country size(population), per cent of agric. in GDP, component of demand in per cent GDP, Geographic proximity, foreign direct investment among other factors, on intra-industry trade were not known. Industrial based characteristics include: - product differentiation, scale of economies, industry specific cost structure and transportation costs.

3.0 Methodology

The instances of intra-industry trade in residues and wastes from food mill industry between Nigeria and ECOWAS sub-regional partners were the major focus of the study. The United Nations Harmonized System of Trade Classification (HS) sections IV (prepared foodstuffs section) and the product sub-sections were assessed to underpin the instances of intra-industry trade, especially in residues and wastes subsection. Export values were reported free-on-board (f.o.b), while import values consisted of costs as well as freight and insurance costs (c.i.f) in Nigerian currency. The expression of the volume of trade in current values instead of constant was not a problem given that the values were merely used to evaluate the Grubel Lloyd indices for various years under review.

The objectives of this study are to: (i) review the pattern of regional trade in prepared foodstuffs at the instance of Nigeria (ii) assess intra-industry trade in residue and wastes from food industry (iii) evaluate the share of intra-industry trade in the total trade of residue and wastes

among ECOWAS partner nations (iv) determine the effects of regional characteristics on the intra-industry trade of the product sub-section.

Trade data on simultaneous exports and imports of the products were collected from Federal Office of Statistics now National Bureau of Statistics (1981-2010) publications. Data on regional characteristics such as GDP nominal, GNI per capita, size (population), foreign direct investment, value added by manufacturing, agriculture value added, household final consumption expenditure, and government final consumption expenditure were country specific and obtained from the United Nations Statistics Division (1981-2010).

Descriptive statistics were used to achieve objectives (i) and (ii), while objective (iii) was achieved by employing the Grubel-Lloyd approach of measuring intra-industry trade index, and objective (iv) was achieved by applying the binary logistic analytical technique.

3.1 Model Specification

The intra-industry trade indices for the 30 year review period were estimated by the following specifications:

$$G_J^* = IIT_j = 1 - \frac{X_j - M_j}{X_j + M_j} \qquad \text{..... (1)}$$

Where;

G_J^* = Grubel Llyod index

IIT = Intra-Industry Trade in product, j

X_j = Exports of product, j

M_j = Imports of product, j

The dependent variable of the function was a dummy variable obtained for each year by the above relationships and lies within the range (0, 1), i.e. dichotomous. To ensure that the predicted values were also limited to the interval, a logistic function was employed and a non-linear least squares technique that permits inclusion of zero values was used for the estimation (Balassa, 1986; Balassa and Bauwens, 1987, Lee and Lee, 1993; Musonda, 1994). This was done by assuming that there was an underlying response variable G_j* defined by the logistic regression relationship

$$G_j* = \beta' xi + \mu_i \qquad (2)$$

Where;

G_j* = Grubel-Ldloyd index

β = Coefficients of xi, s

X_i = Vector of explanatory variables ($x_1, x_2, x_3, x_4, \ldots\ldots x_n$) (national and partners' characteristics);

μ = Error term

3.2 Model Specification for Intra-industry Trade in Residues and Wastes from Food Mill Industry

The Grubel-Lloyd index would have policy implication when analyzed using binary logistic model to determine the factors that significantly influence intra-industry trade in residues and wastes within the sub-region. The implicit and explicit forms of the model are as shown below:

$$G_j^* = f(X_1, X_2, \ldots X_n + \mu i) \quad (3)$$

Where;

G_j^* = Estimated Grubel-Ldloyd index

X_1 = National GDP ($)

X_2 = Partners' GDP ($)

X_3 = National Population

X_4 = Partners' Population

X_5 = National Value added by Manufacturing ($)

X_6 = Partners' Value Added by Manufacturing ($)

X_7 = National Agricultural Value Added ($)

X_8 = Partners' Household Final Consumption Expenditure ($)

X_9 = National Final Consumption Expenditure ($)

μ_i = Stochastic error term

4.0 Results and Discussions:

Results and discussions are presented under the following subheadings: - Exports of Prepared Foodstuffs Subsections of HS Section IV, Imports of Prepared Foodstuffs Subsections, Classification of Intra-Trade in Residue from Food Industry, Determinants of Intra-industry Trade in Residues and Wastes from Food Mill Industry, Test of the Significance of the Coefficients Intra-Trade in Residue from Food Mill Industry, Decisions, Recommendations, and conclusion.

4.1 Exports of Prepared Foodstuffs Subsections of HS Section IV

Table 4.1 presents Nigeria total export values of prepared foodstuffs section to ECOWAS regional partners. The sub-sections of prepared foodstuffs where intra-industry trade took place include residues and wastes from food mill industry, cereal preparations, miscellaneous preparations, beverages, and tobacco. Other prepared foodstuffs subsections where intra –industry trade did not

take place are sugar and Sugar confectionary, Cocoa and cocoa preparations, and preparation of vegetable fruit and nut. The trend shows that the export values of this section increased steadily from 1986 through the end of 2000, when exports dwindled. However, exports ranged from ₦3.87 million between 1981 and 1985 to ₦1,324.73 million between 2006 and 2010. This implies a substantial increase in the market share of the section and gain in revenue.

Table 4.1: Nigeria's Exports of Prepared Foodstuffs Subsections to ECOWAS Partners

Sub Sections Year	Cereal Prep.	Misc. Prep.	Beverages	Residues from Industry	Tobacco	Exports Section IV to ECOWAS	Exports Section IV to ROW
81-85	0.0	0.0	0.001	0.012	0.0	3.87	224.8
86-90	0.0	19.28	0.13	0.03	0.01	26.37	681
91-95	0.0	57.83	0.07	0.0	0.26	64.47	2,237.7
96-00	.06	170.02	0.3	0.0	6.55	297.75	5,018.1
01-05	64.35	16.22	0.07	0.0	0.03	85.8	3,515.4
06-10	10.6	59.61	34.44	39.74	91.35	1,324.73	33,096.7

Source: FOS1979-1987 and NBS 1988-2010 Foreign Trade Data.

The exports of miscellaneous preparations started in 1986, reached a record high in 2000 before it slumped in 2001 by ₦153.8 million or 90.46 percent, from ₦170.02 million to ₦16.02 million; implying loose of market grip. Between 1981 and 1985 export trade were evident in beverages but showed fluctuations, rising and falling. With regard to beverages, export trend are inconsistent, rising and falling; a situation that make products unavailable, and may culminate to reduced market share or lack of patronage.

4.2 Imports of Prepared Foodstuffs Subsections (₦' millions)

Nigeria's total imports of prepared foodstuffs subsection were on the increase from 1981 to 2010. Table 4.2 reveals that mean import values of this section IV from the world ranges from ₦503.4 million between 1981 and 1985 to ₦113,749.2 million between 2006 and 2010, while her imports of the same section from ECOWAS partners ranged from ₦1.17 million to ₦2,037.5 million within the periods under review.

Table 4.2: Imports of Prepared Foodstuffs Subsections (₦' millions)

Sub Sections Year	Cereal Prep.	Misc. Prep.	Beverages	Residues from Industry	Tobacco	Imports Section IV from ECOWAS	Imports Section IV from ROW
81-85	0.15	0.3	0.02	0.03	0.02	1.17	503.4
86-90	0.1	0.14	0.05	0.01	0.76	1.22	598.5
91-95	0.21	0.35	0.64	0.03	11.83	17.39	5,064.0
96-00	3.96	4.77	5.12	0.7	32.72	116.44	16,222.5
01-05	111.77	0.98	129.42	5.88	174.52	980.47	61,268.2
06-10	387.13	411.58	330.08	57.05	299.51	2,037.5	113,749.2

Source: computed from FOS1979-1987 and NBS 1988-2010 Foreign Trade Data.

The imports of cereal preparations and miscellaneous preparations started between 1981 and 1985, but slumped in 1990; started to rise between 1991 and 1995, reached a record high between 1996 and 2000, but miscellaneous edible preparations imports slumped again between 1991 and 1995. However, it continued to rise from 2006 up to 2010.

4.3 Classification of Intra-Trade in Residue from Food Industry

The classification table for intra-industry trade in residues and wastes from food mill industry shows that 66.7% of our intra-industry observations (value = 0), and 100% of our inter-industry trade observations (value =1), were correctly classified, yielding a total correct classification of 83.4. The model distinguished successfully between intra-industry trade and inter-industry trade given the logistic predicted values and the cut values.

4.4 Determinants of Intra-industry Trade in Residues and Wastes from Food Mill Industry

The determinants of intra-industry trade in residues and wastes from food mill industry are discussed below. However, the variables that produced insignificant results are national GDP, partners' household final consumption expenditure, and national final consumption expenditure, X_1, X_8 & X_9, respectively (Table 4.4).

Table 4.4: Determinants of Intra-industry Trade in Residue from Food Mill Industry

		B	S.E.	Wald	df	Exp(B)
Step						
1(a)	X1	.001	.001	.100	1	1.000
	X2	.009	.005	3.24	1	1.009
	X3	-2.174	1.309	2.758	1	.114
	X4	23.720	13.856	2.931	1	2E+010
	X5	.002	.001	4.000	1	1.002
	X6	-.044	.029	2.302	1	.957
	X7	-.168	.110	2.333	1	.999
	X8	-.018	.032	.316	1	.983
	X9	-.137	.109	1.581	1	.872

a Variable(s) entered on step 1: X1, X2, X3, X4, X5, X6, X7, X8, X9.

X_2 = **Partners' GDP:** The coefficient is .009, while the standard error is .005. A Wald statistic of 3.240 is significant at 1% level. The positive value of the logistic coefficient means that, as partners' GDP increases, the chances of intra-industry trade occurring in residues and wastes from food mill industry increases by 1.009.

X_3 = **National Population:** The coefficient (B) is -2.174. The standard error is 1.309 and the Wald statistic is 2.759. The significant level is .097. So, since .097 is larger than .05, we concluded that this variable is significant at 10% level. The logistic coefficient produced an odds multiplier less than one. The negative value indicates that the variable decreases the odds of reporting. In this case, we inferred that **as** national population decreases the chances of intra-industry trade in residues and wastes from food industry trade decreases by .114 among the trading partners within the ECOWAS sub-region.

X_4 = **Partners' Population:** The coefficient is 23.72, while the standard error is 13.856. The Wald statistic is 2.931, and the significant level is .087. The logistic coefficient is a positive value indicating that, as partners' population increases the chances of intra-industry trade in residues and wastes from food industry would also increase. Since the significant level .087 is larger than .05, this variable is significant at 10% level.

X_5 = **National Value Added by Manufacturing:** The logistic coefficient (B) is .002 and the standard error is .001. The positive logistic coefficient value indicates that the variable increases the odds of reporting. So, it was inferred that, as national value added by manufacturing increases, the chances of intra-industry trade in residues and wastes from food industry increases by 1.002 among the trading partners within the sub-region. The Wald statistic of 4.000 is significant at 1% level.

X_6 = **Partners' Value Added by Manufacturing:** The logistic (B) coefficient is -.044 and the standard error is .029. The Wald statistic is 2.302, which is significant at 5% level. The negative logistic coefficient value indicates that the variable decreases the odds of reporting. So, it was inferred that, as partners' value added by manufacturing decreases, the chances of intra-industry trade in residues and wastes from food mill industry decreases by .957 within the sub-region.

X_7 = **National Agriculture Value Added:** The coefficient is -.168 and the standard error is .110. The Wald statistic is 2.333 is significant at 5% level. The negative value of the coefficient indicates that, as partners' value added by manufacturing decreases the probability of intra-industry trade occurrence in residues and wastes from food mill industry by .999 within the sub-region. Since the average $R^2 = .68$, it indicates that 68.0% of the variations in the trade values were explained by these exogenous variables

4.5 Test of the Significance of the Coefficients Intra-Trade in Residue from Food Mill Industry

Null Hypothesis: $H_o: b_1 = 0$, (That national and partners' characteristic do not significantly influence intra-industry trade in agricultural commodity).

Against the alternative hypothesis: $H_1: b_1 \neq 0$ (That national and partners' characteristic have significant influence on intra-industry trade in agricultural commodity). The Wald test, described by Polit (1996) and Agresti (1990), is one of a number of ways of testing whether the parameters associated with a group of explanatory variables are zero. If for a particular explanatory variable, or group of explanatory variables, the Wald test is significant, then it would be concluded that the parameters associated with these variables are not zero, so that the variables should be included in the model. From the model chi-square, we see that the model is adequate (p=.0001). This was concluded from the following output. That the model (p = .002) means the model is significant beyond (p = .002)

4.6 Decisions:

Since the model p=.002, the model is significant, which means that not all $b's$ are zero. So, the null hypothesis is rejected; since partners' GDP, national Population, partners' population, and national value added by manufacturing are all significant, at 1% level each, while partners' value added by manufacturing and national agriculture value added are both significant at 5% level each. The inference drawn is that partners' GDP, national population, partners' population, and national value added by manufacturing, partners' value added by manufacturing and national agriculture value added have significance influence on intra-industry trade in residue from food industry among the partner nations within the ECOWAS sub-region

5.1 Recommendations

Based on the findings, the following recommendations were made.

(1) All national stakeholders should employ efficient methods and tools in production of raw materials for prepared foodstuffs industry given that population negatively influence trade on residues and wastes from food industry.

(2) Regional partners and national stakeholders should improve value addition to promote intra industry trade within the sub-region, in view of the negative effects of partners' value added by manufacturing and national agriculture value added on intra-industry trade on residues and wastes.

(3) During the Economic Partnership Agreements' Negotiations (EPAs), regionally traded products of prepared foodstuffs such as Beet pulp, bagasse and other waste of sugar man; Flours, meals and pellets of fish, etc unfit for human consumption; Oil-cake and other solid residues, of groundnut; Other preparations of a kind used in animal feed among others should be exempted from tariff removal irrespective of the volume of trade. It is expected that sustained intra-industry trade in these products will deepen regional integration as well as promoting ailing regional markets.

(4) What should be held paramount among the negotiators of EPAs is the evidence of trade but not the volumes of trade- giving room for growth for the need of ECOWAS regional integration and market sustenance.

5.2 Conclusion

There is need to improve substantially the manufacturing capacity of ECOWAS sub-region to improve the volume of intra-regional trade of both residues and wastes from food mill industry and other products of the prepared foodstuffs. This would reduce drastically the exports of primary products within the section, prices of which are volatile and exogenously determined. For the sub-region to realize maximum benefits from globalization, she has to diversify her production base and

export commodities that have value addition. Improving the sub-regions' manufacturing capacity will help her become a less disadvantaged player in the world economy, especially in the light of the proposed economic partnership agreements with the European Union that may inevitably entail the establishment of a free trade area between West Africa and the European Union. Hitherto, there is the need for policy makers to continue to make concerted efforts to ensure the effective implementation of the ECOWAS trade liberalization scheme and to stimulate the private sector to enhance value addition to the manufactured products of agricultural origin within the community. This is important, not only to sustain horizontal differentiation (i.e. different varieties of a given good), of prepared foodstuffs and vertical differentiation (i.e. different qualities of a given variety) of agricultural products in general, but in making sure that intra-regional trade would be sustained and improved, given the level of competition her economy would be subjected to when the economic partnership agreement (EPAs) between the ECOWAS and the European Union (EU) goes into operation. Therefore, efforts to reach the millennium development goal of reducing poverty by 2015 from its 1990 level should also be intensified through adoption of the appropriate measures within the ECOWAS sub-regions.

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