



## Determinants of Intra Sub-Saharan African Trade: Evidence from ECOWAS and CEN-SAD Countries

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### ABSTRACT

This study investigates the determinants of intra-regional trade in the Economic of West African States (ECOWAS) and the Community of Sahel-Saharan States (CEN-SAD) over the period of 1995-2018. The study employs the modified Poisson models, which captures the source of zero counts. Data on the real exchange rate, population, and gross domestic product were sourced from World Bank Development Indicators. Import flow, time of import, and time of export were computed from WITS (COMTRADE). Further, the study obtained data on voice and account, law and order, government effect, regulatory quality, reduction in political violence, control of corruption from World Wide Governance indicator. The results of the study indicated that imports within ECOWAS are driven by one governance variable or the other either in the importing countries or the partner countries. Besides, trade facilitation is a binding constraint to imports, while population and GDP are important drivers of intra-ECOWAS trade. For CEN-SAD, it is evident that the gravity variables are responsible for imports, whereas governance variables have no significant effect on imports. The implication of these results is that authorities in ECOWAS and CEN-SAD should strengthen governance institutions as doing so will boost trade within the region. Also, it is necessary for government, particularly in CEN-SAD, to come up with policies that will allow for accountability and transparency.

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## 1. Introduction

International trade plays a pertinent role in any economy, and the volume of trade between two or more countries goes a long way in determining the strength of the relationship between the trading partners. According to UNCTAD and UN (2014), higher trading activities induce economic growth and helps nations to achieve development goals such as poverty reduction, employment, and environmental sustainability. This is because trade leads to the inflow of finance, technology, and services needed to improve productive capacity in agriculture, industry, and service sectors. The growth and the development effect of trade are evident in East Asia and South-East Asia where economic growth was attributed to the ability East Asia and South-East Asia to strengthen competitive productivity and increase the export level in the agricultural and textile sectors (UNCTAD and UN, 2014). Trade has a bearing on the job creation and standard of living of the populace. The channel through which trade leads to job creation is strongly linked to productivity growth. According to UNCTAD and UN (2013), higher trading activities provide nations the opportunity to access foreign technology and foreign direct investment needed to enhance productivity. The increase in the level of productivity strengthens the competitiveness of the trading nations. Competition promotes innovative solutions, which in turns leads to the production of more goods and services, enhance the exports capacities of the country, and generate employment opportunities. As

more people are employed, labour income increases and people become more financially buoyant. The result is a decline in poverty level and improvement in the standard of living of the populace (Goff and Singh, 2014). Further, trade enables local firms to access a better, higher and cheap variety of inputs which lower their production, costs of goods and increases the availability of a variety of products and services (UNCTAD and UN, 2014). Moreover, an increase in trade participation exposes firms to foreign technologies that make production more efficient and reduce the use of environmentally harmful substances (OECD, 2019).

Given the enormous roles of the cross-border trade coupled with the need to address the marginalization of developing countries particularly Africans in a multi-polar world dominated by trading blocs in North America, Europe, South-East Asia, and China, the promotion of improved trading activities in favour of developing countries particularly neighboring African countries is imperative (Madyo, 2008). Higher trading activities among the neighboring African countries will serve as a “buffer” against the negative impact of global trade, boost intra-African investment, and promote economic development (Onyido, Bolu, and Owoyemi, 2018). Obviously, intra Su-Sahara Africa (SSA) trade is low when compared with other continents such as Asia, America, and Europe.

Specifically, intra-SSA trade averaged 15 percent between 1995 and 2015 while trade within Asia between 1995 and 2015 accounted for 58 percent, intra-European trade averaged 72 percent, and intra-America trade posted an average of 57 percent. This suggests that while other continents trade more within themselves, SSA trade less and, by implication, the SSA is vulnerable to external shocks from their trading partners outside the region (NCTAD, 2017). To protect SSA from external shocks and promote intra-SSA trade flow, a clear understanding of the factors that hinder or improve the geographical or regional flow of trade is required. This is because trade policy authorities in individual countries can only formulate appropriate policies that will promote the geographical distribution of trade flows when the factors that deter regional trade flow are known.

Realisation of the need to know the factors that deter or promote geographical distribution of trade flows has partly contributed to the emergence of a number of theoretical and empirical studies along this direction, including Tinbergen (1962), Frankel, Stein and Wei (1995), Geda and Kebret (2007), Hartzenberg (2011), Kagochi and Durmaz (2018) as well as several others. Despite the extensive theoretical and empirical studies on the factors that hinder or promote intra-SSA trade, gaps still exist in the literature. Notably, there is still the need to know the factors that influence intra-trade within the SSA-RECs, specifically ECOWAS and CEN-SAD. Also, the role played by trade facilitation and governance institutions within ECOWAS and CEN-SAD trade needs to be examined. It is an attempt to fill these gaps that have motivated this study. The similarities in their characteristics motivate the choice of ECOWAS and CEN-SAD. For instance, the minimum imports in both ECOWAS and CEN-SAD blocs are the same, and none of the countries in the regions colonized the other. Also, all the countries in the ECOWAS and CEN-SAD are landlocked and have similar trade policies.

Following the above background, the rest of the paper is arranged as follows: Section 2 reviews the theoretical and empirical literature; Section 3 discusses the data and methodology used in the study. Section 4 reports the empirical results and discussion. Finally, Section 5 presents the conclusions and policy implications of the study.

## 2. Theoretical and Empirical Review

The most common theory of economic integration is the gravity theory. The gravity model of trade was developed by Tinbergen (1962) and it has been used to increase the understanding of inter-regional and international flows. The theory explains the amount of trade flow between two countries and this has been postulated to be positively affected by economic size of the two countries, and negatively affected by trade costs (transport cost and other costs). The mathematical specification of the gravity model is as follows:

$$x_{ij} = \alpha_0 + \alpha_1 y_i + \alpha_2 y_j + \alpha_3 n_i + \alpha_4 n_j + \alpha_5 d_{i,j} + \alpha_6 p_{ij} + e_{ij}$$

1

Where  $x_{ij}$  is export from country  $i$  to country  $j$ .  $y_i$  and  $y_j$  are income of exporting country  $i$  and  $j$  respectively, a proxy of production capacity or capital stock for each country,  $n_i$  and  $n_j$  is population of each country and  $P_{ij}$  is a dummy that takes a value of 1 if both country are member of a particular PTA and zero if otherwise. The theoretical foundation of the gravity model is divided into two. The first is the assumption of full specialization in production while the second aspect is the assumption of incomplete specialization (Evernett and Keller, 1998) in a two-country analysis.

Frankel, Stein and Wei (1995) employed gravity model to examine bilateral trade pattern, throughout the world. Within the Hemisphere, MERCOSUR and the ANDEAN pact countries functioned as independent trading areas. They introduced dummies for the EA, the EC and the NAFTA to test the effects of membership in a common regional grouping studied for Asia, European countries and North America. According to them, intra-regional trade is greater than could be explained by natural determinant. The NAFTA functions as independent trading areas but much less than the ANDEAN pact. Their findings revealed the evidence of trading blocs in the Western Hemisphere and elsewhere. Further, they reported that intra-regional trade bias within MERCOSUR increased the most rapidly during period under review. In the East Asia, increased intra-regional trade is explained by the rapid growth of the economies.

Portugal-Perez and Wilson (2010) used the dataset obtained from the World Bank Indicators and employed factor analysis and a statistical modeling technique to explain the correlation among a set of observed variables through an unobserved 'common factor'. The results of their analysis revealed that trade facilitation reforms is important for export performance in the developing countries. In addition, they submitted that marginal effect of infrastructural improvement on export per capita income is more pronounced and that trade facilitation is associated with reduction of behind border transactions costs.

Moise, Thomas and Minor (2011) constructed 12 trade facilitation indicators based on the main policy areas in the WTO negotiation and investigated the effects of those indicators on trade cost and volume. For OECD, they concluded trade facilitation indicators have greatest impact on trade outcome. Sen et al. (2013) analysed the early effects of bilateral and regional preferential trade agreement (PTA) of the 10-member associations of South East Asian Nations (ASEAN) as well as Australia, New Zealand, China, India, Japan and Korea between 1994 and 2006. The results of their augmented gravity model suggested that multilateral PTAs have a more significant impact; relative to bilateral PTAs in stimulating trade among the ASEAN-6 countries.

Trivić and Klimczak, (2015) used an augmented version of the gravity model to examine the determinants of bilateral trade among the Western Balkan countries between 1995 and 2012. The study considered economic, and non-economic factors influencing bilateral trade as suggested by theories. It founds out that war, one year post-war and other non-economic factors influence bilateral trade flows than the economic determinants of bilateral trade flows in the Western Balkan region. Zannou, (2010) used the pooled form of gravity model to study the dynamics of bilateral trade flows in the ECOWAS region. The study considered the role of monetary and geographical dynamics of intra-regional trade and found that appreciation of national currencies reduces the volume of bilateral trade while the degree of openness expands the level of bilateral trade in the region.

Furthermore, Hillberry and Zhang (2015) used the OECD trade facilitation indicators to quantitatively describe trade facilitation policy. They estimated the time required for customs clearance at the port and a custom performance index and they submitted that time spent for customs clearance is inversely related to trade. Unlike Hillberry and Zhang (2015), Peterson (2015) looked at the role played by conflicts in PTAs from 1961 to 2000 by using a triadic extension of the gravity model of trade to estimate how an exclusive PTA influences the exports of non-members relative to PTA members. Their results indicated that PTA induced trade distortions are associated with higher likelihood of conflict between members and non-members.

However, to the best of our knowledge, there exist an inconsistency in the signs of parameters of other variables that determine intra-regional trade. The inconsistency may be due to the technique used. Hence, this study tends to cover this gap by using a new method called the Negative Binomial Pseudo Maximum Likelihood (NBPML). NBPML is better than the techniques used in the existing literature, most especially the Heckman selection model extended by Helpman et al, (2008) and Linders and De Groot (2006) because it gives robust results, it is less restrictive and do not require an instrument for the second stage of the regression. Another distinct feature of this study is the ability to compare the estimates of intra-regional trade of two sub-regions that have similar characteristics.

### 3. Data Issues and Methodology

#### 3.1 Model Specification

The study investigates the determinants of intra-SSA trade using the gravity model which has been used extensively in the international trade literature (see Portugal-Perez and Wilson, 2010 and Hoekman and Shepherd, 2015). The gravity model is adopted because it has lends itself to explaining many additional complexities regional trade agreements (Cernat et al., 2003), commonality of language (Hutchinson, 2002) among others. The estimated model is specified as follows:

$$M_i = \beta_0 + \beta_1 \text{LOGGDP}_{-exi} + \beta_2 \text{LOGGDP}_{-impi} + \beta_3 \text{LOGPOP}_{-exi} + \beta_4 \text{LOGPOP}_{-impi} + \beta_5 \text{LOGDIS}_i + \beta_6 \text{CL}_i + \beta_7 \text{LL}_{-exi} \\ + \beta_8 \text{LL}_{-pat} + \beta_9 \text{LL}_{bothi} + \beta_{10} \text{EX\_TTM}_i + \beta_{11} \text{IMP\_TTX}_i + \beta_{12} \text{EXP\_REER}_i + \beta_{13} \text{IMP\_REER}_i \\ + \beta_{14} \text{VA}_{-exi} + \beta_{15} \text{VA}_{-impi} + \beta_{16} \text{LO}_{-exi} + \beta_{17} \text{LO}_{-impi} + \beta_{18} \text{GE}_{-exi} + \beta_{19} \text{GE}_{-impi} + \beta_{20} \text{RP}_{-exi} \\ + \beta_{21} \text{RP}_{-impi} + \beta_{22} \text{CC}_{-exi} + \beta_{23} \text{CC}_{-impi} + \beta_{24} \text{RQ}_{-exi} + \beta_{25} \text{RQ}_{-impi} + \mu_i$$

Where M is trade flows measure by import flow, LOGGDP is the natural log of gross domestic product, LOGPOP represents the natural log of population, LOGDIS is the natural log of distance, CL denote common language, LL stands for landlocked, TTM is time of import, TTX represents time of export, REER denotes real effective exchange rate, VA is voice and account, LO represents law and order, GE is government effect, RQ stands for regulatory quality, RP is reduction in political violence, CC denotes control of corruption, and RQ stands for regulatory quality.  $\mu$  is error terms, ex stands for export, imp denotes import while  $i = \text{ECOWAS, CEN-SAD}$ . The a priori expectation is expressed geometrically as follows:  $\beta_1 - \beta_4 > 0$ ,  $\beta_5 < 0$ ,  $\beta_6 > 0$ ,  $\beta_7 - \beta_9 < 0$ ,  $\beta_{10} - \beta_{25} > 0$

#### 3.2 Estimation Techniques

Descriptive statistics was employed to analyse the features of the variables and Equation 3 was estimated using the Negative Binomial Pseudo Maximum Likelihood (NBPML). The NBPML is a two-steps method which contains a logit or probit regression of the probability of no bilateral trade, and a Poisson regression of the probability of each zero count for the country pairs that have non- zero probability or interaction intensity other than zero. The NBPML approach capture the source of the zero counts by separating country pairs possessing strictly zero trade flows from those that have non-zero probability of having non-zero-valued trade flows. NBPML is better than the techniques used in the existing literature, most especially the Heckman selection model extended by Helpman et al, (2008) and Linders and De Groot (2006) because it gives robust results, it is less restrictive and do not require an instrument for the second stage of the regression. Moreover, the bias that results from the logarithmic transformation in the second part of the Heckman selection model is avoided because of the multiplicative nature of the equations used.

#### 3.3 Sources and Types of Data

The study obtained data on real exchange rate, population and gross domestic product between 1995 and 2016 from Word Bank Development Indicators while data on import flow, time of import, and time of export were computes using data from WITS (COMTRADE). Data on voice and account, law and order, government effect, regulatory quality, reduction in political violence, control of corruption were obtained from World Wide Governance indicator and finally, the study used dummies for common language and landlocked (1 if a country is landlocked and zero otherwise).

## 4. Interpretation of Results and Discussion

### 4.1 Descriptive Statistics

Table 1 revealed that the minimum import for both the ECOWAS and CEN-SAD was zero. This suggests that there are instances in which bilateral imports did not take place or was unreported in the period. This is the first evidence of zero trade observation that necessitates the utilization of poison maximum likelihood. Further, the descriptive analysis of the ECOWAS regional bloc indicated that the observation was mostly 1,323 even though there are some variables where the observations were short of this. Imports within ECOWAS averaged \$39304.70 million compared to CEN-SAD which stood at \$30109.35 million. Hence the value of ECOWAS imports is greater than the values of import with CEN-SAD. Consequently, ECOWAS imports more among themselves, in terms of values, than CEN-SAD.

**Table 1: Descriptive Statistics**

Variables	ECOWAS				CEN-SAD			
	Obs.	Mean	Min.	Max.	Obs.	Mean	Min.	Max.
IMPORTS (MILLION \$)	1323	39304.70	0.00	2886629.00	1512	30109.35	0.00	2886629.00
GDP -imp (BILLION \$)	1323	5915.21	0.13	95177.70	1368	9305.30	0.78	131813.00
GDP-exp (BILLION \$)	1323	5915.21	0.13	95177.70	1512	7521.50	0.13	95177.70
POP -imp	1323	27.33	1.07	182.20	1512	26.51	1.07	182.20
POP -exp	1323	25.05	1.07	182.20	1512	22.00	1.07	182.20
CL	1323	0.33	0.00	1.00	1512	0.39	0.00	1.00
DIS	1323	1170.81	208.57	2337.69	1512	3087.64	208.57	7899.73
LL -imp	1323	0.33	0.00	1.00	1512	0.22	0.00	1.00
LL -pat	1323	0.25	0.00	1.00	1512	0.22	0.00	1.00
LL -both	903	0.07	0.00	1.00	861	0.05	0.00	1.00
EX_TTM	1323	13.94	0.00	59.00	1512	11.54	0.00	49.00
IMP_TTX	1323	12.37	0.00	59.00	1512	12.65	0.00	59.00
IMP_REER	1323	49.38	0.00	269.20	1512	49.16	0.00	269.20
EX_REER	1323	54.34	0.00	269.20	1512	47.74	0.00	269.20
VA -imp	1323	0.46	0.08	0.75	1512	0.43	0.08	0.67
VA -ex	1323	0.46	0.08	0.75	1512	0.48	0.08	0.92
LL -ex	1323	0.47	0.17	1.00	1512	0.48	0.17	1.00
LL -imp	1323	0.45	0.17	1.00	1512	0.45	0.08	1.00
GE -imp	1323	0.25	0.00	0.75	1512	0.25	0.00	0.75
GE -exp	1323	0.26	0.00	0.75	1512	0.36	0.00	0.75
PV -ex	1323	0.67	0.44	0.88	1512	0.64	0.28	0.88
RQ -imp	1323	0.51	0.09	0.77	1512	0.50	0.00	0.77
RQ -ex	1323	0.52	0.09	0.77	1512	0.56	0.09	0.95
PV -imp	1323	0.67	0.44	0.88	1512	0.64	0.28	0.88
CC -ex	1323	0.34	0.00	0.83	1512	0.36	0.17	0.67
CC -imp	1323	0.36	0.00	0.83	1512	0.39	0.00	0.83

The maximum intra-ECOWAS and intra-CEN-SAD imports is \$2886629.00 and \$2886629.00 respectively. The average GDP of ECOWAS countries as a whole and within the time period was \$5,915.211 billion. The population of the regional bloc averaged 27.33 million while the average distance in ECOWAS was 2082.86 kilometers. No country was colonized by any country in the regional bloc but some of the countries are landlocked. The maximum time to export in ECOWAS was 59 days but the average time to export was 13.9 days. A look at the properties of the governance indicators indicates that governance institution in ECOWAS is weak. This weak governance institution could have implication on the trade within the region. Meanwhile, the GDP in the CEN-SAD region averaged \$9,305.30 million while maximum GDP was \$131,813 billion. Just like the ECOWAS countries, some countries in CEN-SAD are landlocked and they trade among themselves. Time to export in the region was as low as 49 days when compared with export duration of other regions earlier discussed.

The properties of the variables for ECOWAS and CEN-SAD indicated that there is no much difference between trade in ECOWAS and CEN-SAD countries. The minimum and maximum imports in both blocs are nearly the same. Another feature in the characteristics of the variables is that no country colonized any other country in any of the regions and the countries in the two regions have landlocked countries.

### 4.2 Determinants of Intra-ECOWAS Trade Flow

Table 2 reports the determinants of intra-ECOWAS imports. Imports among ECOWAS are significantly driven by all gravity variables considered in the model. Further, trade

facilitation, exchange rate and a considerable numbers of governance indicators significantly explain import demand within ECOWAS region. Starting from the gravity variable, increase in the exporters GDP improves importation among member countries. The same also goes for the GDP of the importers. However, the responsiveness of imports to the GDP of importing countries was faster than the responsiveness to the GDP of the exporting countries. The responsiveness of imports to GDP of the importing countries hover around 0.2% and 0.3% whereas the responsiveness of imports to exporter' GDP hovers around 0.1% and 0.2%. Hence, more income in the importing countries will lead to increase in imports within the countries.

**Table 2: Estimation of the Determinants of Intra-ECOWAS Trade Flow**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LogGDP-exp	-0.0590 (-1.00)	0.171** (2.22)	0.174** (2.20)	0.184** (2.51)	0.481*** (6.86)	0.197** (2.54)	0.288*** (4.30)	0.197*** (2.72)
Log GDP-imp	0.324*** (7.34)	0.312*** (6.98)	0.314*** (7.13)	0.302*** (6.80)	0.264*** (6.23)	0.304*** (6.70)	0.335*** (7.76)	0.331*** (8.00)
LogPOP-exp	1.333*** (12.41)	0.916*** (5.96)	1.054*** (6.62)	0.560*** (2.91)	1.157*** (9.01)	1.110*** (5.80)	1.214*** (8.86)	0.851*** (6.15)
LogPOP-imp	0.889*** (6.20)	0.676*** (4.28)	0.577*** (3.66)	0.750*** (4.55)	0.829*** (6.60)	0.731*** (4.56)	0.740*** (5.54)	0.773*** (5.39)
LogDIST	-0.312 (-1.34)	-0.614*** (-5.92)	-0.738*** (-6.49)	-0.613*** (-5.64)	-0.623*** (-7.00)	-0.500*** (-5.32)	-0.568*** (-6.33)	-0.577*** (-6.52)
CL	0.0277 (0.10)	-0.265 (-0.94)	-0.273 (-0.99)	-0.386 (-1.33)	-0.255 (-0.94)	-0.275 (-0.96)	-0.427 (-1.60)	-0.528* (-1.83)
LL-exp	-1.225*** (-3.10)	3.071*** (5.14)	3.381*** (5.26)	4.742*** (5.59)	0.573 (1.03)	2.059** (2.46)	0.0715 (0.11)	3.183*** (5.18)
LL-pat	-4.749*** (-14.65)	-3.731*** (-7.84)	-3.697*** (-7.62)	-4.355*** (-8.23)	-3.621*** (-8.66)	-3.763*** (-8.00)	-3.389*** (-7.04)	-4.165*** (-8.77)
LL-both	--2.816*** (4.68)	-2.440*** (4.34)	-2.344*** (4.01)	-2.055*** (3.57)	-3.304*** (5.86)	-2.573*** (4.54)	-3.434*** (6.02)	-2.908*** (5.15)
IMP_TTM		-0.0296* (-1.89)	-0.0349** (-2.23)	-0.0301* (-1.95)	-0.0161 (-1.11)	-0.0285* (-1.81)	-0.0382** (-2.41)	-0.0316** (-2.09)
IMP_REER		0.00511 (1.36)	0.00400 (1.03)	-0.000773 (-0.18)	0.00817** (2.38)	0.00579 (1.56)	0.00866** (2.45)	0.00377 (1.04)
VA-exp			-3.508*** (-3.35)					
VA-imp			-0.704 (-0.83)					
LO-imp				3.493** (2.07)				
LO-exp				-3.018** (-2.55)				
GE-exp					7.576*** (7.96)			
GE-imp					-1.487*** (-3.14)			
PV-imp						3.048 (1.64)		
PV-exp						0 (.)		
RQ-imp							8.546*** (9.19)	
RQ-exp							-2.014** (-2.22)	
CC-exp								-4.769*** (-2.67)
CC-imp								5.181*** (4.67)
Constant	-31.74*** (-12.77)	-22.43*** (-6.17)	-20.41*** (-5.36)	-19.00*** (-4.06)	-36.31*** (-10.96)	-29.08*** (-5.43)	-35.09*** (-9.98)	-24.79*** (-7.31)
lnalpha; Constant	2.220*** (45.86)	2.050*** (41.73)	2.038*** (41.45)	2.040*** (41.51)	1.966*** (39.94)	2.047*** (41.63)	1.970*** (40.01)	2.017*** (40.96)
Pseud-R	0.11	0.11	0.10	0.13	0.12	0.11	0.12	0.11
Log-likelihood	-5507.9	-5434.80	-5428.9	-5429.66	-5393.3	-5433.48	-5396.39	-5419.91
Observation	903	903	903	903	903	903	903	903

t statistics in parentheses; \*, \*\* and \*\*\* denoted significance at 10, 5 and 1 percent respectively

Population of the importing and exporting countries also contribute significantly to the behaviour of import demand in the ECOWAS region. A 1% increase in the population rate of the importing countries leads to around 0.8% increase in imports. This outcome conforms to the gravity a-priori expectation. Distance is an import inhibiting factor in this region. The Table indicates that if distance could be reduced by 1%, there will be a compensating increase in imports to the tune of around 0.6%. This magnitude falls within the bound of the import effect of distance in the gravity settings. In the same vein, if the importing country is landlocked, imports will reduce drastically. This implies that landlockedness is not import friendly in the

ECOWAS region. In fact, if both reporting (importer) and partner (exporter) countries are landlocked, imports reduces further. Hence, landlockedness is a serious binding constraint in the importation of goods in the ECOWAS region. The above signs and significance of the gravity variables are in line with the findings of previous studies such as (Trivić and Klimczak, 2015) and Zannou, (2010).

Trade facilitation is significant in explaining import dynamic in ECOWAS. However, the magnitude of effect is mild as it will take doubling of the days to import before importation could fall by around 2%. The effect of exchange rate changes on imports is not consistent across models. In the basic gravity variable, there is no significant influence of exchange rate on imports. Even where a significant effect is noted, the magnitude of effect is mild. It can hence be said that exchange rate changes is not an important driver of imports within the ECOWAS. Virtually all governance variables significantly explain imports, but most of these governance variables have negative effects.

For instance, voice and accountability of the exporting countries, law and order in the importing countries, government effectiveness in the importing countries, regulatory quality in the importing countries and control of corruption in the exporting countries have negative and significant effects. Law and order in the exporting countries, government effectiveness of the exporting countries, regulatory quality of the exporting countries and control of corruption in the importing countries have positive effect on imports. What this implies is that most governance variables of the importing countries reduce imports while most governance variables of the exporting (partner) countries improve imports. Of importance is the control of corruption where improvement in this governance variable in the importing countries leads to increase in imports while the same variables in the exporting countries act as barrier to imports.

In summary, imports within ECOWAS are driven by one governance variable or the other either in the importing countries or the partner countries. Exchange rate plays no meaningful role in intra-ECOWAS imports, trade facilitation is a binding constraint to imports, and finally, population and GDP are important drivers of imports within ECOWAS.

#### **4.3 Determinants of Intra-CEN-SAD Trade Flow**

The member countries of CEN-SAD are 24, namely Benin, Burkina Faso, Central Africa Republic, Chad, Comoros, Cote d'Ivoire, Djibouti, Egypt, Eritrea, Gambia The, Guinea, Guinea Bissau, Libya, Mali, Mauritania, Morocco, Niger, Nigeria, Senegal, Sierra Leone, Somalia, Sudan, Togo and Tunisia. Out of this 24 countries, 4 are from North Africa (Egypt, Libya, Morocco and Tunisia) and so, are excluded from this analysis.

Table 3 presents the results on determinants of intra-CEN-SAD imports. Imports within CEN-SAD is driven by the GDP of the importing countries, population of both trading partners, distance, official language, landlockedness, exchange rate of both partners, reduction in political instability and absence of violence in the exporting countries and exporter's control of corruption. Hence, while the same gravity variables are responsible for imports in CEN-SAD, trade facilitation and governance variables differ. If the GDP of the importing countries increases by 1%, import will also rise by 0.1%, hence the marginal propensity to import in the CEN-SAD region, as far as imports from member countries is concerned, is 0.1%. Increase in the population of importing countries also increases importation among member countries but distance retards importation. Also, if an exporting country or an importing country is landlocked, importation reduces. Hence, landlockedness act as a drag to imports in this region. Increase in time to import leads to increase in importation within CEN-SAD region. This outcome contradicts the expected result but the magnitude is not so strong. Meanwhile the reason for the positive effect is not clear.

Exchange rate depreciation in the importing country favours imports. Even though this is not expected, the pattern of what is imported could provide information about why the positive effect occurs. If it is less expensive to import raw materials for domestic production than importing final goods, then depreciation may likely encourage importation. However, a look at the magnitude of response suggests that imports sluggishly responds to changes in exchange rate. For instance, a 1% depreciation of exchange rate only increase imports by 0.1%. Their percentage response cannot pose any threat to importation.

**Table 3: Estimation of the Determinants of Intra-CEN-SAD Trade Flow**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LOGGDP-imp	-0.154*** (-3.23)	-0.0205 (-0.46)	-0.0129 (-0.25)	-0.0174 (-0.38)	0.0106 (0.15)	0.0524 (0.98)	0.0280 (0.54)	-0.0171 (-0.39)
GDP-exp	0.144*** (3.80)	0.149*** (3.56)	0.169*** (3.58)	0.151*** (3.56)	0.146*** (2.98)	0.153*** (3.51)	0.128*** (2.95)	0.117*** (2.61)
LOGPOP-imp	1.657*** (17.15)	1.853*** (18.21)	1.826*** (14.51)	1.806*** (14.92)	1.834*** (17.45)	1.955*** (18.20)	1.838*** (18.24)	1.825*** (18.09)
LOGPOP-exp	0.974*** (13.29)	0.686*** (8.85)	0.687*** (8.64)	0.650*** (8.17)	0.693*** (8.80)	0.738*** (9.06)	0.653*** (8.10)	0.710*** (9.09)
LOGDIST	-1.474*** (-9.41)	-1.836*** (-14.83)	-1.845*** (-14.72)	-1.861*** (-15.00)	-1.832*** (-14.15)	-1.785*** (-14.46)	-1.778*** (-14.49)	-1.774*** (-14.80)
CL	0.340 (1.32)	0.502** (2.11)	0.478** (1.97)	0.569** (2.36)	0.474* (1.96)	0.394 (1.62)	0.470* (1.93)	0.675*** (2.79)
LL-imp	-1.468*** (-3.29)	0.0763 (0.18)	-0.0687 (-0.15)	0.339 (0.58)	0.0888 (0.21)	-0.605 (-1.25)	-0.0713 (-0.16)	0.0583 (0.14)
LL-pat	-2.758*** (-10.23)	-1.126*** (-3.74)	-1.213*** (-3.43)	-1.027*** (-3.21)	-1.100*** (-3.08)	-0.989*** (-3.23)	-0.719** (-2.04)	-0.978*** (-3.29)
LL-both	2.122*** (3.57)	1.535*** (2.92)	1.573*** (2.96)	1.537*** (2.89)	1.589*** (2.97)	1.530*** (2.96)	1.549*** (2.90)	1.330** (2.44)
EX_TTEX		-0.0123 (-0.76)	-0.0115 (-0.71)	-0.0126 (-0.78)	-0.0128 (-0.75)	-0.00978 (-0.61)	-0.0116 (-0.72)	-0.0173 (-1.08)
IM_TTM		0.0250* (1.82)	0.0236* (1.71)	0.0250* (1.81)	0.0252* (1.70)	0.0198 (1.43)	0.0256* (1.88)	0.0281** (2.06)
EXP_REER		0.0181*** (7.08)	0.0177*** (6.49)	0.0197*** (4.79)	0.0182*** (7.14)	0.0142*** (4.96)	0.0184*** (7.09)	0.0153*** (5.42)
IMP_REER		0.0196*** (7.55)	0.0199*** (7.47)	0.0203*** (7.62)	0.0200*** (7.49)	0.0210*** (7.93)	0.0213*** (8.04)	0.0170*** (6.38)
VA-exp			0.410 (0.41)					
VA-imp			0.653 (0.84)					
LO-imp				-1.121 (-1.39)				
LO-exp				-0.774 (-0.71)				
GE-exp					0.468 (0.62)			
GE-imp					-0.133 (-0.21)			
PV-imp						3.693** (2.48)		
PV-exp						0 (.)		
RQ-imp							1.388 (1.62)	
RQ-exp							-1.498* (-1.94)	
CC-exp								0.953 (0.63)
CC-imp								-2.237*** (-2.68)
Constant	-23.82*** (-11.28)	-26.71*** (-14.18)	-27.38*** (-13.19)	-24.61*** (-10.18)	-27.41*** (-10.22)	-33.68*** (-10.00)	-27.20*** (-11.39)	-25.57*** (-11.92)
lnalpha, Constant	1.896*** (38.72)	1.759*** (35.44)	1.757*** (35.37)	1.755*** (35.36)	1.758*** (35.42)	1.751*** (35.24)	1.752*** (35.29)	1.749*** (35.20)
Pseudo-R	0.12	0.11	0.13	0.154	0.10	0.21	0.20	0.19
Loglikelihood	-5055.59	-4996.32	-4995.92	-4994.97	-4996.05	-4993.24	-4993.61	-4992.31
Observation	861	861	861	861	861	861	861	861

t statistics in parentheses; \*, \*\* and \*\*\* denoted significance at 10, 5 and 1 percent respectively

The result reveals that most governance variables do not have significant effect on imports within CEN-SAD unlike the ECOWAS. Table 3 indicates that reduction in political instability and absence of violence in the exporting countries, regulatory quality and control of corruption in the importing countries are the only significant governance variables affecting imports in CEN-SAD. Of these, only reduction in political instability and absence of violence has positive effect. In particular, if this governance institution improves by 1%, imports will rise by 3.7%. This suggests that political terrain of the CEN-SAD determine the extent to which trade can thrive. Interestingly, regulatory quality and control of corruption negatively affect imports. Increase in control of corruption and regulatory quality reduces importation. Hence as improvement in corruption and regulatory quality is experienced, importation reduces, due perhaps to producing more domestically than importing. The improvement in corruption could also discourage irrelevant importation from member countries.



## 5. Conclusion and Policy Implications

This study investigates the factors that influence trade flow within ECOWAS and CEN-SAD from 1995 to 2016. Further, the study examines if a difference exists between the determinants of intra-trade between ECOWAS and CEN-SAD countries and investigates the role played by trade facilitation and governance institutions in intra-trade within ECOWAS and CEN-SAD. The study adopts the modified Poisson models, which captures the source of zero counts by separating country pairs possessing strictly zero trade flows from those that have a non-zero probability of having non-zero-valued trade flows. It is reasonable to conclude that different factors drive imports within ECOWAS and CEN-SAD. Also, trade facilitation and governance indicators do not have the same direction of effects on imports within ECOWAS and CEN-SAD. Based on these results, the study recommends that authorities in ECOWAS and CEN-SAD should strengthen governance institutions as doing so will boost trade within the region. Also, it is necessary for government, particularly in CEN-SAD, to come up with policies that will allow for accountability and transparency.

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