

Olowofeso, Olorunsola E. et al.

**Research Report**

## Exchange rate dynamics and regional trade integration in the WAMZ

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L'AFRIQUE DE L'OUEST**



## **Exchange Rate Dynamics and Regional Trade Integration in the WAMZ<sup>1</sup>**

**WAMI OCCASSIONAL PAPER SERIES 28**

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## **Abstract**

*This study examines the effects of bilateral exchange rate on trade flows in the WAMZ and assesses the role of complementarity trade structures in enhancing intra-WAMZ trade. The modified gravity model is used to assess whether efforts by WAMZ countries to facilitate transactions in national currencies and promote complementarity trade structures can enhance intra-WAMZ trade. The results from Poisson pseudo-maximum-likelihood (PPML) indicates some interesting results. It shows that there is positive and significant relationship between bilateral real exchange rate and bilateral exports, which suggests that a real depreciation of the exporting country's currency relative to the importing country's currency will stimulate bilateral exports. This clearly suggest that efforts by WAMZ countries to promote quoting and trading in national currencies will have a positive effect on bilateral trade flows among Member States. This relationship remains consistent despite controlling for endogeneity bias and using different alternative measurements for the key variables of interest. The estimated results also reveal that the extent of trade complementarity increases trade flows among WAMZ countries. Similarly, our findings for some other explanatory variables especially economic size indicates large elasticity of trade with respect to economic size. Suggesting that the economic size matters in promoting trade flows among WAMZ countries. Based on these findings this study recommends that WAMZ Member States should support efforts of the private sector to create the enabling infrastructure to support quoting and trading in national currencies. By encouraging cross-border trade and other transactions in national currencies, WAMZ countries can potentially avert large swings in exchange rates. These should be complemented by measures that will enhance trade complementarity structures, including encouraging regional value chains through trading in intermediate inputs across countries to enable WAMZ Member States to take advantage of the African Continental Free Trade Area (AfCFTA) initiative.*

**Keywords:** Exchange Rate; Trade Integration; Complementarity; Trade Structures; Gravity Model; WAMZ.

JEL Classification : F0, F15, F31, C23

## **Introduction**

Over the years, macroeconomic policy analysis has recognised the interlinkages between international trade and exchange rate dynamics as one of the crucial elements of regional integration process. One of such recent practical outcomes is the Africa Continental Free Trade Area (AfCFTA) which strives to promote regional integration. This regional arrangement involves liberalization of trade regimes with a view to boosting regional trade, investment, and sustained economic growth (Shuaibu and Isah, 2020). It is also anticipated that this initiative would safeguard the continent against adverse trade shocks and long-term terms of trade weakening (UNECA, 2020). The quest for such treaties is based on the reasoning that it would stimulate trade competitiveness and thus economic growth through the real effective exchange rate channel.

From the theoretical perspective, the interactions between exchange rate changes and international trade are traditionally termed the “J-curve phenomenon”. This is based on the path it follows over a given period and it draws from the fact that exchange rate visibly affects the direction of trade. A nominal change in domestic currency (depreciation or appreciation) influences the real exchange rate which in turn affects the competitiveness of the economy, trade balance<sup>2</sup> as well as design of optimal policies (Leigh et al., 2017). The J-curve phenomena can be traced to the theoretical exploits of Magee (1973) and have since then received a great deal of attention in the literature. The model is predicated on the notion that an improvement in a country’s trade balance does not instantaneously translate to the appreciation of the currency. This is because, at the time of previous exchange rate, there is obligations, such as import and export contracts that are enforced, this means that there is a time lag during which consumers and producers adjust to relative price changes.

Although the Marshall-Lerner condition has also been widely applied to analyse the impact of exchange rate changes on a country’s trade balance<sup>3</sup>, there is ample evidence under which this condition can be met, yet the trade balance may continue to deteriorate (Bahmani-Oskooee, 1985). For instance, domestic currency depreciation may bring about fall in exports, as the output of the export-oriented sector may need imported capital and intermediate goods. This tends to support the emergent concern that trade liberalization alone is not sufficient, as it should be complemented with

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<sup>2</sup> The loss (gain) in competitiveness of locally produced goods leads to depreciation (appreciation) of the domestic currency relative to foreign currency over time.

<sup>3</sup> If the sum of import and export demand elasticities exceeds unity, a real depreciation will have a favourable effect on the trade balance.

different adjustment programmes that would minimize productivity deficiencies. This is because currency depreciation can adversely affect balance of payments and the export-led growth agenda (Arize et al., 2017).

From the above theoretical exposition, it is obvious that economic literature, both theoretical and empirical, is yet to come to conclusion on the implications of exchange rate fluctuations on trade and balance of payments in an economy. Several studies have documented the important influence of exchange rates on trade and the effectiveness of its policy for external balance and domestic economic stability, while some studies tend to support the existence of J-curve effect<sup>4</sup> (Arize et al. 2017; Bahmani-Oskooee and Gelan, 2012; Adeniyi, Omisakin and Oyinlola, 2011 among others) several other studies documented the lack of evidence of a J-curve pattern (Shuaibu and Isah, 2020; Dogru and Turk, 2019; Akorli and Edem 2017; Cergibozan and Ari, 2017).

Economic literature has also shown that the Global financial crisis (GFC) and the emergence of Covid-19 pandemic, thereafter, appears to have weakened the interaction between exchange rates and international trade, as there seems to be general slowdown in global and regional trade<sup>5</sup> amid huge currency depreciation. This is often called “exchange rate-trade disconnect” or “elasticity pessimism”, where currency depreciation (appreciation) waned to promote (retard) exports and trade. It must be noted that understanding this relationship is very crucial for regional economic policy formulation (Kang and Dagli, 2018; Leigh et al., 2017). Hence, if there is instability in this relationship, it can make exchange rates less potent in absorbing external shocks and dwindling effectiveness of monetary policy on trade. This could also bring about global imbalances (Leigh et al., 2017).

The theory of the Optimum Currency Area (OCA) developed by Mundell (1961) and subsequently Mckinnon (1963) stresses the role of strong trade linkages in realising the benefits of a common currency through lower transaction costs associated with increased bilateral trade between countries.

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<sup>4</sup> Adeniyi, Omisakin and Oyinlola (2011) showed the existence of a J curve effect for Nigeria and Sierra Leone; Ziramfa and Chifamba, 2014 for in South Africa; Bahmani-Oskooee and Gelan (2012) for Egypt, Nigeria and South Africa.

<sup>5</sup> See Leigh et al., 2017; Ahmed, Appendino, and Ruta, 2015; Ollivaud, Rusticelli, and Schwellnus, 2015 among other studies for details on how increased involvement in global value chains (GVCs) has contributed to exchange rate-trade disconnect.

Within this strand of literature, the seminal work by Frankel and Rose (1998) and subsequent empirical studies (e.g. Imbs, 2004; Inklaar et al, 2008; Duval et al., 2014; Egbuna et al., 2020) have illustrated that increased trade integration will foster business cycle synchronisation between countries. Importantly, achieving more closely synchronised business cycles between countries is one major criterion of the OCA theory for countries to form a currency union. As the WAMZ countries are preparing to join the ECOWAS Economic and Monetary Union, exchange rate and trade policies are clearly becoming the major channels available to policymakers for regional integration and sustaining the gains in macroeconomic stabilization achieved over the past two decades<sup>6</sup>. Hence, understanding the main factors influencing bilateral trade flows among WAMZ countries is an important policy issue for the region. These issues raise the critical questions of whether efforts to promote transactions in national currencies of WAMZ Member States and trade complementarity structures will enhance bilateral trade flows in the WAMZ. Thus, understanding the dynamics between bilateral exchange rate and trade flows matters considerably for the WAMZ, considering the limited degree of trade integration and potential for significant reductions in transaction costs, exchange rate uncertainty associated with trading in major international currencies and the potential easing of pressures on foreign reserves of Member States. Also, the quest towards an AfCFTA makes this study very timely and can help WAMZ countries better prepare for market expansion within the continent as well as guide exchange rate and multilateral trade policies (Nusair, 2016). Indeed, an assessment of the relationship between bilateral exchange rates, trade complementarity and trade flows provide more insight to countries pursuing export-oriented growth where exchange rate competitiveness is crucial. Such an evaluation will further provide useful information on policies that will address structural impediments to promoting bilateral trade flows to enable policymakers to better understand the dynamics of the underlying relationships in the WAMZ.

This paper, therefore, seeks to examine the extent to which bilateral exchange rates influence trade flows among WAMZ countries. Specifically, this study will assess whether WAMZ countries can enhance trade by facilitating transactions through quoting and trading in national currencies. Second, it seeks to examine whether the degree of trade complementarity influences bilateral trade between WAMZ countries. The gravity model of international trade flows is used to empirically

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<sup>6</sup> For countries in a monetary union, the evolution of the real exchange rate reflects the differences in the price level between the domestic economy and other countries in the union.



assess whether efforts by WAMZ countries to promote transactions in national currencies and develop complementarity trade structures can enhance intra-WAMZ trade.

Following this introductory section, the rest of the paper is organized as follows: the stylized facts on exchange rate policies and Regional Trade Integration in the WAMZ are discussed in section 2, while the literature review is presented in section 3. The methodology and model specification are presented in section 4, and section 5 presents the empirical results of the study. Section 6 concludes the study and proffers policy recommendations.

## **2.0 Stylized Facts on the Dynamics of Exchange Rate and Regional Trade Integration in WAMZ**

### **2.1 Assessment of WAMZ Trade and Exchange Rate Dynamics**

The West African Monetary Zone (WAMZ) represents a grouping of countries in West Africa aiming for monetary integration and the eventual establishment of a regional central bank and common currency. Understanding the trade and exchange rate dynamics within the WAMZ is crucial for assessing the economic interactions and challenges faced by member states. This assessment covers trade intensity in WAMZ countries and exchange rate dynamics to provide insights into the region's economic landscape.

Trade in the ECOWAS region declined from US\$10.0 billion in 2019 to US\$4.90 billion in 2020. Total exports to the WAMZ declined marginally by 0.010 percent of GDP in 2020 from 0.011 percent of GDP in 2019. Total imports from the WAMZ fell by 0.15 percent of GDP from 0.035 percent of GDP in the reviewed periods. In 2020, economic activities principally trade within WAMZ deteriorated significantly on account of containment and confinement policies ensuing the Corona virus pandemic. Covid-19 further stifled trade in the WAMZ amid the traditional challenges faced by member states. The impact of the pandemic varied and was contingent on the scope and length of time taken to acquire the Covid-19 Jobs. Despite profound efforts to return the member states economies back to normality, the virus continued to impact trade especially in the later part of the fiscal year 2020, thus triggering restrictions and travel bands which ultimately suffocated global and regional trade.

There are indications that trade in the WAMZ deteriorated to US\$1.4 billion in 2019 down from US\$5.0 billion, explained by monumental challenges posed by the pandemic and partly associated with socio-political upheavals in Nigeria and the Republic of Guinea-Conakry. Supply chain was

disrupted and intra- trade in WAMZ also followed global declining trend in trading activities. Global trade dropped from 2.9 percent in 2019 to a minuscule 0.9 percent in 2020. WAMZ direction of trade is in respect of key products like textiles, precious metals, petroleum, gas, and other oil products.

In terms of degree of openness, this indicator declined in all the Member States excluding Republic of Guinea and Liberia. Guinea's performance stood at 3.06 percent and Liberia registered 1.68 percent. Sierra Leone, Ghana, The Gambia, and Nigeria recorded 1.32 percent, 0.36 percent, 0.36 percent, and 0.12 percent, respectively. Compared to a year ago, trade openness declined for the majority of WAMZ member states in 2020 except for Guinea and Liberia. The former's degree of openness stood at 97.4 percent while that of Liberia stood at 53.2 percent. Sierra Leone, Ghana, The Gambia and Nigeria registered 48.3 percent, 39.4 percent, 36.4 percent, and 23.4 percent respectively.

**Table 1: Intra-WAMZ Trade (millions of dollars)**

		2015	2016	2017	2018	2019	2020	Percent of GDP					
		2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020
EXPORTS	Gambia	19.30 <i>0.48</i>	2.50 <i>1.19</i>	0.20 <i>0.52</i>	0.20 <i>0.15</i>	0.20 <i>0.13</i>	0.17 <i>0.25</i>	1.30	0.17	0.014	0.012	0.011	0.010
	Ghana	197.50 <i>1.91</i>	103.10 <i>0.93</i>	91.86 <i>0.66</i>	106.36 <i>0.71</i>	230.56 <i>1.47</i>	238.15 <i>1.65</i>	0.42	0.20	0.158	0.170	0.364	0.337
	Guinea	358.43 <i>20.12</i>	353.40 <i>14.64</i>	395.30 <i>8.60</i>	429.80 <i>10.80</i>	364.20 <i>9.23</i>	443.95 <i>4.97</i>	4.36	4.23	3.766	4.108	2.759	2.838
	Liberia	174.43 <i>65.75</i>	50.40 <i>29.72</i>	9.38 <i>2.64</i>	78.10 <i>15.11</i>	45.90 <i>117.42</i>	31.12 <i>7.97</i>	8.56	2.40	0.286	2.393	1.442	1.008
	Nigeria	70.29 <i>0.15</i>	436.80 <i>1.26</i>	235.80 <i>0.51</i>	270.40 <i>0.43</i>	3,980.80 <i>6.13</i>	401.43 <i>1.12</i>	0.01	0.13	0.063	0.064	0.839	0.099
	Sierra Leone	30.00 <i>5.16</i>	6.10 <i>0.91</i>	26.90 <i>4.06</i>	29.70 <i>4.97</i>	24.00 <i>3.33</i>	28.37 <i>4.54</i>	0.71	0.16	0.705	0.727	0.580	0.749
	Intra-WAMZ	849.94	952.30	759.44	914.56	4,645.66	1,143.19	0.16	0.24	0.168	0.182	0.829	0.229
	IMPORTS	Gambia	1.71 <i>0.48</i>	3.59 <i>1.19</i>	2.20 <i>0.52</i>	3.79 <i>0.62</i>	6.43 <i>1.21</i>	2.71 <i>0.47</i>	0.12	0.24	0.15	0.23	0.35
Ghana		197.50 <i>1.36</i>	103.10 <i>0.74</i>	91.86 <i>0.67</i>	106.40 <i>0.74</i>	224.20 <i>1.55</i>	13.75 <i>0.10</i>	0.42	0.20	0.16	0.17	0.35	0.02
Guinea		99.68 <i>4.19</i>	65.23 <i>1.27</i>	90.20 <i>2.94</i>	54.90 <i>1.31</i>	31.20 <i>0.72</i>	35.13 <i>0.56</i>	1.21	0.78	0.86	0.52	0.24	0.22
Liberia		11.10 <i>0.66</i>	23.90 <i>1.84</i>	16.50 <i>1.23</i>	44.20 <i>3.87</i>	28.20 <i>2.73</i>	20.74 <i>1.88</i>	0.54	1.14	0.50	1.35	0.89	0.67
Nigeria		73.20 <i>0.12</i>	110.20 <i>0.28</i>	62.00 <i>0.17</i>	52.30 <i>0.11</i>	66.00 <i>0.09</i>	66.14 <i>0.11</i>	0.02	0.03	0.02	0.01	0.01	0.02
Sierra Leone		20.30 <i>1.09</i>	27.70 <i>1.84</i>	27.93 <i>2.10</i>	39.71 <i>2.56</i>	29.20 <i>1.85</i>	21.72 <i>1.57</i>	0.48	0.72	0.73	0.97	0.71	0.57
Intra-WAMZ		403.49	333.72	290.63	301.30	385.23	160.20	0.07	0.08	0.06	0.06	0.07	0.03
TRADE		Gambia	21.01 <i>4.65</i>	6.09 <i>1.53</i>	2.40 <i>0.45</i>	3.99 <i>0.53</i>	6.63 <i>0.97</i>	2.89 <i>0.44</i>	1.42	0.41	0.16	0.24	0.36
	Ghana	395.00 <i>1.59</i>	206.20 <i>0.82</i>	183.66 <i>0.67</i>	212.76 <i>0.73</i>	454.76 <i>1.51</i>	251.90 <i>0.90</i>	0.83	0.39	0.32	0.34	0.72	0.36
	Guinea	458.11 <i>11.01</i>	418.63 <i>5.54</i>	485.50 <i>6.34</i>	484.70 <i>5.94</i>	395.40 <i>4.78</i>	479.08 <i>3.14</i>	5.57	5.01	4.63	4.63	3.00	3.06
	Liberia	185.53 <i>9.50</i>	74.30 <i>5.05</i>	25.88 <i>1.52</i>	122.30 <i>7.37</i>	74.10 <i>6.91</i>	51.87 <i>3.48</i>	9.10	3.54	0.79	3.75	2.33	1.68
	Nigeria	143.49 <i>0.14</i>	547.00 <i>0.74</i>	297.80 <i>0.36</i>	322.70 <i>0.30</i>	4,046.80 <i>3.01</i>	467.57 <i>0.49</i>	0.03	0.16	0.08	0.08	0.85	0.12
	Sierra Leone	50.30 <i>2.06</i>	33.80 <i>1.55</i>	54.83 <i>2.75</i>	69.41 <i>3.23</i>	53.20 <i>2.32</i>	114.96 <i>2.49</i>	1.18	0.88	1.44	1.70	1.29	1.32
	Intra-WAMZ	1,253.43	1,286.02	1,050.07	1,215.86	5,030.89	1,368.26	0.23	0.32	0.23	0.24	0.90	0.26
	TRADE BALANCE	Gambia	17.59	-1.09	-2.00	-3.59	-6.23	-2.54	1.19	-0.07	-0.14	-0.22	-0.34
Ghana		0.00	0.00	0.06	-0.04	6.36	224.40	0.00	0.00	0.00	0.00	0.01	0.32
Guinea		258.74	288.17	305.10	374.90	333.00	408.82	3.15	3.45	2.91	3.58	2.52	2.61
Liberia		163.33	26.50	-7.12	33.90	17.70	10.38	8.01	1.26	-0.22	1.04	0.56	0.34
Nigeria		-2.92	326.60	173.80	218.10	3,914.80	335.29	0.00	0.10	0.05	0.05	0.83	0.08
Sierra Leone		9.70	-21.60	-1.03	-10.01	-5.20	6.64	0.23	-0.56	-0.03	-0.25	-0.13	0.18

Sources: WAMZ Country Authorities, WAMI and ECOWAS  
Figures in italics are shares of the associated variable

Intra-WAMZ trade, slumped to US\$1.4 billion in 2020 from US\$5.0 billion in 2019, or by 0.72 percent, on account of supply chain disruptions during the covid-19 crisis. Similarly, intra-WAMZ trade intensity lowered to 0.23 percent in 2020 from 0.61 percent in 2019. Guinea registered the highest performance in the intra-WAMZ trade recording US\$479.08 million whilst Nigeria recorded US\$467.57 million. Ghana, Sierra Leone, Liberia, and The Gambia recorded 251.90 million, US\$114.96 million, US\$51.87 million, and US\$ 2.9 million, respectively. The WAMZ Member States' total trade within ECOWAS deteriorated to US\$4.9 billion in 2020 from US\$10.0 billion last year. Guinea and Sierra Leone however, increased their trading performance within the ECOWAS. Nigeria's performance was the highest in ECOWAS recording US\$1.9 billion followed by Ghana US\$1.7 billion. Guinea, The Gambia, and Sierra Leone registered US\$ 634.15 million, US\$225.38 million, and US\$ 8.58 million, respectively.

Exchange rate dynamics within the WAMZ has been influenced by various factors, including relative prices, balance of payments, interest rates, global economic conditions as well as domestic and external shocks. Some WAMZ countries adopted managed float exchange rate regimes while others have in recent time have operated pure flexible or floating exchange rate regime. These differences in exchange rate policies can lead to exchange rate volatility, impacting the cost of imports and exports within the region. Additionally, the coordination of exchange rate policies among WAMZ countries remains a challenge, given the divergent economic conditions and policy priorities.

In conclusion, the trade and exchange rate dynamics within the West African Monetary Zone (WAMZ) reflect the complexities and challenges faced by member states in their pursuit of economic integration. While intra-regional trade continues to grow, trade imbalances persist, posing challenges to the region's economic stability. Exchange rate dynamics, influenced by factors such as differences in exchange rate regimes and external shocks, further complicate the economic landscape within the WAMZ. Addressing these challenges will require coordinated efforts among member states, along with policies aimed at promoting agriculture for regional sufficiency, trade diversification, improving infrastructure, and enhancing regional cooperation.

## **2.2 Assessment of WAMZ's Individual Country Trade and Exchange Rate regimes.**

### **The Gambia**

The Gambia stopped the use of fixed exchange rate policy when the Structural Adjustment Programme (SAP) was implemented. This was premised on the need to correct imbalances in the economy as well as improve on terms of trade. The exchange rate of the dalasi to the US dollar was

relatively stronger in 1986. During this period, the exchange rate stood at 6.92 to a dollar. The current account balance and foreign reserves amounted to US\$ 3.09 million and US\$13.56 million, respectively. In 2004, exchange rate depreciated to 30.03 dalasi to a dollar, the depreciation set the current account balance to a deficit of US\$30.32 million whilst the foreign reserves stood at US\$83.77 million. The export receipts increased to US\$198.10 million as a result of dalasi depreciation.

**Figure 1: Trend Analysis of The Gambia’s Exchange Rate and Exports (Growth Rate)**

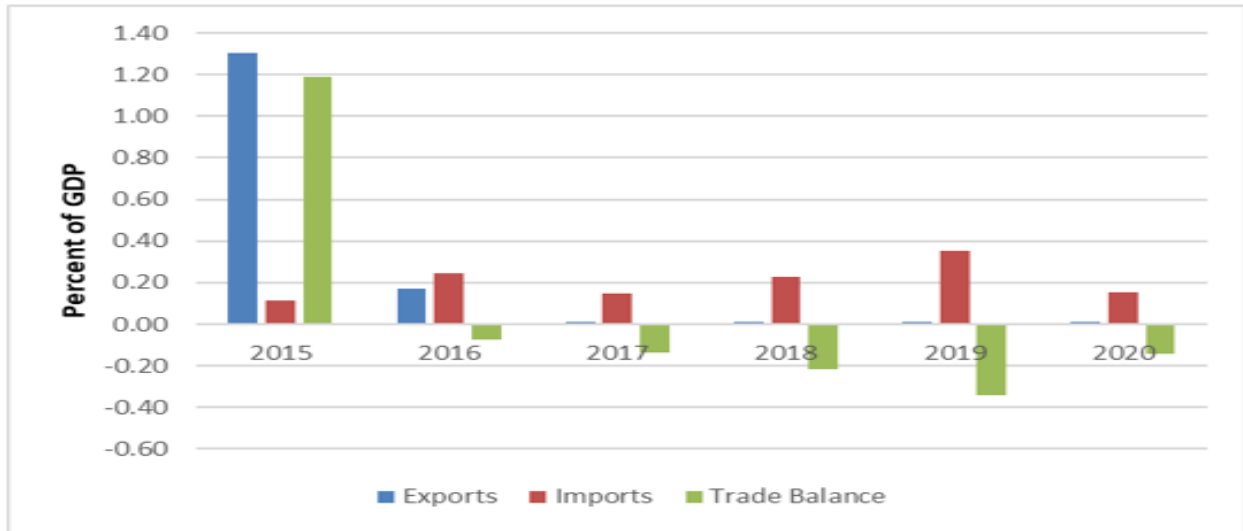


Source: WAMI Trade Integration Data

Despite the financial crises in 2008, the above-mentioned indicators improved significantly. The exchange rate appreciated by 7.84 percentage points. The current account deficit narrowed to a deficit of US\$6.29 million, exports increased to US\$226.07 million, and the foreign reserves surged to US\$116.52 million, and inflation decelerated to 4.44 percent compared to the 2004 position. This development could be explained by low demand emanating from weak economic activities.

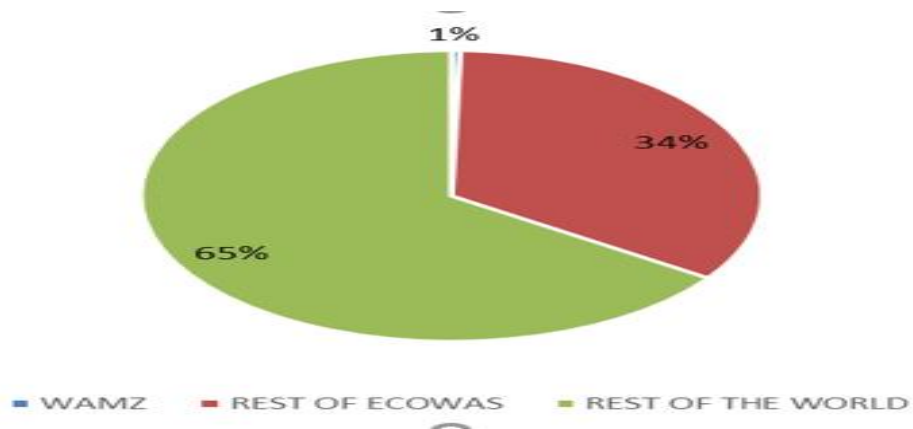
Relative to 2008, the exchange rate depreciated to 42.51 dalasi with corresponding current account deficit of US\$99.17 million, foreign reserves stood at US\$111.04 million and inflation rate of 6.81 percent. This was due to the impact of the EBOLA virus in the subregion in 2014-2015 and the imbalances in the external sector because of high oil price shocks. Up till 2019, the dalasi continued to depreciate against the dollar with significant effects on trade balance.

**Figure 2: The Gambia -Intra-WAMZ Trade Balance (% of GDP)**



Source: WAMI Trade Integration Data

**Figure 3: The Gambia - Direction of Trade**



Source: WAMI Trade Integration Data

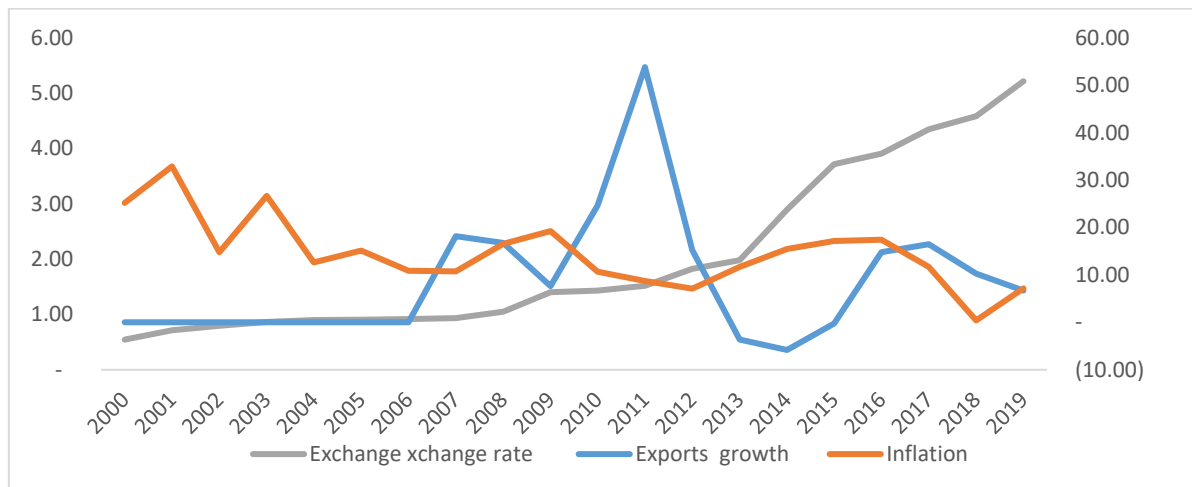
Gambia’s exports of goods and services declined to US\$70.1 million in 2020 from US\$154.5 million in 2019. Imports increased to US\$581.8 million in 2020 from US\$532.5 million in 2019 premised on increased payments on insurance and freight during the pandemic.

The country’s share in both exports and imports within the intra-WAMZ improved by 0.015 and 1.67 percent in 2020, from 0.004 and 1.69 percent in 2019 during the same period. Hence, the country’s share in intra-WAMZ trade slightly rose to 0.22 in 2020, from 0.13 in 2019.

## Ghana

Ghana's exchange rate to the US dollar stood at Cedis 0.93 in 2007 and during the same time inflation and exports growth stood at 10.73 percent and 18.17 percent respectively. In 2009, exports fell to 7.62 percent and inflation accelerated to 19.25 percent relative to 2007 levels. The exchange rate on the other hand depreciated to Cedis1.40. However, exports and inflation both improved to 53.84 percent an 8.73 percent in 2011 compared with 2009 positions, but the exchange rate continued to depreciate relative to 2009 records.

**Figure 4: Trend Analysis of Ghana's Exchange Rate and Exports (Growth Rate)**

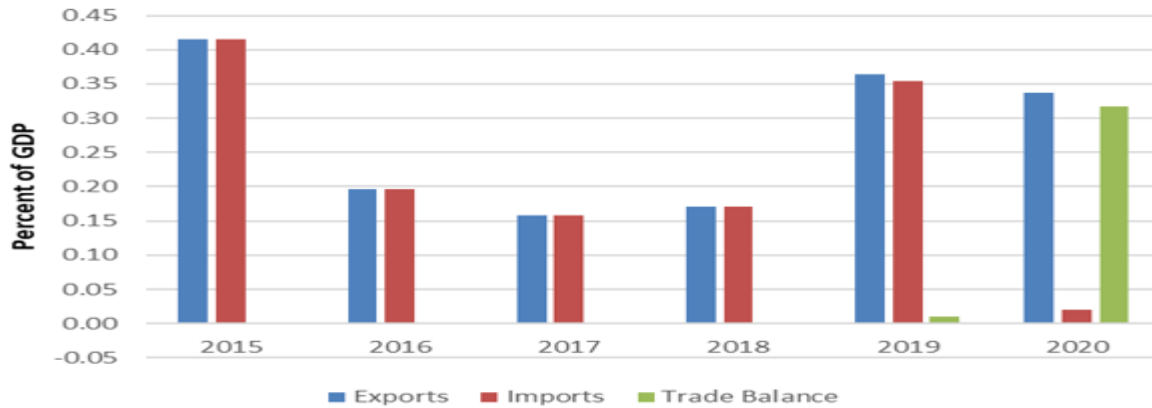


Source: WAMI Trade Integration Data

In 2017, exchange rate stood at Cedis 4.35, inflation accelerated to 11.70 percent and exports grew to 16.50 percent. Despite the depreciation of the exchange rate to Cedis 5.22 percent in 2019, inflation decelerated whilst exports growth dropped to a low of 6.69 percent.

In most recent times, Ghana's exports increased to US\$14.5 billion in 2020 from US\$15.7 billion in 2019. Total imports bill decreased to US\$13.4 billion in 2020 from US\$14.4 billion last year. Ghana's total trade deteriorated to US\$ 27.9 billion in 2020 from US\$30.1 billion in 2019 due to supply chain disruptions. The Ghanaian share of trade in WAMZ increased to 19.3 percent in 2020 from a low of 9.0 percent in 2019.

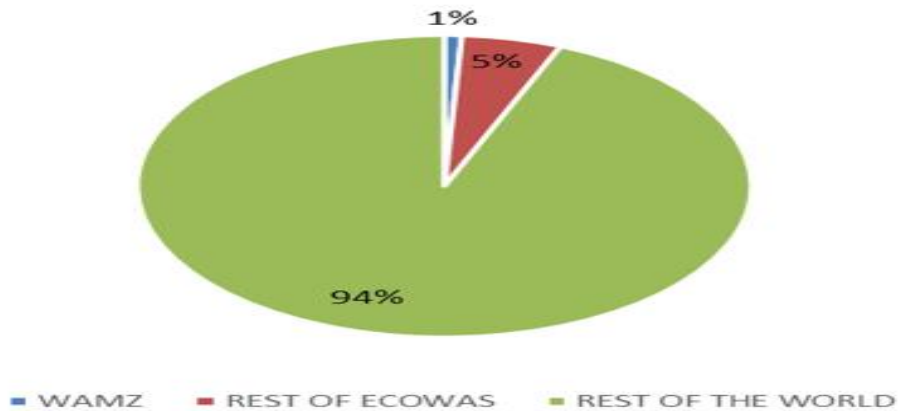
**Figure 5: Ghana- Intra-WAMZ Trade Balance**



Source: WAMI Trade Integration Data

Ghana’s trade with WAMZ declined to 0.36 percent of GDP in 2020 from 0.72 percent of GDP in 2019. The country’s exports share improved to 20.8 percent in 2020 from 5.0 percent in 2019 whilst her imports share stood at 8.6 percent from 58.2 percent last year. The country’s exports to WAMZ increased by 0.36 percent of GDP in 2020 from 0.33 percent of GDP in 2019 whilst total imports from member countries declined to 0.02 percent of GDP in 2020 from 0.35 percent of GDP in 2019.

**Figure 6: Ghana-Direction of Trade**



Source: WAMI Trade Integration Data

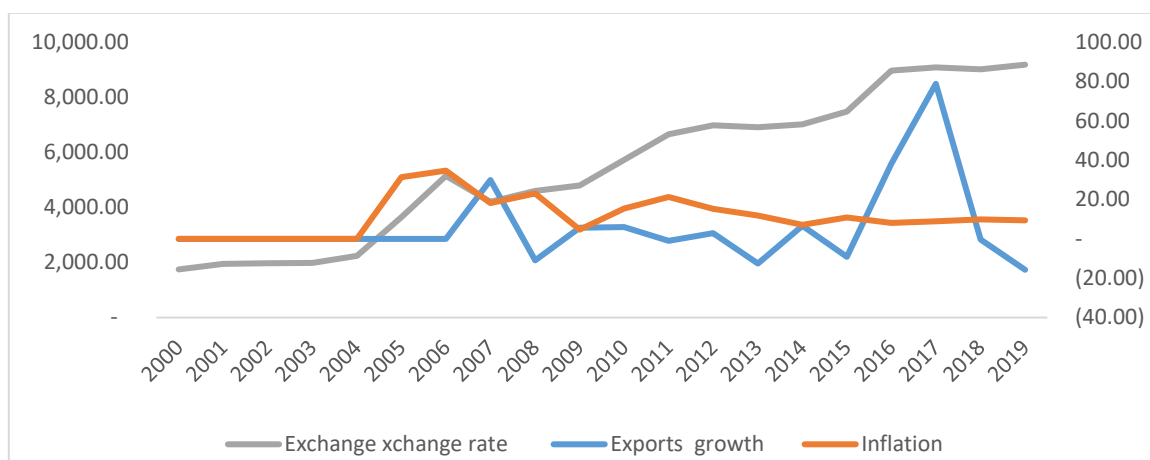
Ghana’s trade with ECOWAS increased to US\$1.5 billion representing 2.17 % of GDP in 2020, from US\$1.3 billion or 2.12 % of GDP in 2019. This was on account of re-opening of borders in 2020. Ghana’s trade with member States, ECOWAS and the rest of the globe represents 1.0 percent, 5.0 percent, and 94.0 percent respectively.

## Guinea

The Guinean economy also used pegged exchange rate up till 1985. During this period, Guinea's domestic currency was initially called CFA franc (in the 1960s) and later changed to the Syli in 1985, but it is now known as Guinean franc (GNF). To mitigate imbalance in the economy and improve on the competitiveness of the exports subsector, the country moved to the floating exchange rate regime in 1994.

In 2007, Guinea's exchange rate was 4197.75 GNF to a US dollar. Her rate of inflation and exports growth stood at 18.18 percent and 29.19 percent, respectively. Exchange rate continued to depreciate and in 2011 it recorded 6658.03 Guinean franc to a dollar with a corresponding inflation rate of 21.35 percent. Exports declined to 0.94 percent.

**Figure 7: Trend Analysis of Guinea's Exchange Rate and Exports (Growth Rate)**



Source: WAMI Trade Integration Data

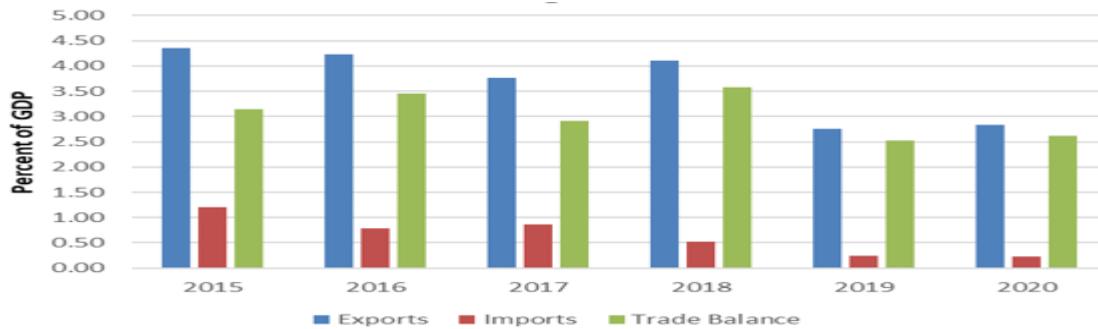
Guinea's exchange rate recorded 6985.83 GNF to a dollar in 2012. However, both inflation and exports growth improved to 15.23 percent and 2.95 percent respectively. Although exports and inflation improved, exchange rate decelerated to a high of 9088.32 GNF in 2017. In 2018, the exchange rate improved to 9011.13 franc to a dollar, but exports and inflation recorded 0.35 percent and 9.83 percent, respectively.

Guinea's total trade improved to US\$15.2 billion in 2020 from US\$8.3 billion in 2019. Total exports increased to US\$8.9 billion in 2020 from US\$3.4 billion in 2019 whilst total imports increased to US\$6.3 billion in 2020 from US\$4.3 billion in 2019. Guinea's share in intra WAMZ trade increased to 36.76 percent in 2020 from a low level of 7.86 percent in 2019. Trade in the WAMZ increased to



3.1 percent of GDP in 2020 from 3.0 percent of GDP in 2019. The country’s share of WAMZ exports improved by 38.8 percent compared to 7.7 percent registered in 2019.

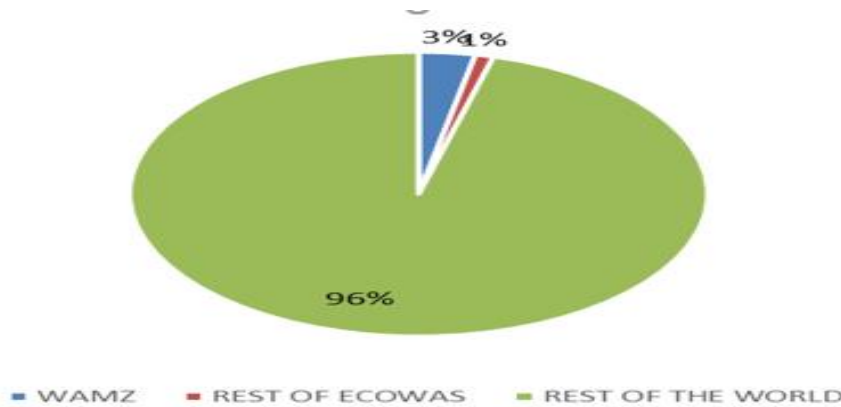
**Figure 8: Guinea - Intra-WAMZ Trade Balance**



Source: WAMI Trade Integration Data

The country’s share in WAMZ’s intra trade imports also increased to 21.9 percent in 2020 from the preceding levels of 8.10 percent. The country’s exports to WAMZ increased by 2.8 percent of GDP in 2020 from 2.7 percent of GDP in 2019. Imports from WAMZ increased to 0.24 percent of GDP in 2020 from 0.22 percent of GDP in 2019.

**Figure 9: Guinea - Direction of Trade**



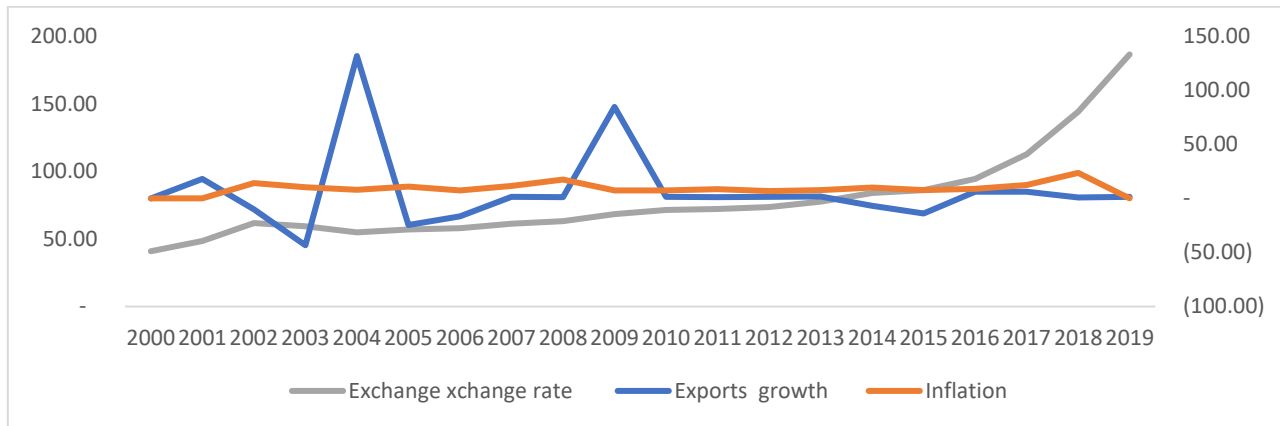
Source: WAMI Trade Integration Data

Trade with ECOWAS increased to stood at US\$155.1 million representing 1.03 percent of GDP in 2020 from US\$ 135.7 million or 0.99 percent of GDP in 2019. The direction of trade of Guinea trade with member countries, ECOWAS and the rest of the world represents 3.0 percent, 3.0 percent, and 96.0 percent respectively.

## Liberia

The exchange rate of Liberia stood at 56.38 Liberian dollar to the US dollar in 2003. The exports of the country grew by 43.35 percent whilst inflation was 10.33 percent. In 2009, exchange rate stood at 68.29 Liberian dollar to a US dollar and reflecting depreciation from the 2008 levels. The exports growth stood at 84.56 percent and inflation decelerated to 7.43 percent in 2009 from 17.49 percent in 2008.

**Figure 10: Trend Analysis of Liberia's Exchange Rate and Exports (Growth Rate)**

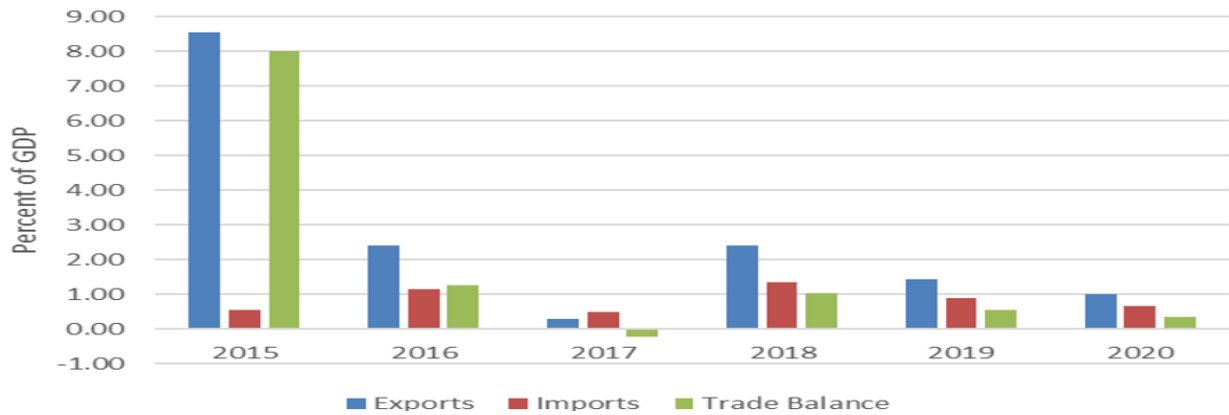


Source: WAMI Trade Integration Data

Liberia's total exports surged to US\$390.3 million from US\$39.1 million in 2019. Total trade increased to US\$1.5 billion in 2020 from US\$ 1.1 billion in 2019. The country's trade with WAMZ declined to US\$31.1 million in 2020 from USD45.9 million in 2019. Liberia's import to member countries worsened to US\$20.7 million in 2020 from US\$28.2 million in 2019.

Liberia's trade with the WAMZ dropped to 1.7 percent of GDP in 2020 from 2.3 percent of GDP in 2019. Liberia's share in the regions' export declined to 2.7 percent in 2020 from 1.0 percent in 2019 whilst the country's import share accounted for 12.9 percent in 2020 relative to 7.3 percent in 2019.

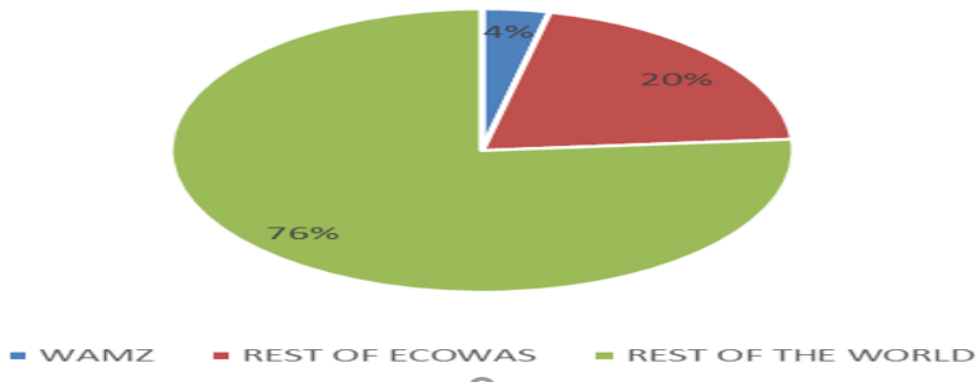
**Figure 11: Liberia - Intra-WAMZ Trade Balance**



Source: WAMI Trade Integration Data

Liberia’s trade with ECOWAS contracted to US\$302.1 million representing 1.0 percent of GDP in 2020 from US\$431.4 million or 13.6 percent of GDP in 2019. The country’s trade with member states, ECOWAS and the rest of the globe represents 4.0 percent, 20.0 percent, and 76.0 percent respectively.

**Figure 12: Liberia - Direction of Trade**



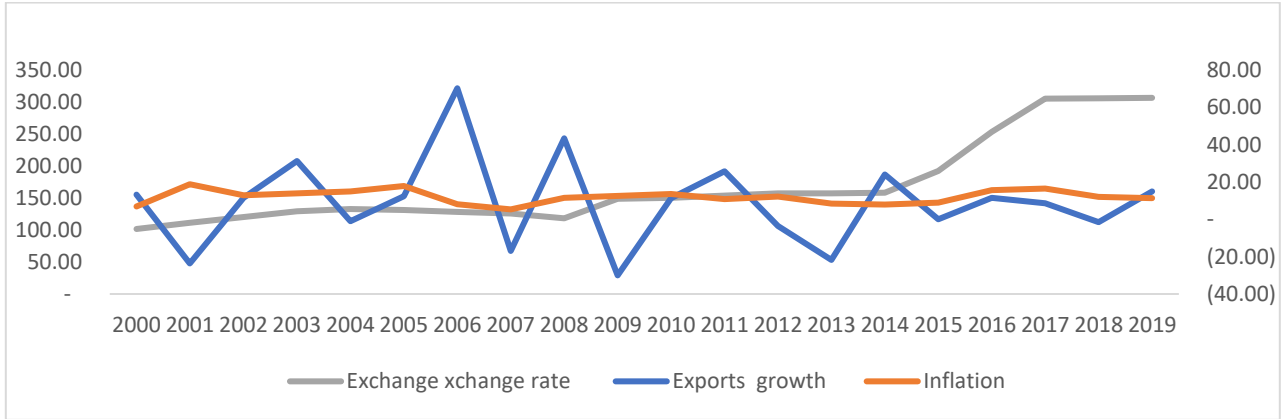
Source: WAMI Trade Integration Data

**Nigeria**

Nigeria was using a fixed exchange rate policy until 1985, however, due to unsatisfactory outcomes, the fixed exchange rate regime was discontinued. On the back of high debt level and overvalued Naira coupled with external imbalances; the authorities implemented structural adjustment programme (SAP) on the recommendations of the International Monetary Funds (IMF), thus, shifting the currency regime from fixed to float exchange rate regime. The exchange rate was temporally fixed in 1994 but

in 1995, the exchange rate was liberalised, and a floating exchange rate regime was adopted once again, with occasional interventions in the foreign exchange market.

**Figure 13: Trend Analysis of Nigeria’s Exchange Rate and Exports (Growth Rate)**



Source: WAMI Trade Integration Data

Further to the SAP, the Naira depreciated from 1.8 Naira per US dollar in 1986 to 132.9 naira to a dollar in 2004. The depreciation affected the current account balance due to the significant reliance on crude oil exports. The inflation rate accelerated to 15.0 percent in 2004 from 7.5 percent in 1986. However, as the world oil price boomed and exports improved, the current account balance improved and stood at US\$16840.5 million in 2004 from US\$210.9 million in 1986. Exports and foreign reserves both increased from the 1986 levels to US\$27,623.3 million and US\$28,632.1million in 2004.

Nigeria’s trade plunged to US\$94.6 million in 2020 from US\$134.5 billion in 2019. Total exports of Nigeria dwindled to US\$35.9 billion in 2020 from US\$65.0 billion in 2019. Total imports plummeted to US\$58.6 billion from US\$69.6 billion during the review period. Exports to the WAMZ contracted to US\$401.4 million in 2020 from US\$4.0 billion in 2019. Imports from WAMZ shrunk toUS\$66.1 million in 2020 from US\$66.0 million in 2019.

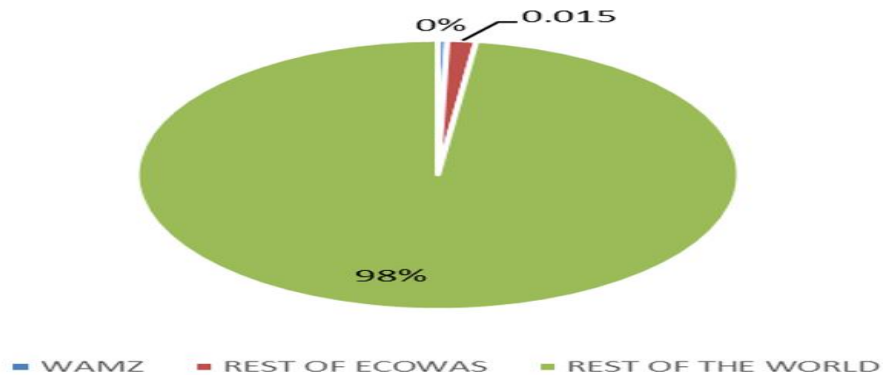
**Figure 14: Nigeria - Intra-WAMZ Trade Balance**



Source: WAMI Trade Integration Data

Trade with member countries declined to US\$ 467.6 million representing 0.12 percent of GDP in 2020 from US\$4.0 billion or 0.85 of GDP in 2019. Nigeria’s export share in WAMZ dropped to 35.1 percent of total trade in 2020 from 85.7 percent in 2019, whilst the imports shot up by 41.3 percent of total in 2020 from 17.13 percent in 2019. The country’s share in intra-WAMZ trade dropped to 35.9 percent in 2020 from 80.4 percent in 2019.

**Figure 15: Nigeria - Direction of Trade**



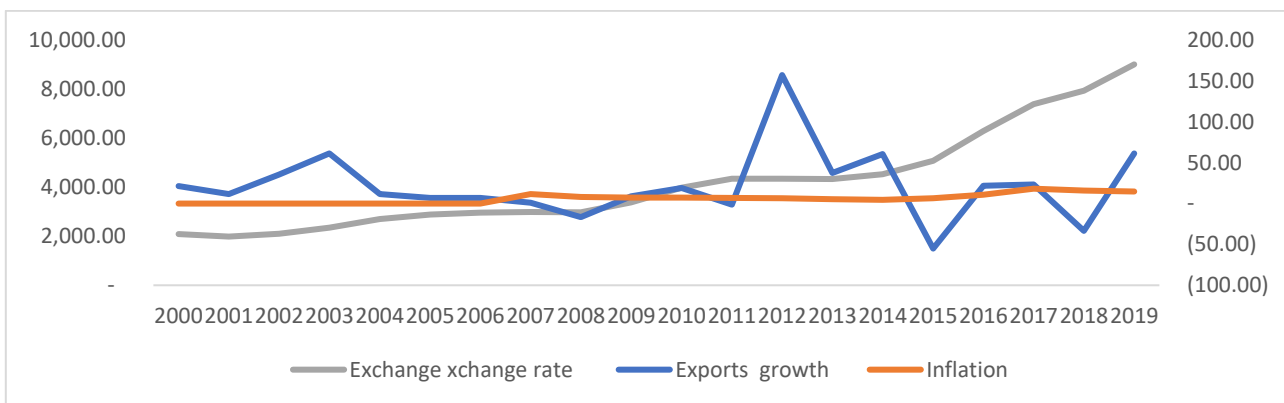
Source: WAMI Trade Integration Data

The country’s trade with the rest of ECOWAS declined to 0.36 percent of GDP in 2020 from 0.60 percent of GDP in 2019. Trade with the WAMZ, ECOWAS and the rest of the world represents 0.015, 1.98 percent and 98.0 percent, respectively. It must be noted that insecurity and government restricted access to official foreign exchange window to import certain goods appear to be affecting the country’s trade within the WAMZ countries.

## Sierra Leone

Sierra Leone’s economy was liberalised after disbanding the fixed exchange rate regime. The country went through various exchange rate regimes which created imbalances in the economy. The fixed exchange rate regime was replaced with a floating exchange rate regime in 1990. The currency was pegged to the US dollar during the period 1982-1989, before then it was fixed to the IMF SDR during 1978 to 1982. During these periods, the Leone was very strong and stood at 1.05 Leone to a dollar. However, following the implementation of SAP, the Leone depreciated against the US dollar to 151.5 Leone in 1990.

**Figure 16: Trend Analysis of Sierra Leone’s Exchange Rate and Exports (Growth Rate)**



Source: WAMI Trade Integration Data

The current account balance showed a surplus of US\$140.7 million whilst Inflation sky rocketed and authorities had to intervene in the foreign exchange rate market to stabilise the Leone and also support exports.

Sierra Leone’s total exports fell to US\$625.0 million in 2020 from US\$720.9 million in 2019. Total imports declined to US\$1.4 billion in 2020 from US\$1.6 billion in 2019. Total trade contracted to US\$ 2.0 billion in 2020 from US\$2.3 billion in 2019. Sierra Leone’s trade with the WAMZ declined to US\$ 50.1 million from US\$53.2 million in 2019. The country’s exports to the WAMZ increased to US\$28.4 million while imports from the WAMZ fell to US\$21.7 million in 2020 from US\$29.2 million in 2019.

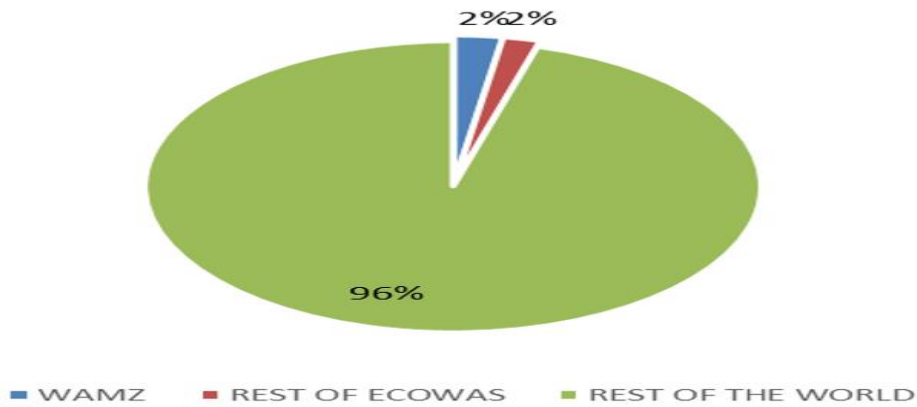
**Figure 17: Sierra Leone - Intra-WAMZ Trade Balance**



Source: WAMI Trade Integration Data

Sierra Leone’s share in intra-WAMZ export increased to 2.5 percent in 2020 from 0.5 percent in 2019. The country’s share in intra-WAMZ import surged to 13.56 percent in 2020 from 7.58 percent in 2019 and her trade share with WAMZ increased to 3.84 percent of total trade in 2020 from 1.06 percent in 2019.

**Figure 18: Sierra Leone - Direction of Trade**



Source: WAMI Trade Integration Data

Sierra Leone’s trade with the rest of ECOWAS improved to 1.02 percent of GDP in 2020 from 0.49 percent of GDP in 2019. The country’s direction of trade with WAMZ, ECOWAS and the rest of the world represents 2.0 percent, 2.0 percent, and 94.0 percent, respectively. Limited productive capacity and limited diversification of the economy truncated the trade flows of the country.

### 2.3 Analysis of Trade Intensity within WAMZ Countries

Trade Intensity Index<sup>7</sup> is a comprehensive indicator used to measure the interdependence of the two countries in terms of trade. The greater the value, the closer the two countries are in terms of trade. Table 2 summarises the computation of trade intensity among the WAMZ countries. A closer examination of the Table, for instance, reveals that Gambia's trade intensity index with Guinea has been consistently greater than 1 and has continued to grow over the review periods. This shows that Gambia has closer trade links with Guinea than the rest of the WAMZ and that trade cooperation has continued to strengthen in recent years.

**Table 2: Summary of Computation of Trade Intensity among the WAMZ Countries**

country_it	country_jt	bil_exp_ijt	bil_imp_ijt	bil_nexc_ijt	bil_trd_index	TII_index	EII_index
GHA	GIN	5,981,998.2	6,404,246.5	3,093.0	0.00027	5.8	5.7
GHA	GMB	2,111,506.0	633,642.5	19.7	0.00009	17.9	17.5
GHA	LBR	15,502,912.0	6,143,924.2	47.8	0.00082	26.3	25.6
GHA	NGA	112,000,000.0	364,900,000.0	102.3	0.00187	9.4	9.2
GHA	SLE	13,281,113.0	5,226,901.4	2,383.3	0.00046	35.6	34.9
GIN	GHA	135,700,000.0	9,778,068.2	0.0	0.00213	69.1	67.5
GIN	GMB	339,461.1	203,749.1	0.0	0.00006	7.3	7.1
GIN	LBR	2,635,934.6	11,440,918.0	0.0	0.00129	29.2	28.5
GIN	NGA	6,356,265.2	3,453,306.4	0.0	0.00003	1.8	1.7
GIN	SLE	10,015,480.0	7,545,002.5	0.8	0.00144	81.9	79.7
GMB	GHA	66,472.9	585,946.0	0.1	0.00002	1.1	1.0
GMB	GIN	7,949,066.5	334,167.1	168.7	0.00093	687.5	668.7
GMB	LBR	16,857.0	46,794.2	2.5	0.00003	3.1	3.0
GMB	NGA	18,475.4	1,121,966.3	5.4	0.00000	0.1	0.1
GMB	SLE	172,023.8	290,485.8	130.2	0.00011	25.5	24.9
LBR	GHA	7,211,810.4	7,514,055.8	0.0	0.00027	64.8	63.5
LBR	GIN	98,281.3	9,415,391.7	68.7	0.00105	2.9	2.8
LBR	GMB	40,935.1	1,464,199.6	0.4	0.00040	9.8	9.6
LBR	NGA	1,647,850.1	7,216,085.1	2.2	0.00002	2.9	2.8
LBR	SLE	16,941,122.0	1,807,437.1	52.1	0.00266	1,218.8	1,192.7
NGA	GHA	843,700,000.0	78,462,987.0	0.0	0.00282	30.2	29.6
NGA	GIN	6,369,181.7	21,910,819.0	32.1	0.00014	1.3	1.3
NGA	GMB	1,462,825.7	1,652,946.4	0.2	0.00001	1.2	1.2
NGA	LBR	102,400,000.0	1,995,686.1	0.5	0.00028	29.1	28.5
NGA	SLE	3,197,649.0	3,675,635.5	24.3	0.00002	0.8	0.8
SLE	GHA	4,589,755.1	8,227,341.8	0.0	0.00030	15.7	15.3
SLE	GIN	4,624,077.9	5,812,102.6	1.3	0.00088	132.3	129.6
SLE	GMB	2,032,994.4	720,531.0	0.0	0.00058	217.0	213.1
SLE	LBR	2,159,274.6	767,551.1	0.0	0.00056	91.9	89.6
SLE	NGA	392,848.3	4,491,714.0	0.0	0.00002	0.4	0.4

Note: The indicators were averaged over 2001-2020.

Source: WAMI Trade Integration Data

<sup>7</sup> See section 4.1 for detailed discussion on the measurement of TII.



**Table 3: The Gambia Trade Intensity with the WAMZ Countries**

YEAR	Reporting Country	Trading WAMZ Partner	Bilateral Export	Bilateral Import	Trade Intensity	Export Intensity
2001-2005	GMB	GHA	1.74	2.77	3.68	3.57
2006-2010	GMB	GHA	0.06	0.43	1.28	1.26
2011-2015	GMB	GHA	0.17	0.65	2.13	2.06
2016-2020	GMB	GHA	0.00	0.93	0.00	0.00
2001-2005	GMB	GIN	0.35	0.19	47.20	46.90
2006-2010	GMB	GIN	3.05	0.34	295.55	288.74
2011-2015	GMB	GIN	23.92	0.29	2013.27	1954.59
2016-2020	GMB	GIN	4.48	0.59	393.86	384.30
2001-2005	GMB	LBR	0.02	0.05	0.69	0.67
2006-2010	GMB	LBR	0.02	0.13	4.10	4.03
2011-2015	GMB	LBR	0.03	0.04	4.90	4.75
2016-2020	GMB	LBR	0.00	0.00	0.00	0.00
2001-2005	GMB	NGA	0.02	0.24	3.02	2.93
2006-2010	GMB	NGA	0.03	1.98	0.14	0.14
2011-2015	GMB	NGA	0.04	0.58	0.12	0.12
2016-2020	GMB	NGA	0.00	1.36	0.00	0.00
2001-2005	GMB	SLE	0.14	0.40	21.80	21.52
2006-2010	GMB	SLE	0.04	0.21	11.52	11.28
2011-2015	GMB	SLE	0.50	0.19	68.28	66.16
2016-2020	GMB	SLE	0.00	0.66	0.00	0.00

Source: WAMI Trade Integration Data

However, the index of trade integration increased from 47.2 to 393.86 in the period 2001-2005 and 2016-2020 respectively, indicating that Guinea's trade cooperation with Gambia is still active and have strengthened over the years. Since 2001, the trade intensity index between Gambia and Guinea has both shown an upward trend and a rapid growth rate. This shows that in the process of regional Integration, Gambia's reliance on Guinea has been deepened, and trade cooperation between the two countries continue to grow from strength to strength. Gambia's trade intensity with Ghana, Guinea, Liberia, Nigeria, and Sierra Leone stood at 11.0, 687.5, 3.1, 0.1 and 25.5 respectively reflecting intense trade amongst them. However, the trade relation between the Gambia and Nigeria is less than 1.0 indicating weak trading relationship between the two economies. The exports intensity between the Gambia and Nigeria dropped from 2.93 in 2001-2005 to zero during the period of 2016-2020.

Ghana trade intensity with Guinea, Liberia, Nigeria, and Sierra Leone improved over the years. This relationship is even more reflective of the real objectives of the WAMZ relative to the developments in other member countries. However, integration between Ghana and The Gambia deteriorated from 18.28 percent to 6.87 percent in the periods 2001-2005 and 2006-2010, respectively. The bilateral exports intensity between Ghana and the Gambia has declined significantly from 18.11 percent in 2001-05 to 6.69 percent in 2016-2020.

**Table 4: Ghana Trade Intensity with the WAMZ Countries**

YEAR	Reporting Country	Trading WAMZ Partner	Bilateral Export	Bilateral Import	Trade Intensity	Export Intensity
2001-2005	GHA	GIN	0.43	0.59	2.79	2.76
2006-2010	GHA	GIN	3.48	7.73	9.33	9.12
2011-2015	GHA	GIN	9.05	7.48	6.68	6.49
2016-2020	GHA	GIN	10.96	9.81	4.52	4.40
2001-2005	GHA	GMB	0.75	0.43	18.29	18.11
2006-2010	GHA	GMB	2.42	0.16	28.52	27.77
2011-2015	GHA	GMB	3.57	0.50	17.85	17.36
2016-2020	GHA	GMB	1.71	1.45	6.87	6.69
2001-2005	GHA	LBR	6.66	7.92	5.66	5.60
2006-2010	GHA	LBR	5.93	4.41	27.44	26.71
2011-2015	GHA	LBR	40.45	5.83	59.10	57.45
2016-2020	GHA	LBR	8.98	6.41	12.82	12.51
2001-2005	GHA	NGA	96.46	420.50	20.19	19.97
2006-2010	GHA	NGA	83.36	497.36	9.34	9.14
2011-2015	GHA	NGA	161.42	465.68	4.66	4.53
2016-2020	GHA	NGA	106.58	76.00	3.40	3.31
2001-2005	GHA	SLE	5.05	0.42	39.62	39.17
2006-2010	GHA	SLE	11.05	0.66	64.12	62.61
2011-2015	GHA	SLE	11.27	5.65	11.20	10.88
2016-2020	GHA	SLE	25.76	14.18	27.60	26.90

Source: WAMI Trade Integration Data

Ghana's export intensity has decreased continuously from 2013 and her trade balance has been in deficit over the years, except for 2017 and 2018. Despite the most recent trade agreements in the continent, trade has not been very integrated amongst WAMZ countries as manifested by Ghana's relationship with other countries including The Gambia. If robust measures are not taken to facilitate trade amongst member states by way of improving infrastructure, exports diversification, stable

exchange rate and improve exports intensities, the purpose of the AfCFTA which is expected to promote and spur growth in trade by 52.0 percent in Africa will be defeated (Obeng, 2021). However, there is hope that the new National Export Development Strategy, which is set to run from 2020 to 2029 to raise non-traditional export earnings to U\$25.3 billion in 2029 will deepen intra-regional trade thus improving exports intensity in the WAMZ.

Guinea’s trade intensity with The Gambia, Ghana, Liberia, Nigeria, and Sierra Leone indicates 7.3, 69.1, 29.2, 1.8 and 81.9 percent, respectively (Table 2). The trade intensity index between Guinea and sister countries in the WAMZ are very impressive except for Nigeria which is not performing quite well in the trade integration process with Guinea. This has been reflected in the deteriorating exports intensity index between the two countries from 0.28 percent in 2001-2005 to 0.06 percent in 2016-2020.

**Table 5: Guinea Trade Intensity with the WAMZ Countries**

YEAR	Reporting Country	Trading WAMZ Partner	Bilateral Export	Bilateral Import	Trade Intensity	Export Intensity
2001-2005	GIN	GHA	0.06	0.31	0.22	0.22
2006-2010	GIN	GHA	0.37	4.43	0.62	0.60
2011-2015	GIN	GHA	155.73	17.65	120.80	117.83
2016-2020	GIN	GHA	386.64	16.72	154.86	151.18
2001-2005	GIN	GMB	0.03	0.12	2.47	2.45
2006-2010	GIN	GMB	0.10	0.25	5.87	5.73
2011-2015	GIN	GMB	0.18	0.19	6.08	5.92
2016-2020	GIN	GMB	1.04	0.25	14.83	14.50
2001-2005	GIN	LBR	0.32	0.07	0.85	0.84
2006-2010	GIN	LBR	2.19	1.80	45.10	44.00
2011-2015	GIN	LBR	5.96	30.11	62.26	60.43
2016-2020	GIN	LBR	2.07	13.78	8.76	8.55
2001-2005	GIN	NGA	0.31	0.62	0.29	0.29
2006-2010	GIN	NGA	21.64	1.23	6.12	5.93
2011-2015	GIN	NGA	2.85	5.27	0.63	0.61
2016-2020	GIN	NGA	0.63	6.69	0.06	0.06
2001-2005	GIN	SLE	1.10	0.18	26.93	26.66
2006-2010	GIN	SLE	2.92	0.99	55.54	54.23
2011-2015	GIN	SLE	29.11	11.12	219.51	212.80
2016-2020	GIN	SLE	6.30	18.30	29.40	28.74

Source: WAMI Trade Integration Data

Nigeria has not been an active trading partner to the rest of the WAMZ member countries, particularly Guinea. Ali & Berahab (2018). Guineas' trade relations with Nigeria decelerated from an index of 0.28 in 2001-2005 to a five-year average of 0.06 in 2020. The exports trade intensity also follows the same position as reflected above.

Liberia's trade intensity index indicates 9.8, 64.8, 2.9, 2.9 and 1218.8 for the Gambia, Ghana, Guinea, Nigeria, and Sierra Leone, respectively. Her relationship with Sierra Leone can to a very large extent be explained by the proximity and complete trade openness between the two nations. Despite the low index record of 2.9, trade intensity between Liberia and Nigeria improved from a record low of 0.46 to 8.33 from the period 2001-2005 and 2016-2020 respectively. With respect to its trade integration with Guinea, indications are that on a five-year average, the relationship deteriorated from 7.15 in 2001-2005 to 2.25 in 2016-2020, respectively.

**Table 6: Liberia Trade Intensity with the WAMZ Countries**

YEAR	Reporting Country	Trading WAMZ Partner	Bilateral Export	Bilateral Import	Trade Intensity	Export Intensity
2001-2005	LBR	GHA	0.00	0.05	0.53	0.51
2006-2010	LBR	GHA	0.01	2.06	0.11	0.11
2011-2015	LBR	GHA	7.37	13.18	26.07	25.41
2016-2020	LBR	GHA	19.80	12.42	226.03	221.40
2001-2005	LBR	GIN	1.67	2.40	7.15	6.93
2006-2010	LBR	GIN	0.04	27.56	3.95	3.85
2011-2015	LBR	GIN	0.27	8.40	5.40	5.27
2016-2020	LBR	GIN	0.08	1.62	2.26	2.20
2001-2005	LBR	GMB	0.00	0.08	0.04	0.04
2006-2010	LBR	GMB	0.06	0.33	16.78	16.54
2011-2015	LBR	GMB	0.04	5.10	7.60	7.37
2016-2020	LBR	GMB	0.06	0.38	14.24	13.88
2001-2005	LBR	NGA	0.00	0.05	0.46	0.45
2006-2010	LBR	NGA	0.11	18.68	0.25	0.24
2011-2015	LBR	NGA	3.32	4.42	2.62	2.55
2016-2020	LBR	NGA	2.90	4.96	8.34	8.16
2001-2005	LBR	SLE	0.26	0.80	0.26	0.25
2006-2010	LBR	SLE	0.01	0.31	1.12	1.10
2011-2015	LBR	SLE	14.67	0.70	421.69	409.24
2016-2020	LBR	SLE	48.80	5.40	4275.10	4188.52

Source: WAMI Trade Integration Data

Nigeria remains the largest contributor to wealth in the ECOWAS and the largest in terms of population size. However, her trade intensity with member countries has been very low over the years. This is premised on the over dependence on the oil sector and as such, the economy accounts for only 4.2% of its total exports to the region (Ali & Berahab, 2018). The trade intensity index of Nigeria to The Gambia, Ghana, Guinea, Liberia, and Sierra Leone stood at 1.2, 30.2, 1.3, 29.2 and 0.8 respectively (Table 2). Nigeria’s trade relation with Ghana, and Liberia has been more impressive relative to the other member states.

**Table 7: Nigeria Trade Intensity with the WAMZ Countries**

YEAR	Reporting Country	Trading WAMZ Partner	Bilateral Export	Bilateral Import	Trade Intensity	Export Intensity
2001-2005	NGA	GHA	310.08	15.51	218.83	212.67
2006-2010	NGA	GHA	1025.80	45.84	33.00	32.38
2011-2015	NGA	GHA	983.14	184.46	14.78	14.31
2016-2020	NGA	GHA	983.66	56.92	27.95	27.34
2001-2005	NGA	GIN	79.32	26.66	5.90	5.73
2006-2010	NGA	GIN	2.76	59.81	0.57	0.56
2011-2015	NGA	GIN	8.97	1.97	0.93	0.91
2016-2020	NGA	GIN	10.20	11.14	1.38	1.34
2001-2005	NGA	GMB	0.69	0.05	0.07	0.07
2006-2010	NGA	GMB	2.87	0.92	2.63	2.57
2011-2015	NGA	GMB	1.96	5.59	1.25	1.21
2016-2020	NGA	GMB	0.72	0.02	0.74	0.72
2001-2005	NGA	LBR	0.97	0.49	0.36	0.35
2006-2010	NGA	LBR	229.90	2.80	76.33	75.22
2011-2015	NGA	LBR	174.47	0.63	37.69	36.45
2016-2020	NGA	LBR	2.12	3.80	0.71	0.69
2001-2005	NGA	SLE	2.57	0.42	1.46	1.41
2006-2010	NGA	SLE	4.31	0.22	1.52	1.48
2011-2015	NGA	SLE	6.07	12.55	0.86	0.84
2016-2020	NGA	SLE	2.14	0.86	0.66	0.64

Source: WAMI Trade Integration Data

However, her trade relations with The Gambia, Guinea, and Sierra Leone have been erratic and tending to zero (Table 2). With appreciation of the bilateral exchange rate (table five-year averages), Nigeria exports intensity to Guinea decelerated from 5.73 in 2001-2005 to 1.34 in 2016-2020 and that of Sierra Leone also fell from 1.4 in 2001-2005 to 0.6 in 2016-2020. In the case of the Gambia, exports

intensity improved from 0.06 to 0.72 in 2016-2020 despite the appreciation of the bilateral exchange rate from 5.36 to 0.17 in the same reporting period. Liberia's exports relationship with Nigeria trended up from an index of 0.35 to 0.69 during the review period because of a depreciation of the bilateral exchange rate from 0.39 Naira in 2001-05 to 0.45 Naira in 2016-2020.

Sierra Leone's trade integration with The Gambia, Ghana, Guinea, Liberia, and Nigeria showed an index of 217.0, 15.7, 132.3, 91.9 and 0.4 respectively (Table 2). The integration relationship between Sierra Leone and WAMZ member countries improved from strength to strength except for Nigeria. The trade intensity position with Nigeria deteriorated to 0.59 in the periods 2016-2020 from a high of 4.37 in 2001-2005. This could be attributed to the huge exchange rate variability which ultimately reduces incentives to trade.

**Table 8: Sierra Leone Trade Intensity with the WAMZ Countries**

YEAR	Reporting Country	Trading WAMZ Partner	Bilateral Export	Bilateral Import	Trade Intensity	Export Intensity
2001-2005	SLE	GHA	0.47	1.78	9.52	9.48
2006-2010	SLE	GHA	0.26	0.80	1.93	1.90
2011-2015	SLE	GHA	4.01	24.37	14.93	14.52
2016-2020	SLE	GHA	10.50	6.35	27.34	26.75
2001-2005	SLE	GIN	4.12	1.65	135.97	134.24
2006-2010	SLE	GIN	3.18	1.81	193.33	190.06
2011-2015	SLE	GIN	6.52	1.81	134.89	130.72
2016-2020	SLE	GIN	6.42	15.78	64.56	63.14
2001-2005	SLE	GMB	1.70	3.15	73.71	73.14
2006-2010	SLE	GMB	2.26	0.57	566.06	557.62
2011-2015	SLE	GMB	4.99	1.56	169.05	164.02
2016-2020	SLE	GMB	0.66	0.36	58.69	57.31
2001-2005	SLE	LBR	0.17	0.84	10.04	9.73
2006-2010	SLE	LBR	1.47	0.14	116.83	114.39
2011-2015	SLE	LBR	2.05	0.39	125.17	121.18
2016-2020	SLE	LBR	4.98	1.25	121.26	118.47
2001-2005	SLE	NGA	0.14	2.10	4.37	4.24
2006-2010	SLE	NGA	0.34	1.26	0.82	0.79
2011-2015	SLE	NGA	0.09	9.27	0.06	0.06
2016-2020	SLE	NGA	0.78	5.23	0.60	0.59

Source: WAMI Trade Integration Data

The bilateral exchange rate weakened from SL0.47 in 2001-05 to SL0.03 in 2016-20 reflecting a drop in export intensity index from 4.23 in 2001-05 to 0.58 in 2016-20. Nicita (2013) argued that exchange rate volatility results in minuscule international trade caused by risks and cost of transaction.

Nigeria is the least integrated economy in the WAMZ and ECOWAS, as it is not participating actively as expected in the intra-trade within the region. Premised on this, it could be summarised that other WAMZ economies are relatively more into integration among themselves excluding Nigeria and have improved tight trade relations to foster the integration process. Excluding Nigeria, the integration between the rest of WAMZ nations have reached 16.7% in 2000, and in 2016, Nigeria sets back the rate of integration by 3.0 percentage points (Ali & Berahab, 2018).

### **3.0 Literature Review**

#### **3.1 Theoretical Literature Review**

In the last few years, cross border trade has been impeded by the adverse impact of both global financial crisis and the Covid-19 pandemic with disruption to supply chains, which have undermined several efforts<sup>8</sup> made to minimizing barriers to trade, over the years. Hence, various macroeconomic and trade theories have attempted to explain the interrelationship between exchange rate (level - nominal vs real, and its volatility) on trade (volumes and values)<sup>9</sup>. Exchange rate variations<sup>10</sup> often have effects on trade balances and vice versa, but the degree or magnitude could be influenced by other presumptive economic and structural phenomena; production capacity, trade complementarity, comparative advantages among other factors, that varies from one country to another. Moreover, economic literature has shown that ability of domestic currency to reduce trade imbalances is not that straight forward and cannot be separated from the influence of other macroeconomic and monetary variables.

One of the often-used theoretical underpinning for this relationship is the exchange rate determination through relative prices. This theory explains that under a fixed exchange rate regime, relative prices tend to bring about trade imbalances and limit trade deficit financing. Moreover, with

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<sup>8</sup> Some of these efforts include several regional trade agreements for market expansion that is expected to subsequently promote economic growth.

<sup>9</sup> As discussions about foreign trade incorporates exchange rate through the demand for foreign currency.

<sup>10</sup> As exchange rate is often expressed as the price paid (in terms of unit of domestic currency) for acquiring a foreign produced good or service and the relationship between exchange rate and foreign trade can be explained in how exchange rate variation affects the value of exports and imports (Pablo, 2017).

higher inflation in one trading partner, exports will become more expensive and imports cheaper, further expanding existing trade deficits. However, with the situation of higher inflation, trade imbalances can be reduced through efforts that bring about disinflation in which adjustment between the nominal exchange rate and the real exchange rate is explained as purchasing power parity. Under a flexible exchange rate regime, adjustment between the nominal and real exchange rate is influenced by market forces. In such instance, with domestic currency depreciation, adjustments happen in both price levels and market forces (Demand & Supply) and terms of trade is changed, resulting into a decrease in export prices and an increase in import prices (Pablo, 2017).

The J-Curve Phenomenon explains the short to long-term relationship between exchange rate and trade. It suggests that devaluation or depreciation in the domestic currency initially causes a deterioration in the trade balance of the domestic economy, export becomes cheaper and import more expensive, reflecting the inelastic nature of demand but after which it becomes elastic to price changes, increasing export volume, subsequently improving the balance of trade as well as the current account balance. On the other hand, currency overvaluation could lead to a reverse J-curve effect in which the domestic economy export quickly becomes expensive for trading partner(s). Export competitiveness will later be reduced along with comparative alternative. In addition, imported goods could become more appealing to local consumer because of its price competitiveness.

The Absorption approach incorporates the income effect on trade as changes takes place in the value and volume of imports and exports (Pilbeam, 2006). It explains that a country's current account balance will improve if its output exceeds absorption, since the disequilibrium is reflected in the difference between the domestic economy's output and expenditure level.

Another theoretical basis for this relationship is the Marshall-Lerner condition and the elasticity approach which states that domestic currency devaluation does improve the balance of trade for the domestic economy once the sum of elasticity for both the domestic economy demand for import and foreign demand for its export is greater than one, otherwise there will be a deterioration in its balance of payments. Balance of trade improvements requires desirable adjustments in the value of imports and exports, which can be influence by exchange rate variation (Haberler, 1961).

Related to this strand of the literature is those that tend to promote disconnect between exchange rate and trade (Elasticity Pessimism). This is where traditional J-curve effects breakdown and the effects of currency (either depreciation or appreciation) tend to wane in promoting or retarding international trade and exports. The implication of this strand is that domestic currency is impotent in



absorbing external shocks and that monetary policy would be ineffective in resolving external vulnerabilities (Leigh et al., 2017).

### **3.2 Empirical Literature Review**

Several empirical studies have shown that the relationship between exchange rate variation and trade is not universal and the effects of currency overvaluation and undervaluation on trade also depends on other monetary, macroeconomic and structural variables including its market accessibility and vulnerability to external shocks. A good number of past studies have proven the existence of a J-curve relationship between exchange rate and trade. Assessing this theory particularly with the linear model estimation techniques, has proven that it exists among various African nations, including sub-Saharan countries and in the ECOWAS region. Akonji et al. (2013) provided evidence of the J-curve relationship in Nigeria using the vector error correction and granger causality technique. Adeniyi et al (2011) also found the J-curve to be existent in Nigeria and an even clearer pattern in Sierra Leone, but an inverted J-curve was found for Ghana and the Gambia. However, other studies have proven that the J-curve doesn't entirely hold in some regions or countries. Shuaibu & Isah (2020), in assessing the J-curve hypothesis in five (5) African countries between 1980 to 2018, showed that it is only coincidental in the short run for Uganda and South Africa, long term for Algeria and therefore doesn't provide significant influence on their trade balances. Dogru, Isik & Turk (2019), provided evidence disputing the J-curve hypothesis but supporting the Marshall-Lerner condition, explaining that US dollar devaluation subsequently improves US trade with all three trading partners, while appreciation deteriorates its bilateral tourism trade in the long-run with exception of one of its trading partners. Akorli & Edem (2017) while studies on the Ghanaian economy between 1980 and 2016 found a non-existing J-curve relationship between exchange rate and trade. They, however, found exchange rate devaluation to have a positive impact on trade balance in the long run. Table 3.1 provides summary of the literature review on the currency dynamics and regional trade integration.

**Table 9: Summary of Literature Review on Exchange Rate Dynamics & Regional Trade Integration**

S/NO	Studies	Sample/Scope	Theoretical Framework	Methodology		Empirical Results/Findings
				Estimation Methods	Variables	
<b>Exchange Rate- Trade Integration Studies</b>						
1	House, Proebsting & Tesar, 2019	US States, 1999-2018	Impact of Exchange rate variation on economic activity	Multi-Country DSGE model and HPT Model	Weighted real exchange rate, trade in goods, unemployment & output	Weighted Exchange rate depreciation is beneficial to employment, economic activity or output, trade & promotes labor migration
2	Shuaibu & Isah, 2020	Five (5) African Countries (Algeria, Nigeria, Cameroon, South Africa & Uganda), 1980-2018	J-Curve effect, exchange rate and trade balance	Linear and non-linear ARDL model & NARDL estimation model	Real & Nominal GDP, Real effective exchange rate (REER), and trade balance	Results showed that the J-curve hypothesis does not completely hold in the five countries.
3	Rajkovic et al, 2020	Eighteen (18) Western Balkan, central & Eastern European Countries, 1990-2016	Exchange rate impact on foreign trade imbalances	Pooled ordinary least squares method with panel-corrected standard error	Current a/c Bal as a percentage of GDP, real GDP, REER, real interest rate, domestic credit growth rate,	Results explain that real exchange rate had less impact on current account balances and devaluation was not an ideal policy instrument for reducing external imbalances during the

				(OLS-PCSE) and generalized least squares method (FGLS)	public expenditure expressed as % of GDP, FDI net flows as percentage of GDP	global financial crisis. However, it reveals that exchange rate can be a powerful tool to reduce trade imbalances when economic environment is stable.
4	Kang & Dagli, 2018	Bilateral data of 72 economies, 2001-2015	Exchange rate impact on international trade	Dynamic Gravity (DG) model	PPI, EPI GDP, trade balance, short term external debt stock, CPI	Results shows positive effect of real exchange on export volume but however weaken over time particularly post global financial crisis (2012-2015) compared to (2003-2006) with effect short lasting
5	Nicita, 2013	100 United Nations Member Countries, 2000-2009	Exchange rate volatility & misalignment impact on trade & trade policies	Fixed Effect Model (Panel gravity model)	Trade data, exchange rate and trade policies	Findings explain that ER misalignment substantially affects trade flows, currency undervaluation to found to promote export & restrict imports and conversely hold in the case of overvaluation. In magnitude, misalignments across currencies result in trade diversion

						quantifiable in about 1 per cent of world trade.
6	Nathaniel, Oladiran & Temidayo Oladiran, 2019	ECOWAS 1980-2017	Exchange rate regimes & Economic integration	Econometrics technique of panel fixed effect model	Trade openness, real gross domestic product, per capita income, transport cost, common language, tariff and exchange rate	The result implies that a unit increase in exchange rate regimes will lead to 0.13% deepening of the economic integration in the ECOWAS. The study concluded that exchange rate regimes plays an important role in promoting economic integration in the ECOWAS.
7	P. Ruiz Nápoles, 2017	Theoretical & Empirical observation	Connection between the neoclassical theory of trade and real exchange rate	the Heckscher-Ohlin model in the context of General Equilibrium conditions and Purchasing Power Parity doctrine	Nominal exchange rate, PPP, GDP, CPI, PPI, trade	Most of the empirical studies on PPP for various periods and countries show the low predictive capacity of this theory regarding exchange rate changes over time, and the existence of persistent deviations. However, most international well-known experts, promote free trade and flexible

						exchange rates policies around the world as the adequate policies to follow by governments, in order to obtain external balance equilibrium, assuming implicitly that the theoretical foundations are correct.
8	Chaudhary, Hashmi & Khan, 2016	Major south Asian & southeast Asian countries, 1979-2010	Long run & short run relationship between exchange & foreign trade	ARDL & Error Correction model	Trade data (export & Imports), exchange rate data (nominal ER)	Results show that the long run relationship between exchange rate and exports exists in more than half of the sample countries; however, the relationship between exchange rate and imports is found only in one sample country. Moreover, the significant short run relationship between the variables isn't found in majority of the sample countries.

9	M. V. Sokolova, 2016	138 countries that have been involved with RTA since 1990, 1990-2010	Trade integration and exchange rate impact	Fixed effect & OR model	DOT statistics, international financial statistics, monthly exchange rate aggregated to yearly average, yearly CPI	Result shows that trade integration has a substantial impact on the burden of the exchange rate adjustment. Also, higher trade balance is associated with more competitive behaviour (higher exchange rate) to the non RTA trading partners, and that aggregate trade elasticity varies over time even with similar level of appreciation or depreciation.
10	Sabri et al, 2012	EU-member states & Southern Mediterranean Countries, Jan 2000- June 2011	Currency impact on trade Volume	VARX model	Monthly trade data, monthly exchange rate	Results shows that exchange rate volatility in the region appear less sensitive to export compared to imports with currency appreciation for the Southern Mediterranean countries experiencing greater percentage increases in imports due to domestic currency appreciation.

11	Dogru, Isik & Turk, 2019	US and trade partners (Canada, Mexico & UK),	J-curve theory, Marshall-Lerner (ML) condition	Linear & Non-linear ARDL model	Exchange rate data, Trade data (tourism)	These results provide evidence contradicting the J-curve theory but supporting the postulations of the ML condition. Explaining that US dollar depreciation subsequently improves US trade with all three trading partners, while appreciation deteriorates its bilateral tourism trade but except with one in the long run.
12	Akorli, Edem, 2017	Ghana, 1980-2016	J-Curve effect, Exchange rate & trade balance	Ordinary least square, Johansen Co-integration test and the Error correction model	CPI, GDP, REER	Findings reveal that the J-curve phenomenal is seen to be non-existent in Ghana. However, it shows that exchange rate devaluation has positive impact on trade balance in the long run.
13	Ali & Berahab, 2018	ECOWAS & ASEAN,	Trade Complementarity & Competitiveness	Augmented Gravity Model	GDP, bilateral distance, contiguity, landlockness, infrastructure &	Results suggest that trade potential within the ECOWAS, remains below the potential given by the gravity model, especially for small economies in the

					Complementarity indexes	community. Brief analysis of revealed comparative advantage (RCA) shows that aside from primary commodities, the majority of products imported by the ECOWAS are supplied by other countries who have a stronger Revealed Comparative Advantage.
14	J. Trotignon, 2010	50 developed & Developing Countries considering several regional trade bloc with respect to trade agreements, 1986-	Trade creation & Diversion through regional integration	Gravity Model	GDP, real exchange rate, regional trade agreement (RTA) intra extra bloc, distance, contiguity, exports	Results shows that integration stimulate intra bloc trade of members countries as well as extra bloc export & Imports. The only trade bloc reflecting trade diversion was NAFTA, substituting sales to the rest of the world with internal flows.
15	Zhijie Guan, 2019	40 African Countries trading with China, 1999-2015	Bilateral Trade determinants	Gravity Model	Export, Import, GDP, distance, population, real exchange rate (RER), trade	Results shows that GDP effect on Africa export to China is negatively significant but positive on imports from china. RER effect is positive on Africa's



					agreement, recession	export but negative on imports from china. Population effect is positive for both export to and import from China. Trade agreement is positive on both fronts but however not significant, while recession has a negative effect on both fronts but only significant for imports from China
16	B.P.S. Chandran, 2010	ASEAN & India, 1990-2006	Trade Complementarity & similarity	Indexation (trade intensity for both Export & Imports)	Sectorial Trade Statistics (Export & Import)	Results revealed various sectors complementarity between India & ASEAN for both exported & imported commodities from India & the ASEAN bloc.
17	C. Carrere, 2004	130 countries, covering seven RTA, 1962-1996	Regional trade agreement effects	Gravity Model	Trade data (Export & Import)	Result revealed evidence of trade diversion, showing increased intra-regional trade levels beyond the gravity model prediction for most RTAs as well as reduction in import together with momentous decline in exports,

						from and to the rest of the world, respectively.
18	Matyas et. Al, 2004	Eleven APEC Countries, 1978-1997	Modelling & Predicting trade flows	Generalized Gravity model	DOT statistics, Exports, GDP, population, real exchange rate (RER), distance b/w countries, foreign currency reserves	Results provides that foreign currency levels for the importing country have a strong positive effect on export flows, large domestic or large potential markets decrease export flows, exchange rate, population also prove to have a significant effect on trade flows.
19	Adu et al 2022	ECOWAS Countries, 1980-2018	Baier et al. (2019) two-stage estimating technique	Gravity model	Bilateral export values, CFA franc's common currency, real GDP per capita, bilateral geographical distances, contiguous borders, and the common language	The study finds that the CFA franc (common currency) has no significant effect on bilateral trade in ECOWAS and that the country pairs' economic sizes and geographical contiguities determine the ultimate CFA franc trade effect. The study concludes that future trade gains from the proposed ECOWAS common

						currency appears to be constrained.
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**Source:** Authors' Compilation

Researchers have also tested with different estimation techniques the trade and exchange rate relationship. Rajkovic et al (2020), in a research conducted among Eighteen (18) Western Balkan, central & Eastern European Countries, during 1990-2016, using Pooled ordinary least squares method with panel-corrected standard error (OLS-PCSE) and generalized least squares method (FGLS) found that real exchange rate had less impact on current account balances and domestic currency devaluation was not an ideal policy instrument for reducing external imbalances during the global financial crisis. However, it reveals that exchange rates can be a powerful tool to reduce trade imbalances when there is some form of economic stability. House, Proebsting & Tesar, (2019), using the multi-country DSGE model and HPT Model, carried out research on intra-trade between US States, 1999-2018 and found that weighted exchange rate of depreciation is beneficial to employment, economic activity or output, trade & promotes labor migration. Kang & Dagli, (2018) examines bilateral trade data of 72 economies, for the periods 2001-2015. It found positive effect of real exchange rate on export volumes, which however, weakened over time particularly post global financial crisis (2012-2015) compared to (2003-2006), Nicita, (2013) analyses the impact of exchange rate volatility and misalignment on trade & trade policies among 100 United Nations member countries, for the periods 2000-2009. It uses the fixed effect, panel gravity model and found that real exchange rate has a positive effect on export volume, but it weakened over time. Sabri et al, (2012) using VARX model shows that exchange rate volatility in the region appears less sensitive to export compared to imports with currency appreciation for the Southern Mediterranean countries experiencing greater percentage increases in imports due to domestic currency appreciation. Results from the study conducted by Chaudhary, Hashmi & Khan, (2016), among major south Asian & southeast Asian countries, 1979-2010, showed that the long run relationship between exchange rate and exports exists in more than half of the sample countries; however, the relationship between exchange rate and imports is found only in one sample country. Moreover, the significant short run relationship between the variables isn't found in majority of the sample countries.

Exchange rate dynamics and economic or regional trade integration considers not just exchange rate valuation for improved trade balance but also exchange rate regimes. Most economists, particularly those from Bretton Woods Institutions (such as IMF, World Bank, World Trade Organisation (WTO) among others), tend to promote free trade and flexible exchange rates policies around the world as being adequate policies to be followed by governments, in order to obtain

external balance equilibrium. Oladiran & Oladiran, (2019), when studying exchange rate regimes and economic integration in the ECOWAS region, 1980-2017 implies that exchange rate regimes play an important role in promoting economic integration in ECOWAS. The study provided evidence that a unit increase in exchange rate regimes will lead to deepening of the economic integration in the ECOWAS by 0.13 percent. Sokolova, (2016). Empirical research conducted on 138 economies that have been involved in Regional Trade Agreements (RTA) since 1990-2010, found that trade integration had a substantial impact in diffusing the burden of the exchange rate adjustment. Also, higher trade balance is associated with more competitive behaviour to the non-RTA trading partners, and that aggregate trade elasticity varies over time even with similar level of appreciation or depreciation.

From the literature, the relationship between the dynamics of exchange rate and trade, and how exchange rate variation and or valuation impact trade and accelerate regional trade integration could be attributed to the influence of structural imbalances. Studies have proven that integration or setting up regional trade blocs through regional trade agreements help boost trade especially intra trade, by giving rise to market expansion. However, issues relating to the quality of infrastructure, diversification among others, which enhance productive sector complementarities and competitiveness will need to be addressed in-order to increase trade flows. Despite regional trade integration efforts that have been made, trade in the ECOWAS region remain well below its full potential as evidenced in the intra-regional trade statistics. Ali & Berahab, (2018), when assessing trade potential in the ECOWAS and ASEAN with the augmented gravity model found that with improved infrastructure and complementarities indices, the ECOWAS has higher trade potential, as results revealed a significant increase in elasticity when infrastructure and complementarity variables are controlled for. Analysis of the study also revealed that comparative advantage is a major factor for higher imports from outside the region. Carrere, (2006), using the gravity model in a study covering seven RTAs, involving 130 countries from 1962-1996, found that RTA brought about increases in trade between members at the expense of the rest of the world. Trotignon (2010), in a study assessing trade creation and diversion from regional integration involving 50 developing and developed countries using the gravity model also found that integration stimulates intra bloc trade among member countries. The only trade bloc reflecting trade diversion was NAFTA, substituting sales to the rest of the world with internal flows. In a study done by Chandran (2010) on trade Complementarity that also considered similarity between

India and the ASEAN from 1990-2006, he revealed that enhancing trade corporation could lead to increase in trade flows with the existing productive sector complementarity between India and ASEAN. He also pointed out comparative advantages that further back their complementarity. Empirical evidence tends to indicate that countries with similarities in their trade structures (particularly those producing similar products without differentiation, or value addition) are more likely to struggle in increasing trade flows with one another. Hence, they will be trading less among themselves, exception to this proposition could be regions where there are extensive industrial activities and tends to differentiate their products.

#### **4.0 Model Specification and Estimation Technique**

##### **4.1 Empirical Specification**

In line with the vast theoretical and empirical literature on international trade flows, this paper has employed the gravity model to examine the relationship between bilateral exchange rate and trade flows in the WAMZ countries. As mentioned above, the paper attempts to determine empirically whether WAMZ countries would enhance trade by facilitating transactions through quoting and trading in national currencies. Specifically, it examines the effects of bilateral exchange rate on trade in the WAMZ and assesses empirically whether efforts by WAMZ countries to develop complementarity trade structures can enhance intra-WAMZ trade. The gravity model has been applied extensively in empirical works to analyse how economic characteristics influence the pattern of bilateral trade flows. The traditional gravity model developed by Tinbergen (1962) draws from the Newton's Law of Universal Gravitation. The theoretical foundations of the gravity model rely on the theory of trade under imperfect competition, particularly intra-industry trade theory (Dell'Ariccia, 1998), as illustrated by Helpman (1987) and Bergstrand (1989). In its basic form, the gravity model posits that the intensity of bilateral trade between two countries is positively related to the economic masses (GDP) of both trading countries and inversely to the distance between these countries, as specified in equation (1):

$$TD_{ijt} = \beta_0 \frac{GDP_{it} * GDP_{jt}}{D_{ij}} \quad (1)$$

Where  $TD_{ijt}$  is the value of aggregate merchandise trade flows (bilateral exports) to country  $j$  (importer) from the source country (exporter)  $i$  at year  $t$ .  $GDP_{it}$  and  $GDP_{jt}$  denote real GDP of country  $i$  and country  $j$  at year  $t$ , respectively.  $D_{ij}$  is the geographical distance between two trading

countries. The trade literature predicts that bilateral trade between trading countries would increase with increases in real GDP of both countries and decreases with geographical distance between them.

Transforming equation (1) into a linear form yields the basic gravity model specified in equation (2):

$$\ln(TD_{ijt}) = \beta_0 + \beta_1 \ln(GDP_{it}) + \beta_2 \ln(GDP_{jt}) + \beta_3 \ln(D_{ij}) + \varepsilon_{ijt} \quad (2)$$

Since  $D_{ij}$  is a proxy for transportation costs (2008), the coefficient on  $D_{ij}$  is expected to be negative since proximity reduces transportation and information costs (Bayoumi and Eichengreen, 1997). Several studies, both theory and empirical (e.g., Helpman, 1987; Matyas, 1997; Matyas, Konya, and Harris, 1997; Egger, 2000; Anderson and van Wincoop, 2003; Carrere, 2006; Trotignon, 2010; Ali and Berahab, 2018) have extended the basic gravity model to include economic characteristics that potentially influence bilateral trade flows. Following this body of literature, equation (2) is extended to capture the effects of bilateral real exchange rates, relative factor endowments, similarity in real GDP between countries and remoteness, as well as country-pair fixed effects ( $\gamma_{ij}$ ) and time fixed effects ( $\delta_t$ ). Thus, an extended version of the gravity model is specified in equation (3):

$$\begin{aligned} \ln(TD_{ijt}) = & \beta_0 + \beta_1 \ln(GDPT_{ijt}) + \beta_2 \ln(RER_{ijt}) + \beta_3 CMP_{ijt} + \beta_4 \log D_{ij} \\ & + \beta_5 RLFAC_{ijt} + \beta_6 SIM_{ijt} + \beta_7 \ln(REM_{ijt}) + \beta_8 LANG_{ij} \\ & + \gamma_{ij} + \delta_t + u_{ijt} \end{aligned} \quad (3)$$

$\gamma_{ij}$  captures the time-invariant unobserved country-pair specific heterogeneity (Westerlund and Wilhelmsson, 2011). The inclusion of these fixed effects helps to address potential endogeneity of the regressors and capture the effects of time-invariant country-pair factors not included in the model such as the existence of a common border and colonial links between the trading countries. The time fixed effects ( $\delta_t$ ) capture common country pair time-varying heterogeneity such as business cycle effects (Matyas, 1997; Egger, 2000; Egger and Pfaffermayr, 2003) and  $u_{ijt}$  is the error term.

Our first variable of interest is the  $RER_{ijt}$ , which denotes bilateral real exchange rate between country  $i$  and country  $j$  at year  $t$ . In the empirical literature,  $RER_{ijt}$  is included in the gravity model to capture the evolution of competitiveness over time especially when the data spans over a long period of time (Carrere, 2006; Trotignon, 2010). An increase in  $RER_{ijt}$ , reflecting a real depreciation of the exporting country currency against that of the importing country  $j$  should stimulate export flows (Kien and Hashimoto, 2005; Trotignon, 2010). Thus, the coefficient  $\beta_2$  should be positively associated with bilateral trade flows.

The second variable of interest is the trade complementarity index denoted by  $CMP_{ijt}$ . This variable measures the extent to which trading countries have complementarity trade structure i.e., whether the exports of country  $i$  to the world matches with the imports of country  $j$  from the world (Chandran, 2010; Ali and Berahab, 2018). Following Chandran (2010) and Qayyum and Nigar (2020), we consider trade intensity index and export intensity index as proxy for trade complementarity between the trading countries. Generally, the trade integration index reflects the degree of closeness of trade between two partners. This index measures the extent to which country  $j$ 's share in total exports of country  $i$  is larger or smaller relative to country  $j$ 's share in world trade (Drysdale, 1969). Thus, a higher value of the index implies strong trade complementarity between the trading countries (Qayyum and Nigar, 2020). In line with the empirical literature, trade intensity index ( $TII_{ijt}$ ) is constructed as follows:

$$TII_{ijt} = \frac{(X_{ijt}/X_{it})}{X_{wjt}/X_{wt}} \quad (a)$$

Where  $X_{ijt}$  denotes exports of country  $i$  to country  $j$  at year  $t$ ;  $X_{it}$  is total exports of country  $i$  at year  $t$ ;  $X_{wjt}$  is the world's exports to country  $j$  at year  $t$  and  $X_{wt}$  is total world exports at year  $t$ .

The Export Intensity Index ( $EII_{ijt}$ ) is computed as,

$$EII_{ijt} = \frac{(X_{ijt}/X_{it})}{M_{jt}/(M_{wt}-M_{it})} \quad (b)$$

Where  $M_{jt}$  is total imports of country  $j$  at year  $t$ ;  $M_{wt}$  is total world imports at year  $t$ ; and  $M_{it}$  is total imports of country  $i$  at year  $t$ . Recent empirical evidence points to a positive relationship



between trade complementarity index and bilateral trade flows between trading countries (Ali and Berahab, 2018)<sup>11</sup>.

Regarding the control variables,  $GDPT_{ijt} = (GDP_{it} + GDP_{jt})$  captures the overall economic space of the two countries and bilateral trade is expected to be higher with larger overall economic size (Egger, 2000). Equally, the similarity in terms of levels of real GDP between countries ( $SIM_{ijt}$ ) should be positively associated with bilateral trade flows as it captures the relative economic size of the trading countries (Egger, 2000; Wang, Wei, and Liu, 2010). This variable is obtained using the formula:

$$SIM_{ijt} = \ln \left[ 1 - \left( \frac{GDP_{it}}{GDP_{it} + GDP_{jt}} \right)^2 - \left( \frac{GDP_{jt}}{GDP_{it} + GDP_{jt}} \right)^2 \right] \quad (c)$$

$SIM_{ijt}$  ranges from 0 which denotes absolute divergence in economic size between two countries to 0.5 implying equal economic size. The literature predicts that the higher the size of this similarity index, the more similar the economic sizes of trading countries and the higher the share of intra-industry trade (Helpman, 1987; Egger, 2000; Wang, Wei, and Lui, 2010).

$RLFAC_{ijt} = \left| \ln \left( \frac{K_{jt}}{N_{jt}} \right) - \ln \left( \frac{K_{it}}{N_{it}} \right) \right|$  captures the distance regarding the relative factor endowments between countries, where  $K_{it}$  and  $K_{jt}$  denote the stock of capital of country  $i$  and country  $j$ , respectively at year  $t$  and  $N_{jt}$  and  $N_{it}$  denote labour force. Theory suggests that the larger the difference in factor endowments among countries, the higher the volume of inter-industry, and therefore the overall trade between countries, and the smaller the share of intra-industry trade (Egger, 2000; Wang et al., 2010). Hence,  $RLFAC_{ijt}$  is likely to be positively associated with bilateral trade between countries. In the absence of data on capital-labour ratios, per capita income is used in most empirical studies as proxy for capita-labour ratios (e.g., Trotignon, 2010). Thus, the  $RLFAC_{ijt}$  variable can also be constructed as follows:

$$RLFAC_{ijt} = \ln \left| \frac{GDP_{it}}{POP_{it}} - \frac{GDP_{jt}}{POP_{jt}} \right| \quad (d)$$

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<sup>11</sup> The construction of these trade integration indices follows the approaches developed by Kojima (1964) and Drysdale (1969) which are widely used in the empirical trade literature.

Where  $GDP_{it}$  and  $GDP_{jt}$  denote real GDP of country  $i$  and country  $j$  at year  $t$ , respectively and  $POP_{it}$  and  $POP_{jt}$  the respective population of both trading countries. Some scholars have argued that the gravity equation should include a variable that captures the effects of multilateral trade resistance ( $REM_{ijt}$ ) in terms of the relative distance to other trading partners, in addition to the geographical distance between the two countries (e.g., Anderson and van Wincoop, 2003; Troignon, 2010). This variable captures the relative attractiveness of trade origin-destination pairs and included in the model to mitigate the problem of omitted variable bias. Thus,  $REM_{ijt}$  is measured in terms of the relative distances of country  $i$  to all bilateral partners:

$$REM_{ijt} = \sum_j \left( D_{ij} * \frac{GDP_{jt}}{GDPW_{it}} \right) \quad (e)$$

$GDPW_{it}$  denotes the total world GDP at year  $t$ . The literature predicts that  $REM_{ijt}$  variable is positively associated with bilateral trade flows, implying greater trade between countries that are far away from the world's largest economic centres than between countries that are relatively geographically closer to the centres (Troignon, 2010). The dummy variable for common official language between country pairs ( $LANG_{ij}$ ) captures the role of cultural distance in explaining bilateral trade flows. The existence of a common language between two countries facilitates communication and reduces transaction costs between countries, which promotes bilateral trade flows (Kien and Hashimoto, 2005). Thus, the coefficient  $\beta_8$  is expected to be positively associated with bilateral trade flows.

#### 4.2 Estimation Technique

One argument against the application of the ordinary least squares (OLS) estimator in the estimation of the gravity model such as equation (3) is that the log-transformation can lead to biased and inconsistent parameter estimates in the presence of heterogeneity in trade levels (Santos Silva and Tenreyro, 2006; Shepherd, 2012; Krisztin and Fisher, 2015; Baltagi, Egger and Erhardt, 2017; Mnasri and Nechi, 2021). The argument is that if the disturbances ( $u_{ijt}$ ) from the multiplicative gravity equation are heteroscedastic, then the log-transformation could give rise to correlation between the disturbances and the covariates in estimating the gravity model. Another econometric issue relates to how the zero trade flows are treated in the estimation. In practice, the log-transformation of the gravity equation (3) will drop observations for which the observed trade values are zero. Dropping such observations will lead to loss of valuable information on the trading

countries and could lead to sample selection bias. In trying to address these estimation issues, one useful approach is to directly estimate the multiplicative gravity of bilateral trade flows. Along these lines, an influential work by Santos, Silva and Tenreyro (2006) has shown that the Poisson pseudo-maximum-likelihood (PPML) estimator is an appropriate technique to produce consistent parameter estimates of the gravity model of bilateral trade flows. Specifically, the proposed PPML estimator considers the dependent variable in levels instead of logs which allows the estimation using zero trade values in the dependent variable and addresses the problem of heteroscedasticity. In a related study, Santos, Silva and Tenreyro (2011) illustrated that the PPML estimator is well-behaved even when there is overdispersion in the dependent variable. Equally, they have also demonstrated that the performance of the PPML estimator is not affected even when the dependent variable is characterised by a large proportion of zero observations. Another important feature of the PPML technique relates to the inclusion of fixed effects in estimating the gravity model (Shepherd, 2012). This allows us to control for unobserved country pair and time-varying heterogeneity effects. Given these interesting features, we have adopted the PPML technique to analyse empirically the role of bilateral exchange rates and trade complementarity structures in explaining trade flows among WAMZ countries.

In line with modelling using the PPML estimator, a useful approach is to estimate the multiplicative gravity relationship directly as an exponential regression function. Following the empirical literature (Silva and Tenreyro, 2006; Westerlund and Wilhelmsson, 2011; Krisztin and Fisher, 2015), the fixed effects conditional mean from equation (3) can be specified as the exponential function as:

$$\begin{aligned} \mu_{ijt} = E[TD_{ijt}/z_k] = \exp(\gamma_{ij} + \delta_t + \beta_0 + \beta_1 \ln(GDPT_{ijt}) + \beta_2 \ln(RER_{ijt}) + \beta_3 CMP_{ijt} \\ + \beta_5 RLFAC_{ijt} + \beta_6 SIM_{ijt} + \beta_7 \ln(REM_{ijt}) + \beta_8 LANG_{ij}) \end{aligned} \quad (4)$$

Thus, equation (4) is interpreted as the conditional expectation of  $TD_{ijt}$  with respect to the covariates, where  $z_k$  is a vector of these explanatory variables. Equally, equation (4) can be written in short form as:

$$\mu_k = E[\lambda_k/z_k] = \exp(z_k \beta) \quad k = 1, \dots, N \quad (5)$$

$\lambda_k$  is the  $k$ th element of the  $N$ -by-1 vector of trade flows between country-pairs; and the conditional mean  $\mu_k$  depends on the covariates  $z_k$  associated with the parameter vector  $\beta$ .

Considering the empirical specification in equation (4), the parameter estimates of this gravity model using the PPML estimator can be easily interpreted. Specifically, the coefficients of the covariates expressed in natural logarithms can be interpreted directly as elasticities, while covariates captured in levels form are interpreted as semi-elasticities of trade with respect to these covariates (Shepherd, 2012).

### 4.3 Data

Our paper uses a panel of all the six WAMZ countries spanning from 2001 to 2020. The reliability of data on bilateral trade flows among WAMZ countries was carefully considered in selecting the starting year of the study. The dependent variable, bilateral trade flows ( $TD_{ijt}$ ) between countries is measured as the annual value of bilateral merchandise exports (in current US dollars) originating from country  $i$  to the destination country  $j$  at time  $t$ . Liu (2009) stressed that import flows provide more reliable estimates of bilateral trade flows than exports since the Customs Authorities pay particular attention to imports for tariff revenue considerations. By extension, the author argued that using total bilateral trade flows (sum of imports and exports) may not be appropriate because imports and exports respond differently to country specific characteristics as well as country-pair characteristics. While these arguments may hold true in WAMZ countries, we considered the value of merchandise exports as our measure of bilateral trade flows since the overarching objective of the present paper is to determine whether trading in national currencies of WAMZ Member States would stimulate trade among these countries. To assess the robustness of the results, we used bilateral total trade flows as an alternative measure of trade flows between countries. Data on bilateral trade was sourced from WAMI database and the ECOWAS Commission.

In line with the empirical literature (e.g., Matyas et al., 2004; Kien and Hishimoto, 2005; Trotignon, 2010), bilateral nominal exchange rate between countries  $i$  and  $j$  is obtained as the annual average of the nominal value of country  $j$ 's currency per US dollar divided by the annual average of the nominal value of country  $i$ 's currency per US dollar. Thus, the bilateral real exchange rate ( $RER_{ijt}$ ) between countries  $i$  and  $j$  at time  $t$  is computed as follows:

$$RER_{ijt} = \frac{NER_{jt/\$}}{NER_{it/\$}} * \frac{CPI_{it}}{CPI_{jt}}$$

Where  $CPI_{it}$  and  $CPI_{jt}$  denote the consumer price indices of countries  $i$  and  $j$ , respectively. This variable takes into consideration movements in the nominal exchange rates between the importing and exporting countries and their relative prices. Data on nominal exchange rates and consumer price index were sourced from the World Bank's World Development Index (WDI) database.

Regarding trade complementarity, we employed two measures of trade integration indexes (TII and EII) described in section 3.1 as proxy to assess the impact of trade complementarity on bilateral trade flows. Data on world imports and exports were sourced from the WDI. Real GDP of the importing and exporting countries  $i$  and  $j$ , respectively and real GDP per capita were obtained from the WDI. The bilateral distance ( $D_{ij}$ ) is measured as the geographical distance between the major cities of two countries, weighted by share of the population of each city in the total population of each country.  $LANG_{ij}$  is a dummy variable coded 1 if both exporting and importing countries share a common official language and zero otherwise. Both  $D_{ij}$  and  $LANG_{ij}$  were obtained from the GeoDist database developed by the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII). Data on capital stock and employment were sourced from the Penn World Table, version 10.0 (Feenstra, Inklaar, and Timmer, 2015).

## **5.0 Results Presentation and Discussion**

This section provides some preliminary analysis of the association between bilateral real exchange rate, trade complementarity and bilateral export flows among WAMZ countries. It then analyses the estimation results to determine empirically whether the use of national currencies in facilitating trade transactions between WAMZ countries and the existing nature of trade complementarity can enhance bilateral trade flows.

### **5.1 Preliminary Analysis**

Table 5.1 presents the correlations between bilateral real exchange rate, trade integration indices (proxy for trade complementarity) and bilateral exports among WAMZ countries for the period 2001-2020. This table shows that there is significant negative association between bilateral real exchange rate and bilateral exports among WAMZ countries. However, there is no significant association between the indexes of trade integration and bilateral exports. Thus, these correlation

coefficients do not show a clear picture regarding the association between trade integration indexes and bilateral exports in the WAMZ. Unlike the expected positive association between bilateral real exchange rate and export flows, the correlation coefficient points to potentially negative association between them. Looking at the descriptive statistics suggests that there are considerable differences in the degree of integration between WAMZ countries. It is worth noting, however, that the correlation coefficients do not provide conclusive evidence of the existence of any significant relationship between variables. In this context, a useful extension of the analysis is to unpack the underlying relationships empirically using the proposed PPML estimator as discussed above.

**Table 10: Correlation Coefficients**

	1	2	3	4
Bilateral exports	1.00			
Log of bilateral RER	-0.1368*	1.00		
Trade Integration Index	0.02	0.0850*	1.00	
Export Integration Index	0.02	0.0846*	1.0000*	1.00

Note: ‘\*’ denotes statistically significant at the 5 percent level.

Source: WAMI Trade Integration Data

## 5.2 Empirical Results

As a starting point in our empirical strategy, equation (4) is estimated using the PPML estimator, including bilateral real exchange rate while trade integration index (proxy for trade complementarity) is excluded from the regression. In doing so, we determine whether the effects of bilateral real exchange rate are sensitive to the inclusion of the trade complementarity index. This approach allows us to analyse the contemporaneous relationship between bilateral real exchange rate and bilateral exports in the WAMZ.

Table 5.2 reports estimates of bilateral real exchange rate, trade complementarity index and the control variables using the PPML regressions. It is worthwhile to note that the geographical distance variable was excluded from column (3) as well as official language dummy across all three columns (1-3) due to limited variation across countries with the estimation of the PPML estimator with fixed effects. However, dropping these variables does not affect the reliability of the parameter estimates since both country-pair and time fixed effects are included in the regression.

**Table 11: Poisson Pseudo-Maximum-Likelihood (PPML) Regressions Results (2001-2020)**

	(1)	(2)	(3)
<b>Variables</b>			
Log bilateral RER	1.0245*** (0.3685)	1.0579*** (0.3808)	
Lag of Log bilateral RER			0.8344** (0.3407)
Trade Intensity Index		0.0002** (0.0001)	
Lag of Trade Intensity Index			0.0002*** (0.0001)
Log of Total GDP	5.9412* (3.0816)	6.8709** (3.0845)	
Lag of log Total GDP			6.6338** (3.1534)
Relative factor endowments	0.2929 (0.8774)	0.2482 (0.8546)	0.1211 (0.8573)
Similarity Index	1.6088** (0.6673)	1.9704*** (0.6246)	2.2649*** (0.7120)
Log of Distance	3.4628* (1.7815)	3.5728** (1.8104)	
Remoteness Index	1.5452*** (0.5087)	1.6228*** (0.5281)	1.5237*** (0.4831)
Observations	600	600	570
Number of country-pairs	30	30	30
Country-fixed effects	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes
Wald ( $\chi^2$ )	6.67e <sup>+07</sup>	1.65e <sup>+08</sup>	1.39e <sup>+08</sup>
Prob. ( $\chi^2$ )	0.000	0.000	0.000
Log pseudolikelihood	-6.820 e <sup>+09</sup>	-6.634 e <sup>+09</sup>	-6.792 e <sup>+09</sup>

Note: The dependent variable is bilateral exports between countries. RER-denotes real exchange rate. \*\*\*, \*\* & \* denote 1%, 5% and 10 %, respectively. Standard errors are reported in brackets and are adjusted for clustering on country-pairs.

Source: WAMI Trade Integration Data

The examination of PPML estimates across columns (1-3) reveals intriguing insights into the relationship among bilateral real exchange rates, trade complementarity, and bilateral exports within the West African Monetary Zone (WAMZ). Notably, in column (1), the coefficient on bilateral real exchange rate exhibits the anticipated positive sign and is statistically significant at the 1 percent level of significance. This finding indicates that a real depreciation of the exporting country's currency concerning the importing country's currency tends to stimulate bilateral exports, aligning with established predictions in the literature regarding the influence of real exchange rates on bilateral trade dynamics. This evidence underscores the potential efficacy of initiatives by WAMZ countries to promote quoting and trading in national currencies, which could positively impact bilateral trade flows.

Moreover, advocating for increased usage of national currencies in bilateral trade transactions carries potential benefits for WAMZ countries. Such measures could lead to reduced transaction

costs and exchange rate uncertainty, facilitate trade and investment flows, and alleviate pressures on foreign exchange reserves of member states. Particularly noteworthy is the substantial impact of real exchange rate fluctuations on bilateral exports, as evidenced by the coefficient indicating that a 10 percent depreciation of the exporting country's currency correlates with an average export value increase of 10.2 percent. These findings diverge qualitatively from some earlier studies focused on aggregate bilateral merchandise exports, which suggested that currency depreciation might decrease bilateral export values (Matyas et al., 2004; Trotignon, 2010).

In the broader context of the WAMZ, discussions surrounding the promotion of quoting and trading in national currencies carry significant implications for bilateral trade dynamics. Emphasizing the use of national currencies can mitigate the adverse effects of currency depreciation on trade flows by reducing the influence of exchange rate fluctuations. By embracing national currencies for trade settlements, WAMZ countries can foster greater stability and predictability in trade relationships, thereby enhancing the resilience and sustainability of bilateral trade flows within the region. Overall, while empirical evidence supports the notion that real depreciation stimulates bilateral exports, advocating for the increased usage of national currencies in bilateral trade transactions presents a promising avenue for mitigating the impact of currency depreciation and promoting stability in trade relationships within the WAMZ.

Turning to column (2), the relationship between real exchange rate and bilateral exports remains qualitatively the same with the inclusion of the trade complementarity index, and the magnitude of the coefficient on bilateral real exchange rate increases slightly. However, one issue that may arise from the estimation results in columns (1-2) is potential endogeneity of the bilateral real exchange rate, complementarity index, and economic size (total GDP) with bilateral exports. For instance, there is potential reverse causality stemming from the contemporaneous variations of trade and nominal exchange rate (Berthou, 2008). A negative shock to trade will induce adverse movements in the nominal exchange rate and the resulting uncertainty and increases in transaction costs can depress exports flows. Consistent with the empirical literature (e.g., Berthou, 2008; Ali and Berahib, 2018), we employed one year lag of the potentially endogenous covariates to mitigate the problem of endogeneity. Interestingly, the estimation results displayed in column (3) shows convincing evidence on the positive effect of real depreciation on the value of exports. Importantly, after mitigating the possibility of endogeneity, the coefficient on bilateral real exchange rate shows



a relatively lower elasticity compared to the parameter estimates of the contemporaneous variable reported in columns (1-2). It suggests that the value of exports increases less than proportionately with the depreciation of the exporting country's currency. Specifically, the result reveals that a 1 percent real depreciation leads to a 0.83 percent increase in the value of exports.

Turning to trade integration variable (column 2), the coefficient is positive and statistically significant at the 5 percent level of significance. This suggests that trade is higher among countries with complementarity trade structures. The results remained qualitatively unchanged after the use of one year lag of the complementarity index in column (3). This outcome is consistent with the results obtained by Ali and Berahab (2018) for the ECOWAS region. The findings suggest that developing more complementarity trade structure promotes bilateral exports among WAMZ countries. By implication, there are significant opportunities for WAMZ countries to promote trade flows and take advantage of the African Continental Free Trade Area (AfCFTA) initiative.

### **5.2.1 Robustness**

In our empirical strategy, we considered different alternatives to assess the robustness of the positive effects of bilateral real exchange rate and trade complementarity on export flows. As a first step, we computed a second measure of trade complementarity index i.e., export trade intensity index. The parameter estimates of the PPML displayed in column (1) of Table 3 shows remarkably consistent positive effects of real exchange rate depreciation and trade complementarity structures on bilateral exports. Next, we assess the robustness of these relationships considering the movements in the bilateral nominal exchange rates rather than real exchange rate as reported in column (2). Our results confirm the evidence that trading in WAMZ national currencies and complementarity trade structures will enhance bilateral exports among WAMZ countries. To further assess the robustness of our results, we make use of total trade flows computed as the sum of bilateral exports and imports between country pairs. While both exports and imports are predicted theoretically to respond in the opposite direction in response to movements in nominal exchange rate, we consider total trade flows to reduce the influence of any misreporting of exports since imports are predicted to provide relatively more reliable estimates of bilateral trade flows. Considering this strategy, we report the PPML estimates of the covariates in columns (2) and (3) of Table 5.3. Importantly, across all columns, the results reveal remarkably consistent findings that countries with strong trade complementarity will trade more. Equally, the

results indicate that using national currencies of WAMZ countries in facilitating transactions will promote trade flows in the Zone.

Turning to the control variables, the results show interesting finding of large elasticity of trade with respect to the combined GDP of the trading countries. The coefficient on this variable shows that trade flows increase more than proportionately with rising income of both exporting and destination countries. It suggests that the economic size matters in promoting trade flows among WAMZ countries. This finding is further confirmed by the positive and significant coefficient of the similarity index variable when bilateral exports are used as the dependent variable (columns 1 and 2). Indeed, the more similar the economic sizes of the countries, the greater the trade between these countries. Results show that the coefficient on remoteness is statistically significant across all regressions and has the expected positive sign. This is consistent with the findings by Trotignon (2010). However, the relative factor endowment variable does not show any significant influence on bilateral trade flows in the WAMZ.

**Table 12: Alternative Poisson Pseudo-Maximum-Likelihood (PPML) Regressions Results (2001-2020)**

Variables	(1)	(2)	(3)	(4)
Lag of Log of bilateral RER	0.8345** (0.3408)			
Lag of Log of bilateral NER		0.6888** (0.2770)	1.0173*** (0.2147)	1.0172*** (0.2146)
Lag of Export Intensity Index	0.0002*** (0.0001)	0.0002*** (0.0001)	0.0002*** (e <sup>-4.466</sup> )	
Lag of Trade Intensity Index				0.0002*** (e <sup>-4.459</sup> )
Lag of log Total GDP	6.6310** (3.1528)	6.6397** (3.2290)	5.6958*** (2.1600)	5.6977*** (2.1603)
Relative factor endowments	0.1209 (0.8574)	0.1627 (0.8787)	0.1821 (0.5334)	0.1821 (0.5333)
Similarity Index	2.2647*** (0.7119)	2.1052*** (0.5927)	1.2019 (0.8472)	1.2021 (0.8472)
Remoteness Index	1.5240*** (0.4831)	1.5379*** (0.5096)	1.1966*** (0.2954)	1.1965*** (0.2954)
Observations	570	570	570	570
Country-pairs	30	30	30	30
Country-fixed effects	Yes	Yes	Yes	Yes
Year-fixed effect	Yes	Yes	Yes	Yes
Wald ( $\chi^2$ )	3.41e <sup>+07</sup>	2.00e <sup>+07</sup>	7.45e <sup>+05</sup>	7.48e <sup>+05</sup>
Prob. ( $\chi^2$ )	0.000	0.000	0.000	0.000
Log pseudolikelihood	-6.793 e <sup>+09</sup>	-6.863 e <sup>+08</sup>	-9.016 e <sup>+09</sup>	-9.016 e <sup>+09</sup>

Note: The dependent variable is bilateral exports between countries (columns 1 & 2) and bilateral total trade (columns 3 & 4). RER and NER denote real exchange rate and nominal exchange rate, respectively. \*\*\*, \*\* & \* denote 1%, 5% and 10 %, respectively. Standard errors are reported in brackets and are adjusted for clustering on country-pairs. Source: WAMI Trade Integration Data

A useful extension of this research is to consider an alternative measure of trade complementarity, which is computed as follows (see Ali and Berahab, 2018):

$$TC_{jk} = 100 * (1 - \frac{\sum |X_{i,j} - M_{i,k}|}{2})$$

Where  $X_{i,j}$  is the share of good  $i$  in global exports of country  $j$  and  $M_{i,k}$  is the share of good  $i$  in global imports of country  $k$ . Equally, it is helpful to consider an alternative estimation technique that explicitly takes into account zeros of bilateral trade values to avoid the potential selection problem in the estimation of the gravity model of bilateral trade flows in the WAMZ.

## **6.0 Summary, Conclusion and Policy Recommendation**

This study seeks to determine empirically whether WAMZ countries would enhance trade by facilitating transactions through quoting and trading in national currencies. Specifically, it examines the effects of bilateral exchange rate on trade in the WAMZ and assesses empirically whether efforts by WAMZ countries to develop complementarity trade structures can enhance intra-WAMZ trade. It utilizes the modified gravity model to analyse how these economic characteristics influence the pattern of bilateral trade flows among WAMZ countries.

Estimated results from the PPML show some interesting results regarding the relationship between bilateral real exchange rates, trade complementarity and bilateral exports among WAMZ countries. It shows that there is positive and significant relationship between bilateral exports and bilateral real exchange rate, which suggests that a real depreciation of the exporting country's currency relative to the importing country's currency will stimulate bilateral exports. The finding is consistent with the a priori expectation. Hence, there is evidence suggesting that efforts by WAMZ countries to promote quoting and trading in national currencies will have a positive effect on bilateral trade. A further refinement of these variables measurements offers similar results, though with relatively lower elasticities.

These results tend to suggest that trade is higher among countries with complementarity trade structures. This tends to support the notion that trading in WAMZ national currencies and complementarity trade structures will enhance bilateral exports among WAMZ countries and this relationship remains consistent despite controlling for endogeneity bias and using different alternative measurements for the key variables of interest.

The estimated results also show some interesting findings for other explanatory variables that are important for explaining bilateral trade in the region. It shows large elasticity of trade with respect to economic size (GDP of the trading countries) and remoteness. This suggests that the economic size and remoteness matters in promoting trade flows among WAMZ countries. This finding is further confirmed by the positive and significant coefficient of the similarity index variable. Indeed, the more similar the economic sizes of the countries, the greater the trade between these countries.

Some of the policy recommendations that emanate from these findings are that WAMZ countries should continue to make efforts in developing more complementarity trade structures and encouraging quoting and trading in national currencies. The findings suggest that there are greater opportunities for WAMZ countries to promote trade integration through trading in national currencies, which will reduce transaction costs and exchange rate uncertainty, promote trade and investment flows, and reduce pressures on foreign exchange reserves of Member States. By encouraging cross-border trade and other transactions in national currencies, WAMZ countries can potentially avert large swings in exchange rates against major international currencies by reducing demand on foreign exchange markets, thus preserving foreign exchange buffers which are critical to insulate economies against adverse external shocks and help in macroeconomic stabilisation. Thus, this policy is critical in complementing monetary policy to achieve price stability in the WAMZ. Accordingly, it is imperative that WAMZ Member States support efforts of the private sector to create the enabling infrastructure to support quoting and trading in national currencies, including retail payment system infrastructure to complement the Pan-African Payments and Settlement System (PAPSS) and Fintech innovations to promote small scale transactions across countries. These policies should be complemented by actions that will enhance trade complementarity structures, including encouraging regional value chains through trading in intermediate inputs across countries. By implication, the findings indicate that there are significant opportunities for WAMZ countries to promote trade flows and take advantage of the African Continental Free Trade Area (AfCFTA) initiative.

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