Trade Openness and Food Security Nexus among Selected ECOWAS Member Countries

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Abstract

The paper investigates the impact of trade on long and short run food security among ECOWAS member countries. The paper relied on Pooled Mean Group approach to capture the impact of market and policy measure of trade openness alongside macroeconomic variables on food security among ECOWAS countries using annual data spanning 2001-2022. Major findings reveal market trade openness, food inflation, political stability and population growth have significant positive impact on food security in the long run, while market trade openness, food inflation and population growth have significant short run impact in Benin, Burkina Faso, Cote d'Ivoire, Mali, Niger, Nigeria and Senegal. Findings inform the conclusion that market trade openness as against policy trade openness is a major determinant of food security in the long run in in the ECOWAS region. The study recommends in favor of full implementation of the ECOWAS customs policy by member countries. This will help eliminate food trade distorting policies and improve intra-regional food trade and hence food security in both short and long run.

Keywords: Trade openness, food security, Pooled mean group, ECOWAS, trade policy

JEL Classifications*:* F13, F14, F18

Introduction

Food and Agriculture Organization (FAO) estimated 735 million people to be victims of hunger and malnutrition in the year 2022 (FAO, 2023). Despite the visible efforts and progress in alleviating global poverty and food insecurity, Africa with a record of 54% of its population being multidimensionally poor, still remains significantly food insecure (Tun-Nessa et al., 2021). Even more revealing is that while East Africa experiences the highest incidence of poverty, West Africa records the highest intensity of multidimensional poverty and hence, is

comparatively the most food insecure sub-region in Africa and by extension the entire world (Awad & Yussof, 2016).

According to FAO report, West African food crisis since 2022 has not only reached and remained at an unprecedented high level but has also belied all projections. This is accounted for by many shocks of different scales. Country-wise shocks such as shortfall in cereal output because of worsening insecurity, regional shocks such as fall in intra-regional cross border food trade and global shocks such as rise in food prices as an attendant consequence of the COVID-19 pandemic and global macroeconomic instability (FAO, 2022).

While it has been debated that trade openness is an important means by which West Africa can overcome her food insecurity situation, (Shaw, 2007, Yahaya, 2023), the Economic Community of West African States (ECOWAS) has over the years, invested huge material and human resources in making the region more open to international food trade. Some of this effort include interventions and programmes such as the establishment of Economic Community of West Africa Agricultural policy (ECOWAP) in 2005 with the main objective of mobilizing sub-regional agricultural policy collaboration to achieve regional food security, ECOWAS food reserve policy in 2013 to complement efforts by member states in their response to food crisis and the MALABO declaration 2014 and 2023 with the main objective of poverty reduction, ending hunger and tripling intra-Agrican trade (ECOWAS, 2008, 2023; Staatz, et al., 2017).

Researchers have tried to empirically investigate the impact of trade openness on food security in the ECOWAS region. Findings from studies such as Bezuneh and Yiheyis (2014); Fusachia et al. (2021); Ibitoye and Ibitoye (2020); Mary, (2019) and Tinta et al. (2018) have revealed conflicting results. Even as previous research in this area has improved understanding of the extent to which trade openness affects food security in the ECOWAS trade zone, a careful observation of their findings and methodologies have revealed major gaps in existing literature. Most attempts known in this paper have downplayed the importance of differentiating between market and regulatory indicators of trade openness, as they have measured openness using the trade volume relative to gross domestic product (trade/GDP).

This limitation is even more so in the studies done in the ECOWAS region. However, Grabner (2020) in addition to pointing out a major limitation of the

trade/GDP indicator of openness, such as inability to account for a country or region's regulatory environments in terms of its willingness to be open to trade, showed the importance in differentiating between market and policy indicators of trade openness as both can possess different influence on food and nutrition security. This paper is an attempt to overcome this limitation by incorporating both indexes of trade openness in the same model of analysis to determine which among them exerts more impact on food security in the ECOWAS region.

This paper contributes to the debate by addressing the question: which between market and policy measures of trade openness has more impact on food availability in the ECOWAS region? The paper uses a panel dataset for selected ECOWAS member countries over 2001-2022 period. This is to reflect period of active commitment of ECOWAS in reducing food insecurity through intra-regional trade openness. The relevance of this paper is in its potential ability in directing ECOWAS intra-regional trade agreements for realization of SDG2 objective of eradicating hunger by the year 2030. Following this introduction, the next section accounts for theoretical and empirical literature reviews. While section three of this paper discusses methodology of analysis to be used, section four presents and discusses empirical findings. Finally, section five concludes the paper with policy implications of findings.

Literature Review

The hypothesized relationship between trade openness and food security has received much audience from empirical researchers. Researchers, however, do not agree on how much of an impact trade openness has on level of food security. Important empirical studies that have been carried out including: Fusachia et al. (2021), Ibitoye and Ibitoye (2020), Mary, (2019), Tinta et al. (2018) and Bezuneh and Yiheyis (2014) among others presents conflicting findings. For example, Fusachia et al. (2021) in their study on the nexus between trade openness and food security in sub-Sahara Africa (SSA) during 1971 and 2014 revealed trade openness to be a strong determinant of food security. similar findings were elicited by Ibitoye and Ibitoye (2020) who during the 1970-2018 period investigated the impact of intra-ECOWAS trade on food security. specifically, the trade/GDP as a measure of trade openness was found to significantly impact food security during the period investigated. Moreover, Oke et al. (2017) has earlier concluded in favor of food import as a means of reducing hunger in Africa

The findings on positive impact of ECOWAS trade openness are contrasted by the works of Olayiwola (2022) whose investigation of the relationship between trade openness and food security in ECOWAS region covered 1995-2019. Results

indicate that trade openness through agricultural export and import has weak impact on ECOWAS food security. The finding by Olayiwola (2022) is supported by later study by Mary (2019) who using a reverse causal analysis revealed food security as a negative function of trade openness in West Africa. Moreover, Bezuneh and Yiheyis (2014) in their study on the short and long run impact of trade openness on food security among 36 developing African countries also found trade openness to weakly impact food security during the short and long run periods.

Furthermore, relevant studies conducted outside the ECOWAS region have also shown conflicting findings. While Fusco et al. (2020) whose investigation of impact of trade openness on the level of food security in European Union (EU) during the period 2000-2012 revealed a strong impact of the EU single market on food security, Fathelrahman et al. (2021) investigated the welfare impact of food trade openness in India, Egypt, Pakistan, Saudi Arabia, and the United Arab Emirates and found weak impact of openness on food security in the study area. Moreover, Abdullahi et al. (2021) in their study effects of trade openness, political risks and institutional and policy effectiveness on food security across 35 Asian countries found trade openness to have a positive direct effect and a negative spatial effect on countries considered which implies a zero-sum game effect of trade on food security.

The reviewed literature reveals that past studies have not paid attention in differentiating between market and policy measures of trade openness. Following Grabner (2020), this paper contributes to the debate by differentiating between market and policy measures of trade openness and hence, their comparative impacts on food security in the ECOWAS region.

Methodology

This paper was an empirical analysis of the impact of trade openness on food security in the ECOWAS region. Following Ijirshar (2019) this paper adopts the mean group (MG) and pooled mean group (PMG) estimators developed by Pesaran et al. (1999) for a panel data set of 9 ECOWAS member countries spanning 2001-2022. Data availability was the major criterion for countries selection while dynamic heterogeneous panel with time (T) greater than number of cross-sections (N) was the major consideration in adopting the MG and PMG estimation techniques. Following the work of Fusco et al. (2020), the following functional form model is built:

$$FS_{i,t} = f\left(TO1_{i,t},\ TO2_{i,t}, FoodCPI_{i,t}, PStab_{i,t},\ POPG_{i,t}\right) \quad (1)$$

Where: FS is food security proxied by dietary energy supply adequacy, TO1 is market measure of trade openness, proxied by trade to GDP ratio, TO2 is policy measure of trade openness proxied by Grabner (2020) augmented tariff-based openness index. FoodCPI is food price inflation proxied by food consumer price index, level of PStab is political stability proxied by its estimated value and POPG is population growth rate which is proxied by its weighted annual average value. The functional form model in equation is parametrized in a panel setting as in equation 2.

$$\begin{aligned} FS_{i,t} &= \alpha + \beta_0 FS_{i,t-1} + \beta_1 TO1_{i,t} + \beta_2 TO2_{i,t} + \beta_3 FoodCPI_{i,t} + \beta_4 PStab_{i,t} \\ &\quad + \beta_5 POPG_{i,t} + \delta\mu_i + \lambda_t + \varepsilon_{i,t} \\ i &= 1, \ldots 9, t = 1, \ldots 22 \end{aligned} \quad (2)$$

Where: α is the intercept of the model, β_0 is the slope of the lagged dependent variable, $\beta_1 \ldots \beta_5$ are the slopes of the explanatory variables. While μ_i is cross-section specific or fixed effect, λ_t is time effect and $\varepsilon_{i,t}$ is error term.

The error correction version of equation 2 is stated in equation 3.

$$\begin{aligned} \Delta FS_{i,t} &= ect_i + \varphi_{0i,j} + \sum_{j=0}^{m} \varphi_{1i} \Delta FS_{i,t-j} + \sum_{j=0}^{m} \varphi_{2i} \Delta TO1_{i,t-j} + \sum_{j=0}^{m} \varphi_{3i} \Delta TO2_{i,t-j} \\ &\quad + \sum_{j=0}^{m} \varphi_{4i} \Delta FoodCPI_{i,t-j} + \sum_{j=0}^{m} \varphi_{5i} \Delta PStab_{i,t-j} + \sum_{j=0}^{m} \varphi_{6i} \Delta POPG_{i,t-j} + \lambda_t + \varepsilon_{i,t} \end{aligned} \quad (3)$$

Data for this paper were sourced from FAOSTAT, World Development Indicators and World Integrated Trade Solution (WITS). Sources and expected behaviors of variables are further explained on table 1.

Table 1: Summary of Data, Measurement, Source and Expected Sign

Variable	Measurement	Source	Expected Sign
FS	Dietary energy supply	FAOSTAT	+
TO1	Trade/GDP	WDI	+
TO2	100-Tariff (MET, MFN)	Grabner (2020)	+
PStab	Estimated value	WTO	+
FoodCPI	Estimated value	FAOSTAT	-
POPG	% Weighted average annual	WDI	-

Source: *Authors' Tabulation*

Presentation and Analysis of Results

This section presents and discusses findings from investigation of the impact of trade openness measures alongside important macroeconomic determinants on food security among ECOWAS member countries.

Table 2: Descriptive Statistics

Country	Statistic	FS	TO1	TO2	FoodCPI	PStab	POPG
Benin	Mean	119.27	50.65	74.51	89.37	0.16	2.93
	S. Div	4.33	8.18	2.05	15.59	0.36	0.09
Burkina Faso	Mean	117.95	49.25	79.30	90.47	-0.58	2.94
	S. Div	3.37	13.30	3.38	19.76	0.63	0.16
Cote d'Ivoire	Mean	122.95	55.88	77.97	91.05	-1.34	2.34
	S. Div	4.32	8.30	0.81	20.14	0.49	0.20
Ghana	Mean	125.95	77.87	77.59	92.35	0.02	2.41
	S. Div	5.80	14.79	0.64	58.51	0.09	0.24
Guinea Bissau	Mean	100.54	49.85	74.26	92.48	-0.60	2.44
	S. Div	8.02	6.88	1.99	17.27	0.17	0.17
Mali	Mean	124.50	60.29	78.67	88.84	-0.98	3.17
	S. Div	7.79	4.70	2.03	15.23	1.12	0.11
Niger	Mean	116.50	39.81	77.09	88.42	-0.95	3.69
	S. Div	5.09	6.00	2.77	18.05	0.49	0.12
Nigeria	Mean	120.50	94.01	73.15	104.01	-1.91	2.61
	S. Div	4.03	5.17	10.01	84.68	0.16	0.12
Senegal	Mean	111.09	58.49	77.55	96.25	-0.17	2.63
	S. Div	7.77	6.78	1.08	17.90	0.107	0.10

Source*: Author's computation*

Table 2 describes the properties of the data based on mean and standard deviation for ECOWAS countries. Ghana has the highest average food security with 125 value of energy supply adequacy. This is followed by Mali with a food security average of 124. Guinea Bissau recorded the least mean for food security with 100 value of energy supply adequacy. The mean of TO1 indicates a wide margin between the level of openness of different countries with Nigeria having the highest average parentage of market trade openness with a value of 94.01 while Niger has the least average market trade openness with a value of 39.01. In comparison with TO1, the mean values of TO2 shows that the policy openness of countries in the region are no much difference with one another with Mali having the highest level of policy openness of 77% while Benin and Guinea Bissau had the least average of 74%. Furthermore, the averages of FoodCPI seem to suggest that Nigeria has the highest average of food price inflation in the region with an average of 104% while Mali has the least food inflation with 88%. In terms of political stability, most countries in the ECOWAS region recorded a negative

average where only Benin and Ghana recorded positive estimates of political stability with 0.16 and 0.02 respectively. This underlines the level of political unrest in the region. Countries in the ECOWAS region also recorded similar pattern of population growth rate with Niger having the highest annual population growth rate of 3.69 while Cote d'Ivoire recorded the least average annual population growth of 2.34%.

Table 3: Panel Stationarity Tests

	Levin, Lin & Chu		Im, Pesaran and Shin		Hadri		
Variable	**T-stat**	**P-value**	**W-stat**	**P-value**	**Z-stat**	**P-value**	**I(d)**
FS	3.19394	0.0007	0.8605	0.1948	8.2653	0.0000	I(0)
DFS	0.62130	0.0000	2.2674	0.0117	1.7148	0.0432	
TO1	0.69287	0.2442	0.1167	0.4535	6.1770	0.0000	I(1)
DTO1	4.84670	0.0000	6.2369	0.0000	0.6173	0.2685	
TO2	3.86647	0.0001	2.3449	0.0095	5.3558	0.0000	I(1)
DTO2	10.3005	0.0000	8.7819	0.0000	0.9617	0.1681	
FoodCPI	6.05078	1.0000	6.4551	0.3719	9.7057	0.0000	I(1)
DFoodCPI	5.16293	0.0802	1.4663	0.0226	5.7615	0.0000	
PStab	0.48701	0.3131	0.3623	0.3585	8.6361	0.0000	I(1)
DPStsb	8.42113	0.0000	8.1291	0.0000	0.2528	0.5998	
POPG	1.18657	0.8823	1.6827	0.9538	5.8002	0.0000	I(1)
DPOPG	3.74459	0.0001	3.4455	0.0003	3.8411	0.0001	

***Source**: Author's computation*

To check the stationarity properties of the data, conventional panel unit root tests developed by Hadri (2000), Levin, Lin & Chu (2002) and Im, Pesaran and Shin (2003) are used. Unit root results on table 2 show that most panels at level contain unit root except for trade openness in the Levin, Lin & Chu while all panels at level have unit root at level in the Im, Pesaran and Shin. Based on results of majority of the panels with emphasis on Im, Pesaran and Shin test, we conclude that most variables are stationary after taking their first difference at 5% level of significance, hence, the empirical model of this study is estimated at first difference of the variables.

Table 4: Hausman Test Result

Test Summary	**Chi-Sq. Statistic**	**Chi-Square. d.f.**	**P-Value**
Cross-section random	6.470	5	0.3724

***Source**: Author's computation*

Table 4 presents the Hausman test of preference between the mean group (MG) and the PMG results. The probability value of the chi-square statistic is not significant at 5% level of statistical significance. Hence, the null hypothesis of PMG estimates being preferred over MG estimates is not rejected. This is

instructive that this study presents the PMG results in analyzing the impact of trade openness on food security in the ECOWAS region.

Table 5: Pooled Mean Group Estimation (Long Run Estimates)

Variable	Coefficient	t-statistic	Prob.
TO1	0.3769***	0.0840	0.000
TO2	0.3556	0.2582	0.168
FoodCPI	-0.2937***	0.0408	0.000
PStab	-4.3735***	1.2369	0.000
POPG	-6.6803**	3.3055	0.043

Note: ****, ** and * denote 1%, 5% and 10% levels of significance, respectively.*
Source*: Author's computation*

The long run PMG estimates of the primary predictor variables on table 4 show that market measure of trade openness has a long run significant impact on food security in the ECOWAS region. This implies that a 1% increase in the level of trade openness will lead to an increase in average value of dietary energy supply adequacy by 0.38 in the long run holding other predictors of food security constant, at 1% level of statistical significance. This finding justifies the work of Fusachia et al. (2021) and Ibitoye and Ibitoye (2020), who in their own investigations using the Trade/GDP to measure trade openness found food security to be a significant positive function of trade openness in the ECOWAS region. However, this finding contradicts those of Mary, (2019), Tinta et al. (2018) who found a weak impact of openness on food security in the ECOWAS zone. Contrary, the sign of the coefficients of FoodCPI, PStab and POPG suggest a negative long run impact of food inflation, political stability and population growth rate on food security in among ECOWAS member countries. This implies that as expected, a 1% increase in food inflation leads to a 0.29 average fall in average dietary energy supply in the long run, at 1% level of significance, holding other predictors of food security constant. Contrary to expectations, a unit increase in estimated political stability leads to a 4.37 fall in average dietary energy supply in the long run, at 1% level of significance, holding other predictors of food security constant. Moreover, an increase in population growth rate by 1% leads to a 6.68 fall in average dietary energy supply in the long run, at 10% level of significance, holding other predictors of food security constant. Even though, policy measure of trade openness exhibits positive impact on food security, its insignificant probability value implies that trade policy on openness do not determine long run food security in the ECOWAS trade zone. This finding fails to justify the argument of (Fuji 2019) and Grabner (2020) of the desirability of the

tariff-based policy measure of trade openness as a substitute to the limitations of the trade/GDP measure of trade openness.

Table 6: Pooled Mean Group Estimation (Short Run Estimation)

Country	EC	Constant	D(TO1)	D(TO2)	D(FOO DCPI)	D(PSTAB)	D(POPG)
Benin	-0.0676*	-4.0088	-0.0231	0.1867*	0.0632*	-0.1752	-0.6014
	(0.0290)	(0.113)	(0.404)	(0.0140)	(0.0630)	(0.8900)	(0.8150)
Burkina	-0.0346**	-1.641	-0.0237	0.0263	0.0509*	1.6133	1.7546
Faso	(0.0210)	(0.1930)	(0.6670)	(0.5490)	(0.046)	(0.1010)	(0.6180)
Cote	-0.0414	-1.6924	0.0419**	0.5166	0.0003	-1.5400	0.5494
d'Ivoire	(0.2530)	(0.4480)	(0.0560)	(0.2010)	(0.9940)	(0.1330)	(0.8150)
Ghana	-0.0390	-2.4611	-0.0334	0.0677	0.0185	5.2041*	-20.8814**
	(0.3980)	(0.4370)	(0.2580)	(0.9240)	(0.5150)	(0.0790)	(0.0500)
Guinea	-0.1219**	-6.1858*	-0.0186	0.0016	0.1464*	0.62426	-34.1065**
Bissau	(0.0160)	(0.0780)	(0.7860)	(0.9910)	(0.0890)	(0.8410)	(0.0050)
Mali	-0.1867*	11.7429**	0.0295	0.1928	0.1259***	0.0384	-1.2400*
	(0.0000)	(0.0280)	(0.5560)	(0.1230)	(0.005)	(0.9670)	(0.0130)
Niger	-0.0144	-0.1982	0.18828***	-0.0515	-0.1124***	-0.6171	8.9785**
	(0.6370)	(0.927)	(0.0000)	(0.4390)	(0.0000)	(0.3320)	(0.0300)
Nigeria	-0.0971	-8.3749	-0.0267**	0.0822	0.1408	-2.2814	-39.6568*
	(0.1230)	(0.1580)	(0.0510)	(0.1480)	(0.1500)	(0.3240)	(0.009)
Senegal	-0.1805*	-8.3000	-0.0179	-0.0226	0.1030	2.7892*	10.09577
	(0.0180)	(0.1560)	(0.7850)	(0.896)	(0.1070)	(0.0620)	(0.2940)

Note: ****, ** and * denote 1%, 5% and 10% levels of significance, respectively.*
Source*: Author's computation*

Table 6 shows the short run PMG estimates for all cross in the regression model. The coefficients and their corresponding probability values are reported. Significant variables are discussed for individual ECOWAS country considered in this study. Benin: The short run PMG estimates shows that policy measure of trade openness and food inflation have significant positive impact on food security in Benin, both at 10% level of significant. While the positive impact of policy measure of openness is expected as Benin has been a loyal signatory to the ECOWAS customs union, owing to its significant GDP gain from trade (Ijirshar, 2019). The positive impact of food inflation, even though marginal, does not satisfy expectation a priori. The positive impact of inflation on food security in Benin might be as a result of the economy being a major food trade corridor for other ECOWAS member countries, as such rises in food prices do not fully reflect the reality of food security in the country. Moreover, the speed of adjustment is negative and significant which implies that policy openness, food security and

food inflation are subject to short run shocks with possibility of possible long run adjustments.

Burkina Faso: The short run impact of trade both market and policy trade openness on food security for Burkina Faso are not significant. This supports an earlier claim by African Economic Outlook (AEO) (2019) that strong tariff policies and barriers have over the years rendered weak Burkina Faso trade with its regional neighbors. Moreover, the significant positive association between food price inflation and food security further supports the argument of AEO (2019), hence, the erosion of consumer sovereignty suggests reduction in their access to short run dietary energy supply. The significant negative error correction term implies that short run shocks in food inflation and food security have possibility of long run adjustment at 5% level of significance.

Cote d'Ivoire: The short run PMG estimate for Cote d'Ivoire shows that market measure of trade openness has an elastic positive impact on food security at 5% level of significant. This can be attributed to Cote d'Ivoire being one of the major hubs for international trade in West Africa with an annual average of 46% trade contribution to GDP according to (Comtrade, 2023). Because, important food commodities such as rice, frozen fish and medicine are among its highest import, food security is one of the important beneficiaries of Cote d'Ivoire market trade openness. However, the insignificant trade policy measure of openness suggests that Cote d'Ivoire has not fully implemented the ECOWAS customs union hence, still holds strong barriers to intra-regional trade partners, as most of the country's trade partners are outside of the ECOWAS trade zone.

Ghana: Short run PMG estimates with respect to Ghana show both market and policy measures of trade openness to have insignificant impact on food security in the short run. This implies that trade openness of the Ghana economy has not contributed significantly in increasing short run adequacy of dietary energy supply. This is not surprising, as Ghana has had a tendency to institute inoculating trade protective policies (Clapp, 2016) which have led to its recent negative average trade balances (World Bank, 2022). However, the significant impact of political stability on food security underlines the advantage of Ghana's relative political stability in impacting food security. Moreover, the highly elastic significant negative impact of population growth on food security in the short run satisfies expectations and shows how highly sensitive food security is to increase in population.

Guinea Bissau: Estimates of also imply that market and policy measures of trade openness have insignificant impact on food security in Guinea Bissau, hence, trade openness in terms of market and trade policy have not helped the economy to overcome its food insecurity challenges. This finding supports the claim of Ijirshar, (2019) that the Guinea Bissau's economy is highly fragile with a performance that rather depends on political and social climate rather than macroeconomic variables. Hence, important macroeconomic variables like trade openness are weak in transmitting their impacts to the food security sector. Moreover, population growth which is found to highly determine short run food security shows that Guinea Bissau's food crisis is highly attributed to its disproportionate population growth rate to growth of its economy.

Mali: Findings suggest that market and policy measures of openness have positive but insignificant impact on food security in Mali. This implies that trade openness in terms of market and trade policy have not helped the economy to increase its food security balance. This finding supports the argument that the Mali economy is inflicted by widespread bureaucratic inefficiencies that limits the growth and liquidity of the private sector trade and non-tariff trade policies country (The Heritage Foundation, 2019). While the coefficient of food inflation contradicts the expectations a priori by exhibiting a significant positive impact on food security, population growth implies a significant negative impact of population on food security. The significant negative error correction term implies that short run shocks in food inflation, population growth and food security have possibility of long run adjustment at 1% level of significance.

Niger: Coefficient of market measure of trade openness has significant positive impact on food security in Niger at 1% level of significant, implying that food market in Niger is very much open to international trade. This emphasizes the submission of World Bank (2023) that 39% of Niger's GDP is represented by international trade. Niger's relative openness to trade can be seen in the country's high food importation as rice constitute 14% of total import which represents the country's highest import in the year 2022 (Comrade, 2022). Even though the country is relatively open to trade, coefficients of policy measure of openness suggest weak implantation of ECOWAS common tariff policy while rising food inflation is found to significantly reduce short run food security.

Nigeria: Findings from Nigeria shows food security to be a negative function of trade openness at 5% level of significance. This is not unexpected as Nigeria, has implemented several food sector trade restrictions such as ban in the importation

of rice, beef, eggs and other highly consumed food items. These domestic market protectionisms have skewed imports, hence, causing major disruptions in its food security balance in Nigeria (Ugwuja & Chukwukere, 2021). The insignificant impact of policy measure of trade openness suggests the extent to which Nigeria has derailed from fulfilling its ECOWAS common market treaty, and hence the weakness of its intra-regional trade policy tools in helping the country to achieve greater food security. Further findings revealed that increase in population growth has a high negative impact on Nigeria's food security at 5% level of significance.

Senegal: Short run PMG estimates for Senegal revealed that market and policy measures of trade openness have insignificant impact on food security in the short run. This implies that trade openness in Senegal has not contributed significantly in increasing short run adequacy of dietary energy supply. Similar to Ghana and Nigeria, Senegal has been attributed with overwhelming national agenda of trade protectionism (Clapp, 2016). However, much similar to Ghana, Senegal is also attributed with comparative social and political stability (Engel & Jouanjean, 2013) which is empirically justified by the short run significant impact of political stability on food security in this study. The significant negative error correction term implies that short run shocks in political stability and food security have possibility of long run adjustment at 10% level of significance.

Conclusion and Policy Implications

This paper investigated the effect of trade openness on food security in the ECOWAS region by relying on 9 cross section of ECOWAS member countries during the 2001-2022 trading period. The study adopted two measures of openness, including trade/GDP measure which was considered the market measure of openness and the augmented tariff-based index introduced by Grabner (2020) as a policy measure of trade openness. The study applied the PMG technique to analyze the long run and short run impact of openness alongside other theoretically validated macroeconomic determinants of food security. Major findings from this study inform the conclusion that market trade openness as against policy trade openness is a major vector in long run food security determination in the ECOWAS region. However, even market openness tends to lose its impact following period after individual ECOWAS countries have implemented their trade policy decisions, as seen in the short run results. Further findings inform the conclusion that negative influences from food price inflation, political regional instability and high population growth are highly detrimental to

improving food security among ECOWAS member counties before and after trade policy implementation.

The policy implications of these findings are as follows: full implementation of the ECOWAS custom union by member countries will help eliminate trade distorting policies and improve intra-regional trade food trade and hence food security in both short and long run periods. This could be made possible only when ECOWAS countries with the highest food trade volume such Ghana, Senegal and Nigeria reverse their trade restrictive food policies as way of setting practical examples in commitment to regional trade and food security agenda. Another major implication of this study in the light of its conclusion is the need for ECOWAS to invest further efforts in reducing the food security limiting consequences of food price inflation and political instability. A bold step in this direction is for ECOWAS to move by mending the current fragmented trade relationship among countries in the region which has led countries such as Burkina Faso, Mali and Niger to temporarily severe ties with the Union. Overcoming these crises with open the region to intra-regional trade, hence reducing the negative consequences of food price inflation both in short and long term.

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