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INSECURITY AND POVERTY: TWO SIDES OF THE FOOD SECURITY COIN IN NIGERIA

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Abstract
The relationship between insecurity, poverty and food security is a bidirectional, dynamic yet complicated one. This is because one can become both a cause and a consequence of the other. Contemporary studies have shown that insecurity (disruption of economic activities) could lead to loss of asset and source of livelihood (poverty) and in extension food insecurity. On the other hand, poverty can be a major cause of insecurity and food security. This study examined the relationship between insecurity, poverty and food security in Nigeria. The study employed time series data on internally displaced person by violent conflicts (IDPVC) as proxy for insecurity, household consumption expenditure (HCEXP) as proxy to capture level of poverty and prevalence of undernourishment (POUN) as proxy for food insecurity all covering a period of 19 years (2001-2020). The data were sourced from the World Development Indicator. The study used STATA software (version 13) to analyze the collected data. The study adopted the Error Correction Model (ECM) to investigate the relationship between poverty, insecurity and food security in Nigeria. The study found a strong positive relationship between insecurity, and food security status of Nigerians. The study further found that an increase in the household consumption expenditure will reduce food insecurity. As a result of these findings, the study recommended among others that Government and private sectors should make concerted efforts to improve agricultural productivity, This could be achieved through unfettered access to agricultural inputs (high yielding varieties seeds, fertilizers, irrigations facilities, farm machines, storage facilities) for farmers especially smallholder subsistent farmers, revision of the current land tenure system in Nigeria, encouraging cutting-edge agricultural research and development.

Key Words: *COVID- 19, Food Security, Insecurity, Poverty, Violence.*

Introduction
Achieving food security, poverty reduction and a society free from insecurity remains the major objective and challenge of most twenty first century economies. In acknowledgement of how important a food secured, violence and poverty free society is world leaders in September 2015 gathered together and agreed on a set of seventeen goals to be achieved before 2030. Goals one, two and sixteen focuses on ending poverty in all its forms, achieving zero hunger and achieving a peaceful society respectively (United

Nations, 2015; World Bank, 2018). In 2018 United Nations Security Council passed Resolution #2417 in recognition of the linkages between conflict and food security. In 2000, the Human Rights Council (HRC) recognized the mandate of the UN Special Rapporteur on the Right to Food in order to respond fully to the need for a cohesive and corresponding approach to the advancement and protection of the right to food and supporting a greater understanding of what Article 11 of the International Covenant on Economic, Social and Cultural Rights (ICESCR) entails (CESCR, 1999). To further help guarantee food security most economies consider access to food to be a basic human necessity and as such have enacted laws to ensure food security. The International Covenant on Economic, Social and Cultural Rights which has been signed and ratified by 170 countries guarantees individual right to nutritious food any day and anytime with dignity (Food and Agricultural Organisation,2019). The 127th Session of the Food and Agriculture Organization of the United Nations (FAO) Council in November 2004 came up with the Right to Food Guidelines.

Unfettered access to quality and nutritious food has been greatly hindered by poverty, rising cases of violence and disturbance of world peace in the more recent times. Poverty is considered to be the inability to get access to basic necessities of life and healthy living. Due to the multidimensional nature of poverty, it has always been difficult to effectively measure poverty in all its forms (Haider, Boonstra, Peterson, & Schlüter, 2018 and Radosavljevic, Haider, Lade, & Schlüter, 2020). Earlier attempts were dominated by the monetary approach which viewed poverty from the material spectrum. More recently the multi-dimensional indices which incorporate indicators like access to quality education, affordable healthcare, decent living standards, security of life and property, access to safe drinking water, sanitation and hygiene affordable housing are used to effectively capture poverty (World Bank,2018). Numerous causes of poverty have been identified such as low per capital income, (Banerjee, Banik & Mukhopadhyay,2015.), uneven distribution of income (Chuliang , Shi Li & Terry 2020), weak institutions(Liyanage & Grace , 2013), poor agricultural practices(De Janvry & Sadoulet 2010 and Fan and Otsuka, 2020.), food systems (FAO. Food and Agriculture Organization, 2017) and land systems (Jayne, Chamberlin & Headey, 2014), insecurity and conflicts (Marion, Rama &Philip,2020 and Anna & Anne,2021), migration (Howell, 2017 and De Brauw & Giles, 2018.). In the more recent times studies have also found linkages between poverty, climate change (Roberto, Gabriela & Ana,2021; Bruce, Beth, Erin & Michaela 2021, and Assa, Levison & Patrick,2021) and outbreak of diseases (Muhammad, 2020) such as the novel corona virus.

The dynamic relationship between poverty, insecurity and food security has always been explained away as a consequence of poverty trap (Sonja, Jamila Haider, Steven & Maja, 2021). The concept of poverty trap extensively conceptualized across scales and levels such as at household, community and country levels. These traps at various level possesses the ability to reinforce each other thereby keeping economies perpetually in poverty. On the other hand, (Barrett and Bevis, 2015) conceptualized poverty as being in a low wellbeing equilibrium and any attempt at moving from these low wellbeing equilibria to a higher wellbeing equilibria is a break away from the poverty trap. Nigeria is considered the most populous black nation on earth with an estimated population of

over 200 million people yet a large number of this population live on less than $190 . With a population growth rate of 2.6% the Nigeria population has been projected to reach 250 million before 2030 however agricultural value added growth rate still crawls at just 2% (World Bank, 2021). The current food inflation rate as at April 2021 stood at 18.12% while the composite food index rose by 22.72% with states like Kogi, Bauchi and Sokoto recording the highest 24.33%, 22.93% and 20.96% respectively (National Bureau of Statistics, 2021). Figure 1 below shows the fast growth in population accompanied by low agricultural value added which invariably translated to high food prices and increase in the number of undernourished in the last two decades. Thirty-two of children below five years of age are stunted making Nigeria home to the world's second highest amount of stunted children while an estimated 2million children suffer from severe acute malnutrition (SAM) (UNICEF, 2021).

Figure 1: Growth in population accompanied by low agricultural value added



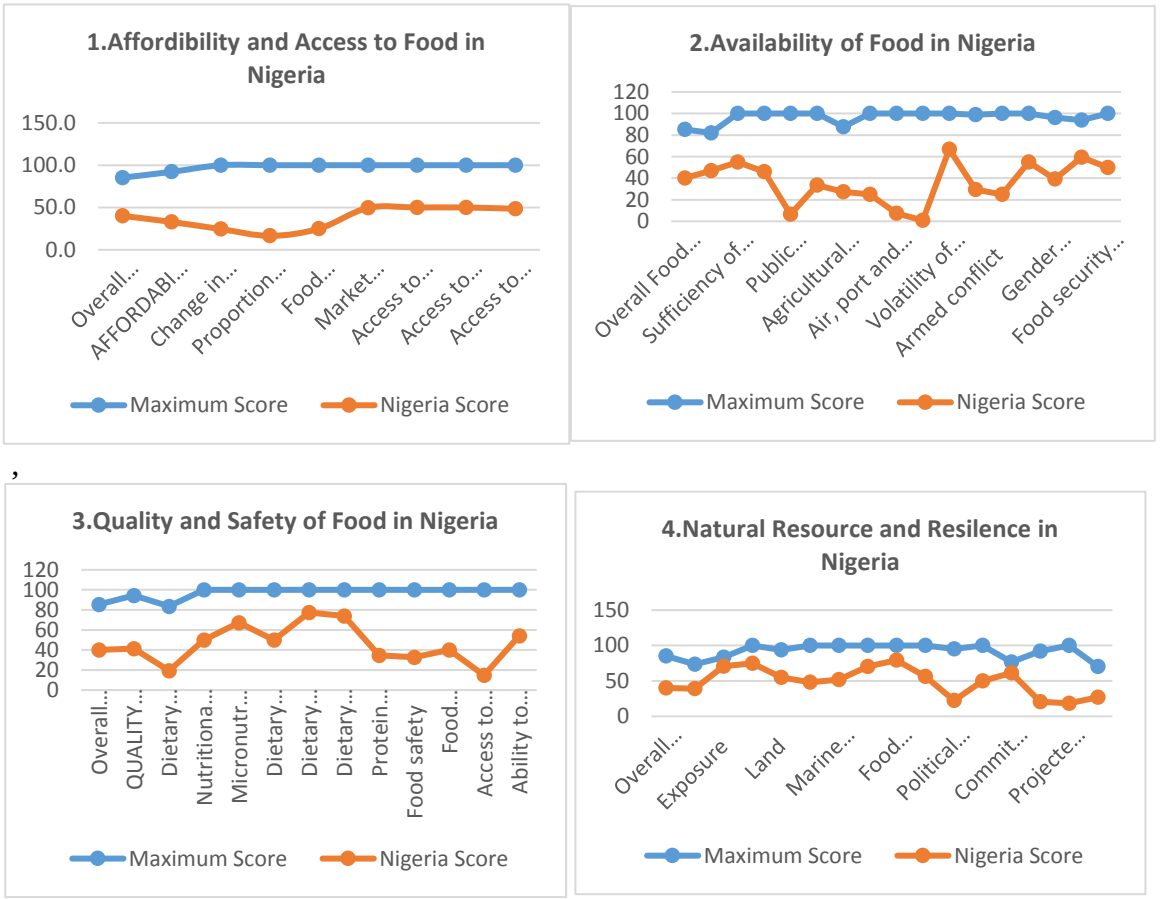
To proffer solution to the problem of food security and to alleviate poverty especially in rural Nigeria, successive Nigerian government have come up with various poverty alleviation programs and schemes. Some of these schemes includes Operation Feed the Nation (OFN-1976), National Accelerated Food Production Project (NAFPP-1973), Green Revolution Program (GRP-1980), The Directorate of Food, Roads and Rural Infrastructure (DFRRI-1986), National Directorate of Employment (NDE-1986) , Better Life Program (BLP-1987) Family Economic Advancement Program (FEAP) -1997; Community Action Program for Poverty Alleviation (CAPPA- 1997); Poverty Alleviation Program (PAP -2000) National Poverty Eradication Program (NAPEP-2001). Other programs include National Economic and Empowerment Development Strategy (NEEDS-2004) National Food Security Program (NFSP -2008), Agricultural Promotion Policy (APP -2016), The National Home Grown School Feeding Program (NHGSFP-2016), N-Power-2016, Conditional Cash Transfers (CCT) FarmerMoni and TraderMoni et cetera. Despite these numerous schemes, the socio economic condition and living standard of Nigerians still leave much to be desired. Nigeria still ranks 100

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out 113 nations on the Global Food Security Index 2020.It still ranks very low across various conventional food security indices as shown in figure 2. This has been greatly attributed to worsening level of insecurity in the country such as herders and famers clash, kidnapping, terrorist attacks, banditry, militancy, extremist attacks, ethnic and religious conflict and recent uprising of secessionist groups across the main geopolitical zones. Due to the increasing level of insecurity, the Global Peace Index ranked Nigeria the 146th least peaceful country to live in out of 163 nations while the Fragile State Index ranks it the 12th most fragile nation on earth.

Figure 2: Nigeria's ranking in Global Food Security Index 2020



The present study aims to examine the relationship between insecurity, poverty and food security in Nigeria using time series data sourced from the World Development Indicator (WDI)) database spanning the years 2001 to 2020

Literature Review

FAO (1996) food security is a condition wherein all people at all-time have unfettered access to sufficient, safe, nutritious food to maintain a healthy and active life,". Food security is built on four main frameworks which are quality and safety, availability, access, and utilization. Availability of food does not mean access to food as food could be available but the prospective consumer does not have the required resources to access them. India in the late 2000s was significant food exporter while a sizeable number of its population was food insecure. Huge progress has been made in ensuring global food security as between 1990 and 2017 substantive number of the world undernourished population were lifted out of the imaginary food insecurity line (FAO et al., 2018). In recent time the worlds sustainable goal of achieving a food secured society before 2030 has been greatly derailed by various factors ranging from climate change, the novel Covid-19 pandemic, poverty and more importantly rising incident of violence and conflicts across the world (FAO, 2016,2018; Tilman & Marco,2019). Global peace in the more recent times has been deteriorating with this year's report showing a 0.07% decline and the ninth deterioration in global peace recorded within the last thirteen-year. This surge in violence has been strongly linked to the novel Covid-19 pandemic. During the lock down, growing unease and economic uncertainty especially for daily pay workers and the unorganized sector of the economy contributed to the increase in violence and insecurity in 2020 as over 5000 violent events were recorded in the first half of the year Global Peace Index (GPI, 2021; UCDP 2018,). The long run impact of the pandemic still remains to be unraveled. According to the GPI report insecurity caused global economy an estimated $14.96 trillion (11.6% of Global GDP) in purchasing power parity(PPP). However, the real cost of food insecurity and conflicts remains inestimable as the multiplier effect of destroyed crops and livestock, direct human suffering, mental health, self-esteem, loss of identity and heritage that comes with displacement, impact of malnutrition on children, maiming and loss of human life are various factor that cannot be effectively measured.

International Food Policy Research Institute (IFPRI, 2021) asserts that more than half of all food insecure people live in countries affected by conflict. In Nigeria, the six North-East states Adamawa, Bauchi, Borno, Gombe, Taraba, and Yobe and other selected states such as Benue, Zamfara, Kaduna and many more. These states are major contributors to the agricultural productivity of Nigeria. The level of insecurity has greatly affected the level of agricultural productivity in these states and the national agricultural level of productivity. This has led to displacement of people, destruction of farms, crops and livestock making it difficult to achieve food security and end poverty (Nwanegbo & Odigbo, 2013). The relationship between insecurity, poverty and food security is a bidirectional, dynamic yet complicated one. This is because one can become both a cause and a consequence of the other. Contemporary studies have shown that insecurity (disruption of economic activities) could lead to loss of asset and source of livelihood (poverty) and in extension food insecurity. On the other hand, poverty can be a major cause of insecurity and food security. In summary this relationship could be seen as a self-reinforcing vicious circle capable of keeping such economies trapped in the circle. The situations in North-East Nigeria, Afghanistan, Syria, South-Sudan, Somalia, Yemen and Democratic Republic of the Congo are shining examples of how insecurity could affect food security. A closer look at the ranking of the least peaceful and most food

insecure countries show a strong correlation between insecurity and food insecurity. Countries like Nigeria (146, 100), Syria (161,101), Sudan (160, 112), Yemen (162, 113), Venezuela(152,96), Ethiopia(139,108), D.R Congo(157,98) which ranked low on the Global Peace Index out of 162 countries also ranked very low out of 113 countries on the Global Food Security Index 2020 respectively (Global Peace Index, 2021 and Global Food Security Index, 2020).

Anna and Dean (2012), under a multivariate regression framework examined the impact of sudden rise in the price of wheat flour among selected Afghan households in different provinces. The study found that households in provinces with higher incident of violence and conflict experienced heightened cases of food insecurity as many of the households in the conflicted affected provinces do not have access to the minimum daily recommended 2,100 kilocalories per person. Brück, Dunker, Ferguson, Meysonnat, & Nillesen, 2018 & Baliki, Brück, Stojetz 2018 and the United Nations High Commissioner for Refugees UCDP, 2018) asserts that violent conflicts force people to leave their communities and countries of origin abandoning arable land for cultivation of crops and fleeing to economies where access to cultivatable land may be difficult for them because of their status as refugees., unavailability of labour to cultivate the land, disruption of economic activities and many more. The situations in North-East Nigeria, Afghanistan, Syria, South-Sudan, Somalia, Yemen and Democratic Republic of the Congo are shining examples of how insecurity could affect food security. A closer look at the ranking of the least peaceful and most food insecure countries show a strong correlation between insecurity and food insecurity. Countries like Nigeria (146, 100), Syria (161,101), Sudan (160, 112), Yemen (162, 113), Venezuela (152,96), Ethiopia (139,108), D.R Congo (157,98) which ranked low on the Global Peace Index out of 162 countries also ranked very low out of 113 countries on the Global Food Security Index 2020 respectively. FAO (2016) asserts that the amount of undernourished people in regions of protracted conflict are more than double in other economies.

The Global Report on Food Crisis for 2018(GRFC,2018) by European Union, World Food Program (WFP), Food and Agriculture Organization (FAO) reported that conflict, insecurity and climate change are the major cause of food insecurity in 18 countries studied and this has further cause the demand for humanitarian action to continue to increase at an alarming rate. The report further observed the dynamic and inter-reinforcing nature of conflict, climate and hunger as conflict which can be food insecurity or climate induced can lead to even more serious insecurity situation. As such region become more volatile, accessing food materials and other aids become even more difficult and if it persists could lead to malnutrition, health and sanitation crisis, outbreak or spread of diseases and even death. In 2017 due to protracted conflict both South Sudan and Yemen experienced serious outbreak of cholera. During the Nigeria-Biafra civil war of 1968 the Biafra suffered various malnutrition related sicknesses such as Kwashiorkor, stunting, wasting, scurvy, rickets etc. Recently in the conflict torn north eastern states of Nigeria, there have been reported rising cases of cholera and acute watery diarrhea (AWD), measles, Malaria, Lassa fever and many more. This has been attributed to the over 12 years conflict induced conditions such as breakdown of health systems, absence of water, hygiene and sanitation (WASH) facilities and unhealthy practices around

internally displaced persons(IDP) camp UN Office for the Coordination of Humanitarian Affairs (OCHA, 2021).

Studies have shown clear cases where hunger and food insecurity has been used as a strategy of warfare in countries such as Nigeria- Biafra war, Guatemala, Colombia, Bosnia and Herzegovina, Croatia, Serbia and some former USSR state. During period of war countries have starved their opponents to submission, cut off channels of food supply, destruction of crops and livestock as well as contamination of water sources until surrender (Messer, 1996 &Keen, 1994). There are very limited studies on how food security can help prevent conflicts. FAO (2016) observes that food aids and social protection help to foster peacebuilding. On the other hand, poverty has been shown to be another major challenge to achieving food security and at the same capable of intensifying conflict and insecurity. Also insecurity is capable of inducing and reinforcing poverty. World Bank (2011) asserts that a year of violence is associated with one-point increase in poverty. In the same manner poverty is capable of inducing food insecurity and conflict as it disrupts people's access to safe and nutritious food and quality socio-economic services. Stijn (2018) using panel data for 106 countries spanning 50 years' period (1961 to 2011). The study which adopted the Error Correction Model found a negative relationship between food security and armed conflict. Its findings are consistent with the findings of (Messer et al., 2006; World Bank, 2011; Radosavljevic, 2020 & FAO et al.,2018)

Materials and Methods

The study employed time series data on internally displaced person by violent conflicts(IDPVC) as proxy for insecurity, household consumption expenditure (HCEXP) as proxy to capture level of poverty and prevalence of undernourishment (POUN) as proxy for food insecurity all covering a period of 19 years (2001-2020). The data were sourced from the World Development Indicator. The study used STATA software (version 13) to analyze the collected data. The study adopts the Error Correction Model (ECM) as adopted in (Stijn, 2018) to investigate the relationship between poverty, insecurity and food security in Nigeria. Sims (1980) popularized the use of vector autoregressive model (VAR) and vector error correction model (VECM) in the field of economics. ECM estimates best estimates a short run dynamic relationship between cointegrated variables and their rate of adjustment to the long-run equilibrium relationship. ECM can control long-term behavior of the endogenous variables and be convergent to their cointegration relation. We proceed with a simple long run form of the model

$Y_t = KX_t$……Eqn 1

Where Y is considered as the dependent variable and X as explanatory variable.

The log for of the model is represented in equation 2 as

$y_t = k + x_t$ …… Eqn 2.

where we follow the convention of letting a lower-case letter designate the natural log of the variable represented by the corresponding upper case letter. The dynamic form of the model is presented in equation 3 with the lagged value of both the dependent and independent variables which allows for a wider form of dynamic patterns in the model.

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$\Delta Y_{t=} \alpha_0 + \alpha_0 Y_{t-1} + \beta_0 \Delta X_t + \beta_1 \Delta X_{t-1} + \varepsilon_t$..... Eqn 3
Where $\alpha_0$is the autonomous component of the model and μ_t is the white noise component of the model. The expressions with the signs of summation in the equation are the short run components. The parameter coefficient signifies the short run effects while lambda (λ) is the analogous relationship in the long run. The Error Correction Model will be used to examine the impact of insecurity and poverty on food security in Nigeria. The ECM model remains one of the most widely used econometric technique of estimation as it enables both the long term and short parameter estimates while simultaneously taking care of the problems usually associated with integration order of the variables.

Econometrically, the model which shows the relationship between food insecurity, insecurity and poverty in Nigeria can be presented in equation (4)as;
$FINSEC = \beta_0 + \beta_1 INSECURITY + \beta_2$POVERTY $+ \varepsilon_t$..... Eqn 4
Where;
FINSEC= Food Insecurity
INSECURITY = Internally Displaced Person by Violent Conflicts New Cases
POVERTY = Household Consumption Expenditure

Results and Discussion
Table 1: Descriptive Statistics

	FINSEC	INSECURITY	POVERTY
Mean	9.69375	338250	7.59e+11
Variance	8.923292	9.66e+10	1.32e+22
Std. Dev.	2.987188	310792.3	1.15e+11
Skewness	.798851	.6815864	-.6501462
Kurtosis	2.292646	2.436872	2.245889
Maximum	15.7	975000	8.80e+11
Minimum	6.9	5000	5.22e+11
Observation	16	12	16

Source: Authors computation with STATA 1.
The table above shows a summary of important descriptive statistics.

Unit Root Tests
Table 2: Summary of Augmented -Fuller Unit(ADF) Stationarity result of the series

Variables	Test Critical Values (5% Level)	**ADF** Test Stat	Order of integration
FINSEC	-3.600	-4.049	I(2)
INSECURITY	-3.600	-3.869	I(2)
POVERTY	-3.600	-3.869	I(1)

Source: Authors computation with STATA 13

The study adopted the Augmented Dickey-Fuller(ADF) to test for stationarity among the variable. None of the variables understudy was stationary at level however Prevalence of under nourishment (food insecurity) became stationary after first differencing while (insecurity) internally displaced person by violent conflicts new cases and (Poverty) household consumption expenditure became stationary after second differencing.

Table 3 Ordinary Least Square Regression Result
Dependent variable: Food Insecurity

Variables	**Coefficients**	**Standard error**	**t-statistics**	**probability**
_cons	131.3384	119.6766	1.10	0.304
log_insecurity	1.1028155	0.203674	0.50	0.627
log_ poverty	-0.4052858	4.432321	-1.09	0.309
R^2 = 0.6780		F-Statistics) = 9.339781		
Adjusted R^2= 0.5572		Prob(F-Statistic) = 0.0228		
D.W Statistic=2.355227				

Source: Author's Computation using STATA 13

From the ordinary least square regression result, Food Insecurity is dependent variable while insecurity and poverty are the independent variables. The following results below were obtained. The intercept of the regression equation in the table above is 131.3384. All things being equal, it represents the value of food security if insecurity and conflicts is zero holding level of poverty constant. The regression coefficient of insecurity is 0.1028155. It shows that a unit increase in insecurity will bring about 10.45466 unit increases in food insecurity in Nigeria. It is positive showing a direct relationship between food insecurity and insecurity in Nigeria.

The regression coefficient of poverty is -0.4052858. It shows that a unit rise in household consumption expenditure(HCEXP) will bring about 41.32305 unit decreases in the level of food insecurity in Nigeria. It is negative showing an inverse relationship between household consumption expenditure(HCEXP) and food security in Nigeria.

Table 4: Cointergration Test

Trace *Max

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No. of CE	Eigenvalue	Trace Statistics	5% Critical Value	Eigenvalue	Max Statistics	5% Critical Value
0	-	1045.9272	68.52	-	514.3152	27.07
1	1.00000	531.6120	47.21	1.00000	475.4990	20.97
2	1.00000	56.1130	29.68	1.00000	41.2497	14.07
3*	0.94747	14.8633*	15.41	0.94747	14.5657	3.76

Trace and Max-eigenvalue tests indicates 3 cointegrating eqn(s) at the 0.05 level.
$*$ denotes rejection of the hypothesis at the 0.05 level.
$**$MacKinnon-Haug-Michelis (1999) p-values.

To ascertain if there is a long run relation among the variables in the model the study adopted the Johansen cointegration test. The table above depicts both the trace and maximum eigenvalue test, test results are to accept the null hypothesis, under the 5% level, and it further show that atleast three cointergarting equation exist in the model. This means there are stable and long-term equilibrium relationships among the variables. Against this backdrop of an established cointergration among the variables in the model the VEC modeling can be further conducted.

Vector Error Correction Model

The cointegration equation is

$$ECT_{t-1} = \{y_{t-1} - n_j X_{t-1} - qmR_{t-1}\},$$

The cointergrating equation and longrun model. From the estimation of the variables the following results were obtained

$$ECT_{t-1} = \{1.000FINSEC_{t-1} - 0.000026INSECURITY_{t-1} + R2.26\text{e} - 10\text{HCEXP}_{t-1} - 187.7528\}$$

FINSEC as the target variable

$$\Delta FINSEC_t = -4.41982 + 0.2022796\text{FINSEC}_{t-1} - .0000224\text{INSECURITY}_{t-1} + 1.30\text{e} - 10HCEXP_{t-1} - 0.4358668ECT_{T-1}$$

The equation shows the adjustment term (-.4358668) is statistically significant at 5% level of significance indicating that previous year's error or deviation from the long run equilibrium are corrected within the current year at a convergence speed of 43.5%. It further suggests that in the long run, insecurity has a negative impact of food security. All things being equal as insecurity rises in Nigeria by a unit scale the level of food insecurity rises by 0.00224 percentage in Nigeria. On the other hand, a unit increase in house hold consumption expenditure brings about reduction the level of food insecurity in Nigeria. Hence it could be inferred that insecurity and poverty have an asymmetric (Negative and positive) effect on food insecurity in Nigeria.

Post Estimation Diagnostic Test

The Jarque-Bera test is a post estimation test showing the normality and goodness of fit. Since the Jarque-Bera test probability value is > greater than five percent as shown in appendix 1 we can say the equation error are normally distributed. Appendix 2 also shows the stability condition of the model. The VECM specification imposes 2 unit moduli.

Conclusion and Recommendations

The study examined the effect between insecurity and poverty on food Security in Nigeria using the Error Correction model. The study found a strong positive relationship between insecurity, and food security status of Nigerians. The study further found that an increase in the household consumption expenditure will reduce food insecurity. As a result of these findings, the study makes the following recommendations: Government and private sectors should make concerted efforts to improve agricultural productivity, This could be achieved through unfettered access to agricultural inputs (high yielding varieties seeds, fertilizers, irrigations facilities, farm machines, storage facilities) for farmers especially smallholder subsistent farmers, revision of the current land tenure system in Nigeria, encouraging cutting-edge agricultural research and development.

Effective and efficient strategies should be adopted to help mitigate food shortages and control food price inflation especially in areas of conflict and civil unrest. A national grain and other food item reserve bank and public distribution systems which ensures that these reserved food items get to these parts of Nigeria where they are needed is a must if the incessant food insecurity must be effectively curtailed. Finally, ensuring that people have economic and social access to the daily required calories with their dignity intact is a very crucial aspect of the food security paradigm that all stakeholders have to work extensively to achieving especially during periods and places of conflict where human rights and dignity are hardly respected. To achieve these household incomes has to be improved through employment generation, improve infrastructure, increase access to market information, control of food price inflation etc. has to be looked into.

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