

Quality of Life Response to Global Food Prices, Energy Price and Inflation: Evidence from African Countries

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Abstract

The African sub-region is composed of similar countries with a common heritage and home to extremely diverse human and natural resources and at different stages of economic growth. There has been a food and energy scarcity in most nations in the sub-continent. This research investigates the direct influence of energy, food prices and inflation on the quality of life in developing African countries for the period 2015 to 2021. Based on the GMM, the dynamic empirical evidence reveals that an increase in food prices reduces the quality of life in Africa. Policy suggestions are directed towards an increase of grain cropland, food price reduction and mechanizing farming in Africa.

Keywords: Food, Energy Price, Quality of life, GMM, Africa.

1. Introduction

The recent global spike in food and energy prices has brought food security and affordable energy prices to the agenda of the African summit 2023 in Kenya. Critical enquiries have been raised on how food-importing countries that depend on food purchased abroad can secure food demand (Brinkman et al. 2010). Significant effort has been made to analyze the main attributes of food price spikes. Various scholars have put diverse weights on the significance of the factors that lead to food scarcity, it is quite understood that a food price hike was caused by a combination of storm factors which simultaneously affect both the supply and demand (Gilbert, 2010). The provision of food security and energy is one of the instrumental roles played by the government to improve the quality of life of its citizens (Kabore et al. 2022; Abu Hatab, 2022). The availability of quality food and energy supply that the citizens can conveniently access serves as the prerequisite to growth and development and, in turn, improves the nation quality of life (Manap and Ismail, 2019). Food and

energy supply are the components that are linked to the enhancement of the quality of life. Therefore, the countries capacity to produce economically and improve the quality of life, food security, and affordable energy prices are of paramount position.

The global food price hike is argued to be the precursor to the countrywide inflation dynamic, leading to reduced quality of life. This inflationary dynamic is transmitted through direct and non-direct price mechanisms (Khan & Ahmed, 2014). The attention focuses on the direct price spread mechanism.

In line with the above mentioned, food and energy prices are key to African development. The sustainable development goal 2, Vision 2030, aimed to eliminate hunger to zero. The UN's target is to eradicate hunger in Africa by 2030, stressing the significance of reducing the food price spikes and providing affordable energy prices in the continent (UN, 2023). Despite the UN and WTO commendation on reducing the food and energy prices, still Africa is battling with increasing price of

the commodities. From the recent data, global food and energy prices have witnessed spiked from 2015 to 2023. The food price hike has reached its 10-year higher record of 28% in 2021 and 17.9% in 2022 (FAO,2023; USDA,2022). Energy prices have increased significantly from 2018 to 2022. In 2016, the energy price was between \$55.1 and \$87 in 2018, \$95.4 in 2021 and \$152.6 in 2022 (Trading Economics, 2023). Equally, the IMF warns that the African economy will face uncertainty due to the growing increase in

food and energy prices (Zerriffi, Reyes & Maloney, 2023). The global food price spike for the period 2013 – 2022 is presented in Figure 1. African inflationary rate is represented in Figure 2 from 2011 to 2022 financial years. The inflation rate is persistently increasing from the year 2014 down to 2022, when compared with global average. This increase in food prices and the general inflation could affect the improvement on the quality of life in the region.

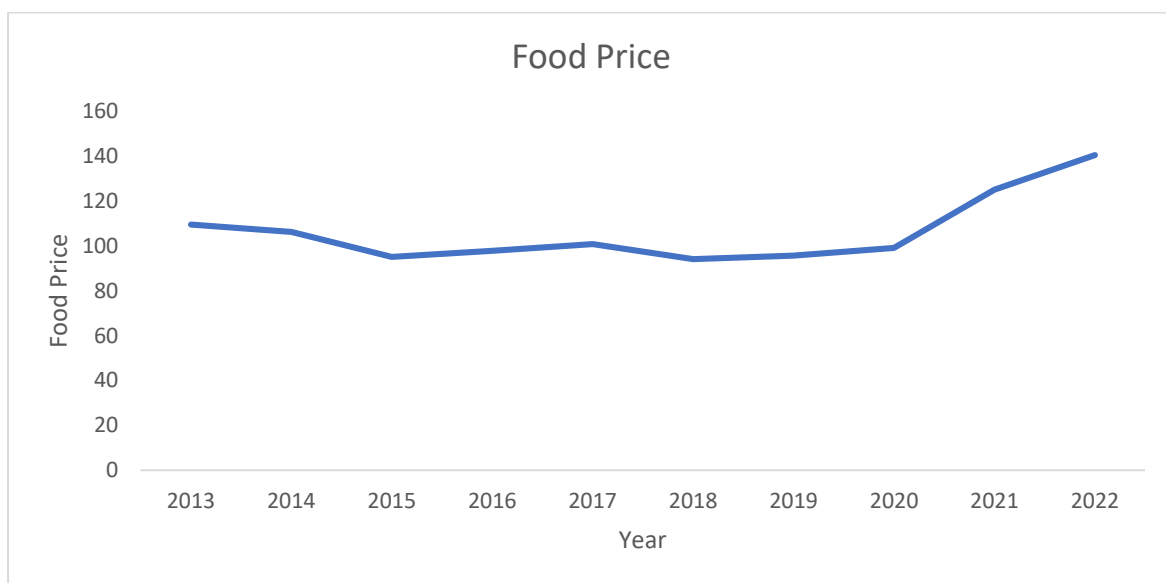


Figure 1: Global Food price
Source: Trading Economics (2023)

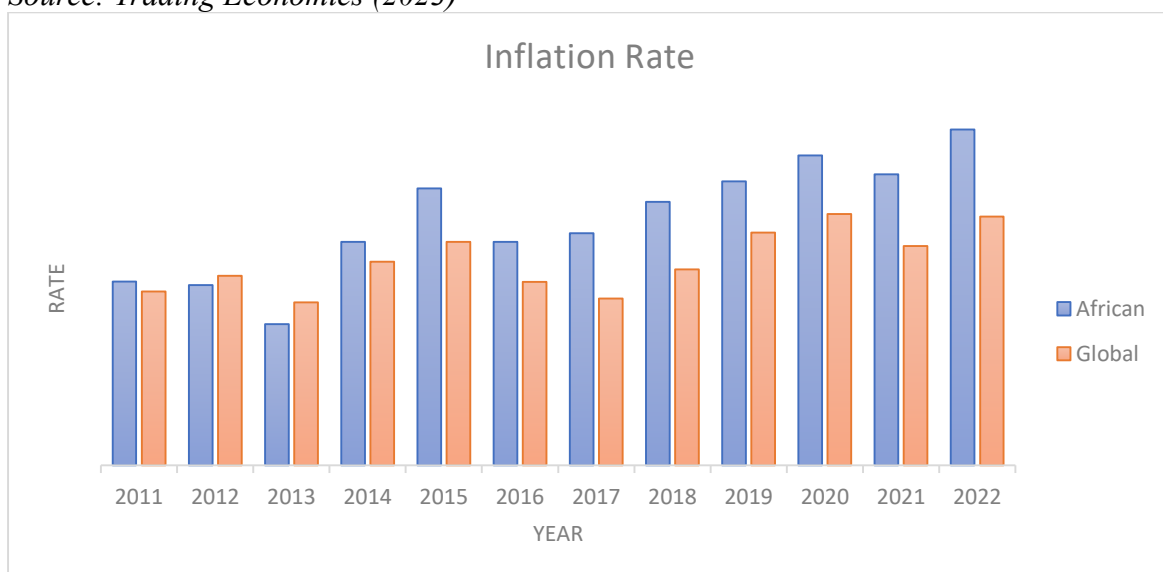


Figure 2: Inflation Rate
Source: World Bank (2023)

2. Literature Review

Reviewing the global food prices becomes important because it throws the attention of global and national policymakers, researchers and Households. The evaluation of the related literature revealed that a plethora of studies have investigated the relationship between food prices and other variables. These relationships take the dimension of both country and cross-country analysis. Some of these studies look at the linear relationship (Erturul, 2021; Gilbert, 2010; Kara, 2017; Khatun, Roy & Rahman, 2016), while others review the relationship from a nonlinear approach (Ott, 2012).

In addition, various econometric approach was adopted to assess the influence of food price, involving ARDL, Non-linear ARDL, DCC, Panel VAR, OLS, VECM and TVP-VAR all in an attempt to progress in the contemporary literature (Bellemare, 2015; Mhonyera et al. 2023; Li & Li, 2021; Zhang & Qu, 2015; Wen et al. 2021; Khatun et al. 2016; Taghizadeh-Hesary et al. 2019). In addition, recent studies have adopted GDM approach, TRIZ-Base problem solving in conjunction with Machine K-means algorithms to examine food prices fluctuations in the economy (Zhang et al. 2019; Kou et al. 2022; Kartel & Depren, 2023). Few pieces of literature vested interest in adopting the GMM approach to investigate food price nexus (Kornher & Kalkuhl, 2013). Despite adopting various econometric approaches in the literature. However, applying the novel GMM approach can still add value to the literature of food prices nexus.

Looking to the further studies that reviewed the literature concerning the impact of food price on economic growth, Dorward (2012) found lack of clarity about the short- and medium-term effect of food price change on the quality of life of different people. The study further Consider the long run theoretical and practical findings, which revels a complementary and consistent effect of food price hike on economic

growth. On a similar note, Wodon and Zaman (2009) investigating the spike of the global food prices on local food prices. The study funds that high local food prices lead to significant high poverty in Sub-Saharan Africa, the impact on consumers outweighs the benefits of food producers, similar result was founded by (Ivanic & Martin, 2008; Ivanic *et al.* 2012).

3. Methodology

Endogenous growth theory serves as the underpinning theory. Consequently, it stresses how increasing household expenditure reduces economic growth (Devarajan et al., 1996). Here, the inputs are the improvement of household income, while the expected outcomes are the improvement of human life quality.

Model Specification

The model used in the study as presented in equation 1, is a modified Arcand (2001) model.

$$\begin{aligned} QL_{it} &= L. QL_{it} + \partial_{oi} + \partial 1_i FP_{it} + \partial 2_i EP_{it} \\ &+ \partial 3_i InF_{it} + \partial 4_i Zscore_{it} + \partial 5_i GSE_{it} \\ &+ \partial 6_i BC_{it} + \partial 7_i RIG_{it} \\ &+ \varepsilon_{it} \dots \end{aligned} \quad \text{Equation(1)}$$

Where economic growth models give quality life (QL_{it}) stand as the function of food security (FP_{it}), energy price (EP_{it}), government security expenditure (GSE_{it}), Bank stability ($Zscore_{it}$), Government Remittance (RIG_{it}), Inflation (InF_{it}), and concentration of bank (BC_{yit}). The subscripts $I = 1, 2, \dots, 34$ African countries, $t = 2015$ to 2021 period of the study.

The relationship between African quality of life and food and energy price from 2015 to 2021 is empirically estimated using the System Generalized Method of Moment (GMM). The GMM controls the omitted variable bias, controls unobserved panel heterogeneity, and regulates measurement error in the data (Roodman, 2009; Mohammad and Aliyu, 2022). The data was extracted from the World Development Indicator (WDI, 2022) and Trading Economics (2022).

4. Results and Discussion

This section presents the result, starting from the descriptive statistics. Table 1 indicates that the average quality of life in the study period from 2015 to 2022 is 17.7%, and the quality-of-life floats between 26.8% to .06%. The Table indicates that food prices, on average, stood at 12.4% and floated between 13.3% and 10.1%, respectively. The Table also reveals that inflation floats between 4.3% to 2.02%,

while energy price on average remains at 48.9%, hovering between 76.5% to 20.4%, while government security expenditure on average is 10% and floated between 229.8% to 0.489%. However, Bank concentrations, Bank stability margin, and Remittance inflow all drift between 180.8% to 33.8%, 13.1% to 0.25%, and 25.5% to less 1%, while the averages are 72.9%, 5.4%, and 3.73%, respectively.

Table 1: Descriptive Statistics

Variable	Observations	Mean	Std. D	Minimum	Maximum
Quality L	231	17.663	5.279	0.064	26.82
Food Price	231	12.41	1.02	10.08	13.25
Inflation	231	2.19	0.21	2.02	4.25
Energy	231	48.899	16.345	20.38	76.54
GSE	231	9.959	25.145	0.489	229.85
Zscore	231	18.47	8.047	6.04	51.49
Bank C	231	72.904	19.644	33.786	180.79
Rigdp	231	3.729	4.592	0	25.58

Similarly, the correlation matrix in Table 2 indicates the highest absolute value of correlation between the energy price and quality of life, which stands at 0.51 and the smallest absolute correlation between food price and government security expenditure, which is 0.06. The correlation matrix

between variables is weak if it is below 70% and strong if it raised above 70% (Koutsoyiannis, 1977). Lower correlation signified lesser element of multicollinearity among the independent variable in our model (Gujarati & Porter, 2009).

Table 2: Correlation Analysis

Variable	Qua L	Food P	Inf	Energy	GSE	Zscore	Rigdp	Bank C
Qua L	1.00							
Food P	-0.09	1.00						
Inf	-0.23	-0.075	1.00					
Energy	0.539	0.295	-0.236	1.000				
GSE	0.11	-0.006	-0.042	0.089	1.000			
Zscore	-0.03	-0.044	-0.121	-0.003	-0.189	1.000		
Rigdp	-0.08	-0.003	-0.003	-0.005	0.106	0.212	1.000	
Bank C	-0.28	0.028	0.008	-0.116	-0.093	0.309	0.309	1.000

Table 3 presents the linearity and stationarity of the variables. After the descriptive analysis, further investigation is conducted to reveal the stationarity of the series. The result based on Levin, Lin and Chu reveals that the variables are mixed, that is, some variables are at difference while the majority are at level. The test for

the stationarity of the variables is necessary because Nonstationary of the variables leads to spurious results (Choi, 2001; Narayan & Popp, 2010). The findings show Quality of life, Energy, government security expenditure, food price, Zscore, and bank concentration are all at I (0). In contrast, the variable of inflation is at I (1).

Table 3: Unit Root Test

Variable	Levin, Lin & Chu (Statistic)	Unit Root	Probability
Quality of Life	-5.9265	Level	(0.000)
Food Price	-7.3487	Level	(0.000)
Infl	-8.917	1 st Difference	(0.000)
Energy price	-15.144	Level	(0.000)
GSE	-14.681	Level	(0.000)
Zscore	-9.3173	Level	(0.000)
Bank Con	-5.0136	Level	(0.000)
Rigdp	-7.7829	Level	(0.000)

The first inquiry stage in this article is the computation of the persistency and effect of food prices on quality of life. The System GMM estimated result reveals that the lag of the dependent variable (quality of life) is significant and persistent at 1 per cent, indicating the quality of life of the preceding year is responsible for the change in the quality of life in the present year. The increase in food price is responsible for the decline in quality of life, and this is shown in the dynamic estimated result in Table 4, a per cent change in food price creates a .1% decrease in quality of life in Africa. The result is consistent with the theoretical predictions and findings of (Derindag et al. 2023). Another important variable is the inflationary rate, Table 4 indicates that a 1% increase in the inflationary rate resulted in

the 10% decrease in quality of life in Africa. The result is consistent with prominent literature (De Gregorio, 2021; Tien, 2021). In Table 4, a 5% increase in security equipment leads to 1% decreased quality of life. This is so because excessive speeding on security leads the government to overlook the social welfare packages for its citizens, this is very common in African states (Dunne & Tian, 2013; Saba & Ngepah, 2019). Also, the result in Table 4, energy price displays a positive and significant relation with the quality of life, this indicates a 1% change in energy price has influenced a significant improvement in quality of life. This is so because some countries in the sample are oil energy-producing countries.

Table 4: The Result of Short-run System GMM Estimations

	(1)	(2)	(3)	(4)
VARIABLES	Energy	Food price	Infl	All Variables
L.GDP	0.51154***	0.5115***	0.9004***	0.5115***
	(0.000)	(0.000)	(0.000)	(0.000)
Energy P.	0.184482***	-	-	0.2130***
	(0.000)	-	-	(0.000)
GSE	-0.01397***	-0.01397*	0.0523*	-0.01397*
	(0.00112)	(0.046)	(0.053)	(0.046)
Food price	-	-0.001499**	-	-0.0069***
	-	(0.004)	-	(0.000)
Zscore	-1.41939***	-1.4193***	0.1893	-1.419***
	(0.000)	(0.000)	(0.33)	(0.000)
Bank Con.	0.0379	0.0379	-0.300***	0.0418
	(0.242)	(0.242)	(0.000)	(0.242)
RIGDP	0.49362***	0.49362***	0.795***	0.493**
	(0.002)	(0.002)	(0.000)	(0.002)

Inf	-1.43084***	-1.4308***	-2.38**	-1.4308***
	(0.000)	(0.000)	(0.017)	(0.000)
Constant	2.470**	9.461*	2.374***	0.753*
	(0.998)	(0.027)	(0.000)	(0.020)
Observations	198	198	198	198
Number of groups	33	33	33	33
Instruments	26	26	33	26
Wald chi2	21285.13	21285.9	1861.16	21689.90
Probability	(0.000)	(0.000)	(0.000)	(0.000)
Hansen	0.249	0.249	0.229	0.736
AR2	0.736	0.736	0.291	0.249
Year Dummy	Yes	Yes	Yes	Yes

5. Conclusions

The estimation GMM technique diagnosed for the overidentification restriction reveals that the model is correctly specified and instruments are valid through the Hansen J test. Arellano and bond test of autocorrelation indicate the model is free from second-order serial correlation. The result of the Wald chi2 confirmed that all variables in the model contribute significantly and affirmed the model's fitness. Based on this, food prices should be considered central because any disruption may lead to a devastating effect on the quality of life of African states. As a result, Africa's unique structure and economic certainties must be considered when designing and implementing a policy.

As earlier stated, our empirical study is designed to complement the available research in some ways still exhibits some weaknesses. Africa is the target of the investigation, several emerging economies and developed nations have confronted regional hikes in the price of food items, and this could be further put in to rigorous investigation. Switching models could significantly help future statistical and econometric applications, which can explain any significant changes between food prices and macroeconomic factors.

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