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13 Economic Shocks and Welfare of Nigerian Households

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1. Introduction

Households in Sub-Saharan Africa (SSA) are exposed continuously to various economic shocks due to climate change, food price fluctuations, pests and diseases, and health issues (Di Falco, 2014; Addison et al., 2019; Atake, 2018). However, households employ different strategies such as insurance, borrowing, and realloing resources, to mitigate the effects of shocks (Frankenberg et al., 2003). Each economic shock and the coping strategies employed may have different effects on households. The effects may be positive or negative depending on the household characteristics and prevailing conditions. For example, positive effects of food price fluctuation may result in income gain if the household is a net food seller, while negative effects may lead to loss of income for net food buyers (Arndt et al., 2008; Amolegbe et al., 2021). Hence, understanding the combined effects of each of these shocks on households remains an immediate and important research issue amidst new and emerging threats such as COVID-19 (Saah et al., 2021; Ufua et al., 2021; Amolegbe, 2020; Amu et al., 2021; Diop et al., 2021; Swinnen and Vos, 2021; Kokas et al., 2020; Ibukun and Adebayo, 2021).

A growing body of literature has explored the effects of shocks on households. For example, Amolegbe et al. (2021) studied the effect of unexpected food price shocks on Nigerian households and found that price shocks have negative relationships with household food security status. Ibukun and Adebayo (2021) examined the food security status of households during the pandemic and investigated its determinants using the COVID-19 National Longitudinal Phone Survey. The study revealed that over two-thirds of Nigerian households are threatened by food insecurity due to COVID-19. During the survey, they found that education, income, and wealth status are the main determinants of food security during the pandemic. More generally, COVID-19 has adversely affected household food and nutrition security (Nechifor et al., 2021), as well as the overall welfare of the most vulnerable households, such as the elderly poor (Kokas et al., 2020). Atake (2018) also found that health shocks negatively affect SSA households. The effect of shocks on individuals within households also varies, and females may be disproportionately affected by shocks (Quisumbing et al., 2018). However, the results from these studies are ambiguous, as many of the studies focus on a specific source

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of economic shock and do not consider the combined effects of different sources of shocks. The studies also failed to control for the endogenous effects of shocks on households and did not account for households' use of coping strategies to mitigate the effects of shocks.

The study fills the observed knowledge gap by answering the following research question: *What is the relationship between economic shocks and household welfare? That is, which category of economic shock has the greatest effect on a household welfare after controlling for the effects of household characteristics and shock coping strategies?* This study contributes to the literature in four ways. First, we employ a comprehensive household panel survey that allows us to employ a robust empirical strategy. We focus on three waves of the Nigerian Living Standard Measurement Survey (LSMS), and we are also able to control for attrition across the three waves. Second, we focus on the combined effects of all economic shocks faced by households. This is because households are often faced with more than one economic shock at a time, and the ability of the household to mitigate the effects of each shock type varies. Third, we account for the mitigating effects of shock coping strategies employed by the households. Fourth, our focus on Nigeria is also relevant, given Nigeria's broad relevance in SSA. Nigeria has diverse cultural, geographical, and socioeconomic characteristics that are relevant in the context of this study.

The remainder of this chapter is structured as follows. The next section gives a brief review of relevant literature. Section 3 describes the data we employ for this study, and Section 4 briefly presents the empirical strategy we use to answer the research questions. We present and discuss the results in Section 5 and conclude in Section 6.

2. Literature Review

A growing body of literature examines the effects of economic shocks on household welfare and coping strategies in developing countries. In the next paragraphs, we discuss empirical works on the welfare effects of economic shocks. The review will be carried out at the global level, for Africa and then for Nigeria. Using Vietnamese household panel data for 2004–2005 and 2006–2008, Bales (2013) examined the impact of health shocks on household welfare. The results revealed that in Vietnam, poor households witnessed reductions in nonfarm income; meanwhile, rich households witnessed an increase in income. In Indonesia, Frankenberg et al. (2003) assessed the effect of economic shocks on welfare. The results from this study revealed that to respond to the effect of these economic shocks, households adopted a wide array of mechanisms. In this regard, households reduced expenditures on semidurables while maintaining spending on food. For Mexico, Skoufias and Vinha (2013) examined the impact of weather shocks on household welfare. The results of their findings revealed that both the ex-ante and ex-post coping strategies were not able to provide these households with sufficient protection against weather shocks. Another important inference of this study was that weather shocks augment household consumption via a transitory increase in income.

Regarding empirical studies in Africa, Mbegalo and Yu (2016), using Tanzanian household data for 2008–2009 and 2010–2011, quantitatively assessed the impact of food price shocks on household welfare in rural Tanzania. The findings showed that during the crisis, sellers witnessed an amelioration in welfare; meanwhile, buyers suffered welfare losses from the food price hikes. Additionally, the negative impact of the food price shock was more pronounced among the poor than among the non-poor. In Kenya, Wineman et al. (2017) studied the effects of weather shocks on household welfare using three waves of the household panel from 2000 to 2007. Empirical findings from this study revealed that all the different extreme weather shocks affect household welfare, although the effect differs by measures of welfare employed (income and calories). Furthermore, Hangoma et al. (2018), using four waves of Zambian surveys, evaluate the implications of health shocks for household income, medical spending, consumption, and coping strategies. The results showed that households are faced with financial and consumption risks that are expected to reduce household social protection. In Cameroon, Kane et al. (2015) examined the welfare effects of food price volatility using the third Cameroon Household consumption survey and the quadratic almost ideal demand system model. The results indicated that the effect of the food price hike is more severe among poor households and that the welfare losses incurred are a function of the degree of the price hike suffered by the household. This is related to the study by Osabohien et al. (2020a) using panel data as well as Osabohien et al. (2020b) using the LSMS dataset. More recently, Kokas et al. (2020) analysed the impact of COVID-19 on Tunisian household welfare. The lack of adequate access to health insurance, low access to water at home, and overcrowded living conditions make the poor more susceptible to becoming infected by COVID-19. Furthermore, the simulation shows that poverty will increase by 7.3 percentage points and 11.9 percentage points under the optimistic and pessimistic scenarios, respectively.

In Nigeria, Shehu and Sidique (2015) used a nationally representative dataset of rural households to evaluate the effect of idiosyncratic and covariate shocks on welfare proxied with consumption expenditure. The results from this study indicated no significant effect of idiosyncratic and climatic shocks on household consumption; meanwhile, price shocks were found to have a significant negative effect on household consumption. The results also revealed that rich households were able to insure against idiosyncratic and climatic shocks. In contrast, poor households were not able to insure themselves against the impact of economic shocks. Additionally, employing historical food prices and household panel survey data, Amolegbe et al. (2021) assessed the implications of unexpected food price shocks for household food security. The results of their study revealed that food price shocks have a negative effect on household food security measures, with the effect being more pronounced among net buyers. Ibukun and Adebayo (2021), analysing the food security status of Nigerian households during the pandemic and investigating its determinants, showed that socioeconomic variables such as education, income, and wealth status were the main determinants of food security during the COVID-19 pandemic. Furthermore, a huge proportion (two-thirds) of Nigerian households were threatened by food insecurity.

Stemming from the foregoing, studies using Nigeria data to examine the implications of the different shock categories for household welfare are relatively limited, even in the COVID-19 era. Indeed, the effects of the different economic shocks on household welfare in Nigeria are still an empirical issue. The contribution of our present endeavour is largely empirical – using the Nigerian household panel records, pooled OLS, and the random-effects model. We investigated the effects of agricultural shocks, health shocks, financial shocks, weather shocks, and other shocks on household welfare in Nigeria as a whole and by the zone of residency (i.e., rural residency versus urban residency). The study also examined the effects of each of these shocks on food expenditure and on nonfood expenditure. We were also able to account for household characteristics, attrition bias, and the shock coping strategies employed by the households. However, data limitation does not allow us to integrate COVID-19 shock into our analysis.

3. Data

We used the World Bank Living Standards Measurement Study Survey (LSMS) for Nigeria, and we focused only on the first three waves based on the comparability of these three waves. That is, we focused on 2010–2011 (wave 1), 2012–2013 (wave 2), and 2015–2016 (wave 3) surveys to construct our panel dataset that will be used for estimation. The surveys have seasonal variations and are nationally representative covering households in rural and urban areas. The baseline survey consisted of 5,000 households, and we addressed attrition bias across waves. The LSMA data collected on economic shocks are present at the household level. Households were asked to rank the three most significant shocks experienced over time, and dichotomous data were collected based on household responses to the shock-related questions. We focused on the two most severe shocks experienced within the survey year, and we categorized economic shocks experienced by households into five groups.

- *Agricultural shocks* include shocks related to either theft of crops, cash, livestock, or other property, destruction of harvest by fire, pest invasion that caused harvest failure or storage loss, increase in the price of inputs by the government, or fall in the price of output.
- *Financial shocks* include shocks related to job loss, nonfarm business failure, loss of land, or increase in the price of major food items consumed.
- *Weather shocks* are related to poor rains that cause harvest failure, flooding that causes harvest failure, or loss of property due to fire or flood.
- *Health shocks* are related to death or disability of an adult working member of the household, death of someone who sends remittances to the household, illness of an income-earning member of the household, or death of livestock due to illness.
- *Other shocks* include loss of an important contact, departure of an income-earning member of the household due to separation or divorce, departure of

an income-earning member of the household due to marriage, dwelling damaged/demolished, kidnapping, hijacking, robbery, assault, or other shocks that may not have been captured in the other shock categories.

We also accounted for the coping strategies households employ to mitigate the effects of economic shocks. We categorized the coping strategies into six groups.

- *Financial measures* include borrowing from friends and family, taking a loan from a financial institution, purchasing on credit, delaying payment obligations, selling harvest in advance, relying on savings, or taking advance payments from employers.
- *Safety net measures and assistance* employed by households include sending children to live with friends, receiving assistance from friends and family, receiving assistance from nongovernmental organizations (NGOs), and receiving assistance from the government or the use of insurance.
- *Household expenditure cuts* may range from withdrawing children from school, reducing food consumption, or reducing nonfood consumption.
- *Liquidity measures* employed by households to mitigate shocks include selling livestock, land, or other properties.
- Some households also *diversify* by engaging in additional income-generating activities. Households also use *other* shock coping measures, such as migration of a household member for work, and some households may choose to do nothing in mitigating the effects of some economic shocks.

4. Empirical Framework

We employed panel data regression models to answer the research question. That is, we estimated a pooled OLS, fixed effect, and random effect regression model (Wooldridge, 2010). We first explored the effect of each category of shock on household welfare by estimating the following regression.

$$Y_{h,t} = \beta_0 + \beta_1 S_{h,t} + \beta_2 R_{h,t} + \delta H_t + \gamma A_h + e_{h,t} \quad 13.1$$

where $Y_{h,t}$ is the household welfare indicator (logarithm of per capita consumption, log of food expenditure or nonfood expenditure) of household h at time t . $S_{h,t}$ is a dummy variable that takes 1 if household h experiences a category of shock at time t and zero otherwise. R is a vector of coping strategies employed by household h at time t . These coping strategies include financial, safety net, expenditure cut, liquidity, diversification, and other measures. H_t is a vector of household characteristics that include household structure (polygamous or monogamous), household size, sex of household head, age of household head, number of literate household members, and adult equivalence (Dedehouanou and McPeak, 2020). A_h is the attrition bias, which we constructed using the inverse probability weighting (IPW) methods recommended by Foster and Bickman

(1996), and Verbeek and Nijman (1992). We operationalized the model on the different categories of shocks – agricultural, financial, weather, health, and other shocks – and the impact of each shock evaluated. However, because households simultaneously experience different types of shocks at the same time, we account for the effects of all shock categories by exploring a regression where $S_{h,t}$ is a vector of economic shocks experienced by household h at time t .

Appropriate estimation of panel data requires the two prominent panel data models: fixed-effects and random-effects models. According to Chan and Gemayel (2004), these models can take onboard households and intertemporal differences and control for the effect of unobserved characteristics and missing data. In this regard, panel data modelling can take the following form:

$$Y_{h,t} = \alpha_0 + \alpha_1 S_{h,t} + \alpha_2 R_{h,t} + \rho H_t + \theta A_h + \mu_h + \varepsilon_{h,t} \quad 13.2$$

where μ_h represents unobserved household-specific effects that are expected to vary with time and constant across households. $\varepsilon_{h,t}$ denotes the random error term. According to Wooldridge (2010), the difference between the fixed effects technique and the random effects technique is based on the assumption we make on the explanatory variables and μ_h . The random-effects model considers μ_h to be random and not correlated with the observed characteristics; meanwhile, the fixed effects models assume that μ_h is not random and that a relationship (correlation) exists between μ_h and observed characteristics. In this regard, in the random-effects model, since μ_h is random, it is lumped into the error term. In practice, the choice between the fixed effects models and the random-effects model relies on the Hausmann test. The Hausmann test is based on the correlation that exists between μ_h and the observed characteristics.

5. Results and Discussion

In this section, we present the descriptive statistics of relevant variables and discuss the results from the empirical analysis. The descriptive statistics are presented overall and by the household zone of residency.

5.1 Descriptive Statistics

Table 13.1 shows the descriptive statistics of households with respect to their zone of residency. The descriptive statistics report that the proportion of polygamous households in the rural setting is higher with respect to the urban setting. In terms of household size, descriptive findings show a rural-urban differential. In particular, households in rural areas are found on average to have approximately seven persons per household compared to approximately six persons per household for their urban counterparts.

On average, the percentage of female-headed households was found to be higher among urban dwellers than among rural dwellers. The descriptive results further indicate that in terms of the age of the household head, no significant

Table 13.1 Descriptive Characteristics

	1	2	3	4	
	Total	Rural	Urban	Rural-Urban Difference	
Polygamous household (%)	24.8	28.8	15.2	-0.136***	(-15.49)
Household size (mean)	6.4	6.7	5.7	-0.957***	(-15.94)
Female head (%)	12.7	11.2	16.0	0.0476***	-8.01
Household head age (mean)	5.5	5.9	4.8	-1.072	(-0.10)
Literate members (mean)	3.9	3.8	4.1	0.289***	-5.81
Adult equivalence (mean)	4.9	5.1	4.6	-0.550***	(-11.62)
Shock (%)					
Agricultural	5.0	6.0	2.9	-0.0315***	(-8.16)
Financial	9.5	9.6	9.4	-0.00237	(-0.46)
Weather	6.9	8.9	2.6	-0.0622***	(-13.98)
Health	13.4	14.6	10.8	-0.0378***	(-6.27)
Others	3.7	3.3	4.5	0.0117***	-3.49
Coping strategies (%)					
Financial	10.7	11.3	9.3	-0.0206***	(-3.77)
Safety nets	8.9	9.7	7.3	-0.0241***	(-4.78)
Expenditure cut	7.9	8.3	7.0	-0.0138**	(-2.89)
Liquidate	6.5	8.0	3.3	-0.0465***	(-10.70)
Diversify	1.9	1.9	1.8	-0.00101	(-0.42)
Others	1.7	1.7	1.7	0.000163	-0.07
N	14600	9902	4698	14600	

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Source: Computed by authors using 2010/2011, 2012/2013, 2015/2016 LSMS and Stata 14

differentials exist between households residing in urban areas and households residing in rural areas. However, regarding literacy, the findings reveal that there is a significant rural-urban disparity. On average, households in the urban setting have a higher number of literate members compared to their rural counterparts.

Regarding the different shock types, descriptive statistics report significant rural-urban differences for all the shocks considered in the analysis. Specifically, in terms of households that suffered from an agricultural shock, descriptive statistics reveal that 6% of rural households against 2.9% of urban households were affected by agricultural shocks. Concerning financial shocks, the percentages were 9.6% and 9.4% for rural and urban households, respectively. Meanwhile, 8.9% of rural areas suffered from a weather shock compared to 2.6% of urban households that suffered from the shock. In addition, a greater percentage of rural households suffered from a health shock compared to urban households, which was 14.6% and 10.8%, respectively. For other shocks, we observed that the percentage was somewhat higher among urban households than among rural households.

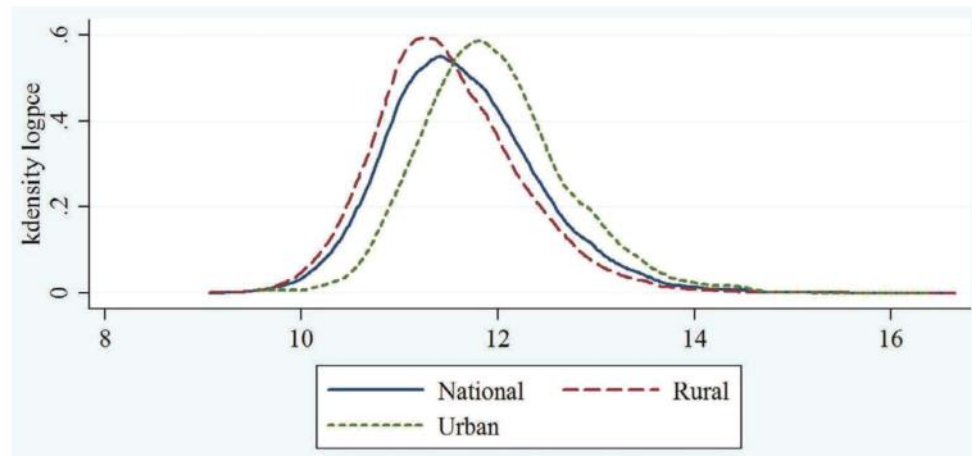


Figure 13.1 Household per capita consumption

Source: Constructed by authors using 2010/2011, 2012/2013, 2015/2016 LSMS and Stata 14

In particular, 4.5% of the urban households were affected by other shocks compared to 3.3% for rural households. The descriptive statistics on the different coping strategies further inform us that there are significant differences in terms of the financial coping strategies, safety nets cuts, expenditure cuts, and liquidity measures. The proportion of households that employ these coping strategies in rural areas was higher than that in urban areas.

Figure 13.1 presents the kernel density estimation of the log of household consumption expenditure per head for the whole sample and by the zone of residency. Comparing the distributions, we observed that the peak of the distribution of the log per capita consumption expenditure for urban households lies to the right of the distribution of the whole sample and rural households. This is a preliminary indication that the welfare of households residing in urban areas is higher than that of rural-dwelling households.

5.2 Regression Results: Effect of Shocks on Welfare

The objective of this section is to evaluate the effects of the different shocks on household welfare proxied by per capita consumption expenditure. Table 13.2 displays estimates of the welfare generating function under different assumptions. In particular, Columns 1, 3, and 5 host the estimates of the separate shock categories; meanwhile, Columns 2, 4, and 6 display the estimates in which all the shocks are considered in a single equation. The preferred results for discussion are the pooled OLS and random effects results hosted in Columns 2 and 6.

The results of the pooled OLS and random effects estimation show that the agricultural shock relates negatively to household welfare. Specifically, the findings of

Table 13.2 Effects of Shocks on Households Per Capita Consumption

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	Fixed Effects	Fixed Effects	Random Effects	Random Effects
Agricultural	-0.108*** (0.0303)	-0.108*** (0.0304)	-0.00772 (0.0275)	0.00125 (0.0277)	-0.0489* (0.0265)	-0.0491* (0.0267)
Financial	0.0340 (0.0249)	0.0402 (0.0255)	-0.0412* (0.0231)	-0.0282 (0.0237)	0.0185 (0.0220)	0.0228 (0.0226)
Weather	-0.0964*** (0.0268)	-0.0861*** (0.0272)	-0.00165 (0.0251)	0.00499 (0.0256)	-0.0529*** (0.0239)	-0.0469* (0.0244)
Health	0.0356 (0.0236)	0.0334 (0.0242)	0.0654*** (0.0223)	0.0638*** (0.0230)	0.0301 (0.0210)	0.0287 (0.0218)
Others	0.103*** (0.0364)	0.0962*** (0.0367)	0.0341 (0.0332)	0.0419 (0.0335)	0.0357 (0.0318)	0.0346 (0.0321)
Shock controls	No	Yes	No	Yes	No	Yes
Coping strategies	Yes	Yes	Yes	Yes	Yes	Yes
Attrition	Yes	Yes	Yes	Yes	Yes	Yes
Constant		12.04*** (0.0194)		10.21*** (0.0767)		12.03*** (0.0240)
Observations		10,387		10,387		10,387
R-squared		0.162		0.171		
Number of households				3,861		3,861

Source: Computed by authors using 2010/2011, 2012/2013, 2015/2016 LSMS and Stata 14

Note: Standard errors in parentheses.

*p < 0.1, **p < 0.05, ***p < 0.01.

the random effects model revealed that households that suffered an agricultural shock are likely to incur losses in terms of welfare on the order of 0.0491 log points (i.e., approximately 5%) compared to households that never witnessed an agricultural shock. Regarding the effect of financial shock on household welfare, the results indicate that no significant welfare differentials exist between households that were affected by financial shocks and households not affected by financial shocks. These findings are not consistent with those obtained by Mbegalo and Yu (2016) using Tanzanian data, which indicated that a financial shock (food price increase) on average leads to an improvement in welfare among sellers and a loss in welfare among buyers.

Another important inference revealed by the regression results is that weather shocks have a negative effect on household welfare. In particular, the result shows that, on average, households that were affected by a weather shock are expected to suffer welfare losses of approximately 0.0469 log points (i.e., 4.69%) compared to their unafected counterparts. This result can be supported by the idea that when households are exposed to extreme weather conditions, this is expected to reduce household farm income based on the hypothesis that a significant proportion of these households depend on agriculture. Wineman et al. (2017) corroborate these findings using Kenyan data by revealing that extreme rough weather negatively affects household welfare. In addition, the results further reveal that health shocks and other shocks are not statistically related to household welfare. Consistent with these findings, Sparrow et al. (2014) also found no significant effect on food and nonfood expenditures even when shocks augment medical expenditures and reduce nonfarm incomes. On the other hand, Khan et al. (2015) indicated that health shocks significantly influence nonfood spending via the income earned.

We explored the effects of economic shocks for rural and urban areas (Table 13.3). Many studies in the literature have noted that economic shocks have varying effects on rural and urban households. The results revealed that weather shocks have a significant negative effect on household per capita consumption of urban households; meanwhile, there was no significant effect of weather shocks on rural households.

We also found that health shocks have a positive effect on the consumption expenditure of rural households, while among their urban counterparts, no significant effect of health shocks was revealed. This could be because when rural households are faced with health shocks such as an illness, they are likely to spend on medications, and this expenditure on medication is expected to soar the household total consumption expenditure per head, which is the proxy for household welfare.

To further explore the effects of shocks on households, we focused on household food and nonfood expenditures. This will enable us to understand the disaggregated effects of economic shocks on households. The disaggregated of total consumption expenditure into food and nonfood expenditure is based on the idea that the different economic shocks are likely to have different effects on food expenditure and on nonfood expenditure.

Table 13.3 Effects of Shocks on Households Per Capita Consumption by Rural and Urban Sectors Using a Random Effect Model

	(1)	(2)
Variables	Rural	Urban
Agricultural	-0.0442 (0.0291)	0.0231 (0.0600)
Financial	0.0288 (0.0261)	-0.0245 (0.0420)
Weather	0.00532 (0.0260)	-0.169*** (0.0627)
Health	0.0611** (0.0246)	0.00913 (0.0424)
Others	0.0173 (0.0390)	0.0684 (0.0530)
Coping strategies	Yes	Yes
Attrition	Yes	Yes
Constant	11.86*** (0.0262)	12.61*** (0.0466)
Observations	7,330	3,057
Number of households	2,708	1,204

Source: Computed by authors using 2010/2011, 2012/2013, 2015/2016 LSMS and Stata 14

Note: Standard errors in parentheses.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 13.4 shows the relationship between household economic shock and the logarithm values of household food and nonfood consumption expenditures using the random-effects model. Column 1 focuses on household food expenditure, and Column 2 shows the results for household nonfood expenditure. Regarding the effect of agricultural shocks on household food consumption expenditure and nonfood expenditure, we found that agricultural shocks negatively affect household nonfood expenditure and have no effect on household food consumption expenditure. These findings can be explained by the idea that food is a necessity, and when a household is faced with an agricultural shock, households are expected to reduce the expenditure devoted to nonfood items. Table 13.4 equally indicates that financial shocks have a significant positive effect on household nonfood expenditure. In particular, households that were affected by financial shocks are likely to have a nonfood expenditure that is 0.106 log points (i.e., 10.6%) higher than that of their unaffected counterparts. These findings are economically expected since a financial shock such as price hikes (inflation) is likely to soar the household nonfood expenditure budget. We also found that health shocks have a positive effect on food expenditure while no significant effect is registered on nonfood expenditure.

Table 13.4 Effect of Shock on Food and Nonfood Expenditure Using a Random Effect Model

	(1)	(2)
Variable	Food	Nonfood
Agricultural	-0.0384 (0.0282)	-0.0599* (0.0317)
Financial	0.0225 (0.0238)	0.106*** (0.0270)
Weather	-0.0404 (0.0256)	-0.000461 (0.0291)
Health	0.0447* (0.0228)	-0.00483 (0.0260)
Others	0.0368 (0.0339)	0.0380 (0.0382)
Coping strategies	Yes	Yes
Attrition	Yes	Yes
Constant	11.69*** (0.0225)	10.58*** (0.0328)
Observations	10,387	10,387
R-squared		
Number of households	3,861	3,861

Source: Computed by authors using 2010/2011, 2012/2013, 2015/2016 LSMS and Stata 14

Note: Standard errors in parentheses.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

6. Conclusion and Policy Implications

This study examined the implications of different economic shocks for household welfare. Specifically, the study assessed the effects of different economic shocks on household consumption expenditure per head for the whole sample and by the zone of residency (urban and rural). The study also evaluated the extent of the different economic shocks on household food consumption expenditure and household nonfood consumption expenditure. To achieve these objectives, we employed three waves of the World Bank LSMS for Nigeria. We focused on the cumulative effects of agricultural, financial, weather, health, and other categories of shocks. We accounted for the mitigating effects of household shock coping strategies and accounted for the attrition effects across survey waves. The random-effects panel model and pooled OLS were further adopted to examine the effects of the different shocks on the various indicators of household welfare.

The results showed that, overall, agricultural shocks and weather shocks negatively affected household consumption per head. That is, households affected by agricultural and weather shocks suffered consumption losses compared to their counterparts that were never affected by these shocks. The study further explored

the effect of the different shocks by the zone of residency and found that weather shocks negatively affected the consumption expenditure per head of urban households; meanwhile, health shocks positively influenced the consumption expenditures of rural households. The study also disaggregated the household total consumption expenditures into food and nonfood expenditures and studied the effects of the different shocks on each of the expenditure components. The findings revealed that agricultural shocks negatively affected household nonfood expenditures; meanwhile, health shocks positively affected household food consumption expenditures.

These findings provide essential information for public policy interventions. The implications of these results are in tandem with the wisdom that improving the ability of resource-poor households to resist shocks is vital in the enhancement of household welfare. In this regard, policies aimed at improving household welfare could factor in strategies of mitigating agricultural and weather shocks due to their negative effects on welfare, as depicted by the findings of this study. Specifically, to reduce agricultural shocks, mechanisms aimed at minimizing postharvest losses could be considered in rural development programs.

Future studies can focus on the impact of COVID-19 on Nigerian households when comprehensive and more detailed data are available. Indeed, at the time of conducting this study, there was a lack of sufficiently detailed data on COVID-19. As a result, we were unable to study the welfare impact of this important health shock that may significantly impact households in both the short and long run.

References

- Addison, T., Pikkarainen, V., Rönkkö, R. & Tarp, F. 2019. Development and poverty in sub-Saharan Africa. In *Development and Poverty Reduction*. Taylor & Francis.
- Amolegbe, K. B. 2020. Hungry birds do not sing: Coronavirus and the school feeding program. *World Development*, 136.
- Amolegbe, K. B., Upton, J., Bageant, E. & Blom, S. 2021. Food price volatility and household food security: Evidence from Nigeria. *Food Policy*, 102061.
- Amu, B., Osabuohien, E. S., Alege, P. O. & Ejemeyovwi, J. O. 2021. Impact of real shocks on business cycles in selected sub-Saharan African countries. *Cogent Business & Management*, 8, 1875548.
- Arndt, C., Benfica, R., Maximiano, N., Nucifora, A. M. & Thurlow, J. T. 2008. Higher fuel and food prices: Impacts and responses for Mozambique. *Agricultural Economics*, 39, 497–511.
- Atake, E.-H. 2018. Health shocks in Sub-Saharan Africa: are the poor and uninsured households more vulnerable? *Health economics review*, 8, 26.
- Bales, S. 2013. Impact of health shocks on household welfare in Vietnam – Estimates using fixed effects estimation. *Institute of Health Policy & Management (HEFPA) Working Paper*, 18.
- Chan, K. K. & Gemayel, E. R. 2004. Risk instability and the pattern of foreign direct investment in the Middle East and North Africa region. *IMF Working Paper*, No.139. Washington, D.C.: International Monetary Fund.

- Dedehouanou, S. F. & Mcpeak, J. 2020. Diversify more or less? Household income generation strategies and food security in rural Nigeria. *The Journal of Development Studies*, 56, 560–577.
- Di Falco, S. 2014. Adaptation to climate change in Sub-Saharan agriculture: assessing the evidence and rethinking the drivers. *European Review of Agricultural Economics*, 41, 405–430.
- Diop, S., Asongu, S. A. & Nnanna, J. 2021. COVID-19 economic vulnerability and resilience indexes: Global evidence. *International Social Science Journal*, 71, 37–50.
- Foster, E. M. & Bickman, L. 1996. An evaluator's guide to detecting attrition problems. *Evaluation Review*, 20, 695–723.
- Frankenberg, E., Smith, J. P. & Thomas, D. 2003. Economic shocks, wealth, and welfare. *Journal of Human Resources*, 38, 280–321.
- Hangoma, P., Aakvik, A. & Robberstad, B. 2018. Health shocks and household welfare in Zambia: An assessment of changing risk. *Journal of International Development*, 30, 790–817.
- Ibukun, C. O. & Adebayo, A. A. 2021. Household food security and the COVID-19 pandemic in Nigeria. *African Development Review*, 33, S75–S87.
- Kane, G. Q., Mabah Tene, G. L., Ambagna, J. J., Piot-Lepetit, I. & Fondo, S. 2015. The impact of food price volatility on consumer welfare in Cameroon. *WIDER Working Paper 013*. Helsinki: UNU WIDER.
- Khan, F., Bedi, A. S. & Sparrow, R. 2015. Sickness and death: economic consequences and coping strategies of the urban poor in Bangladesh. *World Development*, 72, 255–266.
- Kokas, D., Lopez-Acevedo, G., El Lahga, A. R. & Mendiratta, V. 2020. *Impacts of COVID-19 on Household Welfare in Tunisia*. Available at SSRN 3755395.
- Mbegalo, T. & Yu, X. 2016. The impact of food prices on household welfare and poverty in rural Tanzania. *Discussion Papers, No. 216*. Göttingen: Courant Research Centre – Poverty, Equity and Growth (CRC-PEG).
- Nechifor, V., Ramos, M. P., Ferrari, E., Laichena, J., Kihui, E., Omany, D., Musamali, R. & KIRIGA, B. 2021. Food security and welfare changes under COVID-19 in Sub-Saharan Africa: Impacts and responses in Kenya. *Global food security*, 28, 100514.
- Osabohien, R., Matthew, O., Ohalet, P. & Osabuohien, E. 2020a. Population – poverty – inequality nexus and social protection in Africa. *Social Indicators Research*, 151, 575–598.
- Osabohien, R., Osuagwu, E., Osabuohien, E., Ekhat-Mobayode, U. E., Matthew, O. & Gershon, O. 2020b. Household access to agricultural credit and agricultural production in Nigeria: A propensity score matching model. *South African Journal of Economic and Management Sciences*, 23, 1–11.
- Quisumbing, A. R., Kumar, N. & Behrman, J. A. 2018. Do shocks affect men's and women's assets differently? Evidence from Bangladesh and Uganda. *Development Policy Review*, 36, 3–34.
- Saah, F. I., Amu, H., Seidu, A.-A. & Bain, L. E. 2021. Health knowledge and care seeking behaviour in resource-limited settings amidst the COVID-19 pandemic: A qualitative study in Ghana. *PLoS One*, 16, e0250940.
- Shehu, A. & Sidique, S. F. 2015. The effect of shocks on household consumption in rural Nigeria. *The Journal of Developing Areas*, 353–364.
- Skoufias, E. & Vinha, K. 2013. The impacts of climate variability on household welfare in rural Mexico. *Population and Environment*, 34, 370–399.
- Sparrow, R., De Poel, E. V., Hadiwidjaja, G., Yumna, A., Warda, N. & Suryahadi, A. 2014. Coping with the economic consequences of ill health in Indonesia. *Health economics*, 23, 719–728.

- Swinnen, J. & Vos, R. 2021. COVID-19 and impacts on global food systems and household welfare: Introduction to a special issue. *Agricultural Economics*, 52, 365–374.
- Ufua, D. E., Osabuohien, E., Ogbari, M. E., Falola, H. O., Okoh, E. E. & Lakhani, A. 2021. Strategizing government palliative support systems in tackling the challenges of COVID-19 lockdown in Lagos state, Nigeria. *Global Journal of Flexible Systems Management*, 1–14.
- Verbeek, M. & Nijman, T. 1992. Testing for selectivity bias in panel data models. *International Economic Review*, 681–703.
- Wineman, A., Mason, N. M., Ochieng, J. & Kirimi, L. 2017. Weather extremes and household welfare in rural Kenya. *Food security*, 9, 281–300.
- Wooldridge, J. M. 2010. *Econometric analysis of cross section and panel data*. MIT Press.