

The impacts of the food, fuel and financial crises on poor and vulnerable households in Nigeria: A retrospective approach to research inquiry

Blessing M. Chiripanhura and Miguel Niño-Zarazúa*

This article examines the impacts of the financial, food and fuel crises on poor and vulnerable households in two states of Nigeria: Lagos and Kano. It uses retrospective household-level data to analyze the impacts of induced price variability on household welfare. The results indicate that aggregate shocks have significant adverse effects on household consumption, schooling and child labour decisions, with a degree of impact heterogeneity across regions and rural and urban areas of the country. We find that the coping strategies adopted by the poor to deal with the short-term effects of the crises can lock households in a low-income equilibrium or poverty trap. Provided that covariate shocks exacerbate these effects, they become central for policy design.

Key words: food, fuel and financial crises, impact analysis, poverty, vulnerability schooling, child labour, Nigeria

1 Introduction

Global and regional crises arising from the collapse of financial institutions along with high levels of food and fuel price variability have become the focus of research and policy debate. More recently, the 2008 financial crisis, coupled with food and fuel price increases, have been sources of great concern given their potential effects on poverty and well-being. Recent World Bank estimates suggest that the 2008 financial crisis alone pushed nearly 53 million people worldwide into poverty in 2009, and given the slowdown in economic growth in several developing economies, the cumulative poverty impacts were expected to rise even further, to an extra 73 million people (Chen and Ravallion, 2009).

The various coping strategies that households resort to to deal with crises can have long-lasting and devastating effects on present and future well-being, particularly among vulnerable groups. When, for example, children are withdrawn from school, sent to work or suffer early life malnutrition, they are likely to endure long-term (often lifetime) poverty (Hulme and Shepherd, 2003; Baulch and Masset, 2003). To the extent that covariate shocks exacerbate these vulnerabilities, a better

*Researcher, Department of Economics, University of Namibia, Windhoek, Namibia; and Research Fellow, UNU-WIDER (miguel@wider.unu.edu).

[The license statement for this article was changed on 17th October 2016 after original online publication.]

understanding of crises becomes critical to designing effective policy responses to address these episodes.

This article contributes to the existing literature in two important respects: first, it examines the impact of the food, fuel and financial crises on household livelihoods and living standards in rural and urban Nigeria. The study of these crises has remained largely under-analyzed in the country, due in part to the dearth and poor quality of existing data. To overcome this constraint, we employ household-level data explicitly collected in the states of Lagos and Kano to unravel the extent to which households were affected by, and responded to, the crises. The two states were selected with the objective of reflecting a degree of the demographic and socioeconomic heterogeneity observed in the country, and the fact that budgetary constraints precluded collecting a nationally representative sample. Second, the article pays particular attention to the effect of crises on vulnerable groups, notably women and children.

We focus on Nigeria for two principal reasons: first, the country provides a good point of departure for the examination of the impact of aggregate shocks on resource-rich and commodity-oriented economies in the sub-Saharan African (SSA) region. Second, despite having experienced rapid economic growth over the past decade, and being the largest economy in the region, after the re-basing of the gross domestic product (GDP) data in April 2014 Nigeria remains highly underdeveloped in its institutional and economic structures. More than 63% of its population lives on less than \$1.25 a day, with agriculture contributing up to 45% of GDP and employing nearly 90% of the rural population (DFID, 2012).

Our results show that aggregate shocks can have significant adverse effects on household consumption, schooling and child labour decisions, with a degree of impact heterogeneity between rural and urban areas, and northern and southern regions of the country. Although these strategies are generally short term, they often have long-term effects on household welfare.

The article is organized as follows: Section 2 provides an overview of recent crises with special focus on SSA and, more specifically, Nigeria. Section 3 describes the data used in the analysis. Section 4 presents the analytical approach and estimation strategy adopted to assess the effects of the crises, while Section 5 discusses the overall findings with regard to food consumption, school dropout and child labour decisions. Finally, Section 6 concludes with reflections on the policy implications of the findings.

2 Overview of the crises

The *food crisis* came as a result of increases in the domestic and international prices of staple foods. For example, the price of maize increased steeply from less than \$150 per metric tonne in 2005, to over \$300 per metric tonne in 2011. This was confirmed by the report of the Food and Agriculture Organization of the United Nations (FAO, 2011) that world food prices had generally been stable between 1970 and 2000, but increased significantly from 2006 onwards.

The grain price spike in 2008 was caused by a combination of factors, including drought and erratic weather patterns in major grain producing countries like Russia,

Australia and Brazil, rising oil prices and crop diseases.¹ Also, the growing demand for bio-fuels resulted in more resources being devoted to that in order to meet the growing demand for green energy, but at the expense of food production (Chen et al., 2011; von Urff, 2007). It is important to note that, although there may be (positive) correlation between fuel and food prices, and that fuel price changes may induce short-run food price increases, the pass-through rate and impacts are low in labour-intensive agricultural systems, such as that of Nigeria. Given that the pass-through rate to fertilizer and other agricultural input prices is high (Baffes, 2007), the low usage of fertilizers and agricultural chemicals in many SSA countries implies low pass-through rates and impacts.

The *fuel crisis* was caused by persistent increases in the price of fuel on the international market. The global price of hydrocarbon fuels increased persistently from the beginning of 2002. The price per barrel reached a peak of \$120 in May 2008, from an average of under \$30 before 2003. High energy prices fed into higher production and transport costs in the manufacturing sector, contributing to higher agricultural input prices. Given that on average 10% of household expenditure goes to the purchase of energy, rising prices had a significant impact on the overall household purchasing power, especially among poor households (Baker, 2008). Paradoxically, although Nigeria is Africa's biggest oil producer, the country imports more than 80% of its domestic fuel, owing to a lack of refining capacity, which made the country vulnerable to international fuel price volatility.

Between 2001 and 2008, the country experienced unprecedented economic growth, with an annual growth rate of 6% (UNDP, 2009). This was largely due to rising international oil prices, together with a strong agricultural sector that contributes about 40% of the country's GDP (NBS, 2009).

The 2008 *financial crisis* and the subsequent drop in oil prices, plus the disruption of crude oil production due to the conflict in the Niger Delta region, filtered through to Nigeria's stock exchange, with market capitalisation tumbling 63% between March 2008 and March 2009.² As state and local governments rely almost entirely on federal contributions, local communities are de facto vulnerable to fluctuations in the global oil markets.

The financial crisis imposed serious financial constraints on firms, leading to lower employment expenditures (Campello et al., 2009). Although some developing countries in SSA were shielded from the direct effects of the financial crisis by their low international financial integration, they still suffered indirectly because of the intertwining of global food, fuel and financial markets. The food and fuel crises preceded the financial crisis, but the effects became intertwined with serious social and economic consequences across countries. The severity of the combination of crises caused social unrest and food insecurity across countries. Rising prices eroded household incomes, resulting in riots in 30 countries around the world, including Mozambique, South Africa, Cameroon, Senegal, Côte d'Ivoire and Burkina Faso. In response, some countries such as Brazil (in 2008), Russia (in 2010) and South Sudan

1. See data on the website: <http://chartsbin.com/view/oau>

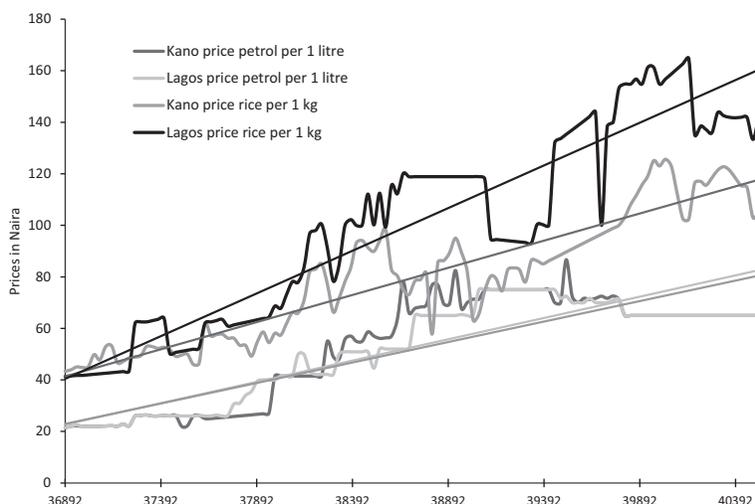
2. While oil prices dropped from \$147 per barrel in July 2008 to \$47 per barrel in January 2009, overall crude oil production dropped from 2.5 million barrels a day in 2007 to under 800,000 in 2008.

and Ethiopia (in 2007) introduced protectionist policies and banned grain exports, whereas others countries introduced price controls (e.g. Kenya, Benin and Senegal) or liberalized trade by reducing import taxes on food imports (e.g. Nigeria and Morocco). Compared to Latin American countries, there was greater price volatility and economic costs in SSA (World Bank, 2011). For example, in Burundi, the cost of high food and fuel prices reached 1.5% of GDP in 2008 (IMF, 2008). The effect was worst in low-income countries where households allocate a larger proportion of their expenditure to food (Diao et al., 2010). The following section focuses on the case of Nigeria.

2.1 The case of Nigeria

For many SSA economies, fuel inflation was, on average, higher than food inflation. In contrast, in Nigeria food prices exhibit higher price variability than fuel prices. This is largely due to fuel subsidies and the persistent scale and technical inefficiencies in the agriculture sector that have left the country reliant on food imports and thus exposed to global food price fluctuations (Olomola, 2013). Poor households are reported to have reduced the intake of varieties of food like meat, vegetables and rice owing to high prices (IFPRI, 2008).

Figure 1: Trends in domestic food and non-food prices in Lagos and Kano, 2003–11



Source: The authors' calculations based on data from the National Bureau of Statistics.

Figure 1 presents the trend of local rice prices in Lagos and Kano between 2001 and 2010. It shows that rice prices had a steady long-term upward trend, characterized by short-term variability with pronounced peaks and troughs between the mid-2000s and early 2008, which corresponded to the rise and fall of

international food prices. Fuel prices also followed a long-term upward trend, although displaying much lower short-term variability than food prices. The standard deviation, which captures price volatility, is greater for local rice prices than fuel prices, particularly in Lagos. This confirms the evidence that food prices were subject to more sudden volatility in the short-run than fuel prices. From a macroeconomic perspective, this reflects the fact that the Nigerian government addressed the international fuel price volatility by subsidising the pump price. Yet our micro-level analysis presented in Section 5.1 shows that fuel subsidies may actually have had a muted effect on household consumption patterns, especially among the poor, whose access to fuels such as kerosene remained scarce and unpredictable.

The financial crisis was transmitted through several channels, including credit availability, trade, employment and financial flows – mainly remittances and aid. The main transmission channel for the fuel crisis was observed through changes in oil prices via high demand, especially from India and China. High oil prices meant more revenue in the earlier stages of the crisis, which were then followed by declining international prices and revenues throughout 2009, although by 2010 oil exports had recovered to pre-crisis levels. In contrast, remittances increased globally from 2000 onwards, including in Nigeria where by 2007 the remittance to GDP ratio exceeded 5% (World Bank, 2011). Interestingly, the crisis did not cause a significant decline in remittances, but just stunted the growth rate. For the households receiving remittances, the adverse effects of food and fuel price increases were partially mitigated.

Although the macro-level seems to show no significant effects of the crises on the economy, the micro-level analysis presented in Section 5 shows a different picture, especially among the poor and vulnerable. In the following section, we describe the primary data used to investigate the impacts of the crises on relevant dimensions of well-being.

3 Data

Our analysis is based on household survey data collected in early 2011 (hereafter referred to as the Lagos-Kano household survey, LKHS) from four deprived local government areas (LGAs) within the two selected states: Ikeja and Amuwo Odofin in Lagos, and Sabongari and Ungogo in Kano state. Given budgetary constraints, the selection of the two states and the corresponding LGAs was based on geographical, economic, socio-political and security criteria aimed at capturing household heterogeneity across states and localities, and at measuring the effects of the food, fuel and financial crises on vulnerable groups, particularly women and children. Thus, while Kano and Lagos would capture the north–south spatial heterogeneity, Ikeja and Sabongari would reflect the urban context, and Amuwo Odofin and Ungogo the rural environments.

The sampling frame was designed in a way that reduces the problem of exclusion bias from the non-probability sampling process, through random selection of households at the four LGAs level, our primary sampling units. This process was

carried out as follows: first, transect walk methods were adopted in each of the selected LGAs in order to ascertain the spread and distribution of population in those localities and to redefine the boundaries of LGAs. In the case of rural communities, the research team requested permission from the community leaders to carry out the survey and to get a sense of the estimated number of households in each LGA. Once the geographical boundaries were delimited, five clusters of 20 households were defined from the cardinal directions (north, south, east and west) and centre. The clusters were formed from a systematic sampling method involving the selection of households from an ordered sampling frame. A random starting point was first selected before enumerators began to follow a sampling interval of every tenth household to pick up a household for interviewing.

100 households in each LGA were targeted to obtain an overall sample size of 400 households across the two states. In the end, 399 households were successfully interviewed, with an uneven distribution across the four locations (see Table 1). It is important to point out that as with most non-probabilistic sampling methods, the results from the LKHS must be taken with caution and cannot be used to infer generalizations over the overall population of Nigeria, but rather, to describe patterns and relationships occurring in the locations under analysis.

Table 1: Sample target and achievement

States and LGAs	Targeted sample	Achieved sample
Lagos	200	199
Ikeja	100	100
AmuwoOdofin	100	99
Kano	200	200
Sabongari	100	87
Ungogo	100	113
Urban	200	174
Rural	200	225
Total	400	399

Source: Lagos-Kano household survey.

The household survey was collected through face-to-face interviews with the household head and/or their spouse. The survey captured information on household composition, housing characteristics, children immunisation, household assets, savings, access to credit, access to social protection, and on shocks. The questionnaire was designed to capture retrospective information on current and past welfare outcomes including children's education, child labour, health status, employment, unemployment and time use during the hungry (April–July) seasons, migration and remittances, household earnings and food consumption. Retrospective information was collected from as far back as 2006, the pre-crisis starting point.³

3. The full version of the questionnaire is available on request from the authors.

The use of retrospective data is increasingly being used in developing countries where pre-test and post-test data is often not available. Cost and administrative factors often limit the regular collection of household data, and in our case, with no existing disaggregated data at LGA level, retrospective questions were the best available option to capture key information on the variability of welfare outcomes during the periods in which the crises in question were observed. The rationale of our implementation strategy was based on the knowledge that the food and fuel price variability appeared in the years 2007, 2008, with a peak in 2009 for the former, especially in southern states, whereas the onset of the global financial crisis began in September 2008 and extended throughout 2009. More precisely, Nigeria was faced with food price variation beyond the observed long-term upward steady trend during 2007, 2008 and 2009, whereas the fuel price increase was experienced during 2006 and 2008. The sole effect of the food price variability may be captured from 2007, whereas the sole effect of the fuel price increases from 2006. The effects of the global financial crisis may be captured in 2008 and in 2009 with the latter also likely to reflect more recent food price variability. Retrospective data thus allows us to measure the changes in reported welfare outcomes in those years and across the locations under examination, under the assumption that any observed change in outcomes is correlated with these covariate shocks and, to a lesser degree, to idiosyncratic events.

Nonetheless, there are two major limitations in this strategy: first, given that data on food and fuel prices is disaggregated at the state level, and having covered only two states through the household survey, we were unable to use price data to identify the impact of the food and fuel price variability through the econometric strategy, and thus we cannot separate the effects of the food and fuel crises, particularly in the years when more than one covariate shock was observed. In those cases, we cannot tell with precision whether a decline in welfare outcomes, say schooling, was due to a food price increase or because of the effect of a channel through which the global financial crisis was transmitted. Nonetheless, we can provide information about changes in welfare over the periods in which these crises were observed, and estimate the predicted probabilities that these changes in welfare were associated with the crises.

Second, retrospective data can generate recall errors that can be systematically correlated with explanatory factors, particularly when the questions involved aim at measuring outcomes of a subjective nature that are difficult for people to accurately remember. Recall errors can generate downward bias in the estimated coefficients. Several studies have shown that recall errors arising from retrospective data seem to be systematically correlated with household composition, suggesting that the inclusion of household size or any other intra-household related variable as controls in the regression equations may mitigate these biases (see Gibson, 2002; Battistin et al. 2003; Gibson and Kim, 2007, 2010; Nakata et al., 2009). Therefore, in our specification strategy we include the dependency ratio to mitigate the potential effects of recall errors, and focus primarily on objective rather than subjective outcomes to limit other sources of biases. Even so, our results should be treated with caution, more in terms of impact size rather than on their direction or statistical power.

4 Analytical approach

In order to measure the impact of the food, fuel and financial crises, we have adopted three estimation strategies: first, we estimate a probit model based on an underlying response variable y_i^* that is defined by

$$y_i^* = X_i\beta + u_i \quad (1)$$

where we can only observe a categorical outcome, y , that takes the values $y = 1$ if $y_i^* > 0$ (if households report an outcome over the 2007-10 period, and $y=0$, otherwise). From equation (1) we estimate the predicted probabilities of observing the outcomes of interest, y , by computing

$$\Pr(Y = 1|X_i) = \int_{-\infty}^{X_i\beta} \phi(t)dt = \Phi(X_i\beta) \quad (2)$$

where $\phi(\cdot)$ and $\Phi(\cdot)$ are the density of the distribution function and the cumulative distribution function of the standard normal, respectively, and X is a vector of household characteristics that contains the following control variables: (1) a dummy variable that takes the value 1 if the household head is female, and zero otherwise; (2) a continuous variable that measures the age of the household head; (3) the dependency ratio used as a proxy for intra-household composition to capture the liquidity requirements for consumption expenditure, and which also helps to mitigate recall errors arising from retrospective data in subsequent estimations.

Based on this specification, we run two models: Model I is estimated with a dummy variable that takes the value 1 if the household resides in Lagos, and zero if the household resides in Kano. Model II is estimated with a dummy variable that takes the value 1 for households living in urban areas (including Ikeja in Lagos and Sabongari in Kano), and zero for households residing in rural areas (in this case Amuwo Odofin in Lagos and Ungogo in Kano). By estimating equation (2), we are able to derive the marginal effects of one unit change in the explanatory variables contained in vector X , including the state and area dummies, on the probability of a change in the outcome variable over the 2007–2010 period in which the crises were observed.

Second, as the LKHS also collected ordered discrete response variables, we estimate ordered probit equations, built as an extension of equation (1) where X is the same vector of household characteristics described above, but y is now observed having the following values: $y = 0$ if $y_i^* < 0$, i.e. if the outcome variable in year $t-1$ was worse than in year t ; $y = 1$ if $0 < y_i^* < m_1$, i.e. if the outcome variable in year $t-1$ remains equal or unchanged to year t , and $y = 2$ if $m_1 < y_i^* < m_2$, i.e. if the outcome variable in year $t-1$ was better than in year t . The latent variable can be seen as the propensity of households perceiving a change in welfare to be the consequence of the factors in X over the periods in which the food, fuel and financial crises were observed, with μ_s and β_s being the unknown parameters.

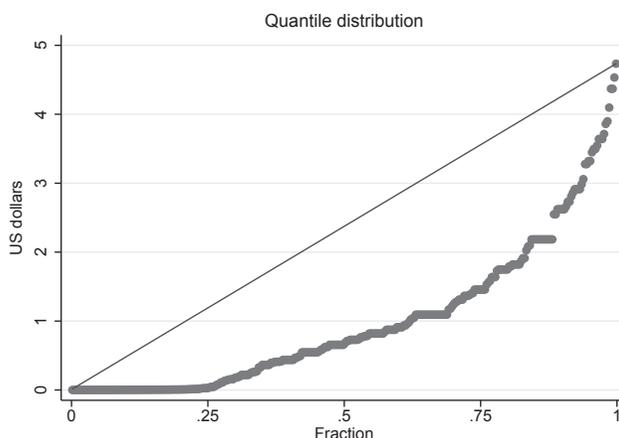
Finally, given that some outcome variables exhibited a censored distribution, taking a maximum value and a lower zero threshold, our third estimation strategy adopts a Tobit model of similar structure as in equation (1), but now $Y_i = \max(0, Y_i^*)$, i.e. $Y_i = Y_i^*$ if $Y_i^* > 0$ for households reporting making welfare-related decisions in times of crisis and $Y_i^* = 0$ if $Y_i^* \leq 0$ otherwise, where the errors, given the information in X , are assumed to be normally distributed.

By adopting a Tobit specification equation, we were able to capture a more precise measure of the determinants of censored outcomes in the periods under which the crises were observed. The Tobit model is based on the assumption that the probability of observing $Y_i > 0$ and $Y_i = 0$ are $\varphi(\cdot)$ and $p(Y_i^* < 0) = \Phi(\cdot)$, respectively, where $\varphi(\cdot)$ and $\Phi(\cdot)$ denote the density function and the cumulative density function of the standard normal. The Tobit model generates three conditional mean functions.⁴ We are particularly interested in examining the observed factors affecting the incidence of the welfare outcomes in the 2007-10 period. In the following subsections we present the empirical results.

5 Analysis

As discussed earlier, the LKHS was conducted in deprived localities of Lagos and Kano and the quantile distribution of per capita income in Figure 2 confirms the level of deprivation among the sample population. Overall, more than two thirds of households lived on less than \$1.25 a day, and the remaining 30% had income levels that place them in a state of vulnerability.

Figure 2: Daily per capital income in US dollars (2010)



Source: The authors' estimations.

4. For further details on the derivation of the conditional mean functions, see Greene (2003).

In order to get a more precise profile of households, we estimated the Foster–Greer–Thorbecke (FGT) poverty measures (Foster et al., 1984) that take the following form

$$FGT = \frac{1}{n} \sum_{j=1}^h \left(\frac{z - y_i}{z} \right)^\alpha \quad (3)$$

where z is the poverty line, n is the number of people in the sample population, h is the number of people with incomes at or below z , y_i are the individuals' reported income and α , the poverty aversion parameter that takes the values $\alpha \geq 0$. For $\alpha = 0$, the FGT becomes the headcount ratio that measures the number of people below the poverty line, that is, the poverty incidence. For $\alpha = 1$, the FGT becomes the poverty gap index, which captures the mean aggregate income shortfall relative to the poverty line across the sample population. The poverty gap index shows the amount of resources needed, in terms of per capita income, to bring the poor to the poverty line. For $\alpha = 2$, the FGT measures the squared poverty gap, which captures the severity of deprivation by taking into account the degree of inequality among the poor. The results are presented in Table 2.

All in all, our estimates show that 70% of the surveyed households were below the World Bank's \$1.25 a day poverty line, using the purchasing power parity conversion factors for 2005, whereas nearly 90% were below the \$2.50 a day poverty line. In terms of regional differences, and focusing on the \$1.25 a day poverty line as reference point, households living in Kano reported a higher headcount index (73%) than those in the Lagos state (65%), although the latter state reveals a higher squared poverty gap than Kano (42% vis-à-vis 37%), which seems to reflect the severity of poverty and inequality in areas of economic affluence in the country.

Table 2: FGT Poverty indices by sample population, state and area

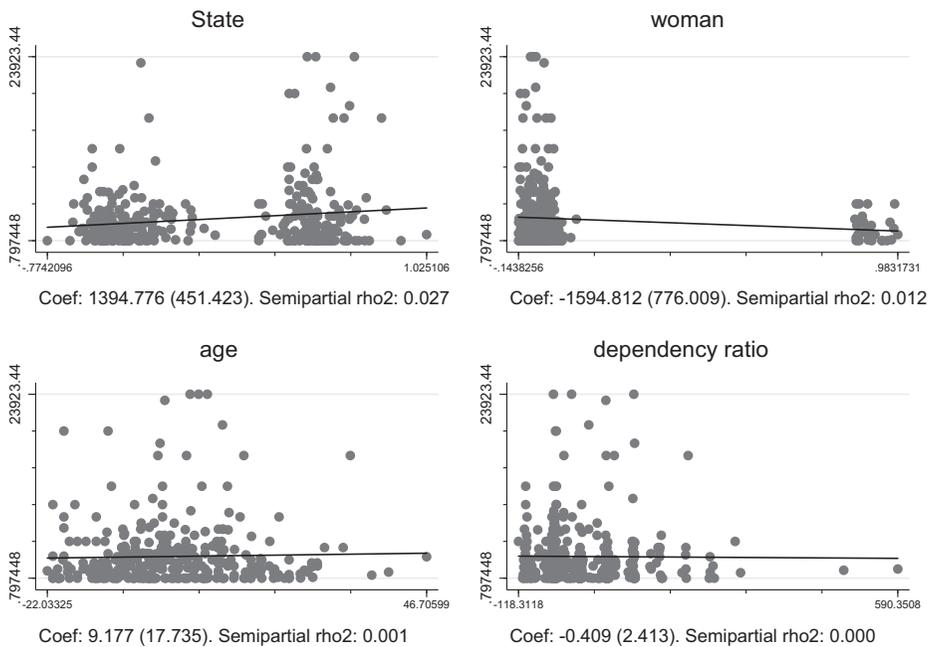
	FGT (1)			FGT (2)		
	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$
Sample population	0.70	0.47	0.39	0.88	0.64	0.53
Kano	0.73	0.47	0.37	0.91	0.66	0.53
Lagos	0.65	0.48	0.42	0.83	0.61	0.52
Rural	0.66	0.41	0.30	0.88	0.61	0.47
Urban	0.74	0.54	0.49	0.87	0.67	0.59

Note: the FGT poverty indices in (1) are derived using the World Bank's \$1.25 a day poverty line, whereas in (2), they are derived using the World Bank's \$2.50 a day.

Source: Lagos-Kano household survey.

In order to estimate the determinants of earning capacity, we regressed the 2010 annual household income in US dollars using a similar specification strategy as derived in equation (1). As we are interested in analyzing households' income differential relative to the effect of specific covariates, we estimate partial regression plots in Figure 3. The slope coefficients suggest that households living in Lagos

Figure 3: Partial regression plots by state



Notes: Dependent variable: Annual income in US dollars (average exchange rate for 2010)

Source: The authors.

have, on average, an annual income (\$1,395, which is approximately \$3.80 a day) higher than the incomes reported by households living in Kano, which is similar in order of magnitude to the income difference between urban and rural areas (\$1,384). Equally important is the fact that households headed by females have on average incomes significantly lower than households headed by men, at approximately \$133 less, and the results are significant at 1% level. This brings out a gender dimension into the issue of extreme poverty and vulnerability in the states and areas under investigation. In the following subsection we discuss the financial and fuel price impacts.

5.1 Financial and fuel price impacts

5.1.1 Financial crisis impacts. As mentioned earlier, the transmission channels through which the global financial crisis displayed its effects on households are convoluted. The effects probably passed through remittances and the labour and credit markets, which in turn affected household incomes. In total value, Nigeria is the leading international remittance-receiving country in sub-Saharan Africa, accounting for 65% of all remittances in the region and 2% of global remittance

flows (Brahmbhatt, 2008). World Bank data shows that international remittance inflows increased from less than 2% in 2003 to more than 5% as a share of GDP in 2007 (World Bank, 2011). The global crisis seems to have reduced the rate of growth of remittances, rather than reduced the inflow. Nevertheless, as remittances represent an important source for consumption smoothing, we expect that a relatively small reduction in cash inflows may impact proportionally more severely on vulnerable households.⁵ We examined the propensity of remittance reception between 2007 and 2010, looking at any potential difference between the locations and areas under investigation; however, we were unable to detect any significant difference.

Another possible transmission channel of the impacts of the financial crisis was through the credit markets. The crisis affected banks' confidence to lend, and that led to increased risk aversion. Higher risk aversion followed the drying up of international credit sources (African Economic Outlook, 2011). Tightened banking conditions also contributed to the stagnation of private sector credit, and state and local government access to credit (Okogu, 2010). Muqtada (2012) pointed out that Nigeria's banking sector was saddled with toxic assets and non-performing loans even before the onset of the financial crisis. The financial crisis created a nearly systemic banking crisis that led to sharp increases in the prime-lending rate from 15–17% in 2007 to 25–28% in 2008. Stricter loan requirements and high borrowing costs adversely affected businesses and informal sector operations, which in turn reduced employment opportunities. Choudhry et al (2010) observed that it is often women and children who bear the brunt of financial crises through the labour market. We return to the issue of child labour in Section 5.4.

5.1.2 Fuel price impacts. Rising world fuel prices had two important effects on Nigeria. The increase in international prices of hydrocarbons was beneficial to the country's balance of payments, as nearly 80% of the government revenues come from crude oil exports. But despite being Africa's biggest oil producer, Nigeria imports more than 80% of its domestic fuel requirements due to a lack of refining capacity, making the country vulnerable to increasing international fuel prices.

The Nigerian government addressed the international fuel price volatility by subsidizing the pump price. However, given the structure of the economy and infrastructural inadequacies, it is not conceivable that the poor and vulnerable significantly benefited from the fuel subsidy. In general, fuel subsidies are an inefficient way of improving household welfare. Corruption and below market prices generated incentives for fuel smuggling to neighbouring countries, which had a knock-on effect on fuel availability and local prices. The LKHS data show that nearly one third of the surveyed households reported pipeline vandalism as the main driver of high fuel price variability (see Figure A1 in the Appendix).

5. The Famine Early Warning System Network estimates that in a normal year remittances, both local and international, account for between 10% and 20% of cash income for poor households (FEWS, 2009).

Adverse domestic conditions seem to have affected the urban poor more disproportionately, as 55% of the urban households reported using kerosene as the main source of cooking fuel. Kerosene is also used in the aviation industry and for adulterating diesel. These competing uses seemed to have pushed the price of kerosene up. This is in contrast with the more extensive use of firewood as the main source of cooking fuel in rural areas (see Table 3). All in all, our analysis suggests that while fuel subsidies had a muted effect in cushioning the impacts of rising fuel costs, local rather than international factors affected the domestic market for fuel.

5.2 Food price increases

We note that it is rather difficult, given our data, to identify the pass-through effects of international food price variability to poor and vulnerable households. However, we argue that rising international food prices, especially of staples, affected local markets and more severely urban households, which are net food consumers. Besides the effect of global food markets, food price increases in Nigeria can also be linked to domestic factors associated with unfavourable weather conditions, including droughts in northern regions of the country, and flooding in the coastal areas of the south. For instance, in September 2007, food prices rose sharply following an early dry season in the northern regions. Across major markets in northern Nigeria, including the Dawanau Market in Kano, retail prices of maize, millet, cowpeas and sorghum were reported to have been significantly higher than in 2006 (USAID, 2007). Food prices remained high following the rise in the price of diesel, which increased the cost of food transportation.

Table 3: Main source of cooking fuel by area, state and local government area

Main source of cooking fuel	Area				State			
	Rural		Urban		Kano		Lagos	
	Freq	Percent	Freq	Percent	Freq	Percent	Freq	Percent
Firewood	85**	(41.67)	20*	(10.87)	84**	(42.42)	21*	(11.05)
Charcoal	46**	(22.55)	55*	(29.89)	68**	(34.34)	33*	(17.37)
Kerosene/Oil	71**	(34.80)	101*	(54.89)	43**	(21.72)	129*	(67.89)
Gas	2**	(0.980)	7*	(3.804)	2**	(1.010)	7*	(3.684)
Other			1*	(0.543)	1**	(0.505)		
Total	204		184		198		190	

Note: The statistically significant association in the cross-tabulations are indicated by the Chi-square values for the cell as a whole at 1% (***) ; 0.05 (**); and 10% (*) levels of significance.

In coastal areas, including Lagos, food insecurity increased due to the effects of severe floods that occurred in 2009. The mobility of food traders was constrained by bad roads conditions, which drove food prices up. In the same areas, prices of maize and yam, the preferred substitutes for other staples such as

rice, increased. By contrast, in northern states such as Kano, access to food was made easier by the combination of good food stocks (especially maize) and stable prices (see Figure 4).

Although average food prices at national level did not experience extreme variability in the period under examination, food prices of items such as maize, sorghum, yam, garri and rice had steady rising trends that may have affected food security given low price elasticities of demand for these products. And because price increases across these staples seem to follow similar patterns, the effect of cross-price elasticities may have reduced the ability of the poor and vulnerable to effectively substitute for food products.

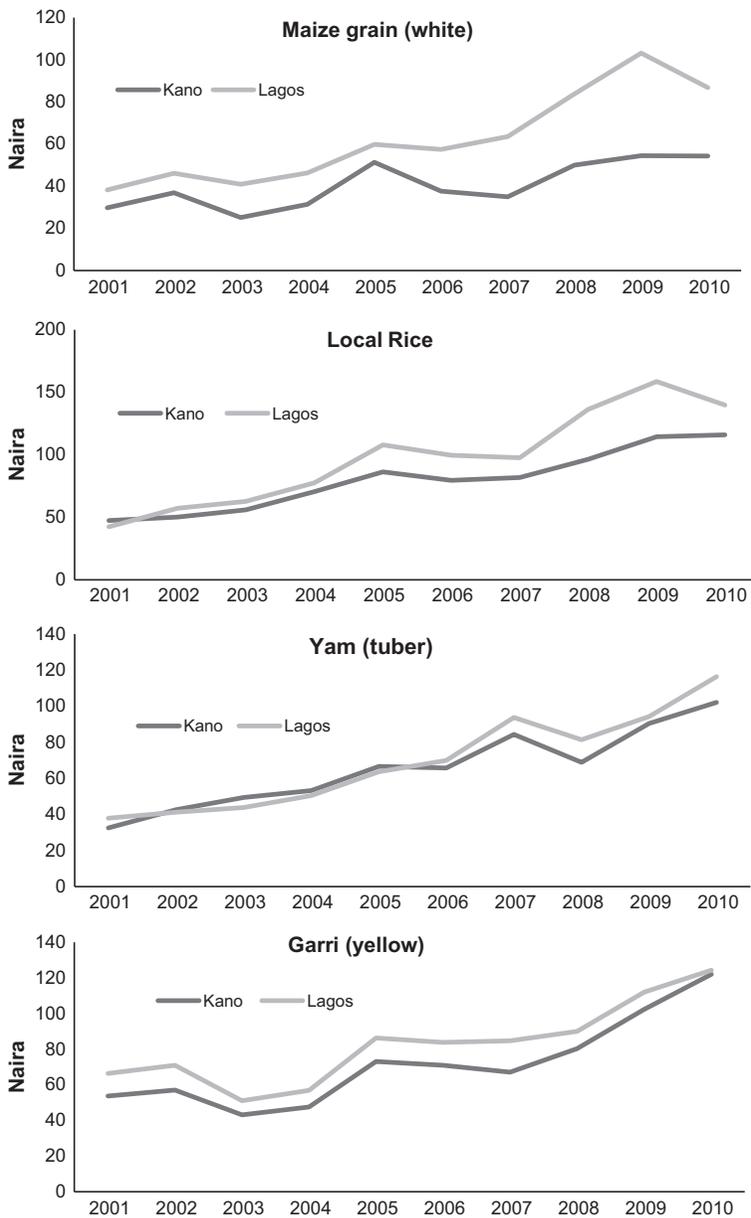
The LKHS collected retrospective information on the perceived increases in food prices, and the year the households recalled such increases. An initial examination of the data shows that in Kano, for example, nearly 16% of households reported to have experienced a significant food price increase during 2007 versus 9% in Lagos, and that may reflect the effect of unfavourable weather conditions experienced in the region. By contrast, nearly 40% of households in Lagos reported to have suffered from higher food prices during 2008 compared to only 8% of households in Kano, a fact that appears to be connected to the rise in food prices, as Lagos heavily relies on food imports.

In order to estimate the probabilities of households having experienced food price increases, we estimated two probit models conditional on a vector of household characteristics. Table 4 presents the results from the two models derived in Section 4.⁶ From Model I, we find a 45% higher chance that a household in Lagos experienced food price increases compared to a household living in Kano over the pooled sample across the period 2006–2010. There is also a 0.6% chance that households headed by older members suffered more from the price increases. Increasing prices reduced household disposable incomes, thus potentially reducing households' well-being.

In the second model, we control for the location of the household – whether it is in an urban or rural environment. The model shows a more significant relationship between age of head of household and the probability of experiencing rising food prices. Again urban households, which are primarily net food consumers, experienced higher risk of food price increases than rural households. This comes as no surprise given that rural households are net food producers, and hence rely less on food markets for consumption. Our findings are also consistent with domestic price trends of staples reported by the National Bureau of Statistics (see Figure 4).

6. As a result of problems with data collection, there were several missing observations on the experiences of food price variability. Therefore, as a robustness check we follow Allison (2001) and compare the predicted probabilities between respondents and non-respondents while controlling for effect of the covariates. The results are presented in Table 3, columns 3 and 4. Overall, there are no significant differences in the two subsamples when looking at the experiences of food price increases, particularly across states and locations. So, while the interpretation of the size effect should be taken with caution, the direction and statistical significant strongly support the proposition that Lagos and urban areas were more severely affected by food price hikes.

Figure 4: Average annual prices of key staples by locality (prices in Naira per kilo)



Source: The authors' calculations based on data from the National Bureau of Statistics.

Given the adverse effects of food price increases, we identify strategies adopted by vulnerable households to cope with food price variability. Correlation analysis (presented in Table A1 in the Appendix) indicates that residents of Lagos were more likely to shift consumption to substitute goods that were cheaper. They also adopted radical measures like reducing food consumption, especially among mothers and children. They resorted to consumption smoothing, and also worked longer hours to compensate for income lost through price increases. Residents of Kano relied more on dissaving and borrowing to cope with rising food prices. Households also resorted to withdrawing their children from school, either because they could not afford the school fees, or because they wanted the children to assist with mobilizing financial resources for the upkeep of the family, leading to an increase in the incidence of child labour. Although these strategies are generally short-term, they often have long-term implications for household welfare. In the following sections, we focus on school dropouts and child labour as relevant welfare dimensions.

Table 4: Probability of experiencing a food price increase

Independent variables	Probit I (mfx)	Probit II (mfx)	Probit I ^a (mfx)	Probit II ^a (mfx)
State	0.445*** (0.0645)		0.181*** (0.0519)	
Woman	-0.0682 (0.142)	0.00712 (0.140)	0.118 (0.0885)	0.135 (0.0890)
Depenratio	0.000525 (0.000331)	0.0000804 (0.000330)	-0.00105*** (0.000315)	-0.00114*** (0.000319)
Age	0.00585* (0.00316)	0.00636** (0.00313)	0.00100 (0.00210)	0.00186 (0.00216)
Area		0.149** (0.0737)		0.192*** (0.0514)
Observations	215	215	392	392
Pseudo R-squared	0.140	0.0230	0.0628	0.0658

Notes: Robust standard errors in parentheses; *significant at 10%; **significant at 5%; ***significant at 1%. a/ probit model on non-respondents

Source: The authors.

5.3 School dropouts

The rationale for examining the relationship between food price variability and school dropouts comes from evidence showing a strong relationship between poor academic and cognitive performance and food insecurity, which in turn impact on people's future labour productivity and income (see Glewwe and King, 2001; Glewwe et al., 2009).⁷ Early school dropouts impose constraints on children as they are unable to adapt to changing economic circumstances, or to effectively use their knowledge and skills to exploit future social arrangements and income opportunities (Becker, 1993).

7. For a systematic review on the effectiveness of education policies on school performance see Masino and Niño-Zarazúa (2016)

The LKHS collected information about school dropouts, the year of occurrence as well as the reasons that led to deterioration in school performance and, ultimately, dropping out. An initial examination of the data (presented in Table A2 in the Appendix) reveals a significant jump in the reported incidence of school dropouts during 2008, which coincides with the global financial crisis. Our results are also consistent with the declining trends in the net enrolment rates for primary education that fell from 67% in 2006 to 57% in 2008 (World Bank, 2013). We also find a significant correlation at the 5% level, in the higher rates of school dropouts in Lagos relative to the rates observed in Kano. Strikingly, the correlations suggest that the rate of school dropouts is more severe in rural areas of Lagos and Kano, and that the pattern may also be capturing attitudes toward schooling in rural communities of Nigeria. These correlations, however, do not provide more precise information on the determinants of school dropouts.

In order to estimate the propensity of dropping out of school by year of occurrence, we estimate a probit model similar to the one derived in Section 4, where the dependent variable y takes the value $y=1$ if a child stops going to school before completing the grade, and $y=0$ otherwise. We include the same vector of household characteristics, X , but now we include a dummy variable 'girl', in substitution of 'women', to control for the effects of being a girl on the probability of dropping out of school. The marginal effects of the slope coefficients are presented in Table 5.

After controlling for the effect of covariates, the results become statistically insignificant for most variables, with one exception: being a girl increases the probability of dropping out of school early. In 2006 and 2007, a girl living in Lagos faced, on average, a 2% higher probability of dropping out of school than a boy living in the same locality. By 2008, the odds of a girl dropping out of school had increased to about 10% and the strength of the correlation is significant at the 1% level. A similar pattern is also found among girls living in urban areas. The evidence suggests that there is a connection between the increasing likelihood of dropping out of school and aggregate shocks, particularly given the jump of the coefficient in 2008. However, given the possibility of lag effects arising from the food price variability of 2007, it is infeasible to separate the two effects. Figure A2 in the Appendix also shows that more than half of those children who reported a decline in school performance (which ultimately led to school dropouts) were less able to concentrate, were more tired and had less time for studying. The former two causes are linked to the issue of food insecurity, whereas the latter reflects the prevalence of child labour. We discuss the issue of child labour in the next section. Overall, the results show that covariate shocks seem to exacerbate the prevailing gender inequalities in the country, which in turn limit girls' prospects for future labour market opportunities.

5.4 Child labour

Child labour, in its various forms, is often associated with poverty, household composition, social norms and labour market conditions (Grootaert and Kanbur,

**Table 5: Predicted probabilities of school dropouts by year (marginal effects)
Dependent variable: reported year of school dropout**

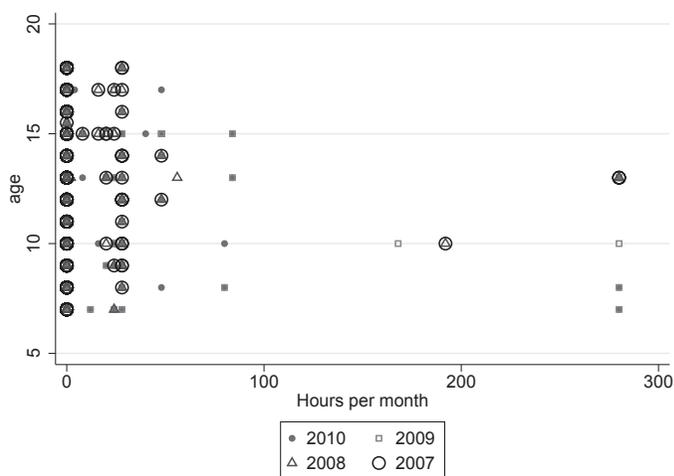
Year of school dropout	Independent variables	Ordered probit I (mfx)	Ordered probit II	Year of school dropout	Independent variables	Ordered probit I (mfx)	Ordered probit II (mfx)
None	State	0.0101 (0.0259)		2008	State	-0.00520 (0.0133)	
	Girl	-0.204*** (0.0554)	-0.200*** (0.0550)		Girl	0.103*** (0.0367)	0.101*** (0.0362)
	Depenratio	-0.000114 (0.000102)	-0.000121 (0.000101)		Depenratio	5.92e-05 (5.08e-05)	6.23e-05 (4.91e-05)
	Area		0.00381 (0.0260)		Area		-0.00197 (0.0135)
< 2006	State	-0.00168 (0.00442)		2009	State	-0.000598 (0.00161)	
	Girl	0.0250** (0.0117)	0.0247** (0.0116)		Girl	0.0155 (0.0104)	0.0150 (0.0103)
	Depenratio	1.92e-05 (2.05e-05)	2.02e-05 (2.05e-05)		Depenratio	6.79e-06 (7.06e-06)	7.13e-06 (7.41e-06)
	Area		-0.000639 (0.00441)		Area		-0.000225 (0.00149)
2007	State	-0.00150 (0.00371)		2010	State	-0.00108 (0.00305)	
	Girl	0.0240** (0.0105)	0.0237** (0.0106)		Girl	0.0367** (0.0170)	0.0359** (0.0162)
	Depenratio	1.71e-05 (1.79e-05)	1.80e-05 (1.77e-05)		Depenratio	1.23e-05 (1.26e-05)	1.31e-05 (1.34e-05)
	Area		-0.000569 (0.00384)		Area		-0.000413 (0.00279)
	Observations	427	427		Observations	427	427

Notes: Robust standard errors in parentheses; *significant at 10%; **significant at 5%; ***significant at 1%. The 'state' variable is dummy with a value Lagos=1 and Kano=0; 'girl' is a dummy with value 1 if girl aged <18 and zero if boy; 'depenratio' measures the dependency ratio; age measures the age of the household head, and 'area' is a dummy with a value urban=1 and rural=0. Model I: Equation with state as explanatory variable. Model II: Equation with area as explanatory variable.
Source: The author.

1995). In environments of aggregate vulnerabilities, and where substitution effects exist between parents' and children's time use, child labour becomes an important source of income. Patrinos and Psacharopoulos (1997) have pointed out that the mutual conflict between schooling and child labour may not necessarily be so if child labour does not act as a substitute for children's time in school. Other studies have also pointed out that child labour often facilitates children's school progression, as it lifts households' budgetary constraints (Weiner, 1991; Maharatna, 1997; Grootaert, 1998). Thus, our concern has more to do with the intensity of child labour and its harmful forms than with its prevalence.

In Figure 5, we plot the number of hours that children worked during the period 2007–2010 relative to their age. The scatter plot shows that the incidence of child labour during 2007 and 2008 began at the age of six, with these frequencies showing a low intensity of labour in terms of hours worked relative to children of similar age during

Figure 5: Intensity of child labour by age and reported year



Source: The authors.

2009 and 2010. The small hollow squares on the lower right-hand side of the scattergram show children under the age of ten being engaged in full-time productive activities during the period 2009–2010. This is in line with previous qualitative enquiries that report young children being involved in farming and hawking activities in Nigeria (Samuels et al., 2011). Nevertheless, it is important to highlight that most children reported to be working at the time the survey was conducted, worked part-time, for between 30 and 50 hours per month. Although illustrative, Figure 5 provides limited information about the factors that determine child labour. More specifically, we do not know whether the determinants of child labour changed over the periods under which the food, fuel and financial crises became apparent.

Given the censored distribution of the number of hours that children worked during the 2007–2010 period, which takes a maximum value and a lower threshold of zero, we decided to estimate a Tobit model as derived in Section 4, but now $Y_i = \max(0, Y^*)$, i.e. $Y = Y^*$ if $Y^* > 0$ for children engaged in labour activities, $Y^* = 0$ if $Y^* \leq 0$ for children who are not engaged in productive activities, with the standard errors following a normal distribution. By adopting a Tobit equation, we can capture a more precise measure of the determinants of child labour in the periods under examination. The Tobit model generates three conditional mean functions. We are particularly interested in examining the observed factors affecting the incidence of child labour in the 2007–2010 period. The results from the Tobit equations are presented in Tables 6a and 6b.

Overall, the results show that, other things holding constant, age and the dependency ratio are positively correlated with the propensity of child labour. Both results are consistent with our priors and statistically significant at the 1% level. First, the intensity of child labour increases as children get older and become able to generate income for the family. Second, higher dependency ratios seem to impose greater liquidity requirements on households to satisfy their consumption needs, and as the budgetary constraints increase during crisis times, so do the incentives for parents to use older children's time to generate income. The results also show that children living in Lagos have, on average, a lower propensity to work relative to children living in Kano. The results are consistent over the period under examination and statistically significant at the 1% level. While the phenomenon of child labour predates the crises, we observe in Table 6a a moderate variation in the number of hours worked, from 102 hours per month in 2007 to 98 hours in 2008, to then increase to 106 hours per month in 2009 in the aftermath of the financial crisis.

In Table 6b, we estimate a Tobit equation using logarithmic functions of the number of hours worked per month, which, by taking the antilog of the slope coefficients, allows us to calculate the percentage change in the propensity of child labour. The results from 2007 suggest that the *median* of the propensity of child labour in Lagos was lower than the one observed in Kano by approximately 99.4% (i.e. $e^{-5.138} = -0.994$). The higher incidence of child labour in Kano during 2009 coincides with a sharp increase in food prices, following the unfavourable weather conditions registered that year. Equation Tobit II, which includes an urban–rural dummy variable, also suggests that the higher propensity of child labour observed during 2007 can indeed be associated with the rural context. This suggests that food price variability may have pushed families to embark on drastic coping mechanisms, including child labour, in an effort to ease the negative income effect from the food price increase.

6 Conclusion

This study has examined the impacts of the food, fuel and financial crises on poor and vulnerable households in the Nigerian states of Kano and Lagos using retrospective household-level data. Our results indicate that aggregate shocks have adverse effects on household consumption, and schooling and child labour decisions. We also find a degree of impact heterogeneity between northern and southern

Table 6a: Incidence of child labour by year (dependent variable: number of hours worked per month)

Independent variables	Tobit I					Tobit II				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
State	-102.2*** (38.58)	-98.20*** (34.17)	-106.7*** (34.12)	-91.44*** (26.02)						
Area						-121.4*** (45.28)	-116.8*** (40.54)	-74.55** (30.14)	-30.34 (20.97)	
Girl	22.96 (24.97)	14.82 (21.59)	12.73 (21.67)	-9.929 (17.50)		17.65 (24.49)	10.06 (21.23)	9.048 (21.27)	-12.48 (17.62)	
Depenratio	0.342*** (0.105)	0.364*** (0.0897)	0.438*** (0.0885)	0.307*** (0.0708)		0.337*** (0.104)	0.359*** (0.0885)	0.447*** (0.0892)	0.344*** (0.0737)	
Age	13.60*** (3.495)	12.76*** (3.015)	12.33*** (2.797)	9.008*** (2.087)		12.68*** (3.413)	11.92*** (2.945)	11.66*** (2.758)	8.555*** (2.095)	
Constant	-430.2*** (78.76)	-389.5*** (66.02)	-393.7*** (60.37)	-289.3*** (42.46)		-413.9*** (76.92)	-375.1*** (64.53)	-392.4*** (60.74)	-306.4*** (44.86)	
Observations	779	779	779	779		779	779	779	779	

Robust standard errors in parentheses. *significant at 10%; **significant at 5%; ***significant at 1%. The 'state' variable is dummy with a value Lagos=1 and Kano=0; 'woman' is a dummy with value woman=1, man=0; 'depenratio' measures the dependency ratio; age measures the age of the household head, and 'area' is a dummy with a value urban=1 and rural=0. Model I with *state* as explanatory variable. Model II with *area* as explanatory variable. Source: The authors.

Table 6b: Incidence of child labour (dependent variable: logarithm of the number of hours worked per month)

Independent variables	Tobit I					Tobit II						
	2007	2008	2009	2010	2007	2008	2009	2010	2007	2008	2009	2010
State	-5.138*** (1.817)	-5.067*** (1.642)	-5.000*** (1.502)	-4.468*** (1.239)								
Area					-5.759*** (2.112)	-5.681*** (1.925)	-3.272** (1.321)	-1.553 (1.010)				
Girl	0.877 (1.151)	0.479 (1.013)	0.597 (0.934)	-0.465 (0.830)	0.618 (1.142)	0.238 (1.009)	0.434 (0.936)	-0.595 (0.847)				
Depenratio	0.0162*** (0.00493)	0.0181*** (0.00432)	0.0195*** (0.00392)	0.0153*** (0.00343)	0.0163*** (0.00493)	0.0182*** (0.00432)	0.0204*** (0.00405)	0.0173*** (0.00362)				
Age	0.696*** (0.168)	0.672*** (0.148)	0.575*** (0.124)	0.467*** (0.101)	0.659*** (0.166)	0.637*** (0.146)	0.552*** (0.125)	0.447*** (0.103)				
Constant	-20.41*** (3.852)	-18.95*** (3.290)	-17.36*** (2.754)	-14.08*** (2.129)	-19.96*** (3.818)	-18.56*** (3.265)	-17.71*** (2.837)	-15.06*** (2.274)				
Observations	779	779	779	779	779	779	779	779				

Note: see Table 6a.
Source: The authors.

regions and urban and rural areas of the country. The analysis indicates that food price variability had a severe impact on the urban and vulnerable poor. It is important to point out that the food price variability observed in the areas under study had as much (if not more) to do with local domestic factors associated with erratic weather conditions and poor transport infrastructure, as with variations in international food prices.

The analysis also finds that, in general, poor households responded to the crises in various ways, including withdrawing children from school, especially girls, shifting consumption to cheap substitutes and engaging their children in child labour. These decisions were found to vary according to regional and rural–urban environments.

Early school dropouts and the active engagement of children in labour activities, particularly in rural areas, are sources of concern that impose constraints on children's future well-being prospects. These decisions can also potentially lock children in a low economic equilibrium or poverty trap. The fact that gender bias in terms of educational opportunities is pervasive – with covariate shocks exacerbating the prevailing gender inequalities – underscores the need for policy responses that, while addressing the effects of covariate risks more generally, can also deal with important sources of inequalities.

first submitted September 2015

final revision accepted November 2015

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Table A1. Correlations of various forms of coping strategies to deal with the food price increase.

Table A2. Year of school dropout (all children).

Figure A1. Perceived factors for the fuel price increase.

Figure A2. Causes for a deterioration in school performance.

References

- African Economic Outlook (2011) African Development Bank, Organisation for Economic Co-operation and Development, United Nations Development Programme, United Nations Economic Commission for Africa (2011) African Economic Outlook. Special Theme: Africa and its Emerging Partners. Available at: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Media_Embargoed_Content/EN-AEO_2011_embargo%20%20Jun.pdf
- Allison, P. (2001) *Missing Data*. Sage University Paper 136. Series: *Quantitative Application in the Social Sciences*. Thousand Oaks, CA: Sage

- Baffes, J. (2007) 'Oil Spills on Other Commodities', *Resources Policy* 32(3): 126–34.
- Baker, J. L. (2008) *Impacts of Financial, Food, and Fuel Crisis on the Urban Poor*. Washington, DC: World Bank, Urban Development Unit.
- Battistin, E., Miniaci, R. and Weber, G. (2003) 'What Do We Learn from Recall Consumption Data?', *Journal of Human Resources* 38(2): 365–85.
- Baulch, B. and Masset, E. (2003) 'Do Monetary and Nonmonetary Indicators Tell the Same Story About Chronic Poverty? A Study of Vietnam in the 1990s', *World Development* 31(3): 441–53.
- Becker, G. S. (1993) *Human Capital: A Theoretical and empirical analysis, with special reference to education*, 3rd edn. Chicago, IL: University of Chicago Press.
- Brahmbhatt, M. (2008) *Weathering the Storm: Economic policy responses to the financial crisis*. Washington, DC: World Bank.
- Campello, M., Graham, J. and Harvey, C. (2009) *The Real Effects of Financial Constraints: Evidence from a financial crisis. Working Paper 15552*. Cambridge, MA: National Bureau of Economic Research.
- Choudhry, M.T, Marelli, E. and Signorelli, M. (2010) 'Financial crises and labour market performance'. Paper presented at the 69th International Atlantic Economic Conference, Prague, Czech Republic (24–27 March).
- Chen, S. and Ravallion, M. (2009) 'The Impact of the Global Financial Crisis on the World's Poorest'. VOX, Portal of the Centre for Economic Policy Research (<http://voxeu.org/article/impact-global-financial-crisis-world-s-poorest>). Accessed 29 July 2011.
- Chen, X.; Huang, H.; Khanna, M., and Onal, H. (2011). 'Meeting the Mandate for Biofuels: Implications for Land Use, Food and Fuel Prices', in Graff Zivin and Perloff (eds) *The Intended and Unintended Effects of U.S. Agricultural and Biotechnology Policies*, Chicago, IL: University of Chicago Press
- DFID (2012) *Gender in Nigeria Report: Improving the lives of girls and women in Nigeria – issues, policies, action*, 2nd edn. Abuja: British Council Nigeria.
- Diao, X., Headey, D. and Johnson, M. (2008) 'Toward a Green Revolution in Africa: What would it achieve, and what would it require?', *Agricultural Economics* 39(s1): 539–50.
- Famine Early Warning Systems Network (2009) *Nigeria Food Security Outlook. July to December 2009*. Washington, DC: FEWS Net.
- FAO (2011) *Addressing High Food Prices: A synthesis report of FAO policy consultations at regional and sub-regional level*. Rome: Food and Agriculture Organization of the United Nations.
- Foster, J., Green, J. and Thorbecke, E. (1984) 'A Class of Decomposable Poverty Measures', *Econometrica* 52(3): 761–66.
- Gibson, J. (2002) 'Why Does the Engel Method Work? Food demand, economics of size and household survey methods', *Oxford Bulletin of Economics and Statistics* 64(4): 341–59.
- Gibson, J. and Kim, B. (2010) 'Non-Classical Measurement Error in Long-Term Retrospective Recall Surveys', *Oxford Bulletin of Economics and Statistics* 72(5): 687–95.
- Gibson, J. and Kim, B. (2007) 'Measurement Error in Recall Surveys and the Relationship between Household Size and Food Demand', *American Journal of Agricultural Economics* 89(2): 473–89.

- Glewwe, P. and King, E. M. (2001) 'The Impact of Early Childhood Nutritional Status on Cognitive Development: Does the timing of malnutrition matter?', *The World Bank Economic Review* 15(1): 81–113.
- Glewwe, P., Kremer, M. and Moulin, S. (2009) 'Many Children Left Behind? Textbooks and test scores in Kenya', *American Economic Journal: Applied Economics* 1(1): 112–35.
- Greene, W. (2003). *Interpreting Estimated Parameters and Measuring Individual Heterogeneity in Random Coefficient Models*. Working Paper 03-19. New York, NY: New York University, Leonard N. Stern School of Business, Department of Economics.
- Grootaert, C. (1998) 'Child Labor in Côte d'Ivoire: Incidence and determinants', in C. Grootaert and H. A. Patrinos (eds), *The Policy Analysis of Child Labor: A comparative study*. New York, NY: St. Martin's Press.
- Grootaert, C. and Kanbur, R. (1995) 'Child Labour: An economic perspective', *International Labour Review* 134(2): 187–203.
- Hulme, D. and Shepherd, A. (2003) 'Conceptualizing Chronic Poverty', *World Development* 31(3): 403–23.
- IFPRI (2008). 'High Food Prices: "The what, who, and how of proposed policy actions"'. Policy Brief. Washington, DC: International Food Policy Research Institute.
- IISD (2012) *A Citizen's Guide to Energy Subsidies in Nigeria*. Manitoba: International Institute for Sustainable Development Global Studies Initiative.
- IMF (2008) *Food and Fuel Prices – Recent developments, macroeconomic impact, and policy responses*. Washington, DC: International Monetary Fund.
- Maharatna, A. (1997) 'Children's Work Activities, Surplus Labor and Fertility: Case study of six villages', *Birbhum Economic and Political Weekly* 32(7): 363–69.
- Masino, S. and Niño-Zarazúa, M. (2016) 'What Works to Improve the Quality of Student Learning in Developing Countries', *International Journal of Educational Development* 48: 53–65.
- Muqtada, M. (2012) *Global Jobs Pact Scan: Nigeria*. Geneva: International Labour Organization.
- Nakata, H., Sawada, Y. and Tanaka, M. (2009). 'Asking Retrospective Questions in Household Surveys: Evidence from Vietnam'. Discussion Paper Series 10-E-008. Tokyo: RIETI.
- National Bureau of Statistics (2009) Gross Domestic Product for Nigeria. Revised 2008 and Q1, Q2 and Q3 2009. Abuja: the Presidency of the Federal Republic of Nigeria.
- Okogu, B. (2010) *The 2010 Budget and the Macroeconomy: A presentation at the Nigerian Economic Society Seminar on the 2010 Budget*. Abuja: Budget Office of the Federation
- Olomola, A.S. (2013). *The Political Economy of Food Price Policy in Nigeria*. Working Paper 2013/016. Helsinki: UNU-WIDER.
- Patrinos, H. A. and Psacharopoulos, G. (1997) 'Child Labor versus Educational Attainment: Some evidence from Latin America', *Journal of Population Economics* 10(4): 377–86.

- Samuels, F.; Gavrilovic, M.; Harper, C. and Niño-Zarazúa, M. (2011) 'Food, Finance and Fuel: The impacts of the triple F crisis in Nigeria, with a particular focus on women and children'. ODI Background Note, October. London: Overseas Development Institute.
- UNDP (2009) *Human Development Report Nigeria 2008-2009. Achieving Growth with Equity*. Abuja: United Nations Development Programme.
- USAID (2007) *Preliminary Livelihoods Zoning: Northern Nigeria. A Special Report by the Famine Early Warning Systems Network*. Washington, DC: US Agency for International Development Famine Early Warning Systems Network.
- von Urff, W. (2007) 'Biofuels – A new chance for agriculture or a threat to food security', *Quarterly Journal of International Agriculture* 46(2): 99–104.
- Weiner, M. (1991) *The Child and the State in India: Child Labor and educational policy in comparative perspective*. Princeton, NJ: Princeton University Press.
- World Bank (2013) *World Development Indicators 2013*. Washington, DC: International Bank for Reconstruction Development/World Bank.
- World Bank (2011) *Migration and Remittances Fact Book 2011, 2nd Edition*. Washington, DC: International Bank for Reconstruction and Development/World Bank.