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# **COVID-19 SHOCK, SOCIAL PROTECTION, AND FOOD INSECURITY IN NIGERIA**

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## **Abstract**

We seek to understand the effect of COVID-19 and assess the effects of social protection in mitigating the effects of the COVID-19 shock on household food insecurity status. We employed the World Bank Living Standard Measurement Survey for Nigeria, focusing on the dataset collected before the COVID-19 shock and during the post-COVID-19 phone survey. We employed a difference-in-differences method and used all the individual measures of food insecurity. We also explored the heterogeneous effects of social protection across the gender of the recipient, household location, and wealth status. Our results show that food insecurity is greater in all households after the pandemic shock. We found that social protection is effective at mitigating the effects of the pandemic and that the effect is greater for cash assistance. The mitigating effect is greater among female-headed households, poor households, those in rural areas, and those involved in farming. The findings of this study highlight the necessity of having a well-organized social protection programme. In particular, policies aimed at promoting cash assistance among female-headed households, poor individuals, those in rural areas, and those involved in farming can have important implications for improving the food security of households in Nigeria.

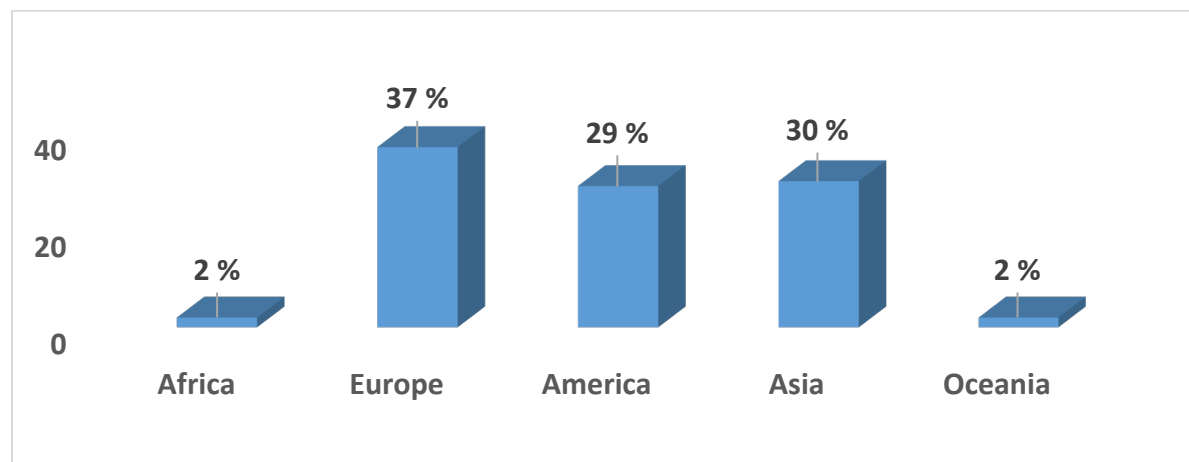
**Keywords:** COVID-19, food insecurity, social protection, Nigeria

**J.E.L codes:** I30, I38, O10, Q18

## **1. Introduction**

Emerging from China in December 2019, coronavirus disease affected 222 countries and territories worldwide. On 30<sup>th</sup> January 2020, it was declared a public health emergency of international concern and a global pandemic by the World Health Organization (WHO) on 11<sup>th</sup> March 2020 (World Food Programme (WFP), 2020; Chabossou et al., 2021). Several studies (AfDB, 2020; World Bank, 2020; Evans 2020; Nonvide, 2020a, b; Laborde et al. 2020; Valensisi, 2020; Chabossou et al. 2021) have shown that the impact of this pandemic will be intense both in the health and economic sectors. Countries with poor healthcare systems, heavy dependence on commodity exports, international trade and tourism, and high dependence on volatile international financial flows and high debt burdens are the most affected (AfDB, 2020; Chabossou et al., 2021). Globally, in 2020, the COVID-19 pandemic pushed 49 million people into extreme poverty; more than 45% of these new poor people were in sub-Saharan Africa (SSA), suggesting that this part of the world will be more affected (World Bank, 2020; Amare et al., 2021). Before the crisis, 135 million people were facing acute food insecurity, and this number almost doubled because of the income and remittance loss effects of the COVID-19 pandemic and the disruption of food systems (World Food Programme (WFP), 2020).

As of August 12, 2022, there were approximately 593.5 million cases of COVID-19 infection worldwide, with 6,449,147 deaths. In terms of country, the United States (USA) is the most affected, with more than 94.5 million confirmed cases, followed by India, France, Brazil, Germany, the United Kingdom, Italy, South Korea, Russia, and Turkey. Europe is the most affected continent, with 37% of the total confirmed cases occurring worldwide, followed by Asia (32%) and North America (29%) (see Fig. 1). Africa and Oceania were the least affected continents, with 2% of the total confirmed cases.



**Fig. 1. Distribution of COVID-19 cases by continent.**

**Source:** Retrieved from <https://www.worldometers.info/coronavirus/#countries>

The COVID-19 pandemic has stressed the interconnection between public health, food security, poverty, and social protection worldwide, especially in Africa. The case of Nigeria is very interesting for several reasons. First, Nigeria relies heavily on international markets; therefore, disruptions in these markets would severely affect food security conditions in the country. Second, before the COVID-19 crisis, countries experienced high rates of food insecurity and poverty, as more than 40% (approximately 83 million) of the population were poor (Amare et al., 2021). Therefore, the current COVID-19 crisis worsened the food insecurity situation in the country. To mitigate this impact, Nigeria, like many countries in the world, is following the recommendation of the WHO concerning physical distancing measures, hand washing, and wearing face coverings. In addition, the Nigerian government implemented strict measures, including travel restrictions, school closures, home-based work, and restrictions on social and economic activities, to conceal the spread of this virus.

The application of these measures has threatened the livelihoods of millions of people. In terms of macroeconomic analysis, Andam et al. (2020) showed that during lockdown periods, Nigeria's economy experienced an approximately 34.1% loss in GDP, equivalent to USD 16 billion. Approximately two-thirds (33%) of the losses come from the service sector. The agricultural sector, which is the main source of livelihood for most Nigerians, suffered a production loss of 13.1% (USD 1.2 billion). The poverty headcount rate has also increased by 14%, equivalent to 27 million new poor people during the lockdown. From a microeconomic perspective, Andam et al. (2020) estimated, on average, a 33 percent decrease in household income, with the heaviest losses occurring among rural nonfarming and urban households. In the same vein, Balana et al. (2020) showed that COVID-19 has dramatically worsened the food security situation of numerous households in Nigeria, especially the poorest households. In their study, they showed that due to the COVID-19 pandemic and state restriction measures, more than 80 percent of respondents feared that they would not have enough food, and 77 percent ate less food than they thought. Similar results were also found by Amare et al. (2021); however, they indicated that the effects depend on the type of economic activity and household. For example, they found that lockdown measures in Nigeria have amplified households' experience of food insecurity by 12 percentage points while reducing the likelihood of participation in nonfarm activities by 13 percentage points. However, the effect is smaller for wage-related and farming activities. Households with school-aged children, poorer households, those relying on nonfarm activities, and those living in remote and conflicted areas have experienced more deterioration in food security status.

Although numerous studies (Abay et al., 2021a; Amare et al., 2021; Andam et al., 2020; Balana et al., 2020; Akim et al., 2021; Martinez, 2021; Balana et al., 2023; Akim et al., 2024) have analysed the impact of COVID-19 and related measures on food security in Nigeria, the role of social protection measures has not yet been sufficiently analysed. The exception is the study by Egbetokun et al. (2021). However, by estimating a panel logit model, the study by Egbetokun et al. (2021) fails to quantify the real impact of social protection measures in mitigating the impact of COVID-19 on household welfare in Nigeria. Indeed, in times of crisis such as the COVID-19 pandemic, social protection acts as a stabilizer by helping to maintain a minimum level of purchasing power and therefore preventing demand from dropping sharply. It helps to maintain household consumption such that people can overcome the risk of poverty and social exclusion.

Our study adds knowledge to the literature in several ways. First, it contributes to the growing literature attempting to analyse the economic impact of COVID-19 in Africa, especially in Nigeria. Second, there is still very little formal analysis on how social protection helps to mitigate the negative impact of COVID-19. Therefore, our study helps to fill this gap by analysing the effectiveness of the social protection measures implemented in response to the COVID-19 shock. Third, in terms of methodology, the study employed a rigorous method of analysis, a difference-in-differences (DiD) approach. As pre-pandemic data are available, the DiD approach helps to investigate whether food insecurity in a household would have evolved in tandem in the absence of social protection. Given that it is well understood that some households may not be able to capitalize on social protection measures, we also analysed the distributional effects of social protection across the gender of the recipient, household location, and wealth status. A disaggregated analysis allows us to identify who benefits more from social protection measures. Fourth, the results of this study are important for formulating social protection-related policies for vulnerable households to moderate the negative effects of COVID-19 on food insecurity.

## **2. Research Questions and Objectives**

In this section, we highlight the specific research questions and objectives we address.

### **2.1. Research Questions**

The study provides answers to the following research questions.

- What are the effects of the COVID-19 shock on household food insecurity status?
- Does access to social protection help moderate the effect of the COVID-19 shock on the food insecurity status of households?
- What are the heterogeneous effects of social protection on mitigating the effect of the COVID-19 shock on household food insecurity status? That is,
  - Does food assistance have the greatest impact on mitigating the shock caused by COVID-19 on household food insecurity status compared to cash transfers?
  - Are urban households better able to moderate the impact of COVID-19 shocks using social protection than rural households?
  - Does the gender of household members with access to social protection determine the mitigating impact of social protection on household food insecurity status?

## **2.2. Objectives**

The general objective is to assess the effect of COVID-19 shocks on the food insecurity status of households in Nigeria.

The specific objectives are as follows:

- determine the effect of the COVID-19 shock on the food insecurity status of Nigerian households;
- assess the effect of social protection on mitigating the effect of the COVID-19 shock on household food insecurity status; and
- To analyse the heterogeneous effects of social protection on mitigating the impact of the COVID-19 shock on household food insecurity status. That is,
  - To examine the effects of two categories (cash and food) of social protection on mitigating the impact of COVID-19 shocks.
  - To analyse the effect of social protection on mitigating the effects of the COVID-19 shock on rural and urban households.
  - When individuals within households are recipients of social protection, we analyse the differences in effects based on the gender of the household members who received the social protection.

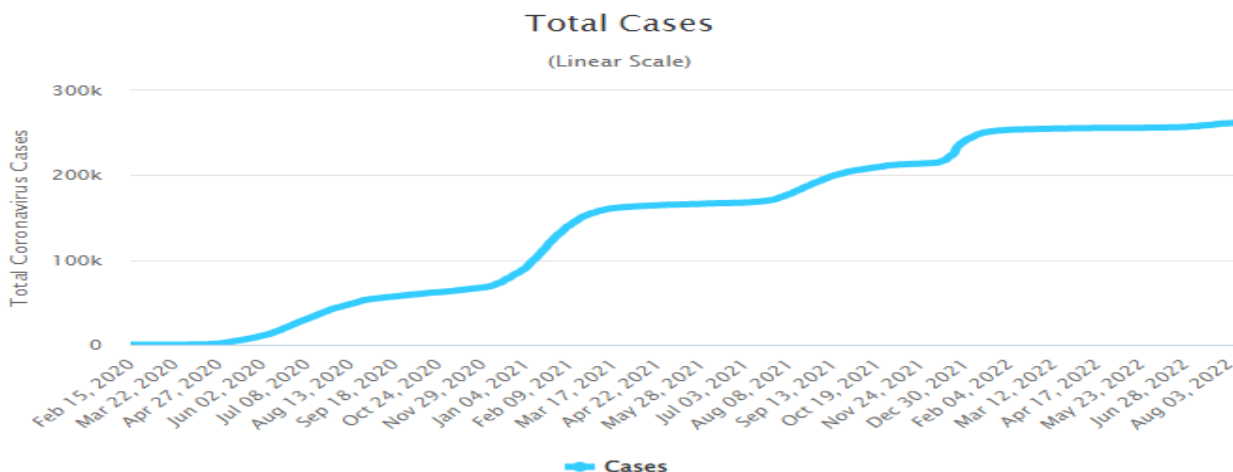
## **3. Context of COVID-19 and social protection in Nigeria**

### **3.1. COVID-19 Emergency Responses in Nigeria**

In the past two decades, emerging and re-emerging infectious diseases have occurred in Nigeria in epidemic proportions and at a devastating public health scale. Popular among these recent epidemics are Ebola fever, yellow fever, Monkey syndrome, and sporadic episodes of Lassa fever. This disease includes the dreaded Malaria that has become endemic. The learned lessons from these outbreaks are believed to have helped in managing the present pandemic caused by the SARS-CoV-2 virus. Recall that during the Ebola outbreak, considerable political and public health resources were rapidly deployed, resulting in timely and effective containment of the disease. At present, Nigeria has progressed to the dreaded community transmission stage concerning COVID-19.

The first case of the COVID-19 pandemic was reported in Nigeria on the 27th of February 2020, and since then, 262,402 cases (Figure 2) of the disease have been confirmed, with 3,147 deaths as of August 12, 2022. This places Nigeria among the fifteen (15) countries reporting the most cases of COVID-19 in Africa. Building on the success of Nigeria's response to Ebola, the government immediately activated a national Incident Control Centre. This approach enabled routine surveillance, diagnosis, and prompt reporting of COVID-19 cases. These patients were equipped with the skills, infrastructure, and materials needed for molecular detection of SARS-CoV-2. Subsequently, real-time epidemiological information for routine

surveillance of cases across the country was obtained in an open-source mobile health system. This Surveillance Outbreak Response Management and Analysis System helps to detect and manage outbreaks early. When a health worker adds a suspected or confirmed case to the system, it automatically triggers a series of actions.



**Figure 2.** Evolution of the total number of cases of COVID-19 in Nigeria

**Source:** Retrieved from <https://news.google.com/covid19/map?hl=en-US&mid=%2Fm%2F05cgv>

On 18 March 2020, the Federal Government placed Lagos and Ogun states under lockdown, schools closed, and large gatherings of people were banned. Eight other states in Nigeria went on state-called lockdowns on the same day. Travel from 13 highly infested countries was banned, and Nigeria’s visa-on-arrival policy was suspended. On March 20, 2020, the government of Nigeria announced measures for the closure of higher education institutions, secondary and primary schools, and three international airports, the Enugu, Port Harcourt, and Kano airports, beginning on March 21, 2020. The Lagos and Abuja airports were also closed two days later. On 30 March 2020, the government issued guidelines outlining actions to curtail the effect of COVID-19 on economic status and livelihoods and started enforcing social distancing rules by closing schools, organizations, and businesses in the Federal Capital Territory (FCT), Lagos and Ogun States for two weeks (PWC, 2020; Babatunde and Olagunju, 2020).

The COVID-19 lockdown began on April 10, 2020, an initial period of two weeks, during which vehicles carrying goods and services were excluded. Additionally, markets selling food and medicine were allowed to open every other day between 10 a.m. and 2 p.m. (Premium Times, 2020). The lockdown was extended in the state for an additional two weeks until May 8, 2020, to reduce the spread of the virus. Protracted lockdowns pose great challenges in ensuring the food security of the population, leading to hunger and misery. Although the lockdown did not concern those providing essential services (food distributors and retailers, including market stalls selling food and groceries), it prevented numerous people from working in the informal sectors of commuting to work or doing their business (Babatunde and Olagunju, 2020).

Vaccination is also another way to fight COVID-19. Although approximately 63%<sup>1</sup> of the world's population has been vaccinated against COVID-19 as of August 12, 2022, the rate remains significantly lower in African countries despite the increased vaccine supply. For example, in Nigeria, this rate is estimated to be 12% versus 23% in Benin, 21% in Togo, 26.5% in Ghana, and 32% in Côte d'Ivoire. Thus, the continent is still struggling to expand the deployment of vaccination. The statistics of the households based on their attitudes toward the

<sup>1</sup> WHO (2022) Word data, <https://news.google.com/covid19/map?hl=en-US&state=7&mid=%2Fm%2F035dk&gl=US&ceid=US%3Aen>

vaccine are presented in Table 1. Approximately 79% of the households were willing to be tested, and more than 80% were willing to take the vaccine if it was free. However, a small percentage of households would rather not take the vaccine for various reasons because the vaccine is not safe for them. Others believe that they cannot contract the coronavirus and that the vaccine has side effects.

**Table 1: Vaccine attitudes according to food insecurity status (%)**

	Food insecure		Food secure	
	Mean	Std dev	Mean	Std dev
Willing get tested (%)	78.93	40.79	78.75	40.92
Willing to get vaccine (%)	82.51	38.00	81.78	38.61
<b>Attitude towards vaccine (%)</b>				
Vaccine does not work	1.60	12.57	1.51	12.21
Vaccine not safe	7.17	25.80	7.69	26.66
Vaccine side effects	4.87	21.54	5.11	22.04
Cannot contract coronavirus	5.84	23.45	5.65	23.10
Against all vaccines	2.78	16.43	2.56	15.79
Vaccine against religion	0.74	8.55	0.67	8.18
Other reasons	3.80	19.12	3.90	19.37
N	1870		1586	

Source: Authors' calculation using the LSMS-ISA dataset

In April 2022, due to the reduced risk of the importation of new variants, the increased availability of vaccines, and the increasing number of people vaccinated in Nigeria and globally, the Nigerian government removed the limit on attendance at social gatherings and the curfew on midnight movements announced two years ago to curb the spread of COVID-19. The Presidential Steering Committee (PSC) on COVID-19 established by the government in early 2020 announced a review of the country's response to the pandemic. Consequently, there are no additional formal restrictions on movement within the country, as the nationwide curfew imposed from 12 midnight to 4 am has been lifted. The PSC said the social restriction recommendations were revised in line with the three established thematic areas – movement, industry, and labour, as well as community activities. However, the PSC advised states to “continue to consider them as the minimum guidelines required to ensure an acceptable level of epidemic control nationwide.” It added that the advisory limiting Nigerians to essential travel only has been lifted, although citizens need to refrain from nonessential movement and comply with nonpharmaceutical intervention guidelines such as the mandatory use of face masks or facial coverings in public, given the risks involved. The government noted that the use of “face masks” was mandatory for indoor activities but at the discretion of individuals during outdoor activities, those aged 60 and above, or those with comorbidities such as diabetes and CVD.

### 3.2. Social protection policy in Nigeria

Various definitions of social protection can be found in the literature. Samson and Taylor (2015) define social protection as a broad range of public, and sometimes private, instruments for tackling the challenges of poverty, vulnerability, and social exclusion. This definition is somewhat limited because it fails to sufficiently capture the entirety of the concept in its broad sense. Therefore, other definitions, provided by the Food and Agriculture Organization (FAO), the United Nations Development Programme (UNDP), and the United Nations Research Institute for Social Development (UNRISD), are used. Both FAO (2019) and UNDP (2019) define social protection as an umbrella term connoting a set of public policies, actions, and instruments enacted by a state (formal) or, in some cases, nonstate (informal) actors within a country or a territory to help address the poverty and vulnerability experienced by citizens. This definition is similar to that of UNRISD

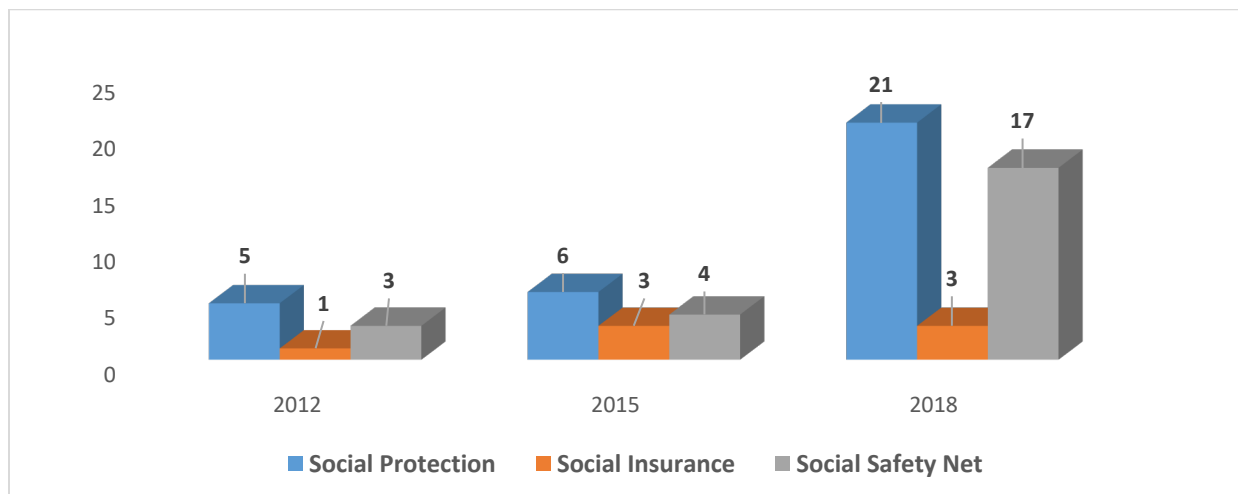
(2010), which defines social protection as policies and programmes concerned with preventing, managing, and overcoming situations that adversely affect people's wellbeing. However, Devereux and Sabates-Wheeler (2004) introduced the transformative dimension to social protection and provided two definitions: conceptual and operational. The conceptual definition describes social protection as comprising all public and private initiatives that provide income or consumption transfers to the poor, protect the vulnerable against livelihood risks, and enhance the social status and rights of the marginalized people, with the overall objective of reducing the economic and social vulnerability of poor, vulnerable and marginalized groups. The operational definition defines social protection as the set of all initiatives, both formal and informal, that provide social assistance to extremely poor individuals and households; social services to groups who need special care or who would otherwise be denied access to basic services; social insurance to protect people against the risks and consequences of livelihood shocks; and social equity to protect people against social risks such as discrimination and abuse.

The Social Protection Policy in Nigeria is an umbrella policy framework that incorporates related social agenda paradigms intended to reduce poverty and provide a life of dignity for all citizens. The first official social protection legislation in Nigeria was the 1942 Workmen's Compensation Act. After several amendments, the federal government enacted Pension Decree No. 102 of 1979 for federal civil servants and Armed Forces Pension Decree No. 103 of 1979 for the military, leading to the establishment of non-contributory defined benefit pension schemes based on final salaries. A private sector benefit pension and gratuity scheme for employees was initiated in 1954 by the Nigerian Breweries. In 1961, the National Provident Fund was inaugurated and later replaced by the Nigeria Social Insurance Trust Fund (NSITF) in 1993. On 25 June 2004, the Pension Reform Act 2004 was enacted to establish a standardized defined contribution pension plan for both the public and private sectors. The new pension scheme is based on individual accounts that are privately managed by pension fund administrators, where employees contribute a minimum of 7.5 percent of their salary, while employers contribute 7.5 percent. Decree 35 of 1999 introduced the National Health Insurance Scheme as a social security system that guarantees the provision of health services to people on the payment of token contributions at regular intervals. These programmes cover the formal sectors of the economy and, as such, do not necessarily cover other vulnerable persons.

Since 2004, when the first draft National Social Protection Strategy document was produced, social protection has become an issue of concern at both the national and state levels (Hagen-Zanker and Holmes, 2012; Aiyede, et al., 2015). The document organized social protection around four main themes: social assistance, social insurance, child protection, and the labour market. However, the government has not demonstrated a significant commitment to social protection judging by the level of implementation. The conditional cash transfer programme was first implemented under the NAPEP in 2007. During that first experiment, paymasters were used to pay beneficiaries, with attendant corruption and inconsistencies. There were cases of no or short payment and payment delays. The programme implementation strategy was reviewed in 2009, and the Office of the Senior Special Assistant to the President on Millennium Development Goals (OSSAP-MDGs) began the implementation of the scheme under its Conditional Grants Scheme (Aiyede, et al., 2015).

Like in other developing countries, the majority of these policies were obscured by politics and implementation bottlenecks (Shadare, 2022). Statistics show that only 21% of Nigerians benefited from social protection measures; this figure includes 3% from social insurance and 17% from the social safety net programme (Figure 3).

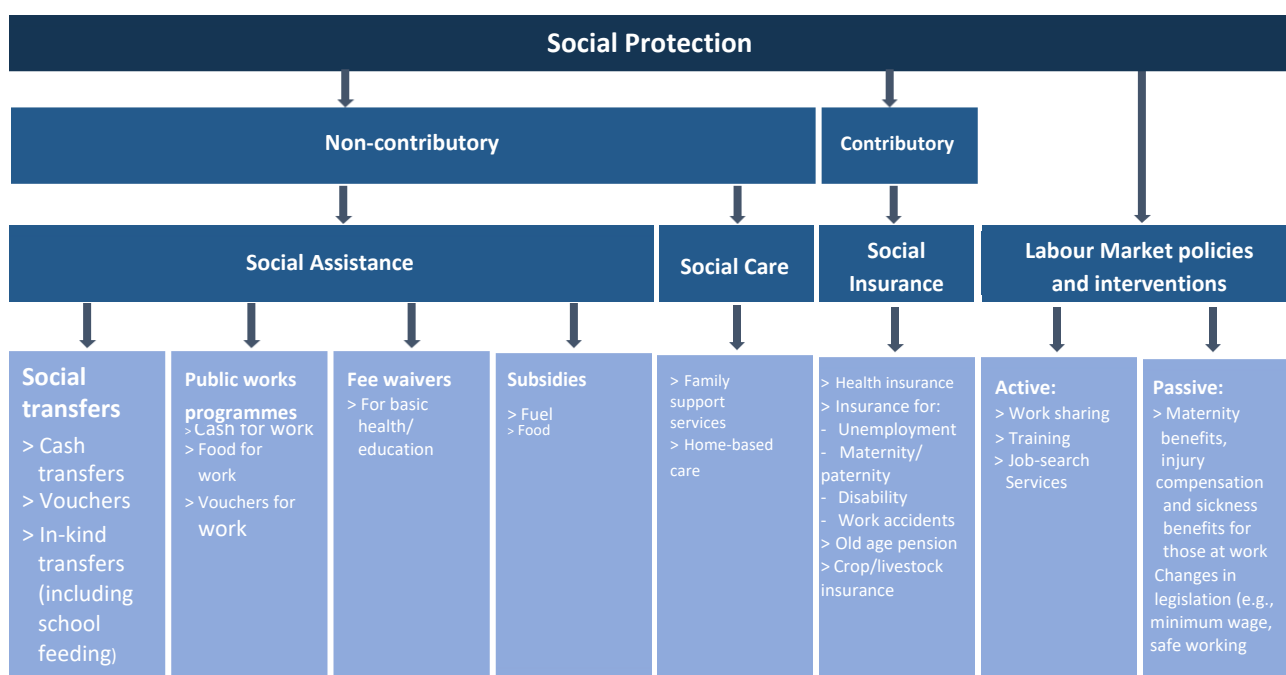
**Figure 3.** Coverage of social protection (% of population) in Nigeria



Source: World Bank Data (2022)

Consequently, Nigeria’s National Social Protection Policy (NSPP) was revised in 2021. This comes at an important time, amid the COVID-19 pandemic. In the revised NSPP (2021), social protection refers to “a mix of policies and programmes designed for individuals and households throughout the life cycle to prevent and reduce poverty and socioeconomic shocks by promoting and enhancing livelihoods and a life of dignity”. In light of this, social protection covers a set of policies and programmes or tools of social justice targeted at large segments of the population to provide people with stable access to a means of income and quality social services, including affordable healthcare and education, to reduce people’s exposure to the risks of poverty and inequality. A description of the types of social protection programmes implemented within the NSPP (2021) is presented below (Figure 4).

Figure 4. Taxonomy of social protection instruments



Source: NSPP (2021)

Table 2 presents the social protection measures taken in response to COVID-19 in Nigeria.

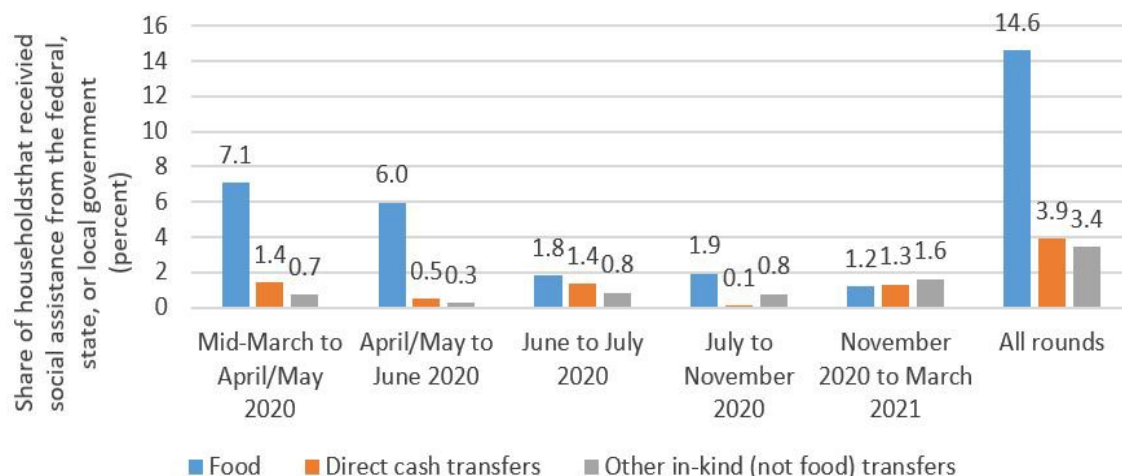
**Table 2.** Social protection measures in Nigeria in response to COVID-19

Type of measure	Implementation
<ul style="list-style-type: none"> <li>Social assistance: cash transfer, food transfer, other in-kind transfer</li> </ul>	<ul style="list-style-type: none"> <li>Cash transfer to 11 million poorest and most vulnerable people; Unconditional cash transfer to poorest and most vulnerable in Kano State (with a grant of N2.95 billion); Financial assistance to road transport workers (with a N10 billion palliative fund)</li> </ul>
<ul style="list-style-type: none"> <li>Labour market policies: wage subsidies, leave benefits</li> </ul>	<ul style="list-style-type: none"> <li>Three-month payment of salary to private workers through the Survival Fund of the Federal Government</li> </ul>
<ul style="list-style-type: none"> <li>Social insurance: health protection, social security, unemployment insurance</li> </ul>	<ul style="list-style-type: none"> <li>Hazard allowance to health care workers</li> </ul>
<ul style="list-style-type: none"> <li>Creation of a special fund for COVID-19 response</li> </ul>	<ul style="list-style-type: none"> <li>N500 billion COVID-19 Intervention Fund (0.3% of GDP)</li> </ul>

**Source:** United Nations Department of Economic and Social Affairs (2021)

Despite these measures, a report by Lain and Vishwanath (2021) indicated that coverage of social protection programs remained low throughout the COVID-19 crisis in Nigeria. For example, between March 2020 and March 2021, only 4% of households had received support in the form of direct cash transfers, 3% had received other in-kind transfers, and approximately 15% had received food transfers (Figure 5). It should be noted that the support was from the federal state or local government. This is significantly less than what would be needed to counteract the widening and deepening of poverty brought about by the crisis.

**Figure 5.** Coverage of social protection programmes throughout the COVID-19 crisis.



**Source:** Lain and Vishwanath (2021)

#### 4. Literature Review

COVID-19 and its strong capacity to spread have consequences for all sectors of activity. While they have health consequences such as a loss of human life, they also disrupt economic activities through reduced productivity and incomes worldwide. Income effects resulting from the economic crisis caused by COVID-19 will be key factors affecting consumer demand for food during and after the pandemic

and will subsequently lead to critical distribution issues that need to be considered when assessing the impact of COVID-19 (Cranfield, 2020). For instance, in Nigeria, Inegbedion (2020) reported that COVID-19 has negatively affected security, transportation, and farm labor, which may decrease food production and increase food insecurity. Using data collected from a sample of 1000 households in four Nigerian states, Balana et al. (2020) examined the effects of COVID-19 pandemic policies on the incomes, employment, and food security of smallholder farming households; they found that 88% of the households lost approximately 50% of their income due to COVID-19. Consequently, approximately 66 percent of them had reduced food consumption, and more than 80 percent of the respondents worried about not having enough food.

Food security impacts are viewed through two main pathways. The first is through issues such as productivity and health consequences, which can in turn affect food security and household welfare. The second is mediated via COVID-19-related measures taken by governments (mobility restrictions, lockdowns and social distancing measures, among others). This also negatively affects incomes through a reduction in economic activities, which directly affects food security. For example, mobility restrictions and lockdown measures could cause a massive shift in food consumption patterns away from food services and wholesale markets toward retail markets. The forced closure of food services and schools could restrict the availability of food for urban households that do not typically grow their own food and for children who rely on school meals. Lockdowns also have an indirect impact on food security due to the resulting loss of jobs and working hours. In turn, lost work or income may also result in knock-on effects on the drop in remittances for recipient families, who may rely on them to meet their basic needs. Ratha (2021) reported a 1.6% decrease in remittance flows to low- and middle-income countries.

Numerous studies have used the Living Standards Measurement Study-Integrated Agriculture Survey (LSMS-ISA) for Nigeria, which includes nationally representative data collected by the Nigerian Bureau of Statistics and the World Bank. For example, Amare et al. (2021) combined pre-pandemic face-to-face survey data with follow-up phone survey data collected from April-May 2020 and employed a difference-in-differences approach. They found that the COVID-19 pandemic has increased food prices and reduced labour market participation. Households' experience of food insecurity increased by 12 percentage points due to measures such as lockdown. The effect is smaller for wage-related and farming activities. Households with school-aged children, poorer households, those relying on nonfarm activities, and those living in remote and conflicted areas have experienced more deterioration in food security status. Using the same data and methodological approach, Abay et al. (2021a) found that Nigerians' households experienced an increase in food insecurity after the COVID-19 survey. The share of households skipping a meal increased by 47 percentage points; the probability of skipping a meal increased by 9 percentage points, and the likelihood of going without eating for a whole day increased by 3 percentage points. Households residing in states experiencing strict lockdown measures reported further deterioration in food insecurity. Single mothers and poorer households experienced relatively greater deterioration in food security due to disruption of school feeding services. Using the first seven rounds of the LSMS-ISA, Martinez (2021) showed that in Nigeria, household food insecurity increased significantly between January and February 2019 and during the first months of the COVID-19 pandemic in April and May 2020. As the pandemic continued, food insecurity decreased between April/May and November 2020 for all items in the FIES but remained significantly greater than it was before the pandemic began. Difference-in-differences models, however, suggest that the lockdowns that were imposed in some Nigerian states did not significantly increase household food insecurity.

Focusing on other countries, Kayira (2021) reported that the 2020 estimate of food insecurity in the EAC region was 2% to 5% greater than that in the pre-COVID-19 period. The number of food insecure people in the region increased from 59.3 million to 65.1 million, creating strong motivation for practical policy recommendations for the immediate, medium, and long term to increase the resilience of EAC food systems to future unforeseen outbreaks or shocks. Using a web-based validated questionnaire completed by 3129 respondents, Elshoryi et al. (2020) found that COVID-19 has a perceptible effect on food security in Jordan. Approximately 23.1% of the respondents were severely food insecure, 36.1% were moderately food insecure, and 40.7% were food secure. Arndt et al. (2020) showed that in South Africa, households with members who depend mainly on labour income and those with lower education levels are at greater risk of food insecurity. Recently, Nguyen et al. (2021) showed that the COVID-19 pandemic and its lockdown measures have left numerous households in a state of food insecurity in India. Food insecurity increased severely from 21% in December 2019 to 80% in August 2020, with 62% of households moving from food security to insecure status over the period investigated.

Various studies have highlighted the benefits of social protection as a response instrument against food insecurity in the context of emergencies and crises. Currently, the effectiveness of the different types of social protection is debated (Gelan, 2006; Harvey, 2007; Gentilini, 2016). However, Feyertag et al. (2021) argue that social protection systems in countries with high levels of debt are at greater risk of failing to maintain support for vulnerable households whose food security is threatened by the pandemic. This is because financial investment flows could drop as governments become preoccupied with their own handling of the economic fallout caused by COVID-19, threatening host governments' fiscal manoeuvrability. Several studies (Coate, 1989; Harvey, 2007; Gentilini, 2016) have shown that the context (whether a natural disaster, war, health emergency, conflict, or recession), cost-effectiveness, market impacts, gender, corruption, diversion risks, security risks, anti-social usage, targeting, consumption/nutrition and skills and capacity to implement are needed when making decisions to implement a social assistance response. Harvey (2007) argues that in war/complex emergencies where markets are not seriously disrupted, cash transfers could be a better option; however, in situations of natural disaster and where markets are disrupted, food transfer will be more appropriate. Kebele (2006) argues that in Ethiopia, cash transfer appears to be well matched to regions with market-oriented infrastructure and institutions, while food transfer is more suited to remote areas. In a review of the literature, Gentilini (2016) found that effectiveness depends on context, objectives and measurement; however, implementing cash transfer is relatively less expensive than implementing food transfer. In this vein, Jacobsen (2020) argued that cash transfers are better than food aid and have a greater impact on Syrian refugees and those who are fleeing conflicts and famine. In contrast, other studies have shown that food-based assistance is more effective during humanitarian crises. For instance, using a randomized design, Hoddinott et al. (2014) found that food transfer has a larger and more positive impact on household food consumption and diet quality than does cash transfer in the Niger Republic. In rural Bangladesh, Ahmed et al. (2010) reported that the majority of people, especially those in the poorest income class, prefer food to cash transfer. Similar results were found by Cunha (2014), who showed that food transfer was more effective than other methods and did not involve resorting to local markets in Mexico.

Coming to the role of social protection in mitigating the impact of COVID-19, Alam (2020) suggested that cash transfer against food aid is a superior and more powerful way to satisfy the needs of people during the current COVID-19 pandemic. This is because vulnerable people recover more quickly. Jerving (2020) also argues that cash transfer is the most impactful form of social assistance used during the COVID-19 lockdown in India. According to Jerving (2020), implementing social safety net infrastructures is easier and more cost effective, especially where there is existing social safety network infrastructure. Babatunde and Olagunju (2020) showed that almost all social safety net beneficiaries

prefer cash transfer rather than food assistance. Their results also showed that more educated household heads and those with access to Bank/ATM services and cell phones prefer cash for food transfer, while richer households, those with older heads and more dependents, prefer food assistance. Considering its effectiveness, cash transfer is more effective than food assistance because it leads to more food consumption and dietary diversity (Babatunde and Olagunju, 2020). A study by Paul et al. (2021) noted that in Zambia, a social cash transfer program with current and proposed enhanced transfer amounts has the potential to reduce poverty significantly by four and six percentage points, respectively. Egbetokun et al. (2021) found that social protection in the form of food or direct cash transfers is associated with a greater probability of Nigerian households being able to afford the food they need. However, this positive effect is offset by the increasing intensity of the pandemic. In Ethiopia, Abay et al. (2021b) reported that households participating in the Productive Safety Net Program (PSNP) were less likely to reduce expenditures on health and education by 7.7% and were less likely to reduce expenditures on agricultural inputs by 13%. In contrast, mothers' and children's diets change little, despite some changes in the composition of diets as the consumption of animal source foods decreases significantly. Their results revealed that the protective role of participation in the productive safety net program is greater for poorer households and those living in remote areas.

Balana et al. (2023) argued that because of the pandemic's indiscriminate effect across communities, the potential of social capital as an informal support mechanism has eroded to enable households to cope with shocks. Furthermore, safety net programs by the government and NGOs did not provide significant protection to households from falling into severe food insecurity and malnutrition amidst the pandemic. A recent study by Akim et al. (2024) suggested that remittances can reduce the negative effects of COVID-19 employment shocks, particularly in the short term. Indeed, the mitigation effect is limited to the early stages of the pandemic, as the negative effects of the shock persist over time. The authors also found that the impact of remittances on mitigating the shock varies according to the recipients' area of residence, origin of remittances, and poverty status. Furthermore, Akim et al. (2024) highlighted the importance of the capital channel in explaining the mitigating role of past remittances. They demonstrated that formal financial inclusion, capital ownership such as livestock, and rental earnings amplify the impact of remittances in mitigating the negative consequences of COVID-19 employment shocks on food security.

## **5. Methodology**

### **5.1. Data description**

We employ the World Bank's Living Standards Measurement Study - Integrated Surveys on Agriculture (LSMS-ISA) for Nigeria in this study. To assess the impact of COVID-19 shock, we focused on a pre-COVID-19 face-to-face survey, that is, the General Household Survey (GHS), which was conducted in 2018/2019 (Wave 4), and twelve rounds post-COVID-19 phone survey, that is, the Nigeria COVID-19 National Longitudinal Phone Survey (COVID-19 NLPS-2020).

The GHS panel sample spans two waves and includes 4,976 households. The first wave was conducted during the post-planting period from July to September 2018, and the second wave was conducted during the postharvest period from January to February 2019. This sample of households is nationally representative and covers the six geopolitical zones in the country. The COVID-19 NLPS-2020 sample is drawn from the 2018/2019 GHS (wave 4). Among the 4,976 households interviewed in the 2018/2019 GHS (wave 4) postharvest survey, 3,000 households with telephone numbers were randomly selected for the twelve rounds of the COVID-19 NLPS-2020 survey, and 1,950 households completed the phone interviews from the first round. The National Bureau of Statistics (NBS) calculated and applied appropriate sampling weights to control for selection bias related to nonresponse and potential attrition in a phone survey, which was necessary to construct a nationally representative sample.

We leveraged the extensive information collected in the 2018/2019 GHS (wave 4) survey, which was just over a year prior to the COVID-19 pandemic, to assess the differential impacts of the COVID-19 shock on households in Nigeria. We focus on measures of food security, social protection and other relevant variables measuring various household characteristics.

We checked for non-random attrition by comparing household characteristics across the 2018/2019 GHS (wave 4) and the first two rounds of the COVID-19 NLPS-2020 survey. The sampling weight calculations reveal that the 1,950 fully interviewed households (from the second round) are similar to the 3,000 initially randomly selected households (see the NBS and World Bank, 2021 p.9 for more details). We create a binary variable, the attrition dummy, which takes on 1 if a household is absent in a given round, and 0 if the household is present. Then, we calculate the attrition rate across waves and find that approximately 90% of all households interviewed in the first round of the post-COVID-19 survey were present in subsequent rounds (see Appendix 1). We, however, use the inverse probability weighting (IPW) methods recommended by Foster and Bickman (1996), Verbeek and Nijman (1992) and Amolegbe et al. (2021) to test for attrition bias and correct for attrition in our analysis.

### **Food insecurity status**

Our outcome variable is household food insecurity, and we measure household food insecurity using our dataset. We focused on the eight indicators (measures) of hunger and food shortage based on self-reported data collected from households in the last 30 days (Hoddinott, 1999).

The eight indicators are yes/no questions (dummy variables) that assess whether the household head or any adult household member answered as follows:

- worried about not having enough food to eat (*not enough*) because of a lack of money or other resources and takes the value one if yes and zero otherwise;
- was unable to eat healthy and nutritious food (*not quality*) because of a lack of money or other resources and took the value of one if yes and zero otherwise;
- ate only a few kinds of food (*few food*) because of a lack of money or other resources and take the value one if yes and zero otherwise;
- skip a meal (*skipped*) because there was not enough money or other resources to obtain food; this variable takes the value of one if the household response is yes and zero otherwise;
- ran out of food (*exhausted*) because there was not enough money or other resources to obtain food; this variable takes the value of one if the response is yes and zero otherwise;
- ate less than he/she thought he/she should (*ate less*) because of a lack of money or other resources and takes the value one if yes and zero otherwise
- were hungry but did not eat (*hungry*) because of a lack of money or other resources and took the value of one if yes and zero otherwise; and
- went without eating (*starved*) for a whole day because of a lack of money or other resources and took the value of one if yes and zero otherwise.

Following Amare et al. (2021), we used PCA to construct a composite index of food insecurity to complement the eight indicators and check for differences in results based on differences in measurements. We also included the sum of all the food indicator (dummy variable) measures as a simple count variable and measure of the food insecurity score. Akim et al. (2024) did the same using a reduced FIES.

## Social protection

To measure household access to social protection, we focus on two measures:

- The yes/no questions presented in the 2018/2019 GHS (wave 4) postharvest and COVID-19 NLPS-2020 surveys asked if any household member received any assistance from any institution, such as an international organization, government, or religious body.
- The yes/no questions presented in the 2018/2019 GHS (wave 4) postharvest and COVID-19 NLPS-2020 surveys asked if any household member received cash or food assistance. This measure is a disaggregation following two categories of social protection (cash, food).

However, we did not add the value of assistance because there is no complete information on value in the post-COVID-19 survey. Based on this information, we aggregate at the household level and define groups following two steps. In the first step, we define four subgroups.

- Group 1 included households with no social protection beneficiary member during the pre-COVID period.
- Group 2 included households with any social protection beneficiary member during the pre-COVID-19 period.
- Group 3 included households with no social protection beneficiary member during the post-COVID period.
- Group 4 included households with any social protection beneficiary member during the post-COVID-19 period.

In the second stage, we dropped “Group 2” and defined two final groups with the remaining three subgroups (Group 1, Group 3, and Group 4). First, we define the “non-beneficiary social protection” group as households belonging at the same time to “Group 1” and “Group 3”, i.e., households with no social protection beneficiary member during the pre-and post-COVID-19 periods. Second, “beneficiary social protection” is defined as “Group 1” or “Group 4”. This group included households with no social protection beneficiary members before COVID-19 but beneficiaries during the post-COVID-19 period. To understand the heterogeneous impacts of social protection, we further consider beneficiary and non-beneficiary groups for each type of social protection received by households (cash and food assistance).

## 5.2. Estimation strategy

To assess the effect of COVID-19 shocks on the food insecurity status of households and the mitigating role of social protection in Nigeria, this study uses a difference-in-differences (DiD) approach. The DiD approach is based on the fundamental assumption of a parallel trend, meaning that food insecurity in a household would have evolved in tandem in the absence of social protection (Akim et al., 2021). Therefore, we assumed that in the absence of the pandemic, the food insecurity status of beneficiaries and non-beneficiary households receiving social protection would follow similar trends. Given that this counterfactual situation is unobservable, we conduct a validity check that compares the food insecurity trends among beneficiary and non-beneficiary households before the pandemic shock, as proposed by Akim et al. (2021) and Akim et al. (2024).

Our difference-in-differences (DiD) strategy is specified as follows in equation (1):

$$y_{ht} = \beta_0 + \alpha_h + \beta_1 Post_t + \beta_2 SP_h + \beta_3 SP_h * Post_t + \mu_{ht} \quad (1)$$

where  $y_{ht}$  represents the food insecurity outcome (each indicator) of household  $h$  in round  $t$ .  $\alpha_h$  represents time and household fixed effects, which capture all time-invariant differences between beneficiary and non-beneficiary households.  $Post_t$  is a dummy variable taking the value 1 for the post-COVID-19 rounds and 0 for the pre-COVID-19 round.  $SP_h$  is a dummy indicating whether the household is a beneficiary or non-beneficiary of social protection. Thus, the social protection variable

takes the value 1 if household  $h$  received any assistance (beneficiary) and 0 otherwise (non-beneficiary). The coefficient  $\beta_3$  is the parameter of interest, and this coefficient is expected to be negative.  $\mu_{ht}$  is the error term, and  $\beta_0$  is the constant term.

As we focus on the household and following Ibukun and Adebayo (2021), we control for variations in the sociodemographic and socioeconomic characteristics of households. The variables included age of the head, gender of the head, household size, and rural status.

We take into account the heterogeneity effect across beneficiaries' and non-beneficiary households' food insecurity status. Therefore, we run our specifications in Equation (1) for dimensions such as area of residence (urban, rural), the gender of a beneficiary household member, farming household, household wealth status, and type of social protection. We estimate the effect through the average treatment effect on treated individuals (ATET), as we are interested in the average of the individual treatment effects of those benefiting from social protection during the COVID-19 pandemic.

To address potential biases arising from attrition and correlations between observables in our panel, we begin by estimating a linear probability model to identify the determinants of attrition. Appendix 2 shows that area of residence (rural), household wealth (nonpoor), and household farming status (farming households) are the determinants of attrition. Then, we predicted attrition bias, corrected it using weight, and included the weighted inverse as a control variable in our DiD regression. This allows us to control for the sampling error that the estimated attrition would cause. Meng et al. (2016) stated that the sampling error of estimated regressors deserves consideration and accounted for, as this could contaminate the estimates.

## 6. Results and discussion

In this section, we first present the descriptive statistics of the key variables and baseline variables and then present the econometric results from the estimation of Equation (1) via the difference-in-differences approach.

### 6.1. Descriptive statistics

Table 3 presents the descriptive statistics of the key variables before (Wave 4) and after (the whole sample) COVID-19. The results indicate a nonsignificant difference in terms of household characteristics between pre-COVID-19 and post-COVID-19. Approximately 19% of the households were female-headed, and 61% were in rural areas. Household heads are, on average, 50 years old, while members are 28 years old. The proportion of households that received cash as a form of assistance was the largest (14.36%) of the three forms of assistance post-COVID-19. We observed a significant difference between pre-COVID-19 and post-COVID-19 data across all eight food insecurity variables. Indeed, the proportion of food-insecure households significantly increased with the COVID-19 pandemic. "Not quality food" was the major food insecurity status of households before (42.15%) and after (89.64%) the pandemic.

**Table 3: Summary statistics of key variables**

	Pre-COVID		Post-COVID		ttest difference	
	Mean	Std dev.	Mean	Std dev.		
<b>Household characteristics</b>						
Rural (%)	61.38	48.70	61.28	48.72	0.10	-0.07
Female headed (%)	19.49	39.62	18.00	38.43	1.49	-1.19
Age of head (years)	49.73	14.85	50.22	14.51	-0.49	(-1.05)
Mean age in household	27.55	13.15	27.48	12.77	6.48	-0.16
Household size	5.85	3.52	6.07	3.60	-0.21	(-1.87)
<b>Food insecurity measures (%)</b>						
Skip	26.00	43.87	72.77	44.53	-0.468***	(-33.04)
Exhaust	25.08	43.36	56.82	49.55	-0.317***	(-21.29)
Starve	4.62	20.99	24.41	42.97	-0.198***	(-18.28)
Not enough	37.03	48.30	83.95	36.72	-0.469***	(-34.15)
Not quality	42.15	49.39	89.64	30.48	-0.475***	(-36.13)
Few food	40.41	49.08	88.00	32.50	-0.476***	(-35.70)
Ate less	34.77	47.64	85.74	34.97	-0.510***	(-38.09)
Hungry	19.08	39.30	73.33	44.23	-0.543***	(-40.49)
<b>Assistance (%)</b>						
Cash	2.26	14.85	14.36	35.08	-0.121***	(-14.03)
Food	6.72	25.04	2.26	14.85	0.0446***	-6.77
N	1950		1950		3900	

Note: post-COVID-19 means post-COVID-19 lockdown

Source: Authors' calculation using the LSMS-ISA dataset

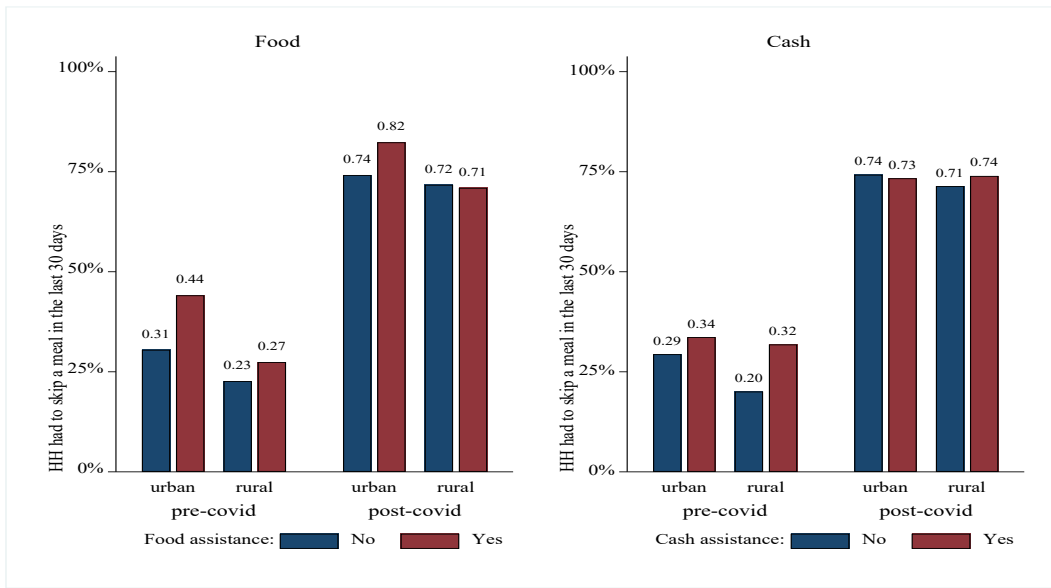
Table 4 presents the characteristics of the two groups of households, beneficiaries, and non-beneficiaries, before the pandemic. Overall, in terms of characteristics, households are similar in terms of rural residency, farming, nonfarming, and wage activities. Differences are observed in their size, head age, and share of females headed. When disaggregating by type of social protection, only households from the food assistance group were similar in terms of all characteristics. Regarding food insecurity outcomes, there was a difference between groups in terms of food insecurity, except for three indicators (exhaust, starve, and not quality). As for household characteristics, there is no difference between households in the food assistance group, and the difference is driven by cash assistance.

**Table 4: Household characteristics at baseline (pre-COVID-19)**

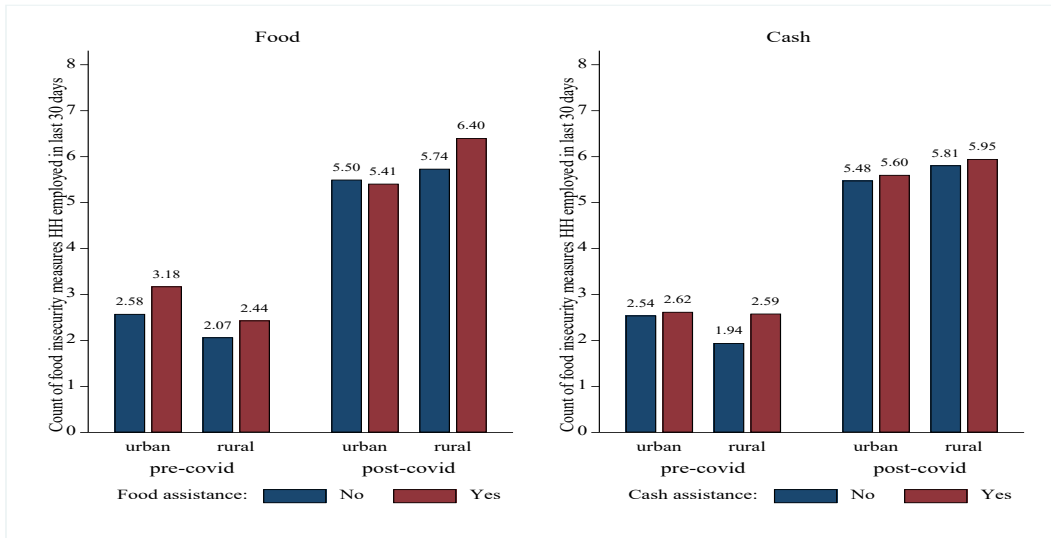
	Social protection (SP)			Cash Assistance		Food Assistance		Difference test		
	Aggregate	Treated	Control	Treated	Control	Treated	Control	Any SP	Cash	Food
<b>Household characteristics</b>										
Rural (%)	60.03	59.84	60.11	60.98	61.75	64.58	59.66	0.002	0.007	-0.049
Female headed (%)	20.12	24.61	18.33	24.51	17.77	20.83	19.97	-0.062**	-0.067**	-0.008
Age of head (years)	49.73	51.39	49.07	51.57	49.08	48.98	49.76	-2.325**	-2.488**	0.78
Mean age in household	28.00	30.29	27.09	29.99	26.70	27.05	28.03	-3.197***	-3.292***	0.974
Household size	5.66	5.18	5.85	5.34	6.01	5.73	5.68	0.664***	0.675***	-0.051
Farming (%)	83.53	84.45	83.16	85.49	84.31	87.50	83.17	-0.012	-0.011	-0.043
Non farming (%)	83.75	83.66	83.79	84.12	84.03	88.54	83.52	0.001	-0.000	-0.050
Wage (%)	46.26	48.62	45.32	49.80	44.91	51.04	46.14	-0.033	-0.048	-0.049
<b>Assistance (%)</b>										
Cash	0.00	0.00	0.00	0.00	0.00	10.42	1.74	0	0	-0.086***
Food	0.00	0.00	0.00	7.06	6.52	0.00	0.00	0	-0.005	0
<b>Food Insecurity (%)</b>										
Skip	26.25	32.68	23.68	32.55	23.64	33.33	25.83	-0.090***	-0.089***	-0.075
Exhaust	24.90	26.38	24.31	26.86	24.36	29.17	24.78	-0.020	-0.025	-0.043
Starve	4.50	4.33	4.56	3.92	4.66	9.38	4.41	0.002	0.007	-0.049*
Not Enough	37.44	42.72	35.33	42.35	35.03	39.58	37.32	-0.073**	-0.073**	-0.022
Not Quality	41.54	45.08	40.13	45.69	40.76	45.83	41.38	-0.049	-0.049	-0.044
Few food	40.42	45.28	38.47	45.69	38.54	46.88	39.99	-0.068**	-0.071**	-0.068
Ate less	34.91	39.57	33.04	40.20	32.74	40.63	34.59	-0.065**	-0.074**	-0.060
Hungry	19.34	23.03	17.86	22.75	17.62	25.00	19.09	-0.051*	-0.051*	-0.059
<b>Food insecurity index</b>										
Food index	-49.80	-0.40	-0.54	-0.40	-0.54	-0.37	-0.50	-0.137**	-0.140**	-0.136
Food count	2.29	2.59	2.17	2.60	2.17	2.70	2.27	-0.417**	-0.427**	-0.424
N	1779	508	1271	510	1396	96	1723	1779	1906	1819

Source: Authors' calculation using the GHS-Panel wave 4

Figure 6 indicates that the proportion of households that skip a meal increased between pre- and post-COVID-19 in both urban and rural areas. Additionally, these households received food assistance more than cash assistance after COVID-19. Figure 7 shows that after COVID-19, households in rural areas were more food insecure than urban households.



**Figure 6: Proportion of households that skip a meal and access to social protection before and after COVID-19**



**Figure 7: Number of households in rural and urban areas that employ extreme measures and access to social protection before and after COVID-19**

## **6.2. Effects of COVID-19 and social protection on household food insecurity status**

Table 5 reports the results of the effect of COVID-19 and social protection (cash or food) on the food insecurity variables. As expected, coronavirus has a positive effect on household food insecurity across all eight indicators, and the effect is higher for the composite index. For example, the pandemic has increased the proportion of households that skip a meal by approximately 61%, those that run out of food (exhaust) by 56%, those that go all day without food (starved), and those that are hungry without eating by approximately 42% and 48%, respectively. Additionally, household size increased food insecurity for all indicators except for skipping a meal. These results suggest that COVID-19 has led many households to experience food insecurity. Our findings are in line with previous studies in Nigeria (Balana, 2020; Inegbedion, 2020; Abay et al., 2021a; Amare et al., 2021; Martinez, 2021) and elsewhere (Arndt et al., 2020; Elshoryi et al., 2020; Kayira, 2021; Nguyen et al., 2021), which showed that COVID-19 has contributed to increasing the number of food insecure people worldwide, especially in developing countries. Overall, there is a mitigating effect of social protection on food insecurity for beneficiary households compared to non-beneficiary households. While the mitigating effect is significant for all eight indicators and for the food index, the results show that the effect is greater for households that skip a meal (7.2 percentage points) and are starved (6.2 percentage points). These findings suggest that social protection helps moderate the effect of the pandemic on household food insecurity. These results corroborate those of Egbetokun et al. (2021) and Abay et al. (2020b). Indeed, Egbetokun et al. (2021) found that social protection increases the probability of a household affording basic food needs in the face of a pandemic. However, they also concluded that this positive effect is offset by the increasing intensity of the pandemic.

Tables 6 and 7 present the estimated effects of COVID-19 and individual assistance (food, cash) on household food insecurity. To examine the role of social protection, we include interaction terms between the COVID-19 variable and each social protection indicator. As shown in Table 6, the results indicate that COVID-19 increased food insecurity within the cash and food assistance groups. However, the mitigating effects of social protection on household food insecurity during the coronavirus pandemic have not been fully elucidated. Indeed, we found that cash assistance reduced food insecurity overall during the pandemic, but food assistance had mixed effects. While food assistance reduced food insecurity for only three indicators (skip, exhaust, few food), it increased food insecurity for the other indicators. When running the difference-in-differences model with the food insecurity index, the mitigating effect is greater for cash assistance (8.7 percentage points) than for food assistance (0.5 percentage points). These results suggest that in the case of Nigeria, social protection has a mitigating effect on food insecurity during the pandemic, and this mitigating effect is mainly driven by cash assistance. Despite being the smallest amount received by households, cash assistance emerges as

expected as the most impactful social protection for recipient households in Nigeria. Indeed, the average cash transfer amounts received by households were \$33 (13,591 Naira), \$48 (19,961 Naira), and \$36 (14,940 Naira) during the outbreak (Covid-19 NLPS, round 1, round 2, round 3, respectively). Cash assistance enables households access to diversified food to meet their needs and preferences compared to food assistance. These findings are in line with previous findings that show the positive role of cash transfers in reducing food insecurity, for instance, in Nigeria (Babatunde and Olagunju, 2020; Egbetokun et al. (2021), India (Jerving, 2020), Zambia (Paul et al., 2021), and Ethiopia (Abay et al., 2021b).

**Table 5: Effects of COVID-19 and social protection (cash or food assistance) on household food insecurity**

VARIABLES	(1) Skip	(2) Exhaust	(3) Starve	(4) Not enough	(5) Not quality	(6) Few food	(7) Ate less	(8) Hungry	(9) Food index	(10) Food count
Female-headed	0.119 (0.069)	0.155 (0.153)	0.263 (0.081)	0.175 (0.035)	0.194* (0.023)	0.183 (0.102)	0.135 (0.035)	0.189 (0.061)	0.517 (0.161)	1.629 (0.511)
Head age	-0.002* (0.000)	-0.005 (0.003)	-0.005 (0.002)	-0.005 (0.001)	-0.004 (0.002)	-0.002** (0.000)	-0.005 (0.003)	-0.003*** (0.000)	-0.010 (0.002)	-0.032 (0.008)
Household size	0.022 (0.004)	0.023** (0.001)	0.036** (0.001)	0.028* (0.004)	0.038* (0.005)	0.033** (0.002)	0.028* (0.004)	0.021* (0.002)	0.080*** (0.001)	0.250*** (0.001)
Covid	0.619*** (0.004)	0.565*** (0.002)	0.422*** (0.003)	0.404*** (0.004)	0.407** (0.007)	0.405*** (0.001)	0.452*** (0.000)	0.481*** (0.002)	1.053*** (0.002)	3.279*** (0.006)
Social protection*Covid	-0.072*** (0.000)	-0.044*** (0.001)	-0.062*** (0.000)	-0.029*** (0.000)	-0.027*** (0.000)	-0.021*** (0.000)	-0.018** (0.000)	-0.012** (0.000)	-0.084*** (0.001)	-0.267*** (0.002)
Constant	0.236 (0.055)	0.345 (0.106)	0.041 (0.138)	0.412 (0.077)	0.370 (0.130)	0.288** (0.006)	0.426 (0.126)	0.194* (0.029)	-0.550 (0.088)	2.142* (0.267)
Observations	3,557	3,557	3,557	3,557	3,557	3,557	3,557	3,557	3,557	3,557

Estimations were adjusted for covariates, panel effects, and time effects and controlled for predicted weighted attrition.

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' calculation using the LSMS-ISA dataset

**Table 6: Effects of COVID-19 and cash assistance on household food insecurity**

VARIABLES	(1) Skip	(2) Exhaust	(3) Starve	(4) Not enough	(5) Not quality	(6) Few food	(7) Ate less	(8) Hungry	(9) Food index	(10) Food count
Female head	0.113 (0.102)	0.149 (0.173)	0.285 (0.095)	0.176 (0.070)	0.171 (0.029)	0.205 (0.109)	0.156 (0.051)	0.188 (0.088)	0.510 (0.191)	1.609 (0.605)
Head age	-0.002 (0.001)	-0.004 (0.003)	-0.006 (0.001)	-0.004 (0.002)	-0.003 (0.002)	-0.002 (0.000)	-0.005 (0.004)	-0.003* (0.000)	-0.008 (0.004)	-0.027 (0.013)
Household size	0.023* (0.003)	0.023** (0.001)	0.035** (0.002)	0.026* (0.003)	0.032* (0.004)	0.031*** (0.000)	0.028 (0.005)	0.022** (0.001)	0.076*** (0.000)	0.240*** (0.002)
Covid	0.618*** (0.001)	0.566*** (0.002)	0.432*** (0.000)	0.412*** (0.005)	0.408*** (0.006)	0.409*** (0.000)	0.460*** (0.000)	0.494*** (0.000)	1.070*** (0.004)	3.332*** (0.014)
Cash*Covid	-0.067*** (0.000)	-0.050*** (0.000)	-0.055*** (0.000)	-0.025** (0.001)	-0.025** (0.001)	-0.021*** (0.000)	-0.024*** (0.000)	-0.021*** (0.000)	-0.087*** (0.001)	-0.275*** (0.002)
Constant	0.186 (0.034)	0.300 (0.107)	0.067 (0.071)	0.377 (0.114)	0.350 (0.129)	0.259* (0.033)	0.387 (0.149)	0.186*** (0.001)	-0.625 (0.168)	1.911 (0.516)
Observations	3,811	3,811	3,811	3,811	3,811	3,811	3,811	3,811	3,811	3,811

Estimations were adjusted for covariates, panel effects, and time effects and controlled for predicted weighted attrition.

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' calculation using the LSMS-ISA dataset

**Table 7: Effects of COVID-19 and food assistance on household food insecurity**

VARIABLES	(1) Skip	(2) Exhaust	(3) Starve	(4) Not enough	(5) Not quality	(6) Few food	(7) Ate less	(8) Hungry	(9) Food index	(10) Food count
Female headed	0.109* (0.014)	0.144 (0.030)	0.272* (0.030)	0.168* (0.016)	0.184* (0.015)	0.176** (0.010)	0.127* (0.017)	0.179* (0.017)	0.495** (0.031)	1.562** (0.098)
Head age	-0.003 (0.001)	-0.005 (0.001)	-0.005 (0.001)	-0.005** (0.000)	-0.004* (0.000)	-0.002 (0.001)	-0.005* (0.000)	-0.003*** (0.000)	-0.010** (0.000)	-0.032** (0.001)
Household size	0.022* (0.002)	0.023** (0.001)	0.037** (0.001)	0.029*** (0.000)	0.038* (0.003)	0.033*** (0.000)	0.028** (0.001)	0.021* (0.002)	0.080** (0.002)	0.252** (0.006)
Covid	0.600*** (0.003)	0.553*** (0.000)	0.399*** (0.002)	0.394*** (0.001)	0.397*** (0.002)	0.401*** (0.001)	0.446*** (0.001)	0.476*** (0.002)	1.027*** (0.001)	3.195*** (0.003)
Food*Covid	-0.033*** (0.000)	-0.045*** (0.000)	0.045*** (0.000)	0.014*** (0.000)	0.024*** (0.000)	-0.010*** (0.000)	0.005*** (0.000)	0.020*** (0.000)	-0.005*** (0.000)	-0.016*** (0.000)
Constant	0.247 (0.045)	0.356* (0.044)	0.038 (0.046)	0.415** (0.021)	0.362** (0.009)	0.293* (0.039)	0.429** (0.011)	0.198** (0.008)	-0.547** (0.016)	2.152** (0.057)
Observations	3,637	3,637	3,637	3,637	3,637	3,637	3,637	3,637	3,637	3,637

Estimations were adjusted for covariates, panel effects, and time effects and controlled for predicted weighted attrition.

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' calculation using the LSMS-ISA dataset

As we expected the mitigating effect of social protection to be heterogeneous regarding household characteristics, we estimated household characteristics by area of residence, gender, farming status, and wealth status. Table 8 presents the results of the effect of COVID-19 and social protection on household food insecurity by area of residence (rural versus urban), gender of the household head (male versus female), and wealth status. Figure 8 shows the results for livelihood status (farming, nonfarming, wage activities). We found that the mitigating effect of social protection (cash or food) is greater in rural areas than in urban areas (Table 8), meaning that households in rural areas benefit more from social protection during the pandemic. In addition, compared to male-headed households, female-headed households benefited more from social protection during the pandemic. While the mitigating effect is significant for all the food insecurity indicators and indices for female-headed households, the effect is not significant for one indicator (few food) for male-headed households. The results reported in Table 8 reveal that overall, the mitigating effect of social protection is greater for poor households than for nonpoor households. While the effects are significant for all indicators for poor households, nonpoor households without quality food do not benefit from social protection. Similar results were found by Abay et al. (2021b), who revealed that the protective effect of participation in a productive safety net programme is greater for poorer households and those living in remote areas.

The results presented in Figure 8 show that the mitigating effects of social protection are greater for farming households than for nonfarming households and households engaged in wage activities. While an increase in social assistance has a significant mitigating effect on all the indicators for farming households, the mitigating effect is not significant for 2 food insecurity indicators (few food, ate less) or 3 indicators (not enough, ate less, or hungry) for wage- and nonfarming households, respectively. Figure 9 reveals that there is no mitigating effect in the South-south zone compared to the Southeast and Northeast where social protection increased food insecurity according to 7 indicators (except skip) and 2 indicators (skip, not quality), respectively. There is a low mitigating effect in the North-central zone (exhaust, stave, few food).

Overall, the results suggest a low mitigating effect of social protection in Nigeria. This could be explained by the social safety net program implementation context in the country. As stated by the International Monetary Fund, there was no effective structure that the government could leverage to mitigate the socioeconomic impact of COVID-19 (IMF, 2020). Before the pandemic, various social assistance programs were introduced by the government. However, the coverage rate of these programs is alarmingly low (World Bank, 2019), and social assistance programs suffer from poor targeting and, as a result, low impact (IMF, 2020). For example, only 4% of households out of 40% of poor households had access to social safety net programs within the country (World Bank, 2019). In addition, food

assistance during the pandemic did not reach all vulnerable families as planned by the ministry in charge, and the distribution of food assistance was marred by a lack of transparency (Dixit et al., 2020).

### **Robustness check**

We test the robustness of our results by using an alternative estimation method, linear regression. We estimated the effects of COVID-19 and social protection (cash or food) to evaluate the changes in the results. Table 9 shows that the results are similar to those of DiD. Indeed, the results showed that COVID-19 has increased food insecurity for all the indicators and indices (as shown in Table 5). Additionally, the results revealed that the mitigating effect of LZD was even greater than that of DiD, which was significant for only 3 food insecurity indicators (skip, starve, hungry). Overall, the results are consistent with the DiD estimates.

**Table 8: Heterogeneous effects of social protection on food insecurity (area of residence, head gender, wealth status)**

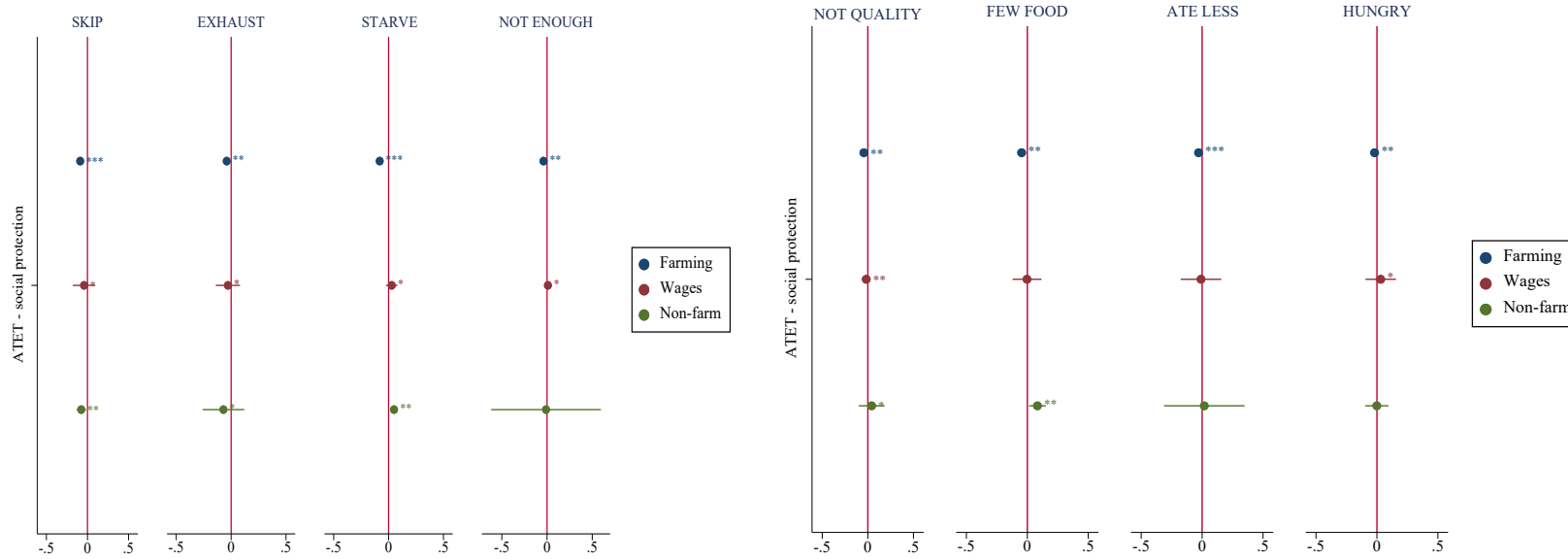
Variables	(1) Skip	(2) Exhaust	(3) Starve	(4) Not enough	(5) Not quality	(6) Few food	(7) Ate less	(8) Hungry	(9) Food index	(10) Food count
<b>Rural</b>										
ATET	-0.090** (0.002)	-0.048** (0.003)	-0.136*** (0.002)	-0.013** (0.000)	-0.036** (0.001)	-0.065** (0.001)	-0.030*** (0.000)	-0.046** (0.001)	-0.129** (0.003)	-0.410** (0.010)
Observations	2,135	2,135	2,135	2,135	2,135	2,135	2,135	2,135	2,135	2,135
<b>Urban</b>										
ATET	-0.047*** (0.001)	-0.043 (0.007)	0.043** (0.001)	-0.058** (0.003)	-0.015** (0.001)	0.041* (0.005)	-0.002 (0.005)	0.039** (0.002)	-0.028 (0.007)	-0.088 (0.020)
Observations	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422
<b>Female-headed</b>										
ATET	-0.157*** (0.001)	-0.116** (0.003)	-0.000 (0.002)	-0.143*** (0.001)	-0.131*** (0.000)	-0.082** (0.002)	-0.063*** (0.001)	-0.125** (0.004)	-0.281*** (0.003)	-0.868*** (0.011)
Observations	716	716	716	716	716	716	716	716	716	716
<b>Male headed</b>										
ATET	-0.045*** (0.000)	-0.025*** (0.000)	-0.080*** (0.000)	-0.003** (0.000)	0.003** (0.000)	0.001 (0.000)	-0.004*** (0.000)	0.022*** (0.000)	-0.029*** (0.000)	-0.099*** (0.001)
Observations	2,841	2,841	2,841	2,841	2,841	2,841	2,841	2,841	2,841	2,841
<b>Poor</b>										
ATET	-0.072*** (0.000)	-0.044*** (0.001)	-0.062*** (0.000)	-0.029*** (0.000)	-0.027*** (0.000)	-0.021*** (0.000)	-0.018** (0.000)	-0.012** (0.000)	-0.084*** (0.001)	-0.267*** (0.002)
Observations	3,557	3,557	3,557	3,557	3,557	3,557	3,557	3,557	3,557	3,557
<b>Non-poor</b>										
ATET	-0.071*** (0.000)	-0.046** (0.002)	-0.031** (0.001)	-0.010** (0.001)	-0.000 (0.001)	0.010* (0.001)	0.004* (0.001)	-0.005** (0.000)	-0.036** (0.002)	-0.113** (0.006)
Observations	2,118	2,118	2,118	2,118	2,118	2,118	2,118	2,118	2,118	2,118

Estimations were adjusted for covariates, panel effects, and time effects and controlled for predicted weighted attrition.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

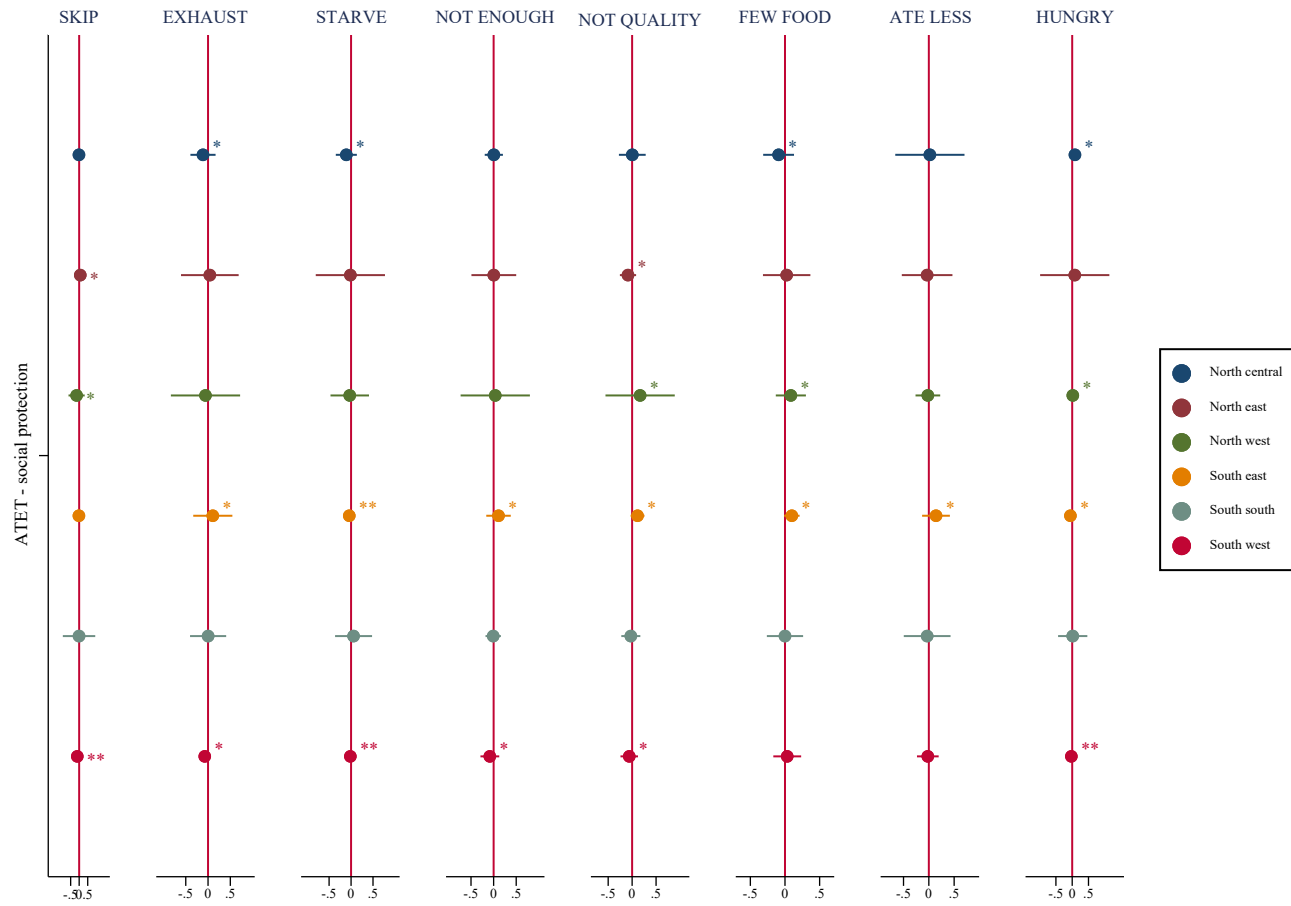
Source: Authors' calculation using the LSMS-ISA dataset

**Figure 8: Heterogeneous effects of social protection—Household livelihood**



Source: Authors' calculation using the LSMS-ISA dataset

**Figure 9: Heterogeneity of social assistance by zone**



**Table 9: Social protection (cash or food assistance) effect on food insecurity during COVID-19**

VARIABLES	(1) Skip	(2) Exhaust	(3) Starve	(4) Not enough	(5) Not quality	(6) Few food	(7) Ate less	(8) Hungry	(9) Food index	(10) Food count
covid	0.439*** (0.020)	0.327*** (0.020)	0.226*** (0.014)	0.266*** (0.023)	0.286*** (0.023)	0.292*** (0.023)	0.348*** (0.022)	0.361*** (0.020)	0.808*** (0.043)	2.513*** (0.133)
Social protection	0.115*** (0.035)	0.041 (0.034)	0.008 (0.019)	0.060* (0.036)	0.024 (0.037)	0.061* (0.037)	0.063* (0.037)	0.057* (0.032)	0.140** (0.070)	0.430** (0.217)
Covid*SP	-0.097** (0.039)	-0.040 (0.039)	-0.059** (0.026)	-0.054 (0.042)	-0.038 (0.042)	-0.028 (0.042)	-0.041 (0.042)	-0.070* (0.039)	-0.130 (0.081)	-0.407 (0.251)
Female headed	0.095*** (0.019)	0.071*** (0.021)	0.014 (0.017)	0.114*** (0.022)	0.111*** (0.021)	0.120*** (0.021)	0.114*** (0.021)	0.098*** (0.023)	0.242*** (0.042)	0.743*** (0.129)
Household head age	-0.001* (0.001)	-0.002*** (0.001)	-0.002*** (0.000)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001** (0.001)	-0.002** (0.001)	-0.007** (0.004)
Household	-0.001 (0.002)	0.002 (0.002)	0.014*** (0.002)	-0.006** (0.003)	-0.002 (0.002)	-0.004 (0.003)	-0.003 (0.002)	0.003 (0.002)	0.001 (0.005)	0.005 (0.015)
Rural	-0.045*** (0.015)	-0.064*** (0.016)	0.027** (0.014)	-0.041** (0.018)	0.004 (0.017)	-0.025 (0.017)	-0.036** (0.017)	-0.033* (0.018)	-0.066* (0.035)	-0.198* (0.108)
Constant	0.300*** (0.032)	0.378*** (0.034)	0.044 (0.027)	0.420*** (0.038)	0.422*** (0.038)	0.429*** (0.037)	0.403*** (0.037)	0.242*** (0.036)	-0.405*** (0.071)	2.576*** (0.221)
Observations	8,400	8,400	8,400	6,643	6,643	6,643	6,643	6,643	6,643	6,643
R-squared	0.131	0.078	0.067	0.065	0.073	0.082	0.107	0.103	0.134	0.134

Robustness check using linear regression - reg skip covid group\_sp interact fhh hh\_age hhsz rural [pw=mweight]

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' calculation using the LSMS-ISA dataset

## 7. Conclusion and Policy Implications

To pursue policies aimed at mitigating the negative effects of the COVID-19 pandemic, governments and policymakers need real data on the situation of households and on the effectiveness of interventions already taken in response to COVID-19. This paper assessed the effect of COVID-19 on food insecurity and the mitigating effect of social protection in Nigerian households. We employed the difference-in-differences approach to pre-COVID-19 and post-COVID-19 data. Overall, the results show that COVID-19 has increased food insecurity within all households (beneficiary and not beneficiary of social protection). The pandemic had a greater effect on food insecurity in rural, farming, male-headed, and poor households. The results also indicate that households that received cash assistance were more food insecure during the pandemic than those that received food assistance. These results imply that the mitigating effect of social protection is more effective for cash assistance than for food assistance. Furthermore, the mitigating effect of social assistance is greater in rural areas, farming areas, female-headed households, and poor households.

Our results highlight the vital role that social protection could play in mitigating the adverse consequences of the COVID-19 pandemic. Consequently, governments and their development partners are likely to rethink and revise national social protection strategies to provide more support to households and increase their resilience to adverse shocks. In particular, policies aimed at promoting cash assistance can have important implications for improving the food security of households in Nigeria. The targets should be women, poor households, and those in rural areas who are involved in farming. Furthermore, social protection should be considered complementary to existing development systems. Our findings support that social protection likely protects only part of the population, as the coverage is still limited, and the amount transferred is very low. Even those populations that benefit from social protection may need complementary support over the long term. Indeed, the attenuating role of social protection, namely, cash assistance, seems to operate only in the short term, and households are still exposed to subsequent shocks, as they mainly rely on their savings, which are limited, to cope with the shock. We therefore suggest two additional policies that may help increase household resilience to shocks. First, there is a need to prioritize investment in local job creation to curb income loss, as households with casual and unreliable jobs are more likely to lose jobs and are thus prone to severe food insecurity in times of shock. Second, there is a need to build a household wealth base, such as land tenure security or livestock, to improve resilience to shocks.

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## Appendix

### Appendix 2: Attrition rate across waves

Round	Pre covid	Post covid lockdown												Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	
<b>Missing</b>	0	0	0	25	69	94	111	139	140	161	165	173	0	<b>1,077</b>
<b>Present</b>	1,950	1,950	1,950	1,925	1,881	1,856	1,839	1,811	1,810	1,789	1,785	1,777	1,950	<b>24,273</b>
<b>Nb. unique HH</b>	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	1,950	<b>25,350</b>
<b>Attrition rate</b>	0	0	0	0.012	0.035	0.048	0.056	0.071	0.071	0.082	0.084	0.088	0	<b>0.042</b>

**Appendix 2: Determinants of attrition**

<b>VARIABLES</b>	<b>OLS</b>
Age of head	0.000 (0.000)
Rural (1=Yes)	0.016*** (0.003)
Female headed households (1=Yes)	0.018*** (0.004)
Household size	-0.001* (0.000)
Nonpoor households	0.018*** (0.003)
Sick household member (1=Yes)	-0.030*** (0.005)
Farming (1=Yes)	0.021*** (0.004)
<i>Number of gathering attended in a week:</i>	
One	-0.061*** (0.004)
Two	-0.066*** (0.005)
Three	-0.044*** (0.005)
Four	-0.069*** (0.006)
Five or more	-0.067*** (0.005)
Constant	0.054*** (0.007)
Observations	23,227
R-squared	0.021

Standard errors are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Source: Authors' calculation using the LSMS-ISA dataset



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