Consumption Deprivation During Covid Times: Survey Data Analysis From Nigeria *

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Abstract

COVID-19 disrupted production networks generating scarcity of many goods while simultaneously individuals suffered financial stress due to the inability to work. In this study we analyze factors affecting households consumption and deprivation of basic goods. We use Nigerian survey data to document how large is consumption deprivation, its main reasons and test whether income related proxies, household location or ethnicity play any role. Our research shows that rural residents exhibit higher deprivation, in most goods, and that high-income households experience less, whereas financially constrained households only affect deprivation of the less needed good (i.e., corn). In addition, we find that being part of one of the many ethnic minorities only increases deprivation in one good (i.e., beans). Other variables such as having kids at school do not have any impact.

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1 Introduction

COVID-19 has meant a before and after in recent history, not only has supposed the biggest health crisis of our century, but rather its repercussions have shaken the economic structure of countries, evidencing great inequalities between developed and developing countries.. A comparative analysis of quarantine measures between a developed country such as the U.K. and a developing country like Nigeria reveals that the latter faced more stringent restrictions during the initial months of the pandemic. These measures included widespread closures and, in some cases, violent enforcement to ensure compliance. In fact, Nigeria's lockdown measures received a score of 85.65 in April, placing it 71st out of 181 countries analyzed by the Stringency Index, which measures the severity of lockdown measures and ranks above several major European countries, Mathieu et al. (2020). Furthermore, Nigeria's heavy reliance on oil exports intensified the impact of these restrictions on its economy. These disparities were further compounded by the inadequate social welfare programs available to households in developing countries, necessitating the adoption of various coping strategies, Lain et al. (2021). The primary strategy involved an inevitable reduction in consumption, underscoring the significance of studying consumption deprivation in these nations.

Most of the existing literature on the socioeconomic impact of COVID-19 has predominantly addressed its effects on employment (Egger et al. (2021), Khamis et al. (2021)), as well as its implications for businesses (Avenyo and Ndubuisi (2020)). Some studies have also investigated hospitalization rates during the pandemic and the presence of racial disparities (Almagro et al. (2020)). However, our research is focused on examining the extent to which this virus has disrupted the well-being of individuals in Nigeria, with a particular emphasis on the deprivation of consumption.

The impact of COVID-19 in developing countries has led to a significant increase in severe food deprivation among the population as a coping mechanism during the crisis. In light of this, our research focuses on analyzing the food deprivation experienced by households in Nigeria during the pandemic, and study factors that may have contributed to it. For this purpose, we utilized data from the World Bank's "COVID-19 National Longitudinal Phone Survey," which pro-

vides insights into staple food consumption. Staple foods hold cultural significance and are essential for meeting basic subsistence requirements. Our objective is to analyze consumption deprivation using survey data from households in Nigeria, a large developing African nation. We develop direct measures of consumption deprivation based on essential food items (ie., rice, beans, cassava, yam, and corn). These food commodities represent fundamental components of the consumption basket for individuals in this country. Furthermore, we demonstrate the significance of this type of consumption for the average household. Subsequently, we explore its determinants using a regression model that considers factors such as residing in rural areas, renting the dwelling, having access to medical treatment, children's school attendance, and the need for interview translation.

To the best of our knowledge and based on a comprehensive review of the existing literature, this study represents the first examination of consumption deprivation resulting from the COVID-19 pandemic in Nigeria within the academic discourse. While prior studies have utilized the same survey data employed in this analysis for investigating diverse topics, such as, (Hossain and Hossain (2021)) none have explicitly focused on the phenomenon of consumption deprivation. Nigeria has served as a focal point for numerous scholarly inquiries into deprivation, encompassing domains such as child deprivation in education and health, racial disparities leading to deprivation of life, and social deprivation among others. Therefore, our research contribution fills a crucial gap in the literature by specifically delving into the realm of consumption deprivation in the context of the COVID-19 crisis.

Throughout the course of this study, it can be inferred that the households experiencing the highest levels of deprivation are those located in rural areas, primarily as a result of the economic challenges they confront. Furthermore, households necessitating the assistance of a translator during the interview procedure are likely to belong to ethnic minority populations and also encounter notable levels of deprivation. In contrast, households with access to healthcare demonstrate a more favorable economic position, leading to reduced levels of deprivation. Interestingly, corn exhibits indications of behaving as a luxury good. Lastly, it has been observed that access to education does not exert a significant influence on levels of deprivation. Our paper is organized into several sections. Firstly, we provide an overview of Nigeria, examining the country's situation and unique characteristics.

Next, we present the methodology and procedures employed in our study. Subsequently, we present the obtained results. Finally, we conclude with a dedicated section summarizing the main findings and implications of our research.

2 Nigeria's overview

2.1 Context

Nigeria, officially the Federal Republic of Nigeria, is a country located in the western part of Africa, better known as Sub-Saharan Africa. It shares borders with Niger to the north, Cameroon to the east and Benin to the west. It is a country with a land area of 923,768 km^2 and a coastline located in the Atlantic Ocean along the Gulf of Guinea. The country is comprised of a federal territory, where the capital city Abuja, and 36 states are located. Its constitution recognizes Nigeria as a democratic secular state.

For thousands of years, Nigeria has been the seat of ancient, indigenous states and various kingdoms. In addition, it was one of the colonies of the United Kingdom during the 19th and 20th centuries. Nigeria is one of the largest countries in Africa, in fact it is known as the "Giant of Africa", due to its population and size. It is a multinational state, as it is inhabited by 250 ethnic groups, the most numerous and prominent being the Yoruba, Igbo and Hausa. These groups speak more than 500 different languages and identify with a plurality of cultures. The official language of Nigeria is English, as it facilitates linguistic unity in the nation. In addition, it is divided approximately evenly between Christians, who are mainly based in the southern part of the country, and Muslims, who are in the north. However, being a country so rich in diversity, there is also a minority of the population that practices the country's own indigenous religions, such as those native to the Igbo and Yoruba ethnic groups.

The Naira is the current currency of Nigeria and was introduced in 1973, making it the main currency in circulation in the country. This monetary unit is equivalent to 100 kobos, which is a smaller monetary unit. It was adopted to replace the Nigerian pound, making Nigeria the last African country to abandon the pound (1 NGN = 0.001746 GBP). The Central Bank of Nigeria is the issuer

of all Naira coins and notes.

Due to high levels of inflation, the currency has experienced a constant devaluation. In response to this, the Central Bank of Nigeria has set a 10% cap on inflation and has managed to control it by raising interest rates. In 2011, the interest rate was raised to 12% to control inflation and in 2012 it was decided to maintain it due to the end of fuel subsidies, one of the country's main sources of wealth. Currently, the exchange rate is 1 NGN = 0.00216262 USD.

Nigeria is a founding member of the African Union and a member of many international organizations, including the United Nations, the Commonwealth of Nations and OPEC. It is considered by the World Bank as an emerging global power and is among the "Next Eleven" economies that will become the largest in the world (*Nigeria*, n.d.).

2.2 Economic Outlook

In this section we will analyze the study country, Nigeria, by focusing on different aspects. To begin, we expose indicators that are essential to understanding the country. These indicators will serve as the basis for further in-depth analysis in the proceeding sections.

The Table 1 represents the most recent value of the Poverty headcount ratio at $2.15 a day (2017 PPP) as a % of the population that is $30.9 in 2018. This value represents 30.9% of the Nigerian population living below the extreme poverty line of $2.15 a day PPP-adjusted for that year. This indicates a high level of poverty in the country, as a significant part of the population is unable to satisfy their basic needs. The trend of this indicator has been negative since 1996. As the percentage has been decreasing over time, it is considered that the percentage of the population living in extreme poverty has decreased, there are fewer people living in extreme poverty.

Life expectancy at birth is an indicator of great interest that, along with others, determines the development of the country. In Nigeria it stands at 53 years in 2020, it is an increasing trend since 1960, which is a positive factor. The cause of this low figure compared to the figures of developed countries is the high infant mortality that still exists in these high poverty countries.

The total population of Nigeria stands at 213,401,323 as of 2021, which increased by 2.44% from the previous year, 2021. The country's net migration is -76,364 in 2021. This number represents the number of immigrants minus the number of emigrants, including residents and non-residents. In the previous year, 2020 it was -4,824. A rise in the number of emigrants in the country has been observed. This suggests that there have been large migratory flows of the Nigerian population to other countries with the aim of improving their future, living conditions and those for their family. However, it is difficult to establish and carry out migration statistics in underdeveloped countries.

The Human Capital Index (HIC) represented on a scale from 0 to 1 was 0.4 in 2020. This indicator shows the contributions of health and education to worker productivity. It measures the productivity as a future worker of a child born today in relation to the benchmark of full health and full and high-quality education.

Gross Domestic Product (GDP) represents the sum of value added by all producers. In Nigeria, the data records a GDP (US$ at current prices) of 440.83 billion in 2021, increasing compared to the previous year to 432.2 billion in 2020 **?**. The GDP at current US$ had a growing trend until 2014, reaching 574.18 billion dollars. From that year onwards, it experienced a decline, reaching 375.75 billion in 2017. Since then, it has been recovering.

On the other hand, the GDP per capita recorded in 2021 is 2,065.7 thousand, US$ at current prices. This refers to the gross domestic product divided by the population halfway through the year.

Regarding GDP growth, the Table 2.2 shows that in 2020 there was a 1.8% contraction. This could be due to the COVID-19 pandemic. However, the trend

Table 1: Global indicators of Nigeria

Poverty headcount ratio at $2.15 a day (2017 PPP) (% of population)	30.9% (2018)
Life expectancy at birth, total (years)	53 years (2020)
Population (total)	213,401,323 (2021)
Net migration	-76,364 (2021)
Human Capital Index	0.4 (2020)

Source: Own elaboration. Data from the World Bank.

of this indicator is very volatile, so a significant portion of this effect cannot be attributed to COVID, as it could simply be the trend. In the following year, 2021, it recovered by 3.6% mainly driven by the base effects produced by the oil sectors. Furthermore, in 2022, it continued to grow by 3.6%, thanks to the boost in trade, transportation, telecommunications and financial services (Bank, 2022) .

Over the past two decades, Nigeria has been subjected to an economic cycle where high inflation has been persistently chronic. This macroeconomic indicator began to accelerate in 2019 due to trade restrictions and the public deficit. These policies imposed by the Nigerian government were the main cause of an accelerated rise in inflation; increasing from 11.8% between 2018 and 2019 to 17% in 2021. These recent figures are almost double the maximum inflation threshold of 9% established by the Central Bank of Nigeria (CBN) (Bank, 2022).

Personal remittances received, as a % of GDP, in 2021 represented 4.4%. This macroeconomic variable refers to personal transfers, meaning current transfers between resident and non-resident individuals, employee remuneration, which includes the income of border workers, seasonal workers and other short-term workers.

This variable becomes very interesting as it represents a fairly high percentage of the country's GDP and, in addition, it has a very different impact on low-middle-income and high-middle-income countries. In the case of Nigeria, an underdeveloped country classified as low income, remittances represent an essential source of income as they exacerbate poverty and help recipient households to strengthen their resilience.

In 2022, remittance flows were affected by different factors caused by the COVID-19 pandemic. The job losses and the difficulty of working during the pandemic by all those immigrant residents in developed countries, caused a decrease in remittances World Bank (2022). The year before the pandemic, remittances represented 5.3% of Nigeria's GDP. However, with the arrival of COVID-19 and the lockdowns, they were affected, reducing to 4.00% in 2020, as shown by World Bank data. Nevertheless, an even more severe decline in the number of remittances received could have been recorded. Perhaps what prevented the curve from falling further were the unemployment subsidies, furlough schemes, and severance packages available to workers in a country with a more developed welfare state

than Nigeria and a more consolidated worker protection system.

The net inflow of foreign direct investment represents 0.8% of Nigerian GDP in 2021. This variable informs about the net investment inflow that the country receives to acquire a lasting managerial interest in a company operating in an economy different from that of the investor. It consists of the sum of equity capital, the reinvestment of profits, long-term and short-term capital found in the balance of payments. On the other hand, the net outflow of foreign direct investment in 2021 represents 0.4% of GDP.

Finally, it should be noted that the personal remittances received represent a higher percentage of GDP than the direct investment received.

Table 2: Economic indicators of Nigeria

GDP (current US $)	$440.83 (billion)
GDP per capita (current US $)	2,065.7 (thousand)
GDP per capita, PPP	4,923 (thousand in 2017*)
GDP growth (annual%)	3.6
Inflation, consumer prices (annual %)	17.00
Personal remittances, received (% of GDP)	4.4
Foreign direct investment, net inflows (% of GDP)	0.8
Foreign direct investment, net outflows (% of GDP)	0.4

Source: Own elaboration. Data from the World Bank.

Nigeria is one of Africa's leading oil and gas producers. The country is investing in gas infrastructure, which is a capital-intensive endeavor. The government aims to become a hub for gas exports to Africa and other Asian countries, such as China and India. Nigeria's net exports of natural gas are 33 billion cubic meters (bcm), and it is expected to rise to 44 bcm by 2030, driving investments towards gas infrastructure development in Nigeria.

The production of oil, gasoline and other fossil fuels accounted for 81.8%, as of the available data from 2015. This industry is significant as it serves as a source of income for many individuals, residents and non-residents. However, the production of energy through renewable energies is negligible, according to the latest data available from the World Bank in 2015.

Nigeria's upstream oil and gas market is dominated by state-owned companies

and other European and American multinationals. Private companies operate alongside and in collaboration with the Nigerian national oil company, NNPC.

However, the industry has been impacted by COVID-19 pandemic, resulting in a reduction in the number of oil and gas platforms and basins, which have not recovered as of January 2021. Nevertheless, it is speculated that the sector will experience growth, as OPEC countries have been creating a supply shortage that can help stimulate production Mordor Intelligence (n.d.).

Regarding the access to electricity for Nigerian citizens, the following data has been found, Table 3. 55.4% of the population has access to electricity (2020). These figures are collected from national and international industry surveys **?**.

As observed, in urban areas of the country, it is stated that 83.9% of the urban population has access to electricity (2020). However, in rural areas, only 24.6% of the population living in the rural exodus has access to electricity (2020). This data is interesting, since the most recent data before 2020 is from 2016, which showed that 34% of the rural population had access to electricity. There has been a drop of 38.212% compared to 2016. This could be a sign of inadequate infrastructure and insufficient investment in improving the quality of life for people.

Table 3: Electricity indicators of Nigeria

Access to electricity (% of population)	55.4 (2020)
Access to electricity, urban (% of urban population)	83.9 (2020)
Access to electricity, rural (% of rural population)	24.6 (2020)
Electricity production from oil, gas and coal sources (% of total)	81.8 (2015)
Electricity production from renewable sources, excluding hydroelectric (kWh)	0.00 (2015)
Annual freshwater withdrawals, total (% of internal resources)	6.00 (2019)

Source: Own elaboration. Data from the World Bank.

Unemployment is the share of the labor force that is without work, but available seeking for one. Nigeria is one of the countries without unemployment or welfare benefits, so people live in a vulnerable work environment, because workers are not protected.

Low unemployment rates can mask considerable poverty in a country, while high unemployment rates usually occur in countries with high levels of economic development and minor poverty rates. However, high and persistent unemploy-

ment rates can indicate inefficient resource allocations. Nigeria's unemployment rate is modeled by the International Labour Organization (ILO) and as the Table 4 shows, it is estimated that it was 5.9% of the total labor force in 2021. This number illustrates a relatively small percentage of the labor force that was unemployed in 2021 in Nigeria. This number is captured through country-reported microdata, which is based mainly on nationally representative labor force surveys, with other sources, such as household surveys and population censuses. However, it is important to note that it does not cover the full country, since it is complex to identify every individual and its work situation, within the living conditions that this country has.

The aggregate of females unemployed as a percentage of the female labor force, designed by the ILO was 5.7% in 2021, while the sum of male unemployment as a percentage of the male labor force was 6.2% in 2021.

One fact that stands out is the number of unemployed with advanced education as the percentage of the total labor force with advanced education, that is 17% in 2019. According to the World Bank: "Advanced education includes shout-cycle tertiary education, a bachelor's degree or equivalent education level, a master's degree or equivalent education level, or doctoral degree or equivalent education level according to the International Standard Classification of Education 2011 (ISCED 2011)". It is striking in comparison to the unemployment rate among individuals with a basic level of education as a percentage of total labor force with basic education which was 8% in 2019. Conforming with the definition of the World Bank: "Basic education comprises primary education or lower secondary education according to the International Standard Classification of Education 2011 (ISCED 2011)".

This difference could be related to the productive specialization of the country. Productive specialization is the emphasis of an economy on the production of specific goods or services in which evidences a comparative or competitive advantage. The reasoning behind this concept is that Nigeria as every other country benefits by concentrating the production of the goods or services in which they are more efficient. These activities may be mainly physical or less dependent on knowledge or the education level. Since the population with advanced studies usually have the opportunity to continue their careers in developed countries and

end up practicing their profession elsewhere. That is why having higher education or advanced studies is not relevant since the selection process in the labor market does not give it importance. As productive specialization of the country takes precedence, intensifying skills, resources, knowledge, and technologies on the extraction of raw materials or the production of manufactured goods may enhance to maximize efficiency and production.

The proportion of young people who are not in education, employment or training (NEET) is the share of young people that corresponds to youth (ages 15 to 24); or people whose ages range from 15 to 29. The NEET group is at risk of exclusion from the labor market and social exclusion, because they are not improving their quality of life or their future prospects in the labor market. This group is not gaining experience or improving skills that allow them to contribute to the country's economy. In addition, this group already has an initial disadvantage, characterized by a low position in terms of household income and a low educational level. In Nigeria the share of total NEET as a percentage of the youth population was 36.7% in 2019, the latest available data from the World Bank 4. Furthermore, the NEET rate provides additional information regarding labor force participation rates and unemployment rates. If the participation rates of young people increase and unemployment decreases, it would indicate widespread discomfort or discouragement among the new generations in the labor market, as employment opportunities are not being utilized and the labor market is not fully efficient. Moreover, the percentage of NEET reflects the population that does not contribute to the country's GDP, resulting in a decrease in GDP per capita, as this group is neither working or receiving education, introducing a problem in Nigeria's economy.

Additionally, it can be remarked how the NEET rate for women as a percentage of the female youth population (43.5%) is higher than that for men as a percentage of the male population (30.0%) in 2019 4. This reflects the significant impact of culture in the country, limiting the presence of women in the labor market and in other institutions, suggesting instead their participation in household chores. This could be closely related to the country's model of productive specialization, suggesting that the tasks that present a comparative advantage are physical tasks, leading to the exclusion of women who then focus on intensive care-giving responsibilities.

Table 4: Unemployment Indicators of Nigeria

Total (% of total labor force)	5.9 (2021)
Female (% of female labor force)	5.7 (2021)
Male (% of male labor force)	6.2 (2021)
Advanced education (% of total labor force with advanced education)	17.00 (2019)
Basic education (% of total labor force with basic education)	8.00 (2019)
Share of youth not in education, employment or training, female (% of female youth population)	43.5 (2019)
Share of youth not in education, employment or training, male (% of male youth population)	30 (2019)
Share of youth not in education, employment or training, total (% of youth population)	36.7 (2019)

Source: Own elaboration. Data from the World Bank.

Table 5 presents data sourced from the World Bank's Living Standards Survey 2018-2019. This survey provides information on consumption and its distribution among households in both urban and rural areas. Although this survey precedes the our study, it is still relevant as it offers significant economic insights into individuals and households who also participated in the survey utilized throughout this paper, which covers the year of the COVID-19 pandemic. The 2018-2019 survey consists of a sample size of 22,110 Nigerian individuals, with 6,808 residing in urban areas and 15,302 in rural areas.

The average household size is 7.09 members. However, a notable difference is observed between urban and rural areas. While urban households have an average of 6.29 members, rural households have 7.53 members. This suggests that either rural households tend to be larger compared to urban households, or they accommodate more individuals within a single household due to economic precarity and limited construction. In rural areas, basic infrastructure such as roads, access to clean water, electricity, and telecommunications is often lacking. This lack of infrastructure hinders construction and development in these areas, resulting in the few existing houses being more densely populated compared to urban areas. Another reason for the higher number of members in rural households lies in their traditions and strong community ties. In certain rural communities, families tend to live together in the same house due to cultural traditions and close community bonds. This can result in larger households in rural areas compared to urban areas.

In terms of per capita consumption, it is observed that this indicator is higher in urban areas than in rural areas. This demonstrates that the Nigerian population residing in rural areas is poorer and therefore consumes less. These differences may reflect disparities in income levels and access to goods and services between

urban and rural areas. Regarding food consumption, urban areas have an average annual consumption of 133,909 Nigerian Nairas,(1 NGN = 0.00216262 USD), while rural areas have an average annual consumption of 96,202 Nigerian Nairas. Additionally, when examining rice consumption per capita, it is observed that less rice is consumed in rural areas. This hypotheses will be tested throughout the paper. These figures may be attributed to variations in food availability, including rice cultivation and trade, in different regions. In our study, the consumption indicator is considered a proxy for income, as an individual or household's consumption level tends to reflect their purchasing power and income level. Thus, the lower consumption levels in rural areas indicate that Nigerian individuals residing in these regions experience greater deprivation of goods.

Finally, the proportion of food consumption to total consumption is 55% in rural areas and a higher proportion in urban areas, specifically 64%. This means that individuals residing in urban areas allocate 9% more of their income to food consumption as a proportion of total consumption compared to rural inhabitants.

Table 5: Descriptive statistics

	(1) Total	(2) Urban	(3) Rural
Number of household members	7.09	6.29	7.53
	(3.943)	(3.573)	(4.066)
Consumption per capita	198,377	266,400	161,072
	(161,112.5)	(207,436.5)	(112,550.8)
Rice consumption per capita	9,553	11,032	8,742
	(7,731.2)	(7,856.8)	(7,539.5)
Food consumption per capita	109,557	133,909	96,202
	(76,414.0)	(86,085.4)	(66,889.0)
Food consumption (over consumption)	0.61	0.55	0.64
	(0.138)	(0.132)	(0.131)
Observations	22,110	6,808	15,302

Notes: Summary statistics from the Living Standards Survey 2018-2019. Mean coefficients; Standard Deviations in parentheses. Population weights used. Source: Own elaboration with Stata. Data from the World Bank.

3 Methodology

3.1 Study Description

The objective of this study is to analyze the deprivation of a basket of essential consumption goods among Nigerian households using survey data. Firstly, we will investigate the relationship between an household's need for these goods and their deprivation. Then, we will analyze the reasons behind the deprivation and the purchasing power related to this basket of essential goods. Next, we will conduct an economic analysis where we will explain, from an economic perspective, the causes of deprivation during the COVID-19 pandemic. The data used corresponds to a survey collected between 2020 and 2021, during the COVID-19 pandemic.

The data for this study has been compiled from a study conducted by the World Bank team of the Development Data Group (DECDG) and Poverty and Equity Practice. The survey is referred to as the COVID-19 National Longitudinal Phone Survey 2020-2021 *World Bank Microdata Catalog* (2021). Therefore, within this definition, not only economic or monetary. The study consists of two phases, with the first phase known as the Nigeria COVID-19 NLPS Phase 1, conducted between 2020 and 2021. The World Bank is providing support to countries to help mitigate the spread and impact of the COVID-19 disease. One aspect of this support is collecting data to inform evidence-based policies that can help alleviate the effects of the pandemic.

To achieve this objective, the World Bank is utilizing the Living Standards Measurement Study, Integrated Survey on Agriculture (LSMS-ISA) to conduct high-frequency telephone surveys on COVID-19 in five African countries: Nigeria, Ethiopia, Uganda, Tanzania and Malawi. For this specific study, Nigeria has been selected. This effort is part of the initial wave of World Bank-supported NLPS, which aims to assess the economic and social implications of the COVID-19 pandemic on households and individuals. The households included in the study were selected from a sample of households interviewed in 2018/2019 for the Wave 4 of the General Household Survey - Panel (GHS-Panel).

Phase 1, corresponding to our study, is followed by Phase 2, the National Longitudinal Phone Survey 2021-2022 *World Bank Microdata Catalog* (2022). This

survey aims to gather information from households over time and has proven to be an effective tool for studying and understanding the socio-economic impact of the COVID-19 pandemic, in Nigeria.

We have specifically chosen Round 3, which consists of 1,925 cases and is divided into 6 sections. The sample is representative. Section A is dedicated to household identification, Section 2 involves updating the household list, Section 5 focuses on access to basic services, with subsection 5A specifically addressing housing. Section 6 covers employment, and Section 12 collects the interview results. Finally, it is emphasized that a cross-sectional analysis has been conducted when developing the model.

3.2 Exploring Needs and Deprivation of Staple Food

To conduct this analysis on consumption deprivation, we have selected a set of typical food items in Nigeria. These include rice, beans, cassava, yam, and corn as they are widely consumed and produced.[1] The initial question we posed to develop this study revolves around whether these foods are considered essential by the Nigerian population. If so, we aim to determine the extent to which people are deprived of these foods, which are necessary for their consumption and well-being.

In order to address this inquiry, we have chosen relevant questions from the household survey. The questions ask whether each household needed to purchase any of the aforementioned food items individually during the past week. The sample of respondents for each of the questions related to each of the food items consists of 1802 households. If they answered in the affirmative, they are further asked whether they had the purchasing power to fulfill their needs.

The table is structured in descending order of need for each listed food item. The percentage of individuals requiring these foods is notably high, particularly for Rice and Beans. As observed, 78.2% of the interviewed individuals reported the need to purchase rice. Furthermore, among those who need to buy rice, 30.9% are unable to do so, indicating deprivation in the consumption of this food item despite the need. Likewise, in the adjacent column, we observe the deprivation of these essential foods despite the need. The most striking data pertains to Yam,

[1]Stable food is essential for final and intermediate consumption.

Table 6: Needs and Consumption Deprivation

Food items	Need (1)	Deprivation (2)
Rice	78.2%	30.9%
Beans	76.2%	23.9%
Cassava	62.7%	15.2%
Yam	56.9%	58.8%
Corn	40.4%	22.9%

Notes: Column Need represents the fraction of households reporting the need to buy a particular item in the previous week. Column Deprivation measures the percentage of households that couldn't satisfy their needs. Source: Own elaboration with Stata. Data from the World Bank.

with 56.9% of individuals requiring it in their daily consumption. However, a significant 58.8% of those needing Yam are unable to afford it, thereby failing to satisfy their need.

Therefore, in response to the question of how necessary these food items are for a representative sample of households, we observe that they are indeed essential for the sample. Henceforth, we will refer to these food items as "Staple Food Items" to emphasize their fundamental nature within the Nigerian population.

3.3 Explaining the Needs and Deprivation of Staple Food

The next question we ask ourselves is why people cannot access each of these essential food items if they are so necessary. Thus, we will explore the reasons why individuals in the sample cannot afford or access them. Considering that the interviews are conducted during the COVID-19 pandemic, it is interesting to analyze whether the reasons for people's inability to purchase these items are related to government-imposed restrictions to mitigate the virus or economic constraints. These factors may be interconnected, as pandemic-related measures and preventive restrictions can limit mobility, thereby reducing food availability because people

cannot go to work or roads are blocked, preventing individuals from accessing the necessary items. Additionally, if individuals cannot work due to limitations, their income is affected, and they may not have the financial means to purchase food due to the measures imposed by Covid-19.

For this reason, we have selected a list of reasons from the survey that address the question of why individuals cannot make these purchases. These reasons are represented as binary variables that take the value (1) if they respond affirmatively to the question or (0) otherwise. The first reason is "out of stock," the second is "local markets not operating/closed," the third is "limited/no transportation," the fourth is "restriction to go outside," the fifth is "price too high," and the last one is "no money."

Table 7: Reasons for Inability to Access Food Items

	(1) Rice	(2) Beans	(3) Cassava	(4) Yam	(5) Corn
Out of stock	.2%	.9%	2.9%	10.1%	4.2%
Local markets not operating/closed	1.2%	.9%	5.8%	.66%	.6%
Limited/no transportation	1.2%	.94%	2.9%	1.7%	2.4%
Restriction to go outside	4.4%	4.1%	5.2%	1.5%	1.2%
Price too high	33.3%	24.1%	17.4%	44.3%	31.7%
No money to buy	89.4%	91.2%	89.5%	78.1%	86.8%
N	435	319	172	603	167

Source: Own elaboration with Stata. Data from the World Bank.

The variables presented in the table originate from the inability to purchase. They are binary variables taking a value of (1) for deprivation and (0) otherwise, meaning that access is possible. As observed in Table 7, the predominant reasons are economic and financial in nature, namely "Price too high" and "No money to buy". For instance, out of the 435 individuals unable to purchase rice, 33.3% attributed it to the high price and 89.4% stated that they lacked the financial means to buy it. Among the 319 individuals unable to purchase beans, 24.1% cited high prices as the reason, while 91.2% mentioned a lack of money. Of the 172 individuals unable to purchase cassava, 17.4% cited high prices, and 89.5% mentioned financial constraints. For the 603 individuals unable to purchase yam,

44.3% stated high prices as the main hindrance, and 78.1% mentioned insufficient funds. Finally, among the 167 individuals unable to purchase corn, 31.7% attributed it to high prices, while 86.8% cited financial constraints.

Therefore, the primary cause of being unable to meet basic needs is lack of money for all staple food items.

3.4 Untangling Consumption Deprivation

We propose a simple linear multiple regression model to understand household deprivation. The equation takes the following functional form:

$$Y_i = \alpha + X_i\beta + \epsilon_i \tag{1}$$

$$\tag{2}$$

Where the dependent variable Y_i represents the deprivation of household i regarding different food items (i.e., rice, beans, cassava, yam and corn). Deprivation refers to the fact of being unable to consume or satisfy a basic consumption need, and is measured as a dummy variable taking value one when the household is being deprived from consuming the item, and zero otherwise.

The variable X_i is a vector that contains a set of exogenous regressors, also measured as dichotomous variables, including whether the household resides in rural areas, has children attending school, is able to access medical treatment, needs translation for the interview, and rents the dwelling where they live.

The first explanatory variable, *Rent*, refers to whether individuals rent or alternatively own their dwelling.[2] The effect we aim to control for is whether paying a rent has a significant impact on deprivation in the consumption of these staple food items. It captures whether the household income is more constrained due to the need to afford regular payments for housing services. The second explanatory variable *Rural* examines the differences in consumption deprivation based on geographical area. Rural households are poorer than urban, however they live closer to the producers of food and, therefore, would be experiencing less

[2]The omitted category also includes a small fraction of non-owners that do not pay any rent for the dwelling.

sourcing disruptions related to the lock-downs.[3] The third explanatory variable *Medical*, captures whether the household is able to access to medical treatment. In a country with a high poverty level like Nigeria, healthcare is deficient, and a significant portion of the population lacks access to quality medical services. This variable is a proxy for higher income. The fourth variable *Translation* pertains to whether the interviewee required translation. This dichotomous variable allows us to analyze whether ethnic minorities experience more or less deprivation than English-speaking individuals. Therefore, this variable capture some other related household characteristics, such as lower income, remoteness and low education. Finally, the fifth binary variable *School* indicates whether children aged 5 to 20 have attended school. This variable aims to determine if having kids attending school influences consumption deprivation.

We estimate the model using OLS and interpret the estimated coefficients as the effect of fulfilling a certain household characteristic on the variable of interest. To interpret the coefficients as representative to the Nigerian population, we use weighted OLS, using the sampling weights provided in the survey. We estimate the standard errors correcting for heteroskedasticity.

4 Results

Table 8 displays the results of the estimation. It is a linear model, Columns 1 to 5 report the estimated coefficients obtained by OLS and 5 regressions one for each staple food item.

Our findings reveal that the variable 'Renting the dwelling' is only significant for the food item 'Corn' at a significance level of 0.05. The interpretation of this coefficient suggests that corn is the least essential food item for individuals who rent. In other words, it is considered a luxury good. Consequently, individuals who rent tend to forgo purchasing corn, thereby exacerbating the deprivation of this good due to its luxury nature. Moving from owning or occupying a dwelling to renting increases the deprivation of corn by 19.1%. The reason we interpret this variable is that renting refers to allocating a portion of household income to

[3]Alternatively, rural households might be exposed to higher trade disruptions if local consumption relies on external sourcing.

Table 8: Regression Results

	(1) Rice	(2) Beans	(3) Yam	(4) Cassava	(5) Corn
Rent	−0.124	0.0344	−0.0458	0.0349	0.191*
	(0.0834)	(0.0822)	(0.0958)	(0.0828)	(0.0886)
Rural	0.228**	0.237***	−0.0148	0.235**	0.0403
	(0.0785)	(0.0698)	(0.0871)	(0.0732)	(0.0849)
Medical	−0.311***	−0.199	−0.260**	−0.163	−0.255*
	(0.0929)	(0.113)	(0.0901)	(0.115)	(0.111)
Translation	0.143	0.136*	0.0753	0.145	0.0572
	(0.0804)	(0.0693)	(0.105)	(0.0799)	(0.0772)
School	0.0502	0.0809	−0.00982	0.0714	0.0813
	(0.104)	(0.0931)	(0.118)	(0.0874)	(0.0827)
Constant	0.462**	0.140	0.882***	0.0686	0.245
	(0.155)	(0.153)	(0.152)	(0.136)	(0.159)
Observations	384	373	266	300	293
Adjusted R-squared	0.08	0.07	0.03	0.07	0.09

Standard errors in parentheses

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Source: Own elaboration with Stata. Data from the World Bank.

pay rent, which reduces consumption in other things and food items, in this case, corn.

For the variable 'Rural', which means living in rural areas we see that is significant for 'Rice' and 'Cassava' at a significance level of 0.01, and 'Beans' at a significance level of 0.001. Moving from urban to rural areas increases the deprivation of rice 22.8%, beans 23.7% and cassava 23.5%. This is attributed to the economic challenges faced by households in rural areas, which make it difficult to access these food items.

The variable 'Medical' refers to households that have access to medical treat-

ment. As shown in Table 8, accessing medical treatment reduces the deprivation of corn by 25.5%, which is the most luxurious food, as we have seen in the 'Renting' variable. Therefore, individuals who can access medical treatments are in a better economic position. Additionally, these households are able to purchase more rice by 31.1% and yam by 26%. In other words, individuals who can afford medical treatment do not experience deprivation in these food items.

The variable 'Translation' refers to individuals who required their interview to be translated into their respective language. As observed in the table, individuals who require translation, specifically ethnic minorities in Nigeria, experience a 13.6% increase in deprivation of beans. This means that individuals who need translation cannot afford access to beans, despite needing them for consumption.

Finally, the variable 'School', which indicates the presence of children aged 5 to 20 attending school, does not have any impact in the model. The objective of analyzing this variable was to observe that if children were in school, they were not working and therefore not contributing to the household income. Consequently, households were expected to have lower spending or consumption levels. However, as shown in the model, the 'School' variable neither increases nor decreases deprivation in any of the staple food items.

5 Conclusions

This study has shown, based on a household survey of Nigeria conducted during COVID-19, factors that affect their consumption deprivation. Having selected five typical food items, we found that these goods were needed for at least 40.4% to 78.2% of the nigerian households depending on the food item. However, of those needing these goods from 15% to 59% were not able to satisfy their needs. Among the reasons provided in the survey, the predominant factors were that households lacked the financial resources, referring they did not have money to purchase these essential foods and they could not purchase due to their high price. Subsequently, we pursued to explain the deprivation of these foods through economic indicators.

We hypothesize that households paying a rent (ie., more financially constrained) were experiencing more deprivation. However, we only found that this variable increases deprivation for 'Corn'. We also tested if living in rural areas increased

deprivation, and found that this effect is significant in three out of five food items ('Rice', 'Beans' and 'Cassava'). Another tested hypothesis was if having access to medical treatment as a proxy for high income, increased deprivation. The results were that it was significant for three out of five items and it actually decreased deprivation in all of them. We also wanted to test if needing translation, as a proxy for ethnic minority, increased deprivation. The results were that this hypothesis was increased significant deprivation only for 'Beans'. Lastly, we wanted to test if having children attending school had an effect on deprivation. However, this variable did not have a significant impact. By examining these variables, we aimed to shed light on the underlying factors contributing to food deprivation and provide insights into the economic indicators associated with it.

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