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COVID-19-Induced Disruptions of School Feeding Services Exacerbate Food Insecurity in Nigeria

Introduction

The COVID-19 pandemic has significantly impacted people, systems and countries across the world – changing the way of life for many. The pandemic's impact on food systems has contributed to increased food insecurity in many parts of the world. Food insecurity is a major public health issue that affects millions of people around the world. One of the major ways that the pandemic impacted food systems is by affecting people's ability to access food. In many parts of the world, lockdowns and movement restrictions made it difficult for people to buy food and the economic downturn made it difficult for people to afford the food they needed. School closures not only impacted education but also disrupted school feeding programs in many parts of the world. The disruption of these school feeding programs had a number of negative effects – particularly among vulnerable populations such as low-income households (these programs were contributing to their food security). One major way was by reducing children's access to free nutritious meals and this left some families struggling to provide enough food for their children. Overall, the COVID-19 pandemic and the resulting school closures disrupted the availability and effectiveness of school feeding programs, putting many families at risk of food insecurity – worsening the status of some. Food insecurity can have social and political implications through negative channels such as social inequality and exclusion. It can also be a source of conflict and instability. Therefore, food insecurity policy is important for promoting economic development, improving public health and fostering social justice.

In this report, I will critique the paper titled "COVID-19-Induced Disruptions of School Feeding Services Exacerbate Food Insecurity in Nigeria" written by Kibrom A Abay, Mulubrhan Amare, Luca Tiberti, and Kwaw S Andam. Abay et al. sought to quantify the impact of school closures prompted by COVID-19 on the food insecurity status of Nigerian households. Thus, the research question explored was: "Does the COVID-19-induced closure of school feeding programs increase food insecurity for households with primary school-going children in Nigeria?" (Abay et al., 2021)

Background

As an intervention under its National Social Investment Program, the Federal Government of Nigeria implemented the National Home-Grown School Feeding Program (NHGSFP) in 2016 to provide one meal a day for each primary school child (grades 1-3) enrolled in government-owned primary schools in an implementing Local Government Area (LGA). By January 2020, 714 of the 774 LGAs in the country were implementing the NHGSFP – with over 9 million children benefitting from the program (Abay et al., 2021).

Data
The paper uses household survey data from the Living Standards Measurement Study-Integrated Agriculture Survey. For COVID-19 specific data, the data is sourced from the Nigerian Centre for Disease Control on COVID-19 cases and lockdown measures implemented by the Nigerian government. Additionally, the paper uses data from the Federal Ministry of Humanitarian Affairs, Disaster Management and Social Development on LGA-level for information on access to school feeding services. The survey data was collected over two rounds: a pre-COVID-19 in-person survey conducted between January to February 2019 and a post-COVID-19 phone survey conducted between April to May 2020. The final sample comprised 1,950 households across 368 LGAs (Abay et al., 2021).

Methods
The analysis is aimed at comparing the food security outcomes for school feeding program beneficiary households to non-beneficiary households, before and after the COVID-19 pandemic. Thus, the paper uses a difference-in-differences regression specification with fixed effects and clustered standard errors at the LGA level. The unit of analysis is households. The main explanatory variable is an indicator variable for access to school feeding programs which is equivalent to an indicator variable for disruption of school feeding programs. There are four outcome variables which are used as food insecurity indicators over the last 30 days. The first is an indicator for "whether an adult household member skipped a meal due to lack of money or resources to access food". The second indicator is "whether a household ran out of food in the last 30 days". The third is an indicator for "whether an adult household member went a whole day without eating due to lack of money or resources to access food". With the three aforementioned indicators being linked, the fourth indicator is an aggregate index constructed as a linear combination of the three other indicators (Abay et al., 2021). The main outcome variable I used in critiquing the paper is the food insecurity index. The paper uses the following difference-in-differences specification:

$$\mathbf{Y_{hvt} = \alpha_h + \gamma_0 Post_t + \gamma_1 Disruption\ of\ school\ feeding_v * Post_t + \epsilon_{hvt}}$$

Where:
Y_{hvt} is food insecurity outcome for each household (h) living in an LGA (v)
α_h are household fixed effects
$Post_t$ is an indicator variable (1 for post-COVID-19 round, 0 for pre-COVID-19 round)
$Disruption\ of\ school\ feeding_v$ is an indicator variable (1 for LGAs implementing school feeding services before the pandemic, 0 for LGAs without school feeding services before the pandemic)
γ_1 is the coefficient that captures the treatment effect
ϵ_{hvt} is an error term

Below is a simplified version of the specification I used in critiquing the paper:

$$\Delta Y_{hvt} = \gamma_0 + \gamma_1 Disruption\ of\ school\ feeding_v + (\epsilon_{hv1} - \epsilon_{hv0})$$

Findings

The impacts of disruption of school feeding services are measured for three groups of households: households with primary school children, households with children above primary school age, and households with no school children. The first group being the main group of interest and the latter two used as falsification tests to validate effects of disruptions of school feeding services. The authors find that "the food insecurity experience of all household groups increased in the post-COVID-19 round". Also, they find that "the food insecurity experiences of households with school children increased due to disruption of school feeding services – specifically, the disruption of school feeding services is associated with a 0.2 standard deviation increase in the food insecurity index for households with primary school children". Additionally, "the disruption of school feeding services only impacted households with primary school children" – the γ_1 coefficient, i.e. the treatment effect, was not statistically significant for households with children above primary school age and households with no school children (Abay et al., 2021).

Critiques

Omitted variable bias

In Table 4, Abay et al. (2021) regress change in food insecurity index on disruption of school feeding services. However, this regression may suffer from omitted variable bias. The COVID-19 pandemic and associated mitigation measures affected family income due to loss of jobs and/or reduced wages due to reduced work hours. If poverty status is excluded from the specification, this can lead to omitted variable bias. This is because poverty is a key determinant of food insecurity, and failing to include it in the specification means that the estimated change in food insecurity may not accurately reflect the true relationship between the two variables. Change in family income may differ across households in ways that are not perfectly captured by the disruption in school feeding services. If there is a change in family income that results in lower family income after the pandemic, this is equivalent to an increase in the household's poverty status. If we assume that an increase in poverty status is mostly experienced by households in LGAs that are affected by COVID-19-induced disruptions of school feeding services then change in poverty status would be *positively correlated* with disruption of school feeding services. Similarly, it is possible that poverty status is associated with food insecurity status. So, poorer households i.e. households that experience an increase in poverty status would be more prone to increased food insecurity levels (i.e. higher changes in food insecurity index). Therefore, change in poverty status would be *positively correlated* with change in food insecurity index. In this case, change in poverty status will bias the observed relationship between change in food insecurity and school feeding disruption *upward*, as shown in the following figures:
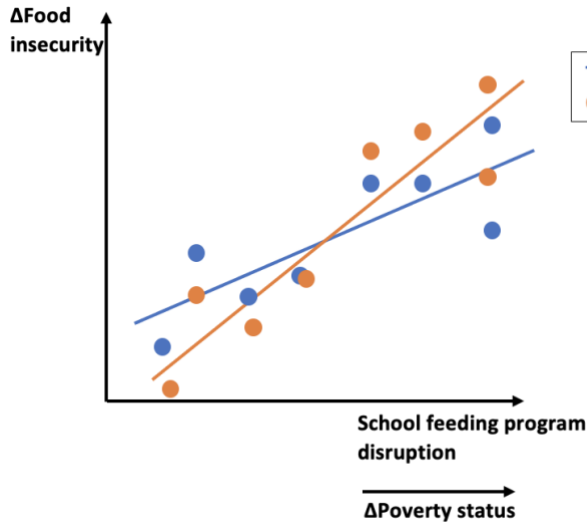
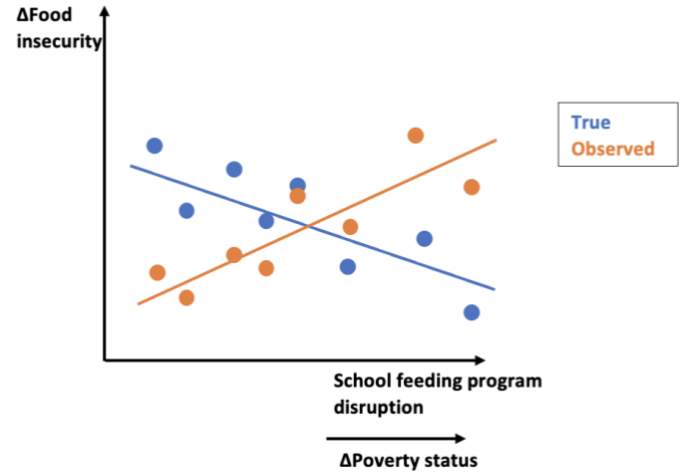*Figure 1.*   *Figure 2.*

The observed relationship in Table 4 of Abay et al. is positive (i.e. disruption of school feeding services leads to a higher food insecurity status), but the true slope may be a smaller positive value or even a negative value (as shown in Figure 2. above), consistent with upward omitted variable bias. To avoid this bias, it is important to include all relevant variables in the specification, including poverty status, in order to accurately estimate the change in food insecurity.

Non-random missing data

For the post-COVID-19 survey, data was missing in a systematic manner – thus, data missing not at random. Several households declined to participate in the post-survey. The post-COVID-19 phone survey was aimed at tracking households that were interviewed during the pre-COVID-19 round of the survey. Of the total sample of 4,976 households that were interviewed in the first round, 99.2% provided phone numbers. Of the households with phone numbers provided, a sample of 3,000 households were selected for the phone survey, i.e. candidate households for the post-COVID-19 survey. The phone survey successfully contacted 69% of sampled households and several households declined to participate in the post-survey (Abay et al., 2021). Eventually, only households with complete information, i.e. data in both rounds, were kept and other households were dropped. It is likely that the missing values are households that experience higher changes in food insecurity, i.e. lower income households, as show in Figures 3. and 4. below. If households prone to higher changes in food insecurity drop out of the survey and are thus dropped from the sample data then we would have bias towards zero.
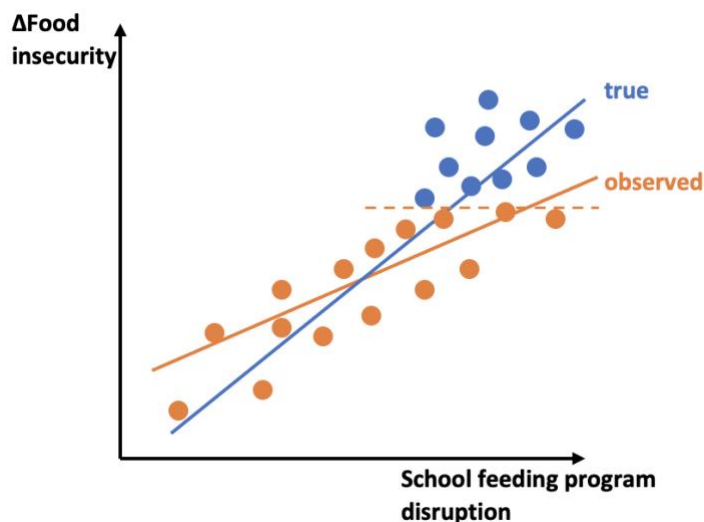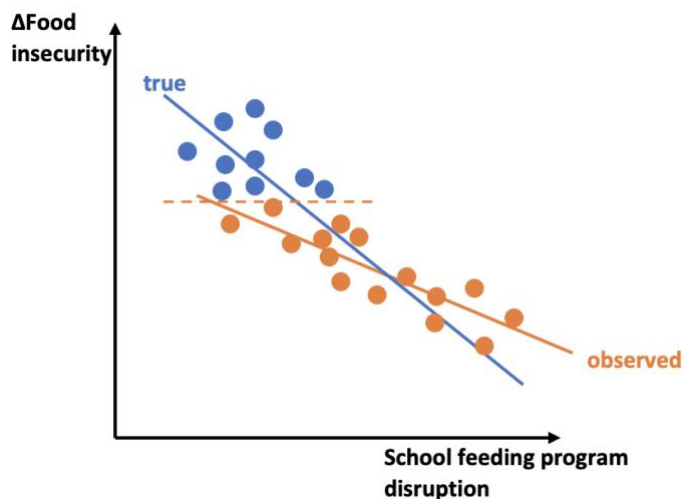
Figure 3.   *Figure 4.*

This can lead to inaccurate conclusions being drawn from the data, as the sample may not be representative of the population as a whole. To avoid this bias towards zero, it is important to carefully design the survey to ensure that missing data is missing completely at random, or to use statistical techniques to correct for the bias.

Discussion

Food insecurity is a multi-faceted issue but the United Nations deems hunger as the greatest solvable humanitarian problem (World Food Programme, 2013). Thus, it is very important to identify and mitigate food insecurity. For Nigeria, hunger is a severe issue plaguing a huge percent of the population. The paper is very important as it sought to quantify the impact of the COVID-19 pandemic on households' hunger experience. The results are unsurprising and reflect the real world experiences though there might be other factors that lead to higher food insecurity experiences for Nigerian households. Although my critiques demonstrate that the estimates may be biased, I believe they do not tell a highly significantly different story from the presumed true state of the hunger experiences. I particularly liked the authors' use of an aggregated index to quantify the food insecurity status of households as I believe this index is robust since it factors in other food insecurity indicators. I also appreciated the authors' use of synthetic controls to assess the validity of the hypothesis in their analysis. The falsification test was conducted to show that there is no treatment effect on households that were not treated i.e. households without school children and children above primary school age.

Conclusion

Overall, the COVID-19 pandemic and the resulting school closures had a significant impact on school feeding programs, disrupting their availability and effectiveness and making it more difficult for these programs to provide the nutrition that children need. Consequently, Nigerian households have been prone to higher experiences of food insecurity. Based on the omitted

variable bias and the non-random missing data, the analysis has both bias towards zero and upward bias. Bias towards zero indicates that the data is biased towards lower values, while upward bias indicates that the data is biased towards higher values. With both of these biases present, the data is likely to be biased towards higher values, resulting in an upward bias in the analysis. This can lead to inaccurate conclusions being drawn from the data, as the true relationship between the disruption of school feeding services and food insecurity may be different from the one that is estimated in the paper. Thus, I conclude that the paper's estimates are biased upward resulting in larger estimates of the treatment effect.

References
Abay, Kibrom A, Mulubrhan Amare, Luca Tiberti, and Kwaw S Andam. "COVID-19-Induced Disruptions of School Feeding Services Exacerbate Food Insecurity in Nigeria." *The Journal of Nutrition* 151, no. 8 (August 1, 2021): 2245–54. https://doi.org/10.1093/jn/nxab100.

World Food Programme. "Hunger Is the World's Greatest Solvable Problem," February 2013. https://documents.wfp.org/stellent/groups/public/documents/communications/wfp255846.pdf.