**Impact of Twin Lockdowns on Hunger, Labor Market Outcomes, and Household Coping Mechanisms: Evidence from Uganda†**

Shamma Adeeb Alam\*

Claus C. Pörtner\*\*

Ishraq Ahmed\*\*\*

**Abstract**

We examine the short- and medium-run impacts of two of the strictest Covid lockdowns in the developing world, employing longitudinal data from Uganda. Household fixed effects estimations show significant, immediate increases in food insecurity with the first lockdown and a continued negative impact three months after its lifting. The medium-term food insecurity impact of the second lockdown was even worse, suggesting a compounding effect of repeated, systemic shocks. The rising food insecurity was partly the result of the lockdown-related reductions in the availability of paid work. Agricultural households were better able to continue working and consequently had better food security. The likelihood of agricultural work during the first lockdown and in the months following increased significantly, suggesting a switch to agriculture to cope. The typical coping mechanisms that households rely on for idiosyncratic shocks failed in the face of a worldwide shock, contributing to the sizeable increase in food insecurity.

[We need to get this to 150 words]

\* Corresponding author: Shamma A. Alam, Associate Professor, Department of International Studies, Dickinson College, Carlisle, PA. Email: [alams@dickinson.edu](mailto:alams@dickinson.edu).

\*\* Claus Portner, Associate Professor, Albers School of Business and Economics, Seattle University, Seattle, WA, and Center for Studies in Demography and Ecology, University of Washington, Seattle, WA. Email: [cportner@seattleu.edu](mailto:cportner@seattleu.edu).

\*\*\* Ishraq Ahmed, Economist, Public Utility Commission, State of Oregon, Salem, Oregon.

† We would like to thank seminar participants at Howard University and Alex Henke for their helpful comments and suggestions. Partial support for this research came from a Eunice Kennedy Shriver National Institute of Child Health and Human Development research infrastructure grant, P2C HD042828, to the Center for Studies in Demography & Ecology at the University of Washington.

**Introduction**

Using longitudinal data and household fixed effects, we examine the impact of the twin lockdowns in Uganda on food insecurity, labor market outcomes, and how households attempted to cope with the impact of the lockdowns.

Several but. These limitations includeusing and a narrow geographical focus, covering only These early studies find evidence of a negative impact of lockdowns during the pandemic on food insecurity, income, employment, and agricultural production.[[1]](#footnote-3) There is also evidence of coping mechanisms through changes in own financial behavior, such as reduced non-food expenditure, drawing down of savings, membership in savings and loan groups, increased borrowing, and sale of assets (Ceballos et al., 2021, 2021; Headey et al., 2020; Kansiime et al., 2021; Rönkkö et al., 2022; Ruszczyk et al., 2021). However, remittances also declined, and there was insufficient government support to help households cope with the shock (Ceballos et al., 2021; Curi-Quinto et al., 2021). [Shamma: please check citations here; not sure I can find the right ones from Zotero]

Only four studies that we could identify used panel data with household fixed effects, and three of these studies found no effect of lockdowns on food consumption across Liberia, Malawi, Kenya, and Ethiopia (Aggarwal et al., 2022; Hirvonen et al., 2021; Janssens et al., 2021).[[2]](#footnote-4) Nigeria’s lockdown did appear to increase food insecurity (Amare et al., 2021)

These studies do, however, have their limitations. The Liberia data had a very low survey completion rate with evidence of non-random attrition (Aggarwal et al., 2022). The Kenya study focused only on households with either a pregnant woman or a mother with children below four years old (Janssens et al., 2021). Ethiopia never went into a complete lockdown, and the study covers only Addis Ababa (Hirvonen et al., 2021). Finally, the Nigeria study could only examine the immediate effect of the lockdown and used a limited set of food insecurity questions (Amare et al., 2021).

Given the mixed findings and limitations in data and estimation methods in the prior literature, our study makes four main contributions. First, we estimate household fixed effects models of food insecurity using nationally representative panel data covering seven rounds, which cover two lockdowns and periods with few restrictions. The two lockdowns allow us to examine whether the second lockdown compounded the effect of the first or whether households were better able to cope with the second lockdown because they already had experience dealing with a prior lockdown. Second, we examine both short- and medium-run effects of lockdowns to understand the persistence of the impact of lockdowns in the months following their lifting. Third, we examine how the coping mechanisms typically employed by households to handle idiosyncratic shocks perform in the face of repeated systemic shocks. Detailed data on coping mechanisms, such as employment, remittance, assistance from family, government assistance, assistance from NGOs, number of household members, and agricultural strategies, allows us to understand how households attempted to cope with the effect of lockdowns. Finally, rather than relying on reported lockdowns like in prior studies, we use additional data on the stringency of lockdowns and Google mobility data to conduct robustness checks of our analysis.

We use FAO’s eight-question food insecurity experience scale (FIES) to measure food insecurity. We find that food insecurity significantly increased during the lockdowns. The point estimates are large, with an increase of 24 percentage points for any food insecurity during the first lockdown compared to the period with no lockdowns. We also find that lockdowns have a substantial medium-term impact, with food insecurity 10 percentage points higher two to three months after the first lockdown was lifted. The medium-term impact was even higher following the second lockdown, with a 22 percentage points increase in any form of food insecurity three months after the second lockdown had been lifted. This suggests that the second lockdown compounded the negative effect of the first lockdown.

We examine the effect on labor market outcomes to understand the mechanism behind the significant impact on food insecurity. We find substantial decreases in paid work during the lockdowns and decreases in different types of income, such as wage income, agricultural income, non-farm business income, and income from assets owned.[[3]](#footnote-6) However, agricultural households fared significantly better in continuing work during the lockdowns than non-agricultural households. This may explain why we observe a significant increase in the likelihood of doing agricultural work during and the months after the first lockdown. However, that difference dissipates by the time of the second lockdown, which suggests that the shift to agriculture was a temporary shift following the first lockdown.

We also investigate other mechanisms households could use to cope with the effects of the lockdowns. We find that transfers from traditional sources of assistance, such as remittance from abroad, assistance from family members within the country, assistance from non-family individuals, and assistance from development organizations, decreased during the lockdowns. This suggests that the worldwide macroeconomic shock from COVID-19 affected everyone’s income and ability to send assistance. The lack of assistance may explain lockdowns’ substantial effect on food insecurity. Finally, we find evidence of a net increase in the number of members in households, which may suggest that lockdowns forced individuals living elsewhere to join/rejoin the household.

**2. Lockdown Context**

On March 18, 2020, the Ugandan government started imposing restrictions, including travel restrictions and cancellation of public gatherings, such as religious services, weddings, and music events (Uganda Bureau of Statistics, 2022). Total lockdowns were imposed on March 30 with a nationwide curfew from 7 pm to 6:30 am, banning of public transportations, strict regulations on the movement of vehicles, and closure of all non-essential businesses, which extended till the end of May (Alfonsi et al., 2021; Margini et al., 2020).

Lockdowns were eased in June 2020 with the resumption of public transportation and the opening of businesses (Guloba et al., 2021; Monitor, 2020; Schwartz et al., 2021; Wagner et al., 2022). Most small and medium businesses were back open by July-August 2020 (Alfonsi et al., 2021). International travel restrictions remained until the end of September, when land borders reopened, and international flights resumed (Guloba et al., 2021).

Given the resurgence of Covid-19 infections in 2021, the government of Uganda imposed a second lockdown from June to July of 2021 (Atamanov et al., n.d.; Athumani, 2021).

**3.** **Estimation Strategy and Data**

To establish the causal effects of COVID-19 lockdowns, we use fixed effects models on a nationally representative longitudinal household data set, relying on the changes over time in government-imposed lockdowns to identify the effect.

Data come from the *Uganda High-Frequency Phone Survey on COVID-19* (UHFS), conducted by the Uganda Bureau of Statistics in collaboration with the World Bank. The survey was conducted in seven waves, with four waves in 2020 (June, August, September, and October) and three in 2021 (February, March, and October). The goal of the UHFS was to help understand the economic and social impacts of the COVID-19 pandemic by collecting high-frequency data on individuals and households (Uganda Bureau of Statistics, 2022). To this end, the survey asked detailed questions on food insecurity, employment, income, outside assistance, and agricultural practices.

The UHFS sample is a subset of the 3,098 households interviewed in the 8th wave of the Uganda National Panel Survey in 2019/20 (UNPS 2019/20). In UNPS 2019/20, households were requested to provide a phone number so they could be reached if they moved from their location.[[4]](#footnote-7) Of the 2,386 households that provided a phone number, UHFS successfully interviewed 2,227 households for round 1.[[5]](#footnote-8) [DISCUSS SAMPLE SELECTION].

Over the seven rounds, the attrition rate was 12.4 percent, so 1,950 households from the baseline were interviewed in round 7 (October 2021). However, replacement households were added to the sample in the following rounds. This brings our total sample size to 2,283 households and 14,475 observations.

Our main specification regresses outcomes, *Y,* discussed below, on a lockdown indicator, *Lt,* and a set of other variables using a linear fixed effects model[[6]](#footnote-9):

*Yi, t = β0 +* *β1* *Lt + ∑t β2t Roundt + β3 Casesi,t + β4 X1 i,t-1 + δi + εi,t* , (1)

where *i* denote household and *t* survey rounds. The first survey round, June 2020, was towards the end of the first lockdown, and the seventh round, October 2021, was soon after the second lockdown. Hence, *Lt* takes the value 1 in rounds 1 and 7 and 0 otherwise, and the main coefficient of interest is *β1*. We also include a set of indicator variables, *Round,* to capture other differences across survey rounds.

As a consistency check on our use of rounds 1 and 7 as lockdown rounds, we also employ a stringency index developed at the Blavatnik School of Government, University of Oxford (Hale et al., 2021). This index is a composite measure based on nine indicators, including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100 = strictest response). We use the average value in the 30 days before the households were surveyed.

In addition to government-imposed lockdowns, households may decide to self-isolate or take other steps to avoid contact with others if they perceive a high risk of contracting Covid-19. To capture the severity of the Covid situation*,* we include the number of new Covid-19 cases per 100,000 people in the past 30 days with the *Cases* variable. The information on the stringency index and Covid cases comes from “Our World in Data”.[[7]](#footnote-10)

Lockdowns may also influence the household structure, so *X1* represents the number of household members in the prior round. We use the lagged values from the previous survey round, which are also before that particular lockdown, thus avoiding endogeneity concerns.

*δi* represents the household fixed effects, which controls for unobserved household-level time invariant factors that may bias the results. The household fixed effects control for time-invariant factors that may bias the results, including unobservables that may affect both job loss and the dependent variables. It allows us to control for time-invariant characteristics associated with the individual/household, such as gender, race and religion, constant preferences, household characteristics, area characteristics, and other time-invariant factors.[[8]](#footnote-11) It is important to note that for estimations on individual level-dependent variables, like employment, it works like an individual fixed effects model because the same individual from the household is followed over the seven rounds.

*3.1 Main Outcomes: Food Insecurity*

The survey measures food insecurity based on the Food Insecurity Experience Scale (FIES) developed by the Food and Agriculture Organization (FAO, 2016). FIES uses eight questions with dichotomous (yes/no) responses to understand the different challenges related to food insecurity. This measure has been empirically validated for cross-cultural use (Ballard et al., 2013; Kansiime et al., 2021). FIES asks whether, during the last 30 days, there was any time when any adult in the household experienced the following because of lack of money or other resources: (i) were worried about not having enough food to eat; (ii) were unable to eat healthy and nutritious/preferred foods; (iii) ate only a few kinds of foods; (iv) skip a meal; (v) ate less than you thought you should; (vi) ran out of food; (vii) hungry, but did not eat; and (viii) went without eating for a whole day. We create a dummy variable for each question where 1 represents “yes,” and 0 represents “no.” Additionally, we create another variable to capture whether a household experienced any form of food insecurity, where 1 represents “Yes” to at least one of the eight FIES questions and 0 otherwise.

*3.2 Mechanisms that Affect Food Insecurity*

To understand how food insecurity was affected by the government lockdowns and how households responded to the lockdowns, we examine three broad categories of outcomes: changes in income across sources, labor market outcomes and type of work done, and whether the households received assistance from outside sources.

Income

Households were not asked the monetary value of their income but rather whether their income from different sources increased, remained the same, decreased, or had a complete loss since the prior round (for round 1, the questions were asked relative to the start date of the lockdown, March 20, 2020). This provides us with a relative, ordinal measure of income compared to the household’s prior income. The income questions were asked about five sources: (i) family farming, livestock, or fishing, (ii) non-farm family business, (iii) wage employment, (iv) income from assets (properties, investments, or savings), and (v) pension. As the income question was ordinal, we created variables for each income source where 1 represents an increase in income, 0 represents income remaining unchanged, and -1 represents a decrease in income or a complete loss.

Labor Market Outcomes

Lockdowns may affect the availability of employment, both because workplaces may close and because of the overall reduction in economic activity that is likely to follow lockdowns. We, therefore, examine both the likelihood that households are working and whether they move between agriculture and non-farm work in response to the lockdowns.

Respondents were asked whether they did “any work for pay, any kind of business, farming or other activity to generate income” in the last week. If yes, they were asked whether this was the same job as the previous round and the broad industry in which they worked in the current survey round. For round 1, respondents were also asked whether they did the same work as before the start of the pandemic, and if it was a different job, what was the broad industry of their job.

We create two indicator variables to capture the likelihood of working: doing any market work and working in the same job as before.

As the place of work being closed for social distancing has been one of the primary channels through which market work is affected, people may have been able to continue some types of work more than others. This may be particularly relevant for agriculture, where workers may have the space to socially distance themselves while working and, in many cases, the workers in a family farm are likely to be from the same household, in which case they do not need to socially distance while working. Also, lockdowns may be challenging to enforce on farms in rural areas. This may mean that the effect of lockdowns on working may differ between agricultural and non-agricultural households. To understand potential switching across sectors, we also create an indicator variable for working in agriculture, where 1 represents working in agriculture and 0 for working in a non-agriculture sector. To be able to understand the effect of the lockdowns on switching, this set of estimations uses the sector that the household worked in at the time of the UNPS 2019/20 survey, setting the number of Covid cases to zero. The UHFS survey also asked whether any household member had operated a non-farm family business since the prior round. We create a dummy variable where 1 represents operating a business and 0 otherwise.[[9]](#footnote-12)

The survey also asked households participating in farming, whether they changed planting activities because of Covid-19. If yes, they are asked how they changed their activities. This allows us to understand whether households changed their agricultural strategy in response to the lockdowns.

Outside Assistance

The UHFS asked households whether they received assistance from the following sources: (i) remittance from abroad, (ii) assistance from family within the country, (iii) assistance from other non-family individuals, (iv) assistance from NGOs, and (v) assistance from the government.[[10]](#footnote-13) The questions were asked the same way as the income questions, where households can either report income increase, remaining the same, decrease, or complete loss. Therefore, like the income estimations, we create ordinal variables where 1,0 and -1 represent an increase, same, and decrease/complete loss, respectively.

Using the household roster information from both UHFS and the UNPS 2019/20, we have data on the number of household members, adults, and children. To understand the impact on household structure, we calculate the change in the number of household members by subtracting the number of household members in the prior round from the number for the current round.

**4. Summary Statistics**

Table 1 presents the summary statistics of the key dependent variables. Column 1 shows the overall sample mean, columns 2 and 3 the respective sample means during lockdowns and no lockdowns, and column 4 the difference between the two samples. Overall, the average food insecurity across all rounds is relatively high, with 59.3% reporting at least one type of food insecurity. The number of households reporting any food security becomes much larger during lockdowns, with the fraction increasing to 74% as opposed to 53.5% for the rounds with no lockdowns. The differences in means between lockdown and no-lockdown periods are large for all food insecurity measures, with the majority having a difference of over 20 percentage points.

For employment, the fraction of individuals working during lockdowns is 16.6 percentage points lower than in periods with no lockdowns, which provides suggestive evidence of the impact of lockdowns on employment. However, more individuals are switching to agricultural work during the lockdowns compared to the no-lockdown period, with a difference of 4.6 percentage points. Similarly, people are less likely to work at the same job during lockdowns compared to other periods.

**4. Results**

*4.1 Food Insecurity and Health Access Insecurity*

In Table 2, we examine the impact of the Covid-19 lockdowns in Uganda on the likelihood of food insecurity using a linear model with household fixed effects. In column 1, we find that lockdowns lead to a substantial and statistically significant increase in the likelihood of having any food insecurity by 23.8 percentage points. The lockdowns lead to a significant increase in all eight food insecurity measures, where most of the point estimates are sizeable with magnitudes of over 20 percentage points. Even more concerning, the worst forms of food insecurity, “went hungry but did not eat” and “went without eating for a whole day,” almost doubled.

*4.2 Impact on Work*

One way lockdowns may have affected food insecurity is by affecting people’s ability to work as places of work were likely affected by the lockdowns. Therefore, we examine the effect of lockdowns on doing market work in the last week (Table 4, column1). We find that the likelihood of any market work decreases significantly during the lockdowns by 18.3 percentage points. Lockdowns can theoretically affect market work through several channels, such as place of work being closed for social distancing, being ill from Covid-19 virus, caring for a sick household member, being laid off from the job, supply-chain issues affecting inputs for businesses, and reducing movement because people may not want to be exposed to the virus. The survey asked individuals the reason for not working, and the top three reasons reported are that the place of work is closed (57%), being ill or caring for an ill household member (13%), and being laid off from the job (6%).

Next, we examine the differential impact of lockdowns on working by comparing agricultural households to non-agricultural households. As lockdowns may affect the likelihood of working in agriculture, we interact lockdown with whether the individual worked in agriculture in the prior round.[[11]](#footnote-14) As shown in column 2, agricultural households fared significantly better; they are 16.8 percentage points more likely to work during the lockdowns than non-agricultural households.

As the results suggest that there are more work opportunities in agriculture during the lockdowns, this may cause some individuals to shift to agricultural work from non-agricultural roles during that period. As we want to understand whether individuals are switching to agricultural work from the prior round’s employment, we limit the estimation to only those employed in the current round and the prior round (or before the lockdown for round 1). We find that the likelihood of switching to agricultural work significantly increases by 7.5 percentage points during the lockdowns (column 3).

This raises the question of whether workers switch back to non-agricultural work sometime after the lockdowns have ended. To examine this issue, we examine the effect of lockdowns on switching to non-agricultural work in the current round.[[12]](#footnote-15) Moreover, we conduct five additional estimations where we examine the effect of lockdowns on the switch to non-agricultural work in the following survey rounds, i.e., rounds 2, 3, 4, 5, and 6, respectively. The results are presented in Appendix Table A1. While there is a decline in the switch to non-agricultural work during the lockdowns, we find a small increase (2 percentage points) in the switch to non-agricultural work in the round immediately following the first lockdown. However, that effect does not persist in the following rounds. Overall, we do not observe a strong shift towards non-agricultural work, which suggests that the net effect of switching to agricultural work persists in the months following the first lockdown.

One potential reason for the lack of switch back to non-agricultural work may be the continued increased fear of contracting Covid-19 in the months following the lockdowns. The survey asked the respondents, “How do you feel about the possibility that you or someone in your immediate family might become seriously ill from COVID-19?” Respondents can report very worried, somewhat worried, not too worried, or not worried at all, and 75 percent report being very or somewhat worried during the lockdown in round 1. However, the numbers only decrease gradually in the three subsequent rounds: where the numbers for very or somewhat worried are 71, 71, and 69 percentages for rounds 2, 3, and 4, respectively. Then in rounds 5 and 6 (which are in the year 2021), we find bigger drops to 59 and 50 percentages, respectively. The minor drop in worry in the months following the first lockdown may partly explain the lack of movement back to non-agricultural work. Another reason behind the lack of switch may be depressed economic conditions in certain non-agricultural sectors continuing in the months following the pandemic. However, we do not have data to test that theory.

The switch to agricultural jobs may also reflect broader changes due to the lockdowns. We examine whether the lockdowns affected the probability of individuals staying at the same job as the prior round (for Round 1, it represents the same job before the lockdown). We find that lockdowns significantly decrease the likelihood of staying at the same job by about 12 percentage points (column 4), suggesting a broader change in jobs.

Similar to market work, the lockdowns may have affected the operation of own family business. We find that the likelihood of operating a non-farm family business increases by 3.5 percentage points, suggesting that individuals owning and operating small businesses may have fared better, on average, compared to working individuals during lockdowns.

*4.3 Agricultural vs. Non-agricultural households*

As agricultural households are more likely to work during the lockdowns than non-agricultural households, we examine whether it translates into better food and health access security for these households. In Table 5, we examine the differential impact of being in agricultural households during lockdowns. It is important to note that we found that we previously found that agricultural households is a choice variable, so these estimations are exploratory in trying to understand the differences in food insecurity between the two types of households. We interact lockdowns with a dummy variable identifying agricultural households, as defined by their agricultural status in the prior round (as defined earlier in Table 4). We find evidence that agricultural households were more food secure than non-agricultural households during lockdowns. Their likelihood of suffering any food insecurity during lockdowns was 8.1 percentage points lower than non-agricultural households. Except for the two food insecurity variables, “Had to eat only a few kinds of food” and “Ate less than they thought they should,” which likely captures the low severity food insecurity challenges, we find significant differences between the two types of households for all other food security questions.

*4.4 Impact on Income*

Given we use ordinal variables to represent changes in income at the household level, we have to use a fixed effects model specifically tailored for such variables. Therefore, we use the *conditional fixed effects ordered logistic regression*. The typical conditional logit model works by applying a fixed-effects logit model for households that see a change in the dependent variable over time. For the conditional *ordered* logit model, the actual values of the dependent variable are irrelevant, instead, greater values should correspond to higher-value outcomes (Baetschmann et al., 2015). Therefore, for our regressions, a positive coefficient for lockdowns represents an increase in household income, a negative coefficient represents a decrease, and a coefficient near 0 would represent income remaining the same. As shown in Panel A of Table 7, lockdowns lead to households having a significant decrease in farm income, non-farm family business income, wage income, and income from assets. We also examine the impact on income from pension, which can act as a placebo test as pension is typically not dependent on the state of the economy and remains steady over time. Not surprisingly, we do not find any changes in pension income during the lockdowns.

*4.5 Coping Mechanisms*

Given the reductions in income for households, we examine the potential mechanisms through which households tried to cope with the effects of the lockdowns. [Cite literature on mutual insurance, Townsend study?] Two forms of potential coping mechanisms are receiving assistance from family members outside of the household or receiving assistance from institutions. We find that assistance from the traditional sources actually decreased during the lockdowns: lockdowns lead to a reduction in remittance, assistance from the family within the country, assistance from non-family individuals, and assistance from NGOs. There is no effect on assistance from the government. These results suggest that some coping mechanisms the households could have depended on were unavailable during the lockdowns. As lockdowns worldwide led to the closure of workplaces and limited people’s movements, it may explain why potential assistance decreased during the lockdowns. Studies have shown a substantial decline in remittances across the world in the second quarter of 2020 because of lockdowns, which can explain the decline in remittances experienced by these households (Cardozo Silva et al., 2022; Guha et al., 2021; Kpodar et al., 2021; Shimizutani & Yamada, 2021; Zhang et al., 2021). The above results also possibly explain the large effects of lockdowns on food insecurity as the availability of outside help decreased during the lockdowns.

We examine other potential coping mechanisms, such as changes in household size. As the households are facing greater food insecurity during lockdowns, it is possible that there may be a net exodus of household members to look for better opportunities. On the other hand, as lockdowns lead to reductions in work and income for different types of jobs, there can be a net increase of household members as migrants return to their families. To understand this issue, we examine in Table 8 the impact of lockdowns on the change in the number of household members in each round. We find that the number of household members increases during lockdowns (column 1). To examine whether there is any difference in effects between adults and children, we find that lockdowns lead to an increase in number for both adults (column 2) and children (column 3). Overall, the results suggest an inflow of household members during the lockdowns.

The change in the number of household members raises the question of whether the lockdowns caused an urban-to-rural migration. However, we find no such evidence of lockdown-induced migration in column 4, where we examine the likelihood of living in an urban area (dummy variable where 1 represents living in an urban area and 0 otherwise).

[This can go to appendix] Lastly, given we find that agricultural households fared better in terms of food security and health access security, it is important to understand whether agricultural households change their agricultural strategy to better cope with the effects of the lockdowns. The survey asks in rounds 1, 4, and 7 to households engaging in family farming planting activities whether they change their “planting activities in the current agricultural season because of changes in the country or community due to coronavirus?”. About 16 percent of farm households reported changing some agricultural strategy, with an average of 21 percent during lockdowns and 6 percent during no lockdowns. We create a dummy variable where 1 represents a change in planting activities, and 0 represents no change. The estimates show that lockdowns increase changes in planting activities by about 63.4 percentage points.

For households reporting a change in activities, the survey also asks them how they changed their activities. This allows us to shed more light on how agricultural households attempted to change their farming strategy to cope with the effect of the shock. The biggest change reported was a change in the use of farm areas, where 6.8 percent reported a reduction and 5.1 percent reported an increase in the use of farm areas. It is followed by changes in the number of varieties of crops produced, where both an increase (3.6%) and a decrease (2.1%) in variety are mentioned. Some farmers also delayed planting (1.5%). Only a tiny fraction of farmers (0.6%) mentioned abandoning crop farming altogether for that season.

Overall, our results from the coping mechanisms suggest that the households, on average, could not take advantage of outside help, whether it was assistance from family members living outside of the household or assistance from institutions. We find evidence of net migration into the households and a switch to agricultural work, which may suggest that some household members return to the family for farm work. Lastly, we find evidence of agricultural households changing their farming strategy to try and cope with the effects of the lockdowns.

*5.6 Robustness Checks*

As there were other restrictions in place even after the primary lockdowns were lifted in June of 2020, such as schools continued to remain closed, it is possible that some forms of restrictions in other rounds may bias our estimations. While the biases are likely to lead to underestimates of our coefficients, it is still important to understand whether the stringency measures by the government are causing the effect. We employ the daily lockdown stringency measure for Uganda discussed earlier and use the average of the stringency measure for the 30 days before the interview. We estimate the effect of this stringency measure on food and health insecurity variables by capturing the variation of stringency measures over the survey rounds. We find that greater stringency measures lead to a significant increase in all food insecurity and health insecurity variables. The results are presented in Appendix Tables A5 and A6. [size of effect?] [problem with measure?]

**5. Conclusion**

[agriculture is likely less productive than non-farm work but better than nothing. With slow switching back from agriculture the lockdowns can potentially have severe long-term negative effects on the development of Uganda.]

[shows the limit of self-insurance/mutual insurance with a general shock]

[State capacity lacking]

Have to add it this somewhere in intro/results:

While not focusing on lockdowns, Gupta et al (2021) find that the pandemic led to a switch in occupations, particularly among salaried and business persons, with agriculture seeing the biggest inflow of labor compared to other industries.

**References**

Aggarwal, S., Jeong, D., Kumar, N., Park, D. S., Robinson, J., & Spearot, A. (2022). COVID-19 market disruptions and food security: Evidence from households in rural Liberia and Malawi. *PloS One*, *17*(8), e0271488. https://doi.org/10.1371/journal.pone.0271488

Alam, S. A., & Bose, B. (2020). Did the Great Recession Affect Fertility? Examining the Impact of Job Displacements on the Timing of Births in the United States. *Southern Economic Journal*, *86*(3), 873–909. https://doi.org/10.1002/soej.12408

Alam, S. A., & Pörtner, C. C. (2018). Income shocks, contraceptive use, and timing of fertility. *Journal of Development Economics*, *131*, 96–103. https://doi.org/10.1016/j.jdeveco.2017.10.007

Alfonsi, L., Bandiera, O., Bassi, V., Burgess, R., Rasul, I., Veroux, O., & Vitali, A. (2021). COVID-19 and Ugandan SMEs: Impacts and Speed of Recovery. *Centre for Economic Policy Research*, 7.

Amare, M., Abay, K. A., Tiberti, L., & Chamberlin, J. (2021). COVID-19 and food security: Panel data evidence from Nigeria. *Food Policy*, *101*, 102099. https://doi.org/10.1016/j.foodpol.2021.102099

Atamanov, A., Cochinard, F., Ilukor, J., Kilic, T., & Ponzini, G. (n.d.). *Economic impact of a second lockdown in Uganda: Results from the seventh round of the High-Frequency Phone Survey*. Retrieved August 23, 2022, from https://blogs.worldbank.org/opendata/economic-impact-second-lockdown-uganda-results-seventh-round-high-frequency-phone-survey

Athumani, H. (2021). *Uganda Lifts Some COVID-19 Restrictions*. VOA News. https://www.voanews.com/a/covid-19-pandemic\_uganda-lifts-some-covid-19-restrictions/6208989.html

Baetschmann, G., Staub, K. E., & Winkelmann, R. (2015). Consistent estimation of the fixed effects ordered logit model. *Journal of the Royal Statistical Society. Series A (Statistics in Society)*, *178*(3), 685–703.

Ballard, T. J., Kepple, A. W., Cafiero, C., & Statistics Division. (2013). *The Food insecurity experience scale: Development of a global standard for monitoring hunger worldwide*. FAO. https://www.fao.org/publications/card/fr/c/1f25bb40-7c4e-49e0-b79b-4d8b5e6354b5/

BBC. (2020, July 23). *Uganda—Where security forces may be more deadly than coronavirus*. BBC News. https://www.bbc.com/news/world-africa-53450850

Birner, R., Blaschke, N., Bosch, C., Daum, T., Graf, S., Güttler, D., Heni, J., Kariuki, J., Katusiime, R., Seidel, A., Senon, Z. N., & Woode, G. (2021). ‘We would rather die from Covid-19 than from hunger’—Exploring lockdown stringencies in five African countries. *Global Food Security*, *31*, 100571. https://doi.org/10.1016/j.gfs.2021.100571

Cardozo Silva, A. R., Diaz Pavez, L. R., Martínez‐Zarzoso, I., & Nowak‐Lehmann, F. (2022). The impact of COVID‐19 government responses on remittances in Latin American countries. *Journal of International Development*, *34*(4), 803–822. https://doi.org/10.1002/jid.3606

Ceballos, F., Kannan, S., & Kramer, B. (2021). Crop prices, farm incomes, and food security during the COVID-19 pandemic in India: Phone-based producer survey evidence from Haryana State. *Agricultural Economics*, *52*(3), 525–542. https://doi.org/10.1111/agec.12633

Charles, K. K., & DeCicca, P. (2008). Local labor market fluctuations and health: Is there a connection and for whom? *Journal of Health Economics*, *27*(6), 1532–1550. https://doi.org/10.1016/j.jhealeco.2008.06.004

Curi-Quinto, K., Sánchez, A., Lago-Berrocal, N., Penny, M. E., Murray, C., Nunes, R., Favara, M., Wijeyesekera, A., Lovegrove, J. A., Soto-Cáceres, V., & Vimaleswaran, K. S. (2021). Role of Government Financial Support and Vulnerability Characteristics Associated with Food Insecurity during the COVID-19 Pandemic among Young Peruvians. *Nutrients*, *13*(10), 3546. https://doi.org/10.3390/nu13103546

FAO. (2016). *Global Food Insecurity Experience Scale Survey Modules*.

Guha, P., Islam, B., & Hussain, M. A. (2021). COVID-19 lockdown and penalty of joblessness on income and remittances: A study of inter-state migrant labourers from Assam, India. *Journal of Public Affairs*, *21*(4), e2470. https://doi.org/10.1002/pa.2470

Guloba, M. M., Kakuru, M., & Ssewanyana, S. N. (2021). *The impact of COVID-19 on industries without smokestacks in Uganda*. Africa Growth Initiative at Brookings. https://www.brookings.edu/research/the-impact-of-covid-19-on-industries-without-smokestacks-in-uganda/

Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., Webster, S., Cameron-Blake, E., Hallas, L., Majumdar, S., & Tatlow, H. (2021). A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). *Nature Human Behaviour*, *5*(4), 529–538. https://doi.org/10.1038/s41562-021-01079-8

Headey, D. D., Goudet, S., Lambrecht, I., Oo, T. Z., Maffioli, E. M., & Toth, R. (2020). *Poverty and food insecurity during COVID-19: Telephone survey evidence from mothers in rural and urban Myanmar* (0 ed.). International Food Policy Research Institute. https://doi.org/10.2499/p15738coll2.134036

Hirvonen, K., de Brauw, A., & Abate, G. T. (2021). Food Consumption and Food Security during the COVID-19 Pandemic in Addis Ababa. *American Journal of Agricultural Economics*, *103*(3), 772–789. https://doi.org/10.1111/ajae.12206

Janssens, W., Pradhan, M., de Groot, R., Sidze, E., Donfouet, H. P. P., & Abajobir, A. (2021). The short-term economic effects of COVID-19 on low-income households in rural Kenya: An analysis using weekly financial household data. *World Development*, *138*, 105280. https://doi.org/10.1016/j.worlddev.2020.105280

Kansiime, M. K., Tambo, J. A., Mugambi, I., Bundi, M., Kara, A., & Owuor, C. (2021). COVID-19 implications on household income and food security in Kenya and Uganda: Findings from a rapid assessment. *World Development*, *137*, 105199. https://doi.org/10.1016/j.worlddev.2020.105199

Kpodar, K., Mlachila, M., Quayyum, S., & Gammadigbe, V. (2021). *Defying the Odds: Remittances During the COVID-19 Pandemic*. International Monetary Fund. https://www.imf.org/en/Publications/WP/Issues/2021/07/16/Defying-the-Odds-Remittances-During-the-COVID-19-Pandemic-461321

Mahmud, M., & Riley, E. (2021). Household response to an extreme shock: Evidence on the immediate impact of the Covid-19 lockdown on economic outcomes and well-being in rural Uganda. *World Development*, *140*, 105318. https://doi.org/10.1016/j.worlddev.2020.105318

Margini, F., Pattnaik, A., Jordanwood, T., Nakyanzi, A., & Byakika, S. (2020). *Case study: The Initial COVID-19 response in Uganda*. ThinkWell and Ministry of Health Uganda.

Monitor. (2020, July 19). *Gulu District lockdown to be lifted on Monday*. https://www.monitor.co.ug/uganda/news/national/gulu-district-lockdown-to-be-lifted-on-monday-1896922

Rönkkö, R., Rutherford, S., & Sen, K. (2022). The impact of the COVID-19 pandemic on the poor: Insights from the Hrishipara diaries. *World Development*, *149*, 105689. https://doi.org/10.1016/j.worlddev.2021.105689

Ruszczyk, H. A., Rahman, M. F., Bracken, L. J., & Sudha, S. (2021). Contextualizing the COVID-19 pandemic’s impact on food security in two small cities in Bangladesh. *Environment and Urbanization*, *33*(1), 239–254. https://doi.org/10.1177/0956247820965156

Schwartz, J. I., Muddu, M., Kimera, I., Mbuliro, M., Ssennyonjo, R., Ssinabulya, I., & Semitala, F. C. (2021). Impact of a COVID-19 National Lockdown on Integrated Care for Hypertension and HIV. *Global Heart*, *16*(1), 9. https://doi.org/10.5334/gh.928

Shimizutani, S., & Yamada, E. (2021). Resilience against the pandemic: The impact of COVID-19 on migration and household welfare in Tajikistan. *PLOS ONE*, *16*(9 September). https://doi.org/10.1371/journal.pone.0257469

Uganda Bureau of Statistics. (2022). *Uganda High-Frequency Phone Survey on COVID-19 – Basic Information Document*. https://microdata.worldbank.org/index.php/catalog/3765/related-materials

Wagner, G. J., Wagner, Z., Gizaw, M., Saya, U., MacCarthy, S., Mukasa, B., Wabukala, P., & Linnemayr, S. (2022). Increased Depression during COVID-19 Lockdown Associated with Food Insecurity and Antiretroviral Non-Adherence among People Living with HIV in Uganda. *AIDS and Behavior*, *26*(7), 2182–2190. https://doi.org/10.1007/s10461-021-03371-0

Zhang, Y., Zhan, Y., Diao, X., Chen, K. Z., & Robinson, S. (2021). The Impacts of COVID-19 on Migrants, Remittances, and Poverty in China: A Microsimulation Analysis. *China and World Economy*, *29*(6), 4–33. https://doi.org/10.1111/cwe.12392

1. Studies that examine the impact on income, employment, or agricultural production include Egger et al., 2021; Ronkko et al., 2022; Harris et al., 2020; Jaacks et al., 2021; Headey et al., 2020; Deshpande, 2020; Balde et al. 2020; Komin et al. 2020; Kesar et al, 2021; Wild et al., 2021; [Ruszczyk](https://journals.sagepub.com/action/doSearch?target=default&ContribAuthorStored=Ruszczyk%2C+Hanna+A) et al., 2021; Kang et al., 2021. [↑](#footnote-ref-3)
2. Janssens et al. (2021) find that households coped by providing fewer gifts, lowering remittances, and postponing loan payments. [↑](#footnote-ref-4)
3. There had been one study, Schotte et al (2021), that use panel data to find that lockdowns in Ghana significantly decreased employment and earnings. [↑](#footnote-ref-6)
4. The phone number could be the household’s number or a reference person’s, such as a neighbor or a friend. [↑](#footnote-ref-7)
5. The heads of the households were typically the respondent to this survey. If the household head was not present, another member of the household over the age of 15 could respond to the survey. [↑](#footnote-ref-8)
6. A linear model has two advantages over non-linear models, such as conditional logit, and has often been used in recent studies (Alam & Bose, 2020; Alam & Pörtner, 2018; Charles & DeCicca, 2008). First, coefficients are easier to interpret. Second, a linear model allows easier comparison of coefficients across regressions where some dependent variables are binary and some non-binary. Robustness checks, presented in Appendix Tables A1 and A2, show that conditional logit models lead to qualitatively similar results. [↑](#footnote-ref-9)
7. The advantage of using “Our World in Data” is that it collects available COVID-19 data from many sources. The data are available at <https://covid.ourworldindata.org/data/owid-covid-data.csv>, and a complete listing of underlying sources is at <https://github.com/owid/covid-19-data/tree/master/public/data/owid-covid-codebook.csv>. [↑](#footnote-ref-10)
8. This means that any variable that does not change over time that are likely to influence our outcome variables would be controlled by the household fixed and would consequently drop out of the estimations. [↑](#footnote-ref-11)
9. Round 1 only asks whether the family has operated a business since the beginning of 2020 and does not ask about operations since the start of lockdown. This means we are unable to use round 1 information to examine the impact of lockdown on doing family business. Therefore, we use rounds 2 to 7 for this analysis. [↑](#footnote-ref-12)
10. Households were also asked whether they received unemployment benefits, but there was only one observation representing a change, so we do not have any variation to conduct a conditional ordered logit estimation. [↑](#footnote-ref-13)
11. For round 1, the survey asks about the employment industry before the lockdown, which allows us to identify whether individuals were employed in agriculture before the round 1 lockdown. [↑](#footnote-ref-14)
12. Similar to the prior estimation, we limit the estimation to only those employed in the current round and also the prior round. [↑](#footnote-ref-15)