Did COVID-19 Market Disruptions Disrupt Food Security?

Evidence from Households in Rural Liberia and Malawi*

Shilpa Aggarwal   Dahyeon Jeong   Naresh Kumar   David Sungho Park

Jonathan Robinson   Alan Spearot

June 15, 2021

Abstract

We use data collected from panel phone surveys to quantify the effect of market disruptions due to the COVID-19 lockdowns on food security of households in rural Liberia and Malawi. We estimate effects using two distinct empirical approaches: (a) an event study around the date of the lockdowns (March to July 2020), and (b) a difference-in-differences analysis comparing the lockdown period in 2020 to the same months in 2021, which helps us control for any seasonal effects. In both countries, market activity was severely disrupted and we observe declines in expenditures. However, we find no evidence of declines in food security.

JEL Codes: O12, O13, Q12

Keywords: COVID-19, market disruption, food security, Liberia, Malawi

1 Introduction

Rural Africa has largely been an afterthought during the COVID-19 pandemic, due in part to relatively lower disease prevalence.[1] Yet while case counts are relatively modest, economic disruptions were nearly as intense as those in developed countries, at least near the beginning of the pandemic.[2] What was the impact of these lockdowns on the livelihoods of rural households?

We measure the impacts of COVID lockdowns in Liberia and Malawi on food security (and other outcomes) using monthly household phone surveys. Both countries implemented versions of lockdowns from roughly March 2020 to July 2020, though restrictions were more severe in Liberia (which ordered a full shelter-in-place for 3 months) than in Malawi (which did not impose shelter-in-place but still closed schools and placed restrictions on transportation and gatherings). Both countries restricted cross-border movement. In both countries, many services were disrupted, and we document large declines in market activity. We find that even in these rural areas, knowledge about the virus was high, that people were concerned about contracting the virus and changed their behavior consistent with health guidance, and that market disruptions were enforced.

The data used in this paper was collected as part of an ongoing evaluation of a large unconditional cash transfer (UCT) program, which takes place in 300 villages each in both countries. At the beginning of the project (in 2018), 20% of the sample (2 respondents per village, or about 600 total households) were selected to take part in a phone survey that is ongoing as of this writing. Because they are randomly selected, these respondents are representative of the approximately 32,000 households (with a total population of about 150,000) in these 600 villages.

Phone surveys began well before the global onset of COVID-19 (March 2019 in Liberia and July 2019 in Malawi), and have continued until the time of the writing of this paper. The survey was conducted every 2 months (with half of the sample interviewed each month), and the main outcome for this paper is food security. We use 3 measures which are recommended for use by organizations such as the FAO and USAID, and have been validated in several settings to meaningfully correlate

---

[1]At this writing, according to Worldometer, there have been about 5 million cases and 130,000 deaths in Africa (population 1.2 billion), and about a third of these are in the country of South Africa. By contrast, North America has approximately 40 million cases and nearly 900,000 deaths (population 580 million) while Europe has approximately 47 million cases and more than a million deaths (population 740 million).

[2]A map-visualization of the stringency of the lockdowns (as of May 2020, the height of restrictions), based on the University of Oxford's Government Response Tracker is available here: https://ourworldindata.org/grapher/covid-stringency-index?year=2020-05-01.

with food security.[3] These are (1) the household dietary diversity score (HDDS); (2) the food consumption score (FCS); and (3) the household hunger scale (HHS). In addition, the surveys include question on income, labor supply, expenditures, transfers and other related outcomes, as well as a module on attitudes towards COVID, and resultant behavior changes, which was added in May 2020.

We use this data in two distinct empirical strategies to measure the impact of the lockdowns on food security in these areas. In the first, we use a similar methodology as other studies of COVID, and use the time series from our survey data to measure the changes in food security immediately after the lockdowns were implemented, in an event study design. In the second strategy, we take advantage of the distant vantage point of 14 months from when the lockdowns were first imposed, to measure the effects in a difference-in-differences framework. Specifically, we measure changes in food security in April and May of 2021 (relative to January-February 2021) and compare them against the difference between the same months in 2020. This provides us with the additional advantage of removing seasonal effects, which tend to be strong in rural areas of developing countries as food markets are poorly integrated, and therefore prices and availability of food are strongly impacted by the harvest.

Our main result, using both the empirical designs, is that while baseline food security is low,[4] we observe no evidence of a decline during the lockdown. We believe that these results stem in large part from these being mostly subsistence households - while we observe a decline in food expenditures and total expenditures, food security levels are preserved. This result is despite that direct government support was non-existent: no households in our samples reported receiving any cash or food support from the government or an NGO during the lockdown.

The null result on food security that we estimate was not expected by the research team, and contrasts both with popular discourse and with most (though not all) of the recent academic research around COVID-19. Because these countries are so poor and lack formal safety nets, many commentators initially expected devastating effects, warning of millions being pushed into poverty and even of imminent starvation (FAO et al. 2020, Laborde et al. 2020). These dire predictions

---

[3]For more information, see the Tufts University's INDDEX project: https://inddex.nutrition.tufts.edu/data4diets/indicators.

[4]In Liberia, 40% of households reported at baseline that a household member went to bed hungry in the past month, while in Malawi this percentage was 48%.

2

were not just a phenomenon early on in the pandemic - many completed academic studies have generally found substantial negative effects. For example, Egger et al. (2021) construct a sample of 16 surveys in 9 countries in Africa, Asia, and Latin America, and find substantial declines in employment, income, and food security in all settings. A number of other studies also show declines in food security in Africa (e.g. Mahmud and Riley 2021, Amare et al. 2021).

Why do our results differ so dramatically? It is of course entirely possible that the effect of the lockdowns were simply different in Liberia and Malawi. However, we conjecture that another possibility is that ours is one of the few studies to measure food security before and after the crisis, using internationally accredited measures, rather than retrospective questions about food security after the lockdowns had been implemented. It is possible that retrospective questions overstate the severity of the crisis on food security.

Whatever the explanation, the rural setting of our study might have been protective. Rural areas were less likely to be affected by the virus, because of low population density, remoteness from population centers, and reliance on farming (which can be practiced at social distance), and so COVID itself did not spread widely in rural Africa. Perhaps some of these factors also insulated households from lockdowns - while economic activity in urban population centers clearly declined, this may not have spilled over into more rural areas. In our samples, people earn very little income to start with (less than $10 per month), and we find no evidence of a decline in income in Liberia. While we find a modest decline in Malawi, this appears to be mostly seasonal. Similarly, while markets were restricted, they were nevertheless open, and the price of food changed only modestly.

While the majority of published research has shown negative effects of COVID-19 market restrictions, ours is not the only study to show more modest effects. Ceballos et al. (2020) find that impacts of lockdowns were linked with market integration levels – farmer incomes declined in remote areas where market integration was poorer, but consumption improved because more stocks were available locally. Our findings are also similar to Hirvonen et al. (2021) and to Lee et al. (2020), who find no worsening of food security in urban Addis Ababa and Delhi, respectively, despite a decrease in incomes; in the case of Delhi, however, this is driven by government-provided assistance. Unlike these papers, we do not observe a decline in income in our data, since our sample is made up largely of subsistence farmers. It is also worth noting that income declines will not necessarily lead to declines in food security as in the face of an income shock, households will likely reallocate

3

expenditures from discretionary consumption towards essentials, such as food. For example, in the multi-country studies described in Egger et al. (2021), even though there are declines in food security, they are, by and large, much smaller in magnitude than the declines in income.

The rest of this paper is organized as follows. Section 2 describes the study context, Section 3 documents market disruptions in the study sample, Section 4 presents results, and Section 5 discusses possible explanations for the results and concludes.

2 Data and Study Context

This project is based on field work that has been ongoing in Liberia and Malawi since 2018. The design is nearly identical in both countries, with minor context-specific differences. In each country, we are evaluating the effect of UCTs which are being given out by the NGO GiveDirectly (henceforth, GD). The cash transfers average $500 at current exchange rate (not PPP), roughly equivalent to annual household expenditures. The treatment is randomized at the village level: in treatment villages, all households receive cash, while control villages receive nothing.[5] Villages were randomly selected to receive $250, $500, or $750 per household, paid in monthly $250 installments, translating into 1, 2, or 3 payments. Additionally, in Liberia, respondents were randomized into being paid in this fashion, or quarterly (every 3 months); in Malawi, households were randomly selected to have the male or female head receive the transfer. Transfers are made via mobile money; since pre-existing mobile money usage is low, beneficiaries are given the option to buy cell phones.[6]

The study areas were chosen by GD and USAID based on poverty levels, cell phone coverage, and proximity to roads. In Liberia, the project takes place in 6 districts in Bong and Nimba counties.[7] In Malawi, the project takes place in Chiradzulu and Machinga districts in the Southern Region. In Liberia, the project was phased in over 2 years: a first wave (90 villages) was enrolled in early 2019, while a second wave (210 villages) began enrolling in early 2020. However, due to COVID-related disruptions, many villages were not enrolled until late August. In Malawi, all villages were enrolled

---

[5]The decision to apply universal targeting, i.e. give transfers to everybody, was made with GD to minimize within-village conflict. However, since there is limited funding, this meant working in a few modestly-sized villages. The average number of households in sampled villages was 53 in Liberia and 55 in Malawi. The villages are therefore not meant to be representative of larger villages.

[6]We also cross-cut a "market access" intervention with the cash transfers. We control for this treatment, but it is not a focus of this paper.

[7]Year 1 of the study takes place in Salala and Yeallequelleh districts in Bong and Year 2 in the districts of Twan River, Meinpea Mahn, Leewehpea Mahn, and Buu Yao, in Nimba, as well as a part of Yeallequelleh district in Bong.

in 2019. A map of study locations, with pins of the study villages and markets, is included as Figure A2. Figure A1 has a timeline of project activities.

We drew a sample using information provided by GD. To select villages, GD visited each village considered for study inclusion, where GD field staff marked each habitation structure with a GPS pin. We randomly selected 10 households from this list of GPS pins, and targeted female heads of households for surveys (because intimate partner violence is a key outcome in our main study).

In total, 600 villages were sampled (300 in each country), and we attempted to enroll 10 households per village in the data collection study. Where possible, treatment intensity was varied by geographic location (the smallest level of governance above the village), and stratified by TA in Malawi and district/clan in Liberia.[8]

2.1 Households phone surveys

Our ongoing evaluation was designed to measure the time-varying effects of cash transfers. We randomly selected 2 households per village to receive cell phones (worth $10-15), and enumerators have been calling them every 2 months for approximately 19-24 months. These surveys are still ongoing at the time of this writing (June 2021).

Our main outcome is food security, but the phone survey also included questions on income, expenditures, transfers, savings, and related outcomes. We have 3 measures of food security: (1) the household dietary diversity score (HDDS), which groups foods into 12 categories, and records whether at least one food item in each category was consumed in the past 24 hours;[9] (2) the food consumption score (FCS), which is similar to HDDS but measures frequency of consumption rather than just indicators for 9 food groups (over the past 7 days), and ranges from 0-112;[10] and (3) the household hunger scale (HHS) is based on a series of 6 questions such as "In the past 4 weeks (30 days), was there ever no food to eat of any kind in your house because of lack of resources to get food?" and "In the past 4 weeks (30 days), did you or any household member go to sleep at night hungry because there was not enough food?" This score ranges from 0-6.[11]

---

[8]In this paper, we do not report effects of the cash transfers on food security during COVID. This is because transfers were disrupted by COVID in the 2nd wave of data collection in Liberia, which form the bulk of our phone study sample in that country.

[9]These survey questions were based on guidance in FAO (2013).

[10]These survey questions were based on guidance in WFP (2008).

[11]These survey questions were based on guidance in Ballard et al. (2011).

Shortly after the lockdowns began, we redesigned our phone surveys to measure the impact of the unfolding crisis. These surveys started in May 2020 after all IRB approvals. The new surveys included several modules. First, we asked a series of questions about knowledge, attitudes and behavior changes around COVID. These questions were designed using other available surveys and so are similar to those used in other contexts. Second, we added modules to retrospectively measure outcomes that had not been measured previously. Specifically, we added questions on spousal labor income as well as business outcomes. To construct a comparison month, we measured these month-by-month from February 2020 to May 2020, and for the previous month thereafter.

Table A1 shows attrition from the household phone surveys. Completion rates range from 50%-79% in Liberia and are somewhat higher, 79%-97%, in Malawi. This is because the cellular network is stronger in rural Malawi, and because of a technical issue with the sim cards provided as part of the cash transfer. In general, we see a downward trend in completion rates, as respondents change phone numbers or decide to opt out of the surveys. However, there is no break in completion around the COVID lockdown period (March - July 2020).

2.2 Summary statistics

Table 1 presents summary statistics. From Panel A, the vast majority of the sample is female (since we targeted female heads), and the average respondent is 40 years old. Most respondents are married and the average household has 4-5 members. Panel B shows data on income, expenditures, and assets. The vast majority of the sample earns income from farming, and only 21-25% report having a business. The average household spends about US $44-51 per month, which works out to less than $0.40 per day per capita.

The average household has about $300 in assets in Liberia and $1,400 in Malawi, but the majority of this is in the form of land and housing – other assets are only $14 in Liberia, and less than $100 in Malawi. Financial assets are almost non-existent: cash savings is less than $10 in each country, and outstanding household debt is similarly sized; in fact, household net financial wealth is negative in Malawi and only $1.36 in Liberia.

Panel C documents food security. While our main results will show indices as described above, we present some intuitive components of those indices here, since they are more understandable. We find that 40-44% of respondents report skipping a meal in the past month because there was

not enough food, and about a quarter experienced no food for an entire day.

Table 1: Household Summary Statistics

	Liberia		Malawi	
	Mean	SD	Mean	SD
Panel A: Demographics				
=1 if female	0.79		0.95	
Age	40.32	14.53	38.79	14.62
=1 if currently married or has partner	0.83		0.69	
Years of education	2.68	3.50	5.04	3.43
Number of household members	4.53	2.19	4.73	2.08
Panel B: Income, expenditure, and assets				
=1 planted any crop in most recent agriculture season	0.89		0.99	
=1 if sold any harvest	0.56		0.52	
=1 if owns a business enterprise	0.21		0.25	
Household monthly expenditure	51.02	46.17	43.61	51.74
Household food expenditure	20.21	17.21	14.95	15.71
=1 if respondent has access to mobile phone[a]	0.19		0.31	
=1 if house owned	0.66		0.85	
=1 if house has thatch roof	0.26		0.51	
Total value of land and housing	247.12	455.63	1,333.32	2,123.83
Total net value of durable goods, livestock, and financial asset	13.98	32.76	80.45	125.93
Total value of physical assets	12.62	27.70	83.51	124.98
Net value of financial assets	1.36	19.96	-3.06	14.46
Savings	5.24	14.44	3.78	8.69
Outstanding household debt	3.88	13.39	6.84	14.76
Panel C: Food security				
For any household member in the past month:				
=1 if skipped a meal	0.44		0.40	
=1 if went to sleep hungry	0.40		0.48	
=1 if had no food for an entire day	0.23		0.27	
Observations	593		596	

Note: Outcomes from the baseline survey. All monetary values are in USD and Winsorized at the 99th percentile. Exchange rates used for calculation are 733 Malawian Kwacha (MWK) = 1 USD and 198 Liberian Dollars (LRD) = 1 USD (May 14, 2020).
[a] This was measured before we provided a mobile phone.

3   Documenting Market Disruptions in Liberia and Malawi

Liberia's response to COVID was typical for Africa. Following the first case on March 16, 2020, the country immediately banned entry from countries with more than 200 cases, closed schools, and restricted public transportation. On March 21, the government announced a state of national health emergency, placing restrictions on bars, restaurants, markets, and other gathering places. On

March 24, Montserrado and Margibi counties (including the capital and the airport) were ordered to shelter in place. Overland borders were closed. On April 8, a state of emergency placed the counties of Montserrado, Margibi, Nimba, and Grand Kru under shelter-in-place starting April 10. This was extended to the entire country on April 24. Restrictions were removed on July 22.

Malawi's response was more atypical, due to a legal challenge upheld by the country's High Court. The government announced a "state of disaster" on March 20, 2020, which mandated school closures, restrictions on public gatherings and on travel. On April 1, the border with Mozambique closed. On April 14, the government announced a country-wide lockdown (due to start on April 18), but this order was challenged and was overturned by the High Court on April 19. Without a country-wide lockdown, Malawi's response was one of the weakest in Africa, scoring 57/100 (compared to 88/100 for Libera) on the Oxford COVID-19 Government Response Tracker.[12]

As of this writing, Liberia has had about 2,250 cases and 86 deaths (population of about 5 million), while the corresponding numbers in Malawi are 35,000, 1,200, and 18 million.

3.1 Descriptive evidence on disruptions

Table 2 documents that lockdown measures by the government during March-July 2020 disrupted overall economic activity. Panel A shows that in Liberia, all activities were almost universally restricted. The extent of disruptions is much smaller in Malawi, but nevertheless schools, religious centers and public transportation were restricted or closed.

Panel B shows summary statistics of self-reported behavior changes. Almost everyone in both countries reports that they stopped shaking hands, started washing hands more frequently, and followed social distancing norms. A significant fraction of people reported limiting travel and wearing masks.[13]

Panel C presents economic disruptions as reported by food vendors. Again, the disruption is felt more strongly in Liberia, where 98 percent of vendors reporting that they are closed or reduced business hours, relative to 25 percent in Malawi. Vendors report difficulty sourcing supplies, and

---

[12]https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker.

[13]Table A2 shows a few other selected indicators. Respondents are universally aware of the virus, and levels of concern about it are quite high (this is true even in Malawi where public health measures were more muted). Respondents overwhelmingly trust information coming from the government, and take the virus as a serious threat. However, from Panel C, no households in Malawi reported any assistance to cope with the crisis (we did not collect this data for Liberia).

report that the cost of stocking the same bundle of supplies as they did in February would cost 38% more in Liberia and 23% more in Malawi. Table A3 shows statistics on income losses, using retrospective data. We find large reductions in profits in Liberia, declining to almost zero by May 2020, and smaller but still substantial losses in Malawi of about 40% in April and 20% in June.

Table 2: Disruptions

	Liberia	Malawi
Panel A: Economics activities		
=1 if following places/activities were closed/restricted:		
schools (e.g. public, private, universities, colleges, etc.)	0.98	0.99
markets	0.93	0.15
retail shops	0.90	0.11
restaurants	0.95	0.19
entertainment centers (e.g. bars, clubs, betting centers, etc.)	0.95	0.28
religious centers (e.g. churches and mosques)	0.86	0.71
barber shops, beauty salons	0.92	0.12
supermarkets	0.96	0.17
gas stations	0.90	0.09
public transportation	0.90	0.67
street selling	0.89	0.20
mobile money agents	0.89	0.10
Panel B: Behavior changes		
=1 if:		
traveled less to shops or markets	0.93	0.57
started wearing a mask	0.77	0.32
stopped shaking hands	0.97	0.95
washed hands more often	0.94	0.95
cleaned things I touch more often	0.73	0.46
stopped going to religious services	0.90	0.59
kept social distance from people	0.96	0.85
Observations	983	1,548
Panel C: Business disruptions on Crop Vendors		
=1 if:		
closed or reduced business hours	0.98	0.25
inventory spoiled	0.23	0.18
consumed inventory for myself	0.44	0.12
supply source changed	0.33	0.09
Change in supply price from Feb to Now (%)[a]	38.25	22.57
	(40.27)	(47.19)
Observations	654	1,021

Note: Means reported and standard deviations in parentheses. Data comes from first survey after COVID disruptions (in May-July 2020). Panel A and B sample includes both food vendors and households, while Panel C includes food vendors only.
[a] This is calculated from the reported cost of procuring a fixed bundle of items February 2020 versus when the survey was conducted, which ranges from May-July 2020.

4 Effect of COVID-19 lockdowns on food security

In this section, we present the main results of the paper in several different ways. First, we plot food security month by month in Figure 1. Our outcome variable is a composite food security index (henceforth, FSI) of three different indices of food security – HDDS, FCS, and HHS – and higher values indicate greater food security.[14] We present results separately for Malawi, and the two Liberia waves. Because the pattern looks similar for treatment and control, we present results with the two groups pooled.[15]

For all 3 samples, we find no decline in food security during the lockdown. Food security appears roughly unchanged in Liberia. For Malawi, we observe an *increase* in the FSI after March 2020. While this result is likely due to the fortuitous fact that the harvest in Southern Malawi begins around March, we argue that the simple pre-post comparison is still important, since these sorts of short-run comparisons formed the basis for initial policy responses to the crisis. Looking at 2021, we see a similar, though less visibly dramatic, increase in FSI from March-July 2021.

We present our results more formally in two ways: (1) an event study around the date of the lockdown in March 2020; and (2) a difference-in-differences comparing the same months in 2020 and 2021. For the event study, we restrict analysis to data collected between January and July 2020 (except March 2020, which was only partially affected) and run the following specification using January-February 2020 as a reference group:

$$y_{it} = \sum_{t=Apr}^{Jul} \beta_t D_t + \theta y_{io} + \mu_i + \varepsilon_{it} \tag{1}$$

where D_t is a month fixed effect, μ_i is an individual fixed effect, and y_{io} is a measure of the dependent variable collected during baseline (making the specification ANCOVA).[16]

For the difference-in-difference specification, we restrict data to those months we have in both

---

[14]Since lower values of HHS is better, the FSI includes the inverted value of the HHS. Figure A5 shows each component separately, and the picture is similar for each measure.

[15]We present versions of this for the control and treatments groups separately in Figure A4. While the cash group has higher food security in general, the pattern over the COVID period is similar.

[16]For outcomes that were measured retrospectively, we do not include the baseline control.

10

Figure 1: Changes in Food Security, pre- and post-COVID
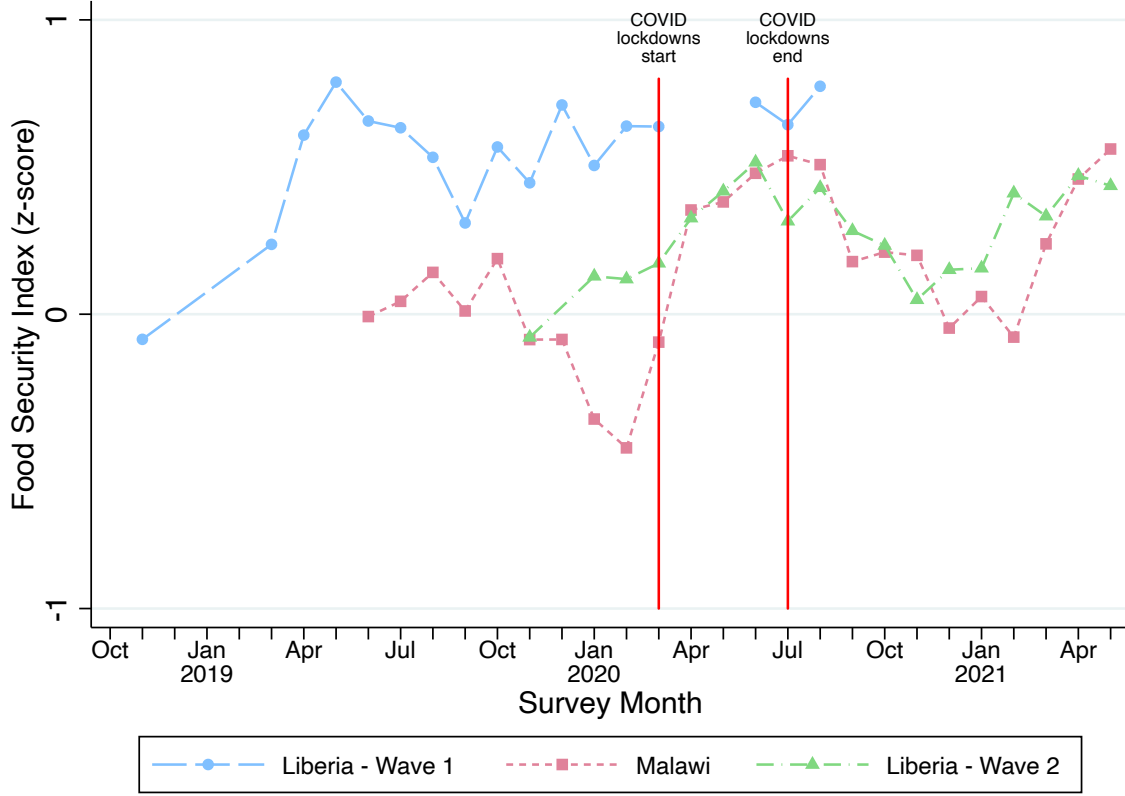
Note: The dependent variable is a standardized index of the household dietary diversity score (HDDS), the food consumption score (FCS), and the household hunger scale (HHS). The recall period is 24 hours for the HDDS, one week for the FCS, and four weeks for the HHS. There are 135 respondents in Liberia Wave 1, 359 in Liberia Wave 2, and 596 in Malawi. We had ended data collection for Liberia's Wave 1 sample in March 2020, but conducted an additional round in June-August 2020 to collect outcomes related to COVID disruptions.

2020 and 2021 (January-May, but again excluding March), and run the following:

$$y_{it} = \sum_{t=Apr}^{May} (\gamma_t + \beta_t D_{2020})D_t + \theta y_{io} + \mu_i + \varepsilon_{it} \qquad (2)$$

In both specifications, β_t represents the difference in food security pre- and post-COVID lockdowns.

Results are presented in Table 3 for the FSI, food expenditure, and total expenditure.[17] Panel A shows Liberia and Panel B Malawi. The odd numbered columns show the event study, and the even numbered columns show the difference-in-differences. From Column 1, we see an increase in food security of 0.19-0.41 standard deviations during the COVID lock-down period in Liberia, and an even bigger rise of 0.73-0.94 standard deviations in Malawi. From Column 2, in the difference

---

[17]Regression results for the components of the FSI can be found in Table A4.

in difference, we see that this increase is mostly seasonal - effects are indistinguishable from zero in Liberia and are mitigated though still substantial (0.26 standard deviations) in Malawi. This latter result could be attributed to a stronger harvest in Malawi in 2020.[18]

Interestingly, when we turn to expenditures (Columns 3-6), we see evidence of large declines in both countries (Column 4), at least when accounting for seasonal variation in the difference-in-difference, equivalent to 20-50% of the Jan-Feb 2020 baseline mean in Liberia and about 30% of the baseline value in Malawi. A similar, but more mixed, pattern is evident in Column 6. Thus, while we observe clear changes in expenditures (which is intuitive since market hours were restricted during this time period), this does not translate into food security directly, perhaps because households substitute to lower quality foods, or to home consumption.

---

[18]According to the Ministry of Agriculture and Food Security, the maize harvest in 2020 was 11% larger than that in 2019, and 28% larger than the 5-year average for the country. See this FEWS NET brief for details.

Table 3: Household Food Security and Expenditures, post-COVID

	(1)	(2)	(3)	(4)	(5)	(6)
	Food Security Index[a] (monthly)		Food Expenditure (monthly)		Total Expenditure (monthly)	
Panel A: Liberia						
April 2020	0.19**	-0.03	1.25	-6.22***	-2.53	-9.60*
	(0.09)	(0.13)	(1.60)	(2.04)	(4.08)	(5.36)
May 2020	0.22**	0.10	-3.13**	-8.13***	-3.31	11.43**
	(0.09)	(0.13)	(1.57)	(2.04)	(4.00)	(5.35)
June 2020	0.41***		1.07		11.87***	
	(0.09)		(1.57)		(4.01)	
July 2020	0.12		0.15		-20.19***	
	(0.10)		(1.72)		(4.40)	
April		0.16		6.48***		3.43
		(0.10)		(1.66)		(4.35)
May		0.20**		5.98***		-11.50***
		(0.10)		(1.62)		(4.23)
2020		-0.04		9.05***		8.46***
		(0.07)		(1.16)		(3.03)
Jan-Feb 2020 mean	0.00	0.00	28.20	28.20	63.65	63.65
Jan-Feb 2020 SD	1.00	1.00	17.11	17.11	42.20	42.20
Observations	840	1,030	840	1,030	840	1,030
No. of households	308	308	308	308	308	308
Panel B: Malawi						
April 2020	0.76***	0.26***	-9.34***	-3.73***	-11.01***	-9.25***
	(0.05)	(0.07)	(1.09)	(1.26)	(3.08)	(3.39)
May 2020	0.73***	0.26***	-8.13***	-4.13***	-5.11	-5.48
	(0.05)	(0.07)	(1.11)	(1.27)	(3.13)	(3.42)
June 2020	0.94***		-9.36***		7.53**	
	(0.05)		(1.07)		(3.03)	
July 2020	0.89***		-8.29***		-10.69***	
	(0.05)		(1.09)		(3.08)	
April		0.51***		-5.12***		-3.64
		(0.06)		(0.97)		(2.61)
May		0.46***		-4.48***		1.93
		(0.06)		(1.00)		(2.67)
2020		-0.33***		7.72***		14.33***
		(0.04)		(0.73)		(1.97)
Jan-Feb 2020 mean	-0.00	-0.00	23.27	23.27	44.41	44.41
Jan-Feb 2020 SD	1.00	1.00	18.09	18.09	38.61	38.61
Observations	1,645	2,078	1,645	2,078	1,645	2,078
No. of households	538	538	538	538	538	538

Note: Odd columns show event study regressions for the household phone survey from January - July 2020, excluding March 2020, which was partially both pre- and post-COVID disruptions; omitted group is January and February 2020 pooled. Even columns show difference-in-difference regressions for the sample from January - May 2020 and January - May 2021, excluding surveys conducted in the months of March; omitted group in the difference-in differences regressions is January and February 2021 pooled (the comparison group of calendar months against the last survey round in 2020 right before COVID lockdowns). All regressions control for baseline measurement of outcome and individual fixed effects. In Panel A, sample includes only Wave 2. All monetary values in USD and Winsorized at the 99th percentile.
[a] Standardized z-score of HDDS, FCS, and HHS (negatively weighted), using inverse covariance weighting (Anderson 2008) of means and standard deviations of pooled data from January and February 2020.

5 Discussion and Conclusion

We document the effect of COVID-19 market disruptions in Liberia and Malawi using a panel of phone surveys of households and food vendors. We find high levels of awareness and behavior change and large declines in market activity. However, we find no evidence of increased food insecurity.

Before collecting this data, our prior was that our results would be similar to those of other papers, which tend to show large negative effects. However, we can suggest an ex-post reason for the decline, namely that rural areas like the ones we study are poorly connected to economic centers of activity, and while this may be a core reason for their poverty; paradoxically, the isolation of these areas may make them more immune to economic declines in urban centers. Of course, remoteness also makes these areas less prone to the spread of the virus itself. In this section, we provide some evidence for this.

First, in our surveys, we collected information on income for the respondent from casual labor income, business, and other sources. We examine how income was affected in Table A5. As in the prior table, the odd-numbered Columns show the event study and the even-numbered Columns show the difference-in-differences. The tables shows business profits (Columns 1-2), labor income (Columns 3-4), and total non-agricultural income (Columns 5-6). To start, our data shows that people earn very little income, and so there is little to lose during COVID - the bottom of the Table shows the monthly mean pre-lockdown income from various sources, and shows that total non-agricultural income is only \$5.3 in Liberia and \$7.1 in Malawi. During COVID lockdowns, we observe no change in income in Liberia. While we do observe a decline in Malawi (Column 5), this is entirely seasonal (Column 6). It is also worth noting that small declines in income - even for these poor households - may not necessarily translate into consumption declines for bare necessities such as food, as households will likely reallocate their budget away from discretionary expenditures to preserve food consumption.

Second, as part of our ongoing data collection, we have been collecting prices in markets near the cash transfer evaluation, and in comparison markets. There are a total of 80 markets in Liberia and 95 in Malawi. We have enrolled a set of vendors in each market in a price data collection exercise in which vendors are called once a month.[19] We use this data to construct market prices.

---

[19]In Liberia, the items are salt, imported rice, local rice, cassava, cassava flour, chicken, fresh fish, dried fish, palm oil, pepper, bitter balls, okra, onions and sugarcane juice. In Malawi, the items are salt, sugar, sweet potatoes,

Figure 2 shows effects on food prices (the data series in blue is for Liberia and that in red for Malawi).[20] The top row of the Figure shows (1) all items weighted equally (top left); and (2) staples only (top right). The bottom row makes use of historical time series data on prices taken from the WFP to subtract off monthly average prices. However, this is only possible for the staple foods of rice (Liberia) and maize (Malawi), and so in the panel we show results with and without subtracting off this average. In each plot, the figure shows point estimates and confidence intervals relative to February 2020.

The figure shows that prices increased modestly in Liberia and actually declined in Malawi. This latter effect is due in part to the seasonal maize harvest, which occurs around this time (as can be seen in the 2021 data). We show these results in formal regressions in Table A6. In a difference-in-differences comparing 2020 and 2021, we observe price increases of 9-19% in Liberia for all crops (somewhat higher for staples, though lower for rice alone), and modest declines in Malawi. This is consistent with Barrett (2020), which documented that global food prices had not changed much in the early part of the pandemic.

---

rice, maize, maize flour, chicken, soybeans, dried fish, mpiru (a local vegetable), beans, groundnuts, tomatoes, eggs, onions, and pigeon peas.

[20]Table A6 presents the same information in regression form.

Figure 2: Effects on Crop Prices

Panel A: Price of Basket of Food Items

All Items

Staples
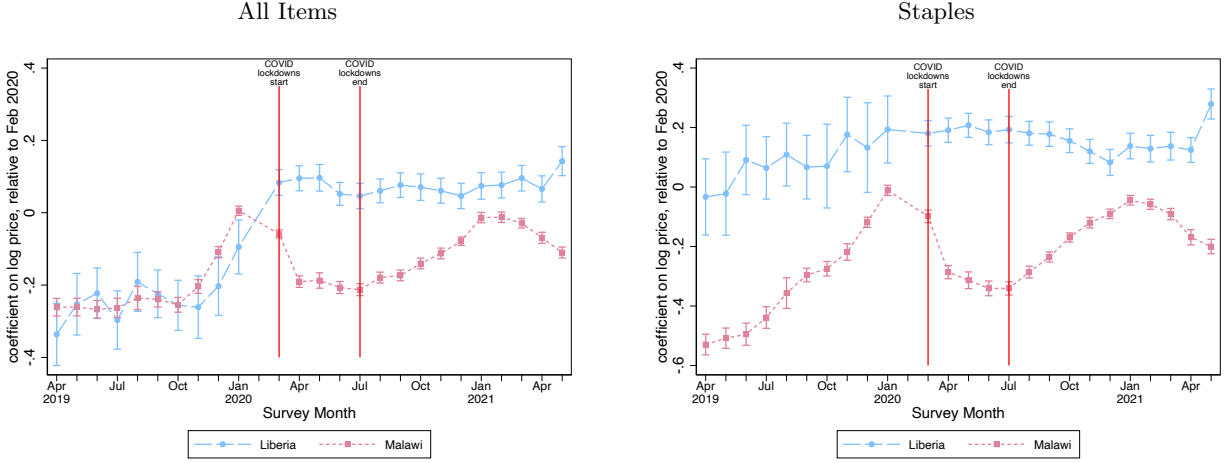
Panel B: Price of Select Food Items

Rice/Maize - Unadjusted

Rice/Maize - Adjusted for Seasonal Price Fluctuations
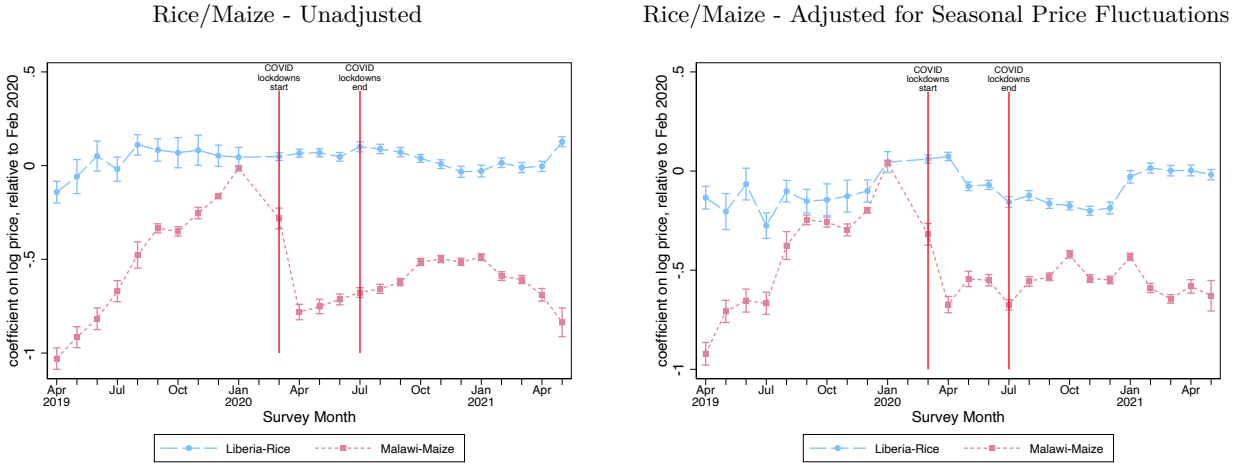
Note: Figure shows coefficients from a regression of log(price) on month dummies, omitting the reference period of February 2020 (the last month prior to lockdowns). The underlying unit of observation is market-month (there are 90 markets and 16 products in Malawi and 85 markets and 14 products in Liberia) - see footnote 19 for list of items). All monetary values are in USD and Winsorized at 1% and 99%. Standard errors are clustered at the market level. All specifications include product fixed effects and market fixed effects. Panel A shows effects on prices of basket of food items Staple crops in Liberia are local rice, imported rice, cassava, and cassava flour. Staple crops in Malawi are sweet potatoes, maize, maize flour, beans, and pigeon peas. Panel B shows (imported rice) and maize prices, with and without subtracting off monthly average prices from the WFP (the WFP data is only available for these two products).

All in all, it appears that the worst fears about lockdowns have not been realized, at least for these contexts. Our results suggest that lockdowns can be implemented in rural areas if necessary, without causing huge increases in food insecurity (at least for some amount of time), even in very poor settings. The disease itself has not yet spread widely in much of rural Africa, and activities like subsistence farming have apparently continued with modest disruption. Other sources of income were disrupted for some time, but most households earned very little from such activities. Similarly, in other contexts, people have worried about the loss of services such as school meals – yet in this setting, kids were not getting meals in the first place anyway, so there was little to lose.[21] In this context, market disruptions – which limit but do not eliminate economic activity, and which are not accompanied by a direct loss of assets – might be much easier to cope with than natural disasters, even for people at the bottom of the pyramid.

---

[21]Table A7 shows that few children received meals and most of these were just replaced by parents.

References

Amare, Mulubrhan, Kibrom A. Abay, Luca Tiberti, and Jordan Chamberlin (2021). "COVID-19 and food security: Panel data evidence from Nigeria." *Food Policy* 101: 102099.

Anderson, Michael L. (2008). "Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects." *Journal of the American Statistical Association* 103 (484): 1481–1495.

Ballard, Terri, Jennifer Coates, Anne Swindale, and Megan Deitchler (2011). "Household Hunger Scale: Indicator Definition and Measurement Guide." Tech. rep.

Barrett, Christopher B. (2020). "Actions now can curb food systems fallout from COVID-19." *Nature Food* 1: 319–320.

Ceballos, Francisco, Samyuktha Kannan, and Berber Kramer (2020). "Impacts of a national lockdown on smallholder farmers' income and food security: Empirical evidence from two states in India." *World Development* 136: 105069.

Egger, Dennis et al. (2021). "Falling living standards during the COVID-19 crisis: Quantitative evidence from nine developing countries." *Science Advances* 7 (6).

FAO (2013). "Guidelines for measuring household and individual dietary diversity."

FAO, IFPRI, and WFP (2020). "2020 Global Report on Food Crises."

Hirvonen, Kalle, Alan de Brauw, and Gashaw T. Abate (2021). "Food Consumption and Food Security during the COVID-19 Pandemic in Addis Ababa." *American Journal of Agricultural Economics* 103 (3): 772–789.

Laborde, David, William Martin, and Rob Vos (2020). "COVID-19 Risks to Global Food Security." *Science* 369 (6503): 500–502.

Lee, Kenneth, Harshil Sahai, Patrick Baylis, and Michael Greenstone (2020). "Job Loss and Behavioral Change: The Unprecedented Effects of the India Lockdown in Delhi." *COVID Economics* 51 (7): 134–158.

Mahmud, Mahreen and Emma Riley (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*.

WFP (2008). "Food consumption analysis: Calculation and use of the food consumption score in food security analysis."

Appendix

Figure A1: Timeline of Project Activities

	2018		2019										2020											
	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12

Malawi
Baseline
Household Phone Surveys
Crop Vendor Phone Surveys
Cash Transfers

Liberia
Wave 1 Baseline
Wave 1 Household Phone Surveys
Wave 1 Cash Transfers
Crop Vendor Phone Surveys
Wave 2 Baseline
Wave 2 Household Phone Surveys
Wave 2 Cash Transfers
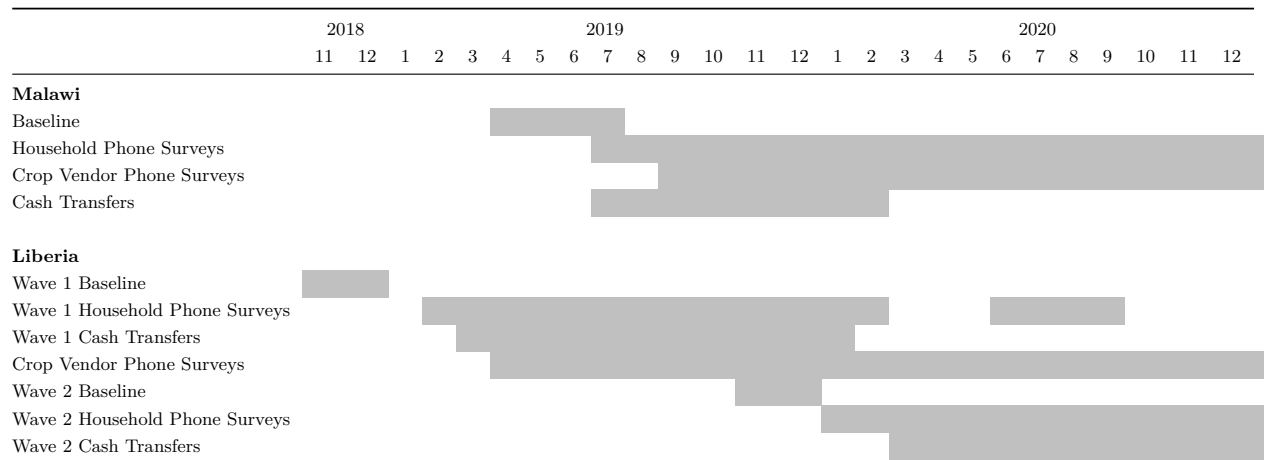
Note: Data collection for phone surveys and endline continue in 2021, but they were omitted from this figure.

Figure A2: Map of Study Villages and Markets in Liberia and Malawi

(a) Liberia
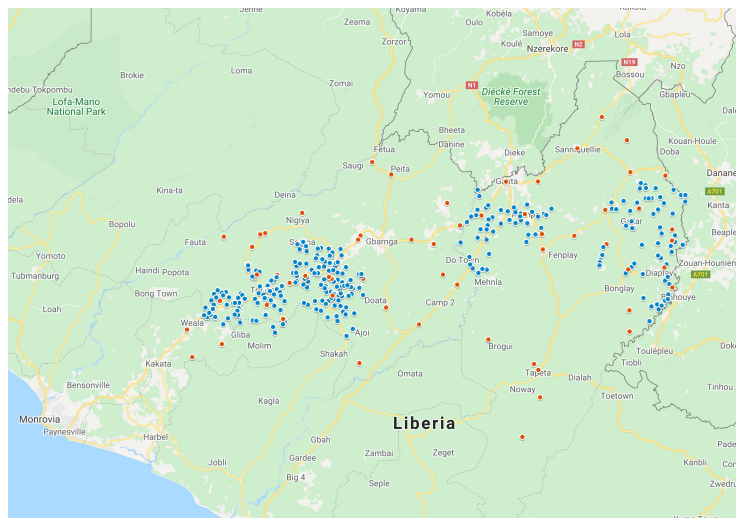
(b) Malawi
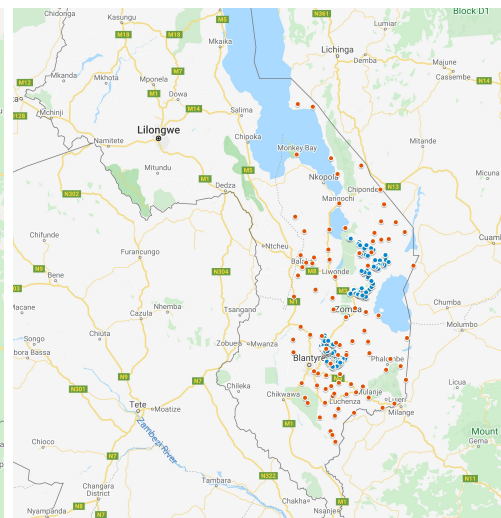
Note: Blue dots refer to villages, and orange dots markets. For Liberia, there are 300 villages and 80 markets. For Malawi, there are 300 villages and 95 markets.

Figure A3: Timeline of Government Responses

Liberia

3/21 Ministry of Health announced a state of national heath emergency, imposing restrictions on gatherings

4/10 A nationwide state of emergency, putting all 15 counties in the country under quarantine

6/22 Extension of a state of emergency by another 30 days

Malawi

3/20 President announced a state of disaster, restricting public gatherings and closing schools

4/14 President announced a national lockdown which was struck down by the High Court of Malawi

6/23 Malawi presidential election

Mar
Apr
May
June
July

Planting
Harvest

Figure A4: Changes in Food Security, pre- and post-COVID (by cash treatment group)

(a) GiveDirectly treatment group

(b) Control group

Note: These graphs show the same information as Figure 1, but the sample is broken down into GiveDirectly treatment and control groups. For the treatment group, there are 60 respondents in Liberia Wave 1, 176 in Liberia Wave 2, and 299 in Malawi. For the control group, 75 in Liberia Wave 1, 182 in Liberia Wave 2, and 297 in Malawi. We had ended data collection for Liberia's Wave 1 sample in March 2020, but conducted an additional round in June-August 2020 to collect outcomes related to COVID disruptions.

Figure A5: Changes in Food Security, pre- and post-COVID (by component)

(a) Household dietary diversity score (HDDS)

(b) Food consumption score (FCS)

(c) Household hunger scale (HHS)
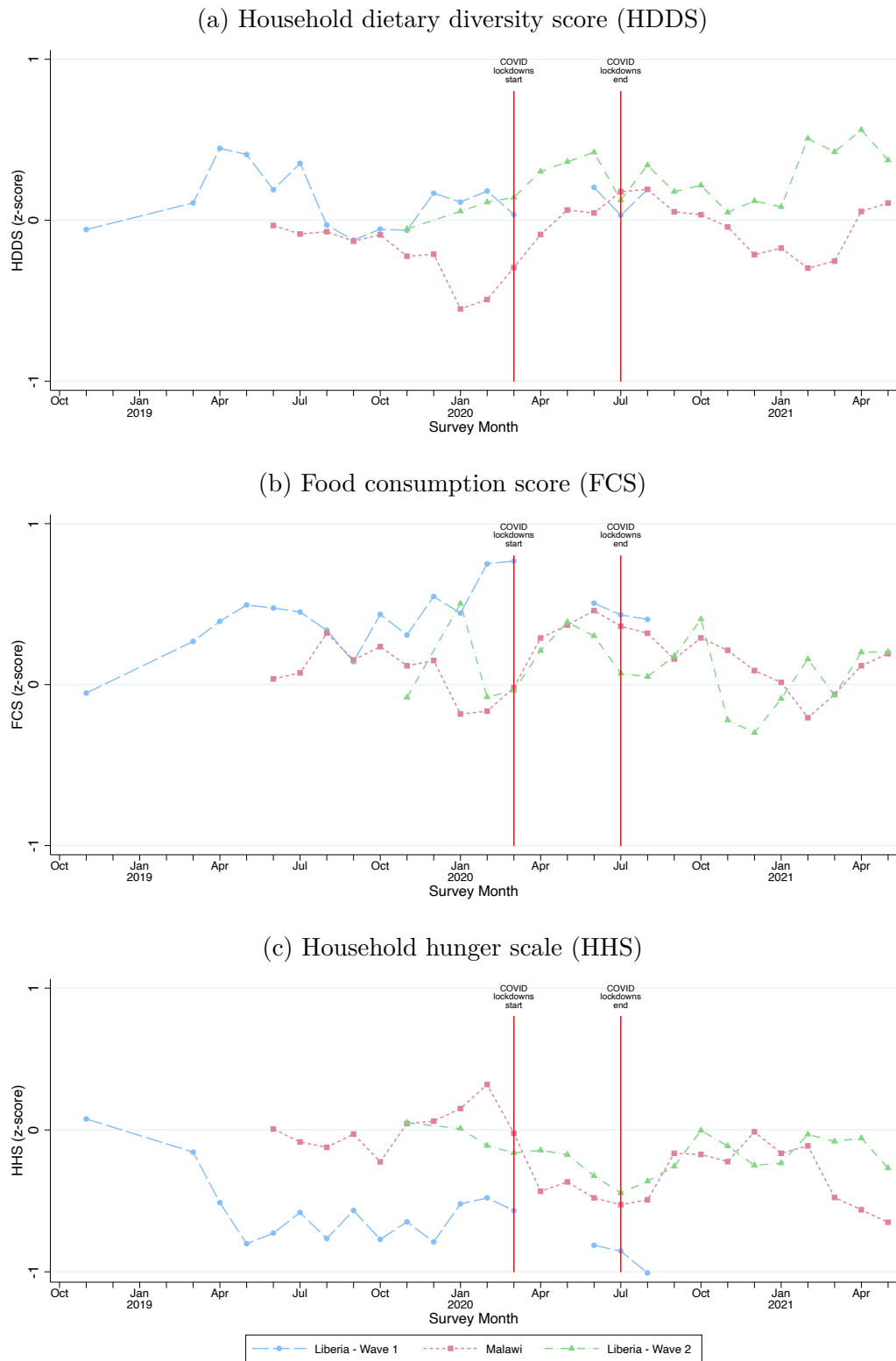
Note: This graph shows the same information as Figure 1, but is broken down into each of the components:
(a) the household dietary diversity score (HDDS), (b) the food consumption score (FCS), and (c) the
household hunger scale HHS). The recall period for these variables is 24 hours for the HDDS, one week
for the FCS, and one month for the HHS. There are 135 respondents in Liberia Wave 1, 359 in Liberia
Wave 2, and 596 in Malawi. We had ended data collection for Liberia's Wave 1 sample in March 2020, but
conducted an additional round in June-August 2020 to collect outcomes related to COVID disruptions.

Figure A6: Historical Price Trends

Liberia: 2011-2019

Palm Oil

Rice

Cowpeas

Cassava

Malawi: 2012-2019

Beans

Maize

Rice

Nuts
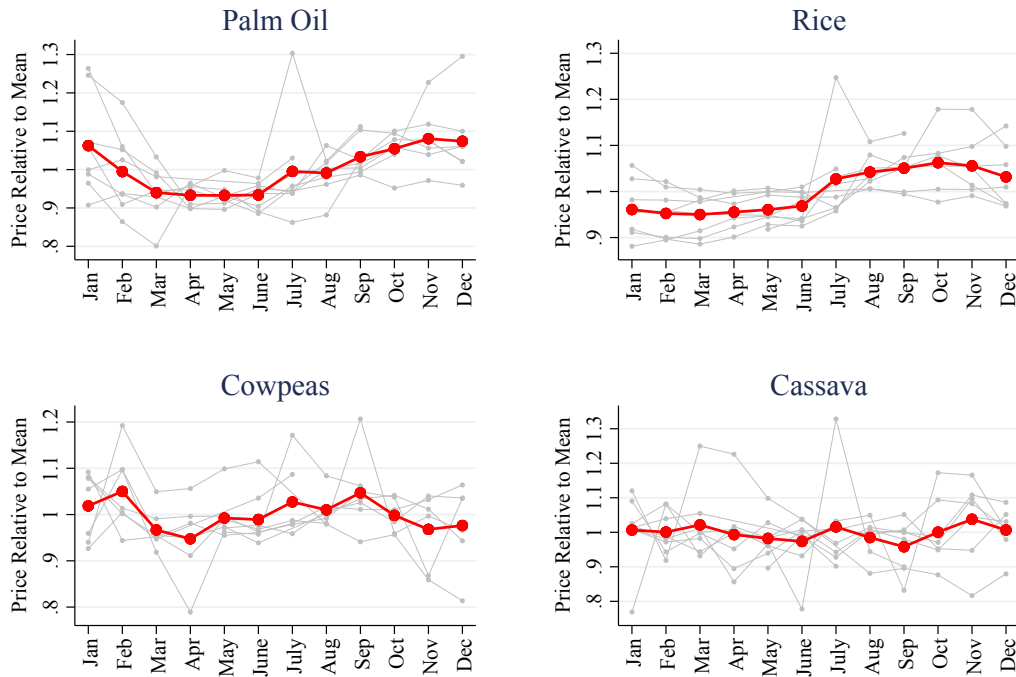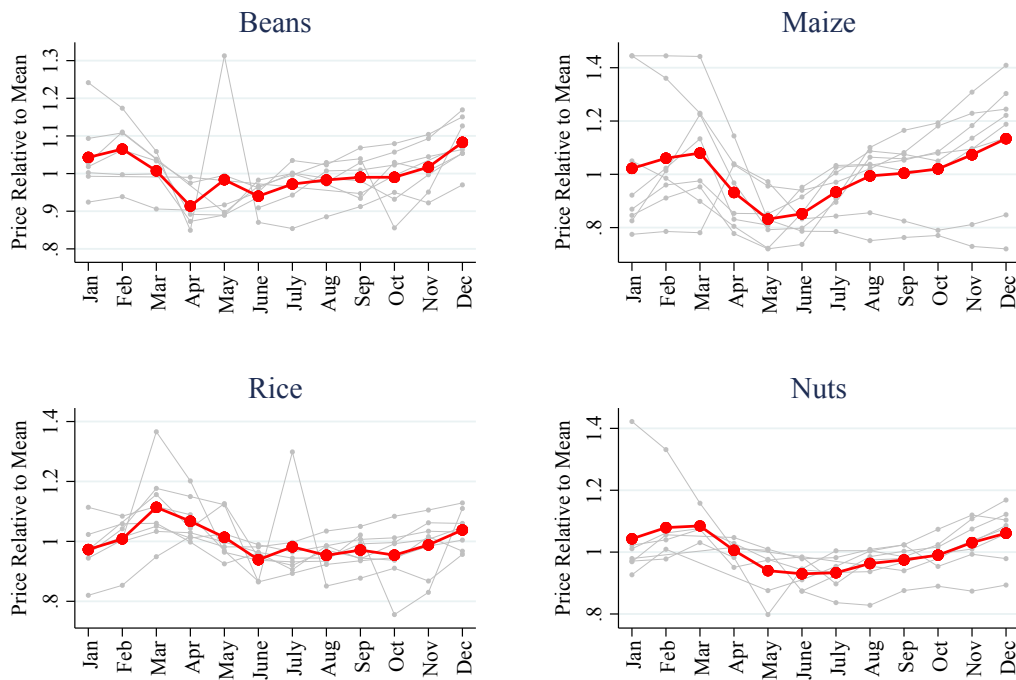
Note: Each grey lines indicate prices for each individual year and red dots show the long run average prices across years in a given month.

Table A1: Household Attrition from Phone Surveys

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	=1 if completed survey in following month:											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Panel A: Liberia												
2020	0.69	0.79	0.74	0.63	0.69	0.69	0.55	0.57	0.64	0.63	0.63	0.61
2021	0.60	0.51	0.50	0.53	0.51							
Panel B: Malawi												
2020	0.90	0.90	0.92	0.91	0.90	0.96	0.95	0.93	0.95	0.94	0.97	0.79
2021	0.81	0.89	0.89	0.84	0.82							

Note: The Liberia results (Panel A) include only Wave 2 of the study (since coverage over this time period was spotty in Wave 1). In Panel A, there are 416 respondents in total, and in Panel B, 596 respondents.

Table A2: Awareness and Attitudes about COVID-19

	(1) Liberia	(2) Malawi
Panel A: Basic awareness		
=1 if respondent:		
is aware of recent virus outbreak	0.98	0.99
knows that it's called coronavirus/COVID-19	0.90	1.00
thinks it's a real public health problem	0.95	0.98
Panel B: Opinions about government response to COVID		
Do you trust the information central gov't is providing?[a]	4.37	4.71
Do you trust the information local leaders are providing?[a]	4.39	4.68
=1 if central gov't and local leaders give different info	0.05	0.12
Do you think gov't measures to prevent spread are helpful?[b]	4.24	4.10
Do you approve gov't measures?[c]	4.19	4.09
Panel C: Support from government/NGO during lockdown		
=1 if received cash transfers		0.00
=1 if received food support		0.00
Panel D: Concern about COVID contraction		
=1 if worried or extremely worried about COVID contraction	0.87	0.93
=1 if knows anyone who tested for COVID-19	0.04	0.09

Note:

[a] 0-5 scale index. 0 - have not received any guidelines; 1 - don't trust at all; 2 - somewhat distrust; 3 - neither trust nor distrust; 4 - somewhat trust; 5 - trust completely.

[b] 1-5 scale index. 1 - not at all helpful; 2 - not helpful; 3 - neither helpful nor not helpful; 4 - helpful; 5 - very helpful.

[c] 1-5 scale index. 1 - strongly disapprove; 2 - disapprove; 3 - neither approve nor disapprove; 4 - approve; 5 - strongly approve.

Table A3: Change in Business Outcomes for Food Vendors

	(1) No. of customers (daily)	(2) Revenue (monthly)	(3) Profit (monthly)	(4) Other income (monthly)
Panel A: Liberia				
April	-14.40***	-101.68***	-24.62***	-5.00**
	(0.80)	(11.56)	(2.43)	(2.22)
May	-12.05***	-98.30***	-18.30***	-3.16
	(0.92)	(21.24)	(3.97)	(2.43)
June	-10.11***	-83.31***	-13.48***	-1.71
	(1.11)	(24.20)	(4.52)	(2.47)
February mean	31.50	255.90	47.42	8.11
February SD	21.08	394.56	68.70	56.11
F statistic	115.22	31.35	41.68	3.41
Observations	2,200	2,200	2,200	2,200
No. of vendors	676	676	676	676
Panel B: Malawi				
April	-22.12***	-182.01***	-44.34***	-17.50***
	(1.64)	(30.12)	(4.92)	(6.23)
May	-23.80***	-136.60***	-32.20***	2.64
	(2.44)	(50.38)	(6.82)	(8.46)
June	-24.88***	-118.67**	-21.73***	3.40
	(2.40)	(48.05)	(7.68)	(6.86)
February mean	67.68	592.57	103.59	34.80
February SD	73.82	1276.22	196.02	188.23
F statistic	61.53	12.73	28.49	5.95
Observations	3,813	3,813	3,813	3,813
No. of vendors	1,042	1,042	1,042	1,042

Note: All variables are Winsorized at 99%. All monetary values are in USD. Standard errors are clustered at the market level.

Table A4: Household Food Security, post-COVID (by component)

	(1)	(2)	(3)	(4)	(5)	(6)
	HDDS [a]		FCS [b]		HHS [c]	
Panel A: Liberia						
April 2020	0.25	-0.15	3.25**	-2.32	-0.03	-0.27**
	(0.18)	(0.27)	(1.40)	(1.94)	(0.10)	(0.13)
May 2020	0.59***	0.34	-0.09	0.20	-0.16*	0.01
	(0.18)	(0.27)	(1.37)	(1.94)	(0.09)	(0.13)
June 2020	0.59***		4.79***		-0.23**	
	(0.18)		(1.38)		(0.09)	
July 2020	0.30		-3.85**		-0.49***	
	(0.19)		(1.51)		(0.10)	
April		0.28		3.63**		0.15
		(0.22)		(1.58)		(0.11)
May		0.39*		1.67		-0.09
		(0.21)		(1.54)		(0.10)
2020		-0.32**		2.53**		0.09
		(0.15)		(1.10)		(0.07)
Jan-Feb 2020 mean	6.18	6.18	55.74	55.74	0.78	0.78
Jan-Feb 2020 SD	1.77	1.77	15.53	15.53	0.92	0.92
Observations	840	1,030	840	1,030	840	1,030
No. of households	308	308	308	308	308	308
Panel B: Malawi						
April 2020	0.69***	0.22*	6.44***	2.97**	-1.05***	-0.32***
	(0.10)	(0.13)	(0.85)	(1.16)	(0.07)	(0.10)
May 2020	1.07***	0.44***	7.79***	4.19***	-0.73***	-0.13
	(0.10)	(0.13)	(0.87)	(1.17)	(0.07)	(0.10)
June 2020	0.96***		9.41***		-1.16***	
	(0.10)		(0.84)		(0.07)	
July 2020	1.29***		8.15***		-1.00***	
	(0.10)		(0.85)		(0.07)	
April		0.53***		4.06***		-0.70***
		(0.10)		(0.89)		(0.08)
May		0.53***		3.15***		-0.64***
		(0.10)		(0.91)		(0.08)
2020		-0.49***		-1.04		0.51***
		(0.07)		(0.67)		(0.06)
Jan-Feb 2020 mean	4.66	4.66	43.17	43.17	1.57	1.57
Jan-Feb 2020 SD	1.62	1.62	15.43	15.43	1.15	1.15
Observations	1,645	2,078	1,645	2,078	1,645	2,078
No. of households	538	538	538	538	538	538

Note: Odd columns show event study regressions for the household phone survey from January - July 2020, excluding March 2020, which was partially both pre- and post-COVID disruptions; omitted group is January and February 2020 pooled. Even columns show difference-in-difference regressions for the sample from January - May 2020 and January - May 2021, excluding surveys conducted in the months of March; omitted group in the difference-in differences regressions is January and February 2021 pooled (the comparison group of calendar months against the last survey round in 2020 right before COVID lockdowns). All regressions control for baseline measurment of outcome and individual fixed effects. In Panel A, sample includes only Wave 2. All monetary values in USD and Winsorized at the 99th percentile.
[a] Household dietary diversity score (HDDS) ranges from 0 (less diverse) to 12 (more diverse).
[b] Food consumption score (FCS) ranges from 0 (worse) to 112 (better).
[c] Household hunger scale (HHS) ranges from 0 (less severe) to 6 (more severe).

Table A5: Income, post-COVID

	(1)	(2)	(3)	(4)	(5)	(6)
	Business profit		Labor income		Total Non-agricultural income	

Panel A: Liberia

	(1)	(2)	(3)	(4)	(5)	(6)
April 2020	0.80	0.50	2.67***	1.89	3.47***	2.39*
	(0.52)	(0.76)	(0.93)	(1.23)	(1.06)	(1.43)
May 2020	-2.18***	-0.98	2.57***	3.09**	0.39	2.11
	(0.51)	(0.76)	(0.91)	(1.23)	(1.04)	(1.43)
June 2020	0.29		0.64		0.93	
	(0.51)		(0.91)		(1.04)	
July 2020	-1.74***		0.85		-0.90	
	(0.56)		(1.00)		(1.15)	
April		-0.15		0.61		0.46
		(0.62)		(1.00)		(1.16)
May		-0.80		-0.51		-1.31
		(0.60)		(0.97)		(1.13)
2020		0.94**		0.08		1.01
		(0.43)		(0.70)		(0.81)
Jan-Feb 2020 mean	2.64	2.64	2.65	2.65	5.30	5.30
Jan-Feb 2020 SD	6.39	6.39	6.58	6.58	9.73	9.73
Observations	840	1,030	840	1,030	840	1,030
No. of households	308	308	308	308	308	308

Panel B: Malawi

	(1)	(2)	(3)	(4)	(5)	(6)
April 2020	0.10	-0.27	-3.21***	-0.42	-3.11***	-0.68
	(0.28)	(0.41)	(0.47)	(0.67)	(0.53)	(0.76)
May 2020	-0.19	-0.03	-1.65***	0.71	-1.84***	0.69
	(0.29)	(0.41)	(0.48)	(0.68)	(0.54)	(0.76)
June 2020	-0.14		-2.54***		-2.68***	
	(0.28)		(0.46)		(0.52)	
July 2020	-0.09		-1.59***		-1.68***	
	(0.28)		(0.47)		(0.53)	
April		0.22		-2.50***		-2.28***
		(0.31)		(0.52)		(0.58)
May		0.05		-2.60***		-2.55***
		(0.32)		(0.53)		(0.60)
2020		0.12		-0.13		-0.02
		(0.24)		(0.39)		(0.44)
Jan-Feb 2020 mean	1.32	1.32	5.79	5.79	7.12	7.12
Jan-Feb 2020 SD	4.79	4.79	7.79	7.79	8.87	8.87
Observations	1,645	2,078	1,645	2,078	1,645	2,078
No. of households	538	538	538	538	538	538

Note: Outcome variables are monthly income of the respondent (in USD and Winsorized at the 99th percentile). Odd columns show event study regressions for the household phone survey from January - July 2020, excluding March 2020, which was partially both pre- and post-COVID disruptions; omitted group is January and February 2020 pooled. Even columns show difference-in-difference regressions for the sample from January - May 2020 and January - May 2021, excluding the months of March; omitted group in the difference-in differences regressions is January and February 2021 pooled (the comparison group of calendar months against the last survey round in 2020 right before COVID lockdowns). All regressions control for baseline measurement of outcome and individual fixed effects. The Liberia results (Panel A) include only Wave 2 of the study (since coverage over this time period was spotty in Wave 1).

Table A6: Crop Prices, post-COVID

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All Items		Staples		Rice/Maize		Rice/Maize	
	Dep. Variable: Ratio of Price to Average Price in February of Same Year							
Panel A: Liberia								
April 2020	0.124***	0.194***	0.224***	0.368***	0.069***	0.088***	0.135***	0.173***
	(0.018)	(0.024)	(0.029)	(0.027)	(0.011)	(0.017)	(0.023)	(0.033)
May 2020	0.129***	0.085***	0.254***	0.259***	0.070***	-0.040**	0.138***	-0.084**
	(0.018)	(0.020)	(0.026)	(0.029)	(0.012)	(0.020)	(0.023)	(0.039)
June 2020	0.083***		0.220***		0.048***		0.095***	
	(0.017)		(0.030)		(0.012)		(0.024)	
July 2020	0.081***		0.244***		0.106***		0.209***	
	(0.018)		(0.029)		(0.015)		(0.029)	
April		-0.015		-0.005		-0.018		-0.036
		(0.015)		(0.014)		(0.011)		(0.022)
May		0.098***		0.133***		0.111***		0.222***
		(0.013)		(0.018)		(0.016)		(0.033)
2020		0.034*		0.099***		0.001		-0.038
		(0.018)		(0.025)		(0.013)		(0.026)
Controls for Price Trend	N	N	N	N	N	N	Y	Y
Markets	80	80	80	80	80	80	80	80
Products	14	14	4	4	1	1	1	1
Observations	5,228	6,219	1,442	1,745	393	466	393	466
Feb 2020 Mean (USD)	1.515	1.515	0.553	0.553	0.681	0.681	0.681	0.681
Panel B: Malawi								
April 2020	-0.148***	-0.093***	-0.217***	-0.113***	-0.534***	-0.441***	-1.603***	-1.443***
	(0.008)	(0.010)	(0.010)	(0.014)	(0.010)	(0.018)	(0.031)	(0.039)
May 2020	-0.138***	-0.039***	-0.233***	-0.052***	-0.520***	-0.313***	-1.560***	-1.205***
	(0.010)	(0.011)	(0.011)	(0.013)	(0.011)	(0.030)	(0.034)	(0.057)
June 2020	-0.152***		-0.253***		-0.506***		-1.518***	
	(0.008)		(0.010)		(0.008)		(0.025)	
July 2020	-0.163***		-0.256***		-0.488***		-1.465***	
	(0.008)		(0.009)		(0.008)		(0.024)	
April		-0.054***		-0.102***		-0.094***		-0.161***
		(0.007)		(0.011)		(0.017)		(0.029)
May		-0.097***		-0.178***		-0.206***		-0.355***
		(0.006)		(0.009)		(0.028)		(0.050)
2020		-0.001		-0.002		-0.001		1.328***
		(0.008)		(0.009)		(0.013)		(0.025)
Controls for Price Trend	N	N	N	N	N	N	Y	Y
Markets	95	95	95	95	95	95	95	95
Products	16	16	5	5	1	1	1	1
Observations	7,331	8,662	2,222	2,557	471	478	471	478
Feb 2020 Mean (USD)	1.043	1.043	0.694	0.694	0.489	0.489	0.489	0.489

Note: All prices are in USD and Winsorized at 1% and 99%. Odd columns show event study regressions for sample from crop vendor phone survey for February - July 2020, excluding March 2020, which was partially both pre- and post-COVID disruptions, omitted group is February 2020. Even columns show difference-in-difference regressions for the sample from February - May 2020 and February - May 2021, excluding surveys conducted in the months of March, omitted group is February 2021. Standard errors are clustered at the market level. Regressions include product fixed effects and market fixed effects. Staple crops in Liberia are local rice, imported rice, cassava, and cassva flour. Staple crops in Malawi are sweet potatoes, maize, maize flour, beans, and pigeon peas. Columns 7-8 In panel A for Liberia have imported rice while in panel B for Malawi is Maize prices. Additionally, in Columns 8, the long run monthly average prices for February from the WFP 2011-2019 price database are used to calculate the price ratio.

Table A7: School Meals

	(1) Liberia	(2) Malawi
=1 if following meals were provided in school (before closure):		
breakfast	0.03	0.56
lunch	0.33	0.01
snack	0.01	0.00
no food at all	0.52	0.37
=1 if respondent reported yes to:		
children miss out meals	0.23	0.12
respondent spends money to make more food	0.56	0.76
assitance from family/neighbor/friends	0.01	0.00
assistance from village chief/gov't/aid programs	0.33	0.13

Note: Questions were asked of all households and crop vendors with school-aged children. N=2,029 (507 in Liberia and 1,522 in Malawi).