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Did COVID-19 Market Disruptions Disrupt Food Security? Evidence from Households in Rural Liberia and Malawi

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ABSTRACT

We quantify the effect of market disruptions due to COVID-19 on the lives of households in rural areas of Liberia and Malawi, utilizing panel data from phone surveys that were implemented as part of a randomized cash transfer experiment. The surveys began collection several months before the pandemic and have continued throughout it. The household survey included a consistent set of internationally accepted and validated questions on food security (the household dietary diversity score, the household hunger scale, and the food consumption score). In both countries, market activity was severely disrupted and we observe large declines in income among market vendors, but we find no evidence of declines in food security for households in the short run. Even though we observe no adverse effects of the lockdowns on food security among the control group, cash transfers improved dietary quality and quantity over the low levels observed at baseline.

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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 have been nearly as intense as those in developed countries.[2] This study focuses on 2 countries: Liberia, which ordered a full shelter-in-place for 3 months, and Malawi, which lacked a shelter-in-place but still closed schools and placed restrictions on transportation and gatherings. Both countries restricted cross-border movement.

The impact of these restrictions on rural households is not obvious *ex ante*. On the one hand, Malawi and Liberia are among the poorest countries in the world; the average household in this study spends less than $1 per day and has almost no financial wealth. Safety nets are weak in both countries, much of the workforce is in the informal sector, and governments have limited financial and logistical capacity to identify beneficiaries and provide income assistance. Indeed, in our study areas, no households reported receiving assistance during the pandemic. Many media accounts take this view, warning of millions being pushed into poverty and even of imminent starvation (FAO, IFPRI and WFP (2020)). On the other hand, rural areas are less likely to be affected by the virus itself, because of low population density, remoteness from population centers, and reliance on farming (which can be practiced at social distance). They may also be similarly insulated from the lockdowns – while economic activity in population centers has clearly declined, this may not have spilled over into more rural areas.

We measure the impacts of the COVID lockdowns on well-being using monthly phone surveys with households as well as with food vendors in local markets. The surveys were implemented as part of an ongoing evaluation of a large unconditional cash transfer (UCT) program, and data collection started well before the global onset of COVID-19, and have continued throughout the pandemic. The household survey was conducted every 2 months (with half of the sample interviewed each month) and includes questions on food security, income, labor supply, expenditures, transfers and other related outcomes. The second survey is with food vendors in markets in the study area, as well as in comparable markets elsewhere in the country, and is conducted monthly. This survey includes questions on food prices; in addition, in the weeks following the imposition of COVID-related public health measures, we added retrospective questions on market activity including income, revenues, the number of customers, and supply chains. Finally, in both surveys, we added modules specific to COVID-19, including questions on attitudes and behavior changes.

While there has been an explosion of research on the economic impacts of COVID-associated market disruptions, this study makes two main contributions. First and foremost, our household

[1] At this writing, according to Worldometer, there have been about 1.5 million cases and 35,000 deaths in Africa (population 1.2 billion), and about half of these are in the country of South Africa. By contrast, North America has approximately 9 million cases and more than 300,000 deaths (population 580 million) while Europe has approximately 5 million cases and 220,000 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.

survey includes standardized questions on food intake, specifically the household dietary diversity score (HDDS), the food consumption score (FCS), and the household hunger scale (HHS). These measures are recommended for use by organizations such as the FAO and USAID, and have been validated in several settings to meaningfully correlate with food security.[3] Second, we use the cash transfer experiment to evaluate the effect of cash during the lockdowns.

We find that knowledge about the virus was high, that people are concerned about contracting the virus and have changed their behavior consistent with health guidance, and that market disruptions were enforced. We find major declines in market activity in both countries, which is not surprising in Liberia where there was a lockdown, but is important to document in Malawi where there was no official restriction. Food vendors suffered large income losses – monthly profit declined by about 42% in Malawi and 52% in Liberia. Effects on prices show no consistent pattern. In Liberia we observe price increases of about 4-9% for all food items and of 12-20% for staples such as rice and cassava; in Malawi, we actually observe large declines in prices of food, likely due to the harvest coinciding with the lockdown, and even relative to historical trends.

Yet despite these disruptions, our main result is that we observe no evidence of worsened food security in either country (for either the treatment or control groups in the experiment). This is not because government or NGO support programs mitigated negative effects (no households reported receiving any such support during this period). This finding is not to diminish the fact that in both countries, the *level* of food security is low – 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%. However, we find that this low level of food security did not further worsen during the market disruptions. We also find that cash transfers modestly improved food security, which is noteworthy because transfers were sent well prior to the crisis. This result is similar to Banerjee et al. (2020), who study the effects of universal basic income (UBI) in Kenya and like us, find modest effects on food security. Our context differs from a UBI, in that the transfers we study pre-date the pandemic onset.

Why are effects so modest? Most respondents in our sample are subsistence farmers, and farming was exempt from restrictions. Respondents do also engage in other income-generating activities like casual labor, or small business, but income from these sources is very limited (less than $10 per month), and we observe modest declines. Finally, while markets have been restricted, they were nevertheless open, and the price of food has increased only modestly in Liberia and has actually declined in Malawi.

In this study context, it appears that the remoteness of rural areas, and its reliance on subsistence farming, may have actually helped mitigate negative effects – while economic activity clearly declined in population centers, as well as for market vendors, effects appear much more muted for study households, most of whom are farmers.[4] While our results are for only 2 countries, they

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

[4] Our results share some similarities with Ceballos, Kannan and Kramer (2020), who 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. However, we do not observe a decline

suggest that temporary lockdowns can be implemented in rural areas like these, without worsening food insecurity (at least for most households). It is possible that other people in these study areas, such as service workers, suffered during the lockdown; however, these jobs are rare in our study samples. It is also clear that some business owners like vendors lost income during the crisis; although these individuals are better off to start with in our data, it is possible that food security declined for them. Nevertheless, our results suggest that the typical farming household was able to cope, which we believe is an important result given that these 2 countries are among the poorest in the world, and our study samples include people living well below the global poverty line. That being said, we reiterate that these findings could be specific to these areas and could differ in other contexts [5], and could also differ in future pandemics if lockdowns last longer, since this study focuses only on the short term.

The rest of this paper is organized as follows. Section 2 describes the study context, Section 3 presents results, and Section 4 concludes.

2 Experimental Design, Background, 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, 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.[6] 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; 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.[7]

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[8] in Bong and Nimba counties. 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

in income in our data.

[5] Indeed, several studies of COVID in Africa find large declines in food security in Uganda (Mahmud and Riley (2020)) and Nigeria (Amare et al. (2020))

[6] 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 27 in Liberia and 55 in Malawi. The villages are therefore not meant to be representative of larger villages.

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

[8] 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.

to COVID-related disruptions, many villages were not enrolled until late August. In Malawi, all villages were enrolled in 2019. A map of study locations, with pins of the study villages and markets, is included as Appendix Figure A2. Appendix Figure A1 has a timeline of project activities.

In total, 600 villages were sampled (300 in each country), and we attempted to enroll 10 households per village in the 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.

2.1 COVID-19 disruptions in Liberia and Malawi

Liberia's response to COVID was typical for Africa. Following the first case on March 16, 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 20th, 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 18th), but this order was challenged and was overturned by the High Court on April 19th. Without a country-wide lockdown, Malawi's response was one of the weakest in Africa, ranking 57/100 (compared to 88/100 for Libera) on the Oxford COVID-19 Government Response Tracker.[9]

As of this writing, Liberia has had about 1,300 cases and 82 deaths (population of about 5 million), while the corresponding numbers in are Malawi 5,600, 176, and 18 million.

2.2 Sample selection and surveys

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 study households from this list of GPS pins, and targeted female heads of households for surveys (because intimate partner violence is a key outcome).

The analysis in this paper is based on two sets of monthly phone surveys, one of households and one of food vendors. We describe these below.

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

2.2.1 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 called them every 2 months for approximately 10-14 months.[10]

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;[11] (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;[12] and (3) the household hunger scale (or 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.[13]

2.2.2 Surveys of food vendors

As part of our evaluation, we set up data collection to measure prices in areas where cash was distributed, and in comparison markets. In Liberia, comparison markets were selected throughout other parts of the country, using the WFP Liberia Market Review Report.[14] We enrolled all markets after excluding the five smallest markets (by number of food vendors), as well as a few additional markets not used by our respondents. We started with 32 markets in Bong in April 2019 and added another 48 from Nimba and other counties in February 2020. In Malawi, we obtained the full official list of markets in the two study districts, Machinga and Chiradzulu, and 7 surrounding districts as comparison.[15] From this, we sampled the biggest market for each traditional authority (TA), resulting in 95 markets. In total, there are 80 markets (40 treatment and 40 comparison) in Liberia, and 95 markets (25 treatment and 70 control) in Malawi.

We attempted to enroll at least 2 vendors of each product per market, though this was chal-

[10] Table A1 shows attrition from the household phone surveys, by treatment status. Columns 1-7 show regression for survey completion round-by-round, while Column 8 shows an indicator for appearing in at least 1 round, and Column 9 shows the percentage of rounds completed. Taking Column 9 as the summary measure, we find that 91% of surveys were completed in Malawi, and this was similar in treatment and control. In Liberia, completion was much lower: 60% in Wave 1 and 70% in Wave 2. Unfortunately, completion is significantly lower among treatment households in Wave 1; this is because households changed their phone numbers when they received the cash transfer offer and so mechanically were harder to reach. We addressed this issue in Wave 2, and attrition is lower and also balanced in Wave 2. However, due to this issue, we do not present Wave 1 results in the main regressions (though we do show them in the appendix, Table A6); we also have very limited data from Wave 2, since enrollment in the treatment was disrupted by COVID (whereas the surveys themselves were not, allowing us to examine the impact of COVID.

[11] These survey questions were based on guidance in FAO 2013.

[12] These survey questions were based on guidance in WFP 2008.

[13] These survey questions were based on guidance in Ballard et al. 2011.

[14] https://documents.wfp.org/stellent/groups/public/documents/ena/wfp188456.pdf

[15] These are Balaka, Blantyre, Mangochi, Mulanje, Phalombe, Thyolo, and Zomba.

lenging in smaller markets. We measured only food prices (given the importance of food in local consumption baskets), and selected items based on their frequency in consumption and production as found in existing household surveys (HIES for Liberia and IHS4 for Malawi) as well as our own baseline survey. We collected prices for 14 items in Liberia[16] and 16 in Malawi.[17] We enrolled ~900 vendors in Liberia and 1,200 in Malawi, and called them once per month. Prior to COVID, these surveys focused only on prices. We asked each vendor about the products that she sold ("direct prices") as well as the prices of other items on the list ("indirect prices"); we did this because some items were rarely sold in smaller markets and finding their prices was challenging. However, we use direct prices whenever possible.

2.2.3 COVID-related questions

Shortly after the lockdowns began, we redesigned our phone surveys to measure the impact of the unfolding crisis. These surveys started in May 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. For households, we added questions on spousal labor income as well as business outcomes. For food vendors, we added questions on quantities sold, the number of customers, revenues, profits, and income from other sources. To construct a comparison month, we measured these month-by-month from February 2020.

2.3 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 $38-42 per month, which works out to less than $0.30 per day per capita.

The average household has about $400 in assets in Liberia and $1,500 in Malawi, but the majority of this is in the form of land and housing – other assets are only $20 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 $2 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.

[16] 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.

[17] The items are salt, sugar, sweet potatoes, rice, maize, maize flour, chicken, soybeans, dried fish, mpiru (a local vegetable), beans, groundnuts, tomatoes, eggs, onions, and pigeon peas.

We find that 40-44% of respondents report skipping a meal in the past month because there was not enough food, and almost a quarter experienced no food for an entire day.

Table 1: Household Demographics

	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	0.32	0.99	0.11
=1 if sold any harvest	0.56	0.50	0.52	0.50
=1 if owns a business enterprise	0.21	0.41	0.25	0.43
Household monthly expenditure	36.43	42.12	43.82	52.25
Household food expenditure	5.59	13.09	15.00	15.97
=1 if respondent has access to mobile phone[a]	0.19	0.39	0.31	0.46
=1 if house owned	0.66	0.47	0.85	0.35
=1 if house has thatch roof	0.26	0.44	0.51	0.50
Total value of land and housing	255.53	498.73	1,398.11	2,404.06
Total net value of durable goods, livestock, and financial asset	15.10	35.01	86.35	144.16
Total value of physical assets	13.26	29.48	89.25	143.05
Net value of financial assets	1.85	21.38	-2.89	14.91
Savings	5.72	16.33	4.00	9.42
Outstanding household debt	3.88	13.39	6.89	14.97
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 99%. 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 Quantifying the Effect of COVID-19 Market Disruptions

3.1 Regression Specifications

3.1.1 Individual level outcomes

We restrict this analysis to data collected between January and August 2020. In most cases, we drop March 2020 (since restrictions came into force mid-month) and run the following specification

using February 2020 as a reference group:

$$y_{it} = \sum_{t=Apr}^{Aug} D_t + \theta y_{io} + \mu_s + \epsilon_{it} \tag{1}$$

where D_t is a month fixed effect, μ_s is a strata fixed effect, and y_{io} is a measure of the dependent variable collected during baseline (making the specification ANCOVA). For outcomes that were measured retrospectively, we do not include the baseline control.

3.1.2 Prices

In each market, we attempted to collect at least 2 price points for each item. We construct a market-level price as the average price in the market, using direct prices where available, and run regressions very similar to (1):

$$p_{mjt} = \sum_{t=Apr}^{Aug} D_t + \mu_m + \gamma_p + \epsilon_{it} \tag{2}$$

where μ_m and γ_p are market and product fixed effects.

3.2 Descriptive evidence on disruptions

Table 2 documents that government measures 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.[18]

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 report that the cost of stocking the same bundle of supplies as they did in February would cost 35% more in Liberia and 22% 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.

[18] 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 (the data for Liberia has not been collected yet).

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]	38.14	22.57
	(40.26)	(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 versus when the survey was conducted, which ranges from May-July 2020.

3.3 Effects on food prices

Table 3 shows effects on food prices (Columns 1-4 are for Liberia and 5-8 are for Malawi). Columns 1 and 5 capture effects on all items and show that prices have increased by 3-9% during the post-COVID period in Liberia (relative to February), but actually declined by about 20-24% in Malawi. When restricted to staple crops in column 2, prices increased by 18-20% in Liberia and declined by even more (29-36%) in Malawi. Since these price changes are purely temporal, changes due to the lockdowns are indistinguishable from seasonal trends, which are important in Malawi, since the this

area harvests around March. To account for historical monthly price trends, we use the 2011-2019 data series from the WFP for available crops.[19] In each country, we focus on the primary staple crop – rice in Liberia, and maize in Malawi. This data is available for an unbalanced sample of 23 markets in Liberia and 115 in Malawi. Seasonal price trends for these crops are shown in Figure A4. Columns 3 and 7 show price trends for these crops only, and shows a 5-10% increase in Liberia and a large decrease of 66-77% in Malawi (due to the harvest). When we control for seasonal trends, price trends became negative in Liberia (because rice prices traditionally rise slightly during this period), but estimates decline somewhat in Malawi, though they are still large (53-66%). Anecdotally, the large decline in Malawi appears due to a bumper harvest.[20]

Table 3: Crop Prices

	Dep. Variable: Log Prices							
	Liberia				Malawi			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	Staples	Rice	Rice	All	Staples	Maize	Maize
April	0.078***	0.180***	0.067***	0.074***	-0.197***	-0.292***	-0.767***	-0.659***
	(0.019)	(0.022)	(0.011)	(0.011)	(0.009)	(0.012)	(0.022)	(0.022)
May	0.085***	0.196***	0.069***	-0.077***	-0.212***	-0.306***	-0.732***	-0.525***
	(0.020)	(0.022)	(0.011)	(0.011)	(0.013)	(0.014)	(0.021)	(0.021)
June	0.037**	0.172***	0.047***	-0.070***	-0.238***	-0.363***	-0.706***	-0.542***
	(0.018)	(0.022)	(0.012)	(0.012)	(0.010)	(0.015)	(0.015)	(0.015)
July	0.032*	0.185***	0.104***	-0.152***	-0.232***	-0.362***	-0.660***	-0.658***
	(0.019)	(0.024)	(0.014)	(0.014)	(0.010)	(0.013)	(0.014)	(0.014)
August	0.045**	0.170***	0.090***	-0.122***	-0.199***	-0.302***	-0.647***	-0.546***
	(0.018)	(0.022)	(0.013)	(0.013)	(0.009)	(0.012)	(0.013)	(0.013)
Controls for Price Trend	N	N	N	Y	N	N	N	Y
Markets	80	80	80	80	95	95	94	94
Products	14	4	1	1	16	5	1	1
Observations	6331	1761	473	473	7017	2464	549	549
Feb Mean (USD)	1.579	0.554	0.682	0.682	0.849	0.703	0.493	0.493

Note: All monetary values are in USD and winsorized at p1 and p99. February is the omitted group. Standard errors are clustered at the market level. 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 3 and 4 look at imported rice and Columns 7 and 8 look at maize. Additionally, in Columns 4 and 8, the long run monthly averarge prices from the WFP 2011-2019 price database are subtracted from the monthly imported rice and maize prices, respectively. All specifications include product fixed effects and market fixed effects.

3.4 Effects on households

We present our main result – the impact of the lockdowns on food security, in Figure 1. Our outcome variable is a composite food security index (henceforth, FSI) of three different indices of

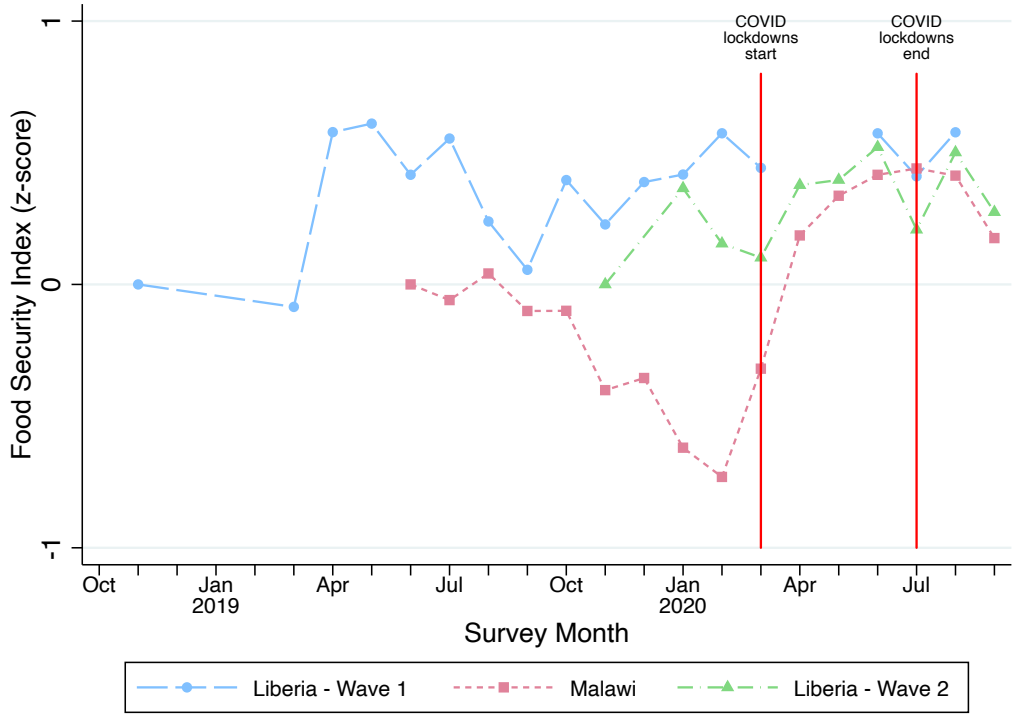
[19] WFP's price data for Malawi start from 1998 and for Liberia from 2006 but with fewer number of markets and items. More information about how WFP collects these prices is here: https://documents.wfp.org/stellent/groups/public/documents/manual_guide_proced/wfp291385.pdf

[20] Table A4 shows effects on soap and cleaning products, and shows increases in prices across the board. Effects seem modest for disinfectant and soap, but the price of water buckets almost doubled.

food security – FCS, HDDS, and HHS.[21] We present three independent data series – Malawi, and the two Liberia waves. To ensure that results are unconfounded by the effects of cash, we present the control groups only.

Mirroring our discussion about seasonality in Section 4.2, we observe that the temporal distribution of the FSI jumps around considerably.[22] For all 3 samples, we find no decline in food security during the lockdown. Table A5 shows these results in regression form, showing that these changes are statistically significant in many cases.

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. The figure shows the average for the control group only. There are 75 respondents in Liberia Wave 1, 174 in Liberia Wave 2, and 296 in Malawi. The empty data points for Liberia's Wave 1 sample indicate when there was a pause of data collection for that sample.

For Malawi, we observe an *increase* in the FSI after March 2020. This result is likely due to the fortuitous fact that the harvest in Southern Malawi begins around March. To shed some light on whether 2020 trends were similar to other years, we use data from the 2010 and 2016 rounds of the Malawi IHS for the Southern Province (where Chiradzulu and Machinga are located) to

[21] Since lower values of HHS is better, the FSI includes the inverted value of the HHS. Figure A5 shows each component separately – results are similar for all of them.

[22] The peaks and troughs for Liberia Wave 1 (the only series with sufficiently long coverage) coincide around the same months in both the years.

examine how responses to similar food security questions change over time (this is identified off of non-random survey rollout, and should be taken with caution)– results are presented in Appendix Figures A6 and A7. For both years, we observe an improvement in the FCS and a decrease in household hunger around March, though these effects are typically more modest.[23] As noted above, price declines were also larger than usual during this time period, which may be explained by the bumper maize harvest in Malawi in 2020.[24]

3.5 Effects of cash transfers

Table 4 shows the impacts of cash transfers on FSI (and its components) during the pandemic period (March-July 2020). We limit the main analysis to Malawi only because (as discussed in footnote 10) the Wave 1 phone survey sample was not balanced (due to a technical problem around sim cards) and the rollout of the Wave 2 cash transfers was disrupted by COVID. In Malawi, we find higher food security among cash transfer beneficiaries on all food security indicators, and observe higher spending on food. However, since food security did not decline for the control group in the first place (Figure 1), these effects represent an *increase* in consumption, rather than a smaller decrease (i.e., mitigation).

Table 4: Cash Effects on Food Security

	(1) HDDS[a]	(2) FCS[b]	(3) HHS[c]	(4) Food Security Index[d]	(5) Food Expenditure
GD	0.19**	1.92**	-0.10*	0.16**	1.49*
	(0.10)	(0.93)	(0.06)	(0.07)	(0.85)
Control Mean	5.51	48.94	0.73	0.45	14.34
Control SD	1.54	13.60	1.00	1.04	12.73
Observations	1,656	1,656	1,656	1,656	1,656

Note: Regressions include survey month and strata fixed effects, and baseline measures of the dependent variable. Standard errors are clustered at village level. Sample includes 595 households in Malawi during the period of March-August 2020.
[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).
[d] Standardized z-score of HDDS, FCS, and HHS (negatively weighted), using means and standard deviations from control group in March 2020.

The Liberia results show a similar pattern (subject to the above caveats). Table A6 shows Lee bounds for Wave 1. The uncorrected estimate is positive and significant, though the bounds include zero. For Wave 2, the rollout of cash was only partially completed in several districts due to

[23] We are unable to replicate this analysis for Liberia using the HIES as the sample size for the relevant counties - Bong and Nimba - is too small to support any conclusive findings.
[24] https://reliefweb.int/report/malawi/giews-country-brief-malawi-03-august-2020

COVID; we can therefore create an ITT estimate by comparing the treatment and control groups in these districts. However, this is underpowered since a large portion (63%) of the assigned treatment villages were untreated; we therefore also compute TOT estimates. As can be seen in Appendix Table A7, the estimates are similar to the Malawi results, though (unsurprisingly) not significant.

4 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.

While we do not want to over-generalize from this research (since these are just 2 data points), at least for these contexts it appears that the worst fears about lockdowns have not occurred. 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 rural Africa, and activities like subsistence farming have apparently continued with modest disruption. In our sample, people earn very little money from sources other than farming, and this income did not decline much.[25] 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.[26] 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.

[25] Table A8 shows that income from other sources is only a few dollars per month, and while this did decline in both countries, this still involved small sums.

[26] Table A9 shows that few children received meals and most of these were just replaced by parents..

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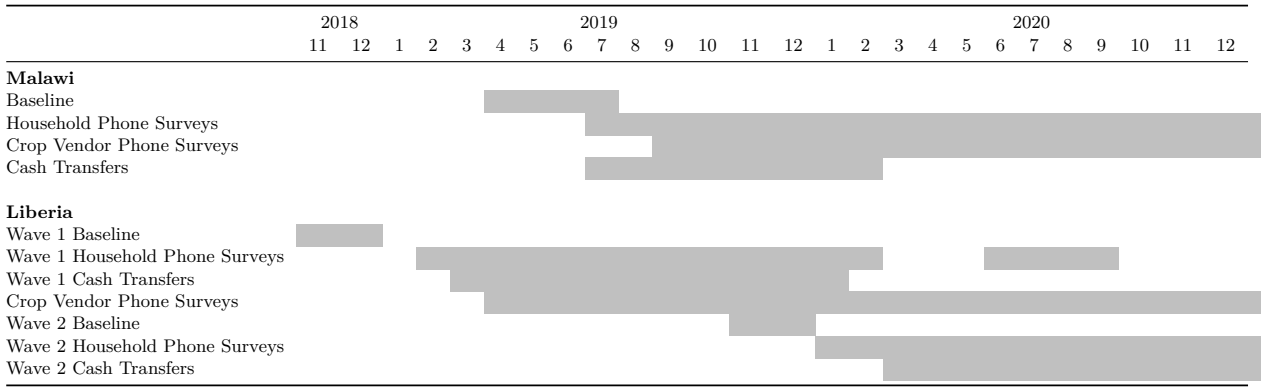
Appendix

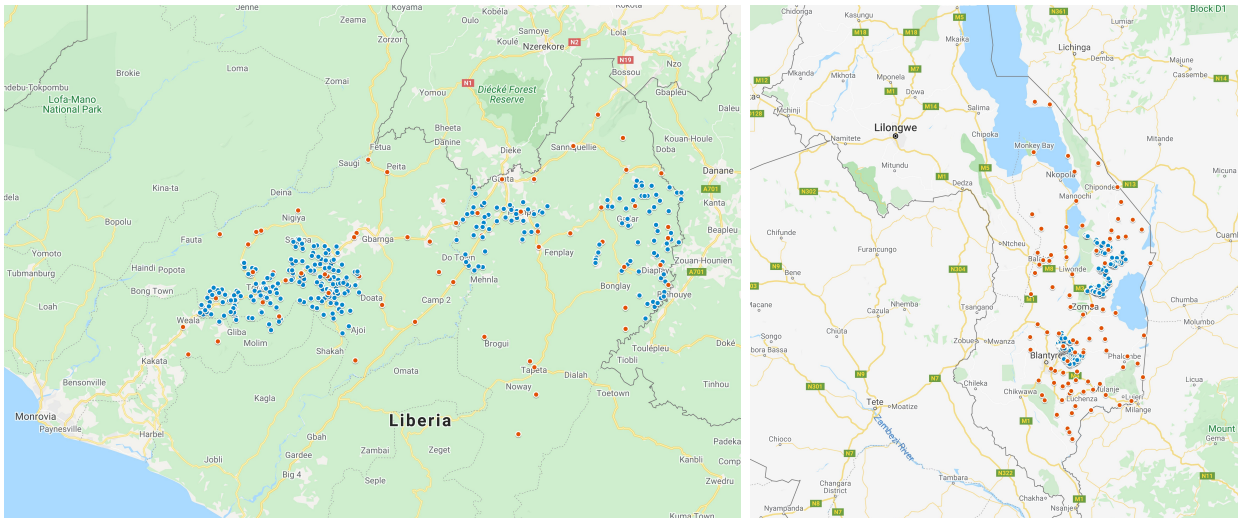
Figure A1: Timeline of Project Activities



Note: Data collection for phone surveys and endline continue in 2021, but they were omitted from this figure.

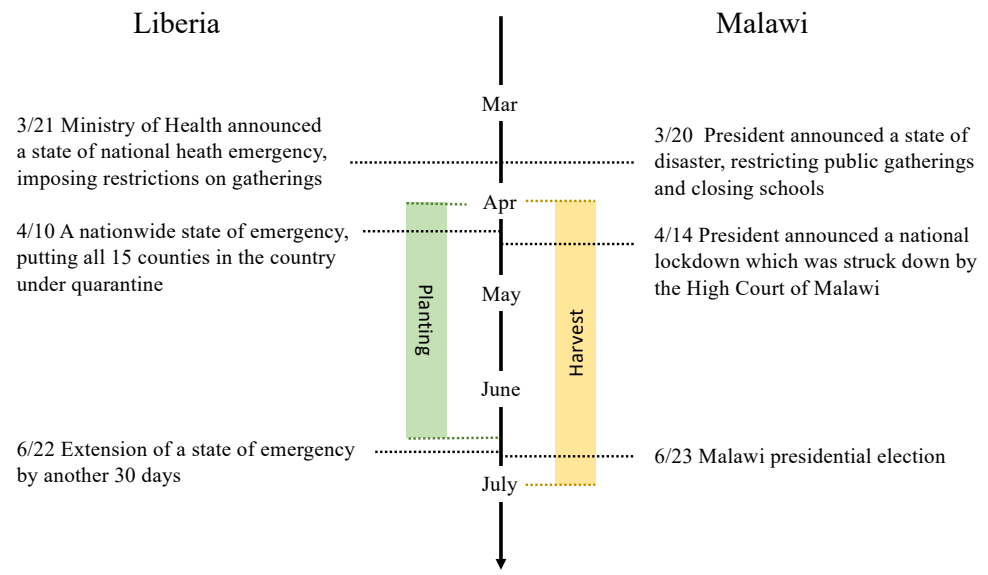
Figure A2: Map of Study Villages and Markets in Liberia and Malawi

(a) Liberia (b) Malawi



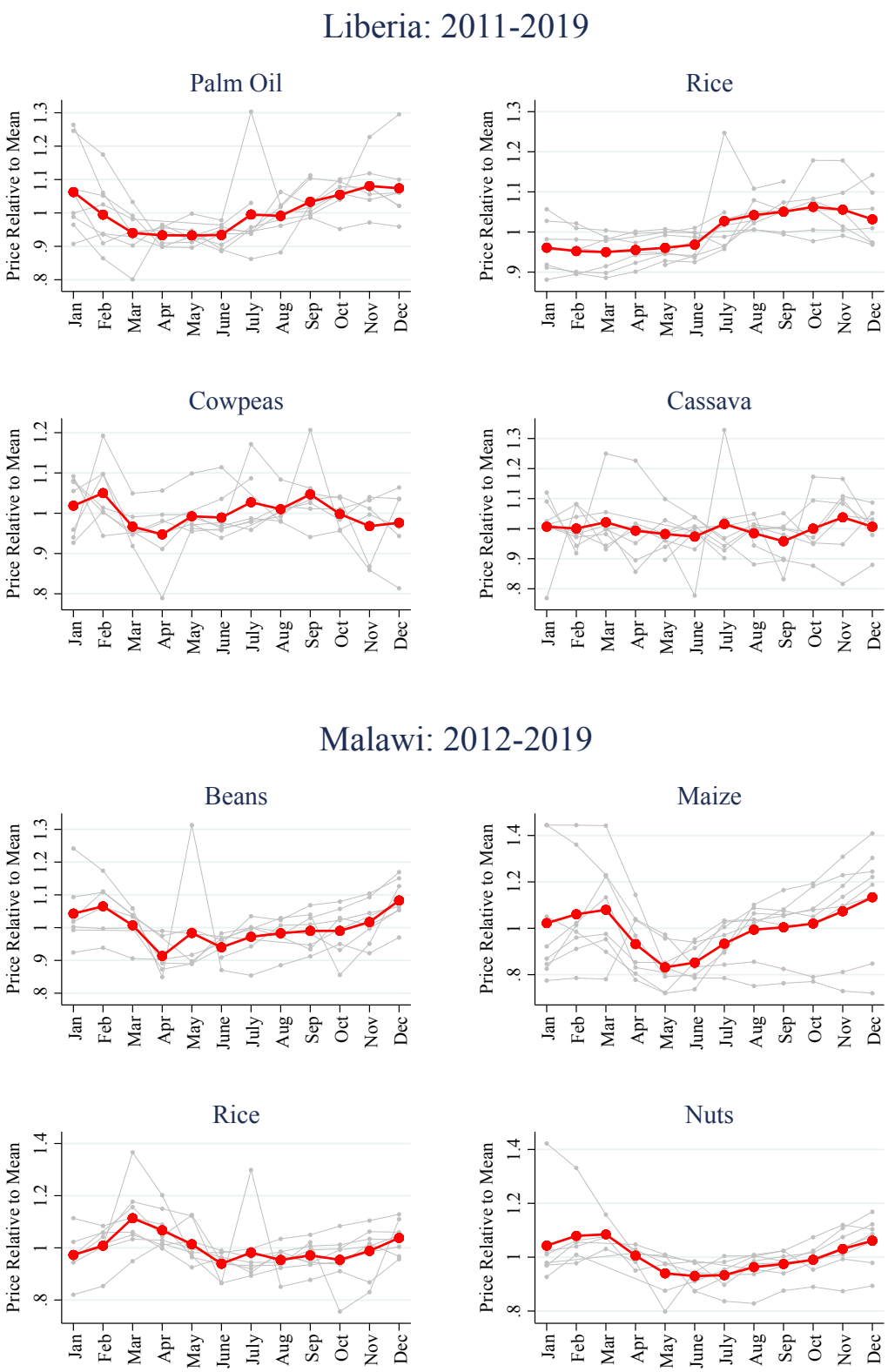
Note: Blue dots refer to villages, and orange dots markets. For Liberia, there are 300 villages and 80 markets. For Malawi, there are 300 villages and 95 markets.

Figure A3: Timeline of Government Responses



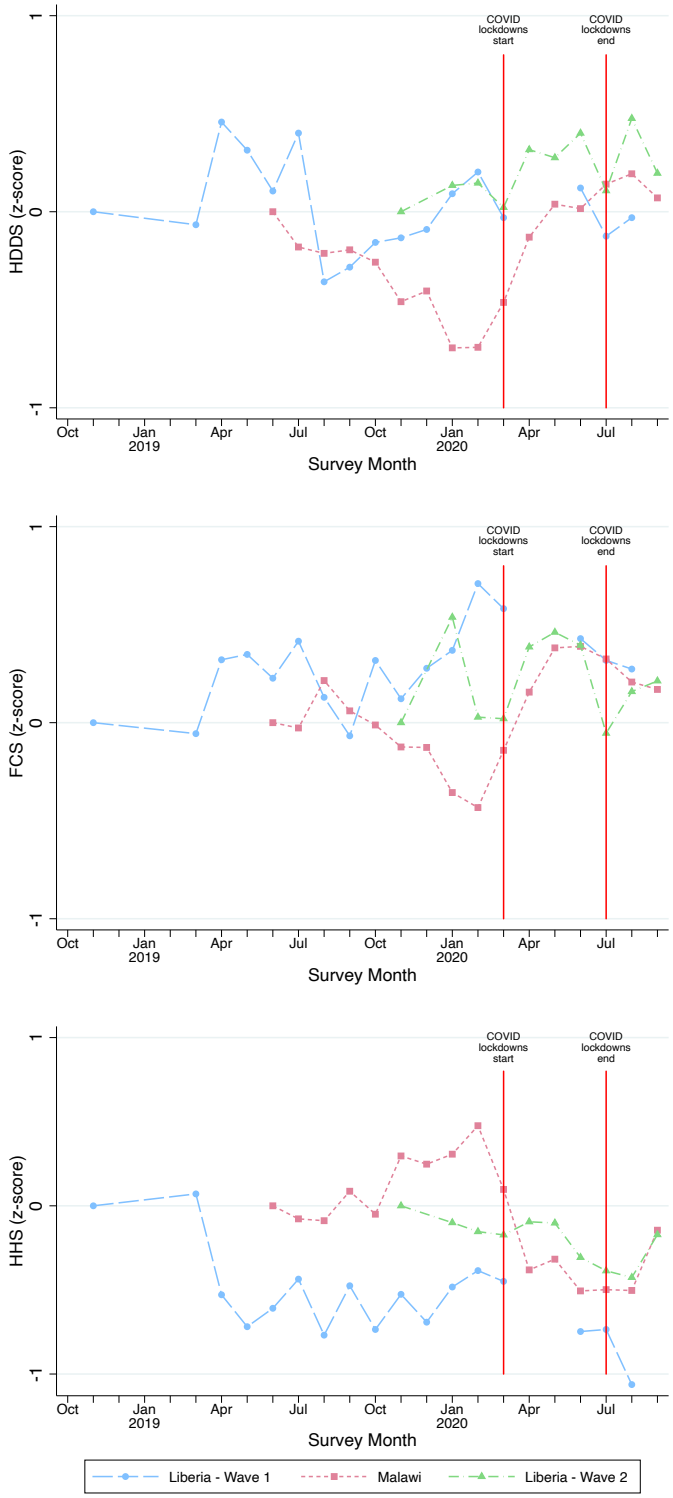
Note:

Figure A4: Historical Price Trends



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.

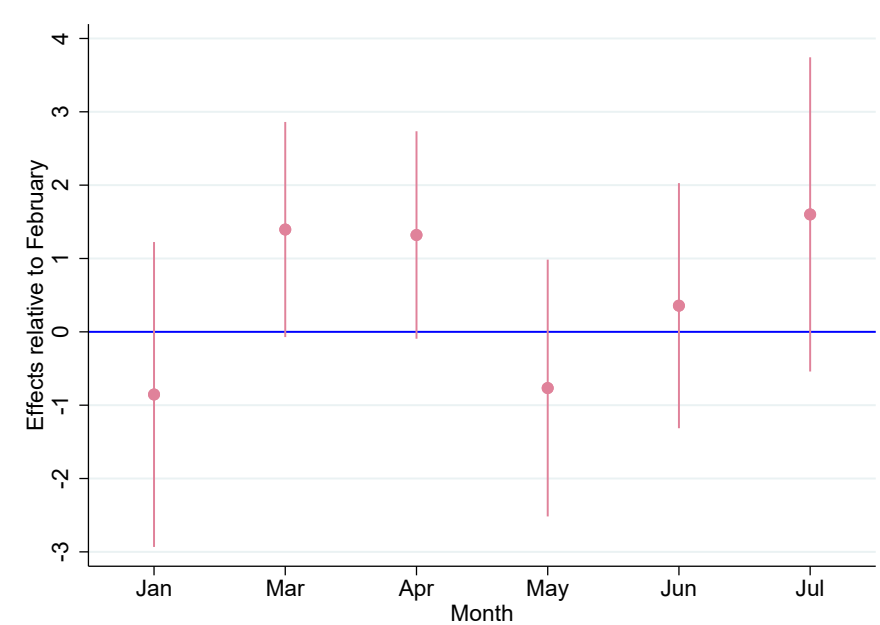
Figure A5: Changes in food security, pre- and post-COVID (by component)



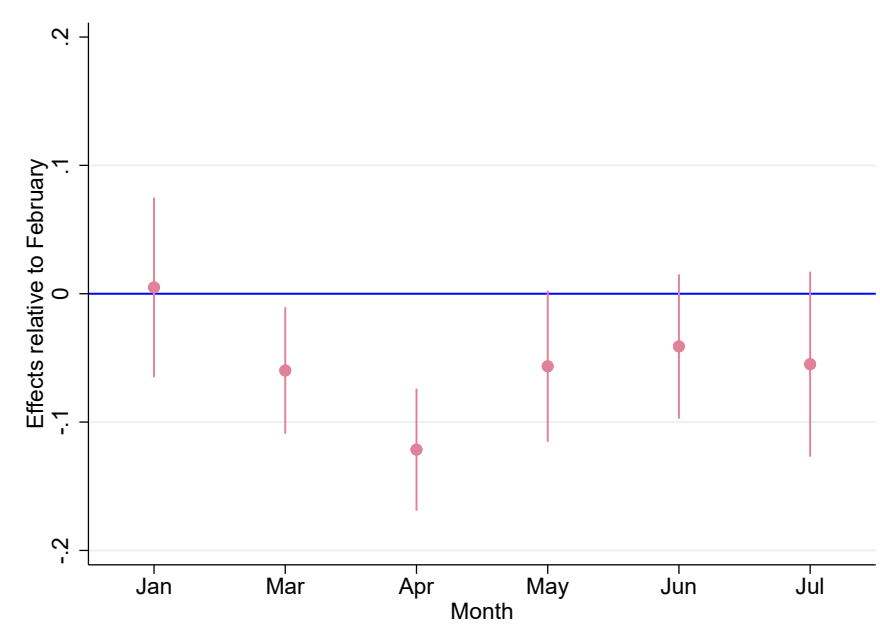
Note: This graph shows the same information as Figure 1, but is broken down into each of the components: (1) the dietary diversity score (HDDS), (2) the food consumption score (FCS), and (3) the household hunger scale HHS). The recall period for these variables is 24 hours for the HDDS and one week for the FCS and HHS. The figure shows the average for the control group only. There are 75 respondents in Liberia Wave 1, 174 in Liberia Wave 2, and 296 in Malawi.

Figure A6: Food security trends from Malawi IHS4 2016

(a) Food consumption score (FCS)



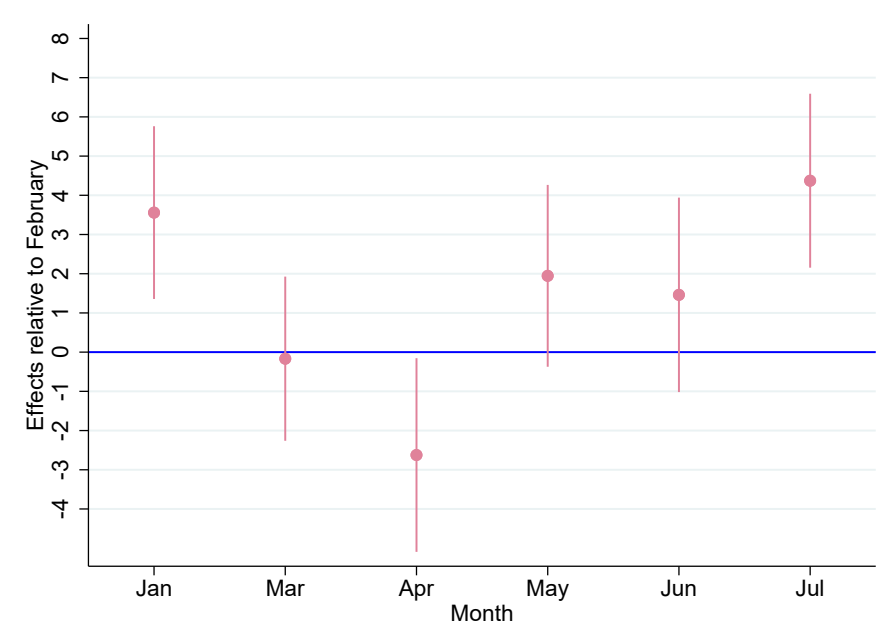
(b) Household hunger scale (HHS)



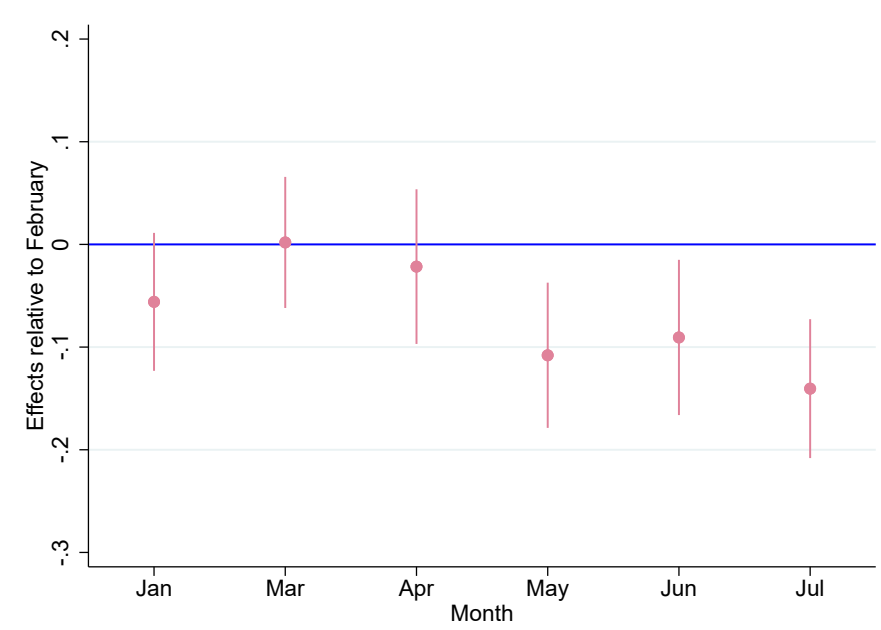
Note: Diplayed are individual months' coefficients relative to February and are for a cross-section of households in the Southern province only. FCS is calculated using the standard definition of FCS while the dependent variable for HHS is a single question "In the past 7 days, did you worry that your HH would not have enough food?" Mean and standard deviation of FCS in February 2016 is 39.0 and 13.5, while the February average for the outcome in panel (b) is 71%. Note that there was a major drought in 2015-2016 in the country and the government of Malawi declared a countrywide state of disaster in April 2016.

Figure A7: Food security trends from Malawi IHS2 2010

(a) Food consumption score (FCS)



(b) Household hunger scale (HHS)



Note: Diplayed are individual months' coefficients relative to February and are for a cross-section of households in the Southern province only. FCS is calculated using the standard definition of FCS while the dependent variable for HHS is a single question "In the past 7 days, did you worry that your HH would not have enough food?" Mean and standard deviation of FCS in February 2016 is 42.3 and 14.4, while the February average for the outcome in panel (b) is 47%.

Table A1: Household Attrition from Phone Surveys

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	=1 if completed survey in following round:							≥ 1R	Pct. of rounds
	R1	R2	R3	R4	R5	R6	R7		
Panel A: Malawi									
GD	-0.00	-0.03	-0.03	0.02	-0.05*	-0.02	-0.01		-0.02
	(0.01)	(0.02)	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)		(0.01)
Control Mean	0.97	0.95	0.87	0.89	0.93	0.95	0.86	1.00	0.92
Control SD									0.16
Observations	596	596	596	596	596	596	596	596	596
Panel B: Liberia Wave 1									
GD	-0.15*	-0.15*	-0.12	-0.15*	-0.16**	-0.14*	-0.08	-0.12*	-0.14**
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.07)	(0.07)	(0.06)
Control Mean	0.70	0.66	0.68	0.59	0.60	0.61	0.34	0.85	0.60
Control SD									0.37
Observations	172	172	172	172	172	172	172	172	172
Panel C: Liberia Wave 2									
GD	-0.02	0.00	-0.03					-0.04	-0.01
	(0.05)	(0.05)	(0.05)					(0.04)	(0.04)
Control Mean	0.75	0.67	0.69					0.84	0.70
Control SD									0.38
Observations	416	416	416					416	416

Note: Monthly household phone surveys are still ongoing. We include as much data as we have in our analysis, and therefore, round 7 for Malawi sample and round 4 for Liberia wave 2 sample do not include those households who have not been called yet. Column 8 is an indicator for appearing in at least 1 round, while Column 9 is the percentage of rounds that were successfully completed. Regressions include strata fixed effects.

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		
=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	-14.41***	-102.63***	-24.58***	-5.00**
	(0.79)	(11.51)	(2.43)	(2.22)
May	-12.19***	-104.37***	-18.96***	-3.20
	(0.92)	(20.34)	(3.88)	(2.43)
June	-10.20***	-89.28***	-14.09***	-1.70
	(1.11)	(23.73)	(4.52)	(2.47)
February mean	31.64	258.37	47.48	8.11
February SD	21.42	406.32	69.41	56.11
F statistic	114.76	30.93	41.00	3.39
Observations	2,199	2,199	2,199	2,199
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	-24.89***	-118.68**	-21.75***	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	61.55	12.73	28.48	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: Changes in Prices of Soap and Cleaning Products

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Liberia				Malawi		
	Soap[a]	Detergent[b]	Disinfectant[c]	Water bucket[d]	Soap[a]	Detergent[b]	Water bucket[d]
May	0.05***	0.02***	0.24***	1.05***	0.00	0.02***	0.51***
	(0.00)	(0.00)	(0.01)	(0.15)	(0.00)	(0.00)	(0.06)
February Mean	0.18	0.36	0.85	2.22	0.18	0.36	2.22
February SD	0.08	0.29	0.31	1.43	0.08	0.29	1.43
Number of markets	80	80	80	74	94	95	86
Number of vendors	567	568	415	300	808	789	594
Observations	1,129	1,125	794	544	1,614	1,574	1,152

Note: All prices are in USD. Regressions include market fixed effects. Standard errors are clustered at market level and reported in parentheses. All variables are Winsorized at 99%.
[a] A bar or piece of soap.
[b] A small pack of detergent powder.
[c] A 100ml bottle of disinfectant alcohol.
[d] A medium-sized plastic water bucket.

Table A5: Household Food Security and Expenditures (in Regressions)

	(1)	(2)	(3)	(4)	(5)	(6)
	Food consumption					
	HDDS[a]	FCS[b]	HHS[c]	Food Security Index[d]	Food Expenditure (monthly)	Total Expenditure (monthly)
Panel A: Liberia						
April	0.28	3.58***	-0.05	0.21**	0.91	-4.94
	(0.18)	(1.39)	(0.10)	(0.09)	(1.67)	(4.69)
May	0.62***	-0.13	-0.16*	0.24***	-3.57**	-7.62*
	(0.17)	(1.36)	(0.09)	(0.09)	(1.64)	(4.61)
June	0.63***	5.29***	-0.24**	0.44***	1.06	11.31**
	(0.17)	(1.36)	(0.09)	(0.09)	(1.64)	(4.60)
July	0.31	-4.06***	-0.48***	0.20**	-0.14	-26.45***
	(0.19)	(1.49)	(0.10)	(0.10)	(1.79)	(5.05)
August	0.32*	2.00	-0.23**	0.26***	-1.24	-2.15
	(0.19)	(1.45)	(0.10)	(0.09)	(1.75)	(4.92)
September	0.22	-5.20***	-0.20*	0.00	-4.24**	-37.23***
	(0.20)	(1.52)	(0.11)	(0.10)	(1.83)	(5.15)
2020 pre-lockdown mean	6.18	55.74	0.78	0.00	28.86	68.49
2020 pre-lockdown SD	1.77	15.53	0.92	1.00	19.55	56.84
F statistic	2.09	2.78	1.70	2.73	2.46	3.26
Observations	1,061	1,061	1,061	1,061	1,061	1,061
No. of households	308	308	308	308	308	308
Panel B: Malawi						
April	0.69***	6.45***	-1.06***	0.72***	-9.20***	-10.96***
	(0.10)	(0.83)	(0.07)	(0.05)	(1.02)	(2.74)
May	1.06***	7.93***	-0.73***	0.73***	-8.09***	-5.12*
	(0.10)	(0.85)	(0.07)	(0.05)	(1.03)	(2.78)
June	0.96***	9.44***	-1.17***	0.90***	-9.28***	7.15***
	(0.10)	(0.81)	(0.07)	(0.05)	(1.00)	(2.68)
July	1.28***	8.22***	-0.99***	0.89***	-8.22***	-10.40***
	(0.10)	(0.83)	(0.07)	(0.05)	(1.02)	(2.73)
August	1.21***	7.27***	-1.18***	0.91***	-8.37***	-4.17
	(0.10)	(0.83)	(0.07)	(0.05)	(1.02)	(2.74)
September	1.12***	5.41***	-0.53***	0.61***	-7.81***	-14.78***
	(0.11)	(0.94)	(0.08)	(0.06)	(1.15)	(3.10)
2020 pre-lockdown mean	4.66	43.17	1.57	-0.00	23.20	43.93
2020 pre-lockdown SD	1.62	15.43	1.15	1.00	17.84	37.69
F statistic	4.60	5.83	3.71	6.62	3.34	3.05
Observations	2,115	2,115	2,115	2,115	2,115	2,115
No. of households	538	538	538	538	538	538

Note: Sample from household phone survey for January - September 2020, excluding surveys conducted in March 2020, because it was a month that was partially both pre- and post-COVID. Omitted group in the regressions is for the last survey round before COVID (January and February 2020 pooled). Regressions include survey month fixed effects, and individual fixed effects. In Panel A, sample includes only Wave 2. All monetary values in USD and Winsorized at 99%.

[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).

[d] Re-standardized z-score of HDDS, FCS, and HHS (negatively weighted). Z-score of each of HDDS, FCS, and HHS (negatively weighted) are summed up, and this variable is standardized again by using its mean and standard deviation of pooled data from January and February 2020.

Table A6: Cash Effects on Food Security (Lee bounds for Liberia Wave 1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	HDDS[a]			FCS[b]			HHS[c]		
	Baseline	Lower Bound	Upper Bound	Baseline	Lower Bound	Upper Bound	Baseline	Lower Bound	Upper Bound
GD	0.47***	-0.12	1.09***	5.99***	0.45	12.13***	-0.26**	0.27***	-0.71***
	(0.18)	(0.17)	(0.15)	(1.83)	(1.65)	(1.41)	(0.11)	(0.09)	(0.11)
Control Mean	5.64	6.24	5.01	45.58	51.86	39.29	0.99	0.44	1.39
Control SD	1.58	1.24	1.18	14.00	10.23	10.91	1.06	0.58	1.01
Observations	646	553	556	646	546	538	646	540	536

	(10)	(11)	(12)	(13)	(14)	(15)
	Food Security Index[d]			Food Expenditure		
	Baseline	Lower Bound	Upper Bound	Baseline	Lower Bound	Upper Bound
GD	0.36***	0.04	0.69***	3.05*	0.64	6.15***
	(0.10)	(0.09)	(0.08)	(1.57)	(1.42)	(1.23)
Control Mean	0.40	0.75	0.06	10.32	10.72	5.34
Control SD	0.77	0.53	0.61	16.06	16.91	9.26
Observations	646	547	540	646	606	587

Note: Regressions include survey month fixed effects, strata fixed effects, and baseline measurements. Standard errors are clustered at village level. Sample includes 135 households in Liberia Wave 1 during whole period of data collection (March 2019 - August 2020).

[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).

[d] Standardized z-score of HDDS, FCS, and HHS (negatively weighted), using means and standard deviations from control group at baseline (Nov-Dec 2018).

Table A7: Cash Effects on Food Security (Liberia Wave 2)

	(1) HDDS[a]	(2) FCS[b]	(3) HHS[c]	(4) Food Security Index[d]	(5) Food Expenditure
ITT:					
GD treatment assignment	0.05	-0.70	-0.11	0.07	-1.11
	(0.15)	(1.26)	(0.08)	(0.10)	(1.71)
TOT:					
GD first payment	0.12	-1.67	-0.26	0.16	-2.66
	(0.36)	(3.02)	(0.17)	(0.22)	(4.10)
Control Mean	6.57	55.90	0.58	0.30	29.08
Control SD	1.58	14.06	0.88	0.95	17.00
Observations	688	688	688	688	688

Note: Sample includes 256 households in Liberia Wave 2 during the period of March-August 2020, excluding two districts (Buu Yao and Leewehpea Mahn in Nimba district) where no village received any transfers by that time. Regressions include survey month fixed effects, strata fixed effects, and baseline measurements. Standard errors are clustered at village level.

[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).

[d] Standardized z-score of HDDS, FCS, and HHS (negatively weighted), using means and standard deviations from control group in March 2020.

Table A8: Income, pre- and post-COVID

	Respondent (panel)[a]			Household (retrospective)[b]		
	(1) Casual labor income	(2) Business profit	(3) Other income	(4) Casual labor income	(5) Business profit	(6) Other income
Panel A: Liberia						
April	0.01	0.98	6.06***	0.92***	0.98	1.36
	(0.69)	(0.95)	(2.21)	(0.34)	(0.60)	(1.73)
May	-1.27*	-3.82***	4.11*	0.65*	-0.46	-1.37
	(0.68)	(0.93)	(2.18)	(0.34)	(0.60)	(1.73)
June	-0.00	0.37	0.37	-1.53***	-1.10*	-5.66***
	(0.68)	(0.93)	(2.18)	(0.34)	(0.60)	(1.73)
July	-1.66**	-3.40***	1.43			
	(0.79)	(1.08)	(2.52)			
2020 pre-lockdown mean	1.89	3.51	1.76	1.53	2.05	5.66
2020 pre-lockdown SD	7.92	11.92	9.63	3.62	7.11	31.77
F statistic	1.22	2.13	1.26	3.80	1.99	2.28
Observations	823	823	823	840	840	840
No. of respondents	370	370	370	370	370	370
Panel B: Malawi						
April	-3.42***	-0.02	-0.03	0.08	0.40	0.30
	(0.56)	(0.44)	(0.24)	(0.67)	(0.38)	(0.41)
May	-1.77***	-0.72	-0.14	1.84***	0.24	0.61
	(0.57)	(0.45)	(0.25)	(0.67)	(0.38)	(0.41)
June	-2.89***	-0.27	0.22	2.31***	0.38	0.16
	(0.55)	(0.43)	(0.24)	(0.67)	(0.38)	(0.41)
July	-1.75***	-0.78*	-0.03			
	(0.58)	(0.45)	(0.25)			
2020 pre-lockdown mean	5.86	1.70	0.37	2.24	0.74	1.01
2020 pre-lockdown SD	9.68	8.19	3.57	5.28	5.49	7.67
F statistic	2.43	2.27	1.80	1.08	1.69	4.61
Observations	1,624	1,624	1,624	1,468	1,468	1,468
No. of respondents	583	583	583	583	583	583

Note: Variables are measured as monthly totals. Table includes phone surveys between January and July 2020. Respondents were called every 2 months, and the omitted group is the last survey round before COVID (January or February). The March 2020 observations are dropped, because it was partially affected by COVID-19 and associated disruptions. Regressions include survey month and individual. The Liberia results (Panel A) include only Wave 2 of the study (since coverage over this time period was spotty in Wave 1). All monetary values are in USD and winsorized at the 99th percentile.

[a] Income information for previous calendar months was asked restrospectively at a survey conducted in May or later . For example, at a survey conducted in May, income was asked for February, March, and April.

[b] Income for the past 30 days was asked in the survey conducted each indicated calendar month.

Table A9: 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=2029 (507 in Liberia and 1,522 in Malawi).