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## Regular Research Article

# 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

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## ABSTRACT

We provide evidence on the economic and well-being impact of the Covid-19 lockdown on a sample of households in rural Uganda. Our sample consists of 1,277 households randomly drawn from 114 rural villages in western Uganda and surveyed in-person in early March 2020, just before the lockdown. We followed up with this sample in May 2020, reaching over 85% of them by phone. We find a large decline of 60% in household non-farm income due to household enterprise profits and labour income being almost wiped-out post the lockdown. Households respond to this loss of income in three key ways. One, there is a 40% decrease in food expenditure per adult equivalent. Two, they use up nearly 50% of their savings and borrow more, but have not yet liquidated their fixed assets or sold livestock. Three, they increase total household labour supply to household farm and livestock, more than making up for the decline in supply to enterprises and labour outside the household. We find a decrease in well-being as a result of this: there is an increase in the likelihood of missing a meal, a decline in reported satisfaction with quality of life, a higher likelihood of having a major argument with their spouse and an increase in perceived frequency of intimate partner violence against women in the village. The negative effects of the lockdown are greater for households that were wealthier at baseline, since these households were more reliant on enterprise and salaried income. These results were one of the first to show a large negative impact of the lockdown for a rural population. Our findings are important to policy makers in Uganda and other developing countries as they suggest income and consumption support is needed for rural households.

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## 1. Introduction

The worldwide spread of the Covid-19 virus has resulted in lockdowns across low and middle income countries. This disruption poses particularly serious challenges for those reliant on informal sources of income and living in poverty (IMF, 2020). It is therefore crucial to understand how this shock is affecting the lives of the poor in order to design policies and programmes to safeguard them. So far, there is limited evidence on the impact of Covid-19 related lockdowns on rural populations in developing countries.

We have a unique opportunity to analyse the immediate impact of the Covid-19 lockdown on rural households by utilising an in-

person household baseline survey conducted with a randomly selected, representative sample of households in rural western Uganda just before the lockdown began. We survey the same households through phone surveys to provide evidence on the impact of the lockdown on economic outcomes and well-being of these households. We surveyed these households approximately two months after the initial baseline survey, seven to eight weeks into the lockdown in Uganda,<sup>1</sup> which is one of the strictest in the world (Hale, Webster, Petherick, Phillips, & Kira, 2020).<sup>2</sup> Importantly, this follow-up survey is at a time when the agricultural cycle is still in the same phase as it was in early March i.e. post planting and pre harvest for maize, millet and beans, which are the main crops in this area. Hence, it is a period when we expect relatively stable activity choices by these households.

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<sup>1</sup> Uganda has been under strict lockdown since the end of March 2020, with all markets, schools and places of worship in rural areas reported as being closed.

<sup>2</sup> Uganda had a stringency level of 91/100 on 30th March 2020.

We were able to successfully follow-up 85% of the 1,277 households from 114 villages that were baselined. This is an extremely high follow-up rate for a phone survey. We nonetheless use propensity score matching to re-weight our estimates to account for any selective attrition and the results are robust to this re-weighting. We find a large decline in total household income of 60% since the Covid-19 related lockdown. This is in line with a series of studies in Bangladesh, Pakistan and Senegal which use self-reported changes in income to document the impact of the lockdown on income (Rahman & Matin, 2020; Le Nestour, Mbaye, & Moscovitz, 2020; Malik et al., 2020). Household income from enterprises and labour, which contributed 50% of household income in our baseline survey, more than halves. As BRAC (2020) point out, countries such as Uganda with stricter government lockdowns are experiencing greater falls in income. However, reassuringly, nearly 82% of households with businesses at baseline expect to re-open their businesses after the lockdown ends.

The Covid-19 crisis was a large, unexpected shock that affected nearly the whole world simultaneously. It is thus a unique example of a worldwide aggregate shock. The literature has highlighted various mechanisms that households use to smooth shocks, such as informal risk sharing, selling assets and livestock, increasing labour supply, cutting back on non-food expenditures, and using savings and credit (Dercon, 2002; Morduch, 1995). However, during a aggregate shock, many of these mechanisms might fail.

Informal risk sharing networks have been highlighted as a key mechanism through which households smooth shocks, both within the village (Townsend, 1994; Udry, 1994; Chiappori, Samphantharak, Schulhofer-Wohl, & Townsend, 2014; Kazianga & Udry, 2006) and with wider networks of family and friends both within the country and abroad (Rosenzweig, 1988; Fafchamps & Lund, 2003; Jack & Suri, 2014; Blumenstock, Eagle, & Fafchamps, 2016). During an aggregate shock such as the Covid-19 crisis, households may be less able to rely on insurance through social networks as everyone is affected by the shock at once. This applies even to remittances, which have previously responded quickly to aggregate shocks at a country level (Yang, 2008; Yang & Choi, 2007; Asare et al., 2020).

While wealth can act as a buffer allowing consumption to be smoothed (Deaton, 1991), evidence suggests that when rural households face shocks they are reluctant to sell livestock or assets to preserve consumption (Fafchamps, Udry, & Czukas, 1998; Kazianga & Udry, 2006). Instead, households may choose to smooth assets and withstand a short-run loss in consumption and so maintain the long-run productive potential of the household (Zimmerman & Carter, 2003; Carter & Lybbert, 2012). The extent to which a household trades off asset and livestock sales against smoothing consumption will depend on whether a reduction in food expenditures puts the household at risk of malnutrition, which in turn has long-term consequences for children (Dasgupta & Ray, 1986; Alderman, Hoddinott, & Kinsey, 2006; Dercon & Porter, 2014). Additionally, if everyone is trying to use the same shock-coping strategies at the same time, they may become less effective as asset markets collapse and savings are withdrawn, leaving no funds available for loans.

In their review of financial crises during the 1990s in Asia, Mexico, Argentina and Turkey, Fallon and Lucas (2002) highlight the movement of family from urban to rural areas and increase in family employment on farms as a key way that households maintained employment, ensured a livelihood for their members and smoothed incomes. They also document children dropping out of school, particularly among the poorest households. Use of labour was likewise highlighted as a coping strategy in Indonesia, with labour supply increasing despite wages falling, and young adults and women entering the labour market (Thomas & Frankenberg, 2007; Frankenberg, Thomas, & Beegle, 1999; Frankenberg, Smith,

& Thomas, 2003). However, looking at the Mexican Peso crisis, McKenzie (2003) notes that families were limited in their ability to use labour as a response due to the large drop in demand for it.

McKenzie (2003) and McKenzie (2006) showed that a second important method households used to respond to the crisis was to change the composition of consumption by reducing durable consumption, health expenditures and donations, and shifting a higher share of their budget into food. This shifting of consumption towards staple food has also been found in other contexts during widespread shocks (Del Ninno, Dorosh, & Smith, 2003; Thomas & Frankenberg, 2007; Stillman & Thomas, 2008).

The ability of asset markets to function as a consumption smoothing device during the current crisis is unclear. Fallon and Lucas (2002) note that borrowing rates increase dramatically during the financial crisis, particularly from microfinance providers and within villages, resulting in a shift towards more informal sources of credit. Likewise, looking at widespread flooding in Bangladesh, Del Ninno et al. (2003) find that household borrowing to buy food was the most important coping strategy. Looking at transfers, McKenzie (2003) documents a drop in transfers within country during the Mexico Peso crisis, as would be expected during an aggregate shock, but a rise in remittances. Unfortunately, given the worldwide nature of the current shock, remittances are unlikely to be helpful in this case (Asare et al., 2020).

In summary, the literature highlights a number of different coping strategies that households can use to smooth aggregate shocks, particularly using labour supply, credit and changes in expenditure, though not all of these will be possible during a worldwide shock.

We find that the short-run response of households to the fall in income is to protect their asset stocks, which is consistent with Zimmerman and Carter (2003) and Carter and Lybbert (2012).<sup>3</sup> This finding is similar to those of Rahman and Matin (2020) and Gallup (2020), who also find that very few households have had to sell assets so far in response to the pandemic.

Instead, we see that households make three key adjustments in response to the income drop: One, they decrease money spent on food purchases, resulting in a decline of 50% in food expenditure per adult equivalent. Two, they use up nearly 50% of their savings and increase borrowing by 100%. Three, adults in each household are working on average 6 days more in a month, a 40% increase in days worked. This is an increase in supply to household farm and livestock and is larger than the decline in labour supplied to household enterprises and outside the household.

We do k-means clustering on baseline characteristics of these households to identify different types of households in the sample. This gives us two clusters that differ by household wealth, expenditure and income, including income sources, with one cluster significantly richer on all these dimensions. The richer cluster are more reliant on enterprise income and less on crop sales. Hence, we see that post lockdown they have a significantly larger drop in income and hence in expenditure. Most of the decrease in salaried labour is, not surprisingly, coming from this richer cluster. Their enterprises seem to have taken the biggest hit, with a large decrease in profits, and hence labour, to their enterprises. This is echoed in the finding of BRAC (2020), that households which depend upon business are more negatively affected by the lockdown.

Overall respondent well-being has worsened post the lockdown. Respondents report significantly lower satisfaction with the overall quality of their life. 53% of the respondents are mild to moderately depressed at the follow-up, an extremely high pro-

<sup>3</sup> We are unable to distinguish whether this is due to a desire to protect assets, difficulties selling assets during the lockdown or the breakdown of asset markets when many people need liquidity at once.

portion. There is an increase in the likelihood of a major argument between spouses and the perceived frequency of intimate partner violence against women in the villages has increased. There is limited evidence from low- and middle- income countries on the impact of Covid-19 pandemic on violence against women due to the lack of administrative data and difficulties in collecting primary data. [Ravindran and Shah \(2020\)](#) find 0.47 SD increase in domestic violence complaints in districts with the strictest lockdown in India while [Silverio-Murillo and de la Miyar \(2020\)](#) find no change using data from calls to domestic violence call centres in Mexico.

We contribute to the wider literature on understanding how rural households respond to a major income shock, adding to the evidence obtained in the early 2000s after the financial crises in Asia, Russia and South America ([Fallon & Lucas, 2002](#); [Thomas & Frankenberg, 2007](#); [McKenzie, 2003](#); [Stillman & Thomas, 2008](#)). We are able to identify the coping strategies the households have used in the short run, showing that households are not perfectly smoothing their consumption but nor have they sold off assets or livestock. Our evidence is consistent with the literature that finds households protect their non-liquid asset stocks ([Carter & Lybbert, 2012](#); [Zimmerman & Carter, 2003](#)) rather than perfectly smoothing consumption ([Fafchamps et al., 1998](#); [Kazianga & Udry, 2006](#)), although it could also indicate a collapse in asset markets limiting people's ability to sell assets or livestock. Like studies of financial crises, we find large increases in labour supply as a coping strategy, as well as increases in credit and depletion of savings. We also likewise find that those households most reliant on wage labour, with more educated heads, experienced larger negative impacts of an aggregate shock. Like [Thomas and Frankenberg \(2007\)](#) during the Indonesian Financial crisis, we see no differential effects depending on whether the household head was male or female. However, in contrast to the bulk of literature on the financial crises, we see large declines in food consumption per capita ([Fallon & Lucas, 2002](#); [Stillman & Thomas, 2008](#)). This could reflect both the short-term nature of our study, where cropping decisions were already made before the harvest, as well as large price rises for staple foods since the start of the lockdown.

We also add to the growing literature that examines the impact of the evolving Covid-19 pandemic and the resulting economic collapse worldwide. The literature on the impact of the pandemic on economic outcomes is still in its nascent stages, but mostly relies on retrospectively asking respondents about their outcomes at the same point last year, which can be subject to substantial recall bias and bias from the salience of disruption due to the lockdown. Innovations for Poverty Action has launched nationwide RECOVER panel surveys in several low- and middle- income countries to track the impact of the crisis. These often rely on retrospectively asking about situation before the crisis but early results from Colombia, Ghana and Rwanda are broadly similar to ours – loss in income, depletion in food consumption, the need to use savings and borrow.<sup>4</sup> Similar findings have also emerged from a series of studies in neighbouring Kenya ([Janssens et al., 2020](#)).<sup>5</sup> Our study has the unique advantage of a baseline survey immediately before the lockdown, to which we can compare outcomes since lockdown. We are also fortuitous that the agricultural cycle for major crops has not changed stages

since the lockdown, and so we are confident the economic activities of the household have not changed significantly due to the harvest cycle. We also have a very high follow-up rate of 85% as compared to much lower rates in other studies ([Le Nestour et al., 2020](#); [Asanov, Flores, McKenzie, Mensmann, & Schulte, 2020](#)), assuaging concerns about our phone survey being with a selected sample. We randomly sampled from the entire village for our baseline survey, and the high follow-up rate makes us confident of still being representative of an average rural household in the area.

Our findings not only increase our understanding of the impact of the crisis but can also help inform the policy response of the Ugandan government and our NGO partner, Raising the Village (RTV), therefore mitigating some of the negative impacts of the crisis. We hope our findings will also be helpful for other policy makers in developing countries to inform their response.

Section 2 describes the background and Section 3 the data. The estimation strategy is outlined in Section 4. Section 5 reports the results on the impact of the pandemic on the households. Section 6 concludes.

## 2. Background

### 2.1. Covid-19 in Uganda

Uganda was in complete lockdown from the end of March 2020 due to the Covid-19 pandemic. The lockdown was imposed after only one case was confirmed in the country. The lockdown in Uganda has been one of the strictest in the world, including in rural areas: On 18 March, all public gatherings including places of worship, pubs, weddings, music shows, rallies and cultural meetings were suspended; all schools and universities closed on 22nd March, and the borders were closed except for food trucks; all public and private transport, non-essential businesses and non-food markets were stopped on 25th March. On 30th March a curfew from 7 pm until 6.30am every day was enacted.

When our follow-up survey took place, the spread of the disease had been controlled with only 260 confirmed cases and no deaths as of 19th May 2020. The lockdown did not begin to be eased in Uganda until the end May, after our follow-up survey was complete.

We conducted phone interviews with one village elder from each of the 21 parishes in our study in May 2020 to understand the current situation in the villages due to the lockdown. All of them reported that all schools and places of worship were closed and that there had been police outside the villages to stop the movement of people. All but one reported that village markets have been closed and all reported that it has been difficult or not possible to access markets in nearby towns. 80% reported that there have been food shortages and difficulty accessing food in their village.

## 3. Data

This study is based in 114 villages from 21 parishes in the Kagadi and Kyenjojo districts of Western Uganda (mapped in [Fig. A1](#)). The villages have around 76 households on average, with a population of close to 400. These villages were chosen in collaboration with the district government as particularly disadvantaged villages with limited access to government services. 36% of the villages have a primary school while only 8% have a secondary school. 13% of villages have health centres and for those which do not, the nearest is, on average, 5.46 km away. 68% of villages have a drinking source available within the village, 18% of villages have a weekly market and 14% have a daily market.

<sup>4</sup> <https://www.poverty-action.org/blog/supporting-most-vulnerable-amid-risk-returning-poverty-what-recover-survey-tells-us-about>; <https://www.poverty-action.org/recover-study/recover-rwanda-tracking-effects-covid-19-pandemic>; <https://www.poverty-action.org/recover-study/recover-ghana-tracking-effects-covid-19-pandemic>.

<sup>5</sup> <https://www.poverty-action.org/recover-study/how-are-kenyan-farmers-faring-face-covid-19>.

We baselined a random sample of households from these villages.<sup>6</sup> A list of all households in each village was collated with the help of the village leadership, and 12 households per village were randomly selected by the research team to complete the baseline survey. The baseline survey was carried out with the household head or their spouse.<sup>7</sup> The households in our sample are therefore a representative selection of households from these villages and will enable us to gain a clear idea of the economic impact on the entire poverty distribution during the Covid-19 crisis in rural Ugandan communities.

The baseline survey was carried out in-person, before any lockdown measures had been enacted in Uganda, from 17th to 24th March 2020. This survey took place with 1,277 households in the 114 villages of the Kagadi and Kyenjojo districts of Western Uganda.<sup>8</sup> We surveyed 11 households, on average, from each village. We conducted a follow-up survey between 12th and 23rd of May 2020.<sup>9,10</sup>

We were able to survey 1,075 households by phone, an 85% follow-up rate. The phone survey protocol instructed enumerators to make three attempts on three different days to contact the respondent with at least one day gap between attempts. There were no monetary incentives provided to the respondents. There were hardly any refusals (a total of 14). The primary reason for non-response was that the call could not connect because the phone was switched off or due to a dead line. We check whether a large number of household characteristics at baseline predict attrition and only mobile phone ownership is marginally significant (see appendix Table A1). To address concerns that we were unable to reach the relatively poorer households, we use propensity score matching to re-weight the estimates by correlates of attrition (discussed in Section 5.7.2). This re-weighting does not change our findings.

We used standard validated questions to measure the economic status of the households at baseline capturing their expenditures, wealth, agricultural activities, labour supply and non-farm enterprises. The survey also covers psychological and well-being outcomes, measured in a standard way. For the follow up survey, we consulted the IGC recommended Covid survey instrument<sup>11</sup> and another large scale survey<sup>12</sup> used in neighbouring rural Kenya to shorten the survey to be administered over the phone. Since the questionnaire did not have any complex or technical questions or tasks/games, and the respondents had heard many of the questions before, we are confident that the enumerators were able to explain these well over the phone. We coded detailed checks into the survey instrument using baseline data to prompt enumerators to check in case of very small or very large responses to questions and conducted high frequency checks on the data as it was being collected, and audited the calls, to ensure its quality.

<sup>6</sup> The baseline survey used in this project was originally conducted as part of a randomised controlled trial evaluating the impact of a village-based poverty alleviation programme run by our partner NGO, Raising the Village (RTV). RTV conducts a village wide programme focused on the provision of livestock and agricultural inputs to the entire village, as well as WASH training and setting up VSLAs. The intervention was originally scheduled to begin in June 2020, but has since been delayed until at least October 2020, as RTV has switched their focus to Covid-19 related relief activities. Note these relief activities were not in the study districts.

<sup>7</sup> The baseline survey instrument is available here: <https://drive.google.com/file/d/1WIrLRNPkOUDKXmWctDvUaekL9dVU-XG/view?usp=sharing>.

<sup>8</sup> 11 respondents did not give us permission to conduct follow up surveys with them so the sample for this study is 1,266 households.

<sup>9</sup> The follow-up survey instrument is available here: [https://drive.google.com/file/d/1vjuGBATg\\_S2kRi8EUolp8EdD1XLQsqob/view?usp=sharing](https://drive.google.com/file/d/1vjuGBATg_S2kRi8EUolp8EdD1XLQsqob/view?usp=sharing).

<sup>10</sup> This study has ethics approval from Oxford (protocol # ECONCIA20-21-05-001).

<sup>11</sup> <https://docs.google.com/spreadsheets/d/14D154dpD37pgEDdir9uyHqHNHwtrMg96ZQZGcWC5Q/edit#gid=2091514673>.

<sup>12</sup> <https://www.povertyactionlab.org/blog/3-20-20/best-practices-conducting-phone-surveys>.

All variables are defined in line with the pre-analysis plan.<sup>13</sup> All nominal values are reported at the 2018 PPP conversion factor for private expenditure for Uganda: 1 USD = 1,223.25 Ugandan Shillings.

The sample descriptives are in Table 1. 27% of the households are headed by women, almost all of these are households where the woman is a widow, divorced/separated or single. 60% of the household heads have any primary education, 19% have any secondary education. The households have five members on average, with total monthly expenditure of US\$ 317 PPP which is about US\$ 104 PPP per adult equivalent.<sup>14</sup> Nearly 70% of total household expenditure is spent on food, yet 30% of the households report missing at least one meal in a month at the baseline. Based on expenditures, 53% of the households in our sample can be categorised as “poor” at baseline if we use the World Bank global poverty line of \$1.90 per person per day in 2011 PPP.<sup>15</sup> The average household has about US\$ 500 PPP worth of assets, 60% of which is the value of livestock owned.

Not surprisingly, the bulk of household income comes from agriculture (37%). Another 25% comes from wage income and 25% from enterprise profits. 90% of the households report owning some land and nearly 70% have a mobile phone.<sup>16</sup>

#### 4. Estimation strategy

We estimate models of the following form to study the effect of the lockdown due to the Covid-19 pandemic:

$$Y_{it} = \beta_0 + \theta Post\_lockdown + \varepsilon_{it} \quad (1)$$

where  $Y_{it}$  is the outcome variable of interest and  $i$  and  $t$  index households and the survey round respectively.  $Post\_lockdown$  is an indicator variable equal to 1 for the follow-up survey, and 0 otherwise. The coefficient of interest is  $\theta_t$  which identifies the effect of the lockdown at follow-up round as compared to the baseline in March 2020 before the lockdown. All standard errors are clustered at the village level. We winsorise the top 1% of all monetary values.

To estimate whether the impact of the crisis differs by baseline characteristics of the households we augment Eq. (1) as follows:

$$Y_{it} = \beta_0 + \theta Post\_lockdown + \gamma Post\_lockdown * X_{i,t=0} + \varepsilon_{it} \quad (2)$$

where  $\gamma$  captures differential effects of the lockdown in the follow-up for a household that had characteristic  $X$  at baseline.

##### 4.1. Identification

The identification of the effect of the lockdown relies on the assumption that there were no changes other than the lockdown between the months of March and May. The key threat to this is changes during the year due to seasonality. The baseline in March and the follow-up in May both fall in the lean season, but since May is later on in the lean season, there may be a decline in expenditures as time passes and households eat less as they use up stored crops. While we have the advantage of both rounds of survey being in the lean period,  $\theta_t$  still captures the effects of both changes due to being further into the lean season and those due to the lockdown.

<sup>13</sup> The study analysis was registered with EGAP before the first follow up data was received: <https://osf.io/jsx5n>.

<sup>14</sup> We calculate adult equivalent by assigning a weight to household members aged 14 and below of 0.25 and adults a weight of 1 following the recommendation of Deaton and Zaidi (2002).

<sup>15</sup> The proportion of households that fall below the \$1.77 national poverty line for Uganda (<http://documents1.worldbank.org/curated/en/274691467991957918/pdf/Global-poverty-goals-and-prices-how-purchasing-power-parity-matters.pdf>) is slightly lower at 50%.

<sup>16</sup> Note that we have phone numbers even for households without their own mobile phone as many households share a phone with a neighbour.

**Table 1**  
Summary statistics.

	Mean	S.D.	Obs
Female head dummy	0.27	0.44	1266
HH head married dummy	0.70	0.46	1266
HH head has any primary education dummy	0.60	0.49	1266
HH head has secondary education or above dummy	0.19	0.39	1266
Household size	5.18	2.48	1266
Non-land assets (US\$ PPP)	504.40	744.18	1266
Consumption per adult equivalent (US\$ PPP)	97.89	74.71	1266
Food expenditure per adult equivalent (US\$ PPP)	58.85	57.56	1266
Missed meal dummy	0.30	0.46	1266
Crop sales (US\$ PPP)	37.10	65.11	1266
Livestock sales (US\$ PPP)	3.04	11.17	1266
Enterprise profit (US\$ PPP)	25.41	92.78	1266
Labour income (US\$ PPP)	27.60	70.91	1266
Net transfers (US\$ PPP)	-2.03	8.25	1266
Rental income (US\$ PPP)	1.86	8.44	1266
Owens land dummy	0.91	0.29	1266
Has mobile phone dummy	0.68	0.47	1266
Wage job dummy	0.33	0.47	1266

Variables measured at baseline. HH refers to household.

To understand how much consumption usually changes during the lean season, we use data from surveys in early April to mid May 2019 for neighbouring districts collected by our partner RTV to analyse any time trend in consumption. Our analysis shows that there is no decline in food consumption between April and May. In Appendix Table A2 we show that there is no time trend effect whether we use a dummy for surveys carried out in May, a variable capturing the number of days since the first survey (1–38) and variable capturing the number of days since the first survey and its square. There is also no indication that the number of meals consumed a day declined over this time period.<sup>17</sup> We also compare the food consumption reported in this other data from April/May 2019 to food consumption levels in our baseline survey in March 2020, finding that food consumption is almost identical and if anything fractionally higher in April/May 2019 compared to March 2020.<sup>18</sup> Again, this supports the idea that in the absence of a lockdown there is not usually a strong downward trend in food consumption between March and May. While we can not completely rule out that some part of the effect we capture is due to seasonality, this analysis gives us confidence that we are primarily capturing the impact of the lockdown.

## 5. The impact of Covid-19 on household economic situation and well-being

We first estimate the impact on household income as a result of the lockdown. We see a large fall in income driven by lower crops sales, enterprise profits and labour income. Households can cope with this loss of income by reducing expenditures, using savings and increasing credit, increasing labour supply or liquidating assets. We find that there is a sharp decline in food expenditure and an increase in reported hunger as a result. The households have hardly sold any assets and instead relied on their savings and borrowing to compensate for the loss of income. They have also expanded labour supply to the household farm and to livestock rearing. 71% of the households can now be categorised as “poor” as per the US\$1.90 per person per day global poverty line, as compared to 53% at baseline, an increase of 34% in poverty.

<sup>17</sup> We also find that there is no significant difference between reported food consumption in the last 7 days in surveys conducted in rural areas in March versus in May in the Uganda National Panel Survey 2015–2016.

<sup>18</sup> However, these are different households in a different, though neighbouring, district, and agricultural conditions in 2019 may have been different to 2020.

## 5.1. Income

At baseline, household monthly income was just over US\$ 100 PPP per month. 37% of this was from agriculture, 25% from household enterprise and 25% from labour supplied outside the household<sup>19</sup>.

Fig. 1 shows the impact of the lockdown on income from enterprise, labour, livestock and transfers. A table showing impacts of the lockdown on total income and all the components of income is in the Appendix as Table A3. We see an overall 60% decline in total household monthly income after the lockdown.

Enterprise profits and labour wage income both decline by over half from their baseline value. Since these represented 50% of baseline income on average, this is a significant income loss for these households. On the other hand, livestock sales have doubled, though the increase is only US\$3 PPP.<sup>20</sup> Net transfers increase slightly, driven by government assistance. However, only 2% of households report receiving any government assistance, predominantly in the form of educational materials. Overall, we are seeing large falls in income.

Digging into the decline in business profits in more detail, we see that 70% of businesses from baseline are now closed, where 21% of households at baseline had an enterprise. However, 82% of these with closed businesses expect to reopen after the lockdown ends. Additionally, we see a small number of new businesses started since the lockdown, with 4.5% of households starting a new business. The main reason, given by 87% of households, that businesses are closed relates to the lockdown (see Table 2).

The most common type of business owned at baseline were retail shop, representing 15% of businesses. Brewing was also common, making up 11% of businesses. Due to the small number of businesses, and large number of types of business, we are not able to examine changes in profit by type of business, though there is some evidence that food stalls were less likely to close (60% of food stalls remained open) and did not see any change in profit on average.

We also dig into the decline in labour income more in Section 5.4 where we document large declines in both casual and salaried labour days. Since there are widespread restrictions on economic activity in the area, it is not surprising that demand for labour has been suppressed.

Looking at Table A3, we also see a fall in crop income of over half, but note that at the follow-up in May it was still the lean season, and crop income at baseline was defined on an annual basis. Since we do not have baseline data on crop income by month, we are unable to tell whether this decline in crop income is more than usual for this season. Hence we have more confidence in the estimated changes in the enterprise and labour income, which was measured on a monthly basis at both baseline and follow-up. Rental income<sup>21</sup> also more than halves, but again this was defined on an annual basis at baseline.

## 5.2. Expenditure

The fall in incomes due to the lockdown has led to large falls in expenditure.<sup>22</sup> In Fig. 2 we see how the lockdown has led to a sharp decline in food expenditure per adult equivalent<sup>23</sup> and a rise of over 50% in reported hunger.

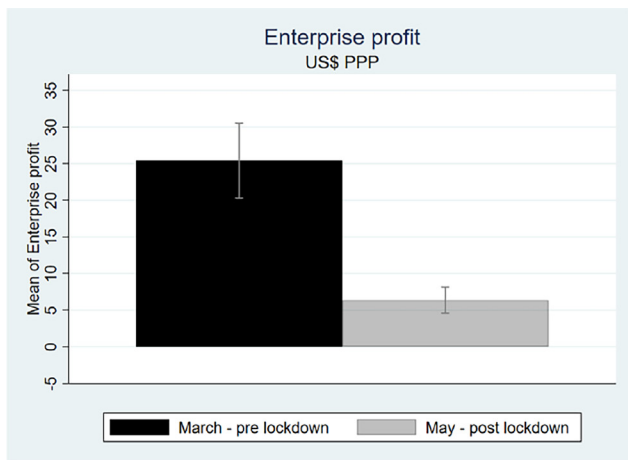
<sup>19</sup> the remainder is livestock sales, transfers and rental income

<sup>20</sup> Note that livestock sales were defined on an annual basis at baseline so we do not know whether livestock sales are usually higher at this time of year, though discussions with our local team suggests these sales are not strongly seasonal.

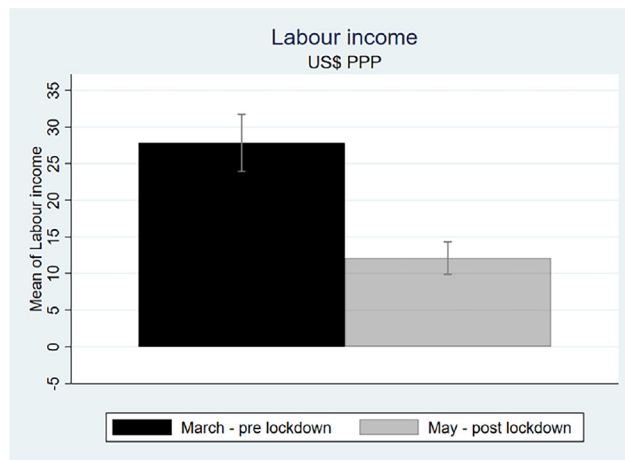
<sup>21</sup> Rental income includes income from renting out both land and assets.

<sup>22</sup> In the follow-up survey we did not capture consumption of own crops. Hence we focus here on spending, which we construct equivalently for the follow-up and the baseline. Note that at baseline, food expenditure was 85% of the value of total food consumption and so focusing on expenditure captures the majority of consumption.

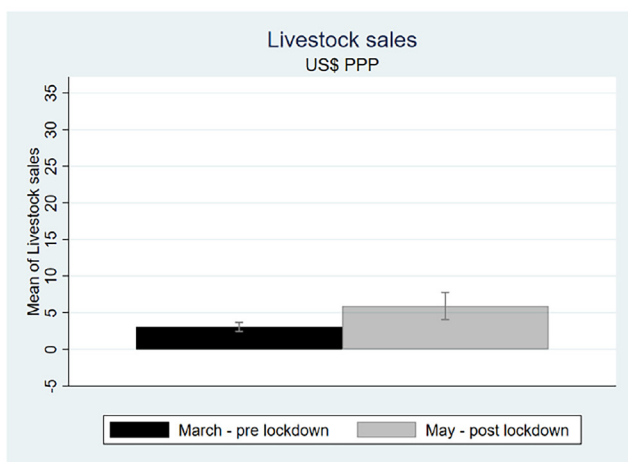
<sup>23</sup> Those over 14 are given a weight of 1 and those under 14 a weight of 0.25 when calculating adult equivalent.



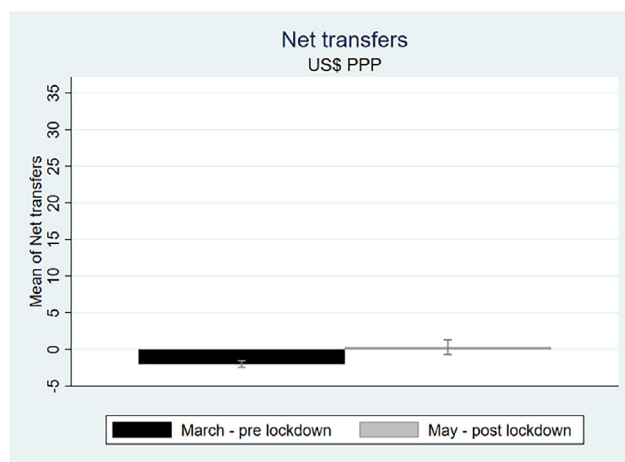
(a) Income from business



(b) Income from wages



(c) Income from livestock sales



(d) Income from transfers

Note: The difference between pre and post lockdown is statistically significant at the 1% level for all except livestock sales which is at the 5% level.

Fig. 1. Impact of the lockdown on income by source.

Table 2

Main reason for business closure.

Not allowed to open due to lockdown	58%
No customers due to lockdown	22%
No stock available due to lockdown	7%
Unrelated to lockdown: making a loss	5%
Seasonal closure or usually closed in this season	5%
Other	3%
Unrelated to lockdown: could not give it time	0%
Unrelated to lockdown: did not have required expertise	0%
Total	100%

We see in Appendix Table A4 a 27% decline in total expenditure since the lockdown, on a baseline mean of US\$ 274 PPP per month. Food constitutes 65% of the total expenditure and almost the entire decline in total expenditure is driven by the decline in expenditure on food: Food expenditure drops by around 40%. There is a similar decline in food expenditure per adult equivalent post the lockdown.

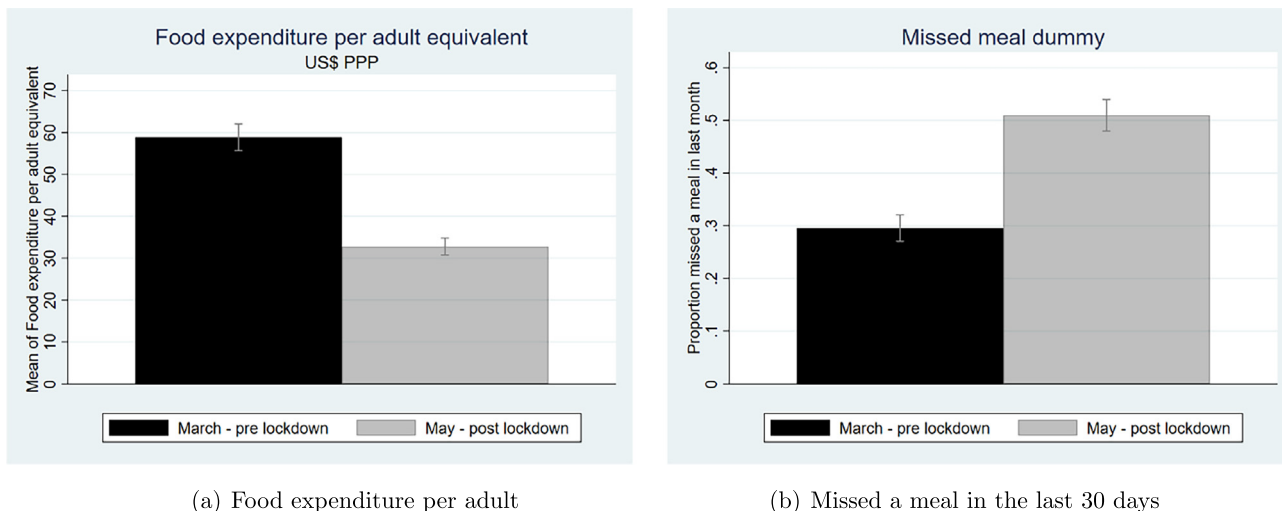
Around 30% of the households at baseline reported missing at least one meal in a month. This has increased by 22 percentage points post the lockdown, meaning that half the households have

now missed a meal because they cannot afford to buy food in the last month.

It is useful to consider here how prices of food have changed during this period.<sup>24</sup> Fig. 3 shows the average purchase price reported by the respondents for commonly consumed food items. There is a large increase in the price of beans, which has more than doubled. Other surveys have found similar price rises, and are able to attribute them to the lockdown rather than being a usual, seasonal price rise: According to the Famine Early Warning System Network (FEWS, 2020), the price of beans is 35–45% higher on average compared to the previous year.<sup>25</sup> Maize flour and sugar have also increased in price. Beans followed by salt and maize flour are the most commonly purchased items during the lockdown. Overall, the large rise in prices of staples due to the lockdown are likely part of the explanation for the drop in food expenditure and increase in hunger we are seeing.

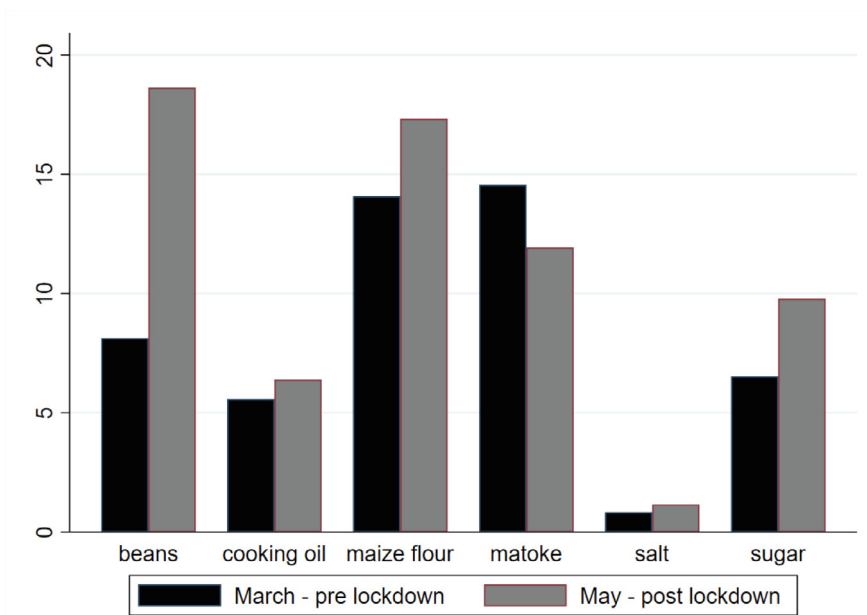
<sup>24</sup> See also [https://fews.net/sites/default/files/documents/reports/Uganda\\_2020\\_06\\_PB.pdf](https://fews.net/sites/default/files/documents/reports/Uganda_2020_06_PB.pdf) and <http://www.fao.org/gIEWS/countrybrief/country.jsp?code=UGA> for details about price rises as a result of the lockdown in Uganda.

<sup>25</sup> <https://fews.net/east-africa/uganda/key-message-update/may-2020>.



Note: The difference between pre and post lockdown is statistically significant at the 1% level. Food expenditure is total spending on a basket of food items in the last 30 days. Adult equivalent is calculated as those over 14 given a weight of 1 and those under 14 a weight of 0.25.

Fig. 2. Impact of the lockdown on food per adult equivalent and hunger.



Note: The reported prices are for food items purchased in the last 7 days at the followup. At followup, we retrospectively ask for the price for each item before the lockdown. The unit for all prices is kilogram except *matoke* (cooking bananas) which are for a bunch and cooking oil which is for a litre.

Fig. 3. Prices of food items before and after the lockdown (US\$ PPP).

### 5.3. Wealth

Wealth can act as a buffer during hard time, cushioning declines in consumption after declines in income (Deaton, 1991). At baseline, total household wealth was just under US\$ 6500 PPP, of which 86% was in the form of land, with assets and livestock together making up 13% of wealth by value, and savings and net borrowing the remainder.

We see a moderate decrease in total wealth of US\$ 84 PPP, driven primarily by declines in saving of 40% and an increase in net

borrowing of 100% (Table 3).<sup>26</sup> We also see small declines in the value of land owned and total asset value, indicating some people are selling land and assets.<sup>27</sup>

<sup>26</sup> The majority of loans are from village rotating saving and loan groups, where the majority of respondents also hold their savings, and other individuals. Most individuals are brokers who can buy crops on credit, taking payment at harvest time.

<sup>27</sup> The questionnaire specifically asked about sales of land or assets, and we see only 3% of the sample report any sales.



**Table 3**  
Impact of the lockdown on household wealth.

	(1) Wealth	(2) Land value	(3) Assets	(4) Livestock	(5) Savings	(6) Net borrowing
Post Lockdown	-84.395*** (17.514)	-4.681*** (1.307)	-1.461*** (0.542)	3.421** (1.705)	-45.508*** (11.021)	42.684*** (11.714)
R <sup>2</sup>	1.000	1.000	1.000	0.999	0.633	0.617
Baseline Mean	6441.27	5557.90	525.11	308.43	112.66	41.21
Observations	2150	2150	2150	2150	2150	2150

Wealth is calculated as the sum of column (2) – column (5) minus column (6). Land, assets and livestock at follow up are calculated by subtracting sales and adding purchases to the baseline stocks. Net borrowing is defined as outstanding loans received minus loan given. Standard errors clustered by village in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

The value of owned livestock increases slightly by 1%, from new purchases of livestock exceeding sales. This could be because households are more reliant on their farm and livestock for income during the lockdown, and so those that can are increasing their livestock holding.

Overall, the picture from examining wealth suggests that household are not selling off productive assets, and are primarily using their savings and borrowing to make up for income shortfalls. While it is good that productive assets are being protected, the drawing down of savings and large increase in debt is concerning. Given the extent that savings have already been drawn upon, it is unlikely that households will be able to continue to rely on them for long.

#### 5.4. Labour supply

Different types of labour are likely to be affected differently by the lockdown, with restrictions mainly affecting non-farm enterprises, wage and salaried work. At baseline, 65% of total household labour days were on the farm, 13% on livestock, 10% on each of non-farm enterprises and casual labour and 3% on salaried labour.

We see a large increase in the reported total number of days worked by household members in a month: about 16 days more on a baseline mean of 38 days (Table 4).<sup>28</sup> We also look at the impact on labour supply per adult<sup>29</sup> in Table 5.<sup>30</sup> An average adult worked 16 days in a month at baseline, which has seen a large increase of 6 days post the lockdown.

This increase in days worked is driven by an increase on average of 13 days (5 more days per adult; 50% of baseline mean) in labour supplied to the household farm. While the households are waiting to harvest maize, which is a major dry crop, they are currently growing fresh crops like beans and harvesting cassava and sweet potatoes. There is an increase of 7 days (3 more days per adult) in labour supplied to household livestock which is a nearly 100% increase on the baseline mean.

Not surprisingly, casual and salaried labour supplied by the household has gone down by around 50% each. In addition, the lockdown has also resulted in a decline of 50% in labour supplied by the household to their enterprises.

Note that we are not seeing just a re-allocation of labour away from outside labour and work on household enterprises towards agriculture and livestock, but an increase in the total amount of work done by these households. The change in time use patterns support this: respondents report a nearly 1 h decline in time spent on other activities in a day and a 1.5 h increase in time spent on productive activities (Table 6). We interpret this as the lockdown having narrowed the options to generate income, and so the households have turned to agriculture and livestock for potential income as well as for subsistence needs. It appears that the house-

<sup>28</sup> The total number of household members who do any work on household farm and livestock increase by, on average, 0.5 members post the lockdown.

<sup>29</sup> Adult is defined as a household member aged 15 and above.

<sup>30</sup> We do not see a substantial movement of adults into the households as result of the lockdown.

holds are exerting greater overall work effort to compensate for the loss of other forms of livelihood.

#### 5.5. Well-being

We would expect declines in income, expenditure and an increase in hours worked to worsen overall well-being, and indeed, we see that overall respondent well-being has considerably worsened post the lockdown (Table 6). We analyse the impact of the lockdown on well-being using two measures: satisfaction with quality of life and the incidence of any major argument with the spouse in the last 30 days.<sup>31</sup> Respondents report 1 point lower satisfaction with the quality of their life on a scale of 1 to 10, a reduction of 25% on a baseline mean of 4. For those currently partnered, there is a 13 percentage point significant increase in the likelihood of any major argument with their partner in the last one month, a 30% increase on a baseline mean of 43%. This increase is driven primarily by those who did not report any discord at baseline, whereas now around half of households report discord.

Economic security and emotional well-being are understood to be key pathways to violence (Buller et al., 2018). Hence, women, an already vulnerable group, are expected to face worsened conditions in the home and are at an increased risk of violence due to the pandemic (Peterman et al., 2020). We do not directly ask respondents about their own experience of intimate partner violence but do ask how many times per month they think a man in their village beats, slaps, or acts physically violent towards his wife. The average for this is quite high at baseline, and post the lockdown the respondents report a significant increase of 0.6 violent acts a month. Hence, respondents think that a man on average beats his wife thrice in a month in these villages (Table A5). Combined with the finding on discord, this could present suggestive evidence that domestic violence is increasing as a result of the lockdown.

We also measure depression using the nine-item depression scale of the Patient Health Questionnaire (PHQ). We did not measure this at baseline so can only comment on the incidence post lockdown, benchmarking it against other studies that use the same standardised scale. The average score is around 6, which is similar to reported score for a selected sample of HIV patients in Uganda in Wagner, Holloway, Ghosh-Dastidar, Kityo, and Mugenyi (2011). In line with standard practice, we categorise a respondent as severely depressed if the total score is above 19, mild to moderate if between 5 and 19 and not depressed if below 5. We find that 53% of the respondents are mild to moderately and 2% are severely depressed. To compare the rates we find to Ssebunnya et al. (2019), who also use the PHQ-9 in Uganda, we calculate what proportion had a score greater than 9. In our sample this measure of depression is a considerably higher 14% of the sample, while in their study it was 6%. Hence, the rate of depression we observe is quite staggering and provides further insight into the low well-being of these respondents.

<sup>31</sup> Note that this analysis is only carried out for households where the respondent in the baseline and follow-up survey is the same which is the case for 78% of the households.

**Table 4**  
Impact of the lockdown on labour supply.

	(1) HH total labour	(2) HH farm labour	(3) HH livestock labour	(4) HH enterprise labour	(5) HH casual labour	(6) HH salaried labour
Post Lockdown	15.942*** (3.501)	12.867*** (2.225)	6.819*** (1.289)	-1.722*** (0.339)	-1.303*** (0.302)	-0.720*** (0.208)
R <sup>2</sup>	0.579	0.605	0.558	0.671	0.553	0.563
Baseline Mean	38.49	25.44	5.19	3.51	3.03	1.32
Observations	2150	2150	2150	2150	2150	2150

All variables sum over labour supplied by all household members in days for the last 30 days. All specifications include household fixed effects. Standard errors clustered by village in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 5**  
Impact of the lockdown on labour supply per adult.

	(1) Total per adult	(2) Farm per adult	(3) Livestock per adult	(4) Enterprise per adult	(5) Casual per adult	(6) Salaried per adult
Post Lockdown	6.208*** (1.511)	4.993*** (0.941)	2.826*** (0.557)	-0.742*** (0.154)	-0.547*** (0.142)	-0.323*** (0.083)
R <sup>2</sup>	0.552	0.576	0.552	0.673	0.564	0.563
Baseline Mean	16.27	10.69	2.16	1.52	1.35	.54
Observations	2150	2150	2150	2150	2150	2150

All variables sum over labour supplied by all household members in days for the last 30 days. Per adult is calculated as total number of household members aged above 14. All specifications include household fixed effects. Standard errors clustered by village in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 6**  
Impact of the lockdown on respondent time use, preferences and well-being.

	(1) Risk (0-10)	(2) Patience I (0-10)	(3) Patience II (0-3)	(4) Any argument	(5) Quality of life (1-10)	(6) Time use productive	(7) Time use other
Post Lockdown	-0.139 (0.234)	0.286 (0.235)	-0.319*** (0.072)	0.129*** (0.038)	-1.033*** (0.159)	1.446*** (0.200)	-0.911*** (0.290)
R <sup>2</sup>	0.541	0.518	0.509	0.540	0.573	0.601	0.577
Baseline Mean	5.11	4.92	2.14	.43	4.16	4.8	13.4
Observations	1692	1692	1692	1176	1688	1692	1692

All estimates are reported only for households where the respondent surveyed at the baseline and follow up is the same person. Risk, patience I, patience II and quality of life are answered on a likert scale. The range of responses for these are noted in round brackets below the variable name. Any argument is an indicator for any major argument of the respondent with their spouse and so is only defined for those who are currently married. Time use productive is defined as the total time spent on productive activities, inside or outside the household in the last 24 h which was not a holiday. Time use other is total time spent by the respondent on household chores, sleep, leisure, with children, religious activity in the last 24 h which was not a holiday. All specifications include household fixed effects. Standard errors clustered by village in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

5.6. Preferences

There is some evidence that extreme shock can affect preferences (Cameron & Manisha, 2015). We measured risk and time preferences at baseline using self-reported qualitative questions from the respondents. The average person at baseline reported that they are about 5 on a 0 to 10 scale of whether they are willing to task risks. Post lockdown, there is an insignificant and small decline in the reported attitude towards risk (Table 6 column (1)). This is consistent with Said, Afzal, and Turner (2015), who find that exposure to a flood only results in individuals becoming more risk-averse if they experience a large loss such as the house structure being destroyed, and not just from the loss of agricultural or other possessions. Hence, the impact of a shock is not uni-dimensional and it may be too early for these preferences to have shifted.

To measure time preferences, we asked two questions. One captures the willingness to give up something today for later and the second measures respondent perceptions of whether they are a patient person. The average person rates themselves around 5 on a scale of 0 to 10 on willingness to give up something today for later. This sees a positive but again small in size and insignificant change post the lockdown. We do, however, see a significant change in respondent perception of whether they are a patient person. At baseline, their perception was quite high, with the average response being 2 on a 0 to 3 scale. This is consistent with the

control mean in Blattman, Jamison, and Sheridan (2017) which uses a similar question in Liberia. We see a small and significant decrease of about 0.32 on this measure indicating the respondents are already perceiving a small decline in their patience levels.

5.7. Robustness

5.7.1. Changes to household composition

At the follow-up, only 5 households reported any deaths and 15 reported that someone who was present at baseline had moved away. Hence, there has been no substantial shifts in marital status between rounds. However, 21% of the households reported a new household member has joined since the baseline. The vast majority of these are the children of the household head and in school-going age so potentially children who were away to boarding school. In Appendix Tables A7-A10, we restrict the sample to those households for which there is no change in household size (Panel A), including a control for household size (Panel B), and a series of covariates that may have changed as a result of the lockdown by augmenting Eq. (1) with linear and quadratic household size, number of male and female adults (aged 15-60), number of elderly (aged above 60), and number of children under 7 and those in the 7-14 age group (Panel C). We do not include marital status of the household head since we see hardly any change in this.

**Table 7**  
Heterogeneity by two baseline clusters separating rich and poor households.

	(1) Total consumption	(2) Missed meal dummy	(3) HH total labour	(4) HH farm labour	(5) HH casual labour	(6) HH salaried labour	(7) HH enterprise labour	(8) Wealth value	(9) Savings value	(10) Net borrowing	(11) Total income	(12) Crop sales	(13) Enterprise profit	(14) Labour income
Post Lockdown	-171.36*** (27.88)	0.24*** (0.05)	22.32*** (6.82)	20.49*** (3.59)	-1.02** (0.40)	-2.91*** (1.03)	-4.53*** (1.40)	-226.05*** (69.62)	-172.18*** (42.63)	111.23** (47.11)	-262.63*** (25.38)	-78.68*** (11.32)	-110.82*** (14.83)	-56.51*** (13.28)
Post Lockdown* poor	111.02*** (26.87)	-0.02 (0.05)	-7.51 (6.28)	-8.98** (3.63)	-0.34 (0.52)	2.58** (1.06)	3.31** (1.45)	166.89** (67.41)	149.26*** (41.93)	-80.73* (46.37)	235.64*** (25.69)	57.95*** (11.51)	105.56*** (14.71)	48.07*** (13.55)
Observations	2,146	2,146	2,146	2,146	2,146	2,146	2,146	2,146	2,146	2,146	2,146	2,146	2,146	2,146
R-squared	0.66	0.56	0.58	0.61	0.55	0.57	0.68	1.00	0.65	0.62	0.73	0.64	0.70	0.58
Baseline mean rich	463.1	0.141	50.36	25.64	1.387	4.037	10.22	20700	365.3	63.58	367.8	106.9	134.4	68.65
baseline mean poor	240.1	0.310	36.42	25.43	3.336	0.832	2.321	3894	67.65	37.29	58.69	27.65	8.567	20.57

Clustering by k-means into two groups. Base group is the richer cluster, with characteristics summarised in Table A16. The bottom panel shows the baseline mean for each group for each outcome. All values in US\$ PPP. Robust standard errors in parentheses. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

Results are qualitatively similar to those reported in tables without any restrictions or controls in Tables 3, 4, A3 and A4.

5.7.2. Propensity score re-weighting

We find that households who own a mobile phone are 4.7 percentage points less likely to attrit and this is the only variable that significantly predicts attrition (see Table A1). Since mobile phone ownership is correlated with other household characteristics, when we compare the full and attriter samples on individual household characteristics, we see that the sample of 191 attriters have 0.5 fewer members, the household head is 8 percentage points less likely to be currently married and total assets are about US\$ 100 PPP lower (Table A6). We therefore check the robustness of our results to selective attrition by using propensity score matching to match each household that attrited to their closest non-attriting household using baseline characteristics. Each attriting household is matched uniquely to one non-attriting household based on a propensity score of the baseline characteristics. These matched households are then given double weight in a weighted regression.

To ensure our matches are good fits, we check the common support of the propensity score and look at balance of baseline characteristics of the attriters and their matches. The propensity scores of the attriters and their matches are shown in Fig. A2. The two k-densities lie entirely on top of each other, showing the extremely close match on propensity scores. The balance table of the characteristics used in the match between the attriters and their matches is shown in Table A11. All of the characteristics used for the propensity score are extremely well balanced between the attriters and our matched households. Overall, our propensity score matching results in extremely close matches.

We use the matching to weight the matched households double in a weighted regression. On the assumption that the matched households are similar on all unobserved and observed characteristics not used for the match, weighting them as double in a regression allows us to re-create the findings had we managed to survey all households (or achieved zero attrition).

These results are shown in Tables A12–A15. We do not find any differences in any results using the re-weighting: all the coefficients are extremely similar in size and the significance of all results stays the same as in Tables 3, 4, A3 and A4. We are therefore confident that selective attrition is not driving or changing our findings.

5.8. Heterogeneous response to Covid-19

We do k-means clustering on baseline characteristics of these household to identify different types of households in the sample. We select the number of clusters by using the k-means command in stata to cluster in groups of 1–20. We then examine the sum of within-cluster distances by number of clusters to choose the natural break point. We also use the Calinski-Harabasz pseudo-F index stopping rule to confirm the chosen break point, with a larger

pseudo-F index suggesting more distinct clustering. Both these approaches suggest two groups.

Summary statistics for these two clusters are shown in Table A16. We see that the clusters are split by various dimensions of household wealth, expenditure and income, including income sources, with group two considerably richer on all these dimensions than group one, as well as more educated.

In Table 7 we show heterogeneous effects by these two clusters. We see that the largest declines in expenditure, wealth and income are seen for the richer cluster.<sup>32</sup> Enterprise profits decline only for the richer cluster. The richer cluster was more reliant on enterprise income and it was a larger share of their total income at baseline.<sup>33</sup> The rich also shift more of the labour supply from enterprise and salary labour into farm labour. These findings are echoed in the finding in BRAC (2020) that households which depend upon business are more negatively affected by the Covid-19 lockdown. They are also similar to findings from the Asian Financial Crisis, that households more reliant on wage labour and more educated saw larger negative impacts (Fallon & Lucas, 2002).

We also examined heterogeneity by a range of measures<sup>34</sup> that predominantly capture dimensions of baseline poverty as measured by expenditure and wealth, education and wage work. Results for these dimensions of heterogeneity are shown in the Appendix Tables A17–A24. Note that all these tables show outcomes transformed with the inverse hyperbolic sine transformation, such that estimates\*100% should be interpreted as percentage changes from the baseline mean (shown at the bottom of each table by whether the heterogeneous variable being examined was true or false).

We also look at heterogeneity by female headed households<sup>35</sup> to see if the results are in any way driven by them. These results are shown in Table A17. There are no differential impacts of the lockdown on income or expenditure for female headed as compared to male headed households. Female headed households increase their labour supply even more after the lockdown when compared to male headed households. Female headed households also see a smaller drop in crops sales and enterprise profits, but partly this is due to the income from these sources in female headed households being half that of male headed households, and so mechanically unable to fall by so much. These findings match those seen in Indonesia after the Asian Financial Crisis (Thomas & Frankenberg, 2007).

6. Conclusion

We find large negative impacts of the Covid-19 lockdown on the income of households in rural Uganda, driven by business closure

<sup>32</sup> This is true in both absolute terms and as a percentage of their baseline mean.  
<sup>33</sup> Enterprise income was 37% of total income for the richer cluster and only 14% of income for the poorer cluster.  
<sup>34</sup> We pre-specified these in our pre-analysis plan.  
<sup>35</sup> The results are similar for widowed female headed households.

and declines in wage labour, which both decline by over 50% compared to before the lockdown. As a result of the income decline, households purchase less food, and we see a drop of 44% in per adult equivalent food expenditure. Households respond to this drop in income by using liquid-assets and increasing labour supply. We see large declines in saving and increases in net borrowing, as well as a large increase in household labour on own farm and livestock. We do not see any changes in the productive asset stock of the households. Household life satisfaction has declined, domestic arguments have increased and over 50% of respondents interviewed qualify as mild to moderately depressed.

These results are concerning due to their large magnitudes. However, a more hopeful finding is that about 80% of business expect to reopen after the lockdown ends. Long term impacts of the lockdown will depend on household ability to bounce back, and restore income and expenditure to pre-lockdown levels. Given assets and livestock do not seem to have been sold off so far, productive capacity should not have declined, facilitating a fast restore to a pre-lockdown state. However, if a partial lockdown remains for the longer term, or demand continues to be depressed, households may be forced to start selling productive assets in order to maintain sufficient nutrition in the face of stagnating incomes.

Our findings suggest that rural households have also suffered significantly from lockdowns. This may in part be due to the lockdown in Uganda being one of the strictest in the world but still highlight the need to not just focus on urban and peri-urban areas, where majority of Covid-19 related studies have been so far. We also see very little evidence of support in the form of food or monetary resources. Given the extent of food expenditure and income shortfalls, social support for rural households in Uganda is surely needed. This should not just be limited to the poorest households since we find that the richer households have seen larger declines as com-

pared to their baseline levels of income due to their greater reliance on livelihoods that are most negatively impacted by the lockdown.

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**Declaration of Competing Interest**

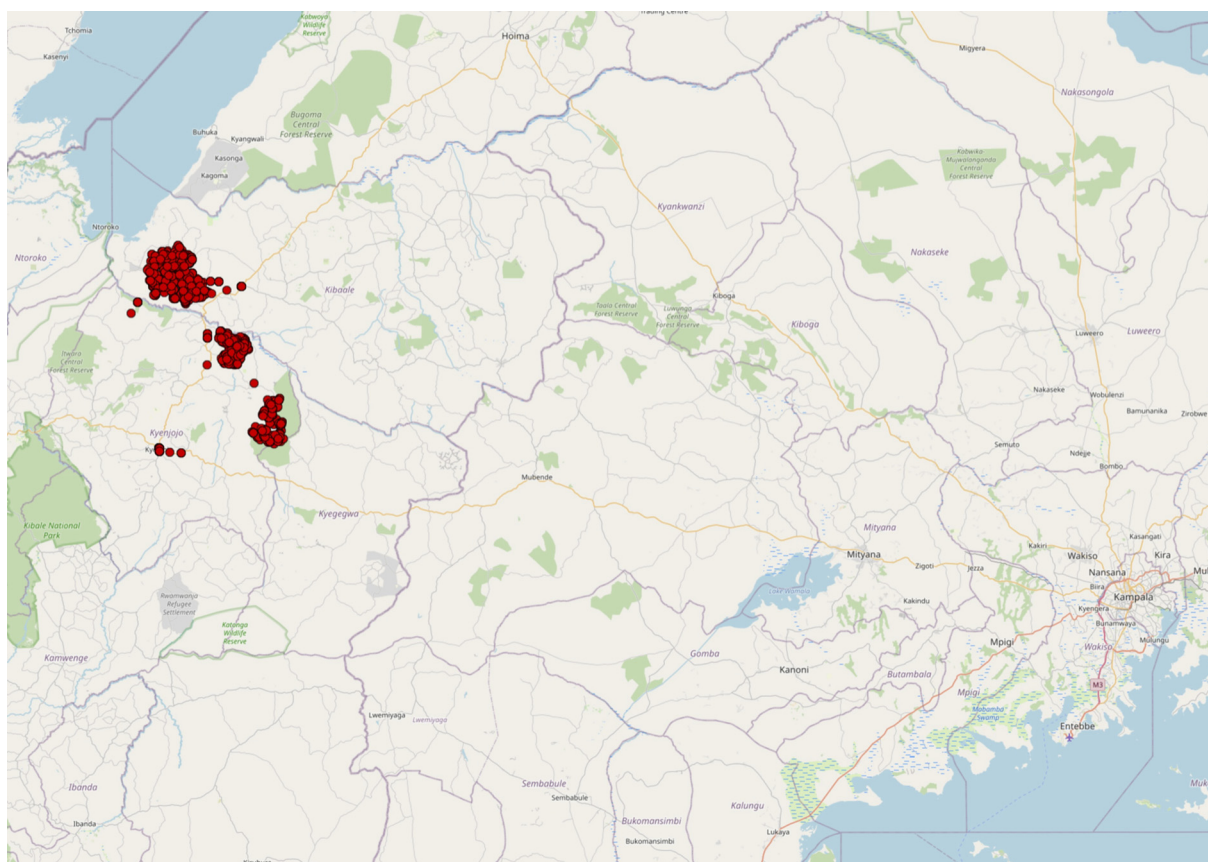
The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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This project would not have been possible without the support and commitment to research of Shawn Cheung, Founder and CEO of Raising the Village. We would like to thank the entire team at Raising the Village, particularly Ian Kambeho and Paul Nzerebende for their support with the phone surveys, as well as the excellent enumerator team for their hardwork and persistence. Ed Sellers provided excellent research assistance.

**Appendix A. Additional Tables and Figures**

See Fig. A1 and Tables A1 and A2.



**Fig. A1.** Study location in Western Uganda.

**Table A1**  
Predictors of Attrition.

	(1)
Female head dummy	-0.010 (0.031)
HH head married	-0.026 (0.033)
HH head has primary education	-0.020 (0.028)
HH head has secondary education	-0.016 (0.028)
Household size	-0.010 (0.006)
Total Consumption	-0.000 (0.000)
Assets	0.000 (0.000)
Consumption per adult equivalent	-0.000 (0.000)
Food Consumption	0.000 (0.000)
Missed meal dummy	0.012 (0.023)
Crop sales	0.000 (0.000)
Livestock sales	0.000 (0.001)
Enterprise profit	-0.000 (0.000)
Labour income	0.000 (0.000)
Rental income	-0.001 (0.001)
Own land dummy	-0.058 (0.035)
Has mobile dummy	-0.047* (0.024)
Wage job dummy	0.008 (0.027)
Constant	0.342*** (0.057)
R <sup>2</sup>	0.028
Attrition Mean	0.15
Observations	1266

Standard errors in parentheses.  
\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A2**  
Time trends in food consumption April-May 2019.

Food consumption (US\$ PPP, last 7 days)				Meals
	(1)	(2)	(3)	(4)
May	-1.43 (3.46)			0.09 (0.07)
Days		0.02 (0.11)	0.81* (0.46)	
Days2			-0.02** (0.01)	
Observations	1,143	1,143	1,143	1,083
R-squared	0.00	0.00	0.01	0.00
Mean April	25.99	25.99	25.99	1.655

Note: This table is based on household data collected by RTV in April and May 2019 in two neighbouring districts to the study locations. Food consumption covers staples, pulses, vegetables and fruit, both purchased and from own production in the last 7 days. Meals is the number of meals consumed a day. May is a dummy variable equal to one if the survey was carried out during May. Days is the number of days since the surveys started on the 3rd April. Days2 is days squared. Robust standard errors in parentheses  
\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

A.1. Additional results

See Tables A3–A6.

**Table A3**  
Impact of the lockdown on household income.

	(1) Total income	(2) Crop sales	(3) Livestock sales	(4) Enterprise profit	(5) Labour income	(6) Net transfers	(7) Rental income
Post Lockdown	-61.540*** (6.117)	-29.485*** (2.834)	2.801** (1.157)	-21.253*** (3.002)	-15.714*** (2.702)	2.521*** (0.639)	-0.504* (0.260)
R <sup>2</sup>	0.648	0.613	0.542	0.637	0.558	0.554	0.506
Baseline Mean	104.33	39.62	3.12	27.63	27.82	-2.24	1.25
Observations	2150	2150	2150	2150	2150	2150	2150

Total income is the aggregate of columns (2)–(7). Note that crop sales, livestock sales and rental income were all defined on an annual basis at baseline but a monthly basis at followup. Changes should therefore be interpreted with caution as they could also reflect normal seasonal differences from the mean. Enterprise profits, labour income and net transfers were all defined on a monthly basis at both baseline and followup. Standard errors in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A4**  
Impact of the lockdown on expenditure and hunger.

	(1) Total expenditure	(2) Total per adult equivalent	(3) Non-food expenditure	(4) Food expenditure	(5) Missed meal dummy	(6) Food per adult equivalent
Post Lockdown	-73.692*** (12.000)	-27.064*** (3.818)	-3.393 (5.153)	-72.675*** (8.844)	0.224*** (0.038)	-26.106*** (2.874)
R <sup>2</sup>	0.649	0.623	0.623	0.624	0.566	0.620
Baseline Mean	273.56	88.85	94.37	178.59	.29	59.5
Observations	2150	2150	2150	2150	2150	2150

All specifications include household fixed effects. All values in US\$ PPP 2018. Expenditure is total spending on a basket of items in the last 30 days. Adult equivalent is calculated as those over 14 given a weight of 1 and those under 14 a weight of 0.25. Standard errors clustered by village in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A5**  
Impact of the lockdown on perceptions of the frequency of domestic violence in the village.

	(1) Number times beats per month
Post Lockdown	0.619** (0.307)
R <sup>2</sup>	0.529
Baseline Mean	2.5
Observations	1386

There are some missing observations at followup due to an error in survey coding initially resulting in the question not being asked for those not currently married. Standard errors clustered by village in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A6**  
Summary Statistics for the full sample and attriters.

	(1) Full Mean	(2) Full S.D.	(3) Attrited Mean	(4) p-value (1)–(3)
Female head dummy	0.27	0.44	0.31	0.150
HH head married dummy	0.70	0.46	0.62	0.008**
HH head has any primary education dummy	0.60	0.49	0.60	0.859
HH head has secondary education or above dummy	0.19	0.39	0.14	0.039**
Household size	5.18	2.48	4.63	0.001***
Non-land assets (US\$ PPP)	504.40	744.18	390.79	0.013**
Consumption per adult equivalent (US\$ PPP)	97.89	74.71	78.74	0.05*
Food expenditure per adult equivalent (US\$ PPP)	58.85	57.56	55.16	0.339
Missed meal dummy	0.30	0.46	0.35	0.088*
Crop sales (US\$ PPP)	37.10	65.11	36.06	0.568
Livestock sales (US\$ PPP)	3.04	11.17	2.65	0.605
Enterprise profit (US\$ PPP)	25.41	92.78	12.89	0.001**
Labour income (US\$ PPP)	27.60	70.91	27.88	0.993
Net transfers (US\$ PPP)	–2.03	8.25	–0.82	0.003**
Rental income (US\$ PPP)	1.86	8.44	0.94	0.542
Owens land dummy	0.91	0.29	0.87	0.148
Has mobile phone dummy	0.68	0.47	0.57	0.002**
Wage job dummy	0.33	0.47	0.38	0.258
Observations	1266	1266	191	

Variables measured at baseline. HH refers to household. The reported p-value for each row is from a regression of the characteristics on a dummy which is 1 if the household attrited.

## A.2. Robustness: Changes to household composition

See [Tables A7–A10](#).

**Table A7**  
Impact of the lockdown on household income – robustness check.

	(1) Total income	(2) Crop sales	(3) Livestock sales	(4) Enterprise profit	(5) Labour income	(6) Net transfers	(7) Rental income
<i>Panel A: Sample restricted to those with no household size change between March and May</i>							
Post Lockdown	–61.771*** (6.510)	–30.384*** (3.138)	3.234*** (1.233)	–21.418*** (3.302)	–14.240*** (2.579)	2.684*** (0.672)	–0.514* (0.291)
R <sup>2</sup>	0.659	0.615	0.549	0.647	0.569	0.567	0.507
Baseline Mean	101.96	39.47	2.81	27.65	26.01	–2.13	1.25
Observations	1676	1676	1676	1676	1676	1676	1676
<i>Panel B: Full sample, control for household size</i>							
Post Lockdown	–60.996*** (6.418)	–29.958*** (3.041)	2.533** (1.195)	–21.868*** (3.046)	–14.865*** (2.621)	2.846*** (0.684)	–0.347 (0.283)
R <sup>2</sup>	0.648	0.613	0.543	0.638	0.559	0.555	0.507
Baseline Mean	104.33	39.62	3.12	27.63	27.82	–2.24	1.25
Observations	2150	2150	2150	2150	2150	2150	2150
<i>Panel C: Full sample, control for household composition</i>							
Post Lockdown	–58.449*** (7.132)	–27.090*** (3.196)	1.899 (1.654)	–20.161*** (3.671)	–17.363*** (3.157)	2.694*** (0.666)	–0.212 (0.353)
R <sup>2</sup>	0.656	0.621	0.546	0.645	0.563	0.557	0.510
Baseline Mean	104.33	39.62	3.12	27.63	27.82	–2.24	1.25
Observations	2150	2150	2150	2150	2150	2150	2150

Panel C includes linear and quadratic household size, number of male and female adults (aged 15–60), number of elderly (aged above 60), and number of children under 7 and those in the 7–14 age group. Total income is the aggregate of columns (2)–(7). Note that crop sales, livestock sales and rental income were all defined on an annual basis at baseline but a monthly basis at followup. Changes should therefore be interpreted with caution as they could also reflect normal seasonal differences from the mean. Enterprise profits, labour income and net transfers were all defined on a monthly basis at both baseline and followup.

Standard errors in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A8**  
Impact of the lockdown on expenditure and hunger – robustness check.

	(1) Total expenditure	(2) Total per adult equivalent	(3) Non-food expenditure	(4) Food expenditure	(5) Missed meal dummy	(6) Food per adult equivalent
<i>Panel A: Sample restricted to those with no household size change between March and May</i>						
Post Lockdown	-91.501*** (11.691)	-30.282*** (3.870)	-13.225*** (4.784)	-78.561*** (9.207)	0.208*** (0.040)	-27.185*** (3.086)
R <sup>2</sup>	0.657	0.635	0.622	0.624	0.566	0.620
Baseline Mean	272.68	89.96	91.99	179.96	.29	60.79
Observations	1676	1676	1676	1676	1676	1676
<i>Panel B: Full sample, control for household size</i>						
Post Lockdown	-84.529*** (11.551)	-27.283*** (3.769)	-9.072* (4.920)	-76.086*** (8.891)	0.217*** (0.038)	-25.610*** (2.954)
R <sup>2</sup>	0.655	0.627	0.629	0.624	0.566	0.620
Baseline Mean	273.56	108685.16	94.370	178.59	.29	59.5
Observations	2150	2150	2150	2150	2150	2150
<i>Panel C: Full sample, control for household composition</i>						
Post Lockdown	-79.023*** (13.267)	-27.023*** (4.310)	-6.054 (5.580)	-73.643*** (10.175)	0.195*** (0.040)	-25.896*** (3.434)
R <sup>2</sup>	0.658	0.630	0.633	0.626	0.569	0.624
Baseline Mean	273.56	88.850	94.370	178.59	.29	59.5
Observations	2150	2150	2150	2150	2150	2150

Panel C includes linear and quadratic household size, number of male and female adults (aged 15–60), number of elderly (aged above 60), and number of children under 7 and those in the 7–14 age group. All specifications include household fixed effects. All values in US\$ PPP 2018. Standard errors clustered by village in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A9**  
Impact of the lockdown on household wealth – robustness check.

	(1) Wealth	(2) Land value	(3) Assets	(4) Livestock	(5) Savings	(6) Net borrowing
<i>Panel A: Sample restricted to no household size change between March and May</i>						
Post Lockdown	-91.105*** (17.273)	-3.322*** (1.146)	-1.874*** (0.694)	2.607 (1.874)	-42.807*** (12.408)	47.398*** (12.411)
R <sup>2</sup>	1.000	1.000	1.000	0.999	0.630	0.614
Baseline Mean	6050.24	5180.3	512.5	293.54	106.81	30.64
Observations	1676	1676	1676	1676	1676	1676
<i>Panel B: Full sample, control for household size</i>						
Post Lockdown	-90.320*** (19.742)	-3.956*** (1.201)	-1.666*** (0.612)	3.686* (1.976)	-47.374*** (11.499)	42.079*** (12.450)
R <sup>2</sup>	1.000	1.000	1.000	0.999	0.633	0.617
Baseline Mean	6441.27	5557.900	525.11	308.43	112.66	41.21
Observations	2150	2150	2150	2150	2150	2150
<i>Panel C: Full sample, control for household composition</i>						
Post Lockdown	-96.393*** (21.869)	-2.729* (1.504)	-1.948** (0.817)	5.284** (2.323)	-61.261*** (13.365)	37.968*** (14.079)
R <sup>2</sup>	1.000	1.000	1.000	0.999	0.638	0.624
Baseline Mean	6441.27	5557.90	525.11	308.43	112.66	41.21
Observations	2150	2150	2150	2150	2150	2150

Panel C includes linear and quadratic household size, number of male and female adults (aged 15–60), number of elderly (aged above 60), and number of children under 7 and those in the 7–14 age group. Wealth is calculated as the sum of column (2) – column (5) minus column (6). Land, assets and livestock at follow up are calculated by subtracting sales and adding purchases to the baseline stocks. Net borrowing is defined as outstanding loans received minus loan given. Standard errors clustered by village in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .



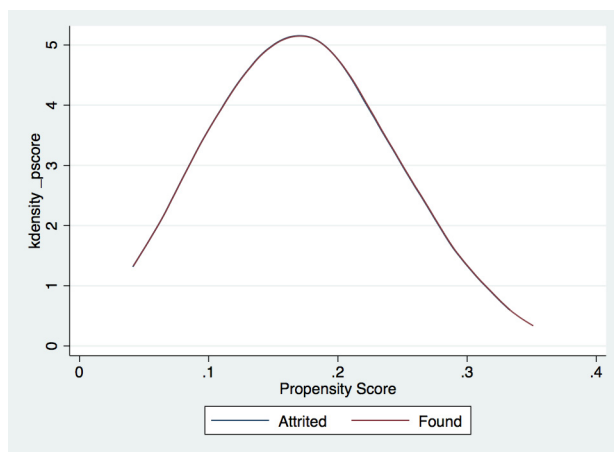
**Table A10**  
Impact of the lockdown on labour supply – robustness check.

	(1) HH total labour	(2) HH farm labour	(3) HH livestock labour	(4) HH enterprise labour	(5) HH casual labour	(6) HH salaried labour
<i>Panel A: Sample restricted to those with no household size change between March and May</i>						
Post Lockdown	14.125*** (3.519)	11.343*** (2.288)	6.522*** (1.251)	-1.462*** (0.382)	-1.428*** (0.314)	-0.850*** (0.243)
R <sup>2</sup>	0.571	0.593	0.566	0.673	0.563	0.544
Baseline Mean	38.4	25.49	5.08	3.37	3.12	1.34
Observations	1676	1676	1676	1676	1676	1676
<i>Panel B: Full sample, control for household size</i>						
Post Lockdown	15.183*** (3.589)	12.257*** (2.300)	6.785*** (1.285)	-1.667*** (0.350)	-1.496*** (0.329)	-0.697*** (0.225)
R <sup>2</sup>	0.579	0.606	0.558	0.671	0.556	0.563
Baseline Mean	38.49	25.44	5.19	3.51	3.03	1.32
Observations	2150	2150	2150	2150	2150	2150
<i>Panel C: Full sample, control for household composition</i>						
Post Lockdown	13.545*** (3.667)	11.218*** (2.383)	6.620*** (1.296)	-1.725*** (0.442)	-1.552*** (0.354)	-1.016*** (0.270)
R <sup>2</sup>	0.585	0.613	0.563	0.673	0.557	0.566
Baseline Mean	38.49	25.44	5.19	3.51	3.03	1.32
Observations	2150	2150	2150	2150	2150	2150

Panel C includes linear and quadratic household size, number of male and female adults (aged 15–60), number of elderly (aged above 60), and number of children under 7 and those in the 7–14 age group. All variables sum over labour supplied by all household members in days for the last 30 days. All specifications include household fixed effects. Standard errors clustered by village in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

A.3. Robustness: Propensity score re-weighting

See Fig. A2 and Tables A11–A15.



K-densities showing the propensity scores for the 191 attriting households and the 191 matched found households

**Fig. A2.** K-densities of propensity scores, matches and attriting households.

**Table A11**  
Balance between matched and attriting households.

	Matched households		Attriting households		Difference		
	mean	sd	mean	sd	diff.	se diff	p
Female head dummy	0.30	0.46	0.31	0.46	0.01	(0.11)	(0.91)
HH head married	0.64	0.48	0.62	0.49	-0.02	(-0.42)	(0.67)
Head primary educ.	0.76	0.43	0.74	0.44	-0.02	(-0.35)	(0.72)
Head secondary educ.	0.14	0.35	0.14	0.35	0.00	(0.00)	(1.00)
Household size	4.70	2.43	4.63	2.36	-0.07	(-0.28)	(0.78)
Total Expenditure	211.17	170.40	217.28	184.82	6.11	(0.34)	(0.74)
Assets	370.71	596.49	390.79	625.41	20.08	(0.32)	(0.75)
Expenditure per ad. eq.	75.71	60.18	78.74	64.03	3.03	(0.48)	(0.63)
Food Expenditure	139.76	136.16	148.10	141.91	8.34	(0.59)	(0.56)
hunger dummy	0.36	0.48	0.35	0.48	-0.01	(-0.21)	(0.83)
Crop sales	34.78	65.56	36.06	73.41	1.28	(0.18)	(0.86)
Livestock sales	3.50	11.62	2.65	11.15	-0.85	(-0.73)	(0.46)
Enterprise profit	8.07	39.56	12.89	42.71	4.82	(1.14)	(0.25)
Labour income	28.27	57.74	27.88	68.43	-0.39	(-0.06)	(0.95)
Rental income	0.95	5.14	0.94	5.69	-0.01	(-0.01)	(0.99)
Own land dummy	0.88	0.32	0.87	0.33	-0.01	(-0.31)	(0.75)
Has mobile dummy	0.58	0.49	0.57	0.50	-0.01	(-0.21)	(0.84)
Wage job dummy	0.43	0.50	0.38	0.49	-0.06	(-1.15)	(0.25)
Observations	191		191		382		

Baseline characteristics used to perform propensity score matching. Matched households are those households we followed up with that are matched to those households we were unable to followup with (attriters) using the propensity score and a one-to-one match without replacement.

**Table A12**  
Impact of the lockdown on household income – weighted regression.

	(1) Total income	(2) Crop sales	(3) Livestock sales	(4) Enterprise profit	(5) Labour income	(6) Net transfers	(7) Rental income
Post Lockdown	-58.932*** (5.714)	-28.790*** (2.878)	2.294** (1.130)	-18.566*** (2.740)	-16.002*** (2.646)	2.429*** (0.631)	-0.436 (0.265)
R <sup>2</sup>	0.646	0.605	0.541	0.634	0.566	0.553	0.503
Baseline Mean	104.33	39.62	3.12	27.63	27.82	-2.24	1.25
Observations	2532	2532	2532	2532	2532	2532	2532

Weighted regression where households selected by propensity score one-to-one match using the characteristics in Table A11 given a double weight. Standard errors in parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

**Table A13**  
Impact of the lockdown on consumption and hunger – weighted regression.

	(1) Total expenditure	(2) Total per adult equivalent	(3) Non-food expenditure	(4) Food expenditure	(5) Missed meal dummy	(6) Food per adult equivalent
Post Lockdown	-71.203*** (12.102)	-26.371*** (3.920)	-2.108 (5.149)	-69.760*** (8.906)	0.221*** (0.039)	-25.488*** (2.955)
R <sup>2</sup>	0.648	0.622	0.623	0.614	0.568	0.609
Baseline Mean	273.56	88.85	94.37	178.59	.29	59.5
Observations	2532	2532	2532	2532	2532	2532

Weighted regression where households selected by propensity score one-to-one match using the characteristics in Table A11 given a double weight. Standard errors in parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

**Table A14**  
Impact of the lockdown on labour supply – weighted regression.

	(1) HH total labour	(2) HH farm labour	(3) HH livestock labour	(4) HH enterprise labour	(5) HH casual labour	(6) HH salaried labour
Post Lockdown	16.487*** (3.493)	13.077*** (2.206)	7.154*** (1.334)	-1.551*** (0.316)	-1.459*** (0.318)	-0.734*** (0.195)
R <sup>2</sup>	0.589	0.618	0.557	0.671	0.562	0.566
Baseline Mean	38.49	25.44	5.19	3.51	3.03	1.32
Observations	2532	2532	2532	2532	2532	2532

Weighted regression where households selected by propensity score one-to-one match using the characteristics in Table A11 given a double weight. Standard errors in parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

**Table A15**  
Impact of the lockdown on household wealth – weighted regression.

	(1) Wealth	(2) Land value	(3) Assets	(4) Livestock	(5) Savings	(6) Net borrowing
Post Lockdown	-79.156*** (18.438)	-4.943*** (1.375)	-1.466*** (0.537)	3.346** (1.479)	-44.898*** (11.842)	36.987*** (12.376)
R <sup>2</sup>	1.000	1.000	1.000	0.999	0.621	0.601
Baseline Mean	6441.27	5557.90	525.11	308.43	112.66	41.21
Observations	2532	2532	2532	2532	2532	2532

Weighted regression where households selected by propensity score one-to-one match using the characteristics in Table A11 given a double weight. Standard errors in parentheses. \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

A.4. Heterogeneity

See Tables 16–24.

**Table A16**  
Summary statistics for two clusters at baseline. All values in US\$ PPP.

	group1 mean/sd poor	group2 mean/sd rich
Household size	4.95 2.38	6.66 2.59
HH head Education (yrs)	5.43 3.47	9.01 4.31
HH head age	42.81 16.12	43.74 13.28
Wealth	3819.12 4270.83	21195.90 22425.26
Total Consumption	233.73 190.74	457.70 256.95
Food purchased	158.19 155.75	271.88 190.72
Total income	58.54 79.21	374.65 309.60
Land value	3312.12 4002.83	18218.02 21804.65
Assets	306.30 313.34	1714.07 1274.39
Consumption per adult equivalent	81.46 66.27	123.12 83.43
Food per adult equivalent	56.18 55.72	75.34 65.45
Crop sales	27.10 45.50	112.28 139.32
Livestock sales	1.27 4.54	13.86 24.97
Enterprise profit	9.05 35.57	124.84 204.70
Labour income	20.59 47.13	72.13 141.80
Net transfers	-0.85 5.60	-9.20 15.24
Rental income	0.60 3.70	9.62 18.87
Observations	1084	179

**Table A17**  
Heterogeneity by female headed households.

	(1) Total consumption IHS	(2) Missed meal dummy IHS	(3) HH total labour IHS	(4) HH farm labour IHS	(5) HH casual labour IHS	(6) HH salaried labour IHS	(7) HH enterprise labour IHS	(8) Wealth value IHS	(9) Savings value IHS	(10) Net borrowing IHS	(11) Total income IHS	(12) Crop sales IHS	(13) Enterprise profit IHS	(14) Labour income IHS
Post Lockdown	-0.52*** (0.06)	0.19*** (0.03)	0.34*** (0.10)	0.49*** (0.11)	-0.23*** (0.07)	-0.14*** (0.04)	-0.33*** (0.06)	-0.16** (0.07)	-0.61*** (0.15)	1.43*** (0.22)	-1.88*** (0.14)	-2.19*** (0.13)	-0.59*** (0.08)	-0.52*** (0.12)
Post Lockdown* female head	0.13 (0.11)	0.03 (0.04)	0.36*** (0.13)	0.36*** (0.12)	0.08 (0.11)	0.10 (0.07)	0.19** (0.09)	-0.07 (0.10)	0.32 (0.23)	0.37 (0.29)	0.32 (0.22)	0.41** (0.18)	0.27** (0.13)	0.20 (0.19)
Observations	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150
R-squared	0.67	0.57	0.60	0.62	0.58	0.58	0.69	0.82	0.65	0.61	0.60	0.68	0.71	0.56
Baseline Mean	225.1	0.360	29.61	20.30	2.420	0.630	2.250	4153	64.16	31	62.05	24.83	14.51	19.40
female head = 1														
Baseline Mean	290.4	0.260	41.57	27.22	3.250	1.550	3.950	7236	129.5	44.75	120.5	44.75	32.18	30.75
female head = 0														

Robust standard errors in parentheses.

\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

**Table A18**  
Heterogeneity by baseline consumption below the median.

	(1) Total consumption IHS	(2) Missed meal dummy IHS	(3) HH total labour IHS	(4) HH farm labour IHS	(5) HH casual labour IHS	(6) HH salaried labour IHS	(7) HH enterprise labour IHS	(8) Wealth value IHS	(9) Savings value IHS	(10) Net borrowing IHS	(11) Total income IHS	(12) Crop sales IHS	(13) Enterprise profit IHS	(14) Labour income IHS
Post Lockdown	-0.93*** (0.07)	0.21*** (0.04)	0.43*** (0.11)	0.64*** (0.12)	-0.12 (0.08)	-0.13** (0.05)	-0.39*** (0.07)	-0.23** (0.10)	-0.77*** (0.18)	1.44*** (0.24)	-1.90*** (0.16)	-2.22*** (0.15)	-0.77*** (0.10)	-0.38*** (0.13)
Post Lockdown* consump. below median	0.90*** (0.08)	-0.03 (0.04)	0.01 (0.10)	-0.12 (0.11)	-0.19** (0.10)	0.03 (0.08)	0.22*** (0.08)	0.10 (0.10)	0.48** (0.22)	0.17 (0.27)	0.22 (0.21)	0.29 (0.17)	0.50*** (0.11)	-0.17 (0.17)
Observations	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150
R-squared	0.72	0.57	0.60	0.61	0.58	0.58	0.69	0.82	0.65	0.61	0.60	0.68	0.71	0.56
Baseline Mean consump below median = 1	138.3	0.310	39.16	27.48	3.450	1	2.270	5840	81.27	25.41	75.60	32.51	11.87	21.84
Baseline Mean consump below median = 0	406.1	0.260	37.84	23.44	2.630	1.630	4.730	7030	143.4	56.68	134.7	46.59	43.07	33.68

Robust standard errors in parentheses.  
\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

**Table A19**  
Heterogeneity by baseline wealth below the median.

	(1) Total consumption IHS	(2) Missed meal dummy IHS	(3) HH total labour IHS	(4) HH farm labour IHS	(5) HH casual labour IHS	(6) HH salaried labour IHS	(7) HH enterprise labour IHS	(8) Wealth value IHS	(9) Savings value IHS	(10) Net borrowing IHS	(11) Total income IHS	(12) Crop sales IHS	(13) Enterprise profit IHS	(14) Labour income IHS
Post Lockdown	-0.58*** (0.07)	0.25*** (0.04)	0.39*** (0.12)	0.53*** (0.12)	-0.18*** (0.06)	-0.15*** (0.05)	-0.36*** (0.06)	-0.02*** (0.00)	-0.89*** (0.19)	1.66*** (0.24)	-2.30*** (0.15)	-2.50*** (0.16)	-0.74*** (0.10)	-0.47*** (0.12)
Post Lockdown* wealth below median	0.20** (0.08)	-0.11*** (0.04)	0.10 (0.12)	0.11 (0.13)	-0.07 (0.12)	0.07 (0.06)	0.16* (0.08)	-0.32** (0.13)	0.73*** (0.20)	-0.27 (0.29)	1.04*** (0.20)	0.86*** (0.17)	0.45*** (0.12)	0.01 (0.19)
Observations	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150
R-squared	0.67	0.57	0.60	0.61	0.58	0.58	0.69	0.82	0.65	0.61	0.61	0.68	0.71	0.56
Baseline Mean wealth below median = 1	228.3	0.400	33.73	22.76	4.220	0.900	2.720	1449	44.97	46.46	58.58	19.47	12.04	26.53
Baseline Mean wealth below median = 0	316.3	0.180	42.99	27.96	1.920	1.710	4.270	11154	176.6	36.25	149.7	58.64	42.35	29.04

Robust standard errors in parentheses.  
\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

**Table A20**  
Heterogeneity by baseline below the median progress out of poverty index.

	(1) Total consumption IHS	(2) Missed meal dummy IHS	(3) HH total labour IHS	(4) HH farm labour IHS	(5) HH casual labour IHS	(6) HH salaried labour IHS	(7) HH enterprise labour IHS	(8) Wealth value IHS	(9) Savings value IHS	(10) Net borrowing IHS	(11) Total income IHS	(12) Crop sales IHS	(13) Enterprise profit IHS	(14) Labour income IHS
Post Lockdown	-0.62*** (0.07)	0.22*** (0.04)	0.32*** (0.10)	0.45*** (0.11)	-0.15** (0.07)	-0.20*** (0.05)	-0.32*** (0.06)	-0.21** (0.09)	-0.75*** (0.19)	1.44*** (0.25)	-2.00*** (0.17)	-2.25*** (0.16)	-0.62*** (0.09)	-0.55*** (0.13)
Post Lockdown* ppi below median	0.28*** (0.08)	-0.04 (0.04)	0.24** (0.11)	0.26** (0.12)	-0.13 (0.09)	0.19** (0.07)	0.08 (0.08)	0.07 (0.10)	0.43** (0.22)	0.17 (0.27)	0.42** (0.19)	0.33* (0.17)	0.19* (0.11)	0.17 (0.17)
Observations	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150
R-squared	0.68	0.57	0.60	0.61	0.58	0.58	0.69	0.82	0.65	0.61	0.60	0.68	0.71	0.56
Baseline Mean ppi below median = 1	270.6	0.350	40.60	27.47	3.940	0.590	2.980	5512	89.75	50.87	90.15	36.48	24.06	20.47
Baseline Mean ppi below median = 0	276.5	0.220	36.40	23.41	2.140	2.040	4.040	7362	135.3	31.63	120.6	42.73	31.17	35.11

Robust standard errors in parentheses.  
\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

**Table A21**  
Heterogeneity by baseline household head had some primary school education.

	(1) Total consumption IHS	(2) Missed meal dummy IHS	(3) HH total labour IHS	(4) HH farm labour IHS	(5) HH casual labour IHS	(6) HH salaried labour IHS	(7) HH enterprise labour IHS	(8) Wealth value IHS	(9) Savings value IHS	(10) Net borrowing IHS	(11) Total income IHS	(12) Crop sales IHS	(13) Enterprise profit IHS	(14) Labour income IHS
Post Lockdown	-0.37*** (0.12)	0.19*** (0.05)	0.74*** (0.15)	0.82*** (0.16)	-0.13 (0.11)	-0.02 (0.05)	-0.05 (0.06)	-0.24** (0.12)	-0.28 (0.20)	1.74*** (0.26)	-1.18*** (0.22)	-1.73*** (0.18)	-0.08 (0.08)	-0.22 (0.16)
Post Lockdown* head primary	-0.14 (0.11)	0.01 (0.05)	-0.37*** (0.14)	-0.30** (0.15)	-0.10 (0.11)	-0.12* (0.06)	-0.30*** (0.09)	0.08 (0.11)	-0.31 (0.22)	-0.27 (0.28)	-0.76*** (0.22)	-0.43** (0.19)	-0.54*** (0.11)	-0.30* (0.16)
Observations	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150
R-squared	0.67	0.57	0.60	0.61	0.58	0.58	0.69	0.82	0.65	0.61	0.61	0.68	0.71	0.56
Baseline Mean head primary = 1	287.7	0.260	41.07	26.62	3.140	1.520	4.130	6838	126.5	46.37	120.7	44.76	32.44	31.81
Baseline Mean head primary = 0	214.4	0.410	27.66	20.47	2.600	0.450	0.910	4778	54.47	19.54	41.48	18.05	7.450	11.10

Robust standard errors in parentheses.  
\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

**Table A22**  
Heterogeneity by baseline household head had some secondary school education.

	(1) Total consumption IHS	(2) Missed meal dummy IHS	(3) HH total labour IHS	(4) HH farm labour IHS	(5) HH casual labour IHS	(6) HH salaried labour IHS	(7) HH enterprise labour IHS	(8) Wealth value IHS	(9) Savings value IHS	(10) Net borrowing IHS	(11) Total income IHS	(12) Crop sales IHS	(13) Enterprise profit IHS	(14) Labour income IHS
Post Lockdown	-0.42*** (0.07)	0.21*** (0.03)	0.51*** (0.11)	0.62*** (0.12)	-0.23*** (0.08)	-0.02 (0.02)	-0.25*** (0.05)	-0.19*** (0.06)	-0.37*** (0.14)	1.62*** (0.18)	-1.67*** (0.13)	-2.05*** (0.13)	-0.42*** (0.06)	-0.34*** (0.11)
Post Lockdown* head secondary	-0.30*** (0.10)	-0.06 (0.05)	-0.37*** (0.13)	-0.18 (0.14)	0.06 (0.12)	-0.48*** (0.12)	-0.20 (0.12)	0.09 (0.16)	-0.80*** (0.27)	-0.51 (0.34)	-0.63** (0.29)	-0.13 (0.22)	-0.49** (0.19)	-0.64** (0.28)
Observations	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150
R-squared	0.68	0.57	0.60	0.61	0.58	0.59	0.69	0.82	0.65	0.61	0.60	0.67	0.71	0.57
Baseline Mean head secondary = 1	336.1	0.200	44.79	26.50	1.520	4.330	5.710	7991	210.7	70.68	169.7	42.94	49.59	60.35
Baseline Mean head secondary = 0	258.1	0.310	36.93	25.17	3.410	0.570	2.970	6058	88.43	33.92	89.58	38.80	22.20	19.79

Robust standard errors in parentheses.  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table A23**  
Heterogeneity by baseline had a wage job (casual or salaried).

	(1) Total consumption IHS	(2) Missed meal dummy IHS	(3) HH total labour IHS	(4) HH farm labour IHS	(5) HH casual labour IHS	(6) HH salaried labour IHS	(7) HH enterprise labour IHS	(8) Wealth value IHS	(9) Savings value IHS	(10) Net borrowing IHS	(11) Total income IHS	(12) Crop sales IHS	(13) Enterprise profit IHS	(14) Labour income IHS
Post Lockdown	-0.50*** (0.07)	0.23*** (0.04)	0.67*** (0.12)	0.68*** (0.12)	0.46*** (0.04)	0.07*** (0.02)	-0.32*** (0.06)	-0.10 (0.06)	-0.54*** (0.14)	1.51*** (0.21)	-1.33*** (0.15)	-2.10*** (0.14)	-0.59*** (0.07)	0.85*** (0.07)
Post Lockdown* wage job	0.07 (0.09)	-0.09* (0.05)	-0.72*** (0.12)	-0.32** (0.13)	-2.05*** (0.10)	-0.57*** (0.08)	0.11 (0.08)	-0.23* (0.14)	0.01 (0.22)	0.03 (0.28)	-1.40*** (0.19)	0.05 (0.19)	0.20* (0.12)	-4.02*** (0.15)
Observations	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150
R-squared	0.67	0.57	0.62	0.62	0.74	0.61	0.69	0.82	0.65	0.61	0.62	0.67	0.71	0.78
Baseline Mean wage job = 1	247.6	0.370	46.86	26.51	9.190	3.960	2.600	4615	108.2	59.12	141.2	31.92	16.74	84.97
Baseline Mean wage job = 0	286.2	0.240	34.41	24.91	0.0400	0.0300	3.960	7330	114.8	32.48	88.04	43.37	32.93	0

Robust standard errors in parentheses.  
\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

**Table A24**  
Heterogeneity by baseline owns a mobile phone.

	(1) Total consumption IHS	(2) Missed meal dummy IHS	(3) HH total labour IHS	(4) HH farm labour IHS	(5) HH casual labour IHS	(6) HH salaried labour IHS	(7) HH enterprise labour IHS	(8) Wealth value IHS	(9) Savings value IHS	(10) Net borrowing IHS	(11) Total income IHS	(12) Crop sales IHS	(13) Enterprise profit IHS	(14) Labour income IHS
Post Lockdown	-0.26*** (0.10)	0.13*** (0.05)	0.61*** (0.14)	0.62*** (0.16)	-0.30** (0.12)	-0.04 (0.03)	-0.06 (0.04)	-0.24** (0.11)	-0.11 (0.16)	1.88*** (0.23)	-1.32*** (0.19)	-1.65*** (0.16)	-0.14** (0.06)	-0.44** (0.17)
Post Lockdown* mobile phone	-0.32*** (0.10)	0.10** (0.04)	-0.24* (0.13)	-0.07 (0.15)	0.13 (0.11)	-0.11** (0.05)	-0.32*** (0.07)	0.10 (0.12)	-0.60*** (0.21)	-0.50* (0.27)	-0.67*** (0.23)	-0.62*** (0.17)	-0.54*** (0.10)	-0.03 (0.19)
Observations	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150
R-squared	0.68	0.57	0.60	0.61	0.58	0.58	0.70	0.82	0.65	0.61	0.61	0.68	0.71	0.56
Baseline Mean mobile phone = 1	310.6	0.230	41.71	26.60	2.710	1.650	4.610	7718	144	52.19	127.3	46.36	36.59	31.39
Baseline Mean mobile phone = 0	186.1	0.430	30.89	22.68	3.810	0.520	0.930	3428	38.71	15.29	53.99	23.71	6.490	19.41

Robust standard errors in parentheses.

\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1.

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