Effects of the intensity and duration of COVID-19 lockdown policies on the use of coping strategies: Evidence from four African countries

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Abstract: Governments worldwide have been responding to the spread of the COVID-19 pandemic with various lockdown measures. These restrictions can have positive effects on curbing the spread of the virus but may also cause serious economic challenges. Evidence on how the severity of lockdown policies impact the well-being of households in low- and middle-income countries over time is largely absent. In this paper, we study both the immediate and protracted effects of COVID-19 lockdowns on households' use of coping strategies. Specifically, we examine how different combinations of policy intensity and duration affect the use of spending savings, selling assets, and reducing essential non-food expenditure in four African countries: Mozambique, Sierra Leone, Tanzania and Uganda. Using "Life with Corona Africa", a large-scale dataset collected through continuous phone interviews over a full year in 2021, we apply a linear probability model with country- and month-fixed effects to test the combined effect of the duration and intensity of lockdown policies. We find that, immediately after the introduction of (stricter) lockdown policies, the share of households who draw down savings or sell assets to cope with shocks declines. Instead, households reduce expenditure on non-food essential items, such as education and clothing. However, this response changes with longer periods of stringent lockdowns. Analysing the impact of stringency averages over a period of 180 and 360 days, we find that households cope by drawing down their savings and selling their assets. The effects are particularly pronounced for the two poorest quintiles of all households in our sample. Taken together, these findings underscore the importance of providing adequate social safety nets for poor and vulnerable households to deal with income shocks under protracted lockdowns, since households are only able to cope over shorter periods without having to employ harmful coping mechanisms.

Keywords: COVID-19; lockdown; income shocks; coping strategies; Africa

1. Introduction

In the first two years of the pandemic, COVID-19 has resulted in over 6 million deaths (Dong et al., 2020). However, the burden of the pandemic has not only been created by this new virus, but how governments have responded to the pandemic has also shaped people's behaviour and welfare. In fact, governments worldwide have responded to the fast spread of the virus by introducing varying strict lockdown measures, limiting access to public social and economic aspects of everyday life (Hale et al., 2021). These measures were, at times, successful in curbing the spread of the virus, but led to disruptions in the global and local markets, resulting in food shortages, high inflation, and unemployment, particularly in low- and middle-income countries (Narayanan & Saha, 2021; Picchioni et al., 2021; Mekonnen et al., 2022; Hausmann & Schette, 2022). The combination of declining income and increasing living cost has resulted in severe welfare losses for many households (BRAC International, 2020). The impacts of the pandemic and the resulting countermeasures have disproportionately affected poorer households living in low- and middle-income countries (Bargain & Aminjonov, 2021; Kansiime et al., 2021; Bundervoet et al., 2022), particularly in their economic well-being and coping capacities (Hausmann & Setter, 2022). As a consequence, the first two years of the pandemic led to an increase in the number of extremely poor households by 40 million people in sub-Saharan Africa (CDKN Global, 2022).

In this paper, we analyse how the intensity and duration of the lockdown policies implemented to countermeasure the COVID-19 pandemic impact the use of livelihood

coping strategies of households in four African countries. Covariate exogenous shocks often lead to economic recessions inducing high unemployment rates and deviations of relative prices (Skoufias, 2003). The additional full or partial business closures during lockdown episodes also led to large shares of households in low- and middle-income countries experiencing income losses (Balana et al., 2021; Egger et al., 2021; Janssens et al., 2021; Kansiime et al., 2021; Mahmud & Riley, 2021).

As a consequence, many households are forced to adopt harmful livelihood coping strategies to deal with income shortages and increased product prices (Bundervoet et al., 2022). Households may use different coping mechanisms such as reducing non-essential expenditure, drawing down savings, selling personal or productive assets, taking-up extra labour or borrowing money (Dercon, 2002; Deaton, 1991). However, due to the covariate nature of the COVID-19 pandemic, markets and informal insurance mechanisms are disrupted, reducing the set of available coping mechanisms (Mahmud & Riley, 2021). The COVID-19 pandemic and the corresponding lockdown policies particularly disrupted employment (Meyer et al., 2021), formal and informal entrepreneurial income (Schotte et al., 2021; Mahmud & Riley, 2020), and formal and informal finance and assistance systems (Rönkkö et al., 2022; Janssens et al., 2021; Schotte & Zizzamia, 2021). Hence, many households are forced to use the few remaining coping strategies, such as reducing their non-food expenditure, selling their personal assets or reducing their savings.

We hypothesise that households tend to, in the first instance, reduce expenditure before employing more exhaustible strategies, such as selling household assets or spending their savings. Therefore, we expect that the immediate response of households to the COVID-

19 countermeasures is the reduction of expenditure on non-food items. If this strategy is not sufficient, then households will apply more harmful coping strategies over longer periods of protracted lockdowns.

There is some evidence emerging on the immediate household responses to the pandemic and its countermeasures in low- and middle-income countries. A number of studies find that households reduce food and non-food expenditure as an immediate response to the pandemic and the introduction of lockdowns in rural Uganda, Bangladesh and urban South Africa (Mahmut & Riley, 2021; Rönkkö et al., 2021; Schotte & Zizzamia, 2021; Sitko et al., 2022). In Kenya, Namibia, Tanzania and Uganda, households are more likely to employ food-based coping strategies during lockdown episodes (Kansiime et al., 2020; Tabe-Ojong et al., 2022). Households are also more likely to use their savings during lockdowns (Kasiimee et al., 2021; Mahmut & Riley, 2021; Rahman and Matin, 2020; Schotte & Zizzamia, 2021). Other studies observed that coping mechanisms in the short-term include borrowing money or taking up credit (Mahmut & Riley, 2021), reallocating labour to farm work (Rahman & Matin, 2020), and migration to rural areas (Meyer et al., 2021). Conversely, poor households in Kenya did not respond to countermeasures in the short-term by reducing food expenditure or spending savings but rather by postponing loan repayments, decreasing lending, and cutting back remittances (Janssens et al., 2021). In the short-run, households also refrain from using harmful coping strategies such as the selling of personal assets (Janssens et al., 2021; Mahmut & Riley, 2021). Furthermore, studies also reveal that countermeasures continue to negatively impact the well-being and behaviour of households in the medium-term (Balana et al., 2021; Rönkkö et al., 2021).

This underscores that policies implemented to combat the pandemic can also have longer-term social and economic repercussions, particularly for poorer households.

Despite the growing number of studies, the available evidence on how households respond to the COVID-19 countermeasures in low- and middle-income countries is limited in design and scope. Existing work does not address how households prioritise and employ the use of the coping strategies; if they are used jointly or separately; or how their use changes with longer periods of strict lockdowns. Most of the current work is limited to analysing overall immediate impacts relying on aggregate before and after comparisons of lockdowns. Moreover, there remains a gap on using large, frequent and continuous data to observe changes in overall dynamic relationship between measures and the response of households, which allows for more in depth heterogeneity effects.

In this paper, we fill these knowledge gaps by testing both the immediate response of households to lockdown measures and the gradual change in their coping strategies after exposure to a prolonged period of lockdown. More specifically, we address three research questions: First, we examine how different degrees of lockdown affect households' decisions to employ harmful livelihood coping strategies. Second, we test if and how the duration of the varying lockdown policies change the use of these strategies over time. Finally, we identify the heterogeneous effects by the wealth and income status of households.

In order to answer these research questions, we use novel continuous cross-sectional survey data from four countries in Africa (Mozambique, Sierra Leone, Tanzania and

Uganda), comprising over 24,000 observations (Brück & Regassa, 2022). We collected this data continuously between January and December 2021 through phone interviews jointly with BRAC International and Intercampus. In addition, we use the countermeasure stringency index developed by OxCGRT - Oxford Covid-19 Government Response Tracker (Hale et al., 2021), from which we retrieve the current levels of stringency at the country level and calculate measures for 30-, 90-, 180-, and 360-day stringency averages. The averages will allow us to measure the intensity of the lockdown policies over these various periods.

Combining these datasets, we find that the share of households who spend savings or sell assets to cope with shocks declines as a response to the introduction of stricter lockdown measures. Households, in the short-term, rely instead on reducing expenditure on non-food essential items, such as education and clothing. However, this relationship changes the longer the lockdown policies last. Looking at the exposure of stringency averages over a period of 360 days, we find that households are forced to sell their assets or spend savings to cope with long and intense lockdown policies. The effects are strongest for poorer households below the 40th percentile. Our findings suggest that poor and vulnerable households are able to withstand strict lockdown measures only for shorter periods of up to 90 days.

This paper has three novel contributions: First, the analysis uses one of the largest household phone survey datasets built specifically to capture the socioeconomic and health implications of COVID-19 in sub-Saharan Africa. Having structurally uniform data from four different countries for a continuous period of 12 months, we are able to

estimate credible counterfactuals assessing the impact of COVID-19 lockdown policies on coping behaviour with a novel degree of robustness, excluding seasonal and country-specific biases. Second, our paper is the first to test for both the intensity and duration of lockdown policies. To unfold the full and multidimensional effects of the COVID-19 countermeasures, it is imperative to assess their impacts while accounting for the length and intensity of the policies, given that households respond differently to immediate versus protracted shocks. Third, our paper contributes to the policy debate on the tradeoffs between saving lives and saving livelihoods. Understanding the coping behaviour of vulnerable households experiencing different lockdown policies in both intensity and duration is crucial for designing better policies to minimise the unintended impacts of these lockdowns. Hausmann and Schetter (2022) argue that poor countries are better off if no strict countermeasures are introduced. We argue that strict lockdown policies are tolerable for short periods, yet in the absence of adequate social safety nets targeted to the most vulnerable, countermeasures should not exceed six months in duration. Under protracted lockdown, it is crucial that governmental agencies ensure that these households have access to adequate welfare benefits to help them deal with income shocks without having to employ harmful coping mechanisms.

The remainder of this paper is structured as follows: In section 2, we discuss the COVID-19 regulations in the study locations. In section 3, we describe our data and our methods. Section 4 presents our results. In section 5, we address the limitations and the robustness of our approach. In section 6, we discuss our findings and conclude.

2. Context

COVID-19 has been detected as early as March 2020 in all four countries. However, the response to mitigate the spread of the virus varied. On 30 March 2020, Uganda introduced one of the strictest and longest lockdowns in the world which included the closure of borders, non-essential businesses, non-food markets, as well as schools and universities. Moreover, population movement within the country was limited including restrictions on the use and movement of private vehicles and introduction of a night curfew. The restrictions were gradually eased between September 2020 and May 2021. The lockdown was reintroduced in Summer 2021 and Ugandans again faced strict restrictions up until the end of January 2022.

In contrast, Tanzania had in place some of the most relaxed measures despite the high number of COVID-19 cases at the start of May 2020. The Tanzanian government denied the existence of COVID-19 and did not release figures on the infection rate or deaths. However, this policy changed in March 2021, after the death of President Magufuli. The new president acknowledged the risks associated with COVID-19 and started promoting preventive measures such as wearing face masks and keeping distance. Nevertheless, Tanzania has not introduced or implemented a lockdown.

Sierra Leone and Mozambique chose the medium course: They have introduced lockdowns in response to COVID-19, however, the lockdowns were rather short, compared to other countries studied. Sierra Leone implemented some restrictions even prior to any confirmation of infection (Jones, 2022). In response to the first COVID-19

case in March, authorities implemented the first three-day full lockdown on 5th April, followed by a partial lockdown, including the restrictions on inter-district travel and a curfew from 9 pm to 6 pm. In May, there was another 3-day full lockdown in the country, after which the restrictions slowly started to ease. 2021 was rather lax in terms of COVID-19 restrictions for Sierra Leone. Mozambique responded to the outbreak of COVID-19 with a number of restrictions such as school closure, cancellation of public and private events, restrictions on international travel, and closure of commercial and public establishments. The lockdown including restrictions on internal movements was introduced at the end of May 2020. People in Mozambique faced strict restrictions until the end of October, then they were gradually relaxed until the end of the year. Similar to Sierra Leone, restrictions in 2021 were relatively mild in Mozambique, including reduced opening hours for supermarkets, restaurants and other establishments, restrictions on the number of people permitted to attend private events, funerals and religious places. The strictest period last year was in February, when in addition to the existing restrictions, a mandatory curfew between 9 pm-4 am was introduced in several districts.

Overall, the differences in policy measures between these four countries and over time within each country make these four countries an attractive setting to understand and analyse the impact of COVID-19 lockdown measures. Also given the varying stringency over time, particularly in the early months of the pandemic in 2020, it would be interesting to compare not just how households immediately respond to these measures but also how the duration of these stringent lockdowns affect this response.

3. Data and Methods

3.1 Data

We use data from the “Life with Corona - Africa" (LwC-A) survey. The LwC-A is a large continuous phone survey conducted between January and December 2021 in Mozambique, Sierra Leone, Tanzania and Uganda. Using repeated cross-sections, we collected data from 500 random respondents per month per country. In total, the LwC-A dataset contains 24,000 observations collected continuously throughout 2021 across these four countries. The data builds on and complements the global Life with Corona online survey (Stojetz et.al, 2022) and is novel compared to the other phone-based survey datasets (Brück & Regassa, 2022).

In all four countries, the respondents for the LwC-A survey were chosen randomly from large databases which were generated in the past decade through Random Digit Dialling (RDD) and/or face-to-face interviews. In Mozambique, the data were collected by Intercampus, a survey firm, where they drew the sample from a large database of about 600,000 mobile phone contacts. In Sierra Leone, Tanzania and Uganda, data were collected by BRAC International. They relied on the Independent Evaluation and Research Cell (IERC) database, which consists of more than 10,000 beneficiaries per country selected from their current and previous programmes. While these databases are large and cover respondents from across all regions, they are not nationally representative. Therefore, we followed a stratified random sampling method to generate a sample where

its distribution reflects the national population by gender, age group and location. However, we could not reach this goal fully due to two limitations: First, mobile phone subscriptions are not universal in any of the survey countries. There are about 80 subscriptions per 100 people in Sierra Leone and Tanzania. The subscription rate is much lower in Uganda and Tanzania (61 and 49 subscriptions per 100 people, respectively). Second, given the large sample size of the study, the databases did not contain enough respondents to maintain the sampling balance at the national level (e.g., many of the BRAC projects focus on women). Nevertheless, although the results cannot be generalised to the country level, the large sample size and uniformity of the survey time and structure across the four countries provide novel insights to the understanding of how vulnerable households in sub-Saharan Africa respond to the lockdowns.

The LwC-A survey questionnaire includes information on basic socio-demographic characteristics, housing and basic assets ownership, as well as on the economic well-being of the household. Moreover, it includes questions on personal coronavirus exposure, testing and vaccination experiences, social life, mental health and well-being, assistance received since the start of the pandemic, food security, consumption, and the use of coping strategies. The modules were shortened to be suitable for phone interviews and the questions were also simplified and answer choices limited (e.g., yes or no).

3.2 Main variables

For this paper, our main set of dependent variables are based on three coping mechanisms used during the last four weeks before the interview because of lack of money or other

resources. More specifically, households were asked if they have: (i) Spent personal or household savings; (ii) sold personal or household assets; and (iii) reduced essential non-food expenditures (health, education, and clothing). These variables take a value of 1 if the respondents used any of these strategies in the past four weeks, and 0 otherwise. We also calculate the sum of all three variables, which take a value between 0 and 3, in order to measure the use of multiple strategies that were employed at the same time.

Figure 1 shows the share of households using these three coping strategies for Mozambique, Sierra Leone, Tanzania and Uganda separately. First, we observe that the majority of households in Uganda, Mozambique and Sierra Leone have spent their assets and reduced essential non-food expenditures during 2021. While the usage of those mechanisms has been relatively stable in Mozambique (between 60-80% of the households) and Sierra Leone (between 80%-100% of the households), we observe fluctuations in the shares of households over time in Uganda. Spending savings has declined since April 2021, whereas the share of households reducing essential non-food expenditures steadily increased, reaching 100% by the end of the year. Second, in Uganda and Mozambique about one fifth of households have sold their personal or household assets to cope with income loss. However, the figures are alarming for Sierra Leone. The share of households who sell their assets has been increasing steadily since May 2021, reaching 47% in December 2021. Finally, compared to the other three countries, the use of the coping mechanisms is generally much lower for Tanzania (Panel B). In fact, between January and April 2021, the share of households that spent saving and reduced non-food

expenditure was declining rapidly. After April, however, both steadily increased to their levels at the beginning of the year.

[Figure 1 about here]

To measure the intensity of the COVID-19 countermeasures, we use data on policy stringency from the Oxford Covid-19 Government Response Tracker (Hale et al., 2021). OxCGRT collects information on policy measures implemented by governments to curb the spread of the pandemic. Based on this information, OxCGRT constructs the stringency index, which measures the strictness of the policies. The index is based on nine indicators: school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaigns; restrictions on nationwide and international movements. Each Sub-index has an ordinal score to measure the stringency levels. For example, the sub-index "stay-at - home requirements" has 4 categories: 0 - no measures in place, 1 - recommend not leaving house, 2 - require not leaving house with exceptions for daily exercise, grocery shopping, and 'essential' trips, 3 - require not leaving house with minimal exceptions (e.g., allowed to leave once a week, or only one person can leave at a time, etc). The sub-index "restrictions on internal movements" has only 3 categories: 0 - no measures, 1 - recommend not to travel between regions/cities, 2 - internal movement restrictions in place. Additionally, both indices have variables, which indicate whether those policies are targeted or general

(so called flag variables). The sub-indices are then normalised based on the recorded binary policy value on the ordinal scale, the flag variable and the maximum value of each sub-index, and then multiplied by 100. The normalisation hence produces sub-indices with a value between 0 and 100 where each full point in the ordinal scale is equally spaced (Hale et al., 2021). Finally, the overall stringency index for each country is calculated as the mean score of these nine indicators where each sub-index has an equal weight in the total stringency index based on this formula.

$$index = \frac{1}{k}\sum_{j=1}^{k} I_j$$

where I_j is the normalised stringency level for each sub-index, and k is the number of sub-indices. This implies that the overall stringency index will also take a value between 0 to 100 (where 100 means that countries are applying the strictest policies/restrictions possible on all these nine sub-indices). The stringency index is calculated at the country level and is updated daily since January 2020. As of the writing of this paper, the database contains 180 countries. The main advantage of the stringency index is that it ensures the comparability of lockdown measures across countries and over time which makes it suitable for our analysis.

Using the daily stringency index data, we create average indices for Uganda, Tanzania, Sierra Leone and Mozambique. Namely, for every day in 2021, we calculate in each country the average stringency level during the last 30, 90, 180 and 360 days separately. Then, we merge the daily stringency and average indices with the LwC-A survey data using

the date of the interview and country as merging variables. Thus, the stringency variables show to what level of stringency each respondent has been exposed in a given country for a given day. More precisely, *the current stringency index*, which is the original daily stringency levels, shows what degree of stringency each household faced in their country at the exact date of the interview. *The 30-day*, *90-day*, *180-day and 360-day average stringency indices* show the average stringency levels each household faced during the last 30-days, last 3 months, last 6 months and last year before the interview, respectively. We use the five separate stringency indices as our main explanatory variables after rescaling to take a value between 0 and 10 to facilitate the interpretation of the coefficients from our analysis.

[Figure 2 about here]

Figure 2 shows the various stringency indices for all four countries over our study period (January - December 2021). The daily and monthly-average stringency measures (panel a and b) capture the acute change in policy while the 90-, 180-, and 360-day averages stringency average measures capture the intensity of restrictions over longer periods of time (panels c, d & e). We see that in panel (a) the majority of households in all countries, apart from Tanzania, faced in January 2021 daily stringency levels between approximately 4 and 5. Yet, we also observe that over the last 180 days (panel d), the same respondents from Uganda and Mozambique experienced on average stricter lockdown policies

(stringency levels vary between 6 and 8), while respondents from Sierra Leone experienced less stringent lockdown policies. By differentiating daily levels of stringency from longer-term averages, we can distinguish acute responses to the lockdown policies from protracted responses. For example, as described in the background section, Uganda had two strict lockdowns episodes over the past two years. The first was between April and September 2020 and the second started in July 2021. As shown clearly in Figure 2, the 180-day average of a respondent from Uganda has a stringency level of 7.5 (panel d) compared to 5 for the 30-day average (panel b).

Finally, for assessing the heterogeneous effects on wealth quintiles, we use information on household asset ownership and housing characteristics to calculate a composite wealth index. Assets include ownership of apartments/houses, livestock, plot of land/land for farming, car, motorcycle, bike, TV, radio, sofa, and refrigerator. We also include variables to describe the quality of housing, such as whether a dwelling has access to piped water and electricity in the residence and the number rooms. To calculate the overall wealth index, we use the weights from the first component of the Principal Component Analysis (PCA) as it retains most of the variance of the original asset variables (Bertram-Hümmer & Baliki, 2015; Kolenikov & Angeles, 2009). This measure has been shown to reflect economic well-being similarly to income or expenditure measures, particularly for low-income countries in SSA (Filmer & Scott, 2012), which is particularly useful given the ease in collecting asset information (in contrast to expenditure and income) over short phone surveys. Based on the composite asset index, we then divide the households into five wealth quintiles and conduct the analysis for each group separately.

3.3 Empirical strategy

We use a country- and month-fixed effect linear probability model to estimate the impact of COVID-19 related restrictions on coping behaviour:

$$y_i = a_0 + \beta_1 STRINGENCY_{it} + \beta_2 CONTROLS_i + FE_c + FE_m + \varepsilon_i \quad (1)$$

Where y_i is a binary outcome variable for household i, t represents the fact that each outcome variable is regressed on current stringency, 30-day average, 90-day average, 180-day average and 360-day average in separate regressions. Our main coefficient of interest is β_1, which captures the change in the share of households using our set of coping strategies. More specifically, and given that we rescale the stringency indices to take a value between 0 and 10, then β_1 can be interpreted as the difference in the share of households who use coping strategies in response to the 10-point increase in the level of stringency. As controls, we use households and respondent socioeconomic and demographic characteristics of. The controls include age, sex, years of education, dummy variables for being married and living in rural area, household size and wealth rank based on household assets. More importantly, we also control for the number of days between the date of the interview and the start of the pandemic. The reason is that a respondent surveyed by the end of 2021 has been experiencing the pandemic as a whole much longer than the respondent surveyed at the beginning of 2021. This difference in general experience is likely to influence coping behaviour. As time passes, we get more informed about the virus, how policymakers might react in response to increasing infection numbers, and how long lockdowns usually last. We rely on this knowledge when we make

decisions in our everyday life. Furthermore, we include country (FE_c) and month (FE_m) fixed effects to control for unobserved heterogeneity across space and time. ε_i represents an error term. Our identification strategy relies on the strong assumption that changes in the lockdown measures set by the governments are exogenous to the choices and coping behaviour of households. Any changes that could impact the dependent variables in the absence of lockdowns are captured by the country and month fixed effects.

4. Main Results

4.1 Effect of stringency on the use of coping strategies

Table 1 shows the effect of the various lockdown stringency levels on the overall use of all three coping strategies, as well as on the share of the households who employed the three coping strategies separately. The columns show the dependent variables and the rows show the independent variables. Within each cell we display the main coefficient and the standard errors, number of observations and the R^2 from each regression. Given that we rescale the stringency index variables (0-10), the coefficients for the individual coping mechanisms can be interpreted as the change in the share of households who implement these coping mechanisms in response to a 10-point increase in stringency. Coefficients of the control variables are not displayed in the table.

[Table 1 about here]

In the first column, we show the findings from analysing how the current levels of policy stringency affect the use of coping strategies. First, we find that the overall number of coping mechanisms used by households declines, the higher the levels of lockdown stringency, which is significant at the 1% level. This implies that households are less likely to use multiple coping strategies under stringent lockdown. Second, by examining the effect of each coping mechanism separately, we find that the share of households who spend savings or sell personal assets as a response to higher stringency significantly drops by about 2 percentage points each ($p<0.01$) compared to households who do not face any lockdown restrictions, which is driving the overall effect. At the same time, we observe that the share of households who reduce expenditure on essential non-food items (such as on education and health) significantly increases by 2.1 percentage points ($p<0.01$). In other words, we find that households experiencing high stringency levels, prioritise the use of less harmful coping strategies such as reducing non-essential expenditure rather than spending savings or selling households assets. Actually, as our results show, households living under more stringent levels of lockdown are more likely to hold onto their savings and personal assets compared to households living under no lockdowns.

We also broadly find a similar effect when using the 30-day and 90-day averages as explanatory variables, as shown in columns (2) and (3) of Table 1. However, the magnitude of the effect across the different coping strategies varies. First, we find that the share of households who do not sell their assets increases by 2.3 percentage points with the 30-day stringency average and by 3.3 percentage points for the 90-day averages. Simultaneously, we find that the share of households reducing essential non-food

expenditure increases at a similar rate, but there is no notable change in the share of households that use their savings. This reiterates that even after 90 days of stringent lockdown measures, households still prioritise the reduction in expenditure over liquidating savings or assets.

Interestingly, we find that the direction and size of these coefficients start to gradually shift when we analyse the effect of lockdown intensity over longer periods of time using the 180-day and 360-day stringency indices as shown in column (4) and (5) of Table 1. More specifically, we find that households experiencing higher levels of stringent lockdowns over longer periods not just continue to reduce expenditure on essential non-food items, but also begin to use their savings and sell their assets to make ends meet. The share of households who spend their savings increases by 4.8 percentage points and who sell their assets by 4.7percentage points , which are both significant at the 1% level.

In contrast to our first set of results, over very prolonged periods, the use of any of these coping mechanisms does not substitute the use of the other two coping mechanisms. This is clearly reflected by the change in the coefficient of the overall sum of the coping strategies used by households, where the coefficient changes from -0.021 ($p<0.01$) for current stringency levels to a notable and significant +0.138 ($p<0.01$) for the 360-day average. In other words, prolonged periods of stringent lockdowns force households to use up all their available coping strategies, particularly through spending their savings and/or selling their personal and household assets to deal with income shortages.

4.2 Heterogeneity of the stringency effect

Figure 3 shows the coefficient plot of the effect of all five stringency indices on spending savings for all wealth quintiles separately. We observe that the effect changes considerably by the wealth of households. When examining the effect of the current, 30-day and 90-day levels of stringency, we find that the share of households who spend savings within poorer population groups (below the 40th percentile) decreases in response to stricter lockdowns. While we find no significant effect for these stringency indices for the richest groups (above the 40th percentile). However, over longer periods of stringent lockdowns, the share of households who rely on spending savings to deal with income shocks in both the poorest and the richest groups increases whereas the use of savings of the middle-income groups (between 40th and 60th percentile) remains unaffected to changes in lockdown stringency.

[Figure 3 about here]

Figure 4 shows the effects on selling of personal assets. Here, we find that neither acute nor protracted exposure to stringency has an impact on the sale of assets for wealthy and middle-income households. In contrast, stricter lockdowns lower the likelihood of selling assets among poorest population groups up to 180-days average, but this effect is reversed for 360-day averages of stringency. This suggests that the poorest households

reduce their reliance on using harmful coping mechanisms as an immediate response but end up using them over longer periods of strict lockdowns.

[Figure 4 about here]

Interestingly, we do not observe any heterogeneous impact among the different income groups on the reduction of non-food expenditure for the daily, 30-, 90- and 180-day averages of the stringency index. However, exposure to higher stringency over a period of 360 days reduces the share within the poorest households who rely on reducing expenditure but increases the share of midline-income households. In other words, the poorest households living under protracted lockdowns are less likely to rely on reducing expenditure on essential items compared to households living under no lockdowns. As we observed in Figures 3 and 4, the poorest 20% will rely on more harmful strategies to cope with long stringent lockdowns.

[Figure 5 about here]

Figure 6 shows the coefficient plot broken down by changes in income status. More than two-third of respondents report that the income of the main breadwinner in the household has drastically or moderately decreased since the start of the pandemic. We observe that the stringency variables have different impacts on coping behaviours for

these households, compared to the households whose main breadwinner did not experience an income decrease. First, we observe that households who lost income are more likely to use their savings and sell their assets over long periods of lockdown while we find no effect on these coping mechanisms of households who did not face negative income shocks. The reduction in expenditure is similar for both groups. Households rely on this strategy over short periods of lockdowns, but not over year long lockdowns.

[Figure 6 about here]

5. Robustness Checks

One limitation of our survey data is that the questions about the use of coping mechanisms only have “yes” or “no” without clear differentiation on if households answered “no” due to the fact that a household has already exhausted the strategy and cannot use it anymore or because that household did not need to apply this strategy. This is particularly difficult to interpret for the questions on “spent savings” or “sold assets”. As a robustness check, we exclude observations on selling assets if households do not report having any (household or personal) assets. We were not able to remove observations for the question on “spent savings” because we do not ask people whether they have any savings. Instead, we decide to drop the poorest 20% in our sample and rerun the analysis as one might argue that the poorest population groups do not have any savings. In both scenarios, the main results do not change.

Furthermore, since the start of the COVID-19 pandemic, Tanzania has exceptionally refrained from introducing strict lockdown measures. The low variation in the stringency index for Tanzania (particularly for the 180- and 360-day averages) might generate noise in the data. Hence, we remove Tanzania from the analysis to check the robustness of our findings. The results remain robust to those reported in Table 1 and Figures 3-6.

Lastly, we control for the number of policy changes that occurred for each of our stringency indices. For example, in the regression with the 180-day average stringency, we control for the number of times the stringency levels have changed during those 180 days. This allows us to differentiate between long, moderate and short strict lockdowns. The findings are robust with no significant differences to be reported.

6. Discussion

COVID-19 and the countermeasures implemented to curb its spread have impacted households globally on multiple dimensions. The negative impacts are particularly detrimental in low- and middle-income countries (Hausmann & Schetter, 2022). In this paper, we use a large continuous phone survey data set from four African countries to show that the intensity and duration of lockdowns play an important role in determining the capacity and ability of households to respond and cope with the pandemic and its economic ramifications. Our findings indicate that under acute stringent lockdowns, the immediate response of households is to reduce expenditure on essential non-food items (such as clothing and education) and, at the same time, refrain from liquidating their assets

to deal with income losses. Both these findings align with recent evidence from low-income countries (Janssens et al., 2021; Mahmut & Riley, 2021; Sitko et al., 2022). Our findings show that in addition to existing evidence, under long strict lockdown measures, households will stop substituting one coping strategy with the other, but instead begin selling assets even while continuing to reduce expenditure on essential non-food items.

Our findings on how households respond to the intensity and duration of lockdowns by spending savings explains the conflicting evidence in the literature. For example, Janssens et al. (2021) find that households in Kenya do not spend saving to cope, while other studies show in contrast that households actually rely more on savings after the pandemic (Mahmut & Riley, 2021; Kasiimee et al., 2021; Rahman & Matin, 2020; Schotte & Zizzamia, 2021). We find that both of these results are factually true. On the one hand, we show that households indeed refrain from spending savings when faced with acute short episodes of lockdown, but on the other hand, prolonged stringent lockdowns also drive the spending of savings.

We argue that the uncertainty around the economic repercussions of a covariate shock such as the pandemic, particularly as strict lockdown measures are being introduced, shapes household risk and time preferences. Similar effects were found for exposure to natural disasters (Cassar et al., 2017). Households will value the future more and become more risk-averse, particularly in employing harmful wealth-depleting strategies in the short-term. Therefore, assets and savings take over an insurance function to smooth the severity of uncertain further downfall of livelihoods. However, our findings also underscore that under strict and long lockdown measures, these self-insurance strategies

in low-income countries become insufficient and ineffective, as households (particularly the most poor and vulnerable) become constrained and need to use all the available coping strategies.

Several studies show that negative economic effects on households are detrimental also in the long-term (Balana et al., 2021; Rönkkö et al., 2022). In addition to these studies, we also show that the duration of the lockdown has different implications on the coping capacity and decision-making of households, which also has different effects for various income groups. Under protracted lockdowns, the share of poorer households who rely on selling assets or spending savings significantly increases.

In conclusion, this paper emphasises that households are indeed able to bridge a bottleneck period of strict lockdown though expenditure reductions. However, over long periods of stringent lockdown, the ability of households to cope without applying harmful coping strategies is limited, which in hand is likely to have a long-lasting negative impact on their well-being. Strict lockdowns are tolerable for short periods, yet in the absence of adequate social safety nets become economically detrimental if they last for longer periods. This highlights the difficult trade-offs governments face between saving lives and saving livelihoods, particularly in the absence of strategies to alleviate the negative economic impacts for the most vulnerable.

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Figure 1: Usage of coping strategies by country and month

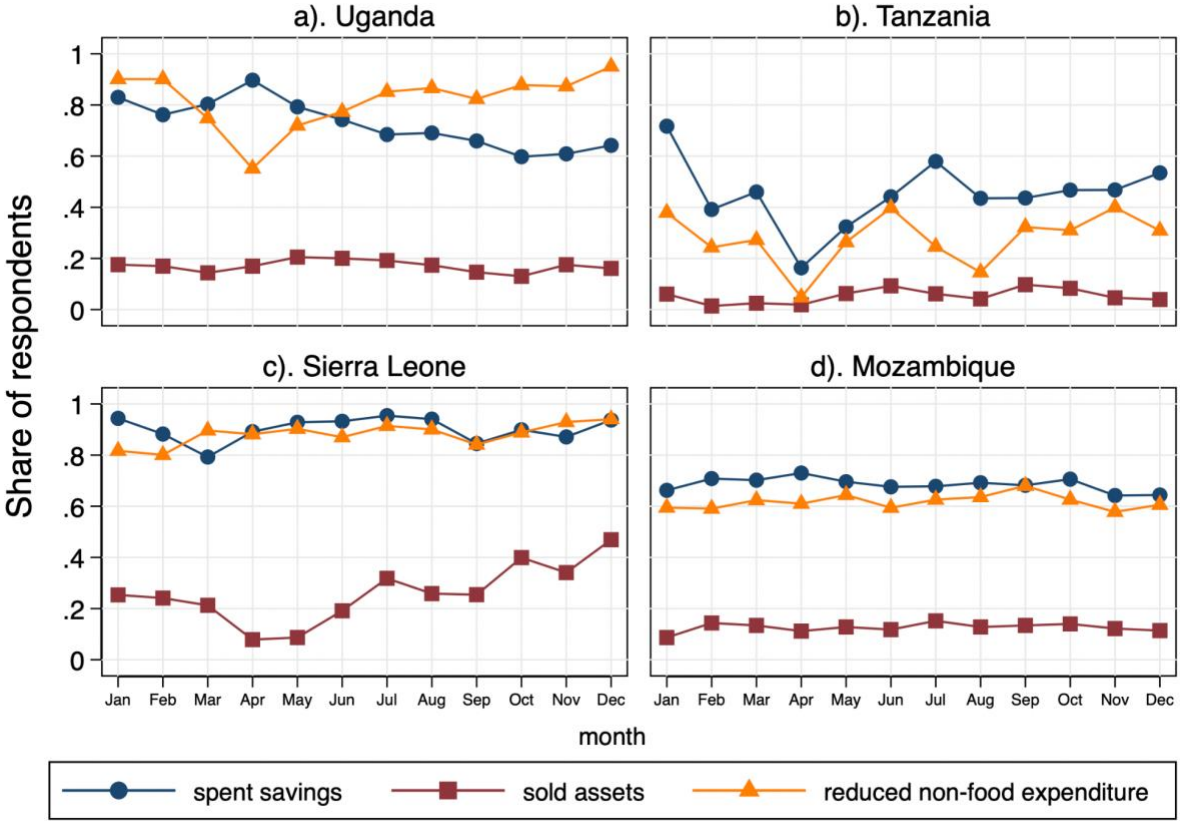


Figure 2: Rescaled stringency levels by country and month in 2021

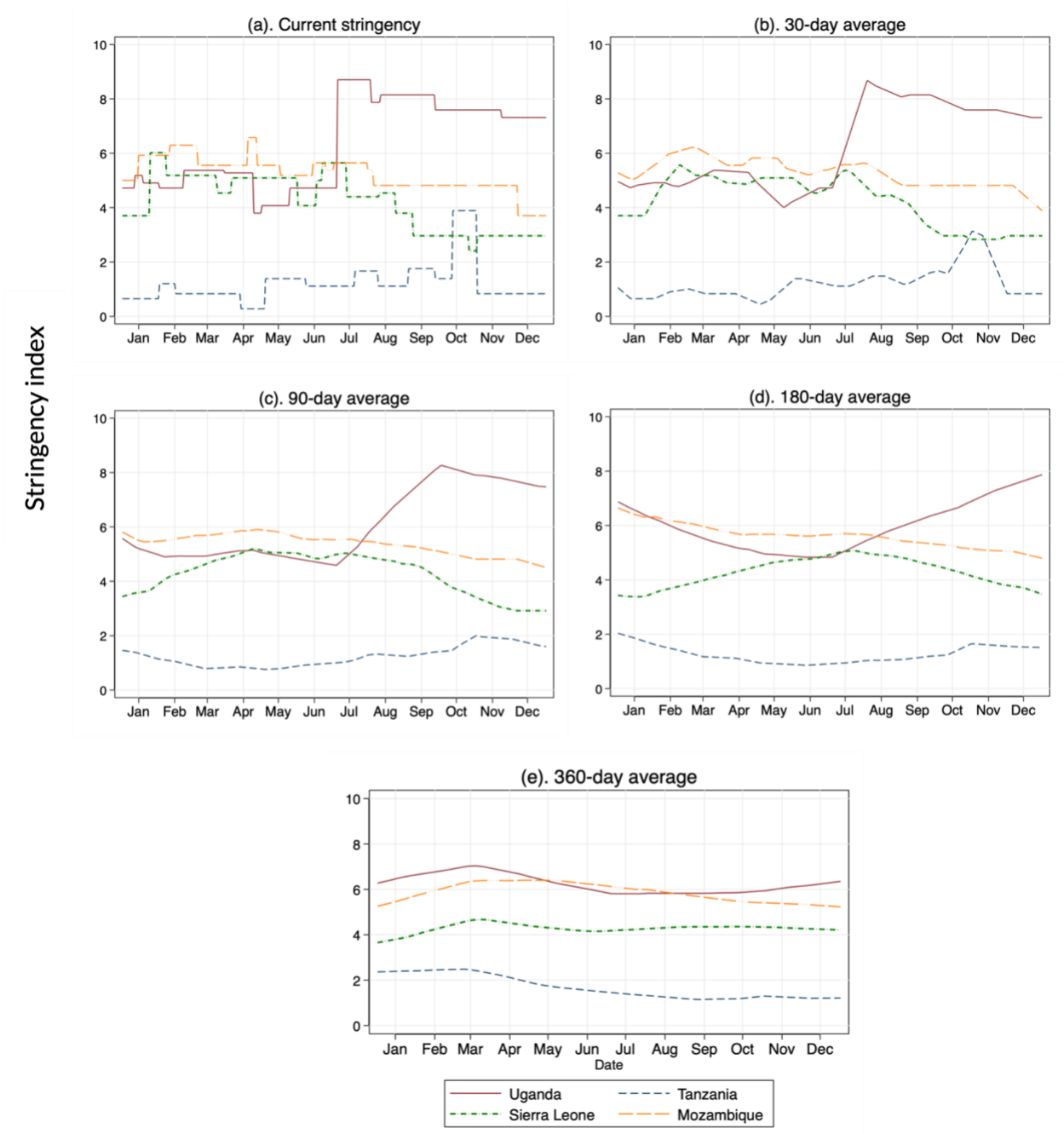
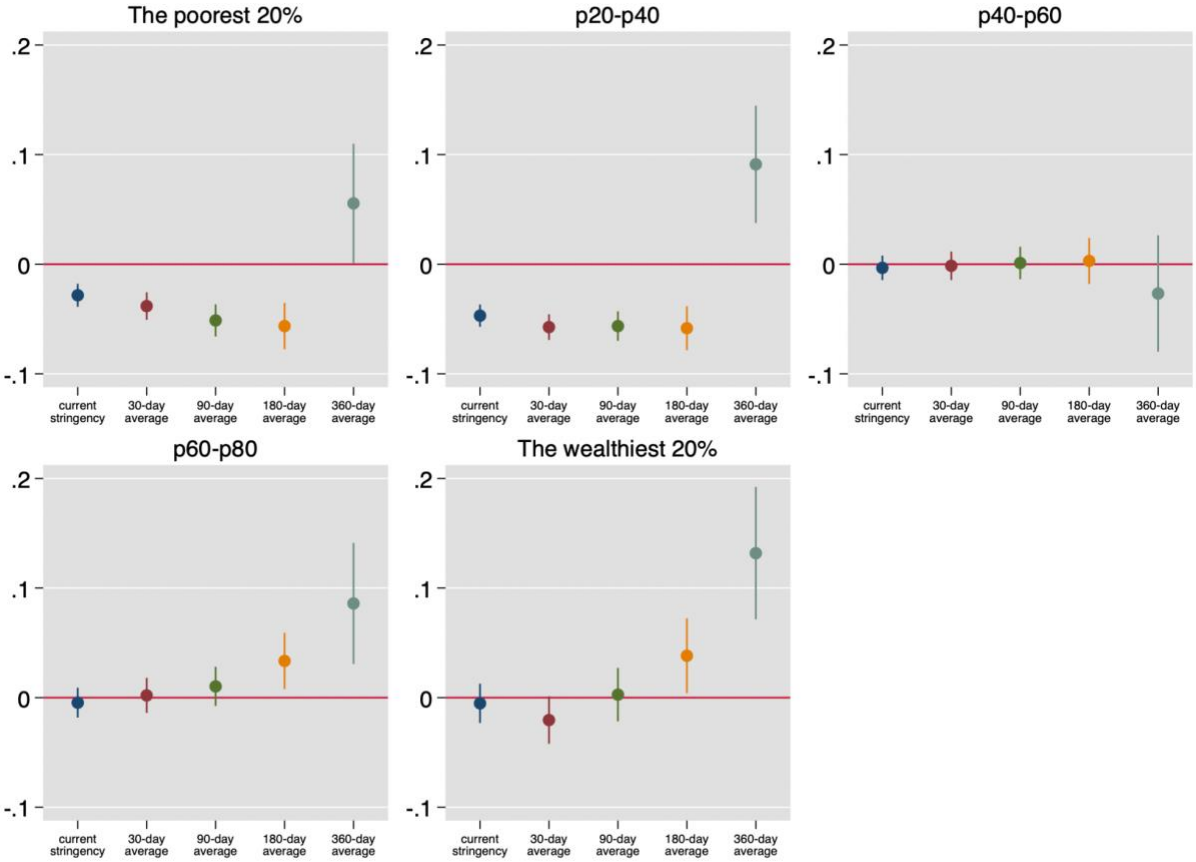


Table 1: Effect of policy stringency on coping behaviour

	(1) Current stringency	(2) 30-day average	(3) 90-day average	(4) 180-day average	(5) 360-day average
Sum of all three coping measures	-0.021***	-0.024***	-0.036***	-0.012	0.138***
	(0.005)	(0.005)	(0.006)	(0.009)	(0.021)
	24248	*24248*	*24248*	*24248*	*24248*
	0.271	*0.271*	*0.272*	*0.271*	*0.272*
Spent savings	-0.019***	-0.024***	-0.022***	0.016**	0.048***
	(0.003)	(0.003)	(0.004)	(0.005)	(0.012)
	24248	*24248*	*24248*	*24248*	*24248*
	0.128	*0.128*	*0.127*	*0.126*	*0.127*
Sold assets	-0.017***	-0.023***	-0.033***	-0.029***	0.047***
	(0.002)	(0.003)	(0.003)	(0.005)	(0.009)
	24248	*24248*	*24248*	*24248*	*24248*
	0.071	*0.072*	*0.073*	*0.070*	*0.070*
Reduced essential non-food expenditures	0.021***	0.032***	0.030***	0.047***	0.035***
	(0.002)	(0.003)	(0.003)	(0.004)	(0.011)
	24248	*24248*	*24248*	*24248*	*24248*
	0.256	*0.257*	*0.256*	*0.256*	*0.254*

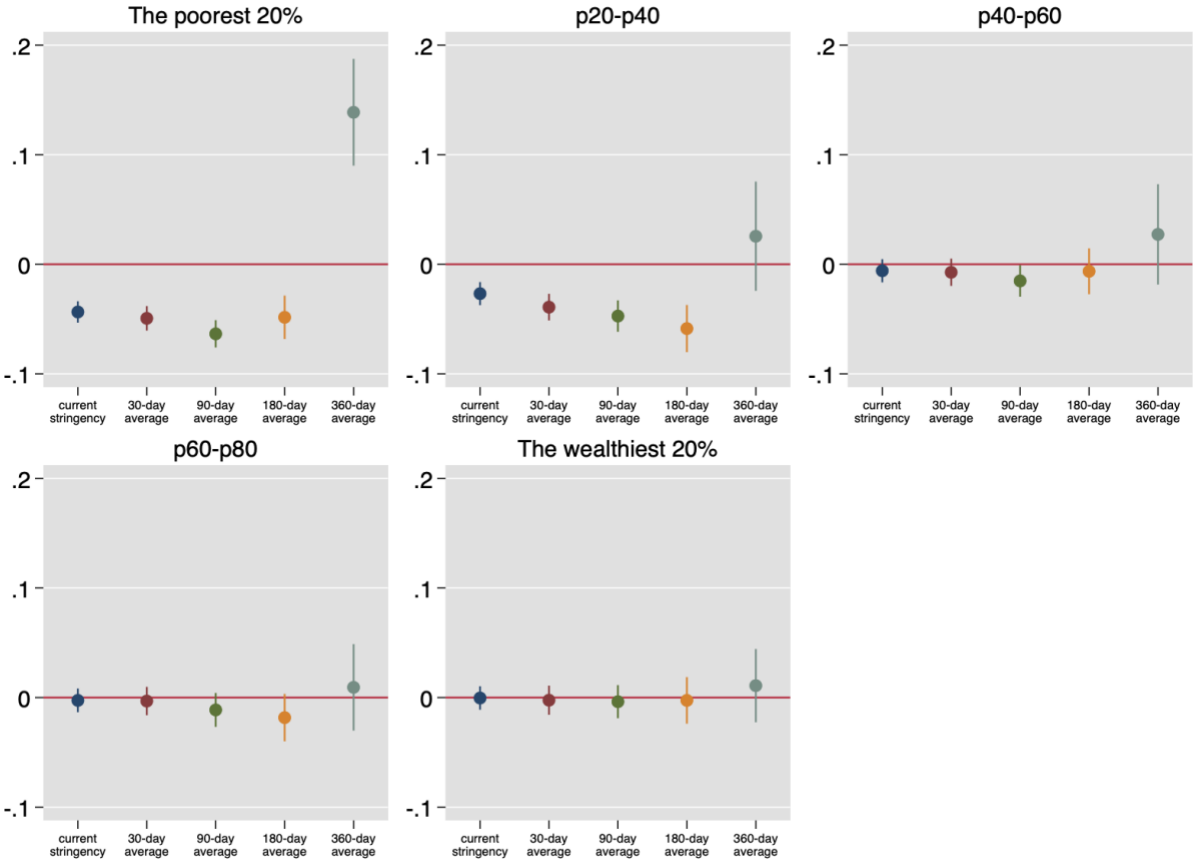
Note. Rescaled stringency variables (between 0-10). Robust standard errors in parentheses. * p < 0.05, ** p < 0.01, *** p < 0.001. Number of observations and R^2 of regressions shown in italic. Controls: age, sex, years of education, being married, household size, living in rural area, number of days since the start of the COVID-19, wealthrank, country and month fixed effects.

Figure 3: Effect of stringency on spending savings by wealth groups



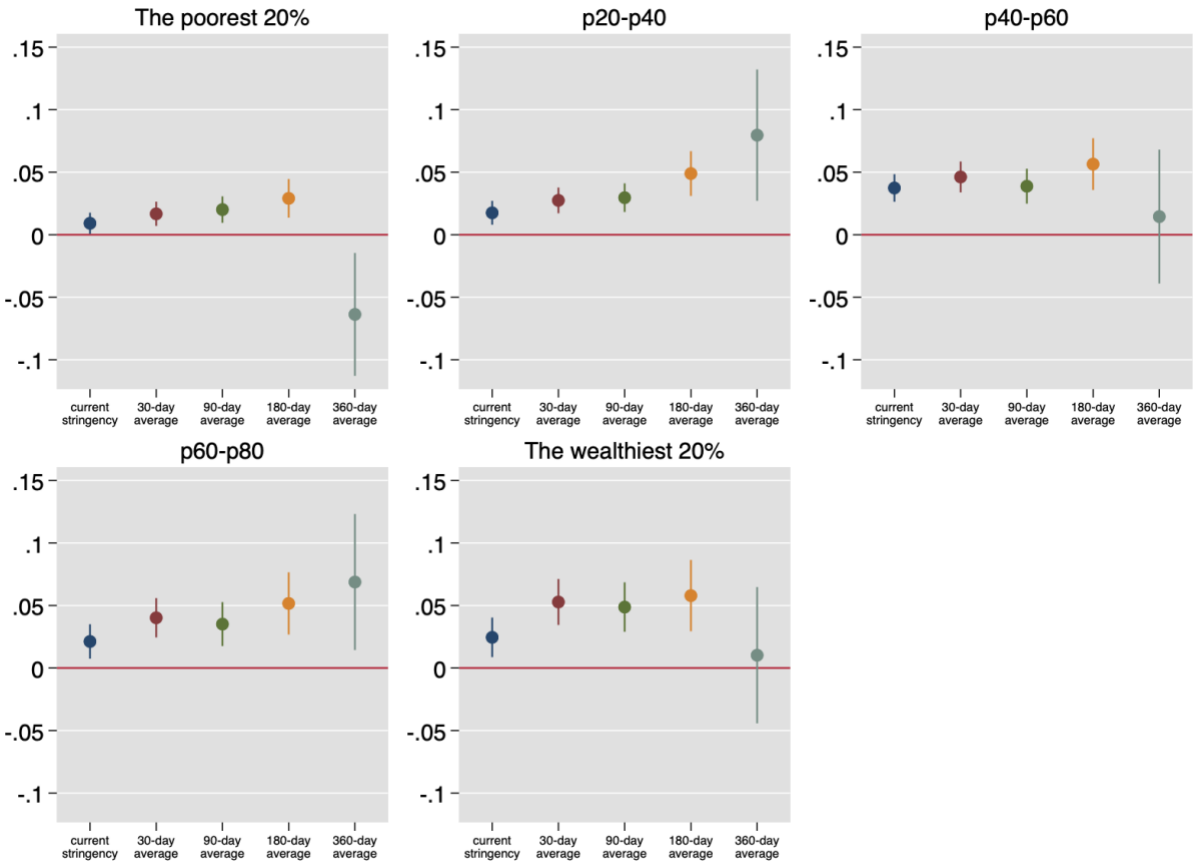
Note. Rescaled stringency variables. Covariates: age, sex, years of education, being married, household size, living in rural area, number of days since the start of the pandemic, wealthrank, month and country fixed effects.

Figure 4: Effect of stringency on selling assets by wealth groups



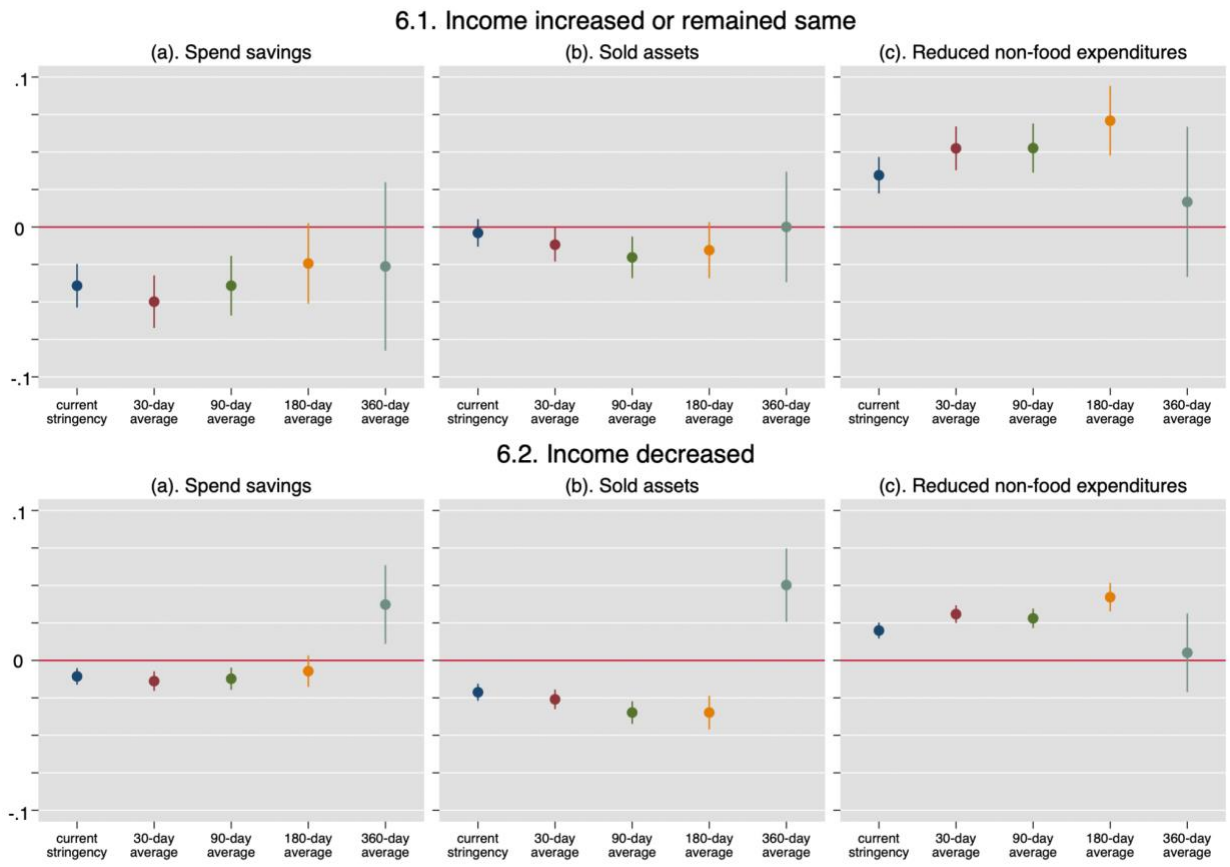
Note. Rescaled stringency variables. Covariates: age, sex, years of education, being married, household size, living in rural area, number of days since the start of the pandemic, wealthrank, month and country fixed effects.

Figure 5: Effect of stringency on reducing essential non-food expenditures by wealth groups



Note. Rescaled stringency variables. Covariates: age, sex, years of education, being married, household size, living in rural area, number of days since the start of the pandemic, wealthrank, month and country fixed effects.

Figure 6: Effect of policy stringency on coping mechanisms by change in income



Note. Rescaled stringency variables. Covariates: age, sex, years of education, being married, household size, living in rural area, number of days since the start of the pandemic, wealthrank, month and country fixed effects.