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How Did Urban Household Enterprises in Sub-Saharan Africa Fare during COVID-19?

Evidence from High-Frequency Phone Surveys

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Abstract

While the impact of COVID-19 on Sub-Saharan African labor markets is well documented, there is suggestive evidence that urban households may have fared particularly poorly. This paper uses data from high-frequency phone surveys in 27 Sub-Saharan African countries to investigate which kinds of urban household enterprises were most affected, what coping strategies were utilized, and heterogeneity by sociodemographic characteristics in the short and medium run. Using linear probability models, the paper finds that households that relied on income from non-farm enterprises were hit particularly hard during the early stage of the crisis, with 20-26 percent reporting income declines, and women experiencing even greater losses. Few coping strategies were utilized in the short run to counterbalance the loss of enterprise income. As the crisis progressed, wage employment recovered more quickly than self-employment, with faster gains for non-farm household enterprises, less poor households, and those headed by males and adults. Women, adults, and non-poor self-employed household heads were more successful at leveraging external sources of support early in the pandemic, but these supports largely dropped off by August 2020. These results demonstrate the vulnerability of non-farm household enterprises in urban Sub-Saharan Africa to the COVID-19 shock and highlight the need to expand publicly and privately financed coping mechanisms, particularly for women, youth, and poor household heads who are self-employed.

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Introduction

In Sub-Saharan Africa (SSA), the COVID-19 pandemic caused significant income loss, disrupted value chains, and reallocated resources toward short-term measures to fight the pandemic. While the health impacts of the illness were moderate, with the exception of South Africa, the economic impacts have been significant (Calderon and Kobata 2021). Mobility restrictions were widely implemented, severely disrupting economic activity, whether by preventing people from going to work and earning a wage or by prohibiting the self-employed from engaging in commerce (Khamis et al. 2021). Associated disruptions in supply chains, trade patterns, and fiscal spending further affected product markets and related jobs. The persistence of the disruptions, as the COVID-19 virus morphed into new strains, led to a long-term suppression of economic activity in SSA. The disruptions created by the pandemic pushed the region into the first recession in 25 years (Aga and Maemir 2021).

Urban non-farm household enterprises in SSA were particularly vulnerable to the shock. Recent high-frequency phone surveys in four African countries found that 86 percent of urban and rural non-farm household enterprises (NFHE) lost income due to the pandemic, as compared to 62 percent of farm households and 54 percent of wage-earning households (Contreras-Gonzalez et al. 2021). Khamis et al. (2021) found similar results using a larger sample, reporting that, when taking a simple average across nine countries in SSA, 82 percent of those with NFHE reported an income loss in the early stages of the crisis. This is particularly worrisome as most urban workers in Africa (70 percent, by ILO (2018) estimates) are engaged in mostly informal NFHEs. They are particularly vulnerable to COVID-19-induced shutdowns since they rarely have private risk management strategies due to their small size and low, irregular earnings (Guven et al. 2021). They also tend to not be connected to social protection systems, particularly in urban areas where the prevalence of safety nets and cash transfer programs has been meager as compared to rural Africa (Gentilini et al. 2021, Bossuroy et al. 2017). Finally, they are more affected by global economic fluctuations, compared to rural households, because of the nature of their economic activities being more exposed to international markets.

Within the NFHE sector, and the informal sector more generally, certain demographic groups may have experienced particular hardship. In the SSA region, 78 percent of employed women work in the non-farm informal sector, compared to 67 percent of men (ILO 2018). Employed women's work tends to be concentrated in face-to-face services (Madgavcar et al. 2020), including food service, hospitality, retail and wholesale, all of which were disproportionately affected during the shutdowns and mobility restrictions. Women were further saddled by an increase in home care[1] – tending to children whose schools had closed, caring for family members who were sick with COVID-19, and home production of goods and services that may have been difficult to procure due to the shutdowns and disrupted supply chains – that required diverting time and financial resources away from their businesses (Goldstein et al. 2020). Indeed, preliminary evidence from phone surveys from 40 developing countries finds that women were disproportionately affected by employment loss (Kugler et al. 2021). The same study suggests that

[1] https://blogs.worldbank.org/developmenttalk/global-state-small-business-during-covid-19-gender-inequalities

youth were also more likely to stop working and lose wage employment in the initial phase of the crisis, relative to adults, though bias due to the nature of the phone survey makes age differentials more difficult to measure. There is currently little systematic evidence on the distributional impacts of COVID-19 in Sub-Saharan Africa.

Furthermore, little is known about the medium-term impacts as the pandemic disrupted economies for more than a year. Kugler et al. (2021) finds a partial recovery in employment over the first six months of the crisis (April and August) was stronger for groups hit hardest by the crisis, such as women, less educated workers, and youth. But detailed information from Sub-Saharan Africa is difficult to obtain due to data limitations. The pandemic disrupted traditional data collection systems in many countries and alternative data sources such as administrative data are rarely available. While high-frequency phone survey data has compensated for such disruptions in several countries, these data are used to measure short-term dimensions, such as immediate shocks and short-term recovery measures.

Understanding how the COVID-19 crisis affected urban informal household enterprises and how the owners responded sheds light on the type of social policy interventions that can support this largely unserved population. This paper leverages High-Frequency Phone Surveys supported by the World Bank to estimate how COVID-19 affected the urban informal sector in 13 Sub-Saharan African countries in the short term and in 27 countries in the medium term. Specifically, we explore which types of urban household enterprises experienced a decline in farm or nonfarm income, which types of households utilized different coping strategies, the nature of the relationship between the use of coping strategies and income declines, and how these trends differed by gender and age of the household head as well as poverty status of the household. We consider these effects both at the beginning of the pandemic, as well as how patterns shifted throughout the first year of the pandemic.

There are six main findings regarding households with enterprises in the 13 sampled countries. First, households with non-farm enterprise income were 26 percentage points more likely than households with only wage income to report a decline in total household income. Similarly, households headed by non-agricultural self-employed workers were 20 percent more likely to report declines in total income than households headed by wage workers. Second, declines in non-farm enterprise income were 9 percent more prevalent among female headed households. Third, households that reported declines in farm income were 12 percentage points more likely than those that did not lose income to sell assets in response, as were male-headed households in comparison to female-headed households (by 11 percentage points). Fourth, households that reported losses to enterprise income were equally as likely as households that did not to report losses to receive public and private assistance. The least poor seemed to have had greater access to public and private assistance. Fifth, as the crisis progressed, wage employment recovered more quickly than self-employment and gains were faster for wealthier households and those headed by males and by adults. The gender labor force participation gap widened as men went back to work. Sixth, women, adults, and non-poor self-employed household heads were more successful than men, youth, and the poor at leveraging external sources of support early in the pandemic, but these

supports largely dropped off by August 2020 and all groups had low access to external support thereafter.

Overall, these results suggest that urban households relying on informal enterprises were particularly vulnerable to the COVID-19 crisis and may need further assistance to get back on their feet. While these households experienced significant income loss, neither public nor private income support was disproportionately directed to them. Enterprise-owning households that were poor, female-headed, and youth-led faced particular difficulties during the recovery.

1. Data and Definitions

We use data from Waves 1 through 11 of the High-Frequency Phone Survey (HFPS) that were supported and harmonized by the World Bank during the first year of the COVID-19 pandemic. The HFPS is a World Bank data collection initiative that sought to implement phone surveys in a variety of countries.[2] To construct the sample for the HFPS in each country, a random sample was drawn from a previously sampled household survey that provided cell phone numbers.[3] We use the data that were collected across the first year of the HFPS effort, from April 2020 to April 2021.

We use a subset of 13 African countries that include variables that allow us to identify urban households that own enterprises. Since the survey questionnaire differs between countries, we are not able to use all the HFPS data collected in SSA. We use only those surveys that include variables to identify urban household enterprises and income changes. We focus on urban households because they were more heavily affected by the crisis, due to their greater reliance on face-to-face economic interactions that were severely curtailed by lockdowns.[4] The countries in Sub-Saharan Africa that meet our criteria are Burkina Faso, Chad, Ethiopia, Madagascar, Malawi, Nigeria, São Tomé and Príncipe, Senegal, Sierra Leone, Somalia, South Sudan, Sudan, and Zimbabwe, representing 45 percent of the population of SSA (516 million people) in a range of countries from different parts of the continent, large and small economies, different levels of economic development, and large and small labor forces. While the sample is not representative of the Sub-Saharan Africa region, it does reflect the region's diversity.[5]

The HFPS is a nationally representative sample of households, with two important caveats. The HFPS includes weights that attempt to make the survey nationally representative of households. These weights are derived from nationally representative baseline surveys conducted prior to the crisis (Brubaker et al. 2021). However, the sampling frame has two major limitations. First, the survey excludes the portion of the population that were unwilling or unable to participate, for example because of lack of access to phones or a stable phone network.[6] Second, because

[2] https://www.worldbank.org/en/data/interactive/2020/11/11/covid-19-high-frequency-monitoring-dashboard
[3] The HFPS sample was not stratified by poverty status, social assistance receipt, or any other variable.
[4] As shown in Contreras-Gonzalez et al. (2021) and Kugler et al (2021), although rural households were affected by the pandemic (especially through increasing prices and inflation, as well as reduction in remittances), they were able to maintain a more stable farm income and cope with the crisis.
[5] Given the differences in how and when COVID-19 affected economies across Africa, we were unable to identify a weighting strategy so that the sample could be representative of the region.
[6] This may have been a small share since we focus on urban areas, which have quite high cell phone coverage in Africa.

existing nationally representative surveys were used as a sample frame, the respondents tend to be household heads and are therefore more likely to be male and older. As a result, indicators measured at the individual level, such as job type, are likely to be biased and differ from other nationally representative surveys.

The HFPS includes a range of questions related to the household and to the individual responding to the survey. Questions about the household include household characteristics and behaviors related to health, managing COVID-19 protocol, household income changes, education decisions, and strategies to manage income loss, among others. The variables that are most relevant for this paper are: urban status, ownership of a household enterprise, prevalence of income declines or increases, and coping strategies employed by the household. Urban status is determined based on the location of the household in the baseline survey and verified by the enumerator. Notably, the data set does not include a household roster or the work activity of its individual members. A single respondent per household provides information on behalf of the entire household. The respondent also answered basic demographic questions about himself or herself (age, sex) as well as his or her work activity (self-employed, worked in a family business, wage employee, temporary employee). The respondent was not asked about his or her wages or earnings.

We construct and use two alternative definitions to identify urban households that own enterprises in the HFPS data. **The first definition uses household-level variables.** We generate a variable that takes a value of 1 if (i) anyone in the household owns a business,[7] and (ii) the household received farm or nonfarm enterprise income during the 12 months prior to the survey. We call this the "household business definition." This definition allows us to differentiate between farm and non-farm entities, which are both relevant in urban SSA. We thus can classify a household into one of four categories: farm household enterprise (FHE) only, nonfarm household enterprise only (NFHE), farm and nonfarm household enterprise, and none. The data also allow us to explore heterogeneity by poverty-status of the household. The shortcoming of this definition is that we do not know the characteristics of the enterprise owner since the survey does not indicate if the enterprise owner is the survey respondent.

The second definition uses the employment type of household head respondents to identify that the household owns an enterprise and characteristics of the enterprise owner.[8] We would like to attribute changes in household enterprise earnings to characteristics of the owner, but the data do not allow us to directly observe these correlates. Further, the data do not provide information on the number of enterprises owned by a household nor on income changes in each enterprise.[9] By limiting the sample to respondents who are household heads and report that he or she is "self-employed," or "working in a family business," we attempt to address both shortcomings.[10] We only consider household heads because we assume that he or she owns the

[7] The HFPS asks whether the respondent or any member of the household owns or operates a business, even if only partial equity ownership.
[8] Only the single survey respondent per household provides information about his or her work activity, gender, and age and informs about the change in total income earnings from all the enterprises owned by the household (not the individual).
[9] The HFPS surveys ask respondents to report on household enterprise income loss at the household level, not their particular enterprise. Therefore, it is feasible that a respondent who reports loss of household enterprise income is informing on losses in a business owned by another household member rather than his or her own business.
[10] The HFPS question is: What is the type of your current employment?

most lucrative enterprise in the household, which is therefore likely responsible for most of the reported variation in household enterprise earnings.[11] Respondents who are self-employed also report basic demographic information, which allow us to consider age and gender of firm owners.[12] Thus, to identify if a household owns an enterprise, we generate a variable that takes a value of 1 if the respondent is (i) self-employed or works in a family business and (ii) a household head. When we consider demographics of the firm owner, we further limit the sample to only those respondents who are self-employed. The variable is treated as missing if the respondent is not a household head. We call this the "household head definition." Given the importance of separating farm and non-farm businesses in the analysis, we use the sector of employment of the respondent to limit the sample to only agricultural (or non-agricultural) enterprise when considering the behavior of farm (or non-farm) enterprises.

The outcome variables of interest are income changes and use of coping strategies. Some countries provide information on total income decline in the household, while others ask about income decline in farm enterprises, non-farm enterprises, and wage earners. The respondent provides a subjective response to the perception of income change since the pandemic began; the results are not triangulated with actual earnings data. We use four variables to capture the use of coping strategies: sold assets, received cash or in-kind assistance from government entities, received cash or in-kind assistance from private (non-governmental) entities, and received any kind of assistance from any entity. These variables are reported at the level of the household. Again, they are subjective responses that are not triangulated with data monitoring actual use of coping strategies. Each variable is asked separately; none are imputed. Not all variables are included in the surveys of all countries in the sample. The variables of interest that are reported for each country are provided in Annex A.

We use both definitions to identify enterprise-owning households in the analysis. The household business definition provides greater precision on the presence of an enterprise in the household (farm or non-farm) and income changes attributable to those enterprises. The household head definition, when limited to respondents who are self-employed, allows us to observe how trends differ by gender and age of a household head who is likely to be the owner of a household enterprise (farm or non-farm). We use a broad definition of household enterprise, which includes both a recognized household enterprise as well as self-employed service providers, namely casual workers who are not in an employer-employee relationship.[13]

We also use a subset of HFPS data from 27 Sub-Saharan African countries to explore how households fared in the first year of the pandemic. In this exercise, we are interested in how

[11] Using the first wave of the HPFS data, heads comprise 75 percent of the respondents in the sample and 79 percent of heads are self-employed or work in a family business.

[12] The gender composition of the sample reflects that of data reported for female self-employed household heads in the same 11 countries in the Global Monitoring Database (GMD). Specifically, women are 32 percent of the GMD sample and 27 percent of the HFPS survey. The average age is the same between surveys for women (45 years) while HFPS men are three years older than men in the GMD sample. Women's households are 0.5 people smaller (4.6) among HFPS female heads than GMD female heads while men's households are 0.2 people larger in the HFPS, as compared to male heads who are self-employed in the GMD data.

[13] Nearly all respondents identified as living in a household that owns an enterprise (household Business Definition) also report being self-employed. However, 25 percent of those who report being self-employed do not identify as living in a household that owns an enterprise. We may understand the latter as casual workers who are not employees and also do not consider themselves as owning a business, such as freelance construction workers.

business owners with different characteristics evolved throughout the pandemic, so we use the household head definition. This allows us to add 14 countries to the sample, which had been excluded from the short-term analysis due to a lack of data on variables necessary for those exercises. The 27 countries included in the larger sample are home to more than 78 percent of all Sub-Saharan Africans.[14]

2. Methodology

The analysis focuses first on the initial impacts of the crisis and then on the medium-term effects. First, using samples derived from both the household business and household head definitions, we explore how they fared during the early period of the pandemic by looking at changes in income, the use of coping strategies, and the extent to which use of coping strategies are associated with income declines.[15] Second, using a sample generated by the household head definition,[16] we look at the medium-term impacts of the pandemic by exploring the prevalence of household enterprises, income decline and coping strategies changes during the first year of the pandemic, namely April 2020 through April 2021. In both exercises, we pay particular attention to differential effects by household welfare, and when using the household head definition, by gender and age of the head. Since we are working with cross-sectional, recall data, our results are limited to correlations of events occurring within a defined time period.

Table 1: Data from the first wave of the survey in each country, and month of the first pandemic-induced lockdown (2020)

Country	Month of first lockdown	Month of first survey wave	Share of respondents who are heads (%)	Included in HH business sample	Included in household head def
Burkina Faso	March	June	87.3	---	X
Chad	April	June	n/a	X	---
Ethiopia	April	April	84.4	X	X
Madagascar	March	June	67.6	X	X
Malawi	April	June	97.2	X	X
Nigeria	March	April	82.3	X	X
São Tomé and Príncipe	N/A	July	100	---	X
Senegal	March	May	100	---	X
Sierra Leone	April	July	60.6	X	X
Somalia	March	July	n/a	X	---
South Sudan	March	June	54.4	X	X
Sudan	March	June	59	X	X
Zimbabwe	March	June	100	X	X

Source: HFPS data, Our World In Data. Month of first lockdown based on first appearance of stay-at-home restrictions. n/a indicates that the data are not available and --- indicates that the country is not included in the sample of countries generated by the corresponding definition.

[14] The countries with multiple waves are Burkina Faso, the Central African Republic, the Democratic Republic of Congo, the Republic of Congo, Ethiopia, Gabon, Ghana, Guinea, The Gambia, Kenya, Madagascar, Mali, Mozambique, Mauritius, Malawi, Niger, Nigeria, Sudan, Senegal, Sierra Leone, Somalia, South Sudan, São Tomé and Principe, Chad, Uganda, Zambia,Zimbabwe.
[15] The WHO declared COVID-19 to be a global pandemic on March 11, 2020.
[16] We only use the household head definition of a household enterprises since this exercise focuses on how different groups were affected, and adapted, during the first year of the pandemic.

2.1 Early impacts of the pandemic

We hypothesize that urban household enterprise income fell, few coping strategies were utilized, and women, youth and the poor were disproportionately affected by the COVID-19 shock. The HFPS data do not allow us to observe the extent of income declines, though there is a measure of their prevalence. We expect that income declines were more prevalent among urban household enterprises than urban households that rely on other sources of income. We also expect that the disproportionate negative income impacts on women, youth and the poor that were observed in other studies will emerge in these data. Finally, given the scarcity of public and private support such as insurance or safety nets in urban Sub-Saharan Africa (Guven et al. 2022), we expect that few household enterprises were able to access these tools or to use them to offset the impact of the pandemic.

To analyze the early impact of the pandemic on enterprise income and use of coping mechanisms, we pool information from the first wave of the HFPS for the 13 countries in the sample and estimate linear probability models. The sample is restricted to people who were employed and report information on income decline. Table 1 shows the month of the lockdown, month of the first survey wave, and the share of respondents that are household heads. Most countries locked down in March or April 2020, while most data were collected one to three months after the first lockdown. Due to slight differences in the questions included in each country survey, the subset of countries differs by definition and across empirical exercises. We use the household sample weights.

We carry out four empirical exercises to better understand the initial impacts of the crisis. We estimate each model for the sample derived from each of the two definitions of household enterprises described above. In each case, observations are weighted using the survey weights included in the HFPS.

First, we examine if the incomes of urban households with enterprises changed in the first months of the COVID-19 pandemic, relative to urban households without household enterprises. The exercise uses the full sample to assess if households with enterprises have differential propensity of income loss compared to households that do not run an enterprise. We estimate a LPM that takes the following general form:

$$Y_{hpc} = \alpha + \beta E_{hpc} + \theta G_{hpc} + \delta X_{hpc} + \gamma I_{pc} + \varepsilon_{hpc} \quad (1)$$

Y_{hpc} takes the value 1 if the household (*h)* in province *p* within country *c* reported a decline in total income since the pandemic started and 0 if it did not.[17] As noted above, the data only provide the binary dummy; there is not information on the magnitude of the change in income.

E_{hpc} is a vector of dummy variables for the type of employment (when using the household head definition) or the type of enterprise (when using the household business definition). The vector for the type of head employment are farm self-employed,[18] non-farm self-employed, wage employees,

[17] The survey question is: "Has your Total Household Income changed since the pandemic started?"
[18] Although the category is "self-employed or works in a family business", we shorten it to "self-employed" for ease in presentation

and seasonal/temporary workers. The vector for the type of enterprise is farm, non-farm, farm and non-farm, and no enterprise.

G_{hpc} is a vector of dummy variables for income group of the household, proxied by imputed household welfare measures.[19] We construct four levels of income, based on the World Bank's new poverty thresholds: below 2.15 USD-a-day, between 2.15 and 3.65 USD-a-day, between 3.65 and 6.85, and above 6.85, in 2017 PPP terms (Jolliffe et al. 2022). The imputation method and validation of the poverty proxy is provided in Annex B.

X_{hpc} is a vector of individual characteristics of the respondent, comprising gender and age. Age is defined as a binary variable, where "adults" are older than 24 years of age and "youth" are between 16 and 24 years old. Unfortunately, the data do not include information on the education level of the respondent. This vector is only relevant when using the household head definition.

I_{pc} are fixed effects specified at the provincial-country level.[20] ε_{hpc} is a standard classical error term clustered on country and province.

Second, we examine which types of household enterprises were more economically affected by the COVID-19 pandemic, according to estimated household welfare and characteristics of the owner.[21] Again, we estimate an LPM. This specification differs from Equation (1) in that we drop the *E* vector, limit the sample to household with enterprises (or are self-employed, when using the household head definition), and use a different dependent variable. The LPM specification is:

$$Y_{hpc} = \alpha + \beta G_{hpc} + \delta X_{hpc} + \gamma I_{pc} + \varepsilon_{hpc} \quad (2)$$

We use two outcome variables: decline in farm income and decline in non-farm income.[22] First, Y_{hpc} takes the value 1 if the household (*h)* in province p within country *c* reported a decline in farm income since the pandemic started and 0 if it did not. Second, Y_{hpc} takes the value 1 if the household (*h)* in province *p* within country *c* reported a decline in non-farm income since the pandemic started and 0 if it did not. The vectors G_{hpc}, X_{hpc},and I_{pc} are defined as in Equation (1).

We estimate this model in two samples. First, we use the household business definition of urban household enterprise to estimate how farm and non-farm household enterprise income changes by poverty status of the household. We restrict the sample to households owning a farm business when modeling declines in farm income, and similarly to households owning a nonfarm business when modeling declines in nonfarm income. This model does not include the X vector control variables. We then use the household head definition of urban household enterprise and include the X vector to explore how farm and non-farm income changes among the self-employed who

[19] We use the survey-to-survey imputation method. Using household surveys with individual level data, we run a model for each country where the welfare measure is the dependent variable (per capita consumption) controlling for demographic characteristics. Then we use the coefficients of the regression to predict the welfare level in the HFPS. The variables used to impute the poverty proxy are not included in the control variables in the regression.

[20] The survey asks for location at the 1st level administrative unit. We would have preferred to control for fixed effects at the city level to allow for differences between capital and secondary cities, but the data do not include a city variable.

[21] The exercise only observes change in enterprise earnings so we cannot rule out that factors other than the pandemic affected enterprise income. However, given the magnitude of the pandemic shock, it is likely that the pandemic played a significant role.

[22] The survey questions are: (i) "Has this source of household income changed since last 12 months?": Family farming, livestock or fishing, and (ii) "Has this source of household income changed since the pandemic started?": Non-farm family business.

have different characteristics. We restrict the sample to self-employed who work in the agriculture sector when modeling declines in farm income and to self-employed working in services, manufacturing, or other sectors (which excludes agriculture) when modeling declines in non-farm income.[23]

Third, we identify which coping mechanisms were used in the first months of the pandemic, and how this varied across different types of respondents and households. The specification is similar to (2) with a different dependent variable, and two additional independent variables indicating farm and nonfarm ownership. We use the full sample to assess if households with enterprises (or who have a self-employed head) have differential propensity of use of coping strategies compared to households that do not run an enterprise. The following LPM specification is used:

$$Y_{hpc} = \alpha + \beta_F F_{hpc} + \beta_{NF} NF_{hpc} + \beta_G G_{hpc} + \delta X_{hpc} + \gamma I_{pc} + \varepsilon_{hpc} \quad (3)$$

We use four outcome variables to proxy coping mechanisms. First, Y_{hpc} takes the value 1 if the household sold assets during the pandemic and 0 if it did not. Second, Y_{hpc} takes the value 1 if the household received cash or in-kind assistance from a private source, and 0 if it did not. Third, Y_{hpc} takes the value 1 if the household received either cash or in-kind assistance from a public source during the pandemic and 0 if it did not. Finally, Y_{hpc} takes the value 1 if the household received any form of assistance from public or private sources – cash, in-kind, informal finance, other services, etc. – since the start of the pandemic and 0 if it did not.[24]

We estimate model (3) for the samples created using the two definitions of household enterprise. We use the control variables in model (2) and add two indicator variables - whether the household owned a farm (F_{hpc}) or a nonfarm business (NF_{hpc}) - to control for systematic differences in the coping behaviors of households that have farm-based businesses as compared to those with non-farm businesses, or some combination. These two variables are constructed using information on whether the household received these sources of income since the start of the pandemic. For the household head definition, we consider the business as a farm business if the head reports working in agriculture and a non-farm business if the head reports another sector. When using the household business definition of household enterprise, we drop the X_{hpc} vector from equation (3).[25]

Finally, we estimate the correlation between the use of coping strategies and income declines to shed light on whether coping strategies may have mitigated the adverse income impacts

[23] Conditioning on sector of self-employment when considering declines in farm or non-farm income does not ensure that the decline in income is due to the respondent's firm. However, it eliminates clear mis-designations since, for example, a decline in farm income cannot reflect income changes in the enterprise of a head who reports self-employment in the service sector. Instead, in this example, the decline in farm income is due to another household member's enterprise, who we do not have demographic information about.

[24] The surveys asked separate questions about receipt of public, private, or any sources of support. The "any" category is not imputed from the response to public and private sources. Instead, it is a reflection of the respondent's perception of the total package of support, which may include factors that were not included in the private or public responses, or it may overlook types of support that had been reported in the public or private support responses.

[25] The specification for the household enterprise definition is: $Y_{hpc} = \alpha + \beta_F F_{hpc} + \beta_{NF} NF_{hpc} + \beta_G G_{hpc} + \gamma I_{pc} + \varepsilon_{hpc}$

during the pandemic. This question brings together the previous specifications into a single model. Again, we estimate an LPM of the following form:

$$Y_{hpc} = \alpha + \beta_F DF_{hpc} + \beta_{NF} DNF_{hpc} + \beta_q G_{hpc} + \delta X_{hpc} + \gamma I_{pc} + \varepsilon_{hpc} \quad (4)$$

Model (4) uses the same four outcome variables used in model (3), estimating the correlates of different coping strategies. Since we are interested in the relationship between enterprise income declines and coping mechanisms, the sample is limited to self-employed heads or households with enterprises. The variable DF_{hc} takes a value of 1 if earnings from a farm household enterprise declined compared to the period immediately before the pandemic started, while the variable DNF_{hc} takes a value of 1 if a non-farm household enterprise's income declined. Thus, the coefficients β_F and β_{NF} represent the conditional correlation between an income decline and the prevalence of different coping mechanisms. The other control variables are the same as in model (3).

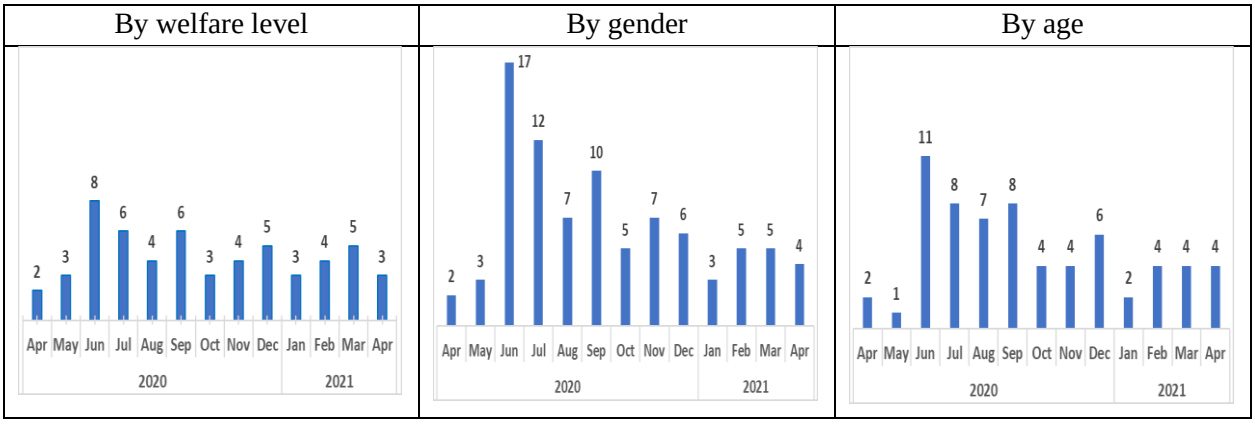
2.2 Evolving impacts of the pandemic

The impacts of the COVID-19 crisis varied over time. We hypothesize that the share of household enterprises, captured by the share of self-employed workers or people working at a family business, fell in the first months of the pandemic when mobility constraints were imposed, and slowly recovered as the pandemic ran its course and mobility constraints were lifted.

We use the larger sample of HFPS data from 27 countries and 11 waves covering 13 months from March 2020 to April 2021. We only use the household head definition so that we can estimate how business owners with different characteristics evolved throughout the pandemic. In this exercise, the weights are normalized such that each country is given equal weight, to prevent estimates from being skewed towards populous countries. The results should therefore be interpreted as a simple average across included countries. For comparison purposes, we also estimate the trends of wage earners and of the non-working population.

The timing of the survey varied by country. Figure 1 shows the number of countries with available information by month. At the beginning of the analysis period, we only have information for two countries. In the subsequent months, the number of countries included in the analysis increase to 17 for the June 2020 wave (when disaggregating by gender) and oscillates between 2 and 17 in the following months.

Figure 1. Countries with available data by month, by owner characteristics



Source: HFPS.

We explore the hypothesis that impacts declined over time by estimating the following logit model:

$$\Pr(Y_{hpct}) = \alpha X_{hpc} + \beta f(t) + \delta f(t) * X_{hpc} + \theta_{pc} + \varepsilon_{hpct} \quad (5)$$

Y_{hpct} is a binary variable that takes a value of 1 if the respondent is self-employed or works in a family business, and 0 otherwise, in household *h*, province *p* and country *c*, and month *t*. The term *f(t)* in the right-hand side is the cubic polynomial of time (in months) that we interact with different socio-demographic or economic variables (one at a time), represented by X_{hpc}. We use a cubic polynomial to strike a balance between precision and flexibility. We present results of the evolution of the probability of self-employed or family business by gender and age of the household head and by welfare level of the household; the full estimates are available from the authors. The term θ_c captures country fixed effects. β and δ are the parameters of interest which captures the evolution of the outcome Y_{hpct} for groups defined by gender, age, or welfare level relative to the baseline period (March 2020). We run similar models using the share of wage employees and the share who are not working as outcome variables, as well as using indicator variables for income loss and the use of coping strategies.

3. Descriptive Statistics

Three-quarters of the sample report owning a household enterprise, regardless of the definition used. Table 2 shows the distribution of observations using the household business definition and data from wave 1 of the HFPS from 10 countries.[26] An estimated 73 percent of urban households own some kind of family business. Forty-two percent of them own a nonfarm

[26] The 10 countries with available information are Chad, Ethiopia, Madagascar, Malawi, Nigeria, Sierra Leone, Somalia, South Sudan, Sudan, and Zimbabwe.

business only, 11 percent own a farm business only, and the rest own both. An estimated 26 percent of the pooled sample households do not own a business of any type.

Table 2. Distribution of household business ownership (household business definition)

	Share (%)	Observations	Countries
Owns a business	73	3008	11
Farm business	11	3008	11
Nonfarm business	42	3008	11
Farm & Nonfarm business	20	3008	11
Does not own a business	26	3008	11

Source: Own calculations based on HFPS-Wave 1.
Notes: Urban observations only. Countries include Chad, Ethiopia, Madagascar, Malawi, Nigeria, Sierra Leone, Somalia, South Sudan, Sudan, Zimbabwe.

These patterns are similar when using the household head definition to identify household enterprises. Table 3 presents the distribution of respondent employment type from wave 1 of the HFPS from 11 countries.[27] Most respondents are self-employed, from which we infer that they own or work in a household enterprise (79 percent). An estimated 58 percent the sample are self-employed in non-agriculture sectors, similar to the estimates using the household business definition. The remaining observations correspond mainly to wage employees (19 percent).[28]

Table 3. Distribution of Urban Household Enterprises (Household Head Definition)

	Share (%)	Observations	Countries
Self-employed/Family agricultural business	21	2,812	11
Self-employed/Family non-agricultural business	58	2,812	11
Wage employee	19	2,812	11
Seasonal or Temporary workers	2	2,812	11

Source: Own elaboration based on HFPS-Wave 1. Notes: Urban observations only. Countries include Burkina Faso, Ethiopia, Madagascar, Malawi, Nigeria, Sudan, Senegal, Sierra Leone, South Sudan, Sao Tome and Principe, Zimbabwe.

Income declines were most prevalent among households that owned a non-farm business, which are also the vast majority of households. Among households that own a business, those with non-farm businesses were most likely to experience an income decline (88 percent) as compared to 78 percent of those with only a farm business (Table 4). If we consider a slightly larger sample of countries that asked about farm and non-farm income declines (9 versus 3 countries) or a decline in business revenue, we see the same trends: greater incidence of income loss among nonfarm enterprises (83 percent and 82 percent, respectively) than farm enterprises (46 percent and 55 percent, respectively).

[27] The list of countries is similar to that when using the household business definition with five exceptions: data from Burkina Faso, São Tomé & Príncipe, and Senegal are added while data from Chad and Somalia are dropped.
[28] The share of self-employed is much higher in the HFPS sample than in comparable samples before the pandemic, when more than half the sampled household heads reported being wage workers. This may reflect that job loss was higher among wage workers than among the self-employed at the onset of the pandemic or other characteristics of the survey that were not corrected by the weighting.

Similar results are observed when considering the sample of household heads who own (or work in) a household enterprise, namely income declines were most prevalent among heads owning a non-farm business. While 75 percent of the sample of household heads experienced a decline in income, 83 percent of those who are self-employed or working in a family enterprise report household income loss as compared to 55 percent of those who are wage employees (Table 5). As in the sample that uses the household business definition, owners of non-farm household enterprises are more likely to experience an income decline than those that own farm businesses (89 versus 68 percent) (Table 5).

Table 4. Share of urban household reporting income decline and use of coping strategies since the start of the pandemic (Household Business Definition) [29]

	All	Farm business	Non-farm business	Farm and Non-farm business	No enterprise ownership	Countries[30] (count)
Share Reporting an Income change, by source of income						
Total income decline	0.8 (0.033)	0.78 (0.074)	0.88 (0.042)	0.75 (0.026)	0.72 (0.105)	3
Farm income decline	0.55 (0.045)	0.46 (0.087)	n/a	0.47 (0.093)	n/a	9
Nonfarm income decline	0.84 (0.024)	n/a	0.83 (0.033)	0.83 (0.046)	n/a	9
Own business revenue decline	0.7 (0.035)	0.55 (0.081)	0.82 (0.038)	0.72 (0.069)	n/a	9
Wage income decline	0.5 (0.049)	0.58 (0.113)	0.51 (0.114)	0.47 (0.132)	0.51 (0.118)	9
Share reporting Coping strategies, by type of coping strategy						
Sold assets	0.05 (0.02)	0.06 (0.065)	0.03 (0.03)	0.04 (0.021)	0.08 (0.07)	4
Private assistance (cash or in-kind)	0.06 (0.015)	0.04 (0.013)	0.05 (0.019)	0.09 (0.05)	0.04 (0.021)	7
Public assistance (cash or in-kind)	0.07 (0.035)	0.03 (0.018)	0.03 (0.01)	0.05 (0.026)	0.05 (0.023)	7
Any assistance from any source	0.22 (0.055)	0.21 (0.132)	0.18 (0.118)	0.23 (0.117)	0.21 (0.134)	8

Source: Own calculations based on HFPS-Wave 1.

Notes: Urban observations only. Standard errors in parentheses. n/a indicates that the statistic is not relevant for that cell, namely households that do not own an enterprise cannot report on income declines in a household enterprise.

[29] The survey questions are: (i) "Has your Total Household Income changed since the pandemic started?" (ii) "Has this source of household income changed since last 12 month: Family farming, livestock or fishing?", (iii) "Has this source of household income changed since the pandemic started: Non-farm family business?", (iv) "Has this source of household income changed since the pandemic started: Wage employment of household members?", and (v) "If someone in the household own a business, has the revenue from that business decreased since the pandemic started?"

[30] Countries included: **Total income decline** (Ethiopia, Malawi, Nigeria), **Farm/nonfarm, wage** income and **business revenue** decline (Ethiopia, Madagascar, Malawi, Nigeria, Sudan, Sierra Leone, Somalia, South Sudan, Chad), **Sold assets** (Ethiopia, Nigeria, Sudan, South Sudan), **Private assistance** (Ethiopia, Madagascar, Malawi, Nigeria, Sudan, Somalia, Chad), **Public assistance** (Ethiopia, Madagascar, Malawi, Nigeria, Sudan, Somalia, South Sudan), **Any assistance from any source** (Ethiopia, Madagascar, Malawi, Nigeria, Sudan, Sierra Leone, South Sudan, Chad).

Access to support or assistance was low across all households but slightly more common among families owning both types of businesses. Approximately 22 percent of households enjoyed some kind of support. Families owning both types of businesses had a slightly higher propensity (23 percent) to receive assistance from any source, as compared to households with only farm or non-farm (or no) enterprises (Table 4). Families owning any type of business or owning both were more likely to receive assistance from a third party --i.e., the government, family, friends, whereas families not owning a business coped by drawing down (selling) their own assets or government assistance.

Table 5. Income change and use of coping strategies since the start of the pandemic (Household Head Definition)

	All	Self-employed agricultural enterprise	Self-employed non-agricultural enterprise	Wage employee	Countries[31]
Share Reporting an Income change, by source of income					
Total income decline	0.75 (0.078)	0.68 (0.126)	0.89 (0.060)	0.55 (0.190)	4
Farm income decline	0.51 (0.052)	0.47 (0.100)	0.51 (0.050)	0.42 (0.097)	7
Nonfarm income decline	0.83 (0.024)	0.74 (0.046)	0.85 (0.040)	0.84 (0.033)	8
Own business decline	0.70 (0.044)	0.60 (0.075)	0.79 (0.050)	0.73 (0.071)	8
Wage income decline	0.46 (0.056)	0.36 (0.095)	0.51 (0.060)	0.29 (0.071)	8
Share reporting Coping strategies, by type of coping strategy					
Sold assets	0.06 (0.025)	0.08 (0.062)	0.06 (0.030)	0.09 (0.062)	4
Private assistance (cash or in-kind transfer)	0.06 (0.019)	0.06 (0.032)	0.07 (0.050)	0.08 (0.037)	6
Public assistance (cash or in-kind transfer)	0.02 (0.007)	0.02 (0.010)	0.02 (0.010)	0.04 (0.012)	6
Any assistance from any source	0.17 (0.052)	0.20 (0.119)	0.21 (0.119)	0.18 (0.096)	8

Source: Own calculations based on HFPS-Wave 1.

Notes: Sample limited to urban household heads. Nonfarm (farm) income is reported for agricultural (non-agricultural) enterprises since income is reported at the household level while the source of income is only defined for the household head. Similarly for reported changes in income for wage employees.

[31] Countries included: **Total income decline** (Ethiopia, Malawi, Nigeria, Senegal), **Non-farm income** (Ethiopia, Malawi, Nigeria, Sudan, Senegal, Sierra Leone, South Sudan, Zimbabwe), **Farm income** (Ethiopia, Malawi, Nigeria, Sudan, Sierra Leone, South Sudan, São Tomé and Príncipe), **Business revenue** (Burkina Faso, Ethiopia, Malawi, Nigeria, Sudan, Sierra Leone, South Sudan, Zimbabwe), **Wage income** (Ethiopia, Malawi, Nigeria, Sudan, Senegal, Sierra Leone, South Sudan, Zimbabwe), **Sold assets** (Ethiopia, Nigeria, Sudan, South Sudan), **Private assistance** (Burkina Faso, Ethiopia, Malawi, Nigeria, Sudan, Zimbabwe), **Public assistance** (Ethiopia, Malawi, Nigeria, Sudan, South Sudan, Zimbabwe), **Any assistance from any source** (Burkina Faso, Ethiopia, Malawi, Nigeria, Sudan, Sierra Leone, South Sudan, Zimbabwe).

Similar results hold when using the head definition. When restricting the sample to household heads, a slightly higher share of heads who are self-employed (20 - 21 percent) receive assistance compared to those who are wage earners (18 percent). All other kinds of assistance are nearly equally received by self-employed/family enterprises as compared to wage earners, with the latter being 1-2 percentage points more likely to sell assets, receive government assistance, or receive cash or in-kind support from a private contributor (Table 5). Asset sales are low, though 9 percent of wage-earning household heads and 8 percent of household heads owning an agricultural enterprise sold assets. In contrast, 6 percent of non-agricultural self-employed sold assets.

The summary statistics suggest that households owning an enterprise, especially a non-farm enterprise, are more likely than non-enterprise owning households to experience income loss, and they depend more on external support to cope with shocks than households without enterprises. These results are robust to the definition used to identify household enterprise. That said, the sample size does not allow us to test if the averages differ across groups. As the literature suggests, though, some sub-groups of household enterprise owners may be particularly susceptible to income losses or to using particular coping strategies. We further explore these correlations using regression analysis below.

4. Early Impacts of the Pandemic on Income and Use of Coping Strategies

In line with the analysis presented in section 3, in the first wave of the pandemic, households with enterprises, particularly non-farm enterprises, were more likely to report total income declines as compared to those without enterprises. Table 6 shows the correlates of income declines from linear probability models when pooling data from the three countries with complete data: Ethiopia, Malawi, and Nigeria. The estimates suggest that, controlling for household welfare, owning a non-farm business increases the likelihood of total income decline by 26 percentage points in comparison to households not owning a business of any kind.[32] The correlations were not statistically significant for households with farm businesses.

The same trends emerge when using the household head definition of urban household enterprise. Controlling for poverty and demographic characteristics, self-employed heads of non-agricultural enterprises are about 20 percentage points more likely on average to have reported declines in total income than wage workers (Table 6). This reiterates the importance of separately analyzing urban agricultural and non-agricultural household enterprises.

Adult heads were disproportionately likely to report income losses while gender differences were small. Controlling for poverty, the results show that adult-led households are 30 percentage points more likely to experience a decline of household revenue than are heads of younger households (Table 6). This may reflect the larger size of older households that may have more people of working-age and a more diversified household labor portfolio, so the joint probability of an income loss may be greater than in smaller households. The gender coefficient is small and not statistically significant, signaling that female-led households fared similarly to those headed by males, with an average of 60 percent of households losing income, given the controls. While

[32] The results are similar when controlling for industrial sector (manufacturing, services, agriculture, and other).

income losses were greatest among the poorest households, the estimates are not statistically significant.

Table 6. Correlates of Total Income Decline

	Total income decline	
Sample	Household Head's Work and Sector	Household Business Sector
Self-employed, farm	-0.069	
	[0.102]	
Self-employed, non-farm	0.197	
	[0.080]**	
Temporary/seasonal workers	0.348	
	[0.071]***	
Own farm business		0.101
		[0.111]
Own non-farm business		0.262
		[0.091]***
Own farm and non-farm business		0.167
		[0.090]*
Between $2.15 and $3.65	-0.145	-0.058
	[0.153]	[0.115]
Between $3.65 and $6.85	-0.029	-0.015
	[0.124]	[0.088]
Above $6.85	-0.030	-0.016
	[0.132]	[0.098]
Female	-0.005	
	[0.049]	
Adult	0.294	
	[0.129]**	
Constant	0.605	0.715
	[0.177]***	[0.109]***
Countries	ETH, MWI, NGA	ETH, MWI, NGA
Observations	972	1,106
R-squared	0.257	0.178

Robust standard errors in brackets. Omitted categories: Wage employee, less than $2.15, male, young, don't own business.

*** p<0.01, ** p<0.05, * p<0.1

Which types of household enterprises were more likely to report income declines?

We now limit the sample to household enterprises and the self-employed. We continue to use both definitions of household enterprises. The household business definition allows us to look into differences among farm and non-farm enterprises, while the household head definition also allows us to explore how gender and age of self-employed household heads are correlated with the propensity of income declines. Table 7 shows the correlates of farm and non-farm income declines from linear probability models when pooling data from the four countries with complete data:

Ethiopia, Malawi, Nigeria, and Sierra Leone. Zimbabwe is also included in the sample when using the household business definition of a household enterprise.

The poorest households were most likely to report enterprise income declines. The households in the top three income groups were less likely to report a loss in enterprise income since the pandemic began relative to the poorest income group (Table 7). This result is observed both for households owning farm and non-farm enterprises and for both definitions of household enterprise. That said, none of the coefficients are statistically significant.

Female-owned enterprises were more likely to experience income loss than those owned by men. When controlling for welfare level, male household heads, who are a proxy for male owners of non-farm enterprises, were 10 percentage points less likely than women to lose income (Table 7). While urban male farm enterprise owners are 3.6 percentage points less likely than women to experience business income loss, the difference is not statistically significant.

Income loss by age differed by firm type, but the estimates are not statistically significant. Using the sample based on the household head's job definition, we see that self-employed heads that are adults (age 25 or older) were nearly 3 percentage points less likely to suffer a decline in farm income than young owners (18 to 24 years old). Yet they are 8 percent more likely to experience a decline in non-farm enterprise income (Table 7). Neither estimate is statistically significant.

Table 7. Correlates of reported household enterprise income decline

	Household Head Definition		**Household Business Definition**	
Sample	agricultural self-employed	non-agricultural self-employed	Own farm enterprise	Own non-farm enterprise
Dependent variable	Farm income decline	Nonfarm income decline	Farm income decline	Nonfarm income decline
Between $2.15 and $3.65	-0.402	-0.215	-0.040	-0.101
	[0.209]*	[0.115]*	[0.406]	[0.079]
Between $3.65 and $6.85	0.064	-0.085	-0.135	-0.024
	[0.091]	[0.083]	[0.401]	[0.084]
Above $6.85	-0.247	-0.076	-0.211	-0.056
	[0.135]*	[0.091]	[0.414]	[0.080]
Adult	-0.029	0.084		
	[0.194]	[0.112]		
male	-0.036	-0.103		
	[0.051]	[0.046]**		
Constant	1.135	1.071	0.666	1.054
	[0.166]***	[0.112]***	[0.402]	[0.077]***
Observations	105	595	447	1,131
R-squared	0.330	0.338	0.288	0.238
Countries	ETH,MWI, NGA,SLE	ETH,MWI,NGA, SLE,ZWE	ETH,MWI, NGA, SLE	ETH,MWI,NGA, SLE,ZWE

Source: HFPS-Wave 1.

Notes: Urban observations only. Adult defined as 25 years old or more. Omitted categories: Below 2.15 USD-a-day. Robust standard errors clustered at the subnational geographic units between brackets. *** significant at 1%, ** 5%, * 10%.

Which coping mechanisms were used by which kinds of urban households that own enterprises?

Turning to the use of coping strategies, Table 8 shows results from an analysis of the correlates of household and household head characteristics and coping strategies. Information on coping strategies differed across surveys. As a result, the sample used to estimate each type of coping strategy differs. Asset sales were only reported for Ethiopia and Nigeria. Private and public assistance cash and in-kind transfers were also reported in Malawi. Sierra Leone's survey also includes information on receiving any kind of support from any source.

Households owning non-farm enterprises were less likely to use any coping strategy from any source, as compared to those that did not own an enterprise. Table 8 shows that households owning a non-farm businesses were roughly 8 percentage points less likely to employ any coping strategy as compared to households that do not own enterprises. The estimate is similar when using the household head definition, though not statistically significant. Households owning farm enterprises are not statistically different than non-enterprise owners in their use of coping strategies from any source. These patterns are consistent with the unconditional estimates, which showed very small difference in means.

There is a weak correlation between owning a farm business and selling assets, unlike households owning non-farm businesses. Households that owned a farm business – perhaps by the household head or perhaps through another household member – were 3 percentage points more likely to sell assets than households that do not own an enterprise. The correlation is only significant at the 10 percent level (Table 8). The trends may reflect greater ownership of sellable assets in farm business households that are not captured by the poverty status controls. Self-employed owners of farm or non-farm businesses were no more or less likely than wage employees to sell assets.

Households with and without enterprises have a similar incidence of receiving aid from public or private sources when these sources are considered separately. Households owning farm and non-farm enterprises generally have a lower probability of accessing private or public assistance as compared to those households without an enterprise. However, the point estimates are very small, not exceeding 1 percentage point for most of the correlations, and not statistically significant.[33] The estimates are not statistically significant for self-employed household heads.

The use of coping strategies does not differ by gender or household welfare, with some discernable trends by age of the household head. Adults were 9.9 percentage points more likely to receive public assistance than were self-employed youth. They were more likely to access all kinds of assistance, though the difference is not statistically significant. The receipt of public assistance increases with wealth while asset sales decline for both households with enterprises and

[33] When limiting the sample to the sector of employment (agriculture or non-agriculture) of the household head, several correlates become statistically significant at the 5 percent level: farm households are less likely to receive public assistance while non-farm businesses are less likely to receive any assistance.

for the self-employed. This may be due to wealthier households being more connected to government networks and having savings, but the differences are not statistically significant.

Table 8. Which coping mechanisms were used by whom?

	Household Heads				Household Business			
Sample:	Sold assets	Any assistance	Public assistance	Private assistance	Sold assets	Any assistance	Public assistance	Private assistance
Farm business	-0.017 [0.031]	0.031 [0.033]	0.009 [0.030]	-0.007 [0.009]	0.034 [0.018]*	0.015 [0.032]	-0.008 [0.032]	0.008 [0.007]
Nonfarm business	-0.009 [0.030]	-0.002 [0.029]	-0.003 [0.018]	0.001 [0.011]	-0.006 [0.021]	-0.080 [0.032]**	-0.035 [0.027]	-0.008 [0.007]
$2.15 to $3.65	0.077 [0.048]	-0.030 [0.031]	-0.008 [0.031]	-0.003 [0.017]	0.080 [0.053]	0.025 [0.045]	0.000 [0.026]	-0.002 [0.014]
$3.65 to $6.85	-0.071 [0.052]	0.021 [0.034]	0.044 [0.036]	-0.008 [0.020]	-0.055 [0.050]	0.079 [0.058]	0.031 [0.026]	-0.003 [0.017]
Above $6.85	-0.049 [0.054]	0.104 [0.070]	0.095 [0.068]	0.012 [0.023]	-0.032 [0.044]	0.123 [0.068]*	0.065 [0.047]	0.009 [0.021]
Male	0.023 [0.026]	-0.044 [0.045]	0.019 [0.032]	-0.009 [0.009]				
Adult	0.023 [0.035]	0.099 [0.046]**	0.033 [0.028]	0.022 [0.014]				
Constant	0.037	0.030 [0.081]	-0.139 [0.102]	0.101 [0.025]***	0.048 [0.048]	0.027 [0.050]	-0.056 [0.037]	0.093 [0.015]***
Obs.	685	1,727	1,098	1,553	827	2,256	1,321	1,879
R-squared	0.261	0.258	0.152	0.220	0.22	0.218	0.141	0.226
Countries	ETH, NGA	ETH, MWI, NGA	ETH, MWI, NGA, SLE	ETH, MWI, NGA	ETH, NGA	ETH, MWI, NGA, SLE,ZWI	ETH, MWI, NGA, ZWE	ETH, MWI, NGA, ZWE

Source: HFPS-Wave 1.

Notes: Urban observations only. Adult defined as 25 years old or more. Omitted categories: Below 2.15 USD-a-day, female, youth. Robust standard errors clustered at the subnational geographic units between brackets. *** significant at 1%, ** 5%, * 10%.

What is the correlation between the use of coping strategies and declines in enterprise income?

To directly test if coping strategies were adopted in response to a decline in household enterprise earnings, Table 9 presents how the probabilities of reporting different coping strategies differed for enterprise-owning households who reported farm or non-farm income declines from those that did not experience an income loss. Only households with enterprises are included in the sample. As in the previous sub-section, country surveys included different coping strategies, which affects the sample for each estimate.

Households that experience a decline in enterprise income are more likely to sell assets. When using the household business definition, non-farm household enterprises that experienced income declines were 8 percentage points more likely to sell assets in comparison to households that did not experience a decline in income, while farm enterprises were 12 percentage points more likely. In the latter case, the difference is statistically significant (Table 9, Panel A). The relationship is similar, but not statistically significant, when using the household head definition (Table 9, Panel B).

Reported income declines are not associated with a higher likelihood of receiving either public or private assistance. If anything, the opposite is true, as can be seen by the consistently negative coefficients on income decline in the three reported assistance regressions, for both farm and non-farm enterprises, using either definition of household enterprise ownership. None of the estimates is statistically significant (Table 9).

Self-employed male heads were more likely to report selling assets than their female counterparts, while female heads were slightly more likely than male heads to receive help from others. Even when controlling for a decline in self-employment income, men who owned non-farm businesses were 11 percentage points more likely than women to sell assets (Table 9, Panel B). Male self-employed farm enterprise owners were about 6 percentage points more likely to sell assets, but the estimate is not statistically significant. This may reflect that households headed by males may have more assets available for sale, even when controlling for household welfare. Women were slightly more likely than men to receive help from private or public sources, though the results are not statistically significant.

Asset sales decline by household wealth while government and private cash or in-kind assistance increase with household wealth. When controlling for an income shock, both definitions of household ownership find that asset sales were less likely for farm and non-farm owning households with higher levels of welfare (Table 9, Panel A), consistent with the unconditional estimates in Table 8. Receipt of any, public or private assistance is also greater among the least poor (Table 9, Panel B). The trends are similar, though the magnitudes are lower, when using the household business definition (Table 9, Panel A). This may reflect that households with higher welfare have better information or connections that they can leverage when they need assistance. However, none of these relationships is statistically significant.

Table 9. Correlation between the use of coping strategies and income declines

Panel A. Household Business Definition of household enterprise

	Sold assets		Public assistance		Any assistance		Private assistance	
Sample:	FHE	NFHE	FHE	NFHE	FHE	NFHE	FHE	NFHE
Farm income decline	0.121 [0.054]**		0.009 [0.020]		-0.076 [0.053]		-0.069 [0.080]	
Nonfarm income decline		0.083 [0.063]		-0.012 [0.017]		-0.032 [0.061]		-0.103 [0.064]
Between $2.15 and $3.65	0.178 [0.134]	0.154 [0.096]	-0.027 [0.052]	-0.037 [0.053]	-0.020 [0.050]	-0.017 [0.032]	-0.053 [0.077]	-0.062 [0.074]
Between $3.65 and $6.85	-0.088 [0.121]	-0.053 [0.075]	-0.028 [0.058]	-0.038 [0.056]	0.014 [0.039]	0.024 [0.017]	0.012 [0.072]	0.007 [0.063]
Above $6.85	-0.071 [0.119]	-0.049 [0.068]	-0.000 [0.066]	-0.035 [0.054]	0.083 [0.095]	0.075 [0.059]	0.074 [0.136]	0.015 [0.093]
Constant	-0.031 [0.077]	0.016 [0.067]	0.016 [0.050]	0.029 [0.054]	-0.025 [0.039]	-0.050 [0.091]	-0.012 [0.082]	0.075 [0.100]
Observations	218	427	378	791	378	791	447	1,130
R-squared	0.397	0.281	0.148	0.132	0.205	0.146	0.279	0.263
Countries	ETH, NGA	ETH, NGA	ETH, MWI, NGA	ETH, MWI, NGA, ZWE	ETH, MWI, NGA	ETH, MWI, NGA, ZWE	ETH, MWI ,NGA, SLE	ETH, MWI, NGA, SLE, ZWE

Panel B. Household Head Definition of a household enterprise

	Sold Assets		Any Assistance		Public Assistance		Private Assistance	
	FHE	NFHE	FHE	NFHE	FHE	NFHE	FHE	NFHE
Farm income decline	0.160 [0.099]		-0.045 [0.053]		-0.019 [0.020]		-0.079 [0.063]	
Nonfarm income decline		0.181 [0.123]		-0.092 [0.060]		-0.035 [0.031]		-0.154 [0.091]*
Between $2.15 and $3.65	0.159 [0.108]	0.289 [0.170]*	-0.020 [0.051]	-0.085 [0.080]	0.008 [0.016]	0.008 [0.020]	-0.044 [0.055]	-0.108 [0.085]
Between $3.65 and $6.85	-0.033 [0.038]	0.057 [0.059]	0.017 [0.023]	-0.009 [0.028]	-0.008 [0.014]	0.003 [0.016]	0.008 [0.040]	-0.001 [0.041]
Above $6.85	-0.029	0.039	0.149	0.120	0.031	0.008	0.186	0.102

	[0.064]	[0.040]	[0.146]	[0.105]	[0.030]	[0.016]	[0.139]	[0.112]
male	0.061	0.112	0.077	0.011	-0.009	-0.019	-0.013	-0.033
	[0.041]	[0.053]**	[0.061]	[0.066]	[0.015]	[0.019]	[0.094]	[0.081]
Adult	0.000	-0.020	0.097	0.079	0.029	0.010	0.144	0.083
	[0.042]	[0.038]	[0.085]	[0.049]	[0.023]	[0.008]	[0.093]	[0.052]
Constant	-0.203	-0.286	-0.141	-0.079	0.010	0.028	-0.050	0.020
	[0.099]**	[0.128]**	[0.118]	[0.203]	[0.036]	[0.033]	[0.160]	[0.230]
Observations	173	289	257	509	257	509	286	626
R-squared	0.557	0.413	0.314	0.370	0.245	0.218	0.461	0.475
Countries	ETH, NGA	ETH, NGA	ETH,MWI,NGA	ETH, MWI, NGA, ZWE	ETH, MWI, NGA	BFA, ETH, MWI,NGA,ZWE	ETH, MWI, NGA, SLE	BFA, ETH, MWI, NGA, SLE, ZWE

Source: HFPS-Wave 1.

Notes: Urban observations only. Adult defined as 25 years old or more. Omitted categories: Below 2.15 USD-a-day. Robust standard errors clustered at the subnational geographic units between brackets. *** significant at 1%, ** 5%, * 10%.

To sum up, in the first months of the crisis, urban households, especially those with non-farm enterprises, experienced significant income loss. Some – mostly those with farm income – coped by selling assets but most did not employ any additional coping strategies when incomes fell. Women fared worse than others, both in terms of income loss, and in having access to coping strategies. Adults experience greater income losses than youth but also had more access to assistance from an outside source. Those with different levels of poverty fared similarly, both in terms of income losses and use of coping strategies, though trends suggest that the non-poor were more successful in acquiring help from others while not selling off assets. The next section considers how these trends progressed over the first year of the COVID-19 pandemic.

5. Evolving Impacts of the Pandemic on Household Enterprises, Incomes and Use of Coping Strategies

Job type, income losses, and use of coping strategies shifted over the first year of the pandemic, with some differences by gender, age, and household welfare. The results are reported in figures, which show the point estimate (and confidence interval) of the share of household heads who are in a situation indicated by each graph – employment status, income declines, and use of coping strategies.[34] The first set of graphs is disaggregated by gender, followed by disaggregation by age. Finally, we present the disaggregation by household welfare, where we consider three welfare groups: less than $3.65 per capita, $3.65-$6.85, and above $6.85.[35] The household head definition of household enterprises is used in the analysis. For comparison purposes, the evolution of wage earners and of the non-working population is also estimated for

[34] The full regression results are available from the authors.

[35] We combined the bottom two welfare groups so that the estimates would converge. We also estimated the differences by sector, though most of the regressions did not converge.

the employment status graphs. Thereafter, the sample is limited to self-employed/family business household heads to understand how income and coping strategies varied among different characteristics of the owner of the family business. Since the data were collected in different months in each country, the country sample for each wave differs. The country-province fixed effects control for time-invariant characteristics across local markets. The full list of countries for each period is presented in annex A.

By gender

While women's and men's employment increased during the first 8 months of the pandemic, the gender gap in employment grew as the crisis evolved. About 50 percent of men and 60 percent of women were not working in the first month of the pandemic (April 2020) (Panel A of Figure 2). For both groups, this percentage declined with the passing of time until November 2020 with a larger decline for men. These results indicate that the initial negative impact of the pandemic on female and male employment was short lived.[36] By November 2020, men were 15 percentage points more likely than women to be working and the gender gap was statistically significant. Evidence from Kugler et al. (2021) suggests that the gender differences are not attributable to the presence of children since empirical estimates find that the presence of children explained only a small part of the gender disparity in work stoppage.

As labor markets recovered, men became more likely to work as wage employees. Conditional on being employed, the percentage of men who worked as self-employed or in a family business declined by about 10 percentage points, especially in the first months of the pandemic (Figure 2, Panel B). At the same time, the percentage of male household heads with wage employment increased by approximately 8 percentage points. The initial decline in the percentage of men working as self-employed or in family business can be understood as men being better able to switch to wage labor as mobility restrictions affected the possibility of running businesses. However, men's self-employment did not recover in the last months of 2020 and beginning of 2021, when restrictions were eased. Instead, men continued going back to work in wage employment rather than resuming their self-employed work.

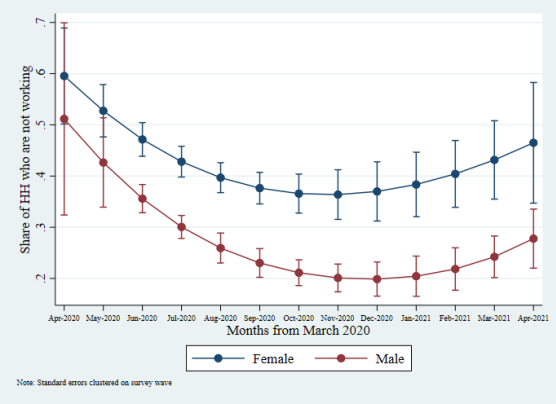
Women saw a disruption in employment patterns in the first year of the pandemic, with a return to early pandemic work types after a year into the crisis. For women who were self-employed or worked in a family business prior to March, the estimated probability of working in a self-employed or family business initially increased by 5 percentage points (Figure 2, Panel B). This may reflect a faster loss in wage employment or it may be a response to an increased demand for home production, forcing women's market work into the home via household enterprises. This is consistent with the estimated decline in the share of wage employees from 30 percent down to approximately 22 percent (Figure 2, Panel C). The trend reversed in November 2020 and by April 2021, the female share in each type of employment was at a similar level as the beginning of the pandemic (April 2020).

[36] According to estimates using the first wave of the HFPS for the SSA region, the rate of work stoppage with respect to the pre-pandemic period was 26 percent for women and 23 percent for men (Kugler et al., 2020).

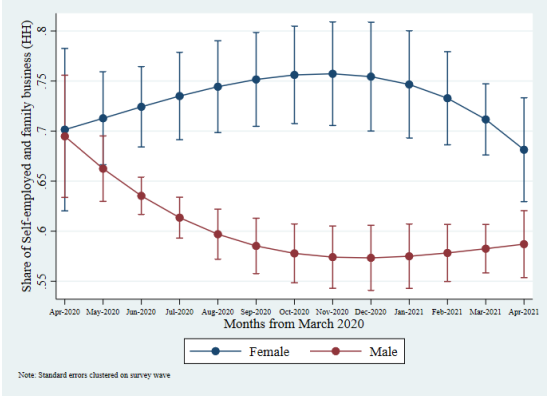
The percentage of both women and men reporting a decline in non-farm household income fell over the course of the pandemic, while farm income losses did not fluctuate (Figure 3). The percentage of self-employed reporting a reduction in non-farm income fell from more than 80 percent at the beginning of the pandemic to 40 percent 12 months later. Women experienced a faster reduction in the propensity to report losses than men did, though the gender-specific trends converged by the end of the period. The share of self-employed reporting a loss in farm income remained around 40 percent throughout the first year of the crisis for men and women, but the extent of the decline is not measured very precisely, as indicated by the large confidence intervals.

Figure 2. Not working women and men and employment composition by employment type

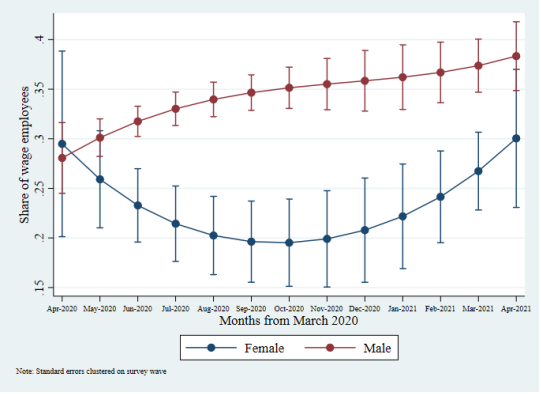
Panel A. Not working



Panel B. Self-employed/Fam business



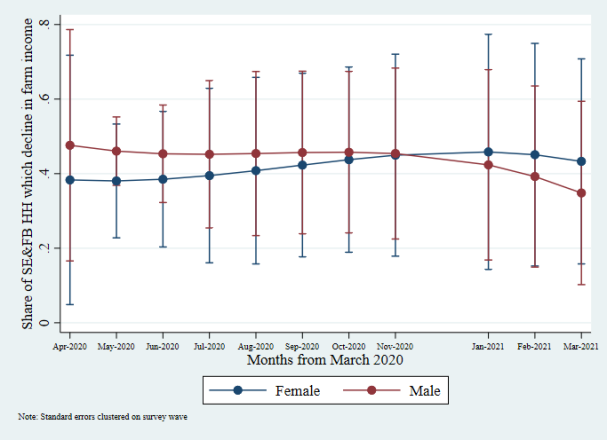
Panel C. Wage employees



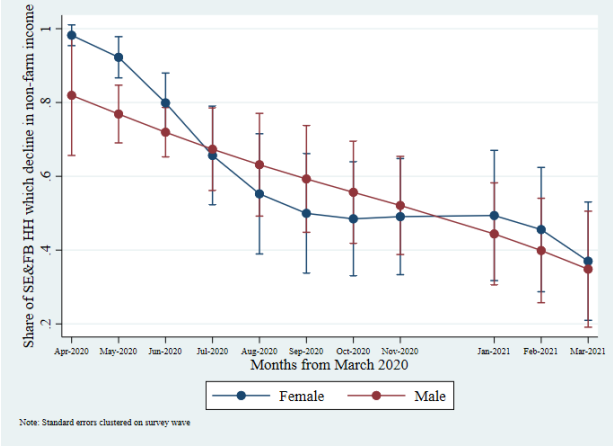
Source: HFPS. Notes: Household heads in urban areas. Panels B and C present the composition of employment by employment-type conditional on being employed. For a list of countries in each period, see Annex A.

Figure 3. Percentage of self-employed women and men reporting income declines

Panel A. Farm income



Panel B. Nonfarm income



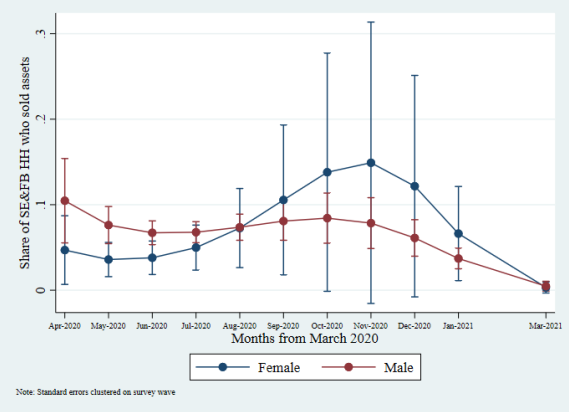
Source: HFPS. Notes: Self-employed household heads in urban areas. For a list of countries in each period, see Annex A.

A small share of the self-employed, especially men, sold assets throughout the pandemic. Men's asset sales were relatively flat, perhaps slightly falling, across the pandemic period. Women who are self-employed show a less concise trend. While asset sales appear to increase six months into the pandemic, the confidence intervals are too large to rule out that self-employed women's asset sales also did not change across the period.

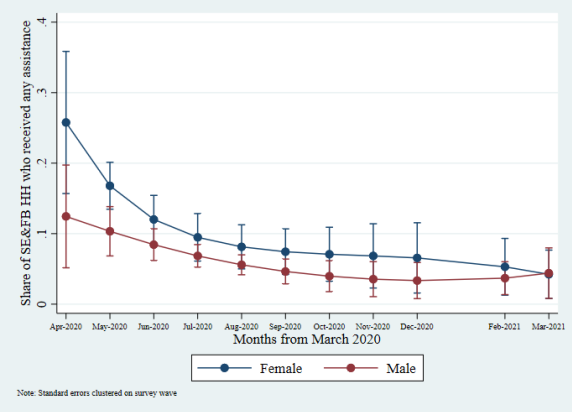
The share of self-employed household heads receiving external support declined across the crisis. Women had a higher incidence of receiving assistance from any source early in the crisis, but the gender gap quickly narrowed, as such assistance stabilized around 5-7 percent by October 2020 (Figure 4, Panel B). While small sample sizes lead to large confidence intervals when exploring the evolution of the source of external assistance,[37] the point estimates suggest delayed support. The percentage receiving cash or in-kind transfers from private sources slightly increased over the 12-month period. The large confidence interval in the middle period, however, may indicate that use of this coping strategy did not change over the pandemic. The percentage receiving public assistance seemed to increase slightly early in the pandemic, but again the confidence intervals do not allow us to conclude that there was any meaningful receipt of public assistance for self-employed men or women across the pandemic (Figure 4, Panels C and D).

Figure 4. Percentage of self-employed women and men using coping strategies

Panel A. Selling assets

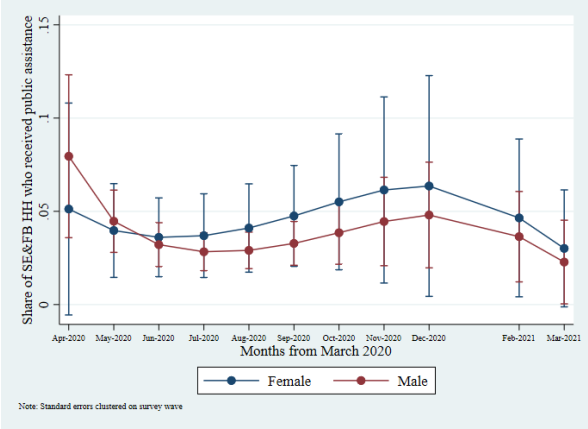


Panel B. Assistance from any source

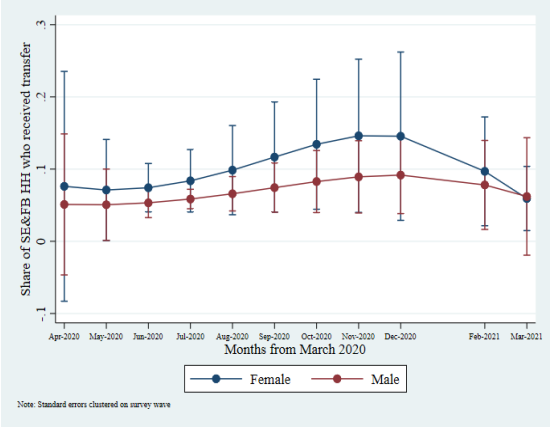


[37] As noted earlier, the coping strategies questions were asked separately in the surveys. In other words, the variable "assistance from any source" is directly asked of the respondent and not imputed from the responses to the "public assistance" and "private assistance" questions. In fact, some surveys do not ask all three questions. Thus, differences in the trends observed for "assistance from any source" and those from the public or private assistance questions may differ due to respondent recall bias, inclusion of other sources of support in the "any source" response such as bank loans or migration, or small sample bias.

Panel C. Public assistance



Panel D. Private Assistance



Source: HFPS.
Notes: Self-employed household heads in urban areas. For a list of countries in each period, see Annex A. The "assistance from any source" question is directly asked and is not imputed from the response to public and private assistance questions.

By age group

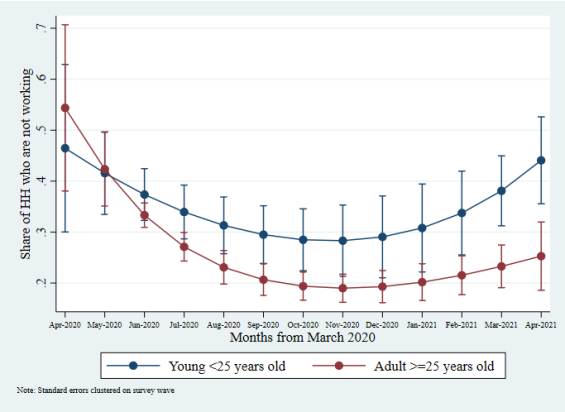
Adults returned to work as the pandemic progressed while youth had more difficulty returning to work. The share of non-working adults fell rapidly until November 2020, stabilizing around 25 percent thereafter (Figure 5, Panel A). In contrast, the share of non-working youth fell in the first six months of the pandemic and resumed an upward trend thereafter. Given large confidence intervals, the decline and month-on-month variations may not be statistically significant, which would suggest that job loss by youth caused by the onset of the pandemic did not recover a year into the crisis.

Adults who went back to work gradually shifted the composition of job types, while youth did not. We observe a gradual decline in adults who are self-employed or work in a family business, accompanied by a slight increase in wage employment (Figure 5, Panels B and C). Youth exhibited similar work types across the first year of the pandemic, though the confidence intervals are so large that we cannot rule out a flat trend.

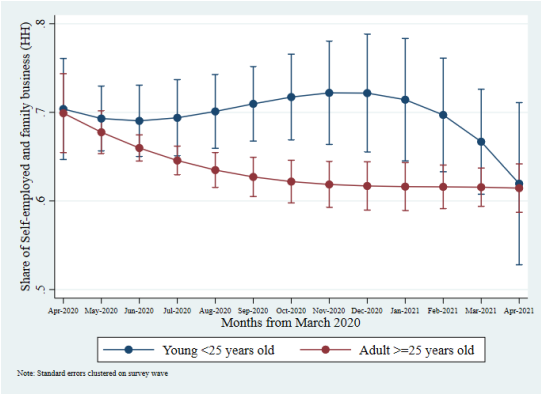
Self-employed adults and youth had a decreasing incidence of non-farm income loss across the first year of the pandemic. The incidence of adult household heads reporting a reduction in non-farm income continuously fell during the first year of the pandemic, reflecting their return to work (Figure 6, Panel B). Self-employed youth saw an increased incidence of losses from non-farm income in early 2021, though with large confidence intervals. As reported in the last section, fewer households experienced a loss in farm income than in non-farm income early in the pandemic. The propensity of a farm income losses stabilized early in the pandemic for self-employed adults, near 40 percent. In contrast, self-employed youth who own farms saw an upswing in losses early in the pandemic, and then a steep decline by November 2020. However, the overlapping confidence intervals suggest that the monthly estimates may not be statistically different from each other.

Figure 5. Change over time in distribution of heads, by employment status and age group

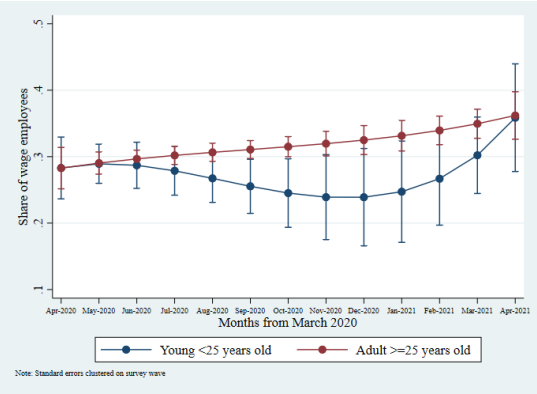
Panel A. Not working



Panel B. Self-employed/Family business



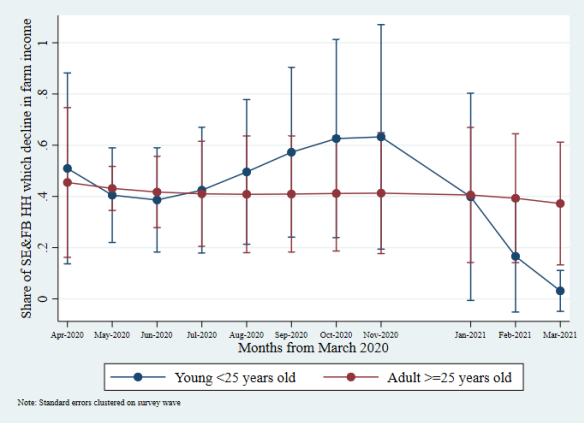
Panel C. Wage employees



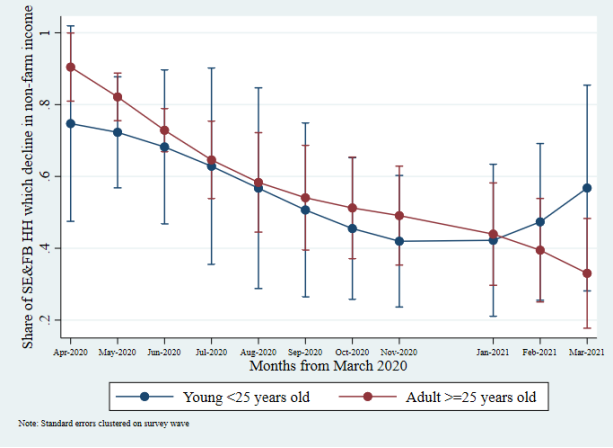
Source: HFPS. Notes: Household heads in urban areas. For a list of countries in each period, see Annex A.

Figure 6. Percentage of self-employed reporting income declines, by age groups

Panel A. Farm income



Panel B. Nonfarm income

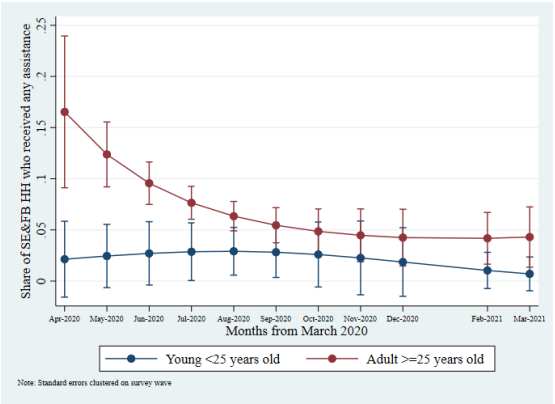


Source: HFPS. Notes: Household heads in urban areas. For a list of countries in each period, see Annex A.

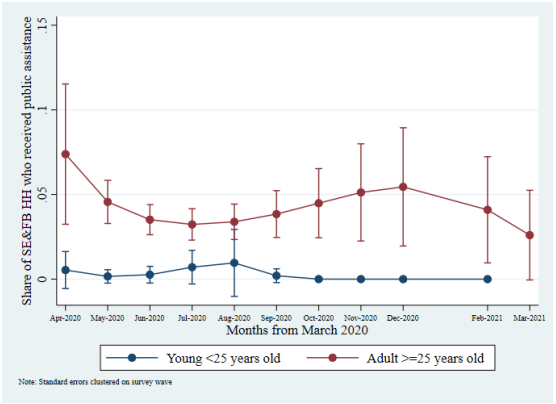
Self-employed adults were particularly successful in accessing external sources of support early in the pandemic. [38] More than 10 percent of adults had some type of external support in the first three months of the crisis, while very few youth did (Figure 7, Panel A). However, adults' access to support rapidly declined and, by September 2020, receipt of assistance from any source was indistinguishable from that of youth. This trend may be underpinned by adults' greater success in accessing public assistance (Figure 7, Panel B), but the confidence intervals are too large to conclude that there is a trend. That said, adults consistently received more public assistance than youth in all periods. Virtually no one reported accessing private assistance (Figure 7, Panel C).

Figure 7. Percentage of self-employed using coping strategies, by age groups

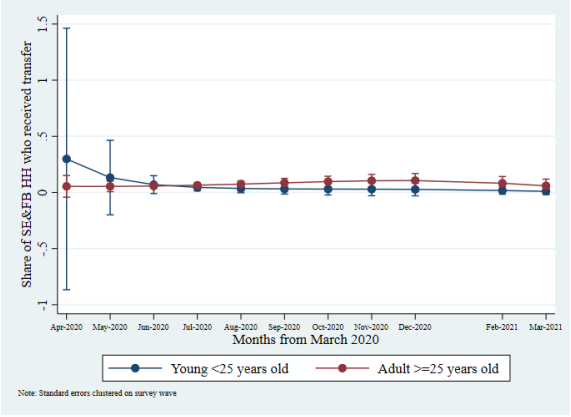
Panel A. Assistance from any source



Panel B. Public assistance



Panel C. Private Assistance



Source: HFPS. Notes: Household heads in urban areas. For a list of countries in each period, see Annex A. The "assistance from any source" question is directly asked and is not imputed from the response to public and private assistance questions.

[38] The asset sales estimates did not converge so are not presented here. We only report results when controlling for country fixed effects since the regressions did not converge when using region fixed effects.

By welfare level

Job loss affected all income groups in a similar manner across time. The share of the non-working declined over time for all groups, resuming in late 2020 (Panel A of Figure 8). The non-poor seemed to resume their jobs more quickly in the first few months of the pandemic.

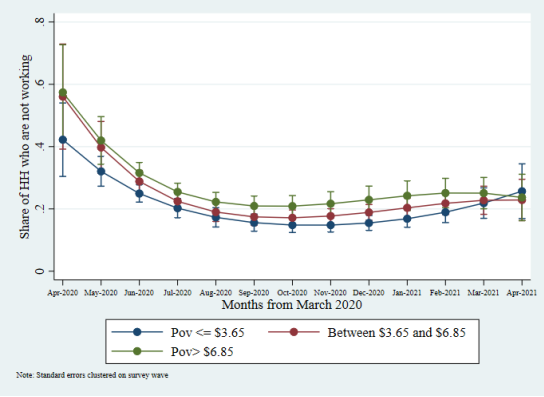
Only the non-poor notably changed their type of employment over the course of the pandemic. For this group there was a decline in the percentage of self-employed or family business and an increase in the share of wage employees (Panels B and C of Figure 8). The two other welfare groups were similarly distributed across their employment sectors throughout the pandemic.

While workers were changing status, losses to non-farm household income persisted for all welfare groups. Losses in non-farm income declined early in the pandemic, but the estimates from July 2020 onward are too imprecise to detect trends. The losses in farm income do not provide statistically significant trends.

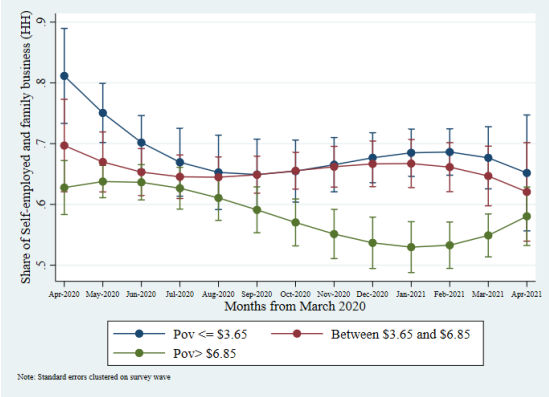
Very few poor self-employed household heads receive external assistance across the pandemic period, while non-poor households had more help early on. In the first months of the pandemic, 10-20 percent of the less- and non-poor received assistance from any source, as compared to less than 9 percent of the poor. The difference between welfare groups converged by mid-2020, as access to support from any source rapidly declined for the less- and non-poor (Figure 10, Panel B). The trends by source of income show a slight increase in the receipt of private and public assistance for the less- and non-poor through December 2020, though with large confidence intervals (Figure 10, Panels B and C). The poorest self-employed do not show any change in the use of private or private assistance across the period. Given the small share of any welfare group receiving aid and the large confidence intervals, we can conclude that public and private aid were largely absent for all, similar to the findings in the first period of the pandemic, as reported above, though less- and non-poor could rely on support from other sources early in the pandemic.

Figure 8. Change over time in distribution of heads by employment status and welfare group

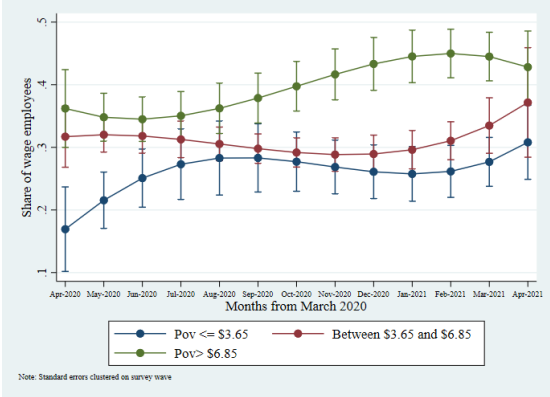
Panel A. Not working



Panel B. Self-employed/Family business



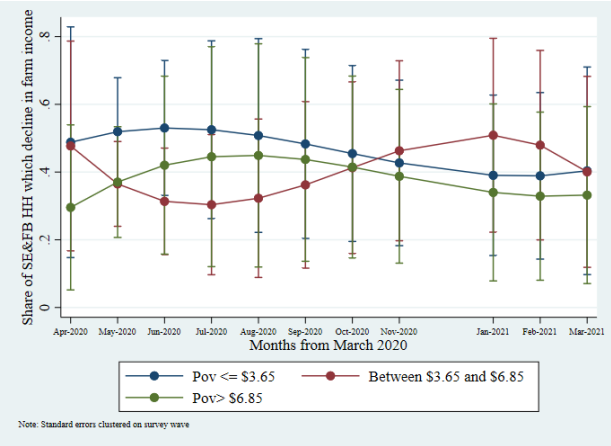
Panel C. Wage employees



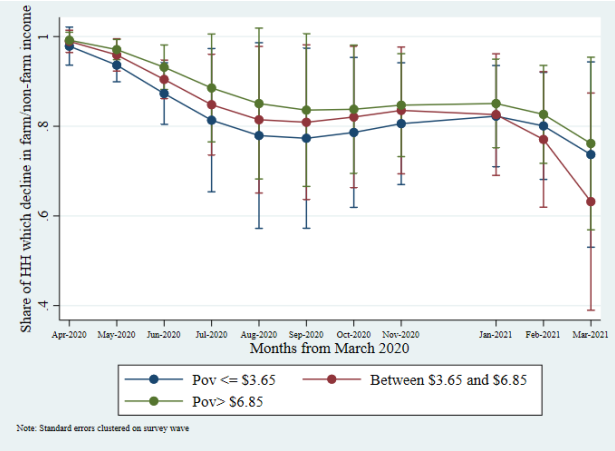
Source: HFPS. Notes: Household heads in urban areas. Welfare groups based on consumption at the household level. Panels B and C present the composition of employment by employment-type conditional on being employed. For a list of countries in each period, see Annex A.

Figure 9. Percentage of self-employed reporting income declines by welfare groups

Panel A. Farm income



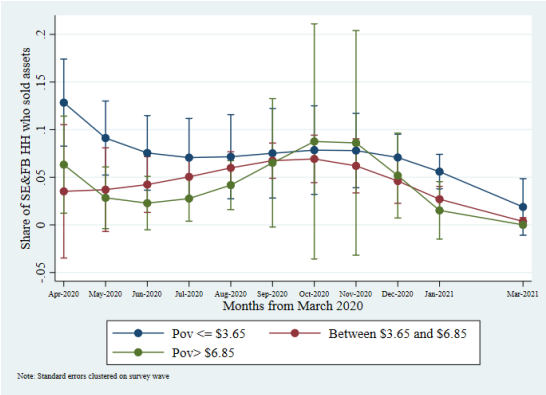
Panel B. Nonfarm income



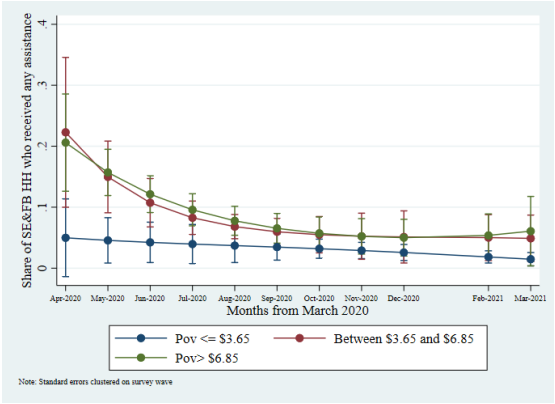
Source: HFPS. Notes: Household heads in urban areas. Welfare groups based on consumption at the household level. For a list of countries in each period, see Annex A.

Figure 10. Percentage of self-employed using coping strategies by welfare groups

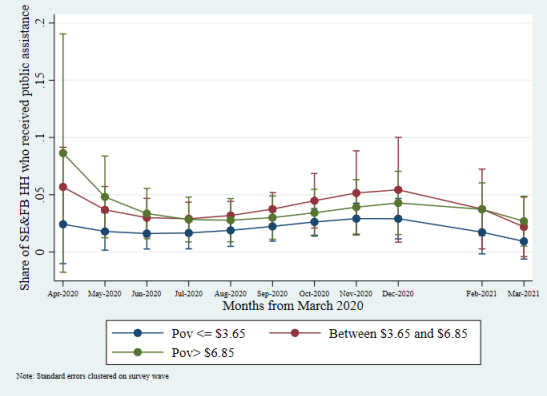
Panel A. Selling assets



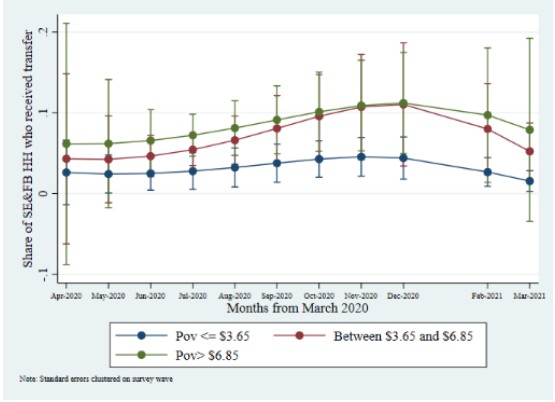
Panel B. Assistance from any source



Panel C. Public assistance



Panel D. Private Assistance



Source: HFPS. Notes: Household heads in urban areas. Welfare groups based on consumption at the household level. For a list of countries in each period, see Annex A. The "assistance from any source" question is directly asked and is not imputed from the response to public and private assistance questions.

6. Conclusions

Detecting clear patterns in the high-frequency phone survey data is challenging. Data on enterprise outcomes are only available for a subset of Sub-Saharan African countries, making estimates imprecise. Furthermore, there are only a few available questions with which to draw inferences about the state of urban household enterprises. We have relied largely on questions on total income declines as well as farm and non-farm enterprise declines. Our preferred measure focuses on household enterprises since the information on income loss and coping strategies is collected at the household level. However, we also analyze the experience of household heads, which in many countries often make up the vast majority of respondents, who are self-employed. Though the information on income losses pertains to all household enterprises, this household head sample allows us to observe and control for the head's gender and age and how these factors correlate with their experience during the pandemic.

The results confirm that urban households with non-farm enterprises were particularly vulnerable to the initial pandemic-induced income shocks and had limited access to coping

strategies. Households that own non-farm enterprises were substantially more likely to report total income losses, with a difference of 26 percentage points for households with only a non-farm business. Similarly, total income losses were 20 percentage points higher for self-employed heads of non-farm businesses as compared to households headed by wage earners. They were less likely than urban farm enterprises to sell assets to cope with the income losses and were no more likely to access public or private sources of assistance than those households that did not experience income losses.

Female heads who owned non-farm enterprises were more likely than their male counterparts to report revenue declines and less likely to access coping strategies early in the pandemic. Female heads in non-farm enterprises were about 9 percentage points more likely to report declines in non-farm income than male heads with non-farm enterprises. This might be due to women typically working in less productive sectors and activities, hence being more vulnerable to economic crisis and market fluctuations (WBG 2019). Gender differences are also particularly apparent in asset sales, where male enterprise owners were more likely to report selling assets by about 11 percentage points, when controlling for reported income declines.

The coping strategies utilized by female heads throughout the first year of the pandemic also differed from those of male heads. While male heads were able to move into wage jobs as the pandemic progressed, self-employment increased for female heads. At the same time, losses to non-farm income in urban enterprises was becoming less prevalent. The widening gender gap in employment type may have been due to women's increased value in household production, though other literature (Kugler et al. 2021) suggests that this is not a response to an increased demand for child care. While both women and men sold assets to cope, men were more able to employ this coping strategy. Women were more successful than men at leveraging assistance from various sources, though this strategy waned early in the pandemic. However, access to other private or public sources of support was very small, with no fluctuation across the first year of the pandemic, suggesting that women accessed less conventional sources to manage early in the crisis.

Adult heads were more likely to experience total income declines early in the pandemic than youth heads, but also rebounded more quickly. Adult self-employed heads were 30 percentage points more likely than their younger counterparts to experience overall income decline in the beginning of the pandemic. They also had more assets to sell to cope with the income shocks early in the crisis. However, the data tell us little about the source of that differential income fall. Adults and youth had statistically indistinguishable propensity to experience farm and non-farm income losses, as well as a (low) use of assistance from others. That said, differences do emerge in the medium-term. Adults were faster to get back to work. They resumed income faster than youth, sold assets to manage losses, and had greater access to external support, which may have come from a greater access to public assistance.

There are some indications that the poorest were hardest hit and slowest to recover. Poor households were generally most likely to report declines in non-farm incomes in the short-run, though the difference is not statistically significant. The least poor groups were more likely to receive in-kind or cash assistance from private and public sources, though the estimates were not statistically significant. When looking at the medium-term impacts of the crisis, poor heads were

less likely to move into wage employment, even as non-farm income fell across the pandemic. They increasingly sold off assets as the pandemic progressed, although the estimates are imprecise, and they had the least access to external sources of support among the welfare groups.

Due to several factors, this analysis provides indicative, rather than definitive, evidence of the relationship between a loss of household income and use of coping strategies. The data set does not include information that would allow us to determine if a loss of household income is due to the pandemic or is caused by other factors that are not related to the household, such as a household level shock or seasonal fluctuations in the demand for the enterprise's products. Furthermore, the data only allow us to observe if a shock to household earnings and a coping strategy were employed in the same period. We do not have information on which preceded the other. Finally, we do not have information on the depth of the income shock or coping strategy. Nonetheless, this indicative evidence sheds light on how the pandemic may have affected households, which has not been sufficiently studied in the developing world, particularly in Africa.

The results help highlight the need to expand social protection systems to urban, informal households affected by systemic income losses. The pandemic decimated urban non-farm households, many of whom rely on face-to-face interaction. Few reported receiving public assistance. Women and the poor experienced the greatest hardship early in the pandemic and they – as well as youth – were the slowest to recover losses over the first year of the pandemic. These results highlight the importance of building social protection systems that can reach the urban poor, especially those who are most vulnerable, to help protect workers from future potential shocks to the urban economies where women and the poor particularly depend on household-owned service sector jobs as their source of livelihoods.

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Annex A: Variables of Interest included in country surveys

Table A1: Availability of variables in high frequency phone surveys

	Self-employed	Household Enterprise	Total Income decline	Farm/non-farm income decline	Sold assets	Private assistance	Public assistance	Any assistance
Burkina Faso	X	X				X		X
Chad		X		X		X		X
Ethiopia	X		X	X	X	X	X	X
Madagascar	X	X		X		X	X	X
Malawi	X	X	X	X		X	X	X
Nigeria	X	X	X	X	X	X	X	X
Sudan	X	X		X	X	X	X	X
Senegal	X	X	X	X				
Sierra Leone	X	X		X				X
South Sudan	X	X		X	X		X	X
São Tomé & Príncipe	X			X				
Somalia						X	X	
Zimbabwe	X	X		X		X	X	X

Countries included in the sample for each corresponding estimate presented in the graphs in section 5.

1. Countries in the Sample of Estimates by gender

Table A2: Sample of countries by month for estimates by gender

	2020									2021			
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Self employed	ETH NGA	ETH MUS SEN	BFA COD ETH MDG MUS MWI NGA SDN SSD ZWE	BFA GIN MUS MWI NGA SLE SOM STP ZWE	ETH MOZ MWI NGA UGA	BFA COG ETH MOZ MWI NGA SSD UGA	ETH MOZ NGA	BFA GIN MWI NGA SLE UGA	BFA ETH MWI NGA ZWE	BFA ETH MWI NGA SOM	BFA ETH NGA UGA	BFA MWI NGA UGA	BFA ETH GMB MWI
Wage employ-ment	ETH NGA	ETH MUS SEN	BFA COD ETH MDG MUS MWI NGA SDN SSD ZWE	BFA GIN MUS MWI NGA SLE SOM STP ZWE	ETH MOZ MWI NGA UGA	BFA COG ETH MOZ MWI NGA SSD UGA	ETH MOZ NGA	BFA GIN MWI NGA SLE UGA	BFA ETH MWI NGA ZWE	BFA ETH MWI NGA SOM	BFA ETH NGA UGA	BFA MWI NGA UGA	BFA ETH GMB MWI
Not working	ETH NGA	ETH MUS SEN	BFA CAF COD ETH GHA KEN MDG MLI MOZ MUS MWI NGA SDN SSD UGA ZMB ZWE	BFA COD GIN MLI MOZ MUS MWI NGA SLE SOM STP ZWE	CAF ETH MOZ MWI NGA UGA	BFA COD COG ETH MOZ MWI NER NGA SSD UGA	COD ETH MOZ NGA	BFA COD GIN MWI NGA SLE UGA	BFA COD ETH MWI NGA ZWE	BFA ETH MWI NGA SOM	BFA NGA UGA	BFA MWI NGA UGA	BFA GMB MWI
Farm income decline	ETH NGA	ETH SEN	ETH GHA MDG MLI MOZ MWI SDN SSD UGA ZMB	GIN MWI SLE SOM STP	ETH MWI UGA	ETH MWI NER SSD UGA	ETH	SLE UGA		MWI SOM	UGA	UGA	
non-farm income decline	ETH NGA	ETH SEN	ETH GHA MDG MLI MOZ MWI SDN SSD UGA ZMB ZWE	GIN MWI SLE SOM ZWE	ETH MWI UGA	ETH MWI NER SSD UGA	ETH	BFA SLE UGA		MWI SOM	UGA	UGA	
Sold assets	ETH NGA	ETH MUS	CAF COD ETH GHA KEN MLI MUS SDN SSD UGA ZMB	BFA MUS NGA ZWE	CAF ETH KEN MWI	COD ETH NER SSD	ETH KEN	BFA COD	COD NGA	MWI SOM	KEN	BFA UGA	
Public assistance	ETH NGA	ETH	CAF COD ETH GHA KEN MDG MUS MWI NGA	GIN MUS MWI NGA SLE SOM ZWE	ETH MWI NGA UGA	BFA COD COG ETH NER UGA	ETH	MWI NGA UGA	BFA COD	SOM	UGA	BFA MWI NGA UGA	

			SDN SSD UGA ZMB ZWE										
Private assistance	ETH NGA	ETH MUS	BFA CAF COD ETH GHA KEN MDG MLI MWI NGA SDN ZWE	GIN MWI NGA SLE SOM ZWE	MWI NGA UGA	COD COG ETH NER UGA	ETH	NGA UGA	BFA COD	ETH SOM	UGA	NGA UGA	
Assistance from any source	ETH NGA	ETH MUS	BFA CAF COD ETH GHA KEN MDG MLI MUS MWI NGA SDN SSD UGA ZMB ZWE	GIN MUS MWI NGA SLE ZWE	ETH MWI NGA UGA	BFA COD ETH NER UGA	COD ETH	MWI NGA UGA	BFA COD	SOM	UGA	MWI NGA UGA	

Table A3: Sample of countries by month for estimates by age

	2021									2021			
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Self emp. And Family bus.	ETH NGA	ETH MUS	BFA COD ETH MDG MUS MWI NGA SDN SSD ZWE	BFA GIN MUS MWI NGA SLE SOM ZWE	ETH MOZ MWI NGA UGA	BFA COG ETH MOZ MWI NGA SSD UGA	ETH MOZ NGA	BFA GIN MWI NGA SLE UGA	BFA ETH MWI NGA ZWE	BFA ETH MWI NGA SOM	BFA ETH NGA UGA	BFA MWI NGA UGA	BFA ETH GMB MWI
Wage emp.	ETH NGA	ETH MUS	BFA COD ETH MDG MUS MWI NGA SDN SSD ZWE	BFA GIN MUS MWI NGA SLE SOM ZWE	ETH MOZ MWI NGA UGA	BFA COG ETH MOZ MWI NGA SSD UGA	ETH MOZ NGA	BFA GIN MWI NGA SLE UGA	BFA ETH MWI NGA ZWE	BFA ETH MWI NGA SOM	BFA ETH NGA UGA	BFA MWI NGA UGA	BFA ETH GMB MWI
Not working	ETH NGA	ETH MUS	BFA CAF COD ETH GHA KEN MDG MLI MOZ MUS MWI NGA SDN SSD UGA ZMB ZWE	BFA COD GIN MLI MOZ MUS MWI NGA SLE SOM ZWE	CAF ETH MOZ MWI NGA UGA	BFA COD COG ETH MOZ MWI NER NGA SSD UGA	COD ETH MOZ NGA	BFA COD GIN MWI NGA SLE UGA	BFA COD ETH MWI NGA ZWE	BFA ETH MWI NGA SOM	BFA MWI NGA UGA	BFA MWI NGA UGA	BFA GMB MWI
Farm income decline	ETH NGA	ETH	ETH GHA MDG MLI MOZ MWI SDN SSD UGA ZMB	GIN MWI SLE SOM	ETH MWI UGA	ETH MWI NER SSD UGA	ETH	SLE UGA		MWI SOM	UGA	UGA	

non-farm income decline	ETH NGA	ETH	ETH GHA MDG MLI MOZ MWI SDN SSD UGA ZMB ZWE	GIN MWI SLE SOM ZWE	ETH MWI UGA	ETH MWI NER SSD UGA	ETH	BFA SLE UGA		MWI SOM	UGA	UGA	
Sold assets	ETH NGA	ETH MUS	CAF COD ETH GHA KEN MLI MUS SDN SSD UGA ZMB	BFA MUS NGA ZWE	CAF ETH KEN MWI	COD ETH NER SSD	ETH KEN	BFA COD	COD NGA	MWI SOM	KEN	BFA UGA	
Public assistance	ETH NGA	ETH	CAF COD ETH GHA KEN MDG MUS MWI NGA SDN SSD UGA ZMB ZWE	GIN MUS MWI NGA SLE SOM ZWE	ETH MWI NGA UGA	BFA COD COG ETH NER UGA	ETH	MWI NGA UGA	BFA COD	SOM	UGA	BFA MWI NGA UGA	
Private assistance	ETH NGA	ETH MUS	BFA CAF COD ETH GHA KEN MDG MLI MWI NGA SDN ZWE	GIN MWI NGA SLE SOM ZWE	MWI NGA UGA	COD COG ETH NER UGA	ETH	NGA UGA	BFA COD	ETH SOM	UGA	NGA UGA	
Assistance form any source	ETH NGA	ETH MUS	BFA CAF COD ETH GHA KEN MDG MLI MUS MWI NGA SDN SSD UGA ZMB ZWE	GIN MUS MWI NGA SLE ZWE	ETH MWI NGA UGA	BFA COD ETH NER UGA	COD ETH	MWI NGA UGA	BFA COD	SOM	UGA	MWI NGA UGA	

Table A4: Sample of countries by month for estimates by household welfare

	2020									2021			
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Self employed	ETH NGA	ETH SEN	BFA ETH MWI NGA ZWE	BFA MLI MWI NGA SLE ZWE	ETH MOZ MWI NGA UGA	BFA ETH MOZ NGA UGA	ETH GMB MOZ NGA	BFA MWI NGA SLE UGA	BFA ETH GMB MWI NGA	BFA ETH MWI NGA	BFA ETH GMB UGA	BFA MWI NGA UGA	BFA ETH MWI
Wage employ-ment	ETH NGA	ETH SEN	BFA ETH MWI NGA ZWE	BFA MLI MWI NGA SLE ZWE	ETH MOZ MWI NGA UGA	BFA ETH MOZ NGA UGA	ETH GMB MOZ NGA	BFA MWI NGA SLE UGA	BFA ETH GMB MWI NGA	BFA ETH MWI NGA	BFA ETH GMB UGA	BFA MWI NGA UGA	BFA ETH MWI
Not working	ETH NGA	ETH SEN	BFA ETH GHA MLI MOZ MWI	BFA MLI MOZ MWI NGA SLE ZWE	ETH GMB MOZ MWI	BFA ETH MOZ NER	ETH GMB MOZ NGA	BFA MWI NGA	BFA ETH GMB	BFA ETH MWI NGA	BFA GMB UGA	BFA MWI NGA UGA	BFA MWI

			NGA UGA ZWE		NGA UGA	NGA UGA		SLE UGA	MWI NGA				
Farm income decline	ETH NGA	ETH GAB SEN	ETH GHA MLI MOZ MWI UGA	MWI SLE	ETH GMB MWI UGA	ETH NER UGA	ETH GMB	SLE UGA	GMB	MWI	UGA	UGA	
non-farm income decline	ETH NGA	ETH GAB SEN	ETH GHA MLI MOZ MWI UGA ZWE	MWI SLE ZWE	ETH GMB MWI UGA	ETH NER UGA	ETH GMB	BFA SLE UGA		MWI	UGA	UGA	
Sold assets	ETH NGA	ETH	ETH GHA MLI UGA	BFA NGA ZWE	ETH GMB MWI	ETH NER	ETH	BFA	NGA	MWI		BFA UGA	
Public assistance	ETH NGA	ETH GAB	ETH GHA MWI NGA UGA ZWE	MWI NGA SLE ZWE	ETH GMB MWI NGA UGA	BFA ETH NER UGA	ETH	MWI NGA UGA	BFA		UGA	BFA MWI NGA UGA	
Private assistance	ETH NGA	ETH GAB	BFA ETH GHA MLI MWI NGA ZWE	MWI NGA SLE ZWE	MWI NGA UGA	ETH NER UGA	ETH	NGA UGA	BFA	ETH	UGA	NGA UGA	
Assistance from any source	ETH NGA	ETH GAB	BFA ETH GHA MLI MWI NGA UGA ZWE	MWI NGA SLE ZWE	ETH GMB MWI NGA UGA	BFA ETH NER UGA	ETH	MWI NGA UGA	BFA		UGA	MWI NGA UGA	

Annex B: Imputing poverty into the High Frequency Phone Surveys

The imputation process relies on a small set of time-invariant variables present in both the GMD and the HFPS, listed in Table 1. For each country, the team identified a set of variables that are available in both the HFPS and GMD. We define the vector of regressors X_1 as the variables in Table B1 plus the interaction terms. X_1 is common to all the countries.

Table B1: Common variables in both GMD and HFPS

Variables	Label
hsize	Household size
hhsizeSq	Household size squared
children_share	Share of children residents in the household
elderly_share	Share of elderly residents in the household
urban	Area of residence (urban/rural)
subnatid1	1st Level Administrative Unit
phone	Mobile phone Ownership (household level)

For each country**,** In the GMD dataset, we estimate $\log(welfare) = y^{GMD} = \hat{\beta}_1 X_1^{\mathrm{GMD}} + \varepsilon$ and use the "LASSO" method to select a set of regressors, $X_2^{\mathrm{GMD}} \subset X_1^{\mathrm{GMD}}$. We ensured that if an interaction term was selected by LASSO, the appropriate level terms were also included in the final model. For instance, if the interaction c.hsize#i.urban is selected by the "Lasso", the variables hsize and urban are both included in X_2.

We estimate the model $\log(welfare) = y^{GMD} = \hat{\beta}_2 X_2^{\mathrm{GMD}} + \varepsilon$. X_2^{GMD} is the vector of predictors, which differ by country.[39] We then use the model to predict welfare within the HFPS $\hat{y} = \hat{\beta}_2 X_2^{HFPS}$ for urban households.[40] This predicted welfare level for urban households is divided into quintiles to distinguish between poorer and wealthier urban households. Table B2 below reports that the R^2 values for the full country sample vary from 0.36 in Ethiopia and Gabon to 0.56 in Sierra Leone. Table B3 shows the kernel density plots of the measured welfare data in the GMD, the predicted welfare in the GMD, and the predicted welfare in the HFPS. In general, the distribution of predicted welfare looks quite similar in the GMD and the HFPS, but it is distinct from the measured consumption data in the GMD. This highlights that the poverty measure used is a longer-term measure of welfare that does not necessarily reflect transient shocks.

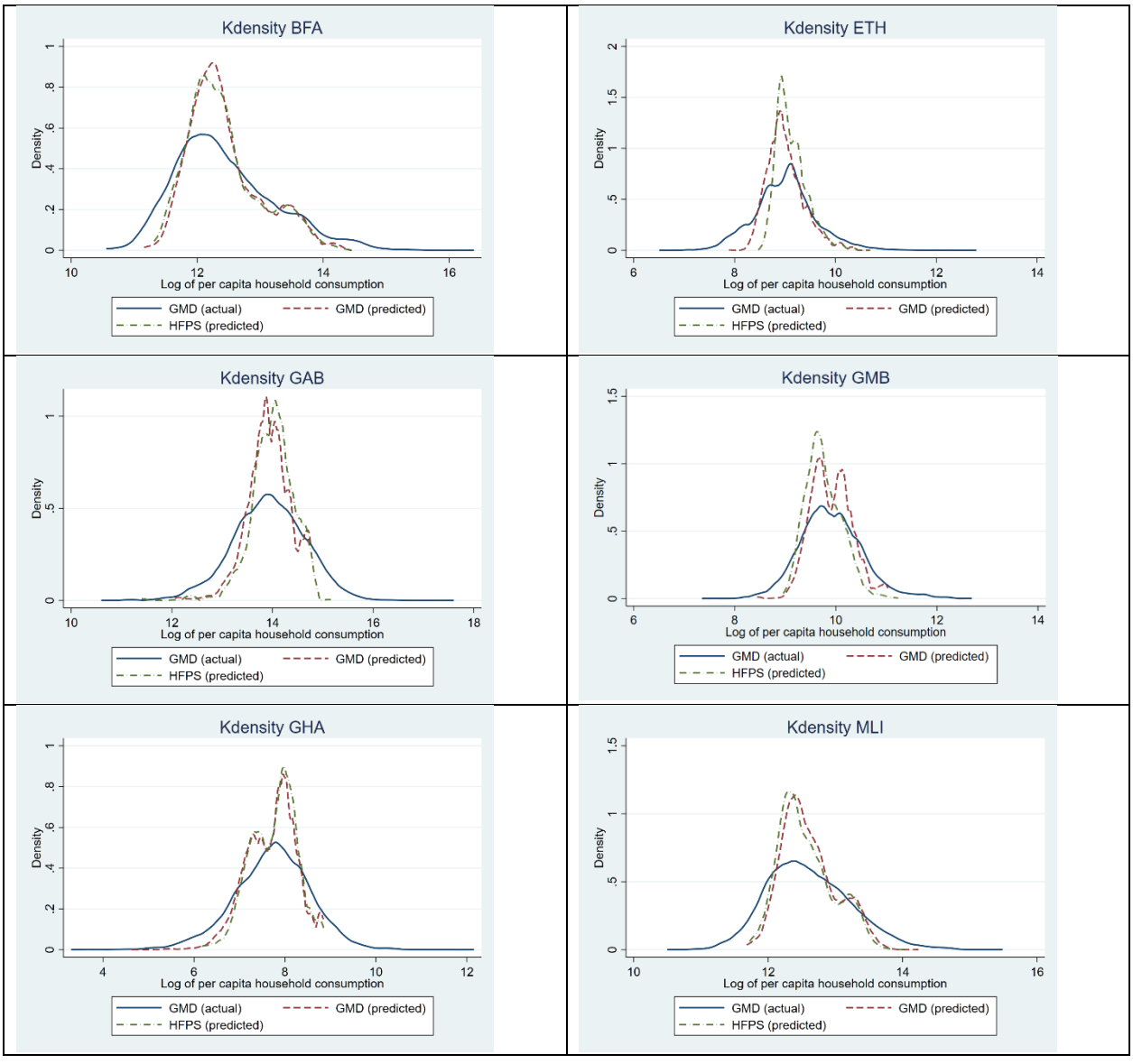
Table B2: Adjusted R-squared from imputation models

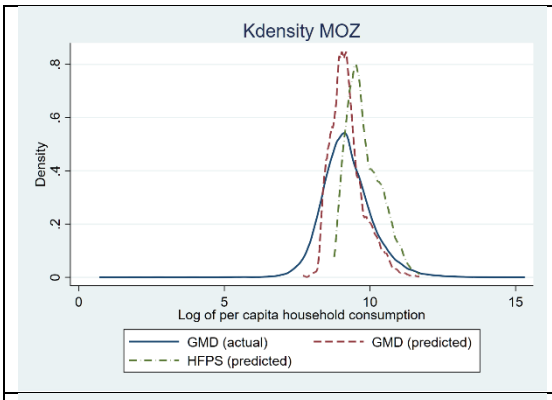
Country	Adj. R-squared
Burkina Faso	0.54
Ethiopia	0.36
Gabon	0.36
Ghana	0.43
Gambia, The	0.43
Mali	0.43
Mozambique	0.43
Malawi	0.53
Niger	0.46

[39] Regression results are available on request.
[40] For the purposes of the prediction, all HFPS respondents are assumed to own a mobile phone.

Nigeria	0.55
Senegal	0.55
Sierra Leone	0.56
Uganda	0.36
Zimbabwe	0.50

Appendix Table 3: Comparison of distribution of actual and predicted (for the first wave of HFPS) per capita household consumption




Kdensity MOZ
Density
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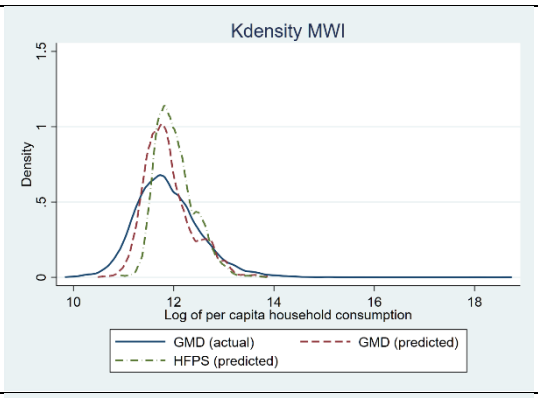
.4
.6
.8
0
5
10
15
Log of per capita household consumption
GMD (actual)
GMD (predicted)
HFPS (predicted)


Kdensity MWI
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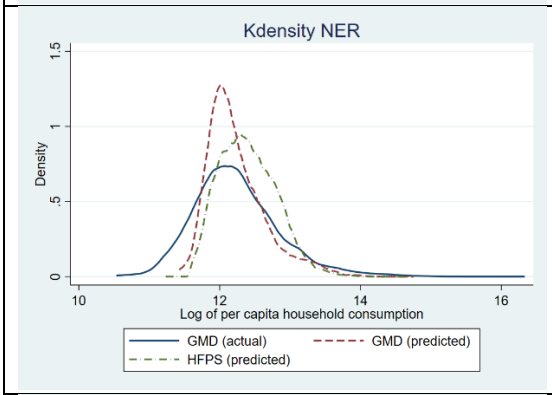
1.5
10
12
14
16
18
Log of per capita household consumption
GMD (actual)
GMD (predicted)
HFPS (predicted)


Kdensity NER
Density
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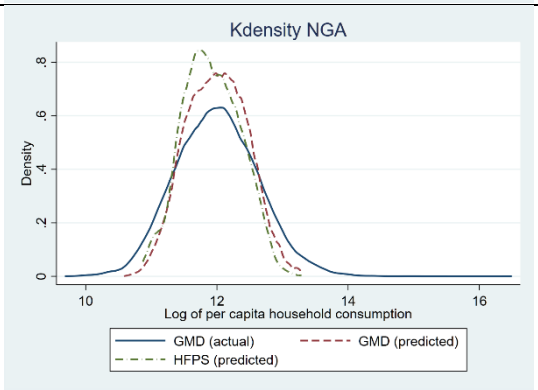
14
16
Log of per capita household consumption
GMD (actual)
GMD (predicted)
HFPS (predicted)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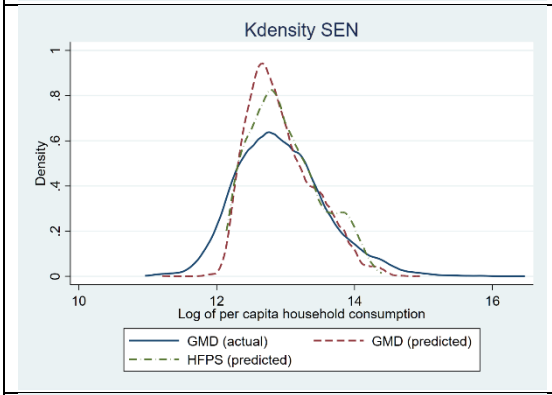
Log of per capita household consumption
GMD (actual)
GMD (predicted)
HFPS (predicted)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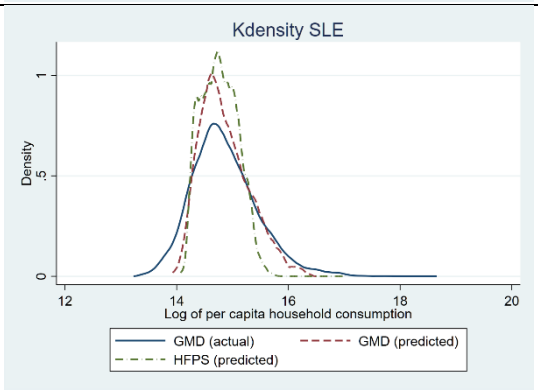
Log of per capita household consumption
GMD (actual)
GMD (predicted)
HFPS (predicted)


Kdensity SLE
Density
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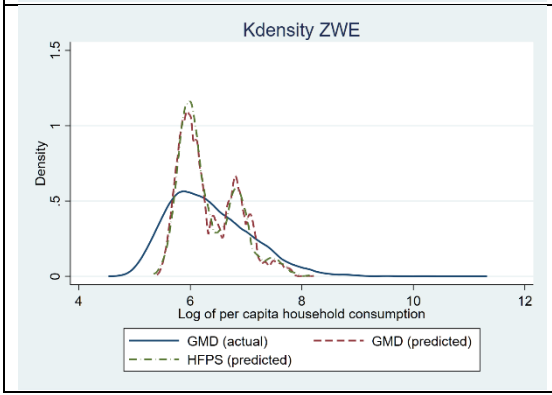
Log of per capita household consumption
GMD (actual)
GMD (predicted)
HFPS (predicted)


Kdensity ZWE
Density
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.5
1
1.5
4
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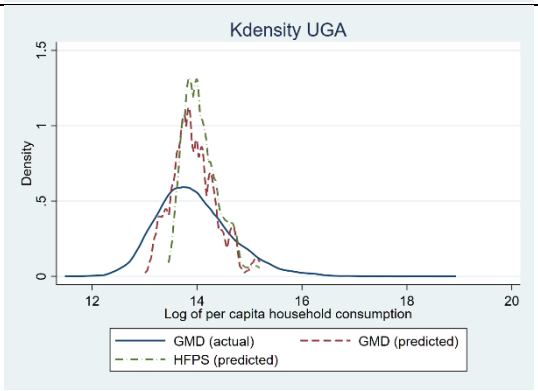
8
10
12
Log of per capita household consumption
GMD (actual)
GMD (predicted)
HFPS (predicted)


Kdensity UGA
Density
0
.5
1
1.5
12
14
16
18
20
Log of per capita household consumption
GMD (actual)
GMD (predicted)
HFPS (predicted)