The impact of COVID-19 on urban informal workers in Maputo

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Abstract: Informal self-employed traders in developing countries are vulnerable to shocks as they often lack access to social insurance or formal finance. This study investigates the impact of the COVID-19 pandemic on these urban traders in the capital of Mozambique, Maputo. Drawing on longitudinal phone survey data over six months, we find they experienced significant negative shocks to earnings, leading to a reduction in savings as well as worsening food security and assets. Individuals simultaneously affected by a municipal policy to remove informal traders from a central market were hit particularly hard as they lost their clients and market stalls. We simulate that a cash transfer equivalent to the government's proposed COVID-19 response would have significantly buffered these shocks. The findings point to the need for a more shock-responsive social protection system, easy access to liquidity and provision of market infrastructure for informal traders.

Key words: COVID-19, informal, urban traders, Mozambique

JEL classification: I32, J46, O17

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1   Introduction

COVID-19 pandemic-related restrictions have hit urban economies in low-income countries hard. Early in the pandemic, policy makers, civil society actors, and international organizations raised concerns about the vulnerability of informal workers to public health restrictions (FAO 2020; ILO 2020; WIEGO 2021), especially given the general absence of formal support structures targeting this segment of the population. For example, Egger at al. (2020) estimated that on average less than 15 per cent of urban households across 30 sub-Saharan African countries met the conditions to endure a strict lockdown.

As the pandemic has progressed, multiple studies have confirmed these fears, including findings of significant employment and income losses across various African countries, for example, Amare at al. (2020) and Balana et al. (2020, 2021) for Nigeria; Abay et al. (2020) and Hirvonen et al. (2020) for Ethiopia; Balde et al. (2020) for Burkina Faso, Mali, and Senegal; and Egger et al. (2021) and Khamis et al. (2021) for multi-country surveys. These losses have been associated with heightened food insecurity, in many instances with impacts persisting several months into the pandemic, even after initial signs of economic recovery (Balana et al. 2020, 2021; Egger et al. 2021; Hirvonen et al. 2020). Evidence also suggests that households have often drawn on savings or sold household assets as a response to the pandemic shock, with the most vulnerable groups being informal workers, such as street vendors and market traders. WIEGO (2021), for instance, documented initial income losses of around 85 per cent among street vendors in 11 cities, including Accra and Dar es Salam. Schotte et al. (2021) identify the largest income losses among informally self-employed workers in Ghana, independent of local lockdown measures, emphasizing their vulnerable position.

This paper adds to the evidence on pandemic impacts examining the experience of informal workers in urban Mozambique during the pandemic. We draw on four rounds of rapid phone surveys of informal workers undertaken in the capital city of Maputo between September 2020 and April 2021. The surveys collected both current and retrospective data, focusing on economic activity, business earnings, informal savings, and household coping mechanisms such as reducing meals, selling assets, or drawing down savings. We use data from these surveys to document the extent to which small informal businesses saw their earnings drop throughout the pandemic and show that many ceased economic activity altogether. Without making strict causal claims, we show that the pandemic was associated with a fall in earnings of around 65 per cent among households of informal workers. In addition to the impact on earnings, we also find that the proportion of traders participating in informal rotating saving groups (called *Xitiques* in Mozambique) drops by 40 percentage points, from around 70 per cent before the pandemic to around 30 per cent, which corresponds to a 64 per cent decline in informal savings engagement. The few traders who continue to save through such *Xitique* savings groups reduced the value of their contributions by almost 40 per cent.

Following the analysis of the impact of the COVID-19 pandemic on informal workers' earnings and savings, we investigate their coping mechanisms. We find that, while borrowing money is not linked to earnings losses or savings group participation, food intake reduction is strongly responsive to both. Loss of profits and lack of savings via *Xitique* are also significantly associated with the likelihood of trying to sell assets.

Few low-income countries have had adequate fiscal space to respond to the pandemic with social protection measures, but where such programmes already existed, they seem to have helped buffer its worst effects (Abay et al. 2020). In Mozambique, an emergency cash transfer was planned as

part of the government's response to the pandemic. Building on the existing national social protection programme, this emergency cash transfer was expected to reach segments of the population that were more exposed to the socioeconomic impacts of the pandemic, including people working in the informal economy. However, technical and bureaucratic challenges significantly delayed its implementation and none of the 600 workers included in our sample received any support throughout the period of this study. Against this background, we simulate how the planned intervention—a monthly cash grant of 1,500 Mozambican metical (MZN) over 6 months to eligible households—would have mitigated the negative effects of the pandemic. The result is a much smaller drop in earnings (36 per cent compared with 65 per cent without the transfer). By our estimates, this would translate to a reduction by around half in food insecurity and selling of household assets versus what we observed. These results illustrate the severe impacts of the COVID-19 pandemic on informal traders and the potential role for shock-responsive cash grants to substantially buffer adverse impacts, as missing meals and selling off household assets.

By way of structure, the next section provides some context of the labour market structure in Mozambique, followed by an overview of the evolution of the COVID-19 pandemic in the country, including government measures taken to mitigate its socioeconomic impacts. We then describe in Section 4 the survey and main characteristics observed in the sample. In Section 5, we provide descriptive estimates of the pandemic's impact on earnings and savings, as well as possible household coping mechanisms. Finally, we provide simulation estimates of the buffering effect of a planned but not implemented cash grant before concluding in Section 6.

2   Mozambique and the COVID-19 pandemic

Despite registering strong and sustained economic growth since the early 1990s, Mozambique remains one of the poorest countries in the world, with purchasing power parity rates of gross national income per capita at only USD 1,250 in 2020, compared with an average of almost USD 2,000 for low-income countries as a whole, ranking in 2020 in position 181 of 189 countries considered in UNDP's Human Development Index. Comparative analysis of multidimensional poverty undertaken by Mahrt et al. (2020) indicates substantially higher rates of deprivation in Mozambique, as well as slower progress in their reduction, relative to other neighbouring sub-Saharan African countries. In their analysis of recent economic trends, Ferreira and Tarp (2021) highlight the absence of a sustained internal (domestic) engine of growth and a high reliance on external capital flows, many of which are of an enclave nature, as hampering prospects for more inclusive patterns of growth and development in the country.

In keeping with this overall challenging situation, economic activity in the country is predominantly of an informal nature. According to the most recent national household survey of 2014/15, which provides the most comprehensive basis for labour market analysis, 72 per cent of the economically active population in Mozambique was employed in predominantly smallholder agriculture, with another 13 per cent engaged in informal family enterprises or self-employment. Put differently, fewer than two in every ten workers can be classed as having a formal or wage-earning employment, and many of these are engaged in the public sector (see Jones et al. 2018). Indeed, a recent longitudinal survey of graduates from technical and vocational educational institutions found that 12 months after finishing their course, just 8 per cent of participants had any form of fixed employment, another 38 per cent were reliant on irregular informal work, and 24 per cent were unemployed (Jones et al. 2021). Formal employment and the protections these afford are enjoyed by just a minority of workers.

With regard to the evolution of the pandemic in the country, during the period of interest for our analysis (March 2020–April 2021), Mozambique experienced two primary COVID-19 surges. The first was relatively mild, lasting from August to December 2020, with a maximum of 305 cases reported in one day (27 September 2020). The second surge was considerably stronger, lasting from early January to April 2021, with a maximum of 1,274 daily cases reported on 25 January (Figure 1). Despite the small number of cases during the first months of the pandemic, measures imposed by government on social and economic activities were relatively strict, especially in urban areas, as measured by the Government Stringency Index of the Oxford COVID-19 Government Response Tracker (Hale et al. 2021). Among others, opening times for shops and restaurants were limited, a night-time curfew was introduced in urban areas, social distancing measures were implemented in markets and in public transport, and restrictions were imposed on border crossings.

Figure 1: COVID-19 cases and government stringency in Mozambique, January 2020 until June 2021
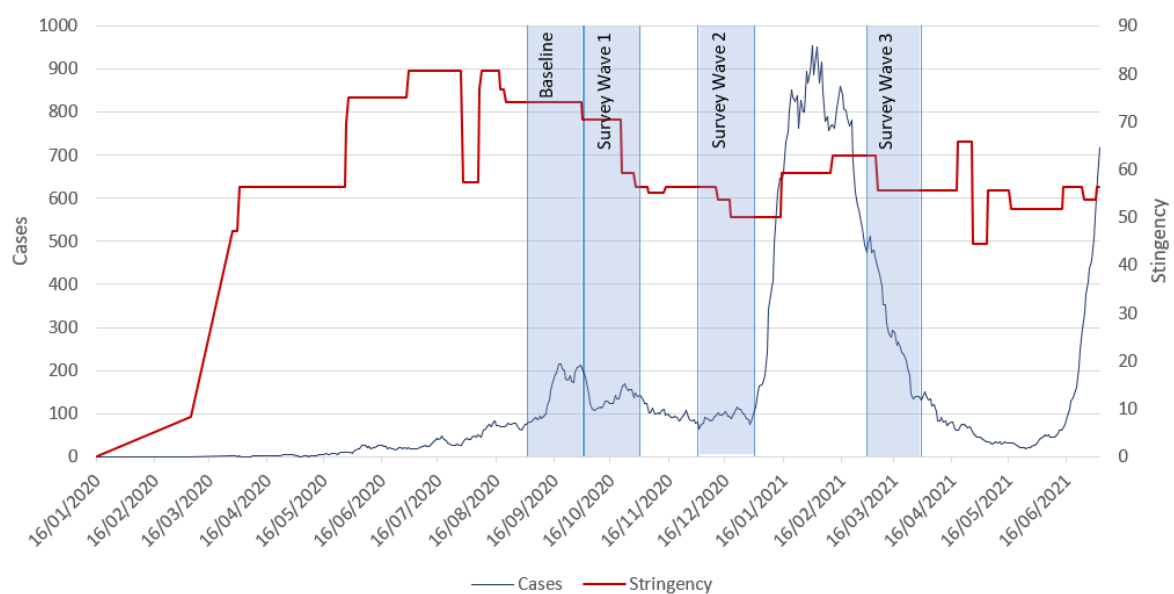
Note: the left axis measures the number of cumulative daily confirmed COVID-19 cases over time, whereas the right axis shows the government stringency index (Hale et al. 2021) over the same period.

Source: authors' compilation based on public data from Ministry of Health (2020–21) and National Institute of Health (2020–21).

Up until the pandemic, Mozambique had experienced broadly robust economic growth. Between 2001 and 2005, real gross domestic product (GDP) growth averaged 7.7 per cent per year, but this slowed to 3.3 per cent between 2016 and 2019 (for discussion of recent trends, see Ferreira and Tarp 2021). The year of the pandemic, 2000, started with optimistic forecasts of 6 per cent real GDP growth, but this turned out to be the first year the Mozambican economy contracted in 28 years (World Bank 2021). By the end of 2020, real GDP had contracted by 1.3 per cent (INE 2020). The hardest hit sectors were the extractive industry, manufacturing, and private services due to foreign demand reduction, but also affected by a decline in domestic demand due to COVID-19-related restrictions (World Bank 2021).

Previous studies have documented the severe economic impacts that the pandemic and related restrictions have had in Mozambique. Betho et al. (2021) assess the macroeconomic impact applying a social accounting matrix multiplier analysis. Using a set of assumptions and data on key economic indicators, they estimate COVID-19 led to a decline in real GDP and employment by 3.6 per cent and 1.9 per cent, respectively, compared with what would have happened had the

pandemic not struck. They also find that urban labour was most affected. Barletta et al (2021) support this view, estimating household consumption fell between 7.1 and 14.4 per cent due to the pandemic, generating an increase in poverty of between 4.3 and 9.9 percentage points. On average, this corresponds to about 2 million people falling into poverty in less than a year. Consumption losses were estimated to be larger for the urban population, while poverty effects were larger among rural Mozambicans, already living closer to the poverty line. Similarly, the World Bank (2021) finds that COVID-19 severely affected enterprises and households, causing sudden income losses and worsening living conditions, particularly affecting the urban poor who are largely dependent on the informal sector. All these impacts are expected to have affected informal traders via a decline in demand for their products and services.

3 The COVID-19 Informal Sector Survey

The analysis presented in this paper is based on a longitudinal survey of informal workers operating in the capital city of Maputo, conducted to assess the socioeconomic impact of COVID-19 on this group of the population, which had been identified as potentially one of the most vulnerable to the socioeconomic effects of the pandemic (UNDP and MEF 2021). The COVID-19 Informal Sector Survey (CISS)[1] was designed as a quantitative longitudinal study, consisting of an initial baseline survey and three follow-up waves, implemented between August 2020 and March 2021 (see Table 1 for timeline and number of participants).

Table 1: Sample structure (respondents/rounds)

Wave	Female	Male	Total
Baseline (31/08/20–23/09/20)	385	215	600
Wave 1 (22/10/20–04/11/20)	323	178	501
Wave 2 (09/12/20–30/12/20)	326	174	500
Wave 3 (19/02/21–24/03/21)	322	178	500

Source: authors' calculations based on CISS data.

The CISS was constructed from a stratified random sample of informal operators taken from the population of individuals affiliated with the Associação da Economia Informal de Moçambique (ASSOTSI-AEIMO), Mozambique's main association of informal economy operators, for whom basic identity information and contact details were available at the time of the survey.[2] The sample was stratified by age to better represent the characteristics of self-employed workers living in the city of Maputo, as reflected in data from the 2017 Mozambique national census for own account workers residing in Maputo.

The CISS intended to cover 500 informal workers over the survey period. The first baseline survey was conducted in September 2020. Anticipating likely dropouts during the remaining three follow-up waves, a total of 600 workers were questioned for this baseline survey. This first survey provided a baseline for the whole study, generating a rich set of information on informal workers and their families, as well as on the initial effects of the pandemic on this group of the population.

Thereafter, subsamples of 500 informal workers were randomly assigned for each of the three follow-up waves conducted for this study, waves that sought to monitor over time the socioeconomic effects of COVID-19 in the informal sector. Throughout the survey, information was collected on business, employment, and household conditions faced by informal operators in the sample.

In terms of participation rates, 69.8 per cent of informal workers taking part in the CISS participated in all four rounds, 15.5 per cent in three rounds, 8.5 per cent in two rounds, and 5 per cent only participated in the baseline survey (see Table 2 for more details).

Table 2: Participation pattern

Frequency	Percentage	Participation pattern			
		Baseline	Wave 1	Wave 2	Wave 3
419	69.8	•	•	•	•
39	6.5	•		•	•
35	5.8	•	•	•	
30	5.0	•			
28	4.7	•	•		
23	3.8	•			•
19	3.2	•	•		•
7	1.2	•		•	
Total	100	600	501	500	500

Source: authors' calculations based on CISS data.

As mentioned, the baseline survey yielded a rich set of background information on survey participants and their households. Table 3 presents key characteristics of the sample disaggregated by gender. The average age of informal sector workers participating in the CISS was 39.9 years, with the median and modal ages both at 38 years. Women were somewhat older than men: 42.3 years of age on average, as opposed to 35.5 years for men. The youngest person was 19 years old at the time of the survey. The oldest was 70 years. The CISS sample has a strong presence of female informal economy operators, with women representing 64 per cent of the sample. This is a significantly higher share than that of self-employed female workers residing in Maputo reported in the 2017 national census (48.8 per cent). This difference lies in the history of ASSOTSI-AEIMO, which has traditionally attracted among its membership informal workers engaging in activities that have a larger number of female informal workers (e.g., market workers selling fresh foodstuff). In terms of educational attainment, up to 58.8 per cent of informal workers in the sample had only completed primary school at the time of the baseline survey, and an additional 29.1 per cent had completed secondary education. Women generally reported having lower educational attainment levels than men.

Informal workers in the sample live in relatively large households of 5.9 people on average, with 2.8 children per household. Informal sector households in the sample present important vulnerabilities. On average, there is only 1.45 people contributing income to household earnings. Moreover, 15 per cent of households are estimated to be multidimensionally poor, defined as facing at least four deprivations in the standard Alkire–Foster multidimensional poverty measure. Moreover, many informal workers were unemployed at the time of the survey: 20.5 per cent at the time of the baseline survey, in September 2020, with this percentage being significantly higher for women than for men.

Table 3: Profile of respondents

	Full sample		Female		Male	
	Mean	SD	Mean	SD	Mean	SD
Age of respondent (years)	39.86	11.17	42.31	11.18	35.49	9.75
Household size	5.91	2.80	6.07	2.80	5.61	2.78
Contributors to household income	1.45	0.82	1.44	0.78	1.45	0.90
Number of children in household	2.83	1.88	2.84	1.87	2.81	1.89
Educational level (% share)						
No school attainment	6.8		10.2		0.9	
Primary education	60.9		64.6		54.4	
Secondary education	29.1		23.2		39.5	
Technical education	1.8		1.3		2.8	
Tertiary education	1.3		0.8		2.3	
Poverty/deprivation						
Education	0.61	0.49	0.64	0.48	0.54	0.50
Ownership of durable goods	0.46	0.50	0.53	0.50	0.34	0.48
Drinking water	0.08	0.27	0.08	0.27	0.08	0.28
Food intake	0.58	0.49	0.58	0.49	0.58	0.50
Sanitation	0.36	0.48	0.37	0.48	0.34	0.48
Number of deprivations per household	2.10	1.21	2.21	1.23	1.89	1.19
Multidimensionally poor (>3 deprivations)	0.13	0.33	0.16	0.37	0.08	0.28
Source of income at baseline (%)						
Fixed merchant	50.3		53.8		44.2	
Street trader	22.3		21.3		24.2	
Unemployed	20.5		22.1		17.7	
Services (shoemaker, plumber, carpenter)	4.8		1.8		10.2	
Telephone agent or lottery	1.3		0.3		3.3	
Informal cross-border trader (*Mukherista*)	0.5		0.5		0.5	
Farmer	0.2		0.3		0.0	

Source: authors' calculations based on CISS data.

4 Headline findings

Having described the main characteristics of informal workers in our sample, this section turns to their experience during the COVID-19 pandemic. It presents key headline findings regarding the evolution of business conditions, business performance, and household wellbeing in the informal sector, as perceived by informal workers in our sample. These findings take as a point of reference the pre-COVID-19 situation experienced by informal workers in our sample, based on recall questions for pre-pandemic business and household conditions included in the first baseline survey of September 2020.

Looking at changes before and after the start of the pandemic, the CISS data suggest significant negative tendencies (see Table 4). Thus, the pandemic and the social distancing and confinement measures adopted by the Mozambican government to contain its spread, coincided with a sharp deterioration of business and market conditions faced by informal workers in the CISS sample. Additional information collected in the September 2020 survey (not shown in Table 4), indicated that up to 83.6 per cent of participants reported reduced sales since the beginning of the pandemic. A very similar share saw the number of clients fall during this time, while 60 per cent claimed experiencing problems in acquiring products to sell or finding these more expensive. Also, during the pandemic many informal workers—up to 46 per cent of the sample—reported being forced

by local authorities to relocate from the places in which they usually operated. Market and business conditions facing informal workers in the CISS sample appear to have somewhat stabilized following the baseline survey, but continued to remain challenging in subsequent waves.

In addition to these adverse market conditions faced during the pandemic, informal workers also saw the number of hours they worked drop, with up to 72 per cent of them reporting having experienced such drops for the baseline survey of September 2020. In fact, many of these workers stopped working altogether. Hence, at the time of the baseline survey, 20.5 per cent of informal workers in the CISS sample reported being unemployed, with most of these having stopped working following the beginning of the pandemic—80 per cent of those unemployed in September 2020. Thereafter, reported unemployment increased to 26.8 per cent in October 2020 and to 28.8 per cent in December, stabilizing at 25.8 per cent in the CISS wave of March 2021. Unemployment in the sample has a strong gender dimension, with women accounting for 80 per cent of unemployed informal workers in the third CISS wave of March 2021, a percentage significantly higher than the proportion of women in the CISS sample (64 per cent).

Table 4: Key outcomes

	Pre-COVID	Baseline (September 2020)	Wave 1 (October 2020)	Wave 2 (December 2020)	Wave 3 (March 2021)
Unemployment (%)					
Total	—	20.50	26.75	28.80	25.80
Men	—	17.67	19.10	18.39	15.17
Women	—	22.08	30.96	34.36	31.68
Average earnings (monthly in MZN)					
Total	15,107.6	5,567.8	4,147.2	4,261.6	3,915.9
Men	16,711.2	6,894.2	4,999.5	5,480.6	4,883.4
Women	14,181.8	4,786.6	3,634.8	3,404.5	3,240.3
Use of *Xitiques* (% using *Xitiques*)					
Total	69.00	30.33	28.34	31.20	28.80
Men	70.70	32.56	29.78	32.76	30.90
Women	68.05	29.10	27.87	30.37	27.64
Value of *Xitiques* (monthly in MZN)					
Total	5,625.2	1,631.5	1,486.4	1,727.8	1,632.0
Men	7,606.2	2,658.7	1,766.6	2,072.0	1,846.7
Women	4,471.8	1,039.0	1,324.9	1,540.9	1,505.2

Note: MZN, Mozambican metical. The pre-COVID values are self-reported based on a recall question that was asked in general terms, for example: 'Prior to COVID-19, . . .'; '—' indicates data is unavailable (not collected).

Source: authors' calculations based on CISS data.

Informal workers in the CISS sample also saw their earnings and capacity to save/invest drop sharply since the beginning of the pandemic. Average monthly household earnings in the sample dropped from a pre-pandemic reported value of MZN15,108, to MZN5,568 in September, a 62.9 per cent drop. They then continued to fall, albeit at a slower pace, until reaching an average of MZN3,916 per month at the time of the March 2021 CISS wave. Informal workers' contributions to *Xitiques*, a type of rotating savings and credit scheme popular among informal workers in Maputo, which we take as a measure of their capacity to save and invest, saw similar drops and trends throughout the various waves of the CISS, as can be seen in Table 4. *Xitique* contributions did not only drop but many informal workers stopped altogether contributing to *Xitiques*. Hence, the share of informal workers in the CISS sample contributing to *Xitiques* dropped from 69 per cent before the pandemic to 30 per cent at the time of the September 2020 baseline survey, with this share remaining at similar levels for subsequent CISS waves.

The COVID-19 pandemic also coincided with a worsening of household wellbeing conditions, according to information collected for the CISS. Thus, the drop in earnings experienced by informal workers appears to have coincided with an increase in the share of households drawing down on savings, with 55 per cent of workers in the CISS sample reporting having done so at the time of the baseline survey. However, for many households this has not been an option, with up to 40 per cent of informal workers taking part in the baseline survey indicating they had no savings to fall back on. This points towards pre-existing high levels of vulnerability among informal workers and their families that predate the pandemic.

In this context, many informal worker families in the CISS sample resorted to selling household assets, 21.3 per cent of them doing so at the time of the September 2020 baseline survey. Others have resorted to debt and borrowing, mainly from family, friends, and relatives. Informal workers have also seen a drop in food intake during the COVID-19 pandemic. At the time of the baseline survey, in September 2020, 72.5 per cent of participants in the CISS reported having eaten less than usual during the past month due to lack of money (see Table 5 for details). Of these, 78.6 per cent indicated they had at least missed one meal during this same period. These two shares dropped in subsequent waves of the CISS, although they continued to remain at very high levels. To see how these trends related to the nutritional situation faced by these same families before the COVID-19 pandemic, respondents who had reported missing a meal during the past month were asked in the third CISS wave of March 2021 whether they had experienced a similar situation 12 months earlier, before the pandemic. Seventy-eight per cent of those who missed at least one meal in March 2021 reported they had not done so a year earlier, suggesting that the food constraints that these families were experiencing at the time the CISS were being undertaken were specific to the pandemic period.

Table 5: Coping strategies

	Baseline (September 2020)	Wave 1 (October 2020)	Wave 2 (December 2020)	Wave 3 (March 2021)
Share of respondents or other people in their household who ate less than what they should have due to lack of money (%)				
Total	72.5	71.1	67.2	65.4
Men	69.8	70.8	65.5	64.0
Women	74.0	71.2	68.1	66.2
Trying to sell household assets (share of those who tried to sell, %)				
Total	21.3	8.6	11.4	8
Men	34.0	15.2	21.8	16.3
Women	14.3	5.0	5.8	3.4
Borrowing (share of those who borrowed, %)				
Total	31.5	16.8	20.2	20.8
Men	34.9	14.0	22.4	23.0
Women	29.6	18.0	19.0	19.6

Source: authors' calculations based on CISS data.

Despite this challenging environment, informal workers and their households received very limited support. At least until the time of the third (and last) wave of the CISS, in March 2021, the share of those receiving support from government or local authorities was negligible (between 0 and 1.4 per cent, depending on the CISS wave). This is particularly worrying in a context in which these people and their families were already experiencing important vulnerabilities before the COVID-

19 pandemic and, in Maputo, the municipality forcibly removed many informal traders from their previous place of work.

5   Estimating pandemic impacts on business activities and family coping mechanisms

In this section, we seek to estimate the change of informal traders' economic and social outcomes as the pandemic evolved. First, we assess how earnings and savings behaviour changed throughout the pandemic. Second, we investigate how families of the traders coped with the economic losses. It is important to note that the data at hand do not allow for the identification of a causal effect of the pandemic onset on the outcomes of interest. On the one hand, we only have recall data on pre-pandemic outcomes. On the other hand, we do not have a valid counterfactual group of comparable informal workers who did not experience the pandemic at the same time as our sample. However, even a descriptive assessment of the estimated changes can provide useful insights into the pandemic experience of this vulnerable group of workers.

5.1   Estimation strategy

To complement the previous descriptive statistics estimate, we estimate a linear regression to model how earnings and savings behaviour changed during the pandemic.

$$Y_{i,t} = \alpha + \beta_1 Pandemic_t + \mu_i + \varepsilon_{i,t} \tag{1}$$

$Y_{i,t}$ is the outcome of interest [earnings (if any and amount), participation in informal saving scheme (*Xitique*), and the amount of such savings] in the four waves of the survey. *Pandemic*$_t$ indicates the onset of the pandemic. The coefficient β_1 captures the change in the outcome of interest from before to after the onset of the pandemic controlling for time-invariant unobservable characteristics of the informal trader, μ_i.

We also run the same estimation but allowing for differential effects over time, *Wave*$_t$, that is, reporting the average effect for each wave to see whether the immediate change after the pandemic onset subsided or not.

$$Y_{i,t} = \alpha + \beta_j Wave_t + \mu_i + \varepsilon_{i,t} \tag{2}$$

However, it should be noted, that the panel is not balanced across the follow-up waves, so the results must be considered with caution.

In a second approach, we then investigate heterogeneity of the effect by baseline characteristics X_i estimating

$$Y_{i,t} = \alpha + \beta_1 Pandemic_t + \delta Pandemic * X_i + \mu_i + \varepsilon_{i,t} \tag{3}$$

The characteristics of interest include the trader's gender and education, the deprivation level of their household, the age of their business, and whether they used to trade in the Bairro Central. The interaction between these characteristics and the *Pandemic* indicator allows for heterogeneous experiences of the pandemic.

9

5.2   Results

Table 6 presents the average change of informal traders' earnings and their savings behaviour in terms of participation and value after the pandemic onset. In terms of earnings, 22-percentage point fewer traders report any earnings. Among those traders still running their business, the overall loss in their earnings is 62 per cent.[3] Also, traders' probability to participate in *Xitiques* drops by 43 percentage points from around 70 per cent before the pandemic to around 30 per cent. The few traders who continue to save through *Xitique* groups reduce the value of their contributions by almost 45 per cent.

The magnitude of these effects may seem large—implying average earnings fell to around one-third of their pre-pandemic level—but are in line with similar studies using high-frequency phone surveys. For example, across the 16 samples in nine countries in Latin America, Asia, and Africa, Egger et al. (2021) found income losses of around 70 per cent (median share). Khamis et al. (2021) report non-farming income losses between 74 and 88 per cent in ten sub-Saharan African countries where they conducted comparable phone surveys.

Table 6: Average impact of the pandemic on informal traders' earnings and savings behaviour

|	Earnings (any)	Earnings (log value)	*Xitique* (any)	*Xitique* (log value)
Pandemic	−0.223***	−0.956***	−0.428***	−0.597***
	(0.018)	(0.050)	(0.017)	(0.059)
Individual FEs	Yes	Yes	Yes	Yes
Observations	2,850	1,441	2,850	1,014
R-squared	0.062	0.275	0.217	0.151

Note: FE, fixed effects. The table shows the estimate of the pandemic impact on the respective outcome. Each coefficient comes from a separate regression of Model 1. Earnings and *Xitique* (any) are linear probability models of whether the trader has any earnings or savings. To get the percentage change in earnings and *Xitique* value, one needs to compute $100 \cdot (e^{\beta} - 1)$ where β is the respective coefficient.

Source: authors' estimations based on CISS data.

We then assess the changes over time and not simply before and after the onset of the pandemic (see Model 2). Figure 2 illustrates how they do not subside significantly over time. There is some indication that the earnings losses increased as the pandemic-related restrictions continued. While the likelihood to have any earnings dropped by 15 percentage points in the baseline compared with before the pandemic, it dropped by 23 or 26 percentage points in the following waves. The loss in earnings in terms of value remains relatively stable, though. Similarly, it seems saving became even less likely between September and October 2020, while the value of savings recovered a little over that same period.

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[3] To get the percentage change in earnings and *Xitique* value, one needs to compute $100 \cdot (e^{\beta} - 1)$ where β is the respective coefficient.

Figure 2: Impact of pandemic on earnings and savings over time
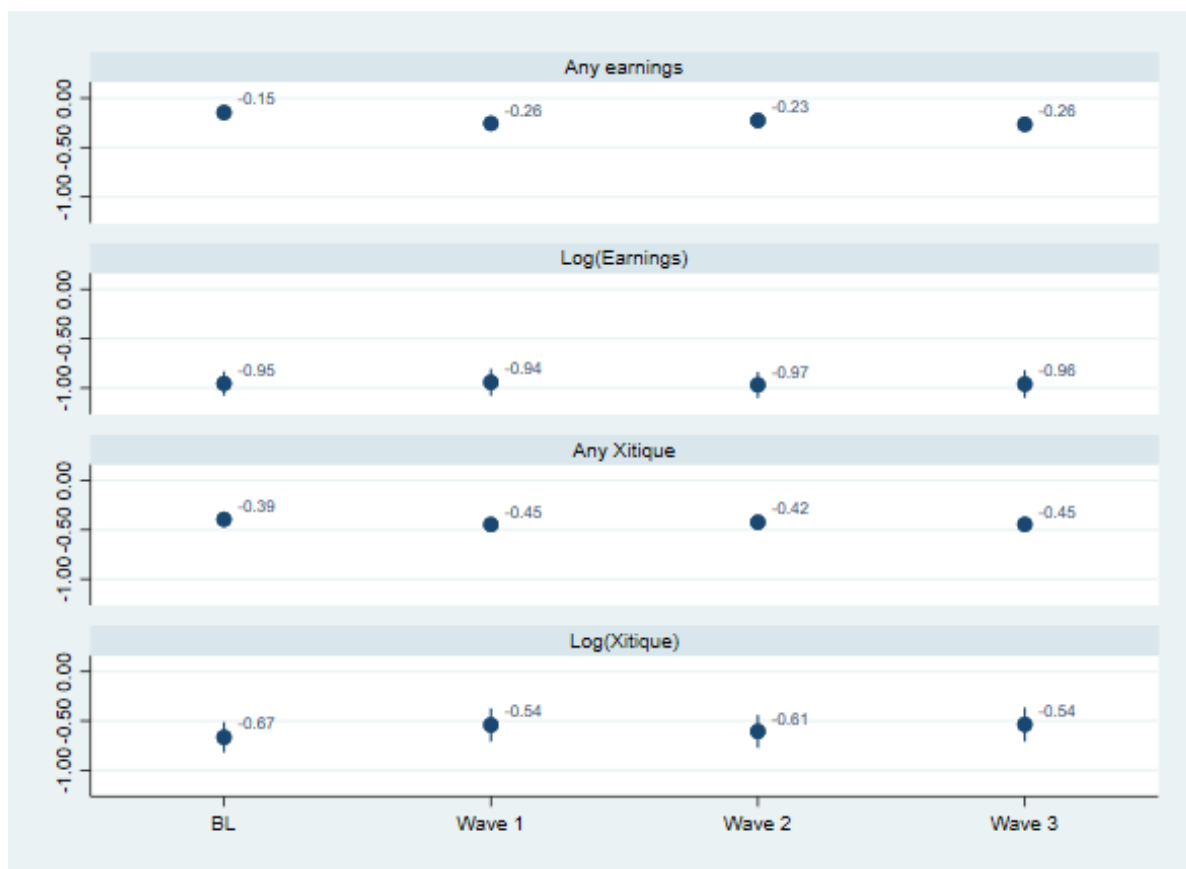
Note: the figure shows the estimated difference in the respective outcome in each survey wave relative to the pre-pandemic period. Each coefficient comes from a separate regression of Model 2. Earnings and *Xitique* (any) (Rows 1 and 3) are linear probability models of whether the trader has any earnings or savings. From Rows 2 and 4, one can get the percentage change in the amount of earnings and *Xitique* by computing $100 \cdot (e^{\beta} - 1)$ where β is the respective coefficient.

Source: authors' estimations based on CISS data.

Finally, we investigate heterogeneous effects by characteristics of the informal trader. Figure 3 presents the interaction effects from the corresponding regression specification (3) (full results are presented in Appendix Table A1). In terms of earnings, we find little heterogeneity, which is consistent with the shock being broad-based. On the extensive margin (any earnings), we find that households with four deprivations are more likely to have lost any earnings than families with fewer deprivations. Also, business age slightly mattered for earnings. Businesses between 1 and 3 years old slightly buffered the pandemic shock compared with very young businesses. Having worked in Bairro Central, the central commercial district in Maputo, and the pandemic jointly are associated with a higher likelihood to still run a business but with a significant reduction in earnings. These traders had significantly higher earnings before the pandemic and now lost an additional 34 per cent. In terms of *Xitique* participation, these workers reduce their participation by 10 percentage points. Those with some education compared with none were more likely not to engage in *Xitique* after the onset of the pandemic. This is because those with no education were previously already unlikely to participate in *Xitique* (56 per cent had no *Xitique* compared with 20–30 per cent of those with some education). The more deprived households were more likely not to engage in *Xitique* after the pandemic onset, though not the most deprived (Levels 2–5). We did not find heterogeneous effects of the pandemic on the amount saved in *Xitique* (intensive margin). However, this result does not account for selection into engaging in *Xitique* and many of the baseline characteristics seem to explain the extensive margin as observed in Column 3.

Interestingly, we do not find a statistically significant gender difference in the COVID-19 impact for all outcomes [in contrast to, for example, Casale and Posel (2021) in South Africa]. However, earnings and the amount of savings of female traders were lower than those of male traders before the pandemic.

Figure 3: Pandemic impact on earnings and savings by baseline characteristics, interaction effects
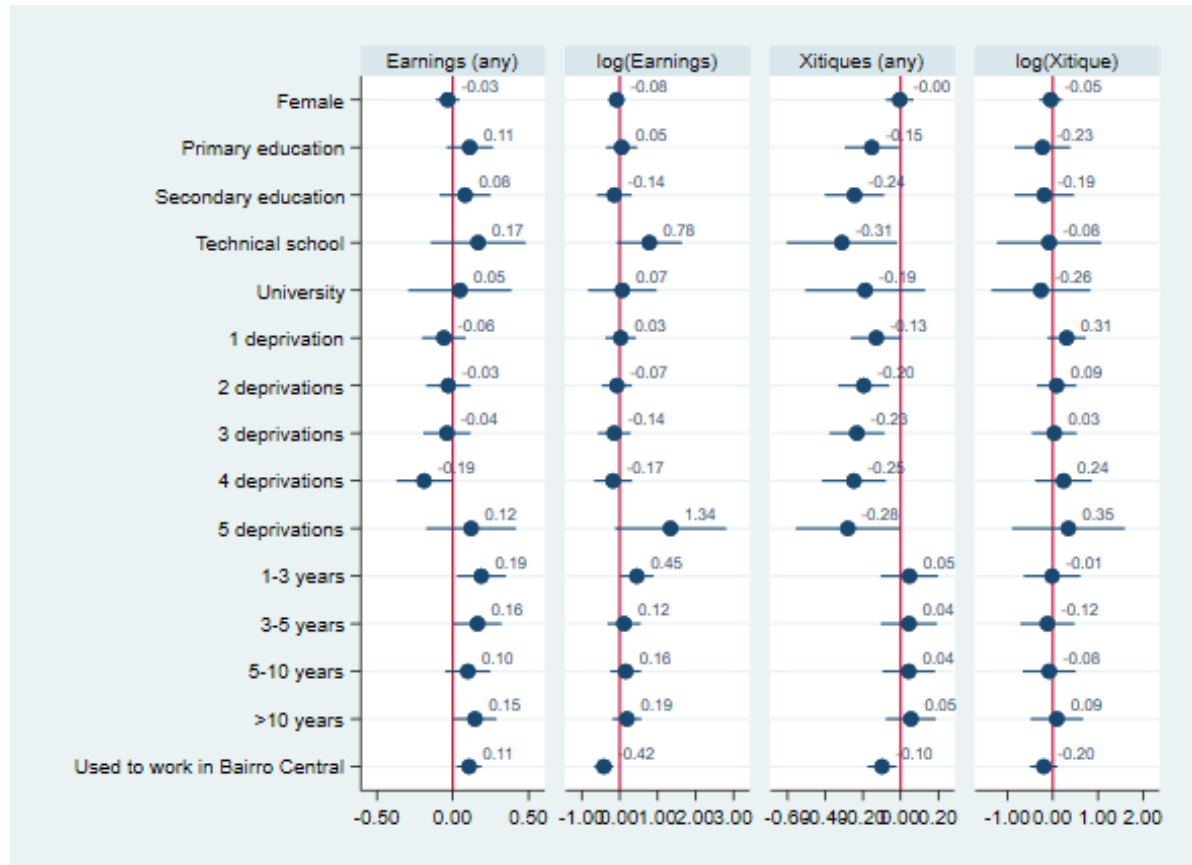
Note: each column presents coefficient estimates and confidence intervals from a separate regression with the corresponding dependent variable earnings, *Xitique* participation, or value of *Xitiques* as specified in Model 3. The coefficients are those of the interaction between the post-dummy and the relevant baseline characteristic. Base categories are as follows: for education, 'No education'; for deprivations, 'No deprivations'; and for business age, 'less than 1 year'.

Source: authors' estimations based on CISS data.

5.3 Elasticity between pandemic impacts and coping mechanisms

For most households in the sample, the informal trader participating in the survey is the only income provider. To understand the extent to which losses in earnings (associated with COVID-19) may have driven a household to adopt coping strategies, we estimate naïve elasticities between earnings or *Xitique* and the reported coping mechanisms:

$$C_{i,t} = \alpha + \gamma_1 Y_{i,t} + \gamma_2 X_i + \epsilon_{i,t} \tag{4}$$

where $C_{i,t}$ is one of three possible coping mechanisms: whether the household borrowed money, whether they had to reduce the amount of food consumed or skip meals, and whether they tried to sell assets. The baseline characteristics X_i are the same as previously, as are the pandemic-affected outcomes, $Y_{i,t}$, earnings, and *Xitique* at the extensive and intensive margin, are the same as previously. Note that in this regression, we cannot exploit a pre- and post-pandemic comparison,

as the coping mechanisms as such were not included as baseline characteristics. We therefore only have the prevalence of coping mechanisms for post-pandemic onset waves.

Our results are presented in Table 7. At the extensive margin of earnings, only borrowing is affected. Traders who still earn any income are 5 percentage points more likely to borrow money. Other than that, there is no statistically significant association between the level of earnings, *Xitique* participation or amount and the probability that a trader tried to borrow money. We find statistically significant and large correlations between earnings and *Xitique* and the likelihood to reduce food intake. Specifically, the probability that traders and their families consume less food is 7.4 percentage points larger for those who do not earn any income and among those who still report earnings, it is 3.5 percentage points larger for those whose earnings dropped by 100 per cent. We observed in Table 1 that the average loss in earnings was 62 per cent, so we can calculate a corresponding food reduction of around 2 percentage points. Those traders who are not engaged in *Xitique* are almost 10 percentage points more likely to eat less. The amount of *Xitique* corresponds to a 6-percentage point increase in the probability of food insecurity if we assume a decline in *Xitique* of 100 per cent.

Earnings loss and lack of savings via *Xitique* are also significantly associated with the likelihood to try to sell assets to make money. Although there is no relationship between whether a trader reports any earnings and the selling of assets, the observed earnings loss of 62 per cent through the pandemic can be associated with a 1.4-percentage point higher probability that a trader's family tries to sell assets (2 percentage points in case of 100 per cent earnings loss). This probability increases by 5 percentage points for traders who disengage from *Xitiques* but does not correlate with the amount of *Xitique*. The latter result indicates that these families cannot draw on informal savings any more, so they have to sell assets instead.

Table 7: Coping mechanisms in response to changes in earnings and savings

	Borrowed				Less food				Sell assets			
Any earnings	0.046**				−0.074***				0.003			
	(0.019)				(0.020)				(0.014)			
Log (earnings)		0.003				−0.035**				−0.021**		
		(0.014)				(0.015)				(0.010)		
Any *Xitique*			0.030				−0.098***				−0.050***	
			(0.021)				(0.021)				(0.016)	
Log (*Xitique* amount)				−0.007				−0.060***				−0.003
				(0.016)				(0.018)				(0.010)
Constant	0.046	0.059	0.069	0.007	0.368***	0.721***	0.353***	0.991***	0.081	0.215*	0.105**	0.142
	(0.067)	(0.156)	(0.066)	(0.192)	(0.070)	(0.165)	(0.069)	(0.206)	(0.051)	(0.115)	(0.050)	(0.120)
Wave FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,071	1,051	2,071	616	2,071	1,051	2,071	616	2,071	1,051	2,071	616
R-squared	0.039	0.045	0.037	0.048	0.132	0.128	0.135	0.164	0.106	0.114	0.11	0.088

Note: FE, fixed effects. Asterisks indicate significance levels: *$p<0.1$; **$p<0.05$; ***$p<0.01$. Each regression controls for the survey wave dummies. The number of observations is smaller than in previous regression tables because in this specification we excluded the pre-pandemic period for which no data on the outcome variables is available.

Source: authors' estimations based on CISS data.

6 Simulation of cash transfer

Our findings show that households experienced a severe cash constraint not only due to earnings losses but also as they appear to have depleted informal saving sources (*Xitiques*). As a result, traders and their families resort to reducing their food intake and trying to get cash by selling their assets. From development economics literature, we know that such coping strategies can have negative long-term consequences (among others, see Baez et al. 2018; Dercon 2005; Ellis et al. 2009; Groover et al. 2015; Lawson and Kasirye 2013; Tschirley et al. 2006).

The Mozambican government tried to pre-empt such issues through a rapid cash transfer to families in poor neighbourhoods of the main urban centres of the country, among them Maputo. The design envisioned a payment of MZN1,500 per month for a period of 6 months (Vieira et al. 2020). Due to delayed implementation, the roll-out has only started slowly in some targeted areas at the end of 2020. At the time of the survey, including its latest round, none of the traders in the sample had received such a transfer.

Thus, we simulate by how much the transfer could have avoided the observed hardship of the affected traders. To do so, we artificially increase the earnings of traders after the pandemic by MZN1,500 per month over 6 months. This is possible as we observe the earnings in the three waves during the pandemic over a period of 6 months. We then re-estimate the pandemic shock as specified in Model 1. The result is presented in Table 8. We estimate a drop in the probability to have any earnings of 14 percentage points compared with 22 percentage points without the transfer. In terms of the amount, the loss is now 'only' 29 per cent compared with 62 per cent without the transfer. Plugging this result into the estimates from Table 5, this translates to a reduction in food insecurity or the likelihood to sell assets by around half.

Table 8: Counterfactual earnings in response to pandemic.

	Earnings (any)	Log (earnings)
Pandemic	−0.141***	−0.349***
	(0.018)	(0.037)
Individual FEs	Yes	Yes
Observations	2,850	1,628
R-squared	0.026	0.072

Note: FE, fixed effects. Asterisks indicate significance levels: *$p<0.1$; **$p<0.05$; ***$p<0.01$.

Source: authors' estimations based on CISS data.

7 Conclusion

Informal self-employed traders in developing countries are vulnerable to shocks. In this study, we look at the experience of this population in the Mozambican capital, Maputo, during the COVID-19 pandemic. Drawing on phone survey data over 6 months, we find they experienced significant adverse shocks ranging from an increase in unemployment, a considerable loss in earnings and savings, and a reduction in participation in informal savings groups. We further show that these economic losses translated into food insecurity and selling off assets for the informal traders' families.

Looking at the characteristics of traders, we observe that those who used to work in the central market area of Maputo experienced large and significant income and job losses as the pandemic

onset coincided with an initiative by the municipality to remove informal activities from this area. These traders thus lost their clients and market infrastructure at the same time as the local economy experienced a downturn.

To assess the potential for government responses to buffer such negative effects, we simulate a cash grant and find that such an instrument could have significantly protected informal traders' earnings and savings. Consequently, one could also expect significant protection for families from food insecurity and the selling of assets.

These findings point at two avenues for policy. First, governments should consider shock-responsive social protection systems. In the case of Mozambique, the government planned an emergency cash grant to the vulnerable population in urban areas but delayed the implementation due to various challenges. Thus, potential or later beneficiaries already suffered for almost a year before receiving any support, possibly with detrimental long-term consequences. For example, the government could now reform the system by setting up mobile payment systems ready to function in a new crisis or establishing relationships with relevant organizations, such as the informal economy association, to facilitate the targeting of beneficiaries.

Second, with a large population working as self-employed informal traders, the government should seek ways to support their economic activities, raise their productivity, and protect them from shocks. For example, moving traders to a new location in the city should have been accompanied by providing basic infrastructures such as market stalls and vehicle access at the newly assigned area. Further, as informal savings dried up, one could think of offering small short-term loans to informal traders to secure their liquidity.

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Appendix: Additional material

Table A1: Estimates of pandemic impact on earnings and savings with heterogeneous effects by baseline characteristics

	Profits	*Xitique* (participation)	*Xitique* (value)	Xitique_v_results
	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Pandemic	−0.409***	−0.958***	−0.091	−0.450
	(0.126)	(0.342)	(0.118)	(0.471)
Pandemic # Female	−0.033	−0.081	−0.005	−0.045
	(0.040)	(0.108)	(0.037)	(0.128)
Pandemic # Primary education	0.112	0.052	−0.153**	−0.226
	(0.078)	(0.209)	(0.073)	(0.315)
Pandemic # Secondary education	0.081	−0.142	−0.245***	−0.189
	(0.086)	(0.234)	(0.080)	(0.335)
Pandemic # Technical school	0.167	0.781*	−0.312**	−0.081
	(0.160)	(0.438)	(0.150)	(0.587)
Pandemic # University	0.047	0.068	−0.188	−0.262
	(0.174)	(0.462)	(0.162)	(0.558)
Pandemic # 1 deprivation	−0.058	0.025	−0.129*	0.308
	(0.073)	(0.204)	(0.069)	(0.215)
Pandemic # 2 deprivations	−0.030	−0.074	−0.196***	0.086
	(0.074)	(0.202)	(0.069)	(0.222)
Pandemic # 3 deprivations	−0.039	−0.142	−0.232***	0.034
	(0.079)	(0.218)	(0.074)	(0.252)
Pandemic # 4 deprivations	−0.189**	−0.174	−0.248***	0.239
	(0.093)	(0.255)	(0.087)	(0.319)
Pandemic # 5 deprivations	0.120	1.341*	−0.280**	0.347
	(0.151)	(0.748)	(0.141)	(0.636)
Pandemic # 1–3 years	0.187**	0.454**	0.047	−0.015
	(0.083)	(0.226)	(0.078)	(0.320)
Pandemic # 3–5 years	0.163**	0.117	0.043	−0.117
	(0.081)	(0.223)	(0.076)	(0.305)
Pandemic # 5–10 years	0.099	0.159	0.043	−0.078
	(0.076)	(0.207)	(0.071)	(0.298)
Pandemic # >10 years	0.146**	0.191	0.054	0.089
	(0.073)	(0.195)	(0.068)	(0.297)
Pandemic # Used to work in Bairro Central	0.107**	−0.419***	−0.099**	−0.199
	(0.042)	(0.129)	(0.039)	(0.154)
Constant	0.684***	9.072***	0.698***	8.282***
	(0.016)	(0.042)	(0.015)	(0.044)
Individual FEs	Yes	Yes	Yes	Yes
Observations	2,850	1,441	2,850	1,014
R-squared	0.072	0.298	0.227	0.164

Note: Coeff., coefficient; SE, standard error; FE, fixed effects. '#' indicates an interaction term between two variables; only selected coefficients shown. Asterisks indicate significance levels: *$p<0.1$; **$p<0.05$; ***$p<0.01$.

Source: authors' estimations based on CISS data.