Latin American Economic Review

RESEARCH ARTICLE Special Issue: COVID-19 in Latin America **Open Access**

From bad to worse: The economic impact of COVID-19 in developing countries. Evidence from Venezuela[1]

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Abstract

Policy responses to COVID-19 affected the dynamic of economic growth and labor markets worldwide, hitting economically harder on developing countries. These policies involved economic lockdowns that included the shutdown of the main statistical exercises, making it almost impossible to assess the breadth and variety of their effects. Using a phone survey, this paper examines the impact of the quarantine implemented in Venezuela on labor market outcomes. The identification strategy exploits the exogenous variation in the severity of the lockdown in different regions of the country. The main result indicates a 16.5 percentage points reduction in employment, while in regions with severe lockdowns the reduction has been 13.8 p.p. larger. In particular, the self-employed and informally employed were hard hit by the lockdown. To cope with this effect, households sold their productive assets, reduced their savings, sought for alternative income sources and looked for help from relatives. This paper does not find a differential effect on the number of COVID-19 cases in more severe lockdown settings. Results are robust to endogenous migration and alternative specifications.

JEL: D31, I00, J13

Keywords: COVID-19, Economic impact, Developing countries, Venezuela.

1 The views and opinions expressed in this article are those of the authors and do not reflect the official policy or position of any institution. We thank the editor and the two anonymous reviewers whose comments and suggestions helped improve and clarify this manuscript.

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Introduction

Policy responses to COVID-19 affected the dynamic of economic growth and labor markets worldwide, hitting economically harder on developing countries. These policies involved quarantines and economic lockdowns that included the shutdown of the main statistical exercises, making almost impossible to assess the breadth and variety of their effects. In order to start designing a recovery plan, it is crucially important to understand the consequences of economic lockdowns. Preliminary estimates show that this is probably one of the deepest generalized economic crises in modern history. International agencies project a reduction of global per capita GDP of 5.2 percent (World Bank, 2020). The impact at the macroeconomic level will be devastating mainly for developing countries that have less fiscal and monetary space to react. But even worse are the expected impacts at the microeconomic level affecting household labor market outcomes, household investment decisions and potential long term income mobility.

Development economists usually use face-to-face household surveys to assess the impact of public policies. As COVID-19 is still affecting statistical operations, many papers are not yet published. However, many of the papers that will probably be written about this historic event will contribute to the literature of economic shocks. Due to data availability, there is a small but still growing literature on the microeconomic impacts of COVID19 that shows preliminary negative impacts on hours of work, job losses, job vacancies and unemployment (Adams-Prassl et al., 2020; Beland et al. 2020; Coibion et al., 2020; Gupta et al., 2020; Kahn et al., 2020; Rojas et al., 2020) in developed countries, mainly in the US. Even though all the forecasts by international agencies predict that the economic impact will be the worst in developing countries, there is a very limited number of papers looking at the COVID-19 microeconomic impacts in developing countries.

This paper examines the impact on labor market outcomes of a quarantine with heterogeneous levels of severity implemented in a developing country. We use a face to face household survey in Venezuela, in combination with a follow-up phone survey to estimate the impacts on labor markets. The identification strategy exploits the exogenous variation in the severity of the lockdown in different regions of the country. In particular, we estimate the impacts of economic lockdown due to COVID-19 on labor market outcomes, and the potential coping mechanisms of households in regions with severe lockdowns in comparison with households in regions with non-severe lockdowns.

This work contributes to the incipient literature of economic impacts of policy responses to COVID-19 in developing countries. At the time of submission, this was one of the first papers examining the impact of COVID-19 containment measures in a developing country. This paper also shows the potential of phone surveys to quickly inform about the impacts of a generalized shock in fragile contexts. Finally, it contributes to the discussion about the downside of preventive policies in countries where households are not as resilient and do not have the necessary technology to keep working from home as in developed countries.

Results show that 16.5 percent of the Venezuelans who were employed before the COVID-19 crisis lost their jobs one month after the quarantine. On top of that, those living in states with severe lockdowns experienced an additional 13.8 p.p. of job losses. These results were mainly driven by informal and self-employed workers, which represent more than half of the labor force in Venezuela, as in many developing countries. The effects were not heterogeneous for different income or age groups, but we find that these effects were significant for males and not significant for females, in a context where the female employment rate was 43.5 before the COVID-19 crisis. In terms of income, while we observe an increase of the coverage of public transfers, likely as a response by the government to the crisis, we observe no additional support for those in severe lockdown areas, showing the lack of targeting of this public help. As expected in developing countries, we find that the most common coping strategy was that households sold their productive assets, reduced their savings, looked for alternative income sources and sought

for help from relatives, in a context where the majority of the population was already below the poverty line.

The rest of the paper is organized as follows. In the next section, an overview of the COVID-19 situation in Venezuela is provided. Section 3 depicts the data used in the analysis and describes the empirical strategy. Section 4 presents the main results while Section 5 discusses the main robustness tests performed. Finally, Section 6 concludes and discusses the policy implications and the external validity of our results.

COVID-19 outbreak in Venezuela

The first two COVID-19 cases in Venezuela were confirmed on the 13th of March, 2020 in Miranda State. Two days later 15 more cases were reported, motivating the national government to impose a national quarantine. The first COVID-19 related death was reported on the 26th of March in Aragua State.

Containment measures were imposed at the very beginning of the outbreak. On the 12nd of March, the federal government declared a health system emergency, prohibited public gatherings and imposed a flight ban from Colombia and Europe. On the 16th of March, stay-at-home orders were issued in six states and the Capital area, but on 17 March, the Government extended the quarantine to the entire country. The lockdown ran unchanged at least until 1 June, when a contingent plan was presented for loosening restrictions with three stages and heterogeneous implementation across regions and economic activities. However, on 14 July officials cancelled this normalization schedule in Capital and Miranda (1st and 4th most dense states) due to an unexpected increase in the number of COVID-19 cases.

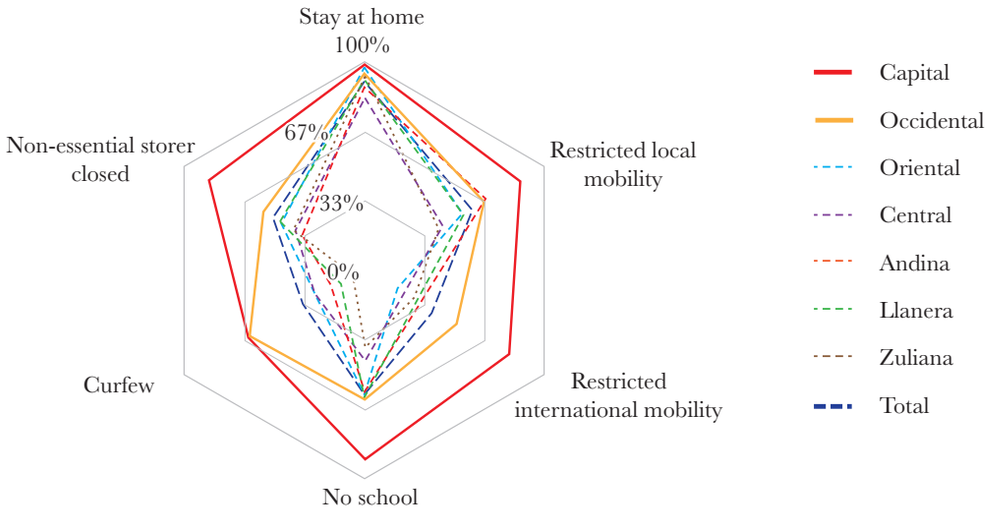
The institutional political dynamics in Venezuela are the ones from a centralized public administration system. The sub-national governments are limited in their power of action and usually subordinated to the central government from a budgetary point of view. These dynamics reduce the possibility of explicit conflicts between the national and the sub-national governments in the design of policies. At the same time, the implementation of policies dictated by the national government was usually supported by local federal entities. This was not an exception for the COVID-19 containment measures.

Naturally, mobility constraints affected the welfare of the population. Anecdotal evidence (Fernandez, H., 2020, April 20) highlights that the mobility restrictions were not well received by the population already affected by a long-lasting economic crisis. As in many developing countries, the labor market in Venezuela is characterized to be highly informal. Most of the workers rely on informal or temporary jobs to subsist and obtain their daily income. Usually, these types of jobs are low skilled with very limited possibilities for teleworking, as in sophisticated labor markets, thus limiting household consumption possibilities.

The enforcement of the lockdown issued from March to June was not achieved homogeneously by the national and sub-national authorities across regions. Using a national phone survey carried out in April 2020, we identified the strength of the enforcement of six dimensions of the lockdown in each of the seven regions of Venezuela. The poll asked each head of household whether, at the regional level, these restrictions were imposed: *a*) recommendations to stay at home, *b*) restrictions on local mobility, *c*) restrictions on international mobility, *d*) closure of schools, *e*) curfew, *f*) closure of non-essential business. Figure 1 represents the variability in the six dimensions of lockdown across regions. Almost every household declared that their community implemented stay-at-home policies. Local mobility reduction and school shutdowns were also frequently reported: nearly two thirds of households reported that these policies were implemented. In the case of more restrictive measures, a full curfew or the prohibition of non-essential

businesses showed more divergence across regions. These restrictions were strongly enforced in the Capital region and to a lesser degree in the Occidental region. International mobility restrictions showed relevant rates at the Capital region, where the main international airport of the country is located. However, the Zuliana and Andina regions did not evidence severe international mobility restrictions in spite of having relevant land borders.

Figure 1. Dimensions of lockdown by regions



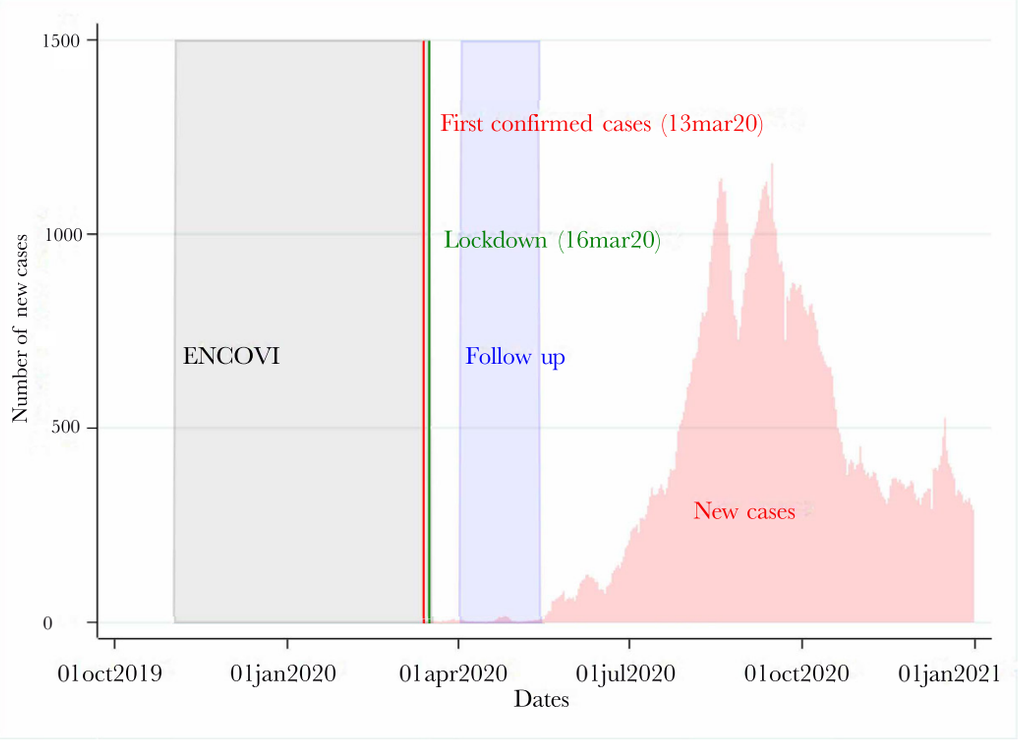
Notes: This figure displays 8 hexagons, one for each Venezuelan region and one for the whole country. Each corner represents the share of households that declares the implementation of a particular dimension of the lockdown. Stay at home implies official recommendations to avoid leaving home; restricted local (international) mobility stands for any type of restriction in local (international) means of transport; no school represents shutdown of schools; curfew designates a mandatory regulation to remain indoors during at least some part of the day; non-essential stores closes represents areas where these stores have shut down independently if it was mandatory or voluntarily.

Source: April 2020 UCAB phone survey.

Overall, the levels of enforcement across regions reveal a considerable gap between Capital and Occidental regions and the other five regions. This gap is more sizable especially in the more severe dimensions of the lockdown such as curfew and business restrictions. Clustering algorithms conducted on the full set of these dimensions group the Capital and Occidental regions together. Thus, we discriminate between the severe lockdown (in the Capital and Occidental regions), and the non-severe lock-down (for the rest of the country) as a benchmark scenario. More details about the robustness of this partition are found in Section 5.3.

Despite the different preventive measures taken in each region, nationally the number of cases was minimal, as shown in Figure 2. Actually, even three months after the phone survey finished, when the virus started to spread more quickly, the health consequences of COVID-19 outbreak in Venezuela were under control relative to neighboring countries. As of 29th of July, 16,571 cumulative confirmed cases and 151 deaths were reported by John Hopkins University, which averages to 583 cases (cpm) per million inhabitants and 5 deaths (dpm). These figures stand in sharp contrast with their neighbors. By the same date Colombia evidenced 5,255 cpm and 178 dpm, Brazil 11,682 cpm and 416 dpm and Peru had 11,980 cpm and 564 dpm. Early social distancing measures probably helped Venezuela's relatively positive outcomes, even in a general context of few health resources and infrastructure. As shown in Figure 2, the peak of new cases took place during August and September.

Figure 2. COVID outbreak in Venezuela and surveys' rounds



Notes: This figure represents the 7-days moving average of new COVID-19 cases in Venezuela, the date of first two confirmed cases (March 13th, 2020), the date where lockdown started in Capital and six states (March 16th, 2020), which was quickly extended to the whole country the next day; and the periods where ENCOVI (Encuesta Nacional de Condiciones de Vida) and the follow-up phone survey took place.

Source: WHO coronavirus disease (COVID-19) dashboard and UCAB surveys metadata.

In addition to the early confinement measures, the country might also have been spared from early rapid spread of the disease by its international isolation and fuel scarcity. Even before the spread of COVID-19, very few international flights were arriving in the country. Between 2014 and 2018, more than 15 airlines had already stopped traveling to Venezuela, and in 2019 the US suspended both personal and cargo flights. The country was also affected in 2020 by very pronounced fuel shortages which could limit internal mobility even before policies to contain the disease were put in place.

While health outcomes, for the moment, appear to be better in Venezuela than in the rest of the countries in Latin America, several questions arise on the economic impact of the containment measures. This trade-off between health and economy was recognized by the government, which issued several policies to cope with the activity downturn. Bans to fire employees, suppression of housing and business rent, tax reliefs and direct transfers were announced.

The Venezuelan case has two special features that allowed this study to test the consequences of a lockdown. First, as we have seen, the direct health outcomes seemed to be contained, at least until July, 2020. Second, the Venezuelan economy was suffering a longstanding crisis before COVID-19 shock, a context which narrowed the toolkit of policies to cope and mitigate the impact of the COVID-19 crisis, and the lockdown appeared to be the only available policy. Practically isolated from the world, this context can work as an example of how a semi-closed economy reacts to an imposed severe lockdown.

This case study can illustrate the challenges of balancing health and economic outcomes to face COVID-19 in a developing country, where poverty and informality are widespread, instability is the norm, and financial markets are not deep enough. This paper aims to address the

economic consequences of COVID-19 shock and lockdown measures by exploiting the variability of the lockdown enforcement to identify the effects on labor market outcomes.

Data and Methodology

Data

In order to analyze the impact of lock-down on employment and income, this study combines two sources of data. First, the *Encuesta Nacional de Condiciones de Vida* (ENCOVI) is a private household survey directed by *Universidad Católica Andrés Bello* (UCAB) of Venezuela. The survey collected data from personal interviews of households once per year since 2014, and it is comparable in extension and quality to the nation-wide household surveys of other developing countries. The list of topics covered by ENCOVI is long: dwelling characteristics, composition of household, labor income sources, education, health, nutrition and expenditures.

This paper uses ENCOVI 2019/2020 that interviewed 9,932 households and 33,086 people from November 2019 to March 2020. We take advantage of its regional representativeness for our study. This survey is our baseline data that provides information pre-COVID-19.

In response to the outbreak, Venezuelan University Andres Bello (UCAB) conducted a complementary phone survey during April 2020 of a random subset that included half of the households that were interviewed in ENCOVI 2019/2020. The phone survey, representative at the regional level, was designed to track the changes of household conditions after the COVID19 shock. The survey collected data on the employment status of the heads of household and income sources of the household. In addition, the survey implemented a new module related to personal and community measures implemented to fight against COVID-19. This particular module allowed us to identify the heterogeneity in the actual enforcement of the lockdown measures that we described in the previous section.

With these two surveys, we build a panel that covers the employment conditions and the income sources of 4,484 heads of household and their families before and after the COVID-19 shock. Table 1 summarizes the distribution of employment, labor income and non-labor income collected in both surveys. On one hand, after the COVID-19 shock, labor outcomes were severely under stress. On average, the probability of being employed was reduced 9.3 p.p., worked hours shrank to 7.90, and (log of) labor income fell sharply. On the other hand, the mean value of non-labor income (local income transfers from relatives, from public sector and remittances from abroad) exhibited considerable growth between rounds in spite of being relatively less frequent than labor income. This result is not necessarily related to inflation, since we accounted for inflation in all the monetary variables using monthly inflation indexes. In particular, all the monetary variables are expressed in prices from Feb. 2020. Still, it needs to be noted that the quality of the price data in Venezuela is not ideal. This issue is exacerbated in the current hyperinflationary context.[1]

Table 1. Outcomes at Baseline and Follow up

	(1)	(2)	(3)
Variables	Baseline	Follow up	Difference
Prob. of being employed	0.60	0.51	-0.09***
	(0.49)	(0.50)	(0.01)
Worked hours (weekly)	21.72	7.90	-13.83***

1 Thus, the authors decided to show the results using monetary variables but emphasizing the results that are not affected by price data.

Table 1 (continued). Outcomes at Baseline and Follow up

	(1)	(2)	(3)
Variables	Baseline	Follow up	Difference
	(21.03)	(14.13)	(0.58)
Labor income	1.00	0.60	-0.40***
	(2.35)	(1.87)	(0.07)
Prob. of receiving transfers from relatives	0.07	0.07	0.01
	(0.25)	(0.26)	(0.01)
Log. of income transfers from relatives	0.90	0.98	0.07
	(3.37)	(3.48)	(0.12)
Prob. of receiving public transfers	0.24	0.51	0.26***
	(0.43)	(0.50)	(0.04)
Log. of income transfers from public sector	3.05	6.54	3.50***
	(5.36)	(6.46)	(0.55)
Prob. of receiving remittances	0.10	0.05	-0.05***
	(0.30)	(0.22)	(0.01)
Log. of income from remittances	0.24	0.68	0.44***
	(1.89)	(3.04)	(0.08)
Observations	4,484	4,484	8,968

Notes: This table presents in columns (1) and (2) the mean (and standard deviation in parenthesis) for employment status and income outcomes of 4,484 Venezuelan households interviewed before and after Venezuelan lockdown. Column (3) reports the difference in means (and standard errors) of baseline and follow up groups. Worked hours (weekly) represent the total worked hours per week. Labor income, income transfers from relatives, income transfers from public sector and income remittances are all expressed in (logarithms of) Feb. 2020 bolivares soberanos. The rest of the outcomes are measured as dummy variables. Standard errors of the difference in mean are clustered at municipal level.* p<10%. ** p<5%. ***p<1%.

Source: 2019/2020 ENCOVI and April 2020 UCAB phone survey.

To show that there is no systematic selection on the final sample of the follow-up phone survey, we check that the observable characteristics at baseline of those that participated in the followed-up are not significantly different from those that did not participate in the follow-up. In Table A.1, we show the difference in means between those that participated in the follow-up and those that did not participate. Both samples are comparable in means at baseline. Almost all the characteristics are balanced across waves. Our main outcomes (the probability of being employed pre-COVID-19, the number of worked hours and the value of labor income) are balanced across samples. The human capital accumulation and the poverty status of each household are also comparable between samples. In other words, we do not have (exante) more unemployed or poorer individuals in our follow-up. However, we do observe a difference in the age of the head of the household (47.6 vs 49.4).

Table A.1. Comparison in means between follow-up phone survey sample and the remainder sample in ENCOVI at baseline

Variables	Follow-up participants	Rest of the ENCOVI sample	Difference in means
Male	0.41	0.43	0.02
	(0.49)	(0.50)	(0.01)
Age of head of household	47.59	49.39	1.80***
	(15.44)	(15.91)	(0.63)

Table A.1 (continued). Comparison in means between follow-up phone survey sample and the remainder sample in ENCOVI at baseline

Variables	Follow-up participants	Rest of the ENCOVI sample	Difference in means
Maximum education level: Primary	0.31	0.33	0.02
	(0.46)	(0.48)	(0.02)
Maximum education level: Secondary	0.42	0.40	-0.02
	(0.49)	(0.49)	(0.01)
Maximum education level: Tertiary	0.27	0.24	-0.03
	(0.44)	(0.43)	(0.02)
Poverty rate	0.94	0.94	0.00
	(0.25)	(0.24)	(0.01)
Prob. of being employed	0.60	0.58	-0.01
	(0.49)	(0.49)	(0.02)
Worked hours (weekly)	21.72	21.40	-0.33
	(21.03)	(21.08)	(1.16)
Labor income	7.09	6.56	-0.54
	(6.95)	(6.91)	(0.35)
Prob. of receiving transfers from relatives	0.07	0.07	-0.00
	(0.25)	(0.25)	(0.01)
Income transfers from relatives	0.90	0.92	0.01
	(3.37)	(3.45)	(0.13)
Prob. of receiving public transfers	0.24	0.24	-0.00
	(0.43)	(0.43)	(0.02)
Income transfers from public sector	3.05	3.06	0.01
	(5.36)	(5.40)	(0.21)
Prob. of receiving remittances	0.10	0.09	-0.01
	(0.30)	(0.28)	(0.01)
Income from remittances	0.24	0.29	0.04
	(1.89)	(4.17)	(0.03)
Migration: At least one member	0.06	0.05	-0.01
left the household	(0.23)	(0.14)	(0.01)
COVID-related symptoms	0.08	0.09	0.01
	(0.27)	(0.28)	(0.01)
Observations	4,484	5,394	9,878

Notes: This table compares the mean of several variables (at baseline) between the individuals that participated in the April 2020 follow-up survey and those that did not, but were included in the larger sample of 2019/2020 ENCOVI survey. All the monetary indicators have been deflated and expressed in natural logarithms of February 2020 bolivares soberanos. Standard deviations around the mean in parenthesis.

When analyzing preexisting differences before the COVID-19 shock between severe and non-severe lockdown regions, there is no clear pattern between groups in terms of socio-demographic, employment, income and household characteristics. Table 2 shows the means of a set of variables of each of these broad categories and the difference of means between groups. The severe lockdown group (Capital and Occidental regions) shows no significant differences in gen-

der, age, education or health. The probability of being employed and employment categories do not reveal significant differences among groups, and there are income discrepancies only in the case of transfers from relatives. Household characteristics are very similar among groups. Access to electricity is significantly different between groups, but is meaningless since access to this service is over 99% for both groups.

Table 2. Baseline balance

	(1)	(2)	(3)
Variables	Non-severe lockdown	Severe Lockdown	Difference
Socio-demographic characteristics of household's head			
Age	47.78	47.05	-0.72
	(15.40)	(15.54)	(0.94)
Sex (male=1)	0.41	0.39	-0.02
	(0.49)	(0.48)	(0.03)
Maximum education level: Primary	0.32	0.28	-0.05
	(0.47)	(0.45)	(0.04)
Maximum education level:Secondary	0.40	0.45	0.05
	(0.49)	(0.50)	(0.03)
Maximum education level:Tertiary	0.27	0.27	-0.01
	(0.45)	(0.44)	(0.02)
Prob. of being sick	0.29	0.25	-0.04
	(0.45)	(0.43)	(0.02)
Prob. of COVID-related symptoms	0.08	0.07	-0.01
	(0.27)	(0.26)	(0.01)
Employment condition of household's head			
Prob. of being employed	0.60	0.60	-0.00
	(0.49)	(0.49)	(0.05)
Prob. of being formal employee	0.18	0.19	0.01
	(0.39)	(0.40)	(0.03)
Prob. of being informal employee	0.23	0.30	0.07
	(0.42)	(0.46)	(0.06)
Prob. of being self-employed	0.48	0.44	-0.04
	(0.50)	(0.50)	(0.03)
Other employment type	0.11	0.06	-0.05
	(0.31)	(0.24)	(0.04)
Worked hours (weekly)	21.76	21.63	-0.13
	(21.05)	(20.98)	(1.96)
Income outcomes			
Labor income of household's head	7.30	6.51	-0.79
	(7.00)	(6.76)	(0.74)
Prob. of receiving transfers from relatives at household level	0.08	0.03	-0.05
	(0.27)	(0.17)	(0.04)
Income transfers from relatives at household level	1.08	0.42	-0.66**
	(3.64)	(2.38)	(0.24)
Prob. of receiving public transfers at household level	0.24	0.25	0.01
	(0.43)	(0.44)	(0.08)

Table 2 (continued). Baseline balance

	(1)	(2)	(3)
Variables	Non-severe lockdown	Severe Lockdown	Difference
Income transfers from public sector at household level	3.02	3.12	0.10
	(5.37)	(5.36)	(0.60)
Prob. of receiving remittances at household level	0.12	0.06	-0.05
	(0.32)	(0.24)	(0.04)
Income from remittances at household level	0.23	0.25	0.02
	(1.89)	(1.90)	(0.09)
Household characteristics			
Household's members	3.56	3.47	-0.09
	(1.77)	(1.83)	(0.10)
Under-aged household's members	1.09	1.05	-0.03
	(1.20)	(1.28)	(0.10)
Electricity	1.00	1.00	0.00*
	(0.03)	(0.07)	(0.00)
Sewage	0.83	0.91	0.08
	(0.37)	(0.28)	(0.07)
Precarious settlement	0.04	0.02	-0.02
	(0.19)	(0.14)	(0.01)
At least one member who migrated	0.07	0.04	-0.03
	(0.25)	(0.19)	(0.02)
Observations	3,582	902	4,484

Notes: This table presents in columns (1) and (2) the mean (and standard deviations in parentheses) of several observable characteristics of Venezuelan households and household heads, grouped by the exposure to different types of lockdown. Column (3) presents the difference in means of type of lockdown (and standard errors in parenthesis). Variables are measured at baseline. The types of lockdown are defined at regional level: the severe lockdown group includes the Capital and Occidental regions, while the non-severe lockdown includes Oriental, Central, Andina, Llanera y Zuliana. Income variables are expressed in (logarithms of) Feb. 2020 bolivares soberanos. Standard errors of difference in mean are clustered at municipal level. * p<10%. ** p<5%. ***p<1%

Empirical Strategy

The empirical identification strategy relies on a comparison of individuals in regions with severe lockdowns and in those with non-severe lockdowns, before and after the lockdown was imposed. The implicit assumption is that the trends in each outcome of interest would be similar across regions in absence of severe lockdown (the classical parallel trends assumption for the differences-in-differences model, Angrist and Krueger, 1999). In this case, the estimations compare individuals in regions with different severity in lockdown measures, conditional on a set of controls and individual fixed effects, before and after COVID. In other words, individuals in both regions (severe and non-severe lockdown regions), independent of their time-invariant individual characteristics, should have experienced a similar increase (decrease) in their probability of losing their job in the absence of severe lockdown measures. These estimations are unbiased under the assumption that, after controlling by time-invariant individual characteristics, there are no other variables (correlated with the geographical distribution of the severity of the measures) affecting the outcomes of interest. This paper estimates the following regression:

$$Y_{irt} = \beta(AftertheCOVID-19crisis_t * SevereLockdown_r)$$

$$+\alpha(AftertheCOVID-19crisis_t)+\gamma_i+\mu_{irt} \quad (1)$$

where Y_{irt} is the outcome of interest for individual i in region r that was surveyed at time t; $AftertheCOVID-19crisis_t * SevereLockdown_r$ is a dummy variable that takes value one for those individuals that were exposed to a severe lockdown after the COVID-19 crisis started; $AftertheCOVID-19crisis_t$ is an indicator that the individual was surveyed after the COVID19 started; γ_i are individual fixed effects; and μ_{irt} is a random, idiosyncratic error term. β measures the additional impact of the severe lockdown (over the impact of a non-severe lockdown) on outcome Y_{irt} for individuals who belong to region r after the lockdown started.

This model measures the direct effect of the lockdown measures related to COVID-19. In this difference-in-difference model, an individual is classified as exposed to the severe lockdown if, at baseline, the individual lived in areas where the enforcement was reported to be significantly higher (Capital and Occidental regions). Our control group includes those living in severe lockdown regions before the shock, and those that live in non-severe lockeddown regions, before and after the lockdown. As our measure of exposure to severe (or non-severe) lockdowns is based on the location at baseline of each household, our estimations are similar to intention-to-treat (ITT) analysis. Naturally, these estimations may differ from the actual effect depending on the accuracy of our exposure measure to the actual severe (or non-severe) lockdown. A robustness check related to the potential bias that endogenous migration may generate is discussed in Section 5.1.

Results

To address the differential impact of severe lockdown measures over a nonsevere lockdown on employment, we first set up a standard difference-indifferences model using the probability of being employed, and then we add controls and fixed effects to see the robustness of the model. Table 3 shows the results of this analysis. Column (1) presents the difference-in-differences without any control. This reveals an unconditional negative impact of the severe lock-down of 6.1 percentage points on employment, comparable in size and sign with the before-and-after effect of the COVID-19 shock across groups (7.4 p.p.). Column (2) shows the same regression as in column (1) but controlling for gender, age and the maximum level of education achieved by the individual. When the individual controls are incorporated, severe lockdowns led to an additional fall in employment of 7 p.p. Column (3) includes individual controls and regional fixed effects to control for any unobserved feature of the region that is unchanged before and after COVID-19 shock, enlarging the magnitude of the effect of the severe lockdown on employment to -7.6 p.p. Finally, Column (4) presents the model depicted in equation (1). This model shows that, after controlling by individual fixed effects, we still find that severe lock-downs led to an additional fall in employment of 7 p.p.. This model includes individual fixed effects controlling for any timeinvariant individual unobserved characteristic. As the location where each individual lives is fixed across rounds, the individual fixed-effects includes the impact on job losses related to the location of each individual. The individual fixed-effects reduce the potential bias related to time-invariant unobservable characteristics correlated with the location of the severe lockdowns. In fact, after the introduction of the individual fixed-effects, the coefficient increases from -7.6 p.p (Column 3) to -7 p.p (Column 4).

Table 3. Impact of the severe lock-down on the probability of being employed

	(1)	(2)	(3)	(4)
Outcome	Prob. of being employed	Prob. of being employed	Prob. of being employed	Prob. of being employed
After*Severe L.	-0.061**	-0.070***	-0.076***	-0.070**
	(0.022)	(0.021)	(0.022)	(0.030)

Table 3 (continued). Impact of the severe lock-down on the probability of being employed

	(1)	(2)	(3)	(4)
Outcome	Prob. of being employed	Prob. of being employed	Prob. of being employed	Prob. of being employed
After	-0.074***	-0.062***	-0.056***	-0.056***
	(0.012)	(0.011)	(0.011)	(0.015)
Severe	-0.002	0.005		
	(0.047)	(0.038)		
Mean of outcome at baseline	0.598	0.598	0.598	0.598
Individual controls	No	Yes	Yes	-
Region FE	No	No	Yes	-
Individual FE	No	No	No	Yes
R-squared	0.010	0.230	0.241	0.865
Observations	8,968	8,968	8,968	8,968

Notes: This table presents the partial correlation coefficients of the severe lockdown impact on the probability of employment with different sets of control variables. After*Severe L. represents the interaction of After (an indicator variable referring to those observations in the follow-up survey) and Severe L. (an indicator variable referring to those observations that were in the regions with severe lockdowns, Capital and Occidental regions). To have a benchmark, the mean of the probability of being employed at baseline is reported. Standard errors in parenthesis, clustered at municipal level. *p<10%. **p<5%. ***p<1%.

Effects on employment

Table 4 summarizes the effects of a severe lockdown on the probability of being employed and on number of worked hours, both for those that were employed at the baseline and independent of the employment status at baseline. Column (1) shows the overall impact on employment while column (2) restricts the analysis to those that were already working at baseline. The additional effect found in column (1) (7 p.p.) is economically significant, as the national probability of being employed at baseline was 60%. When we focus on job losses, that is, when we restrict our observations only to those who were employed before the shock, we find an effect of -13.8 p.p.. While a statistically significant and economically relevant effect of a severe lockdown is detected on the probability of being employed, the negative impact on worked hours is not found to be statistically significant. It is important to mention that our analyzed event is a severe lockdown where our counterfactual is still a lockdown. The 'after' coefficient captures much of the impact on the intensive margin that happens nationally in the non-severe lockdown. Non-severe lockdowns may allow some work hours but, once that effect is accounted for, the additional effect of a severe lockdown is non-significant on the intensive margin as workers may have already reduced their activity. The impact of the lockdown is considerable in both groups, as captured by the 'after' coefficient which shows a fall of more than 13 hours worked per week, almost 2/3 of the average of worked hours before the shock. This fall is equivalent to almost 24 hours if we only consider those that were employed before the lockdown.

Table 4. Impact on employment and worked hours

	(1)	(2)	(3)	(4)
Outcomes	Prob. of being employed	Prob. of being employed if employed at baseline	Worked hours	Worked hours if employed at baseline
After*Severe L.	-0.070**	-0.138**	-0.330	-1.166
	(0.030)	(0.053)	(2.007)	(1.794)
After	-0.056***	-0.165***	-13.289***	-23.911***
	(0.015)	(0.034)	(1.108)	(1.015)
Mean outcome at baseline	0.598	1	21.722	36.311
Individual FE	Yes	Yes	Yes	Yes
R-squared	0.865	0.729	0.703	0.765
Observations	8,968	4,942	8,968	4,942

Notes: This table presents the estimated effect of the severe lockdown on the probability of being employed and the number of hours worked (weekly). After*Severe L. represents the interaction of After (an indicator variable referring to those observations in the follow-up survey) and Severe L. (an indicator variable referring to those observations that were in the regions with severe lockdowns, Capital and Occidental regions). To have a benchmark of the estimated effect, the mean of the different outcomes at baseline is reported. Standard errors in parentheses, clustered at municipal level. * p<10%. ** p<5%. ***p<1%.

The effects of the lockdown on employment are mainly driven by informal employees and the self-employed. Table 5 shows the additional impact of the severe lockdown on employment for those who were employed before the COVID-19 crisis by type of employment (at baseline). Column (1) shows that severe lockdowns led to an additional 13.8 p.p. of job losses. This effect is not significant when we focus on formal employees. In contrast, for informal employees and self-employed, who together represent 71% of workers in Venezuela, the effect of a severe quarantine is negative and significant. For the informal and for self-employed workers, we identify a significant effect of -15.9 p.p. and -20.1 p.p. on the probability of being employed, respectively. Other employees (such as employers, cooperative workers and domestic service) did not seem to be affected by severe lockdowns in comparison to a non-severe lockdown.

Table 5. Impact on the probability of being employed by category of employment at baseline

	(1)	(2)	(3)	(4)	(5)
Category of employment	Employed at baseline	Formal employee at baseline	Informal employee at baseline	Self-employed at baseline	Other type of employment at baseline
After*Severe L.	-0.138**	-0.004	-0.159**	-0.201**	-0.039
	(0.053)	(0.079)	(0.075)	(0.082)	(0.171)
After	-0.165***	-0.125**	-0.135***	-0.197***	-0.156**
	(0.034)	(0.049)	(0.027)	(0.050)	(0.069)
Individual FE	Yes	Yes	Yes	Yes	Yes
R-squared	0.729	0.703	0.729	0.740	0.731
Observations	4,942	972	1,218	2,304	448

Notes: This table presents the estimated effect of the severe lockdown on the probability of being employed by category of employment at the baseline. After*Severe L. represents the interaction of After (an indicator variable referring to those observations in the follow-up survey) and Severe L. (an indicator variable referring to those

observations that were in the regions with severe lockdowns, Capital and Occidental regions). The mean of the probability of being employed at baseline for each category of employment (defined at baseline) is equal to 1 for this sub-sample of employed at baseline. Standard errors in parentheses, clustered at municipal level. *p<10%. **p<5%. ***p<1%.

When we explored heterogeneous effects among demographic groups, we found no statistically significant differences across different groups of the population. Table 6 explores the impacts for each subgroup of the population by gender, age and income level. We find that the severe lockdowns had an additional effect of -18.4 p.p. on the likelihood of being employed for males, while the same effect is not statistically significant for females. We also find that the additional impact on job losses of the severe lockdown on older cohorts of workers is 15.7 p.p. while it is 11.5 p.p for cohorts younger than 45 years old. Similarly, we find a significant effect for those at the bottom 50% of the income distribution where severe lockdowns have an additional effect of -14.6 p.p. on the likelihood of being employed and we find 9.8 p.p. no significant effects for those that are at the top 50% of the income distribution. When tested if the coefficients are statistically different, we find that the standard errors are too big to reject the difference between coefficients for the different sub-groups.

Table 6. Heterogeneous impacts on the probability of being employed for those employed at baseline

	(1)	(2)	(3)	(4)	(5)	(6)
Group	Male	Female	Younger than 45	Older than 45	Below median income	Over median income
After*Severe L.	-0.184**	-0.085	-0.157**	-0.115*	-0.146**	-0.098*
	(0.082)	(0.065)	(0.071)	(0.057)	(0.062)	(0.057)
After	-0.145***	-0.191***	-0.154***	-0.178***	-0.214***	-0.130***
	(0.038)	(0.042)	(0.038)	(0.038)	(0.041)	(0.034)
Test of heterogeneous effects (p-value)	0.355		0.593		0.475	
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.740	0.717	0.729	0.728	0.737	0.719
Observations	2,668	2,274	2,302	2,640	2,472	2,470

Notes: This table presents the estimated effect of the severe lockdown on the probability of being employed if employed at baseline. After*Severe L. represents the interaction of After (an indicator variable referring to those observations in the follow up survey) and Severe L. (an indicator variable referring to those observations that were in the regions with severe lockdowns, Capital and Occidental regions). To test for heterogeneous effects between groups, we performed a fully interacted model on the full sample of the outcome vs. After*Severe, Severe, controls and two interactions: Group*After*Severe, and Group*After, where Group stands for a dummy that spits the sample in the corresponding groups of interest. The reported p-values correspond to the test of no effect associated to the interaction Group*After*Severe. The mean of the probability of being employed at baseline for each category of employment (defined at baseline) is equal to 1 for this sub-sample of employed at baseline. Standard errors in parentheses, clustered at municipal level. *p<10%. **p<5%. ***p<1%.

Effects on income

Effects on labor income

We find no additional impact of the severe lockdown on labor income, as shown in Table 7. It is important to mention that while the impact on jobs losses can be identified even a short time

after the shock, the impact on income may require some additional time to be captured by the survey. The timing of the phone survey (which started two weeks after the lockdown started) is good to detect job losses but is not ideal (as probably it was too early) to detect labor income drops as these are usually detected one month after the job loss occurs. Also, although our monetary variables are deflated by monthly inflation, hyperinflation and the variety of currencies reported (Venezuelan bolivares, US dollars, Euros, Colombian Pesos, etc.) makes our income data noisy. Finally, we lost more than a thousand observations due to misreporting of labor income, which also affects the accuracy of our estimations. Actually, our coefficients suggest additional negative impacts of the severe quarantine, but still the standard errors are too large.

In addition, we explored for heterogeneous effects on labor income. We estimated the same model as in Table 7 but for the same subgroups we used for our employment regressions for heterogeneous effects. As shown in Table 8, we found no differential effect of the severe lockdown for any sub-group.

Table 7. Impacts on labor income by category of employment

	(1)	(2)	(3)	(4)	(5)
Category of employment	Total sample	Employed at baseline	Formal employee at baseline	Informal employee at baseline	Self-employed at baseline
After*Severe L.	-0.240	-0.215	-0.685	-1.271	0.830
	(0.515)	(0.978)	(1.550)	(1.247)	(1.590)
After	-1.746***	-3.690***	-2.529***	-3.170***	-4.639***
	(0.283)	(0.423)	(0.653)	(0.554)	(0.685)
Mean outcome	6.756	12.288	13.852	13.531	10.528
at baseline Individual FE	Yes	Yes	Yes	Yes	Yes
R-squared	0.826	0.729	0.718	0.749	0.672
Observations	7,974	3,844	970	1,214	1,660

Notes: This table presents the estimated effect of the severe lockdown on labor income for different subgroups of workers (defined at baseline). After*Severe L. represents the interaction of After (an indicator variable referring to those observations in the follow-up survey) and Severe L. (an indicator variable referring to those observations that were in the regions with severe lockdowns, Capital and Occidental regions). Labor income is measured in natural logarithm of bolivares soberanos of February 2020. To have a benchmark of the estimated effect, the mean of the (log) labor income at baseline is reported for each category of employment. Standard errors in parentheses, clustered at municipal level. *p<10%. **p<5%. ***p<1%.

Table 8. Heterogeneous impacts on labor income for those employed at base-line

	(1)	(2)	(3)	(4)	(5)	(6)
Group	Male	Women	Younger than 45	Older than 45	Below median income	Above median income
After*Severe L.	-0.070	-0.424	0.017	-0.539	-1.111	0.476
	(1.598)	(1.021)	(1.171)	(0.996)	(1.144)	(1.340)
After	-4.010***	-3.304***	-3.606***	-3.788***	-2.875***	-4.260***
	(0.574)	(0.585)	(0.543)	(0.425)	(0.502)	(0.614)

Table 8 (continued). Heterogeneous impacts on labor income for those employed at base-line

	(1)	(2)	(3)	(4)	(5)	(6)
Group	Male	Women	Younger than 45	Older than 45	Below median income	Above median income
Test of heterogeneous effects (p-value)	0.851		0.602		0.311	
between groups Mean outcome at	12.49	12.06	12.42	12.12	11.07	13.45
at baseline Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.728	0.730	0.720	0.738	0.723	0.726
Observations	2,042	1,802	1,824	2,020	1,922	1,922

Notes: This table presents the estimated effect of the severe lockdown on labor income for different subgroups in our sample. After*Severe L. represents the interaction of After (an indicator variable referring to those observations in the follow-up survey) and Severe L. (an indicator variable referring to those observations that were in the regions with severe lockdowns, Capital and Occidental regions). Labor income is measured in natural logarithm of bolivares soberanos of February 2020. To test for heterogeneous effects between groups, we performed a fully interacted model on the full sample of the outcome vs. After*Severe, Severe, controls and two interactions: Group*After*Severe, and Group*After, where Group stands for a dummy that spits the sample in the corresponding groups of interest. The reported p-values correspond to the test of no effect associated to the interaction Group*After*Severe. To have a benchmark of the estimated effect, the mean of the (log) labor income at baseline is reported for each group. Standard errors in parentheses, clustered at municipal level. *p<10%. **p<5%. ***p<1%.

Again, the caveats related to the quality of the monetary variables in our data may be affecting the large standard errors that we observe in this table.

Effects on non-labor income

Our data allows us to explore the impact of a severe lockdown on labor markets, but also to explore the impact on alternative income sources. In particular, we analyze how local transfers received from the public sector, remittances and local transfers received from relatives have been affected by the COVID-19 containment measures. For each of these three non-labor sources of income, we studied both the probability of receiving a transfer, and the overall changes in the value of transfer received.

While the coverage of public transfers increased after the COVID-19 outbreak, no differences in severe lockdown regions were detected. Columns (1) and (2) in Table 9 summarize the effects on the probability of receiving a public transfer, and the value of the transfer. After the lockdown, we found a more widespread coverage of public transfers, increasing by 28.5 p.p., which is considerable. This shows the potential response of the government to the crisis. However, we found no evidence that those that were in severe lockdowns received more transfers from the government. The results from these two columns support the idea that the severity of lockdown was exogenous, as there is no evidence of a differential effect of severity of lockdown on government transfers.

Table 9. Impact on non-labor income

	(1)	(2)	(3)	(4)	(5)	(6)
Outcomes	Prob. of receiving public transfers	Income from public transfers	Prob. of receiving remittances	Income from remittances	Prob of receiving transfers from relatives	Income from transfers from relatives
After*Severe L.	-0.072	-0.977	0.033	-0.227	0.021	0.251
	(0.087)	(1.099)	(0.039)	(0.234)	(0.021)	(0.277)

Table 9 (continued). Impact on non-labor income

	(1)	(2)	(3)	(4)	(5)	(6)
Outcomes	Prob. of receiving public transfers	Income from public transfers	Prob. of receiving remittances	Income from remittances	Prob of receiving transfers from relatives	Income from transfers from relatives
After	0.286***	3.808***	-0.056**	0.535***	-0.000	0.001
	(0.085)	(1.071)	(0.024)	(0.101)	(0.018)	(0.229)
Mean outcome at	0.244	3.046	0.102	0.240	0.0676	0.903
at baseline Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.662	0.667	0.606	0.811	0.593	0.596
Observations	8,968	8,968	8,968	8,968	8,968	8,968

Notes: This table presents the estimated effect of the severe lockdown on non-labor income. After*Severe L. represents the interaction of After (an indicator variable referring to those observations in the follow-up survey) and Severe L. (an indicator variable referring to those observations that were in the regions with severe lockdowns, Capital and Occidental regions). Income transfers from public sector, remittances and transfer from relatives are measured in natural logarithm of bolivares soberanos of February 2020. To have a benchmark of the estimated effect, the mean value of each outcome at baseline is reported. Standard errors in parentheses, clustered at municipal level. *p<10%. **p<5%. ***p<1%.

In the case of remittances and local transfers from relatives, we found no additional impact on the affected areas. As reported in columns (3) and (4) in Table 9, the more severe lockdown did not cause a significant raise in the probability of receiving the remittance or in the value of remittances received. Similarly, columns (5) and (6) in Table 9 show no additional effect of the severe lockdown on the probability of receiving a local transfer from relatives, nor in the received amount. It is important to mention that the authors concerns related to the limitation of price data also affects these variables, which can be observed in the large size of our 'after' coefficients.

Effects on the number of COVID-19 cases

Our analysis show no statistically significant correlation between COVID-19 related symptoms and the severity of the local quarantines (in comparison with the non-severe quarantines). When the quarantine was imposed in Venezuela, the number of COVID-19 cases in Venezuela was minimal. Stayat-home orders were announced on 15 March when the country registered 17 cases of coronavirus. As shown in Figure 2, COVID-19 started to significantly spread after our follow-up survey concluded. Since at the time of the survey the number of cases was minimal in a country with a population of 30 million people, we argue that we were able to disentangle effects driven by health impacts from COVID-19 from those driven by stay-at-home orders.

In order to show evidence that at the time of our follow-up there was no correlation between health outcomes and imposed quarantines, results show no differential effect between severe lockdown regions and the rest of the country in terms of the potential number of COVID-19 cases. In order to do this, we generated an indicator variable of a potential COVID-19 case that includes any of the following symptoms: (i) fever, (ii) cough, (iii) headache, (iv) muscle or body aches, (v) fatigue, (vi) sore throat, (vii) loss of taste or smell. We found no correlation between the severity of the quarantine and the COVID-19 related symptoms in comparison to the non-severe lockdown areas. This reinforces the observation that COVID-19 started to be a serious issue in Venezuela after our follow-up survey ended.

Coping strategies to the COVID-19 shock

As discussed, the outbreak affected the employment conditions of the Venezuelan population, even in absence of significant health consequences. We disentangle this general effect to extract the portion linked to the containment measures that were taken in place.

Households' behavior also reacted to this shock, not only by adopting health-related social distancing measures but also by readjusting their economic capacity to try to cope with the crisis. In this section, we present the results of the analysis of the coping strategies taken by households as a response to the lockdowns and new employment conditions. With this analysis, we were able to address which main coping strategies households took. The results of this analysis are reported in Table 10.

Table 10. Coping mechanisms

	(1)	(2)	(3)	(4)	(5)
Variables	Consume less	Seek for alternative activities	Seek for relatives support	Support from Gov. or non-profit org.	Expend savings or selling assets
After*Severe L.	0.125	0.078*	0.086*	0.002	0.187***
	(0.074)	(0.039)	(0.049)	(0.015)	(0.051)
After	0.147*	-0.103***	-0.055	0.036***	0.001
	(0.075)	(0.035)	(0.038)	(0.010)	(0.025)
Mean outcome at	0.203	0.122	0.184	0.009	0.091
at baseline					
Individual FE	Yes	Yes	Yes	Yes	Yes
R-squared	0.624	0.514	0.587	0.655	0.624
Observations	8,968	8,968	8,968	8,968	8,968

Notes: This table presents the estimated effect of the severe lockdown on household's coping mechanisms against negative shocks in the last 30 days. After*Severe L. represents the interaction of After (an indicator variable referring to those observations in the follow-up survey) and Severe L. (an indicator variable referring to those observations that were in the regions with severe lockdowns, Capital and Occidental regions). To have a benchmark of the estimated effect, the mean value of each outcome at baseline is reported. Standard errors in parentheses, clustered at municipal level. *p<10%. **p<5%. ***p<1%.

One dimension to take into account is the economic context of Venezuela when the COVID-19 hit. The economic crisis of recent years weakened the public sector toolkit for response to both the health and the economic challenges of this crisis. The lack of resources deprived the majority of households of economic buffers, impacting directly on consumption. As a consequence, even before the COVID-19 crisis many households reduced their consumption and thus their welfare, making it impossible to readjust their consumption to deal with the severe lockdown. Our analysis in Table 10 shows that households coped with decapitalization by selling household assets or by expending savings. We actually find that using savings or selling assets increased by 18.7 p.p. in severe lockdown regions. Households also reported that have looked for a different activity to generate income. This approach increased 7.8 p.p. in lockdown areas. Finally, households sought family support. We found an increase of 8.6 p.p. on the probability of looking for family support in the severe lockdown areas in comparison to the non-severe lockdown areas.

Robustness checks

In this section we test for different assumptions that may affect our estimations of the differential effects of severe lockdowns. In particular, we focus on three exercises. First, we test for endogenous migration. We then perform false experiments to test that the results of the paper are not due to a spurious relationship. Finally, we perform a cluster analysis to show that our partition between severe and non-severe regions is not arbitrary.

Potential endogenous migration

We tested for non-random migration that may affect our estimations and found no statistically significant correlation between migration and the geographical location of severe lockdowns. Our measure of exposure to severe (or non-severe) lockdowns is based on the location at baseline of each household. In other words, any potential migration due to the lockdown imposed after our baseline does not affect our exposure classification between severe and non-severe areas. As mentioned before, our estimations are similar to intention-to-treat (ITT) analysis, and the accuracy of our exposure measure to the actual severe (or non-severe) lockdown affects our estimations. In other words, the accuracy of the estimations will depend on how many of those that were in the severe (or non-severe) lockdown areas remained in those areas between the end of our baseline survey and our follow-up survey. Column (1) in Table A.2 shows no significant effect of the lockdown on migration. This result strengthens our identification strategy and shows that migration was not significantly correlated with the geographical location of our treatment. Actually, as the 'after' coefficient shows, average migration was reduced significantly after the quarantine was imposed.

Table A.2. Impacts on Migration and upper and lower bounds for employment effects based on migration

	(1)	(2)	(3)	(4)
Outcome	Migration	Prob. of being employed (classifying individuals based on their location at baseline)	Prob. of being employed (re-coding all migrants as part of the Non-severe L. regions)	Prob. of being employed (re-coding all migrants as part of the Severe L. regions)
After*Severe L.	0.030	-0.070**	-0.069**	-0.077***
	(0.021)	(0.030)	(0.029)	(0.027)
After	-0.055***	-0.056***	-0.056***	-0.054***
	(0.016)	(0.015)	(0.015)	(0.014)
Mean outcome at	0.0586	0.598	0.598	0.598
at baseline Individual FE				
	Yes	Yes	Yes	Yes
R-squared	0.481	0.865	0.865	0.865
Observations	8,968	8,968	8,968	8,968

Notes: Column (1) presents the estimated effect of the severe lockdown on migration. Migration is defined if at least one member of the household has emigrated in the recent past. Columns (2-4) present the estimated effect of the severe lockdown on probability of being employed under different assumptions on migration. Column (2) is the our benchmark model that defined the location of each individual at baseline. Column (3) and (4) re-code all households which migrated as in non-severe lockdown regions or as in severe lockdown regions. After*Severe L. represents the interaction of After (an indicator variable referring to those observations in the follow-up survey) and Severe L. (an indicator variable referring to those observations that were in the regions with severe lockdowns, Capital and Occidental regions). Standard errors in parentheses, clustered at municipal level. *p<10%, **p<5, **p<10%%.

In addition, to quantify the potential effect of migration in our ITT-like estimations, we generated two simulations by re-coding our exposure to the severe lockdown for two extreme scenarios: (i) assuming that all the migrants should be coded as exposed to a severe lockdown and (ii) assuming that all the migrants should be coded as exposed to a non-severe. Movements within the severe affected areas should not affect our estimations. However, moves between severe lockdown areas and non-severe random areas can add noise to our ITT-like estimations. As shown in Table A.2, our results are similar between these two extreme scenarios. As only 1% of our sample reported migrating during the last month in our follow-up survey, the sign, confident level and size of the coefficient of interest are similar to the main results used in all the paper, highlighting that if migration is adding noise to our estimations, this effect is not large enough to reverse our main results.

Placebo Experiments

We performed several placebo experiments by choosing randomly different regions as the severely lockdown one. In particular, we picked random pairs of regions as false treatment groups. We estimated our main regressions for all the different possible combinations. We report estimations of the overall effect of a more severe lockdown on employment using different batches of 2 regions in Table A.3. We find no negative and significant effect for any alternative subset of regions that do not include Capital or Occidental.[2]

Table A.3. Placebo experiments

Outcome Region	Prob. of being employed	
	Effect	Standard Error
3,7 (No placebo)	-0.070**	(0.030)
1,2	0.020	(0.027)
1,3	-0.007	(0.025)
1,4	-0.018	(0.029)
1,5	0.031	(0.024)
1,6	0.029	(0.031)
1,7	-0.033*	(0.028)
2,3	0.018	(0.023)
2,4	0.001	(0.036)
2,5	0.062***	(0.020)
2,6	0.051*	(0.028)
2,7	-0.042	(0.038)
3,4	-0.033	(0.030)
3,5	-0.033*	(0.019)
3,6	0.027	(0.036)
4,5	0.016	(0.033)
4,6	0.015	(0.043)
4,7	-0.037*	(0.019)
5,6	0.061*	(0.031)
5,7	-0.027	(0.034)

2 Similar results were found were picking all the potential combination of 3 and 4 regions.

Table A.3 (continued). Placebo experiments

Outcome Region	Prob. of being employed	
	Effect	Standard Error
6,7	-0.023	(0.027)
Mean outcome at baseline	0.598	-

Notes: This table presents the estimated effect of the severe lockdown on the probability of being changing the assignments of regions to severe and non-severe classifications. Our benchmark model in row '3,7 (No placebo)' assigns severe lockdown classification to the regions Occidental (region 3) and Capital (region 7). We replace this real treatment with placebos by reassigning the severe lockdown classification to each one of the possible combinations of 2 regions. Region identifiers are: Central (region 1), Llanera (region 2), Zuliana (region 4), Andina (region 6), and Oriental (region 7). All regressions include individual fixed effects. To have a benchmark of the estimated effect, we report the mean value of the employment status at the baseline. Standard errors in parentheses, clustered at municipal level. *p<10%. **p<5%. ***p<1%.Grouping treatment regions based on the severity of different lockdown dimensions

Finally, we also found that the grouping of the treated regions is not arbitrary. In order to test this, we performed a cluster analysis to split the sample between treated and control groups based on the level of enforcement in each region. For these exercises, we used the variables presented in Figure 1. These variables represent different dimensions of the lockdowns by region. We performed a cluster analysis of different combinations of these variables, and we always found the same partition of the space using the variable of level of enforcement of containment measures.

Conclusion

This study estimates the effect of the lockdowns imposed in response to COVID-19 on labor market outcomes, household labor and non-labor income as well as potential coping mechanisms. To conduct this research, we used a household survey that ended right before the COVID-19 crisis began, and a follow-up phone survey collected two weeks after the lockdown started. As such, this is the first paper to measure the welfare impacts of COVID-19 containment measures in a developing country. In addition, this work showcases the potential of phone surveys in situations where all the statistical operations have been stopped.

This paper finds that lockdowns in developing countries severely affect labor market outcomes. Those that were most affected were the informal and self-employed workers, a very relevant share of the labor force in developing countries. To identify these effects, this paper has exploited the exogenous variation in the severity of the lockdown across states along with the timing of the surveys. Apart from the one mentioned, we find no heterogeneous effects by age or income as this is a crisis that affects the overall population in developing countries. Finally, the robustness checks show that the results described in this study are robust to the usage of different specifications and potential endogenous migration.

Venezuela is a country that experienced serious socioeconomic issues before the COVID-19 crisis. The external validity of the paper needs to be understood in that context. The Venezuela case, a country that was isolated before the pandemic and that imposed a heterogeneous lockdown before having a significant number of COVID-19 cases. This fact supports the internal validity of paper allowing the authors to disentangle the economic impacts of severe quarantines and health effects. On the other hand, countries with more sophisticated labor markets, where telework is a more common alternative than in Venezuela, wwill likely demonstrate reduced impacts on unemployment. However, developing countries with labor markets, with high

levels of informality and with a lack of high skill jobs creation, will probably have to deal with challenges similar to the ones that this paper found.

A critical reason for studying the impact of COVID-19 containment measures is that measures applied in developed countries like long and severe lockdowns may not be the most efficient for developing countries. Information about the socioeconomic costs of these policies is necessary in order to inform the design and implementation of future policies. Therefore, this study may be useful and worthy for governments and policy makers analyzing preventive measures against health shocks. This paper identifies the costs of the most copied policy across countries (lockdowns). Based on the estimations, alleviation policies and recovery plans should target informal and self-employed workers who usually have no health insurance or other employment benefits.

The results in this paper contribute to a growing literature that estimates the microeconomic impacts of COVID-19. This approach compares the differences of taking severe versus non-severe measures. The findings in this study also benefit the knowledge of a broader issue, social protection policies for emergency situations. Since this paper has identified those most affected by this shock, the effects of lockdowns may be able to be overcome with well targeted and flexible social plans to support the most vulnerable population.

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