

COVID-19 lockdown led to an unprecedented increase in inequality

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COVID-19 lockdown led to an unprecedented increase in inequality

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Abstract

The COVID-19 pandemic has affected households across the globe due to the health impacts but also through indirect socioeconomic effects as a result of the additional stress on the health systems, implications of the lockdowns and other policy measures undertaken by governments. Moreover, there is evidence that these impacts are associated with socioeconomic characteristics of households and could lead to an increase in inequality and poverty. In this paper, we conduct a first assessment based on household surveys in a large set of countries and analyze the determinants of income shocks at the household-level and macroeconomic inequality implications. While the average income losses of on average 4% but up to 27% are already high (similar to GDP losses in 2020 of on average 6% in our sample), we find an even more striking increase in inequality, of up to several points (1.2 points on average) of the typically very flat Gini index. Across countries, we find that on average an additional one percentage point loss in GDP was associated with an increase in the Gini by one percentage point. Analyzing the determinants of the income shock, we find strong evidence of heterogeneity with higher likelihood of income shocks for poorer, female-led, and less-educated households. The results indicate that we are experiencing an unprecedented crisis also in terms of economic inequality. The policy response to limit the macroeconomic repercussions therefore should explicitly include reducing inequality. Otherwise, a rebuilt macro-economy, will exhibit a much higher degree of social and economic inequality that are likely to persist.

Keywords: COVID-19, inequality, income, distributional impacts

1 Along with direct health impacts of the COVID-19 pandemic, house-
2 holds across the globe has also suffered indirect socioeconomic effects due
3 to the additional stress on the health systems, implications of the lock-
4 downs, and other policy measures undertaken by governments. There
5 is evidence that these impacts are associated with socioeconomic char-
6 acteristics of households and could lead to an increase in inequality and
7 poverty¹. Most of the existing evidence is based on macroeconomic stud-
8 ies, while some studies use micro-simulation and now-casting exercises
9 have been applied to the COVID-19 crisis in 2020^{2,3,4}, empirical analysis
10 using household-level micro surveys are still missing, especially. Further-
11 more, cross-country comparisons are also unavailable thus far. We use
12 household surveys from 35 countries to investigate the socioeconomic im-
13 pacts of the pandemic, specifically, inequality and poverty implications
14 and the differentiated impact of household and individual characteristics.
15 We conduct a first assessment using these household surveys to analyse

16 the socioeconomic determinants of income shocks at the household-level
17 and wider macroeconomic inequality implications. We find strong evi-
18 dence of heterogeneity with higher likelihood of income shocks for poorer,
19 female-led, and lower-educated households. The results indicate that
20 we are experiencing an unprecedented crisis also in terms of economic
21 inequality, whose policy response will be pivotal to mitigate long-term
22 repercussions of this rise in inequality around the world. While the av-
23 erage income losses of on average 4% but up to 27% are already high
24 (similar to GDP losses in 2020 of on average 6% in our sample), we find
25 an even more striking increase in inequality, of several points (1.2 points
26 on average) of the normally very flat Gini index. The policy response
27 to limit the macroeconomic repercussions therefore should explicitly be
28 targeted at reducing inequality. Otherwise, a rebuilt macro-economy, will
29 exhibit a much higher degree of social and economic inequality that are
30 likely to persist.

31 The impact of the pandemic on households has been multidimensional, directly
32 due to the health crisis, but importantly also indirectly to economic implications and
33 restrictions due to the lockdown and even through indirect impacts on employers,
34 firms, and the public sector. The World Bank estimates that global per capita GDP
35 will decline by 6.2% in 2020 with Sub-Saharan Africa’s per capita GDP expected
36 to decline by 5.3% while that of South Asia is projected to decline by 3%⁵. These
37 impacts threatens to offset development efforts and the decrease in global income
38 inequality achieved in the last forty years⁶.

39 In terms of empirical evidence based on past pandemics, it has been indeed
40 found that they have led to persistent impacts on economic growth⁷, inequality⁸,
41 and affected absolute poverty⁹. However, most of this evidence is based on cross-
42 country macroeconomic studies. And while in particular micro-simulation studies
43 and now-casting exercises have been applied to the COVID-19 crisis in 2020^{2,3,4},
44 actual household data based analysis is still missing. Yes their indications show
45 a strong distributional impact of the crisis in particular on market incomes, while
46 in some cases in particular lower-income households in some cases such as the UK
47 even appear to have gained in 2020. Based on household micro-surveys,¹⁰ found
48 impacts of COVID-19 on income and food security for selected regions in India. Yet
49 overall, robust micro-econometric evidence is scarce due to the availability of data
50 that allows the capture of idiosyncratic heterogeneity.

51 Since the beginning of the pandemic, several countries, in particular in Africa and
52 Asia, have conducted High Frequency Phone Surveys (HFPS) of households linked to
53 the ongoing panel micro studies, including Burkina Faso, Ethiopia, Kenya, Malawi,
54 Mali, Nigeria, South Africa, Uganda, and also in India. Most of these surveys have
55 been conducted in collaboration with the World Bank, however, individual countries
56 have also added COVID-19 modules to their existing household surveys (e.g., South
57 Africa). The main aim of these surveys is to monitor the socioeconomic impacts of
58 the pandemic with a focus on employment, income (wages and business revenue),
59 health, education, food security, and coping strategies, including safety nets. Along
60 with surveys from these developing countries, we also use the Survey of Health,
61 Ageing and Retirement in Europe (SHARE) - a pan-European dataset on public
62 health and socioeconomic conditions in Europe¹¹. Descriptions of the datasets used
63 in this paper are available in the c section.

64 Table A1 in the c provides the descriptive statistics of the main variables used in

65 this paper. India had the highest share of respondents who reported a loss in income.
66 In the case of pre-COVID income, surveys in South Africa (monthly - February
67 2020), India (daily wage - March 2020), Kenya (two-weeks period in February 2020),
68 and the SHARE dataset included a question on income before the pandemic. For
69 Nigeria and Uganda, we matched monthly income reported in the 2019 waves of the
70 regular household surveys. Mali reported poverty status of individual households
71 instead of income. The descriptive statistics for the individual countries in the
72 SHARE dataset are provided in Table A2. A number of countries reported that
73 more than 70% of the households suffered a loss in income due to the pandemic;
74 with 78.8% of the respondents in India reporting that their income declined below
75 the pre-lockdown levels. Even the relatively developed countries in the SHARE
76 dataset (EU-27 plus Israel), more than six percent of the respondents had their
77 income reduced.

78 Governments across the world implemented various measures to contain the
79 spread of the COVID-19 pandemic. The Oxford COVID-19 Government Response
80 Tracker (OxCGRT) tracks governments' policies and interventions including school
81 closings, travel restrictions, bans on public gatherings, emergency investments in
82 healthcare facilities, new forms of social welfare provision, contact tracing and other
83 interventions to contain the spread of the virus, and augment health systems¹². We
84 report the stringency of the containment measures in Figure B.3 in the c with the
85 results suggesting that the stringency of the government responses reached peak
86 during March and April.

87 In this paper, we contribute to this research gap by exploiting household surveys
88 in 35 countries that have been conducted to address two main research questions;
89 (1) what are the socioeconomic impacts of the pandemic, in particular in income;
90 hence, inequality and poverty and (2) the differentiated impact of household and
91 individual characteristics.

92 To investigate the socioeconomic the determinants of income loss due to the
93 pandemic, we use the following Probit specification estimated for all countries with
94 available data and covariates to detect common patterns.

$$95 \quad Prob(y_{i,post_lockdown} < y_{i,pre_lockdown})|X_i = \Phi(X_i^T \beta) \quad (1)$$

96 where y_i is the income of a household before and after the pandemic-induced lock-
97 down, and Φ represents the cumulative density of the standard normal distribution.
98 We control for location fixed-effects, socioeconomic and demographic characteris-
99 tics such as the education, gender, and age of household head, log of pre-lockdown
income, and poverty status of households in the case of Mali.

100 *Empirical findings*

101 The regression results for all the countries are shown in Table 1. They suggest
102 that the probability of income loss is generally lower among households with higher
103 educated heads, this is critical as education continues to be beneficial even during
104 a pandemic. In Nigeria, India, Mali, and the SHARE countries – households with
105 female heads have a higher probability of suffering from income loss, however, we
106 find the opposite effect in South Africa. The regression estimates also suggest that
107 households with higher income are less likely to suffer from income loss, further
108 emphasising that the distributional consequences of the pandemic falls disproport-
109 ionately on the lower income earners. In the case of Mali, which report poverty
110 status of households instead of income, our findings suggest that poor households
111 have a higher probability of suffering from income loss due to the pandemic.

Table 1: Determinants of income loss (Probit analysis)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Nigeria	South Africa	India	Kenya	Uganda	Mali	SHARE
HH head gender (female)	0.042*** (0.013)	-0.180* (0.078)	0.445** (0.037)	0.503 (0.209)	0.065 (0.359)	0.039*** (0.008)	0.140* (0.098)
HH head age	-0.028*** (0.000)	-0.083*** (0.000)	0.023*** (0.000)	0.199*** (0.000)	0.028*** (0.000)	0.008*** (0.000)	-0.011** (0.041)
HH head age-squared	0.0003*** (0.000)	0.0009*** (0.000)	0.00003*** (0.000)	0.002** (0.000)	-0.0003** (0.000)	-0.0001*** (0.000)	0.000005** (0.033)
HH head years of schooling	-0.004** (0.015)	-0.044*** (0.002)	0.066*** (0.000)	-0.060** (0.038)	-0.018* (0.062)		
Log of income	-0.005 (0.323)	-0.159*** (0.000)	-0.352*** (0.007)	-0.221** (0.044)	-0.317*** (0.000)		-0.262*** (0.001)
Poor						0.101*** (0.000)	

p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.10, + p<0.15

112 *Impact on inequality*

113 The societal impact on income loss and other individual impacts is important
114 in particular given the evidence on incidence among vulnerable groups found in
115 the previous section. Looking at the overall income distribution in all countries
116 under consideration, we now evaluate the macro-economic picture of these income
117 losses at the household-level and underlying representative survey for the countries.
118 Notably, the panel dimension allows us to produce accurate before and after income
119 distributions. Based on country-level statistics and focusing on past pandemics, it
120 has been found that inequality increases significantly and persistently after pandemic
121 episodes, leading to an increase in the net Gini coefficient by approximately 1% as
122 found in⁸ even five years after the pandemic. At a global average Gini index of
123 around 40 points, this implies an increase by around 0.4 points – significant but
124 comparably small.

125 Here we combine the micro-economic evidence across countries for a short-term
126 and micro-econometric and data-driven estimate of the inequality effect at least
127 in the year of the pandemic for COVID-19. We compute Lorenz curves for net
128 income and consumption – depending on data availability – before and after the
129 pandemic shock and lockdown start. For the countries where only a categorical
130 variable is available and not the monetary value, we approximate the categorical
131 variable reporting perceived impacts on income using the average shock loss reported
132 in previous waves of the survey.

133 Figure 1 shows the resulting Lorenz curves prior and after the lockdown in var-
134 ious countries, computed on household reported income and consumption values
135 using sampling weights and household size as weights. In most cases, we find a
136 substantial shift of the curve outwards indicating an increase inequality across the
137 full distribution. In case of income and for India, this case is most striking since due
138 to the lockdown, workers’ income virtually dropped to zero for a large majority of
139 (informal) workers, at least temporarily.

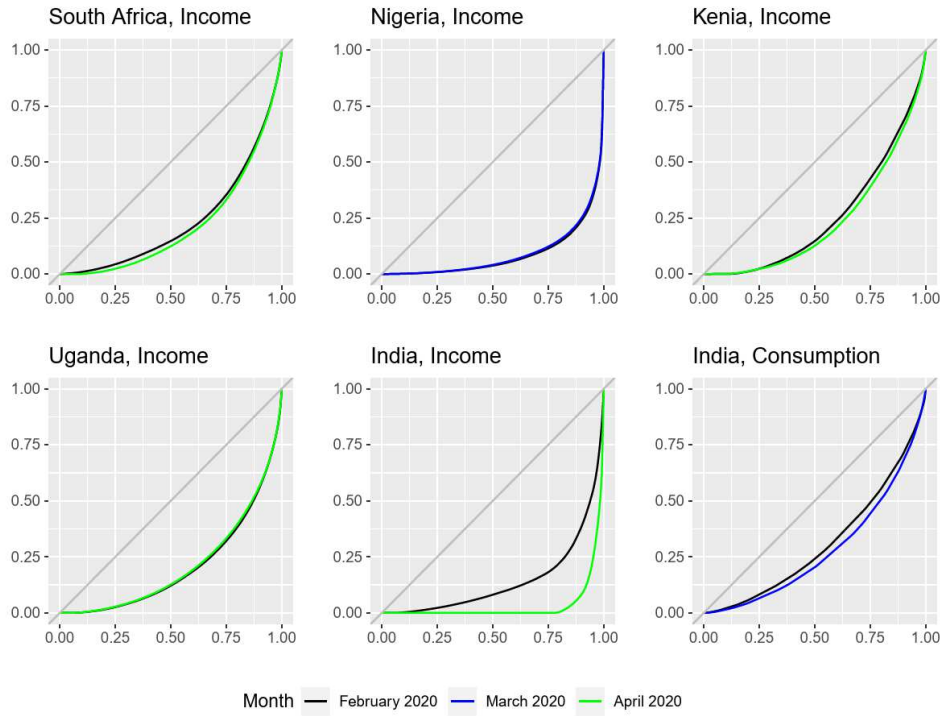


Figure 1: Lorenz curves before and after the lockdown, developing countries.

140 While this figures are based on monthly values and reflect the immediate shock
 141 in particular of lockdown measures, they show strikingly how regressive the impact
 142 has been. Certainly they depict a momentary picture, but shows that while average
 143 income and GDP losses have been unprecedentedly high in 2020, they are by no
 144 means distributed equally across the population but have been accompanied by
 145 tremendous shifts in the income (and consumption) distribution towards better-off
 146 households.

147 For the SHARE dataset, Figure 2 shows the change in the Lorenz curves across
 148 the full distribution (similar as in¹³) and change in Gini in points pre- and post the
 149 March 2020 lockdown. First note the substantial increase in inequality in Southern
 150 Europe of up to 5 points, while some countries show even reductions. Looking along
 151 the full distribution (left panel), in particular at very low incomes (bottom 10% in all
 152 countries and bottom 20% in most countries), the Lorenz curves shifts downwards
 153 in almost all countries for the bottom 20% of the population. For higher incomes
 154 the differences across countries vary much more including with significant gains in
 155 some countries. (shifting inwards of the Lorenz curve).

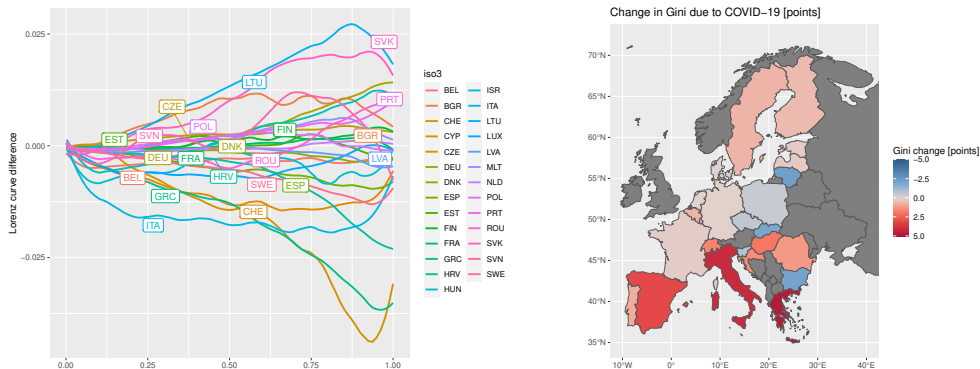


Figure 2: Lorenz curves: difference before and after the lockdown (left) and Gini change (right).

156 In terms of aggregate inequality statistics, we report the Gini index for all coun-
157 tries and variables, see table A3 in the c. Moreover, we show the latest available
158 historical Gini data based on the UNU-WIDER World Income Inequality Database
159 (WIID), and the GDP growth rate estimated for 2020 as of the October 2020 IMF
160 World Economic Outlook Update.

161 The income loss (in India) is the highest, with Gini skyrocketing to almost 92
162 points, as observable from the Lorenz curve. This is due to almost 70% of the
163 respondents reporting their income dropping to zero between February and April
164 2020. This finding is certainly temporary to a large part, but shows the imme-
165 diate dramatic impact not only in terms of average income loss but also its high
166 regressivity.

167 In terms of consumption in the same sample, as expected, the results are much
168 reduced due to consumption smoothing and other measures. However, the findings
169 still shows a substantial increase in the Gini coefficient by almost 7 points, while on
170 average consumption dropped by 3 percent. This again suggests the strong regressive
171 impact of COVID-19 in India.

172 In South Africa, the income Gini index increased by 3.5 points with an average
173 drop of income of 8%. For Nigeria, we do not see a clear pattern, note, however,
174 that the size of the impact we assume to be constant across the distribution, while
175 the impacted households seem evenly distributed. This also shows that some coun-
176 tries notably in Sub-Saharan Africa seemed to have managed to keep the socioeco-
177 nomic impact relatively low. In all cases, the Lorenz curve do not seem to intersect
178 showing an unambiguous deterioration of the distribution between February and
179 March/April.

180 While these impacts certainly show a substantial increase in inequality in most
181 countries, its persistence is yet to be seen. The findings, jointly with the determi-
182 nants of income shocks found in the previous section, show that the impact could
183 indeed be rather persistent and unequally distributed along various dimensions.
184 Compared to the long-run estimated impacts, which have been found to be persis-
185 tent, see⁸, it indicates a strong short-term impact followed by smaller but significant
186 longer term effects.

187 Based on the large set of countries, we estimated the Gini growth rate across
188 countries and how it relates to the policy stringency of the measures enacted and
189 related GDP impact. The results are shown in table 2. The strongest impact is
190 from GDP growth; a one percent higher GDP loss in 2020 leads to approximately a
191 one per cent increase in the Gini index. The (additional) effect of policy stringency
192 in addition leads to a further increase in inequality.

Table 2: Regression of the Gini growth rate on GDP growth and policy stringency

	<i>Dependent variable:</i>	
	Gini index growth rate	
	(1)	(2)
GDP growth in 2020	-1.139*** (0.402)	-0.981** (0.399)
policy stringency (31/03/2020)		0.242* (0.129)
Constant	-3.943 (2.769)	-22.457** (10.167)
Observations	32	31
R ²	0.211	0.321
Adjusted R ²	0.185	0.272
Residual Std. Error	6.662 (df = 30)	6.317 (df = 28)
F Statistic	8.027*** (df = 1; 30)	6.607*** (df = 2; 28)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01	

193 This also has important consequences on increases in poverty, such as the ones
194 projected by⁹, ¹⁴, or¹⁵, but imply that at least in the short-term, poverty increases
195 could be even higher.

196 *Conclusion*

197 The COVID-19 pandemic and the lockdowns implemented to contain it has had
198 multifaceted impacts on countries and household across the globe. Along with dev-
199 astating health impacts, the indirect socioeconomic effects have also been substantial
200 in most countries. Our goal in this paper is to provide a first assessment of some of
201 these impacts, notably on the distributional impact and changes in inequality. Using
202 unique micro-surveys conducted to evaluate the impact of pandemic in both devel-
203 oping and developed countries (35 in total), we investigate the effects on household
204 income and inequality. Our econometric analysis suggests that certain socioeconomic
205 characteristics of households could lead to an increase of inequality and poverty in
206 developing countries. Importantly, we find that higher levels of education lowers the
207 probability of income loss even during a pandemic.

208 To investigate the impact on inequality, we estimate Lorenz curves using house-
209 hold reported values and sampling weights from the surveys. In all cases, we find a
210 substantial shift of the curve outwards indicating an increase inequality across the
211 full distribution. Our findings show an immediate and substantial increase in income
212 and consumption inequality in most countries, of on average 1.2 but up to 5 points
213 in Europe and 7 points in India. While our inequality estimates are short-term in
214 nature, in conjunction with the determinants of income shocks, these impacts could
215 indeed become rather persistent and unequally distributed.

216 The main determinant of this spike in inequality can be traced back to the
217 general economic crisis; on average, one additional percentage point of GDP in
218 2020 translated to about one additional percent increase of the Gini coefficient,
219 highlighting the overall macroeconomic importance of a swift recovery also in terms
220 of inequality reduction.

221 These results highlight the role of two important policy measures: international
222 aid as many of these impacts are within the developing world, and in particular hint
223 to large increases in poverty, and national re-distributive and transfer/safety-net
224 policies to reduce the regressivity of impacts on households.

225 **Methods**

226 *Econometric methodology*

227 To investigate the socioeconomic the determinants of income loss due to the
228 pandemic, we use the following Probit specification estimated for all countries with
229 available data and covariates to detect common patterns.

$$230 \text{Prob}(y_{i,\text{post_lockdown}} < y_{i,\text{pre_lockdown}} | X_i) = \Phi(X_i^T \beta) \quad (2)$$

230 where y_i is the income of a household before and after the pandemic-induced lock-
231 down, and Φ represents the cumulative density of the standard normal distribution.
232 We control for location fixed-effects, socioeconomic and demographic characteris-
233 tics such as the education, gender, and age of household head, log of pre-lockdown
234 income, and poverty status of households in the case of Mali.

235 *Dataset descriptions*

236 Kenya reported 84,000 COVID-19 cases and nearly 1,500 deaths until the end
237 of November. Nairobi so far has reported 45% of all the cases in the country.
238 This survey is being conducted by the World Bank in collaboration with the Kenya
239 National Bureau of Statistics and the University of California Berkeley. The first
240 sample is a randomly drawn subset of all households that were part of the 2015-16
241 Kenya Integrated Household Budget Survey (KIHBS) Computer-Assisted Personal
242 Interviewing (CAPI) pilot. It includes information on household background, service
243 access, employment, food security, income loss, transfers, health, and COVID-19
244 knowledge for 4,457 households.

245 In Mali there were 4,762 COVID-19 cases and 160 deaths at the end of November.
246 The COVID-19 Panel Phone Survey of Households 2020 was implemented by the
247 National Statistical Office (INSTAT) in collaboration with the World Bank in may
248 2020. The survey consists of 1,809 households and provides information on behaviour
249 and social distancing, access to basic services, employment and income, prices and
250 food security, income loss, and social safety nets.

251 Nigeria has the second highest number of infections in Sub-Saharan Africa but
252 has suffered relatively low levels of transmission and mortality. The highest number
253 of cases in the country are in Lagos - the second most populous state in Nigeria.
254 Hence, the Nigerian government implemented strict lockdown measures across the
255 country to successfully contain the pandemic with 67,800 cases and twelve-hundred
256 deaths until the end of November. However, the socioeconomic impact of these mea-
257 sures have been rather significant. World Bank reports at the national poverty line
258 40.1% poor in 2019, which is expected to increase by 2020 by 2.3%, since the Nige-
259 rian economy is expected to contract in 2020 by 3-6%. Although the lockdown has
260 managed to keep COVID-19 transmission and mortality relatively low in Nigeria,
261 the socioeconomic impact has been significant. More than 40% of the respondents
262 reported losing their jobs as a result of COVID-19 while Income losses among house-
263 holds have been widespread in Nigeria, with 16 out of the 37 states in the country
264 reporting that more than 80% of the households surveyed had their total income
265 reduced as a result of the pandemic - 90.1% of the households in Kano reported a
266 loss of income. Commerce (14%), services (9%), and agriculture (9%) sectors have
267 reported the highest number of job losses. We use the Nigeria COVID-19 National
268 Longitudinal Phone Survey (COVID-19 NLPS) implemented by the National Bu-
269 reau of Statistics in collaboration with the World Bank. The survey was conducted
270 on a nationally representative sample of 1,950 households between 20 April and 11

271 May 2020 drawn from wave 4 of the General Household Survey—Panel (GHS-Panel)
272 in Nigeria.

273 South Africa reported more than 792,000 cases of COVID-19 and nearly 22,000
274 deaths as of November 2020. Gauteng, the most populous province in South Africa
275 (population of approximately 15 million) has reported almost 30% of the total num-
276 ber of cases². Data for South Africa suggests an 18% decline in employment between
277 February and April 2020, of which two-thirds were women. In the NIDS-CRAM sur-
278 vey, 47% of respondents reported that their household ran out of money to buy food
279 in April 2020, a sharp increase from the 21% that reported running out of money
280 in the previous year (GHS, 2018). Here we use data from the the National Income
281 Dynamics Study - Coronavirus Rapid Mobile Survey (NIDS-CRAM). The aim of
282 this survey is to investigate the socioeconomic impacts of the national lockdown in
283 South Africa in March 2020, and the social and economic consequences of the global
284 Coronavirus pandemic. NIDS-CRAM is based on a sub-sample of adults from house-
285 holds in the National Income Dynamics Study (NIDS) Wave 5 (2017) and provides
286 data on 7,074 completed interviews.

287 India has reported more than 9.5 million cases of COVID-19 and more than
288 138,000 deaths at the end of November. Maharashtra, the second most populous
289 state (population of 112 million) has so far reported the highest number of COVID-
290 19 cases at 1.82 million and more than 47,000 deaths. Among the six states in which
291 the survey was conducted, Andhra Pradesh (the tenth-most populous state in India
292 with a population of more than 49 million) has reported 868,000 (the third highest
293 in India) and almost 7,000 deaths³. In the case of India, the number of people who
294 reported that they did not work for income increased from 18.4% in March to 70.4%
295 in the beginning of the post-lockdown period. Furthermore, the average income
296 from March 2020 to April 2020 declined by more than 70% among the households
297 sampled. As a the consequences of these losses in employment and income, the
298 average monthly food expenditure also declined by more 5%. The data for India
299 comes from a collaborative effort by the World Bank, IDinsight, Development Data
300 Lab, and John Hopkins University across six states in India; Jharkhand, Rajasthan,
301 Uttar Pradesh, Andhra Pradesh, Bihar, and Madhya Pradesh. This dataset provides
302 information on agriculture, migration, rural labour markets, consumption patterns,
303 access to relief/safety nets, and healthcare using a sample size on 4,550.

304 Uganda so far reported 21,409 confirmed COVID-19 cases and around two-
305 hundred deaths. The High-Frequency Phone Survey was launched in June 2020
306 by the Uganda Bureau of Statistics (UBOS) with support from the World Bank.
307 The survey tracks the impacts of the pandemic. 2,259 households were interviewed
308 from the Uganda National Panel Survey (UNPS) 2019-20.

309 SHARE is the largest longitudinal micro data providing information on public
310 health and socioeconomic living conditions of European individuals¹¹. To investi-
311 gate the health-related and socioeconomic impact of COVID-19 on the risk group of
312 the older individuals, a sub-sample of SHARE’s panel respondents were interviewed
313 using a Computer Assisted Telephone Interview (CATI). The survey has been car-
314 ried out in 27 European countries and Israel from between June and August 2020
315 and consists of more than 70,000 respondents. The COVID-19 module gathers in-
316 formation on health and health behaviour, mental health, infections and healthcare,
317 changes in work and economic situation, and social networks.

²Available at: <https://sacoronavirus.co.za/>

³Available at: <https://www.mohfw.gov.in/>

318 **References**

- 319 [1] Blundell, R., Costa Dias, M., Joyce, R. & Xu, X. Covid-19 and inequalities*.
320 *Fiscal Studies* **41**, 291–319 (2020).
- 321 [2] Patryk Bronka, Diego Collado & Matteo Richiardi. The Covid-19 crisis re-
322 sponse helps the poor: the distributional and budgetary consequences of the
323 UK lock-down. Working Paper 5/20, Centre for Microsimulation and Policy
324 Analysis (2020). URL [https://www.microsimulation.ac.uk/publications/
325 publication-526262/](https://www.microsimulation.ac.uk/publications/publication-526262/).
- 326 [3] O’Donoghue, C., Sologon, D. M., Kyzyma, I. & McHale, J. Modelling the Dis-
327 tributional Impact of the COVID-19 Crisis*. *Fiscal Studies* **41**, 321–336 (2020).
328 URL [https://onlinelibrary.wiley.com/doi/abs/10.1111/1475-
329 5890.12231](https://onlinelibrary.wiley.com/doi/abs/10.1111/1475-5890.12231). _eprint: [https://onlinelibrary.wiley.com/doi/pdf/10.1111/1475-
330 5890.12231](https://onlinelibrary.wiley.com/doi/pdf/10.1111/1475-5890.12231).
- 331 [4] Beznoska, M., Niehues, J. & Stockhausen, M. Distributional Consequences of
332 the Corona Pandemic - A Microsimulation Analysis. Tech. Rep. 65, German
333 Economic Institute (IW) (2020).
- 334 [5] World Bank. *Global Economic Prospect* (World Bank, Washington, DC, 2020).
- 335 [6] UN. *World Social Report 2020* (United Nations, New York, 2020). URL [https:
336 //www.un-ilibrary.org/content/publication/7f5d0efc-en](https://www.un-ilibrary.org/content/publication/7f5d0efc-en).
- 337 [7] Ma, C., Rogers, J. H. & Zhou, S. Modern Pandemics: Recession and Recovery.
338 SSRN Scholarly Paper ID 3565646, Social Science Research Network, Rochester,
339 NY (2020). URL <https://papers.ssrn.com/abstract=3565646>.
- 340 [8] Furceri, D., Loungani, P., Ostry, J. & Pizzuto, P. Will Covid-19 affect inequal-
341 ity? Evidence from past pandemics. *Covid Economics* **12**, 138–57 (2020).
- 342 [9] Sumner, A., Hoy, C. & Ortiz-Juarez, E. Estimates of the impact of COVID-
343 19 on global poverty. Tech. Rep., UNU-WIDER (2020). URL [https://www.
344 wider.unu.edu/node/237051](https://www.wider.unu.edu/node/237051).
- 345 [10] Ceballos, F., Kannan, S. & Kramer, B. Impacts of a national lockdown
346 on smallholder farmers’ income and food security: Empirical evidence from
347 two states in India. *World Development* **136**, 105069 (2020). URL [https:
348 //linkinghub.elsevier.com/retrieve/pii/S0305750X20301959](https://linkinghub.elsevier.com/retrieve/pii/S0305750X20301959).
- 349 [11] Börsch-Supan, A. Survey of health, ageing and retirement in europe (share)
350 wave 8. covid-19 survey 1. release version: 0.0.1. beta. Tech. Rep., SHARE-
351 ERIC (2020).
- 352 [12] Hale, T. *et al.* Oxford covid-19 government response tracker. Tech. Rep., Blavat-
353 nik School of Government (2020). URL www.bsg.ox.ac.uk/covidtracker.
- 354 [13] Nekoei, A. & Seim, D. How do Inheritances Shape Wealth Inequality? Theory
355 and Evidence from Sweden. SSRN Scholarly Paper ID 3192778, Social Science
356 Research Network, Rochester, NY (2019). URL [https://papers.ssrn.com/
357 abstract=3192778](https://papers.ssrn.com/abstract=3192778).

358 [14] Lakner, C., Mahler, D. G., Negre, M. & Beer, E. How Much Does Reducing
359 Inequality Matter for Global Poverty? (2020).

360 [15] Valensisi, G. COVID-19 and global poverty: Are LDCs being left be-
361 hind? Tech. Rep. wp-2020-73, World Institute for Development Economic
362 Research (UNU-WIDER) (2020). URL [https://ideas.repec.org/p/unu/
363 wpaper/wp-2020-73.html](https://ideas.repec.org/p/unu/wpaper/wp-2020-73.html). Publication Title: WIDER Working Paper Series.

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372 **Competing interests** The authors declare no competing interests.

Table A1: Descriptive statistics of the main variables used in the analysis

Variable	Mean	Min	Max
Nigeria			
Gender (Female)	48.6%	0	1
Age	51.4	21	99
Years of schooling	5.6	0	16
Pre-COVID income (Naira)	142,829	0	7,600,000
Income loss (%)	73.9%	0	1
South Africa			
Gender (Female)	61.0%	0	1
Age	40.9	17	102
Years of schooling	11.1	0	16
Pre-COVID income (Rand)	8,290	8	100,000
Income loss (%)	27.0%	0	1
India			
Gender (Female)	14.5%	0	1
Age	35.9	18	82
Years of schooling	6.2	0	12
Pre-COVID income (Rupee)	1,248.7	0	30,000
Income loss (%)	78.9%	0	1
Kenya			
Gender (Female)	30.0%	0	1
Age	44.6	18	100
Years of schooling	8.3	0	16
Pre-COVID income (Shilling)	10,846.1	35	80,000
Income loss (%)	56.8%	0	1
Uganda			
Gender (Female)	31.9%	0	1
Age	48.8	18	96
Years of schooling	5.8	0	16
Pre-COVID income (Shilling)	2,279,777.0	35	43,600,000
Income loss (%)	70.1%	0	1
Mali			
Gender (Female)	50.7%	0	1
Age	35.3	15	95
Years of schooling	-	-	-
Poor	30.7%	0	1
Income loss (%)	65.1%	0	1
SHARE countries (EU-27 and Israel)			
Gender (Female)	63.0%	0	1
Age	71.0	33	101
Years of schooling	-	-	-
Pre-COVID income (€)	2474.9	0	9,999,999.00
Income loss (%)	6.1%	0	1

Variable	Mean	Min	Max
Belgium			
Gender (Female)	57.1%	0	1
Age	70.0	36	99
Pre- COVID income (Euro)	2,595.2	0	20,000
Income loss (%)	1.5%	0	1
Bulgaria			
Gender (Female)	59.5%	0	1
Age	68.9	43	99
Pre- COVID income (Lev)	376.4	0	3,579
Income loss (%)	2.2%	0	1
Croatia			
Gender (Female)	56.3%	0	1
Age	68.6	35	98
Pre- COVID income (Kuna)	704.8	0	3,370
Income loss (%)	2.1%	0	1
Cyprus			
Gender (Female)	58.0%	0	1
Age	71.4	44	99
Pre- COVID income (Euro)	1,315.9	0	9,000
Income loss (%)	2.9%	0	1
Czech Republic			
Gender (Female)	62.0%	0	1
Age	71.9	33	97
Pre- COVID income (Koruna)	879.4	0	9,739
Income loss (%)	3.2%	0	1
Denmark			
Gender (Female)	55.7%	0	1
Age	69.1	38	100
Pre- COVID income (Krone)	3,927.3	0	133,939
Income loss (%)	1.3%	0	1
Estonia			
Gender (Female)	62.7%	0	1
Age	71.3	38	99
Pre- COVID income (Euro)	931.2	0	9,000
Income loss (%)	4.8%	0	1
Finland			
Gender (Female)	54.8%	0	1
Age	68.5	42	97
Pre- COVID income (Euro)	2,858.0	0	20,200
Income loss (%)	0.5%	0	1
France			
Gender (Female)	60.0%	0	1
Age	71.5	39	101
Pre- COVID income (Euro)	2,575.9	32	60,000
Income loss (%)	0.9%	0	1
Germany			
Gender (Female)	54.7%	0	1
Age	70.2	39	96
Pre- COVID income (Euro)	2,932.7	240	50,000
Income loss (%)	0.8%	0	1
Greece			
Gender (Female)	57.5%	0	1
Age	70.5	38	98
Pre- COVID income (Euro)	998.9	0	13,000
Income loss (%)	2.6%	0	1
Hungary			
Gender (Female)	60.5%	0	1
Age	70.6	38	95
Pre- COVID income (Forint)	655.8	0	6,148
Income loss (%)	2.7%	0	1
Israel			
Gender (Female)	59.3%	0	1
Age	73.1	44	104
Pre- COVID income (Shekel)	2,386.0	175.4342	15,037
Income loss (%)	8.3%	0	1
Italy			
Gender (Female)	55.7%	0	1
Age	71.1	41	101
Pre- COVID income (Euro)	1,756.7	0	50,000
Income loss (%)	2.8%	0	1

Latvia			
Gender (Female)	64.2%	0	1
Age	68.7	31	101
Pre- COVID income (Euro)	53,194.9	0	50,000
Income loss (%)	3.9%	0	1
Lithuania			
Gender (Female)	63.3%	0	1
Age	68.8	39	95
Pre- COVID income (Euro)	700.3	0	15,000
Income loss (%)	1.8%	0	1
Luxembourg			
Gender (Female)	54.9%	0	1
Age	68.7	38	101
Pre- COVID income (Euro)	4,862.9	0	30,000
Income loss (%)	1.6%	0	1
Malta			
Gender (Female)	55.9%	0	1
Age	69.2	38	97
Pre- COVID income (Euro)	1,087.4	0	6,000
Income loss (%)	0.5%	0	1
Netherlands			
Gender (Female)	54.9%	0	1
Age	70.8	51	97
Pre- COVID income (Euro)	2,562.1	0	7,000
Income loss (%)	0.8%	0	1
Poland			
Gender (Female)	56.5%	0	1
Age	67.7	38	97
Pre- COVID income (Zloty)	2,662.1	0	2,326,880
Income loss (%)	2.3%	0	1
Portugal			
Gender (Female)	57.1%	0	1
Age	71.1	44	97
Pre- COVID income (Euro)	1,255.8	0	20,000
Income loss (%)	0.9%	0	1
Romania			
Gender (Female)	58.0%	0	1
Age	67.6	34	94
Pre- COVID income (Leu)	478.1	0	10,537
Income loss (%)	2.3%	0	1
Slovakia			
Gender (Female)	55.5%	0	1
Age	64.6	33	104
Pre- COVID income (Euro)	970.2	168	13,090
Income loss (%)	1.2%	0	1
Slovenia			
Gender (Female)	58.6%	0	1
Age	71.3	45	101
Pre- COVID income (Euro)	1,188.2	0	15,000
Income loss (%)	18.3%	0	1
Spain			
Gender (Female)	57.5%	0	1
Age	74.1	37	101
Pre- COVID income (Euro)	1,342.1	0	6,000
Income loss (%)	0.9%	0	1
Sweden			
Gender (Female)	54.4%	0	1
Age	73.5	38	99
Pre- COVID income (Krona)	2,730.1	0	80,271
Income loss (%)	1.6%	0	1
Switzerland			
Gender (Female)	54.7%	0	1
Age	72.1	32	100
Pre- COVID income (Franc)	4,966.4	0	89,896
Income loss (%)	0.8%	0	1

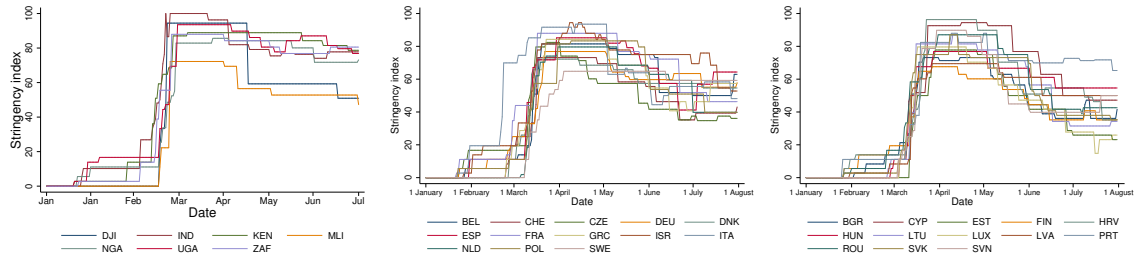


Figure B.3: Stringency of government responses according to OxCGRT

Country	avg. inc. chg.	Gini (pre)	Gini (post)	Gini diff.	GDP chg. 2020 [%]
NGA	-24.517	74.426	74.330	-0.096	-4.278
ZAF	-8.482	52.027	55.459	3.432	-8.000
KEN	-8.273	47.401	49.375	1.973	1.048
UGA	3.646	59.866	57.365	-2.501	-0.288
IND	-3.060	35.269	42.495	7.226	-10.289
BEL	-3.654	27.766	28.452	0.686	-8.262
BGR	-11.487	39.383	37.328	-2.056	-4.000
CHE	-3.026	30.492	32.067	1.575	-5.304
CYP	14.622	47.210	59.719	12.510	-6.438
CZE	0.249	27.634	27.072	-0.562	-6.499
DEU	-4.838	33.746	33.838	0.092	-5.983
DNK	-2.398	34.479	34.400	-0.080	-4.500
ESP	-8.323	27.917	30.980	3.063	-12.830
EST	-4.528	35.174	35.398	0.224	-5.200
FIN	-3.772	31.945	32.474	0.529	-3.979
FRA	-2.167	30.632	30.814	0.183	-9.757
GRC	-1.490	27.530	32.132	4.602	-9.504
HRV	0.475	37.304	38.731	1.428	-9.000
HUN	-5.524	32.376	34.264	1.888	-6.100
ISR	-6.992	38.100	39.564	1.463	-5.885
ITA	-8.915	32.805	36.815	4.010	-10.645
LTU	-8.432	34.868	32.659	-2.209	-1.840
LUX	-2.080	28.045	28.846	0.801	-5.800
LVA	-2.270	46.140	46.342	0.202	-6.000
MLT	-3.169	27.662	26.746	-0.917	-7.917
NLD	-2.570	23.883	23.899	0.015	-5.400
POL	-3.358	32.618	32.183	-0.435	-3.560
PRT	-4.122	34.930	35.726	0.796	-10.002
ROU	-4.612	38.897	40.072	1.176	-4.801
SVK	-8.284	29.213	27.330	-1.883	-7.086
SVN	3.298	33.878	33.106	-0.772	-6.700
SWE	-1.049	33.417	34.067	0.650	-4.716
Average	-4.034	36.470	37.626	1.157	-6.235

Table A3: Aggregate estimates for 2020, various countries

Figures

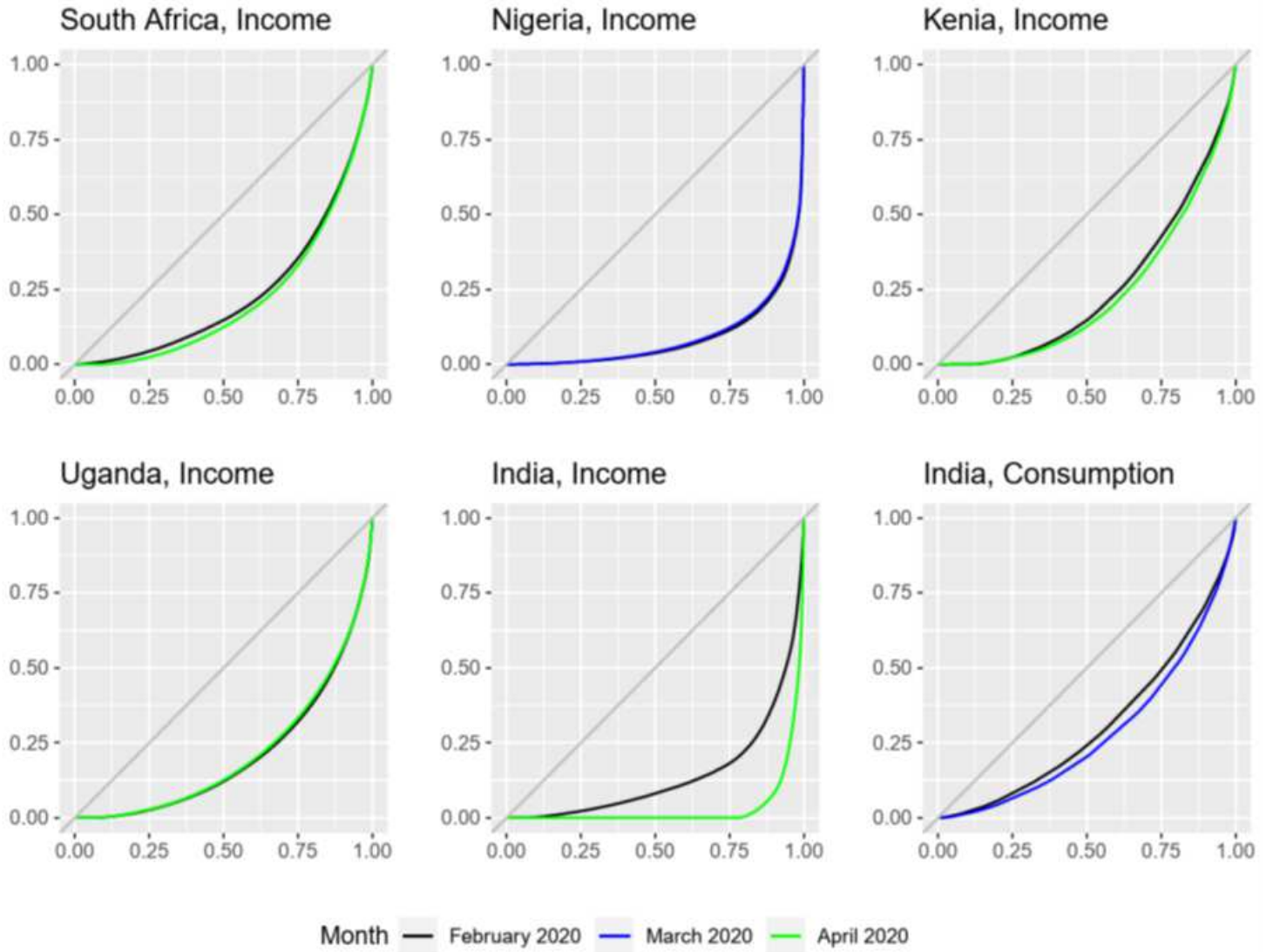


Figure 1

Lorenz curves before and after the lockdown, developing countries.

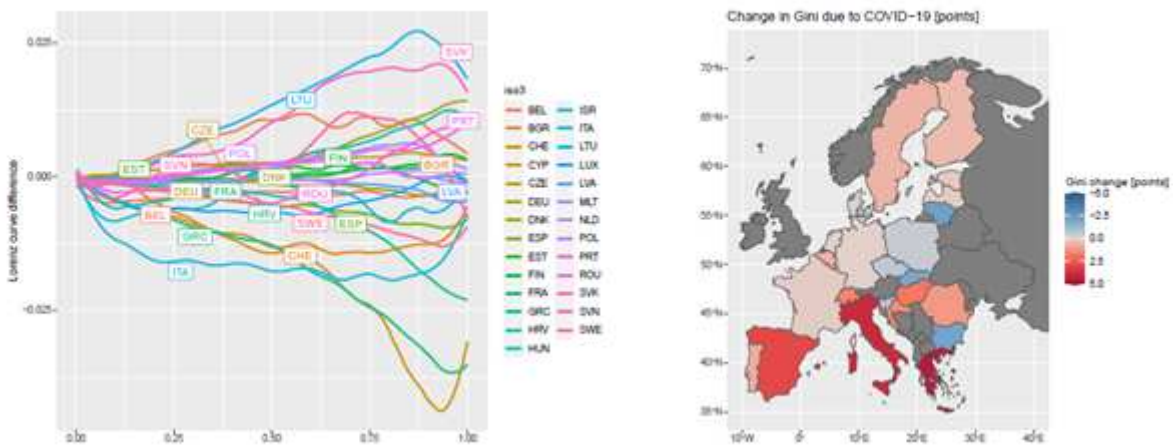


Figure 2

Lorenz curves: difference before and after the lockdown (left) and Gini change (right).