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## MULTIDIMENSIONAL INEQUALITY AND COVID-19 IN BRAZIL

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# Preface

As major global crises often do, COVID-19 has exposed countries' political, policy, and socioeconomic fault lines and vulnerabilities. In a previous public policy brief, Luiza Nassif-Pires led a study examining the feedback loops between the pandemic and racial, gender, and income inequalities in the United States (Public Policy Brief No. 149, "Pandemic of Inequality"). For this current policy brief, Nassif-Pires, Laura Carvalho, and Eduardo Rawet use a similar analytical framework to examine Brazil's experience with COVID-19—a country whose high income inequality and history of slavery predispose it to share similar structural weaknesses in the face of the pandemic.

Nassif-Pires, Carvalho, and Rawet note that Brazil is suffering from some of the worst per capita numbers in the world in terms of cases and deaths, and they explore here how yawning racial, regional, and class disparities can help account for why COVID-19 has had such a deleterious impact on the Brazilian population. Although they find that fiscal policy has so far been successful at mitigating the impacts of the crisis with respect to wage inequality, the existence of structural inequalities along racial lines in particular have resulted in the public health burden of this pandemic being unequally borne.

The authors construct an index to measure the social bases of vulnerability to the virus, focused mainly on risks driven by living and working conditions such as informal employment or cramped living arrangements. The index reveals significant disparities in the risk of infection that break down along lines of race, region, income, and education. Moreover, the overlap of racial inequalities with income or educational inequalities exacerbates these disparities—the authors find this to be especially conspicuous with respect to the intersection of race and low educational attainment. They note that infection, hospitalization, and death rate microdata targeting these intersections of race, gender, and class would help better guide effective public policy.

Nassif-Pires, Carvalho, and Rawet find that the disparate public health impact of the pandemic reflects the inequalities identified by their vulnerability index, particularly with respect to infection rates. Nevertheless, the authors explain that the index only reveals part of the story. Social vulnerability alone does not explain the observed disparities in death rates in Brazil, for instance. For a more comprehensive picture of relevant inequalities, the authors focus on the persistence of unequal access to healthcare and variations in the prevalence of comorbidities, both of which contribute to the severity of illness and number of deaths. The authors also reveal that, in terms of the gaps in observed rates of infection and hospitalization for COVID-19, racial inequality appears to have played a more significant role than income inequality.

Nassif-Pires, Carvalho, and Rawet note that Brazil entered the pandemic on the heels of slow GDP growth, high unemployment, and rising inequality—along with ongoing implementation of an austerity program spurred by a new, constitutionally enshrined ceiling on the growth of federal expenditure. With the COVID-19 emergency, those fiscal restraints were temporarily lifted: Brazil mounted a fiscal response equivalent to 6.5 percent of GDP (in health and nonhealth measures), with almost half of this response dedicated to a cash transfer program, Auxílio Emergencial. The authors find that, for the bottom half of the income distribution, this program raised incomes by more than the crisis-induced fall in wages. As a result, poverty was reduced to its lowest level ever recorded and, so far, the impact of the crisis in terms of rising income inequality has been neutralized.

Amidst uncertainty over how long the Auxílio Emergencial will be extended, rising bankruptcies among small firms, and rumblings of a return to an austerity regime, the authors stress that the current fiscal measures must be both retained and enhanced (they recommend more action on credit measures for businesses). Moreover, the effects of structural inequalities on the country's infection rates and death count make it clear that broader policy changes are necessary for addressing other dimensions of inequality, particularly those rooted in structural racism.

As always, I welcome your comments.

Dimitri B. Papadimitriou, *President*
September 2020

## Introduction

Since the 2008 global financial crisis, income and wealth inequalities have gained renewed attention in the economic literature and wider policy debates. Given the economic and political costs of the broadly acknowledged rise of income concentration at the top of the distribution since the 1980s, economists and politicians in the past decade have put forward various interpretations as well as proposals for reducing the gap between the very rich and the rest of the population. However, none of these discussions seem to have prepared our society to battle the devastating consequences of inequality during the COVID-19 crisis. On the one hand, inequality aggravates the pandemic, as the wide gap between the rich and poor—in terms of income, type of employment, living conditions, access to health, and other dimensions—has major consequences for the distribution of the death toll within and between countries. On the other hand, the pandemic exacerbates inequality by widening this gap through its deep economic and social impacts.

Based on data from 175 countries after five significant epidemics—SARS (2003), H1N1 (2009), MERS (2012), Ebola (2014), and Zika (2016)—a study by Furceri, Loungani, and Ostry (2020) suggests that these episodes have contributed to raising income inequality by almost 1.5 percent in the five subsequent years. This effect may be substantially larger in the COVID-19 pandemic, with health and economic burdens disproportionately laid on those at the bottom of the distribution. First, the most vulnerable are more prone to be infected by the virus, due both to the need to continue working in person and to inequalities in living conditions. Second, precarious healthcare and the unequal distribution of comorbidities play a role in explaining wide disparities in the severity of cases and the number of deaths. Third, the loss of income generated by the crisis seems to disproportionately affect self-employed and informal workers, as well as lower-skilled employees in the services, retail, and construction sectors.

Hence, after an initial period in which high-income countries were the epicenter of the COVID-19 pandemic, developing countries now account for more than half of global deaths. A study by Murray et al. (2006) suggests that mortality rates during the 1918–20 flu pandemic were up to 30 times higher in poor regions of the world. Simonsen et al. (2013) show that during the H1N1 pandemic in 2009, mortality was 20 times higher in South America than in European countries. In 2020, Latin American countries are attracting worldwide attention for their inability to fight the coronavirus. In August, the Latin American death toll passed 200,000, while Brazil topped 100,000 deaths, ranking second in the world in absolute number of deaths. If this were not enough, the IMF projects a fall of 9.3 percent in Latin America's GDP in 2020—a number that makes the 4.9 percent contraction projected for global GDP look like a mild recession.

In addition to the ineffectiveness of lockdown measures, wide structural inequalities, high levels of informality in the labor market, and the importance of the services and tourism sectors in these economies may help explain these disastrous results. Moreover, the region was experiencing a period of slow growth and thus faced high levels of unemployment prior to the pandemic. In this context, many of these countries lacked the fiscal space to react proportionately: as of May 2020, more than $1 trillion had already been obtained as loans from the IMF to fight the crisis in Latin America.

By the beginning of August, countries like Peru, Chile, and Brazil had the fiscal space to spend more than their neighbors but have nonetheless presented some of the highest numbers in the world with respect to deaths per 100,000 people.[1] In contrast, Uruguay ranked 125th while spending less than 2 percent of GDP to fight the pandemic. While other differences certainly have played a role, Uruguay is known for its relatively low level of income inequality in the region: the 2018 Gini index for Brazil was 53.9 and only 39.7 in Uruguay (World Bank 2018).

High inequality may contribute to explaining why, since mid-June 2020, Brazil has had the second-highest number of cases in the world, even after spending more than 6 percent of GDP in fiscal measures to fight the COVID-19 crisis. Setting aside the antiscience discourse of the federal government and the overall disastrous approach on the health front, the next section will examine the country's wide inequalities as a risk factor in the pandemic. The following section will build a preliminary analysis of the unequally distributed economic and health costs of the COVID-19 crisis in Brazil. The final section concludes the policy brief.

## Inequality as a Risk Factor for COVID-19: Measuring Social Vulnerability in Brazil

Several dimensions of structural inequalities can be identified as potentially increasing the risk of infection and death during the pandemic. First, low-income populations are more exposed to contamination. This is due to the difficulty of adhering to quarantine measures, as they cannot forgo their labor income. For

those who continue to work, the use of public transportation and the high concentration of jobs in the service sector makes social distancing difficult. Moreover, the exposure to contamination is greater for low-income populations even when they are in quarantine, as they do not necessarily have access to modern plumbing and live in more crowded spaces.

Second, access to healthcare is not evenly distributed in Brazil. This is due both to regional disparities and to the existence of two healthcare systems: a private and a universal public system. Although the total number of hospital beds in both networks is similar, the latter serves the majority of population (71 percent) and its beds are unequally distributed across regions.

Third, low-income populations infected with the novel coronavirus tend to have worse outcomes. Studies have shown that the incidence of comorbidities that are associated with higher rates of hospitalization and deaths, such as diabetes and hypertension, is higher among low-income and racialized populations (Preston and Taubman 1994; Margolis et al. 1992; Gaskin, Thorpe, and McGinty 2014; Viacava et al. 2019; Malta et al. 2019; Leite et al. 2015).

In this section, we will discuss in detail these three aspects of inequalities in Brazil and construct a social vulnerability index that can help shed light on the roots of the unequal observed health outcomes by region, income, and race in Brazil during the COVID-19 pandemic.

### *Inequality and the Risk of Infection*

The COVID-19 epidemic spread quickly, releasing a scientific race to understand the effects of the virus. Bioscientists and medical authorities ascertained that a few factors increased the risk of contracting and dying of COVID-19: age, sex, and underlying health conditions. Epidemiologists warned that large social gatherings, poor hygiene, and closed spaces would lead to more infections. Social scientists cautioned that structural inequalities increased the risk of minorities and poor populations getting sick and dying from COVID-19. The warnings of medical authorities and epidemiologists were turned into guidelines and policies, but the warnings by social scientists were mostly ignored by authorities and the virus's arrival into unequal societies uncovered a challenge. Policies that treated everyone as equals exacerbated structural inequalities and revealed the discrepancies in living, working, economic, and health conditions.

Data on the evolution of the virus's spread by neighborhood in New York City soon corroborated that socioeconomic characteristics were responsible for stark differences in infection, hospitalization, and death rates. As of the end of July 2020, data from the NYC Department of Health and Mental Hygiene showed that Latino and black populations' infection rates are around 1.6 times higher, with hospitalization and death rates around two-times higher than those of the white population. Furthermore, infection, hospitalization, and death rates are higher among the poor. According to the Centers for Disease Control and Prevention (CDC 2020), "inequities in social determinants of health put racial and ethnic minority groups at increased risk of getting sick and dying from COVID-19." Within such inequities, the CDC cites educational, income, and wealth gaps, as well as differences in access to healthcare, job occupation, and housing conditions.

Indeed, studies on previous respiratory infection epidemics (1918–20 flu, H1N1, and SARS) have shown that social inequalities are a determinant for the rate of transmission and severity of these diseases (Cordoba and Aiello 2016; Mamelund 2017; Tricco et al. 2012; Bengtsson 2018; Bucchianeri 2010). Multidimensional poverty is responsible for the fact that those living near the poverty line did not have the means to avoid infection. Structural racism plays an important role in explaining why minorities are also particularly vulnerable to infections. They are overrepresented in essential jobs and more likely to be dependent on public transportation. Minorities in big cities are concentrated in neighborhoods that experience outbreaks, and the higher population density and likelihood of sharing smaller houses with more people therefore increases contagion within the family. Furthermore, once infected, poor and minority populations are more likely to have worse outcomes due to a higher prevalence of comorbidities and more precarious access to healthcare (Nassif-Pires et al. 2020).

The United States and Brazil share two crucial characteristics: high income inequality and a history of slavery. It is thus expected that race and low income in Brazil would also be risk factors for COVID-19 infection. To investigate, we build an index to measure individuals' social vulnerability to the virus using the National Household Sample Survey (PNAD-Contínua). We construct binary variables to indicate the risk of infection according to living and working characteristics. The work-related risk factors considered for an individual are: employment in a job that has been deemed essential by the federal government, being informally employed (not having carteira assinada),[2] not owning a car or a motorcycle, and not having internet access. Regarding

living conditions, we consider living in a house with more than three occupants per bedroom or with no plumbing and sewage system to be a risk. We compute the social vulnerability index as the sum of risk factors for each individual.

According to our social vulnerability index, the average Brazilian has a score of 1.53, though there are large regional, racial, gender, and educational discrepancies in the values. North and Northeast regions, which are the poorest and most unequal ones,[3] have an average social vulnerability index higher than the national average (2.35 and 1.92, respectively), while those living in the South, Southeast, and Midwest regions are less vulnerable than the average Brazilian according to our index. The value of the social vulnerability index also decreases with educational attainment, as those who have less than a high school degree are found to be more vulnerable than the average Brazilian. For those with a college degree and above, the index is approximately twice as small (0.98) than for those without any formal education (1.86).

**Table 1** Social Vulnerability Index by Race and Sex, Brazil (2019)

| | Total | Women | Men |
|---|---|---|---|
| **All Races** | 1.53 | 1.39 | 1.68 |
| **White** | 1.25 | 1.14 | 1.38 |
| **Black** | 1.74 | 1.59 | 1.88 |
| **Asian** | 1.17 | 1.12 | 1.24 |
| **Brown** | 1.74 | 1.59 | 1.90 |
| **Indigenous** | 2.01 | 1.82 | 2.20 |

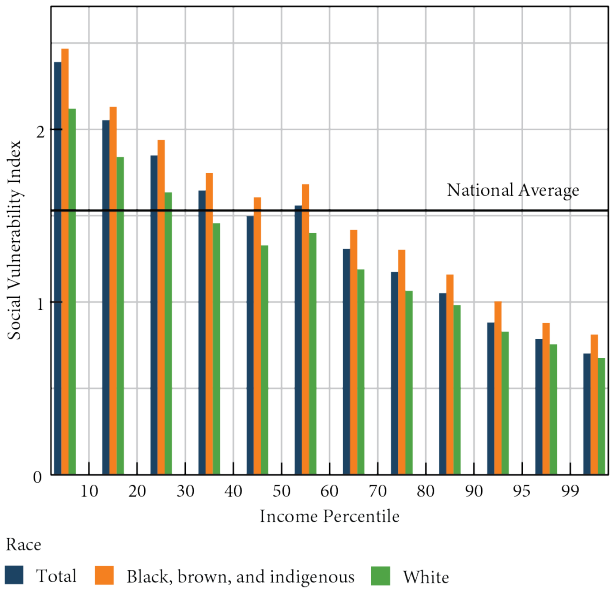
*Source*: Authors' calculations with data from PNAD-Contínua

Table 1 presents the averages of the social vulnerability index by race and sex. The Brazilian Institute of Geography and Statistics (IBGE) provides five race classifications: Brancos, Pretos, Amarelos, Pardos, and Indígenas, here translated as white, black, Asian, brown, and indigenous. Those correspond respectively to 46 percent, 9 percent, 1 percent, 44 percent, and 0.4 percent of Brazil's population. The term Pardo aggregates the vast majority of African and native Brazilian descendents.[4]

For all racial groups, women are less vulnerable than men. Although the average woman is less vulnerable than the average person, this is not true for black, indigenous, and brown women. When we look at the index by race, only white and Asian persons are less vulnerable than average.

Lower infection rates among women, higher rates among minorities, and lack of intersectional data on cases poses a difficulty in inferring the health impacts of COVID-19 on women of color. Our results for the intersection of sex and race shed some light on this discussion and stress the importance of taking the unequal health burden of COVID-19 on women of color into account.

**Figure 1** Mean Social Vulnerability Index by Selected Racial Groups and Income Percentiles, Brazil (2019)




*Source:* Authors' calculations with data from PNAD-Contínua

We now turn our discussion to the intersection between class and race. It has been established that low-income and racialized populations are at increased risk of being infected and dying from COVID-19, but structural racism makes it impossible to separate these factors. Figure 1 presents the mean of the social vulnerability index by income percentile with information for two racial groupings: black, brown, and indigenous—which in the aggregate experience above-average risk—and white, which are culturally dominant in Brazilian society. Income percentiles were calculated from per capita household income reported in the survey.[5] The first two interesting aspects to notice are that, except for the fifth decile, the average vulnerability index falls steadily with income, and that black, brown, and indigenous populations are at higher risk than white populations in every income percentile. The average Brazilian in the bottom 60 percent of the income distribution presents a risk above the national average and race seems to be a determining factor. For white people, the average vulnerability index falls below the national average at the fourth decile; black, brown, and indigenous people only escape the above-average risk in the top three deciles.

Another worrying pattern is the fact that the racial gap in the vulnerability index is higher at the bottom of the distribution than at the top. Those at the intersection of race and poverty are therefore much more vulnerable to COVID-19. An even more dramatic pattern is observed for the intersection between race and low educational achievement, with whites of all educational groups facing below-average risk, while for black and brown people, only those that started or earned a secondary diploma present a social vulnerability index below the national average.

Our results highlight the importance of recording infection, hospitalization, and death rates not only by race, sex, and income, but also for the intersection of those groups. The lack of microdata that would allow researchers to assess how structural inequality, racism, and sexism imposes an unequal distribution of vulnerabilities across different social groups is an obstacle to the design of effective policy measures.

Our social vulnerability index shows that when COVID-19 started to spread locally in Brazil, racialized and low-income populations were at increased risk of being exposed to the virus. The next section provides one additional explanation for observing socioeconomic inequalities in the numbers of cases and death tolls: previous inequalities in health access and outcomes can lead to inequalities in the severity of cases.

***Inequality and Access to Healthcare***

Brazil had an advantage in dealing with the pandemic: one of the world's largest universal public healthcare systems. As dictated by the Brazilian constitution of 1988, health is a universal right and a responsibility of the state. The constitution also states that healthcare should be equally accessible and that the system should be regionally decentralized. The implementation of the Unified Health System (Sistema Único de Saúde or SUS) began in 1990 and has allowed Brazil to slowly address the nation's health inequities, already exacerbated during the preceding 20 years of military dictatorship. Nonetheless, this system still falls short of achieving its egalitarian goals.[6]

Another important aspect of Brazil's healthcare system is the coexistence of a large private health network, mostly available to those who can afford health insurance. According to Guimarães (2020), the overall number of beds available in the private and public systems are comparable, though numbers from the National Health Survey (PNS) show that 71 percent of Brazilians rely on the public healthcare system and 72 percent of Brazilians do not have private health insurance. Those numbers are higher for black, brown, and indigenous populations (80 percent and 81 percent, respectively) and for those that did not complete middle school (83 percent and 84 percent, respectively).

Furthermore, PNS indicates that only 65 percent of Brazilians self-evaluate their health as good or very good; that proportion in the Southeast region is 11 percentage points higher than in the North. The Northern region's population is also the most dependent on the public system (80 percent) and is home to the lowest proportion of those that have been to a doctor in the last year (61 percent). In fact, 18 percent of those that declare having poor or very poor health in the Northern region have not seen a doctor in the last year. The same discrepancies can be observed when we evaluate race and educational attainments, with black, brown, and indigenous populations and those that did not complete middle school being more dependent on the public system and less likely to have been to the doctor in the last year, even if they evaluate their health more poorly on average. This is further evidence that the SUS fails to deliver equal and universal healthcare.

Indeed, Rache et al. (2020) estimates that of the 316 health regional units, 14.9 percent of the population that relies on the public health system lives in one of the 142 units with no intensive care unit (ICU) beds. They also state that in 72 percent of the health regions the number of ICU beds per 10,000 people is below what is adequate for a typical year, without the influence of COVID-19. A report by the Brazilian Intensive Care Medicine Association (AMIB 2020) estimates that the national average of ICU beds per 10,000 people is 2.2, but it is 4.9 in the private system and 1.4 in the public. To make matters worse, those numbers vary widely by region, with the lowest average number of ICU beds per 10,000 people in the public system being in the North (0.9) and the highest in the Southeast (1.8).

Unequal healthcare access in Brazil had two consequences for the pandemic. First, the Brazilian public system was unprepared, and particularly so in the North and Northeast regions, to provide services to those infected by the virus. Second, even before the pandemic, many individuals—especially those racialized and living in poorer regions—had compromised immune systems. This last argument is further scrutinized in the next subsection.

***Inequality and Comorbidities***

According to the World Health Organization (2020), the majority of people infected by COVID-19 (80 percent) will experience mild symptoms. It is consistently observed across countries that age and underlying health conditions can explain severe illness, need of hospitalization, and death (Guan et al. 2020; Instituto Superiore di Sanitá 2020).

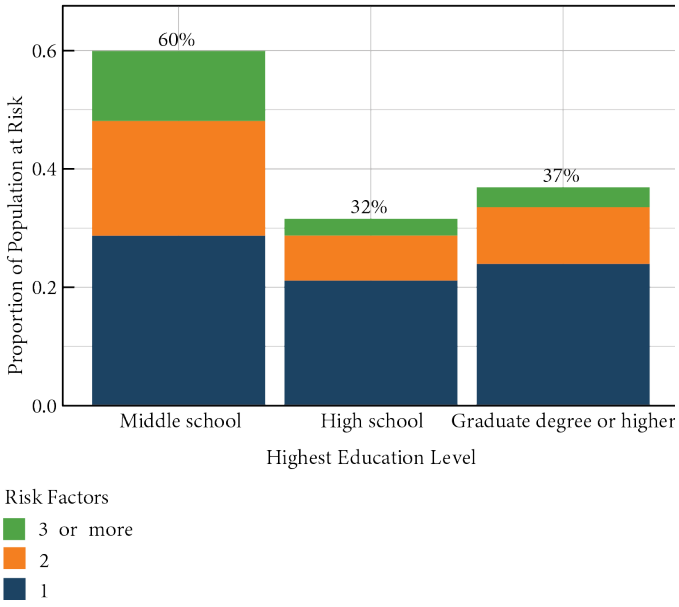
A study carried out in the United States among people diagnosed with COVID-19 (Chow et al. 2020) shows that the hospitalization rate for those who did not have any underlying health problem was 7 percent overall and 2 percent in ICUs. These numbers increase to 30 percent and 15 percent, respectively, for people with reported comorbidities.[7] Furthermore, Gao et al. (2020) report that the rate of hospitalization in the Chinese province of Hubei was 1.8 times higher for patients with one comorbidity and 2.6 times higher for those with two or more comorbidities.

As studies show, gaps in life expectancy (Preston and Taubman 1994), prevalence of lower respiratory illness (Margolis et al. 1992) and diabetes (Gaskin, Thorpe, and McGinty 2014) are correlated with educational attainment, income, and race. Brazil does not escape this pattern, with regional and educational gaps among those diagnosed with diabetes and hypertension (Viacava et al. 2019; Malta et al. 2019; Leite et al. 2015) and income gaps associated with cardiovascular disease mortality rates (Ishitani et al. 2006).

Previous studies for the United States have pointed to the importance of accounting for the different rates of prevalence of comorbidities to explain the racial and income gaps in COVID-19's observed cases and death toll (Nassif-Pires et al. 2020; Kim and Bostwick 2020; Price-Haywood et al. 2020). To investigate this issue in Brazil, we use the 2013 PNS and evaluate the correlation between incidence of risk factors and educational attainment. We consider risk factors to include being over 60 years of age and diagnosed with diabetes, hypertension, asthma, lung disease, coronary disease, or chronic kidney disease. The fact that the information on diseases is self-reported and requires a previous diagnosis by a doctor leads to racial, educational, and regional biases. To partially correct for this, we restrict our sample to individuals who have consulted a doctor within the last year, which corresponds to 72 percent of our initial sample population.[8]

The proportion of our sample who fall into the group considered at-risk for COVID-19 is 42 percent. However, the risk factors are not equally distributed among the population. As shown in Figure 2, the proportion of people who declared to have attended only elementary school and present one or more risk factors is 60 percent, compared to 32 percent for those who attended high school and 37 percent for those who have started a higher degree. This difference is even greater when considering those who have more than one risk factor, with a frequency among those who attended up to middle school 2.5 times higher than among those who attended high school and twice as high than for those that started a graduate degree.

**Figure 2** Proportion of Population at Risk by Education Attainment, Brazil (2013)




*Source:* Authors' calculations with data from PNS

When we consider all results presented in this section, it is clear that when COVID-19 reached Brazil it found a structurally unequal country, where certain social groups were more vulnerable to infection, less likely to have access to healthcare, and more likely to develop severe illness. Finally, the juxtaposition of these three layers of vulnerability were more prominent for those at the intersection of class and race. Therefore, without a strong policy response to support vulnerable groups, the COVID-19 health burden in Brazil will be necessarily higher for racialized, poor, and less-educated populations. In the next section we will discuss the economic policies implemented and study the observed health and economic impacts of COVID-19 in Brazil so far. We then analyze if the policies implemented have been successful in mitigating the expected unequal distribution of the health and economic costs of COVID-19.

## The Impact of the Pandemic in Brazil: Health, Social, and Economic Effects

### *Economic and Policy Context*

As opposed to several high-income countries that entered their COVID-19 crises following long periods of economic expansion and reductions in unemployment rates, Brazil experienced a 7 percent fall in GDP in 2015–16 and had since been going through the slowest economic recovery in its history. Moreover, as a result of the combination between a fiscal expansion and a slowdown in tax receipts, the electoral year of 2014 brought about the first increase in Brazilian public debt relative to GDP in the 21st century.[9]

In the years that followed, the rise in public debt was used to justify the adoption of a fiscal consolidation program focused on cutting public investment and approving structural reforms in the pension system and other sources of mandatory expenditures. In 2016, congress passed an amendment to the constitution that established a ceiling for federal primary expenditures: the budget would only be allowed to expand at the rate of the previous year's inflation. In other words, the country was headed toward a substantial reduction in the size of the state, as public expenditures would not be allowed to keep up with GDP growth. It also attached Brazil's commitment to austerity to the constitution and restricted future governments' ability to implement anticyclical economic policies.

As unemployment almost doubled—from 6.5 million people in 2014 to 13.2 million people in 2017—former president Michel Temer approved a labor reform that allowed for more flexible work contracts. Not surprisingly, the agenda was unable to deliver the promised surge in investors' confidence, leading to successive frustrations in GDP growth projections since the recovery started in 2017. Even if the economy had continued to grow at the same pace, Brazil would only have returned to its precrisis real GDP level by 2025—more than ten years after the 2014 peak. To make matters worse, since 2015, income inequality grew an average of 50 percent faster than it fell in the 2000s, and households were still trying to cope with significant levels of debt and increasingly precarious jobs. Before the COVID-19 crisis, Brazil counted 38.4 million informal workers (41.3 percent of the labor force) and 12.5 million unemployed (11 percent unemployment rate).

Thus, the election of President Jair Bolsonaro in 2018 happened in a context of mounting frustration. The crisis coincided with the largest corruption investigation in Brazilian history (known as Lava Jato, or Operation Carwash), which facilitated the simplistic yet understandable perception among the general population that corruption itself was the main cause of the economic meltdown. From this perspective, it becomes easier to understand how, in contrast to multiple far-right nationalist candidacies around the world, Bolsonaro was elected through the combination of the usual morally conservative discourse and an ultra-liberal economic platform—getting rid of a corrupt state in all areas (except public security) was sold as a solution to all of the country's problems.[10] Paulo Guedes, Bolsonaro's University of Chicago–educated economic guru, became Brazil's minister of finance. With alleged success in the financial industry and market fundamentalist discourse—including promises of privatizing all public assets to pay off public debt and explicit praise of the Chilean economic success under Pinochet—Guedes helped gather support from financial elites.

The COVID-19 shock came right after another round of frustrating GDP numbers released in early March: economic growth in 2019—the first year of Bolsonaro's presidency—slowed to 1.1 percent, far below market expectations from the beginning of the year of around 2.6 percent. The reaction in congress to the disappointing economic performance had already revealed growing discontent with the ability of the austerity agenda and the spending ceiling to deliver economic growth. On March 16, 2020, less than a month after the first case of COVID-19 was reported and only a few days before lockdown measures were imposed by state governors and mayors around the country, Economy Minister Paulo Guedes stated that the Brazilian economy had "its own growth dynamics" and "could perfectly grow 2.5 percent [in 2020]" (CNN Brazil Business 2020). The denial phase did not last long. Less than a week later, President Bolsonaro decreed a state of public emergency, allowing government expenditures during the pandemic to go beyond what is allowed by fiscal rules (including the spending ceiling). The COVID-19 crisis thus put an end to five years of austerity in Brazil: "the one-time star minister is being forced to reconcile his free market 'Chicago Boy' identity with the need for massive government intervention," reported the *Financial Times* on April 28 (Harris and Schipa 2020).

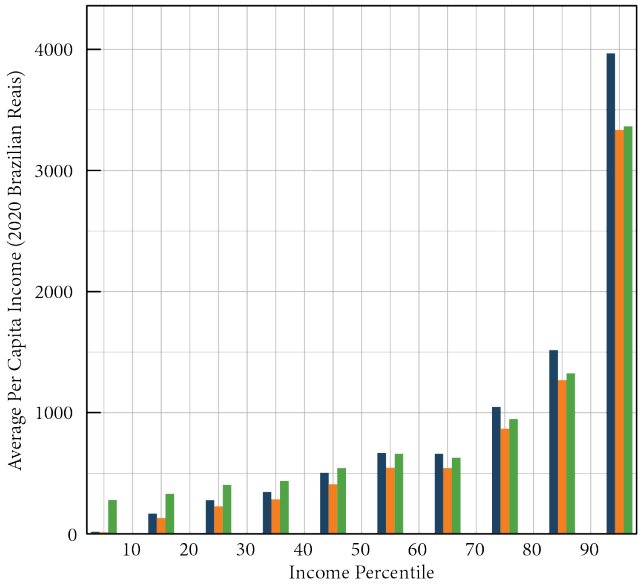
***Policy Responses and the Socioeconomic Impact of COVID-19***

Brazil has adopted loose, inarticulate, and insufficient lockdown measures, as the president continuously denied scientific evidence and blamed the economic collapse on state governors and mayors who imposed any restrictive measures. On April 11th, Brazil had officially reported 1,000 deaths while ranking 131st in an index[11] that classified 178 countries with respect to strictness of government responses.

The same disregard cannot be attributed to the Brazilian government's fiscal response. According to the IMF's "Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic" (IMF 2020), the ten advanced economies[12] of the G20 spent, on average, 6.6 percent of GDP (including deferred taxes) on fighting the pandemic. The average health expenditures in these countries were 0.5 percent of GDP, with the greater part being destined for income transfers and job maintenance programs. In the ten developing economies[13] of the G20, the fiscal response only added up to 2.8 percent of GDP on average, from which the same 0.5 percent of GDP was classified as health expenditures. In other words, this group of developing countries has spent three times less in nonhealth areas relative to the size of their economies (and ten times less if we consider the absolute dollar value of the response) than the advanced economies considered above. However, the same database shows a total of 6.5 percent of GDP in additional spending and foregone revenues in Brazil (0.9 percent of GDP in the health sector and 5.6 percent of GDP in the nonhealth sector). Brazil has thus matched the average fiscal response of the group of advanced economies in the G20 relative to its GDP. Its fiscal response was smaller than that of the United States, Japan, Germany, and Australia, but greater than that of Canada, France, Italy, Korea, Spain, and the United Kingdom. As a consequence, fiscal projections suggest that the country will run a primary deficit of more than 8 percent of GDP in 2020 and that public debt will go beyond 100 percent of GDP in 2026.

Almost half of the total additional expenditures approved by May 15, 2020 were allocated to the emergency cash relief program Auxílio Emergencial, while the job maintenance program, which guaranteed partial or full payment of unemployment insurance to workers with reduced or suspended work contracts, accounted for 22 percent of the total expenditure. Spending more than 2 percent of GDP on Auxílio Emergencial was not a decision made by the executive branch of the government, but rather a package pushed by the national congress with the support of numerous actors in civil society. The program, originally approved for three months and already extended by another six, transferred R$600 (around $110)[14] per adult on a monthly basis in the first five months (and will transfer R$300 in the last four months) to unemployed and informal workers, as well as to beneficiaries of the cash transfer program Bolsa Família.[15] The administrative capacity developed in Brazil for managing Bolsa Família and other social protection programs in the past decades helped in the implementation of Auxílio Emergencial. Brazilians who were registered as potential beneficiaries for other social programs but were not drawing a pension or unemployment insurance were automatically qualified to receive the emergency cash relief. Other informal and unemployed workers were able to fill out a form through a mobile app released by the public commercial bank Caixa Econômica Federal to apply for the benefit. By July, more than 60 million people had directly received the cash transfer and more than half the population had benefited from it.

**Figure 3 Average Per Capita Labor Income before and after COVID-19 and with Auxílio Emergencial, Brazil (by income decile, 2020)**




*Source:* Authors' calculations with data from PNAD-COVID

According to a special June 2020 National Household Survey (PNAD-COVID) released by IBGE, cash transfers from Auxílio Emergencial more than compensated for beneficiaries' income losses during the crisis. As observed in Figure 3, the loss of labor income for the bottom 50 percent of the distribution

was smaller than the average per capita income gain from the emergency program. While there are important methodological differences between PNAD-COVID and previously conducted surveys, data also suggests that the Auxílio Emergencial program was responsible for reducing poverty to its lowest historical level precisely during what may become the deepest recession in world history (Duque 2020). When focusing on black and brown respondents, the average 17 percent loss in labor income has been fully neutralized by the cash relief program.

Hence, the program has so far fully neutralized the pandemic's initial impact on income inequality: while the PNAD-COVID survey suggests that the Gini index for per capita labor income increased[16] from 0.64 to 0.67 during the crisis—representing a significant 5 percent rise in inequality—this index falls to 0.56 when adding the per capita value obtained from Auxílio Emergencial in the corresponding household.

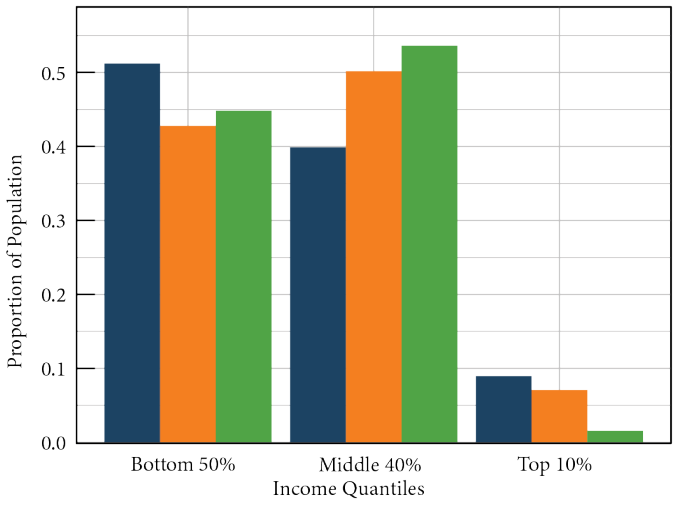
However, as the orignal benefit (approved for three months and then extended for another two) has been reduced by half as of September and is only approved to last until December, these numbers may change quickly. In particular, the substantial fiscal response in Brazil was not matched by an adequate expansion of credit lines to businesses,[17] which seems to be leading to a mass bankruptcy of small firms. Until the first half of July, another survey (IBGE 2020b) revealed that 716,000 companies had closed—99.8 percent of which had fewer than 49 employees. As the small businesses going bankrupt are concentrated in sectors in which low-skilled labor predominates (services, retail, and construction), the crisis may continue to disproportionately affect jobs and wages at the bottom of the distribution. A labor market survey released in August by IBGE[18] shows that between April and June 2020, the greatest job losses happened in the food and housing sector, domestic services, construction, and other services (a reduction of 26.1 percent, 24.7 percent, 19.4 percent, and 17.5 percent, respectively, relative to the same quarter in 2019). In the PNAD-COVID survey, the reduction in labor income of individuals who have at most a middle school education was already at 18.5 percent, relative to a 13 percent decrease for workers with a college degree or more.

As the crisis is expected to be far from over by the end of 2020, the generous but temporary Auxílio Emergencial will most likely have only postponed the pandemic's effect on income inequality in Brazil. An abrupt termination of the program and a return to austerity measures in 2021 could thus amplify the same inequalities that made the country so vulnerable to the health, economic, and social effects of COVID-19.

### *Social Vulnerability, COVID-19 Infections, and Mortality*

The number of reported COVID-19 cases and deaths in Brazil clearly reflect the country's deep racial and regional inequalities. When the death toll reached 54,488 people, a technical report (Medeiros, Cravo, and Tatsch 2020) based on official health statistics showed that 61 percent of the dead were black or brown (categories that together make up only 54 percent in Brazil's population, according to the census). In the Northeast, black and brown people made up 82 percent of total deaths while only accounting for 70 percent of the region's population. Data from PNAD-COVID point in the same direction. Among respondents who declared having had at least three COVID-19 symptoms in the previous week, 62 percent were black and brown—a proportion significantly higher than the 55 percent share of black and brown people in the full sample. For those who had more than six symptoms associated with COVID-19, this share goes up to 66 percent. Finally, considering only those who had to be hospitalized for one or more days, 60 percent are black and brown (this share goes up to 70 percent of those who required a ventilator).

**Figure 4 Proportion of the Population Reporting COVID-19 Symptoms, Hospitalization, and Requirement of a Ventilator in the Previous Week, Brazil (by income distribution, 2020)**



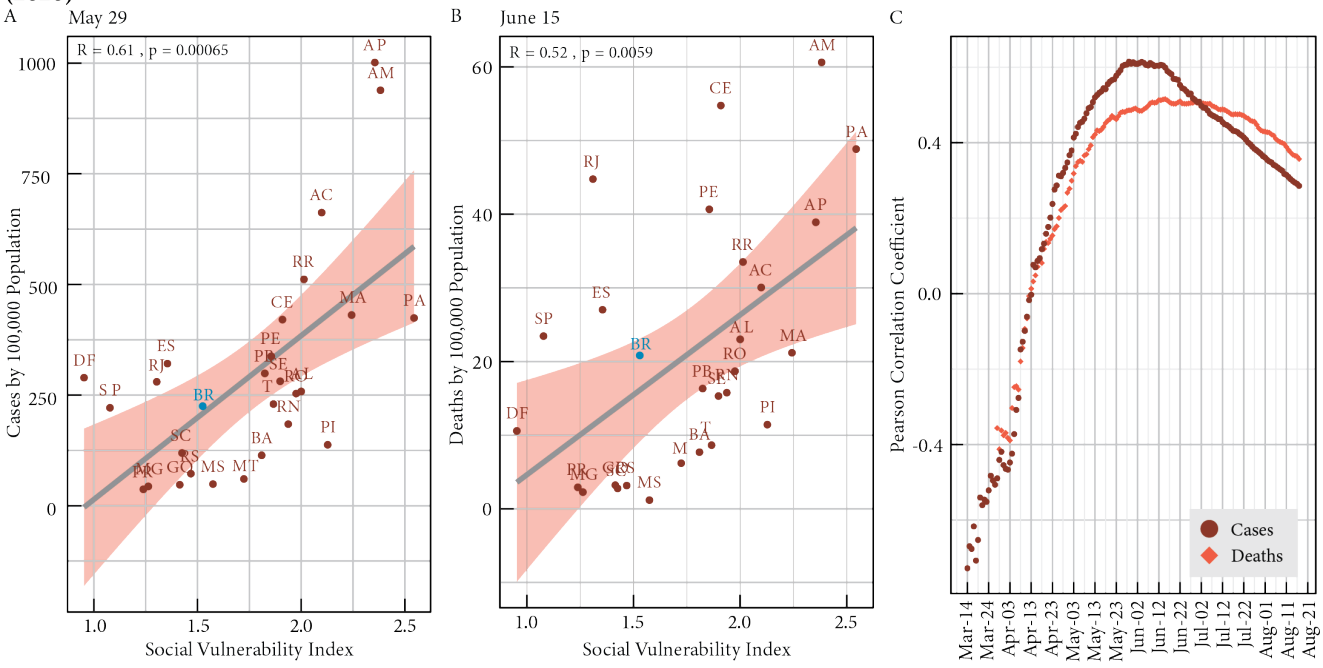

*Source:* Authors' calculations with data from PNAD-COVID

The evidence reflected in the deep racial inequalities in our social vulnerability index, the incidence of comorbidities, and access to healthcare may help explain such racial disparities in the proportion and severity of COVID-19 infections. In fact, racial inequalities seem to have played a more important role in explaining different rates of infection and hospitalization than income inequalities for most of the population. The share of respondents in each section of the income distribution who declared having had at least three COVID-19 symptoms in the previous week corresponds exactly to its share in the total population, as can be observed in Figure 4. In other words, being at the bottom 50 percent (or at the top 10 percent) of the income distribution in Brazil does not seem to increase (or decrease) the likelihood of infection. When observing the share of hospitalizations and, even more so, the share of respondents who have been put on a ventilator, disparities become apparent at the top of the income distribution: for the top 10 percent, the proportion of individuals who required a ventilator is only 1.6 percent.

A few hypotheses could explain this pattern. First, those at the bottom 50 percent of the income distribution in Brazil are highly concentrated in rural areas in the country's North and Northeast, which presented a much lower rate of infection than metropolitan areas in the Southeast. Additionally, these are areas with lower access to hospitals, as previously observed. Both these facts could help explain why the bottom 50 percent of the distribution seems to have a lower rate of hospitalization than the 40 percent at the middle of the distribution, which includes socially vulnerable workers in big cities in the Southern states. Second, Brazil's deep income inequalities have traditionally been associated with a disproportionate concentration of income at the very top: the top 1 percent of Brazilians in the income distribution receive more than one quarter of national income. As a consequence, income differences between the top and middle of the distribution are much higher than those between the middle and bottom, contributing to the disparities in the use of ventilators appearing at the top. These disparities are even more significant when one takes into account that access to ventilators is largely concentrated in the private healthcare system, which is only available to the portion of the population that seems to have been the least in need of such access.

Finally, when it comes to the role of regional inequalities, Figure 5 shows the correlation between our social vulnerability index and accumulated cases and deaths per 100,000 people. The Pearson correlation coefficients are calculated per day since the number of cases and number of deaths first surpassed 100. Panel C displays the evolution of the correlation coefficients by day, while panels A and B present scatterplots for the days in which we observe the strongest correlation between the index

**Figure 5 Correlation between the Average Social Vulnerability Index and COVID-19 Cases and Deaths by State, Brazil (2020)**




*Source:* Authors' calculations with data from PNAD-Contínua

and cases per 100,000 (May 29th) and the strongest correlation between the index and deaths per 100,000 (June 15th). Panels A and B show that the social vulnerability index average for each Brazilian state positively correlates with the number of COVID-19 cases per 100,000 and COVID-19 deaths per 100,000, respectively. In panel A, we can observe that states in the North and Northeast regions with a higher social vulnerability index rating also have a high infection rate, even if these states represent a larger share of rural areas (less affected by the virus); high social vulnerability in the largest cities in these two regions could help explain this apparent contradiction. Manaus, the capital of the Northern state of Amazonas, appeared to have the fastest contagion rate and an explosion in mortality in the first months of the pandemic (Orellana et al. 2020). As a consequence, mortality rates in the state of Amazonas have been four-times higher than the national average and even in remote towns people have been as likely to get sick as in New York City. Tragically, the virus spread along the Amazon River and exacted an especially high toll on indigenous people (Andreoni, Londoño, and Casado 2020). Figure 5, panel A therefore suggests that social vulnerability as measured in this brief had substantial explanatory power for COVID-19 infection rates.

Examining panels B and C, we notice that the positive correlation between our social vulnerability index and deaths per 100,000 is less robust. This is evidence that the factors taken into account in our social vulnerability index explain the vulnerability to infection well, but that other factors, not taken into account in our index, are important for explaining the differences in death rates. This corroborates the importance of taking into consideration the differences in prevalence of comorbidities and access to health when explaining the severity of cases, as previously discussed.

The correlation between our social vulnerability index and the number of reported COVID-19 infections and deaths has also changed during the pandemic, as we can observe in panel C. It was relatively low when the country first reached 100 cases in mid-March and 100 deaths at the end of March, it increased between then and the end of May, and it started to fall in mid-June. As the first reported cases have been associated with travel abroad, the virus took time to spread from elite circles to more vulnerable areas. One possibility is that social vulnerability increased its role as an explanatory factor for infection rates as the pandemic affected the entire population. As a relevant proportion of the socially vulnerable were exposed to the virus in major metropolitan areas, the infection rate among this group may have started to fall, reducing this correlation in a third stage of the pandemic. A study by Gomes et al. (2020) suggests that COVID-19 infection rates start to fall after 10 percent to 20 percent of the population have been exposed to the virus. A study carried out in São Paulo (Tess et al. 2020) revealed that between 15 percent and 20.9 percent of the population in Brazil's biggest city have already been exposed to the virus.

## Conclusion

As of August 8, 2020, Brazil has reported 100,000 deaths by COVID-19 and may soon have the highest total accumulated deaths in the pandemic. If the disastrous response on the health front by the antiscience federal government were not enough, this brief has demonstrated how structural inequalities played an important role in explaining this tragic outcome. First, our social vulnerability index, built around several dimensions of inequality (i.e., work, transportation, infrastructure, and living conditions) that potentially increase the risk of infection, is positively associated with the number of COVID-19 cases across Brazilian states and represents deep racial, income, and regional inequalities. Second, the country's stark inequalities in access to healthcare due to the duality between the private and public systems contribute to explaining why social vulnerability alone does not account for observed disparities in the number of deaths. Third, the comorbidities associated with more severe cases of COVID-19 are also shown to be unequally distributed, thus helping explain the observed gap between the top of the distribution and the rest of the population in terms of ventilator use during the pandemic.

When addressing the social and economic effects of COVID-19, we have shown that the substantial fiscal response pushed by congress—particularly the implementation of the emergency cash relief program Auxílio Emergencial during the pandemic—has been able, through a reduction of poverty levels to a historical low, to neutralize the initial rise in wage inequality caused by the crisis. While this short-term response was insufficient to compensate for the effects of structural inequalities on the country's infection rates and death toll, it has certainly been able to prevent additional social and economic costs to the most vulnerable. However, the future of the program is still uncertain and the sharp increase in public debt during the pandemic has already presented an opportunity for Bolsonaro's ultraliberal economic team to push for the return of an austerity agenda in

2021 that would be even more severe than the five years of pre-COVID austerity policies.

A few policy recommendations can be derived from our analysis. In the short run, we find that allocating a sizable portion of the budget to extending the breadth and length of social welfare programs is sufficient to overcome the unequal economic impacts of a very deep economic crisis. However, when considering the consequences of the pandemic for public health, our results suggest that the problems of multidimensional inequality and structural racism are of paramount importance. Deep racial and regional differences need to be addressed through a government effort to permanently strengthen social welfare programs and public health, education, and infrastructure systems.

Unfortunately, this does not seem to be the direction in which Brazil is heading. In light of the evidence that social inequalities increase the breadth and length of the pandemic and the presence of a deep economic recession, the threat of a return to an economic agenda centered on cutting social expenditures poses major health and social risks. More generally, pursuing the past decades' economic framework on a global level will accelerate the same tendencies in the labor market and in inequality that imposed very high social, health, and economic costs during the COVID-19 pandemic, paving the way for further tragedies. Our analysis suggests that COVID-19 has exacerbated the inequalities that made the pandemic worse, thus requiring an even more substantial effort by governments to counterbalance these tendencies.

In this context, low- and middle-income countries with high levels of inequality require an even more substantial fiscal response to neutralize these effects. However, these are also the countries that are more susceptible to external restrictions, capital flight, and budget constraints in the era of financial liberalization. The way our globalized world and economic system has been shaped in the recent past can therefore be seen as a major comorbidity in compounding the symptoms of the pandemic in 2020. Structural changes to the global labor market, increasing underemployment in high-income countries, and economic insecurity elsewhere are likely to widen health inequities in the longer term and leave us even more vulnerable to future pandemics.

## Notes

1. In the beginning of August 2020, they ranked 5th, 9th, and 11th, respectively.
2. Labor rights in Brazil are only enforced for employees that are officially registered with a worker booklet signed by the employer (carteira assinada).
3. With average household incomes of R$895 and R$905 and Gini of 0.55 and 0.57, respectively, compared to R$1600 and highest Gini of 0.52 in other regions.
4. Since races are socially constructed, assigned at birth and later on self-declared, ethnic background and skin pigmentation might not be the determinant factors in someone declaring themselves Pardo, black, or indigenous. It is important to note that the term Pardo is subject to contestation and, according to Carneiro (2000), "it lends itself only to aggregate those who, have their ethnic and racial identity shattered by racism, discrimination and the symbolic burden that blackness contains socially."
5. As is well-documented, household surveys tend to underestimate the income at the top of the distribution. This is also true for Brazil, as made clear by the combination of survey and tax data in Souza and Medeiros (2017) and Morgan (2017).
6. Before the 1988 constitution, public healthcare was only available for formal workers and local budgets were proportional to contributions by taxpayers (MIS 2012). The SUS inherits many of its regional inequalities.
7. Some illnesses have led to higher hospitalization rates: chronic kidney disease and diabetes had ICU admission rates 11 and 8.5 times higher, respectively; chronic pulmonary diseases had 3.4 times more hospitalizations and 6.5 times more transfers to the ICU.
8. These proportions are higher for white Brazilians (~74 percent), smaller for black and brown (~68 percent), as well as highest in São Paulo (79 percent) and lowest in Amapá (57 percent). Moreover, the proportion of those with some university education or more that have been to the doctor in the last year is approximately 9 percentage points higher than for the rest of the population.
9. This was a consequence of the sharp fall in oil prices and other commodities, and of generous tax cuts created by the government in previous years; see Carvalho (2018).
10. For an extensive account of government responses and the Brazilian economic and political context before the pandemic, see Carvalho (2020).

11. See Roser et al. (2020). The metrics used to calculate the government stringency index are: school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaigns, restrictions on internal movements, and international travel controls.

12. Australia, Canada, France, Germany, Italy, Japan, Korea, Spain, United Kingdom, United States.

13. Argentina, Brazil, China, India, Indonesia, Mexico, Russia, Saudi Arabia, South Africa, and Turkey.

14. This value corresponds to approximately 60 percent of the Brazilian minimum wage.

15. Programa Bolsa Família is the largest conditional cash transfer program on the planet, as it reaches out to 13.9 million families in poverty and extreme poverty. The program's monthly benefit reaches up to $38, depending on the initial income and the number of children or pregnant women in the family.

16. In order to calculate the effect of the crisis on the Gini index, we have compared what respondents declared to be the value of labor income regularly received and what they claimed to be their labor income in June 2020.

17. Pires (2020) reported in June that Brazil's fiscal credit measures for businesses only added up to 1.9 percent of GDP, relative to 29.7 percent in Germany, 15.1 percent in the United Kingdom, 6.1 percent in the United States, 4.1 percent in Singapore, and 3.8 percent in India.

18. Aggregate results from upcoming PNAD-Contínua.

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