Lessons from Brazil's unsuccessful fiscal decentralization policy to fight COVID-19

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Abstract
This manuscript investigates the unsuccessful case of the fiscal decentralization policy implemented by the Brazilian central government to help municipalities fight COVID-19. Based on quantitative analyses of data available on governmental websites, we identified that the transfer policy had ignored municipalities' risk patterns and income changes. It benefited municipalities regardless of their vulnerability and population infection risks, and many municipalities reduced healthcare expenditures funded by their revenues during the pandemic. Hence, some municipalities made a “pandemic surplus” in 2020 – a municipal electoral year. Indeed, COVID-19 killed 663,694 people in Brazil until 4 May 2022. Lessons from an unsuccessful case of response to COVID-19 help develop resilience for other crises by emerging market economies and developing countries. The findings have implications for policymakers and literature since they represent inadequate vertical coordination that followed a path dependence on traditional decentralization policies and took place in a year of municipal elections without clear spending and accountability rules.

KEYWORDS
COVID-19, financial support, fiscal decentralization, governmental accounting, healthcare, intergovernmental transfers, local government, pandemic

1 INTRODUCTION

The COVID-19 pandemic placed individuals and organizations under great uncertainty because there were no previous protocols on how to act against it (Bueren et al., 2003). Suppose uncertainty does not allow for an exact response because the perspectives to address such a problem vary according to each stakeholder’s position (Bueren et al., 2003). In that case, consensus should be sought through the experience of managing work at various levels and through policy instruments. In this sense, the process of political debate would provide an indispensable element for carrying out and generating learning through the evaluation of decision-making (Head & Alford, 2015). The pandemic also challenged the administration structures of different countries, particularly those with a federative arrangement, confronting leadership and coordination with competition and political opportunism (Peters et al., 2021). First, we take account of the Argentine and Brazilian Federations to illustrate the comings and goings of federative leadership and coordination. Then we focus on the institutional design and the consequences of the federal policy of maintaining the fiscal capacity of subnational governments in Brazil during the pandemic.

The Argentine State is structured around a federalism where different provinces have come together to form the Nation, thus enjoying greater autonomy compared to Brazil. In the initial phase of
the pandemic, hitherto unusual coordination of the president of Argentina with the governors and mayors emerged, including all sides of the political spectrum (Cravacuore, 2021). This alignment was achieved through intergovernmental deliberative forums that did not exist until then. It persisted until some subnational jurisdictions governed by the opposition capitalized on a unilateral policy of opening economic activities contrary to federal guidance. This rupture eroded the coordination achieved and had as its main consequence a slow and uneven vaccination in the country conducted outside of technical criteria (Cravacuore, 2021).

Federalism was installed in Brazil in 1889 with the extinction of the monarchy that, until then, ruled a unitary state. In this way, the former provinces were transformed into states and gained autonomy. Nowadays, Brazil is a significant emerging economy, with abundant natural resources, high-ranked universities, and think tanks; three-fourths of its population has access to the internet. Moreover, it has a mature and internationally recognized national immunization program supported by a unified health system (SUS – Sistema Único de Saúde) that covers the entire territory and two institutions that produce vaccines for many diseases (e.g., Fiocruz and Butantan). The SUS, built in the 1990s, is nationally aligned by a committee of managers composed of representatives from the three tiers of the federation and provides free and universal access to its citizens through a healthcare support network that integrates central and local governments. This model is based on national guidelines with regulation and constitutionally guarantees resource redistribution from the Ministry of Health to municipalities (Abrucio et al., 2020). SUS also oversees the Brazilian National Immunization Program (PNI – Programa Nacional de Imunização), a tripartite organization responsible for coordinating immunization programs among local, regional, and central governments. The main goal of PNI is to interrupt the transmission chain of vaccine-preventable diseases in Brazilian territory.

The PNI has reached remarkable achievements, acknowledged by the World Health Organization (WHO). In 1992, PNI was responsible for the national campaign for vaccination against measles, carried out over 28 days, with the vaccination of more than 48 million children between 9 months and 14 years of age, or 96% of the intended population. By 2003, Brazil had eradicated urban yellow fever, smallpox, polio, measles, neonatal tetanus, severe forms of tuberculosis, diphtheria, accidental tetanus, pertussis, Haemophilus influenzae type b infections, rubella, congenital rubella syndrome, hepatitis B, influenza, and pneumococcal infections.

Indeed, between 26 February 2020 (the date of the first reported case of infection by SARS-CoV-2 in the Brazilian territory) and 30 June 2020, the central government transferred Brazilian Real (BRL) 22.5 billion in financial support to help municipalities fight COVID-19. Therefore, it is reasonable to expect that Brazil would have promptly responded to the pandemic and handled COVID-19 efficiently; few cases of infection and virtually zero death. Hence, other jurisdictions would have a lot to learn from the successful Brazilian response to COVID-19. Right?

Unfortunately, such an assumption is false. On 4 May 2022, Brazil accounted for more than 30.5 million confirmed infections by SARS-CoV-2 (equivalent to 14,351 infections per 100,000 inhabitants), just behind the United States (80.8 million) and India (43.1 million); and 663,694 deaths by COVID-19, only behind the United States (988,595). The fatality in Brazil is equivalent to 312 deaths per 100,000 inhabitants, the highest among G20 country members.[i]

The presidency defended dual federalism intending to leave the burden of social policies on subnational governments, taking as its slogan ‘more Brazil, less Brasília’[ii] even before the pandemic (Abrucio et al., 2021). Bolsonaro’s denialist stance in the face of the pandemic reinforced this behavior. However, the portfolio of health policies, such as the institutional design of the unified health system and the bipartite committees (states and municipalities), partially compensated for the lack of leadership and mistakes made by the presidency. This lack of coordination also triggered horizontal cooperation between states and municipalities. Inter-municipal health consortia were strengthened and presented better results in reducing cases compared to municipalities that acted isolated (Abrucio et al., 2021). During the pandemic, a central issue of coordination concerns social distancing because such decisions should be based on statistical models shared between jurisdictions (Paquet & Schertzzer, 2020). However, in May 2020, the Ministry of Health stopped publishing daily pandemic data. In response, the National Council of Municipal and State Health Secretaries integrated and shared data related to contamination and deaths by COVID-19 (Peters et al., 2021). Paradoxically, the Supreme Court had confirmed the intergovernmental mechanisms of health policies contrary to the will of the central government. Then, the latter used its prerogative in acquiring vaccines to procrastinate the purchase and the immunization process.

One common strategy adopted in decentralized countries such as Brazil (Oliveira et al., 2021) is to transfer resources to local governments, funding healthcare expenditures and compensating them for income losses (Ahrens & Ferry, 2020; Argento et al., 2020). In this context, the legislature authorized the approval of the Federative Program to Combat the Coronavirus through the distribution of BRL125 billion to states and municipalities (Senado Federal, 2020). As the central government is primarily responsible for financing the SUS, there is no innovation in resource sharing. Its distribution criterion was the size of each jurisdiction’s population.

Therefore, this research aims to analyze the unsuccessful Brazilian policy design of response to COVID-19 through the perspective of fiscal decentralization to local governments. We expect that a lesson can be learned from the wrongdoings to avoid repeating the errors in future pandemics (Willoughby et al., 2020). It is essential because countries need to prepare and draw lessons learned from the COVID-19 pandemic since “there is no reason to believe that COVID-19 was ‘the big one’” (Ahrens & Ferry, 2021, p. 13).

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[i] https://covid19.who.int/table
[ii] Brasília is the capital city of Brasil.
We rely on a quantitative approach and open governmental databases to understand the transfer policy designed by the central government to (supposedly) help municipalities fighting COVID-19.

The following section presents the literature review and hypotheses; section three presents the method; section four presents the results; the fifth section presents complimentary exploratory analyses. We conclude in section six.

2 | BACKGROUND

2.1 | COVID-19 infections and fatalities

Historically, pandemics have hit vulnerable people disproportionately (Duggal, 2020; Wade, 2020), and the quick spread of COVID-19 shed new light on these inequalities (Kihato & Landau, 2020). It is documented across many cities in Asia, Africa, and South America (Sharifi & Khavarian-Garmsir, 2020) and Brazil (Oliveira & Arantes, 2020).

In western countries, SARS-CoV-2 first infected people living in neighborhoods of higher-income households who had returned from vacations abroad or had contact with people who arrived from international trips (Costa et al., 2020). Nevertheless, soon SARS-CoV-2 spread among lower-income neighborhoods (Teixeira et al., 2020), hitting such vulnerable groups in urban areas harder. Such rapid and non-uniform spread is due to conditions where a large share of the urban population lives in slums with poor living and sanitary conditions, such as clean water to comply with handwashing recommendations (Biswas, 2020), and has limited access to medical care, such as hospital beds (Wade, 2020).

In countries like the USA, where there is no universal access to health services, the lack of health insurance means a risk of severe cases of COVID-19 for more impoverished people (Nassif-Pires, Carvalho, et al., 2020; Nassif-Pires, Xavier, et al., 2020). The absence of an inclusive public healthcare policy significantly raises the risk of infection and death among disadvantaged populations, even in developed countries; one of the explanations for this disproportion is the higher incidence of chronic diseases associated with the most severe cases of COVID-19 among the poorest in the USA (Nassif-Pires, Carvalho, et al., 2020; Nassif-Pires, Xavier, et al., 2020).

Population studies with data on epidemics of previous respiratory illnesses (Spanish flu, H1N1, and SARS-CoV) and diseases like Zika, Aids, and Dengue show that social inequalities lead to higher transmission rates and severity of such sicknesses (Costa et al., 2020).

The Brazilian National Survey on Health identified 42% of the population in some risk groups as not equally distributed among social brackets. Therefore, there is an inverse relationship between deprivation indexes (such as Gini and social vulnerability indexes) and infection likelihood and fatalities.

Since physical distancing was the most effective prophylaxis initiative to prevent COVID-19 before a vaccine became available, municipalities with higher urban concentrations are more vulnerable to infections by SARS-CoV-2. However, municipalities with the most developed healthcare infrastructure might be able to provide better and faster health services to citizens and avoid deaths by COVID-19.

Hence, based on COVID-19 statistics and the recommendations from the WHO on how its member-states should fight COVID-19, we hypothesize:

(H1) Infection by SARS-CoV-2 and fatalities by COVID-19 are driven by pre-existing risk patterns of individuals and municipalities.

2.2 | Federalism and the Brazilian case

Brazil is the fifth largest country globally for territorial size and the sixth in terms of population. There is a great deal of cultural, socioeconomic, financial, administrative, and political heterogeneity throughout its vast territory (Abrucio et al., 2021). In Brazil, municipalities differ in social networks, demographic structure (Tobin, 1999), and idle or scarce healthcare infrastructure. The state of Acre, for example, situated in the poor northern parts of Brazil, has 0.9 Intensive Care Unit beds per 10,000 inhabitants. In contrast, the state of Rio de Janeiro has more than three times that number (Oliveira et al., 2021). Any transfer policy design should consider those different vulnerabilities (Jüptner & Klimovsky, 2021; Padovani et al., 2021).

Such flexibility to produce tailored policy outcomes is praised for being a distinctive feature of federalism (Bennouna et al., 2021) due to its possibility to diminish territorial heterogeneity in many issues, especially in health policy (Giraudy & Pribble, 2020; McGuire, 2010; Moncrieff & Lawless, 2016).

However, during the COVID-19 pandemic, such a feature could be considered a weakness (Bennouna et al., 2021). The constitution of federative countries combines and segregates responsibilities among levels of government. For instance, federal, state, and local governments play different and critical roles in helping people and their communities during a national crisis.

Studies on crisis management mentioned that coordination between levels of government is a relevant aspect of coping with the pandemic, ensuring a quick response to the crisis (Kuhlmann & Franzke, 2021). Governments should cooperate, as policies are most successful when they work together seamlessly (Willoughby et al., 2020). When coordination and cooperation are weak, countries face severe challenges in managing crises (Chattopadhyay & Knüpling, 2021).

The pandemic requires a significant level of central government support, at least as an interim measure. Otherwise, a collapse in local government would weaken any social response after COVID-19 (Ahrens & Ferry, 2020).

In this context, the design of transfer policies to support local governments matters because it can lead to gaming and perverse
incentives (Ahrens & Ferry, 2020). In the UK, for instance, local governments received funding based on a formula that considered the financial situation of the local government, and extra funding was made available to local authorities to address COVID-19 risks (Ogden & Phillips, 2020).

The design of the policy to financially support local governments in emergencies can be influenced by a path dependence on traditional transfers (Vergne & Durand, 2010), especially when a mechanism is perceived as valid in the federation and are already part of the “policy portfolio” (Peters et al., 2021, p. 12), facilitating political negotiation and approval. For instance, the Municipal Participatory Fund (FPM) dates to 1965 and is the key mechanism through which the central government transfers resources to municipalities. It comprises 24% of taxes collected by the central government (income tax and tax charged over industrial products). Population size and local income per capita are the main criteria for allocating FPM among municipalities. Hence, allocating resources to municipalities to cope with the challenges imposed by the COVID-19 pandemic is a clear path dependence on FPM.

In addition to the criteria for financial support, the central government must establish rules for realizing expenditures, such as local government financial reserves, local deprivation indices, and anticipatory financial management practices, to qualify local authorities to receive funds. For example, in the US, there was resistance from Congress to pass on financial support to local governments without the approval of rules about how local governments could spend the resources, such as preventing their use in the payment of pension obligations (Joyce & Prabowo, 2020).

If the financial support to local governments does not consider the aspects of reimbursement or subsequent accountability for the expenses incurred, it leaves room for opportunistic behavior (Crivelli, 2011). Considering the materiality of the resources transferred to local governments and that the first case of infection by COVID-2019 in Brazil occurred on 26 February 2020, when the virus spread to local governments and that the first case of infection by SAR-CoV-2 in Brazil occurred on 26 February 2020, when the virus had infected 80,512 people and killed 2711 people globally, it could be reasonable to assume that the Brazilian government would benefit from the international experiences to develop policies to fight COVID-19 based on risk patterns of individuals, families, and municipalities. Hence, we hypothesize:

(H2) The design of the central government’s transfer policy considered the risk patterns of municipalities.

2.3 | Local government budget and finance

In response to the pandemic, municipalities would increase healthcare spending to deal with the increased demand for health services (WHO, 2020). The increase in health expenses has been reported in Estonia (Raudla & Douglas, 2020), Norway (Argento et al., 2020), and South Africa (de Villiers et al., 2020).

On average, the richer the country, the more local governments depend on transfers (Bird & Rodriguez, 1999). Poor and vulnerable communities are likely to be most affected in times of pandemic, given the collapse of the informal sector with most of the workforce in emerging economies (Upadhaya et al., 2020), and due to their low capacity to increase fees during the crisis (Padovani et al., 2021).

On 20 March 2020, a Legislative Decree recognized the state of emergency in Brazil. It allowed the presentation of an emergency bill of BRL639 billion in supplemental appropriations. On 2 April, another bill obliges the central government to compensate for negative nominal changes in central government transfers to municipalities. On 27 May, Congress enacted a supplementary law channeling BRL3 billion for the payment of professionals working for SUS and BRL20 billion at the discretion of the local governments.

Considering the growth of financial support received and the increased demand for healthcare services, we hypothesize:

(H3) Healthcare expenditures by local governments increased in the first semester of 2020 compared to 2019.

The COVID-19 pandemic was a double-edged sword. In addition to the increase in demand for healthcare that would pressure municipalities’ spending, stringency policies provoked a reduction in economic activity and pressured municipalities’ tax collection (Joyce & Prabowo, 2020).

In some countries, the legislation prohibits local governments from owning borrowing powers, which could be used temporarily to reduce the collapse of revenue during the pandemic period. It is the case for local authorities and devolved administrations in the UK (Heald & Hodges, 2020) and Brazil, where only the central government can borrow from third parties.

In these contexts, transfers from the central government are essential so that local governments maintain the provision of public services. The International Monetary Fund Managing Director, Kristalina Georgieva, said, “spend as much as you can but keep the receipts” (Georgieva, 2020).

Due to the economic downturn that followed physical distancing and lockdown, we expect that the resources transferred by the central government to local governments would compensate for municipalities’ revenue reduction. Hence, we hypothesize:

(H4) Financial support from the central government compensated for municipalities’ revenue reduction.

3 | RESEARCH METHOD AND DATA COLLECTION

Under a quantitative approach, we used secondary data collected from multiple governmental open databases:

- infections by SARS-CoV-2 and deaths by COVID-19 (Brasil, 2020a);
- central government transfers to municipalities (Brasil, 2020b);
- municipalities’ healthcare expenditures (Brasil, 2020d) and budgetary execution (Brasil, 2020c);
proxies for infection risk and deaths (IPEA, 2020; and: IBGE, 2020); and
• the participation in inter-municipal health consortia (IBGE, 2019).

Table 1 depicts the descriptive statistics of the analyzed variables.

We performed a factorial analysis due to the significant correlation (at 1%) among non-monetary variables. For example, Infections and Deaths positively correlate with each other. Both positively correlate with the Gini index, Social vulnerability index, and Urban concentration index. Both negatively correlate with the Elderly population, Family health team, and Healthcare basic infrastructure. Inter-municipal health consortia and Longevity human development index negatively correlate at 1% only with Infections. The correlation matrix is available by request from the corresponding author.

Principal components should explain approximately 75% of the total variance, and a component must have an eigenvalue higher than 1 to be consistent (Hair et al., 1998). The application of an oblique rotation of the factors of standardized component loadings allowed achieving a clear system because of the maximization of component loadings variance. Factor 1 describes the social environment of the first three variables; Factor 2 groups the health infrastructure variables.

The eigenvalues results higher than 1 represent 81% of the variables’ total variance, hence suggesting the existence of two factors. The high factor loadings in only one of the constructs (factor loadings higher than 0.3) and the high values of the Average of Variance Explained (AVE) confirm the convergent validity. The low correlation between the factors confirms the discriminant validity. In addition, considering the criterion of Fornell and Lacker (1981), it was noted in all cases that the AVE Root was higher than the values of the correlation between the factors. The high values of Cronbach Alphas and the high values of Composite Reliability confirm reliability. A table depicting these results and convergent and discriminant validity and reliability analyses is available by request from the corresponding author.

The UK government gradually evolved its transfer policy to support local governments through COVID-19. To define a Relative Needs and Resources Formula used to allocate GBP4.6 billion among local authorities fighting COVID-19, the UK government used over four tranches and considered factors such as population size and deprivation; reimbursement for lost income from sales, fees, and charges; and the varying costs of delivering services across the country.[iii] In contrast, based on a path dependence on traditional decentralization policies designed for ordinary circumstances (namely, FPM), at the first stage of the pandemic (until June 2020), the Brazilian central government transferred BRL22.5 billion to municipalities mainly based on population size. Hence, for statistical analyses, we considered only data from the first semester of 2020,

the point in time when the central government designed the transfer policy to municipalities to fight COVID-19.

To test hypotheses, we analyzed data following six steps. First, to investigate whether data already available on open government websites could predict the pandemic risk of municipalities (H1), we estimated two independent models based on ordinary least square (OLS) regression, which dependent variables were infection rate (model 1) and fatality rate (model 2). These regressions indicate that even without creating new variables and metrics or collecting extraordinary data, the public sector had helpful information at its disposal for use in defining financial support models.

**Model 1**

\[
\text{Infection} = \alpha_i + \beta_1 \text{Social Factor} + \beta_2 \text{Infrastructure Factor} + \beta_3 \frac{\text{population} > 59 \text{ years}}{\text{State capital}} + \beta_4 \text{State capital} + \beta_5 \text{Consortia} + \beta_6 \text{Urban concentration index} + \epsilon
\]

**Model 2**

\[
\text{Fatality} = \alpha_i + \beta_1 \text{Social Factor} + \beta_2 \text{Infrastructure Factor} + \beta_3 \frac{\text{population} > 59 \text{ years}}{\text{State capital}} + \beta_4 \text{State capital} + \beta_5 \text{Consortia} + \epsilon
\]

Then, based on another OLS regression (model 3), we investigated whether the central government transfer to municipalities was associated with their risk factors (H2).

**Model 3**

\[
\text{Financial support} = \alpha_i + \beta_1 \text{Social risk Factor} + \beta_2 \text{Infrastructure Factor} + \beta_3 \frac{\text{population} > 59 \text{ years}}{\text{State capital}} + \beta_4 \text{State capital} + \beta_5 \text{Consortia} + \beta_6 \text{Urban concentration} + \beta_7 \text{Municipal Participation Fund} + \beta_8 \cdot \beta_11 \text{Control by region} + \epsilon
\]

We used the following independent variables in the models mentioned above:

• According to the WHO, citizens aged 60 or older tend to be more vulnerable to COVID-19 (fatality). However, most older people are retired and receive post-employment benefits; hence they do not need to violate physical distancing restrictions to keep their income. Municipalities with many older people might account for fewer contamination cases by SARS-CoV-2.
• Urban concentration is the ratio between the number of inhabitants living in a municipality’s urban area and its total population. The greater the urban concentration, the greater the risk of spreading SARS-CoV-2 and people dying from COVID-19.
• Inter-municipal health consortia are local arrangements between municipalities or states with the objective of regional cooperation to provide medium and high-complexity health services through cost-sharing.

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[iii] https://www.gov.uk/government/publications/covid-19-emergency-funding-for-local-government
| Variables                                      | N    | p50  | Mean  | sd    | Min    | Max    |
|------------------------------------------------|------|------|-------|-------|--------|--------|
| Infections by SARS-CoV-2 (a)                   | 5516 | 6.107| 9.235 | 10.381| 0.000  | 146.444|
| Deaths by COVID-19 (a)                         | 5516 | 0.121| 0.200 | 0.250 | 0.000  | 2.103  |
| %population > 59 years (b)                     | 5564 | 0.126| 0.129 | 0.098 | 0.000  | 0.738  |
| Gini index (c)                                 | 5564 | 0.503| 0.503 | 0.066 | 0.284  | 0.808  |
| Longevity human development index (d)          | 5564 | 0.658| 0.646 | 0.079 | 0.433  | 0.810  |
| Social vulnerability index (e)                 | 5564 | 0.335| 0.352 | 0.130 | 0.090  | 0.784  |
| Urban concentration index (f)                  | 5564 | 0.548| 0.483 | 0.343 | 0.000  | 0.997  |
| Family health team (g)                         | 4225 | 0.318| 0.318 | 0.139 | 0.010  | 2.002  |
| Healthcare basic infrastructure (g)            | 5323 | 0.306| 0.309 | 0.139 | 0.004  | 1.429  |
| Municipality support income, 2020 (h)          | 5569 | 110.00| 127.94| 59.52 | 0.00  | 726.80 |
| Net transfer to municipalities, 2020 (i)       | 3370 | 67.29| 42.24 | 268.34| −10,599| 2110.38|
| Basic assistance expenditures                  |      |      |       |       |        |        |
| 2019 (j)                                       | 5403 | 184.54| 237.70| 185.19| 0.00  | 2003.35|
| 2019 (k)                                       | 5393 | 190.82| 255.01| 291.03| 0.11  | 9216.11|
| 2020 (j)                                       | 1778 | 126.89| 178.05| 179.33| 0.00  | 1998.42|
| 2020 (k)                                       | 4473 | 214.58| 275.37| 206.95| 0.00  | 2688.58|
| Epidemiological surveillance expenditures      |      |      |       |       |        |        |
| 2019 (j)                                       | 5403 | 3.81 | 5.84  | 7.90  | 0.00  | 205.83 |
| 2019 (k)                                       | 3814 | 6.94 | 8.70  | 10.00 | 0.00  | 277.13 |
| 2020 (j)                                       | 1778 | 0.00 | 2.82  | 5.71  | 0.00  | 51.94  |
| 2020 (k)                                       | 3386 | 9.03 | 12.03 | 14.09 | 0.00  | 434.41 |
| Health surveillance expenditures               |      |      |       |       |        |        |
| 2019 (j)                                       | 5403 | 1.18 | 3.89  | 6.93  | 0.00  | 112.17 |
| 2019 (k)                                       | 3734 | 3.37 | 6.02  | 9.81  | 0.00  | 262.52 |
| 2020 (j)                                       | 1778 | 0.00 | 2.29  | 5.32  | 0.00  | 83.06  |
| 2020 (k)                                       | 3166 | 4.07 | 7.14  | 10.54 | 0.00  | 257.93 |
| Hospital care expenditures                     |      |      |       |       |        |        |
| 2019 (j)                                       | 5403 | 59.41| 92.86 | 112.14| 0.00  | 1136.26|
| 2019 (k)                                       | 4572 | 86.04| 116.40| 120.17| 0.00  | 1244.04|
| 2020 (j)                                       | 1778 | 30.98| 67.42 | 99.51 | 0.00  | 905.72 |
| 2020 (k)                                       | 3873 | 99.47| 133.85| 134.67| 0.01  | 1812.45|
| Preventive prophylaxis expenditures            |      |      |       |       |        |        |
| 2019 (j)                                       | 5403 | 0.00 | 6.26  | 15.40 | 0.00  | 310.34 |
| 2019 (k)                                       | 2655 | 7.03 | 12.97 | 20.78 | 0.00  | 310.34 |
| 2020 (j)                                       | 1778 | 0.00 | 5.34  | 20.13 | 0.00  | 670.18 |
| 2020 (k)                                       | 2405 | 8.81 | 15.67 | 23.49 | 0.00  | 346.37 |
| Total healthcare expenditures                  |      |      |       |       |        |        |
| 2019 (j)                                       | 5403 | 347.75| 390.91| 184.97| 0.00  | 2040.92|
| 2019 (k)                                       | 5476 | 353.95| 409.67| 296.76| 0.55  | 9584.48|
| 2020 (j)                                       | 1778 | 260.82| 293.73| 182.47| 0.00  | 1998.42|
| 2020 (k)                                       | 4513 | 413.06| 462.94| 216.07| 0.78  | 3564.51|
The Social Vulnerability index comprises 16 indicators structured in three dimensions (urban infrastructure, human capital, and income and work) that correspond to resources and structures whose insufficiency indicates families’ deprivation. Thus, the higher the municipality’s Social Vulnerability index, the greater the infection and fatality risks.

• The Gini index of income measures social inequality. Municipalities with a high Gini index are more vulnerable to the pandemic since most of the population has no means to cope with it.

• Health infrastructure factor: The family health team and Healthcare basic infrastructure – represent the availability of health equipment (such as Basic Health Units). The greater the availability of healthcare facilities per capita, the lower the risk of COVID-19 escalating to death. However, municipalities with better healthcare infrastructure apply more laboratory testing for coronavirus disease, hence might account for a higher infection rate.

Thirdly, we compared the mean difference between municipalities’ healthcare expenditures from the 2020 first semester with the expenditures from the same period of 2019 (H3).

Since the central government announced that its financial support to municipalities aimed to compensate local governments’ financial losses related to the pandemic and stringent policies, to test H4, we ran a mean difference test to investigate whether the financial support transferred to municipalities that suffered an income reduction is higher than the transfer received by municipalities that experienced an increase in income.

The fifth step is a graphical analysis of healthcare expenditures funded by municipalities’ own and total resources in the 2019 and 2020 first semesters.

Finally, to investigate whether municipalities made a pandemic surplus in 2020, we compared their net cash availability at two points in time: December 2020 and the same period in 2019.

### RESULTS

Based on recommendations for physical distancing and stringency policies, the expectation that older people are more likely to develop severe respiratory illnesses, and based on the awareness that municipalities differ regarding healthcare infrastructure and social inequalities, we applied OLS regressions to test H1, where municipalities’ infection (model 1) and fatality (model 2) per 1000 population until 30 June 2020 are the dependent variables. Table 2 (left-hand columns) shows that the rate of infections by SARS-CoV-2 as expected but does not affect fatalities directly. The higher the health infrastructure factor, the higher the infection rate, probably because more individuals take the virus test. The fatality rate is lower because patients have access to faster and more appropriate treatment in municipalities with better healthcare infrastructure.

Because of the WHO concerns, the elderly population avoided risk-taking behavior. Hence municipalities with a high proportion of inhabitants older than 59 registered fewer infections and deaths.

Inter-municipal health consortia helped public administration coordinate the response to the pandemic and better communicate with society, which was very important at the beginning of the pandemic to convince citizens to comply with physical distancing and handwashing recommendations (Abrucio et al., 2021); hence reducing infections by SARS-CoV-2 as expected but does not affect fatalities directly.

Hence, the central government could have allocated resources among municipalities based on such risk patterns.
The purpose of the H1 test is not to discuss health-related issues. These results serve as preliminary evidence that the design of financial support policies for local governments that considered such risks would be possible, and the information was available in open governmental databases. For example, the UK considered different types of risk as criteria for developing financial support for local governments (Ogden & Phillips, 2020).

To test H2, whether the design of the central government’s transfer policy considered municipalities’ risk patterns, we performed an OLS regression. Based on the results depicted in Table 2 (right-hand column), the transfer policy designed by the central government is upside-down. Although risk factors are significant in explaining transfers to municipalities, their signs are the opposite of expected. It means that the lower the risk of the municipality and the higher the municipality’s health infrastructure factor, the higher the financial support it receives, showing the failure of the decentralization policy given its declared purpose (helping local governments fight COVID-19). Also, Table 2 (right-hand column) shows that local governments that are part of inter-municipal health consortia received less financial support to fight COVID-19. Moreover, municipalities that receive more municipal participatory funds (FPM) received more COVID-19 financial support; it is not a surprise because population size is crucial in allocating both FPM and financial support.

Due to the significant increase in healthcare demand caused by COVID-19, municipalities’ healthcare expenditures would have increased in the 2020 first semester compared to 2019 (H3). The right-hand columns in Table 3 depict that municipalities’ total healthcare expenditures per capita significantly increased from BRL451.64 in the first semester of 2019 to BRL485.20 in the same period in 2020, confirming H3. However, the left-hand columns show that municipalities saved money during the first semester of 2020 since they significantly decreased healthcare expenditures funded by their resources (from BRL421.52 in 2019 to BRL293.32 in 2020), rejecting H3. Both results are consistent for each subaccount of healthcare expenditures.

The effect observed in Brazil is similar to that pointed out by the WHO in a December 2020 publication, showing that “aid inflows for health grew over the period, several countries in the lower-income group reallocated domestic public funding from health to other purposes, exhibiting fungibility between external aid and domestic public spending” (WHO, 2020, p. 75).

To test H4, we created two clusters of municipalities (revenue increase vs. revenue decrease) based on the change in ‘revenues except by pandemic related transfers’ from the first half of 2019 to the same period of 2020, segregated by type of revenue. We applied t-tests to compare the mean of the financial support municipalities received between these groups (Table 4). Such an effect was verified in the municipalities with less than 50,000 inhabitants (Panel C), representing 88% of the municipalities with the same autonomy and responsibilities for providing health, education, and urban
infrastructure as the biggest cities (Oliveira & Berman, 2021). Moreover, municipalities’ size, degree of financial dependency on central government transfers, and capacity to collect their revenues are already known proxies for vulnerabilities (Padovani et al., 2021).

Results shown in Table 4 reinforce previous evidence that the transfer policy designed by the central government was upside-down (H2). Municipalities that experienced an increase in their tax revenue or constitutional transfer from state governments received more financial support related to the pandemic than those that suffered a decrease in other sources of revenue.

Municipalities that suffered a reduction in constitutional transfer from the central government (FPM) received more financial support to fight the pandemic. However, this difference is not significant, indicating that the financial support did not necessarily compensate for the losses.

Figure 1 combines data from Tables 3 and 4. The left-hand-side graph depicts that 96.5% of the municipalities experienced a reduction in healthcare expenditures funded by their resources in the first semester of 2020 compared to 2019, still combined with a positive net transfer received. It is the case for most large-sized municipalities (the circles’ size represents the number of inhabitants, and the red triangles depict the state capitals).

On the right-hand-side graph, an increase in total healthcare expenditure (regardless of how they are funded) combined with positive net transfer received is well-perceived (88.4% of municipalities).

The poorly designed financial support transfer policy becomes more evident since 97.2% out of 3169 municipalities that had increased total healthcare expenditures and suffered a decrease in their revenue in the first semester of 2020 compared to the same period of 2019 made a pandemic surplus (i.e., transfers to fight the pandemic exceeded the increase in healthcare expenditures and own revenue decrease). The pandemic surplus amounted to BRL10.7 million on average (median = BRL2.656 million) or BRL496.92 per capita (median = BRL170.16). Indeed, the pandemic surplus is

### Table 3: Healthcare expenditures comparison 2019 and 2020 (H3)

|                         | Own resources | Total resources |
|-------------------------|---------------|-----------------|
|                         | 2019 mean (SD)| 2020 mean (SD) | 2020 ! = 2019 p-value | 2019 mean (SD)| 2020 mean (SD) | 2020 ! = 2019 p-value |
| **Basic assistance**    | 268.06 (202.55)| 177.79 (179.18) | 0.0000 | 294.68 (410.50) | 301.78 (222.70) | 0.0000 |
| **Hospital care**       | 98.16 (116.65) | 67.24 (99.28)   | 0.0000 | 126.77 (124.58) | 143.09 (135.81) | 0.0000 |
| **Preventive prophylaxis** | 6.61 (14.48)  | 5.36 (20.18)    | 0.0047 | 13.71 (19.63)   | 15.90 (14.52)   | 0.0000 |
| **Health surveillance** | 3.90 (6.38)   | 2.28 (5.28)     | 0.0000 | 6.53 (11.74)    | 7.65 (6.94)     | 0.0000 |
| **Epidemiological surveillance** | 5.59 (7.21) | 2.82 (5.72)    | 0.0000 | 8.61 (11.03) | 12.17 (11.21) | 0.0000 |
| **Total healthcare**    | 421.52 (195.25)| 293.32 (183.57) | 0.0000 | 451.64 (412.48) | 485.20 (220.20) | 0.0000 |

*Note: The sample sizes differ due to missing values on either variable.*

### Table 4: Financial support by clusters of municipalities (increased vs. decreased revenues before pandemic related transfers) (H4)

|                        | Financial support from the central government |
|------------------------|----------------------------------------------|
|                        | N    | Other revenue increases Mean (SD) | Other revenue decreases Mean (SD) | Increase ! = Decrease p-value |
| **Panel A: All Brazilian municipalities** |       |                               |                               |  |
| Municipality’s tax revenue | 3642 | 130.15 (61.48)                 | 121.69 (52.92)                | 0.000 |
| Constitutional transfer from the state government | 3367 | 130.51 (59.49)                 | 121.89 (55.46)                | 0.000 |
| Constitutional transfer from the central government (FPM) | 3369 | 120.09 (64.33)                 | 125.54 (56.66)                | 0.183 |
| **Panel B: Municipalities with more than 100,000 inhabitants** |       |                               |                               |  |
| Municipality’s tax revenue | 245  | 93.96 (51.5)                   | 96.91 (53.1)                  | 0.6547 |
| Constitutional transfer from the state government | 232  | 97.23 (49.1)                   | 96.43 (50.8)                  | 0.9118 |
| Constitutional transfer from the central government (FPM) | 231  | 97.93 (22.7)                   | 96.58 (49.7)                  | 0.9372 |
| **Panel C: Municipalities with less than 50,000 inhabitants** |       |                               |                               |  |
| Municipality’s tax revenue | 1109 | 134.90 (61.9)                  | 126.91 (53.1)                 | 0.0001 |
| Constitutional transfer from the state government | 2889 | 135.78 (59.9)                  | 126.78 (55.8)                 | 0.0000 |
| Constitutional transfer from the central government (FPM) | 2892 | 124.44 (65.5)                  | 130.66 (57.0)                 | 0.1569 |

*Abbreviation: FPM, Municipal participation fund.*
negatively correlated (at 1%) with risk factors (Gini = −0.1343; Vulnerability = −0.1681; Longevity 0.1548) and positively correlated (at 1%) with pre-existent health infrastructure (Healthcare basic 0.2182, Family team 0.1968). Therefore, the more municipalities needed, the less they received. Consequently, municipalities experienced an increase in net cash availability from December 2019 until December 2020, which is persistent regardless of population size, except for the municipalities from the North and Northeast regions. Tables and graphs depicting municipalities’ pandemic surplus are available upon request. Altogether, results indicate that the central government transferred to municipalities had other goals than compensating their financial losses associated with the pandemic. In the next section, we suggest investigating whether political forces are associated with such goals under an exploratory approach.

5 | COMPLIMENTARY ANALYSES

Brazilians voted for municipal legislature and mayors on 15 November (first round) and 29 November 2020 (second round). Elections are mandatory; voters must present themselves at polling stations on a specific date. In municipalities with more than 200,000 voters, a candidate for mayor needs more than half of the valid votes to be elected. If this mark is not obtained in the first round, voters must return to polling stations to choose between the two most voted candidates. Because of the pandemic, there was a sharp decrease in voters’ presence, from 82% in 2016 to 77% in 2020.

Another remarkable difference between the two most recent elections for mayors in Brazil is the rate of success of those candidates that ran for re-election; in 2016 48% succeed, but during the pandemic 59% accomplished re-election (2020: $z = 6.88, p = 0.000$; 2016: $z = −2.15, p = 0.032$). Among those not running for re-election, 74% (69%) failed in 2020 (2016: $z = 53.78, p = 0.000$; 2016: $z = 39.29, p = 0.000$). Differences in frequencies and percentages were significant (2020: $\chi^2 = 717.43, df = 1, p = 0.000$; 2016: $\chi^2 = 280.60, df = 1, p = 0.000$).

Explaining the causes of the significant increase in the re-election rate during the pandemic is out of the scope of this study. However, to shed light on this research problem, we provide two exploratory pieces of evidence that future research could deeply investigate.

First, although the central government transferred financial support to municipalities based on population size, on average, municipalities managed by left-wing mayors (mayors elected in 2016) received significantly lower transfers than all other municipalities (left-wing: mean = 124.61, SD = 54.87, $N = 1431$; non-left-wing: mean = 129.23, SD = 61.12, $N = 4067$; difference $p = 0.0117$). Notice that President Bolsonaro is a retired military officer whose political carrier was remarked by the defense of conservative values and was elected in the second round with 55% of valid votes over the candidate from the left Workers’ Party.

The second exploratory evidence is the significant difference between the financial support municipalities received from the central government during the pandemic and mayors being re-elected or not in November 2020 (mayor re-elected: mean = 127.85, SD = 59.84, $N = 975$; mayor not re-elected: mean = 120.99, SD = 56.30, $N = 661$; difference $p = 0.0200$).

Another evidence that the real purpose of the transfers might be different from that officially announced is the lack of coordination and high-level dissociation between the (ex-ante) accounting policies established by the Ministry of Finance on how municipalities should account for the transfers received and the (ex-post) auditing and accountability requirements created by the Supreme Auditing Institution on how municipalities should have accounted for the transfers received. This scenario generated further questioning by the Supreme Auditing Institution (MPC-TCU, 2020), demanding the central government implement a measure to monitor the transfers for fighting COVID-19, which was not initially planned. The legislation that authorized the billionaire transfer left doubts about whether the
financial transfer's purpose was to fight COVID-19 or compensate for the decrease in local governments’ revenues.

Notice that the Congress of the United States resisted passing on financial support to local governments without the approval of rules about how they could spend the resources (Joyce & Prabowo, 2020).

6 | DISCUSSION AND CONCLUDING REMARKS

Serious events of a previously unanticipated crisis like the COVID-19 pandemic require governments to quickly mobilize resources and coordinate their actions. Based on the exploratory evidence presented in Section 5, we cannot assure that the central government designed the transfer policy to help non-left-wing mayors' re-election projects. However, the main results presented in Section 4 imply that the financial support to municipalities had other goals than helping local governments fight COVID-19 since the central government transferred more resources to the municipalities that needed less. The central government decided to take the easy way out of defining the criteria for financial support instead of innovating in searching for criteria more appropriate to the fight against the pandemic. After all, the criteria “for the transfer of these sums of money are well-regulated and articulated” (Abrucio & Grin, 2015, p. 15), in a clear path dependence on traditional transfer policies such as FPM (Vergne & Durand, 2010) and should be additional evidence of political cultures of patronage and short-term electoral interests (Oliveira & Berman, 2021).

The results have implications for how the vertical coordination of financial decentralization developed in countries. The intriguing Brazilian case indicates that financial support to local governments did not consider ex-ante predictable population infection risk patterns and municipalities’ vulnerabilities. It created an opportunity for the city hall to save its resources and allocate the transfers received to finance other services than healthcare; hence some municipalities made a significant ‘pandemic surplus.’

In hindsight, we can assure that the transfer policy adopted in Brazil was not adequate because it registered 663,694 deaths by COVID-19 (312 per 100,000 population) until 4 May 2022 and the central government gross debt increased from 69.8% of Gross Domestic Product in December 2019% to 88.6% in December 2020 (80.3% in December 2021). The unemployment rate increased from 11% to 13.9% in the same period (11.1% in December 2021).

6.1 | Lessons from the unsuccessful Brazilian experience

Inspired by Willoughby et al. (2020), which analyzed responses provided by the US authorities to many natural disasters and derived valuable lessons from a wide swath of woefully poor responses, we highlight the policy implications and propose the following lessons from the Brazilian case of fiscal decentralization. Albeit unsuccessful, that might help this and other emerging market economies and developing countries better cope with future pandemics and disasters.

First, designing a fiscal decentralization policy based on population size is not the best criterion for allocating resources among 5569 municipalities. The correlation between transfer to municipalities and their population was 0.9. Although the path dependence on traditional transfer policies provides a quick response to the pandemic with few negotiation and transaction costs, municipalities differ in many features, such as demography, urban concentration, human development index, social inequality index, and the availability of healthcare infrastructure. These are driving features of infection and fatality risks. For instance, consider two municipalities with equivalent population sizes but the territory of one is four hundred times bigger than the other; if the demographic density of city A is 0.5 inhabitants/km², the density of city B is two hundred inhabitants/km². Imposing physical distancing in city A might be much easier than in city B. However, the logistics of delivering healthcare services at each corner of A might be much more expensive than in B.

Second, the absence of any ex-ante, clear, and explicitly defined accountability rule is not the best criterion for coordinating the spending of billions of dollars by thousands of municipalities (Georgieva, 2020; Joyce & Prabowo, 2020). When the Ministry of Finance transferred resources to municipalities, it had not required any specific accountability mechanism. Later, the Supreme Auditing Institution demanded detailed information about how resources were spent (MPC-TCU, 2020).

Third, transferring unringfenced grants to municipalities in an electoral year is not the best criterion for allocating resources among municipalities. Incumbents may spend the funds received on beautifying the city or on other actions they deem to be more appreciated by voters than combating the pandemic. The results indicated that when receiving financial support, municipalities took advantage of it and reduced spending on their resources, so financial support did not necessarily improve public health services. Implementing new financial support measures can be more problematic in indebted countries like Brazil, which have a low fiscal margin (IFI, 2021).

Finally, washing one’s hands of coordinating the response among the central, regional, and local governments is not the best way to combat a pandemic. The central government neglected its coordination power over healthcare policies, as discussed by Abrucio et al. (2020). Instead, it transferred resources to municipalities expecting to exempt itself from any responsibility regarding the outcome of decisions made. Adopting population size as the single criterion to allocate resources among municipalities mitigated the political bargain. The need for coordination once population size has been a well-established criterion to transfer resources from the central to regional and local governments since the implementation of FPM in 1965. However, it did not guarantee municipalities best fighting COVID-19 because population size per se does not predict infection and fatality risks.
6.2 Limitations and suggestions for future research

The institutional design of financial transfers and sharing of funds between levels of government is often a complex issue. This manuscript does not consider political factors, such as politicians’ behavior and coordination strategies. Future research could consider the celerity necessary for elaborating financial support policies, the political complexity involved in approving a financial support innovation, and the correct design of incentives to allocate the resource more efficiently among the local governments. Future research could also investigate the role of conflicts between the central, regional, and local governments in implementing a clear and consistent public policy to fight the pandemic and how such conflicts shaped the fiscal decentralization policy analyzed in this study.

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DATA AVAILABILITY STATEMENT

We used publicly available data from open government websites and provide the respective links on the manuscript.

IMPACT STATEMENT

Serious events of a previously unanticipated crisis like the COVID-19 pandemic require governments to mobilize resources and coordinate their actions quickly. Such coordination becomes even more complex in federations. The research results have implications for how the vertical coordination of financial decentralization develops in countries. The Brazilian case indicates that financial support to local governments did not consider ex-ante predictable population infection risk and municipalities’ vulnerabilities. Instead, money was allocated based on population size, under a path dependence on transfer policies implemented for decades and designed for ordinary circumstances. However, a pandemic is anything but ordinary.

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