The Politics of Lockdown Policies: Evidence from Brazilian States

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Abstract

We introduce a novel state-level measure of *lockdown regulatory freedom* to study the severity of lockdowns for Brazilian states and its determinants. Our main results show that lockdown policies were not consistently determined by any health-related variable, such as the number of doctors, hospital beds, the share of the population with private health insurance, or the share of the population 65 years of age and older or Covid-19 cases and deaths. Indeed, the only variable consistently related to lockdown policies in all specifications and robustness checks was the state's share of votes for the right-wing candidate. A one standard deviation increase in the share of votes for the right-wing candidate is associated with a 0.6-0.87 standard deviation increase in lockdown stringency. Our results highlight the importance of political economy considerations in explaining the incentives of policymakers when designing health policies.

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1 Introduction

The Coronavirus pandemic led to substantial costs that were imposed by the virus itself and by government restrictions on mobility and business activities. Numerous papers attempted to assess the effectiveness of lockdowns on contagion and other health outcomes (e.g. Hsiang et al., 2020; Fang et al., 2020; Abouk and Heydari, 2021; Courtemanche et al., 2020) as well as their impact on economic activity (e.g. Gupta et al., 2023; Fairlie, 2020; Cachanosky et al., 2021; Murphy, 2024; Redford and Dills, 2021; Bentkowska, 2021; Dingel and Neiman, 2020; Andersson and Jonung, 2024). Herby et al. (2024) conduct a meta-analysis on the papers analyzing the effectiveness of these lockdown policies. They find that lockdown policies had a relatively small effect on Covid-19 mortality and that voluntary changes in behavior were more effective in mitigating the pandemic, an important finding given the economic costs of these measures.

Before the Covid-19 pandemic, questions related to political determinants of health policies have been mostly overlooked by public choice scholars (Leeson and Thompson, 2021). Notable exceptions include Troesken (2015) and Geloso et al. (2022), who highlight the complex complex trade-off between institutional restraints designed to combat disease and wealth-generating freedom that may prevent it. Geloso and Bologna Pavlik (2021) find similar results when studying the 1918 Spanish Flu pandemic. However, a literature has recently emerged to investigate the political economy of stay-at-home orders and other types of restrictions that were implemented during the Covid-19 pandemic (e.g. Leeson and Rouanet, 2021; Leeson and Thompson, 2023; Boettke and Powell, 2021; Powell, 2022; Furton, 2023).[1]

For instance, Bjørnskov and Voigt (2022) find that the main drivers of pandemic policy were political and that infection and health measures were largely irrelevant. They also find that governments across the world used emergency powers to curtail freedom of speech. Still, most of what we know comes from the United States. McCannon and Hall (2021) analyze the political determinants of the timing of restrictions, finding that US

states with less economic freedom adopted stay-at-home orders sooner than those with more economic freedom, while Miozzi and Powell (2023a) extended this finding to show that states with lower pre-existing levels of economic freedom also implemented more strict lockdown measures overall. Furthermore, Miozzi and Powell find that the stringency of lockdowns was predicted by pre-existing political ideology, as measured by the share of votes for Hillary Clinton in 2016. These latter findings are corroborated by those of Baccini and Brodeur (2021).

Additionally, stay-at-home orders imposed large restrictions on individuals' freedom to participate in a wide variety of commercial relations, which were largely not captured by existing measures of economic freedom. Given that economic freedom is related to numerous desirable social and economic outcomes (Hall and Lawson, 2014; Lawson, 2022; Lawson et al., 2024), documenting this reduction in freedom is an important task. As such, Miozzi and Powell (2023b, 2024) provided adjustments, using a novel measure of *Lockdown Regulatory Freedom*, to incorporate pandemic-related restrictions into countries' existing measures of economic freedom, while Miozzi and Powell (2023c) do the same to adjust US states' economic freedom scores.

Our paper complements the above literature in two main ways. First, we construct a state-level measure of *lockdown regulatory freedom*, following the methodology of Miozzi and Powell (2023c), to measure the severity of lockdowns for each of the Brazilian states. Second, following the spirit of McCannon and Hall (2021) and Miozzi and Powell (2023a), we test whether pre-pandemic economic freedom and other political variables were important determinants in the timing and severity of lockdown restrictions, compared to other health-related indicators. Additionally, we constructed revised estimates of state-level economic freedom that take into account Covid-related restrictions that may aid scholars in future research in the field.[2]

Unlike the above literature examining the US, an outlier in its disparity of subnational Covid-19 policies, we analyze Brazil to see how lockdown policies were determined in a developing country. Our main results show that lockdown policies were not consistently

determined by any health-related variable, such as the number of doctors, hospital beds, the share of population with private health insurance, or the share of population 65 years of age and older. Indeed, the only variable that was consistently related to lockdown policies in all specifications and robustness checks was the state's share of votes for the right-wing candidate. A one standard deviation increase in the share of votes for the right-wing candidate is associated with a 0.6-0.87 standard deviation increase in lockdown stringency.

Second, we find evidence that governors running for reelection implemented more strict restrictions, around 0.8 to 1 standard deviation. This result, however, is less robust to the inclusion of additional controls. We also find some evidence that this political bias also affected the "supply side" of Covid-19 policies, with larger investments in ICU beds in states with greater right-wing electorates. Our results also show that, unlike the United States (McCannon and Hall, 2021; Miozzi and Powell, 2023a), pre-pandemic levels of economic freedom are unrelated to the timing and severity of lockdown regulatory freedom.

Finally, our study suggests that when optimal policy isn't feasible, federalism serves as a strong tool for policy adjustment. Multiple jurisdictions encourage experimentation, promote learning from diverse state strategies, and allow voters to move to regions aligning with their preferences and risk tolerances.

This paper proceeds as follows. The next section describes the data used to measure lockdown severity for the Brazilian states. Section 3 presents our empirical results for the determinants of lockdown policy. Section 4 presents our robustness checks and Section 5 concludes.

2 Data

2.1 Lockdown Regulatory Freedom

Our study introduces a novel state-level measure of *lockdown regulatory freedom* for each of the Brazilian states in 2020 as our primary indicator of lockdown response. Following the methodology in Miozzi and Powell (2023b,c), we define *lockdown regulatory freedom* as the equally weighted average of eight non-pharmaceutical, mandatory pandemic response indicators, each scored from 0 to 10, where 10 represents the least stringent (most free) regulatory response to Covid-19. The eight indicators include (i) mandatory *workplace closures*, (ii) mandatory *school closures*, (iii) mandatory *cancellations of public events*, (iv) *restrictions on gathering sizes*, (v) *internal movement restrictions*, (vi) *stay-at-home orders*, (vii) mandatory *public transport closings*, (viii) and mandated *facial coverings*.

We averaged daily data for each of these indicators to create a monthly measure for each state in 2020.[3] This measure is derived from the *Covid-19 Stringency Index* developed by Hale et al. (2021), which provides daily scores reflecting the stringency of lockdown measures for each country starting in 2020. Brazil is one of the few countries for which subnational data is available, enabling us to construct scores for each state.

In Brazil, command over health policy is shared between federal, state, and local levels. Typically, the federal government, through the Ministry of Health, sets national guidelines and provides funding and technical assistance, while states are tasked with coordinating regional health policies and managing medium- and high-complexity services. Basic services are managed by local authorities (Borges de Sousa Filho and Pimenta Alves, 2024). In the context of the Covid-19 pandemic, the federal government, led by President Jair Bolsonaro, minimized the threat of the virus, while state governments took more proactive stances (Knaul et al., 2021). The latter were responsible for implementing restrictions to gatherings, business activities, and public health measures. Nevertheless, we focus on voter ideology at the presidential level as a potential source of bias because ideology at

the state level is hard to infer from party affiliation, given the notoriously weak party structures in Brazil (see, e.g. Hunter, 2007; Epstein, 2009; Lucas and Samuels, 2010).

We use the adjusted *lockdown regulatory freedom* as opposed to the *Covid-19 Stringency Index*, since the latter includes policy measures that were not mandatory restrictions on social and economic activity. The *Covid-19 Stringency Index* was modified to include only mandatory restrictions on economic freedom.[4] For example, merely recommending school closures is non-coercive, and *lockdown regulatory freedom* is adjusted to not penalize for these cases.[5] For a more detailed discussion of the justification and inclusion of the eight lockdown indicators, refer to Miozzi and Powell (2023b,c).

Table B1 lists the *lockdown regulatory freedom* scores for each state in 2020. Scores range from a low of 2.11 (Roraima) to a high of 5.52 (Maranhão), reflecting the relatively stringent approach Brazilian states took in response to Covid-19. Compared to the United States, where scores ranged from a low of 2.65 (New Mexico) to a high of 8.21 (North Dakota), the overall lockdown policy variation in Brazil was much lower.

Among the states, *school closures* and the *cancellations of public events* were Brazil's lowest-scoring lockdown indicators, with average scores of 0.48 and 0.84, respectively. *School closures* also showed the least variation across states; no state scored above 0.52 out of 10 in this category in 2020. Brazil's highest-scoring lockdown indicators in 2020 were the *closure of public transport* (8.49) and *stay-at-home orders* (7.95). However, these indicators exhibited much more variation. For instance, Mato Grosso do Sul had the lowest *stay-at-home order* score of 3.76, while seven states had perfect scores of 10, indicating they did not implement stay-at-home orders in 2020, though these states concentrated their lockdown policies in other areas.

2.2 State-Level Economic Freedom

The *Índice Mackenzie de Liberdade Econômica Estadual* is a state-level index of economic freedom for the 26 Brazilian states, published by the Mackenzie Center for Economic Freedom (Maciel et al., 2023). It is divided into three areas of (i) government expenditure,

(ii) taxation, and (iii) labor market regulations. The final score is just the simple average across the three areas, ranging from 0 (least free) to 10 (most free). The data is available for all 26 Brazilian states (but not for the Federal District) from 2003 to 2021.

2.3 Additional Data

Apart from the main datasets referred to above, here we briefly describe other covariates included in the estimations that follow. These variables serve as controls for other confounding factors that are potentially related to both economic freedom and lockdown policies. In special, we aim to capture the relative exposure to Covid-related cases and deaths, either through initial exposure to cases, or the state's ability to treat those that were ill, proxied by its healthcare indicators. Thus, we include the number of hospital beds, and the number of medical doctors, all scaled by 10,000 people and sourced from OpenDataSUS. We also control for GDP per capita and mean minimum temperatures at the state capital, since colder temperatures are associated with greater Covid-19 transmission (e.g. Landier et al., 2021).

Further, we include lagged data for Covid-19 cases and deaths. These are organized in two ways. In our main estimates, we include a variable with the week in which the state reached one death per 100,000 population. Since for most states this occurred relatively early in the pandemic it mitigates concerns about endogeneity (relative to using the total cases/deaths for 2020). In our robustness checks, we also use the cumulative cases and deaths per 100,000 people from March to July in regressions that track regulatory freedom in the second half of the year (August to December). The summary statistics for all variables are provided in Table 1.

Table 1: Summary statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Lockdown Stringency Measures					
LRF (2020)	27	3.602	0.762	2.112	5.518
LRF (Aug-Dec)	27	3.603	1.104	1.667	6.142
First Stringency Index Score	27	39.284	15.605	16.67	72.22
Avg. Stringency Index (2020)	27	47.361	7.313	31.613	62.525
Week of First Restriction	27	11.778	0.424	11	12
Covid Measures					
Week 1 death per 100k	27	18.222	2.154	15	24
Week 10 cases per 100k	27	16.630	1.471	14	19
Cum. Deaths per 100k (2020)	27	96.520	24.818	56.229	147.872
Cum. Cases per 100k (2020)	27	4713.204	2050.146	2325.168	11339.79
Cum. Deaths per 100k (Mar-Jul)	27	48.284	22.799	13.525	84.687
Cum. Cases per 100k (Mar-Jul)	27	1847.479	1114.186	614.584	5401.965
Health Indicators (2019) - per 10,000 population					
Hospital beds	27	20.019	3.431	13.060	26.605
ICU beds	27	2.539	0.841	1.581	5.128
Doctors	27	13.706	4.636	6.942	25.885
Health Insurance (% pop)	27	8.914	4.874	1.759	19.864
Δ *Health Indicators (2020/2019)*					
Δ Hospital beds	27	1.031	0.057	0.947	1.249
Δ ICU beds	27	1.373	0.097	1.203	1.625
Δ Doctors	27	1.052	0.0245	0.969	1.093
Political and Economic Variables					
GDP per capita (R$, 2019)	27	16911.12	9097.272	7730.164	50985.55
GDP per capita (R$, 2020)	27	16549.54	8384.492	7930.305	45919.55
State Economic Freedom (2019)	26	6.375	0.713	4.8	7.63
Votes to Right-Wing Cand. (%)	27	0.489	0.163	0.217	0.739
Other Controls					
% Population $\geq$ 65 (2019)	27	8.384	2.064	3.797	12.546
Avg. Min. Temperature (^oC, capital)	27	20.115	4.176	12	27.3

Notes: LRF is the Lockdown Regulatory Freedom index, following the method of Miozzi and Powell (2023b). The Avg. Raw Stringency Index ranges from 0 to 100. ICU stands for intensive care units. Votes to right-wing candidate is the share of votes for Jair Bolsonaro in the 2018 election.

3 Results

This section analyzes the determinants of lockdown policies. We contrast two sets of variables in explaining these restrictions. The first set considers what a science-based, data-driven policy would suggest. Since the main argument for lockdowns was to "flatten the curve," we would expect states with larger healthcare capacity to impose fewer restrictions as their hospital infrastructure could presumably accommodate a larger uptick in the virus. The second group of variables attempts to explain lockdowns in terms of political variables, in the spirit of McCannon and Hall (2021) and Miozzi and Powell (2023a). In this case, they would be majorly driven by policymakers appealing to their voters. As we detail below, our results present strong evidence for the latter hypothesis of political influence in lockdown policies.[6]

3.1 Health Determinants

Our main dependent variable is the average Lockdown Regulatory Freedom (LRF) for 2020, although below we consider alternative measures as robustness checks. All else equal, states with greater availability of healthcare inputs should require fewer restrictions, and thus a higher LRF. Table 2 reports the results.

We begin by regressing it on the stock of main healthcare inputs per 10,000 population. We use data for 2019, to avoid potential issues of simultaneity.[7] Column (1) shows that the average stringency of lockdowns during 2020, the first year of the pandemic, was not related to pre-existing healthcare infrastructure. In the second column, we include the percentage of the population with private health insurance, the share of the state population at 65 years of age and above, and the average minimum temperature at the state capital. Likewise, none of these variables are statistically significant. In column (3) we control for the week in which each state reached one death per 100,000 people.[8] We

also do not find any association to lockdown stringency.

Table 2: Health Determinants of Lockdown Restrictions

Dependent Variable:	*Avg. Lockdown Regulatory Freedom (2020)*			
	(1)	(2)	(3)	(4)
ICU Beds (2019)	-0.085	-0.536	-0.495	-0.392
	(0.322)	(0.495)	(0.502)	(0.590)
Hospital Beds (2019)	0.012	-0.021	-0.025	-0.012
	(0.0533)	(0.0701)	(0.0709)	(0.0795)
Doctors (2019)	0.010	-0.111	-0.134	-0.209
	(0.0610)	(0.0956)	(0.101)	(0.133)
% Health Insurance (2019)		0.065	0.093	0.091
		(0.069)	(0.077)	(0.083)
% Pop. $\geq$ 65 (2019)		0.233	0.221	0.282
		(0.149)	(0.150)	(0.192)
Avg. Min. Temp. (^{o}C)		-0.015	-0.017	-0.033
		(0.045)	(0.046)	(0.054)
GDP per cap. (2019)		0.055	0.050	0.0744
		(0.053)	(0.054)	(0.060)
Week reach. 1 death/100k			0.081	0.117
			(0.097)	(0.120)
Δ ICU Beds				-1.054
				(1.857)
Δ Hosp. Beds				4.700
				(4.519)
Δ Doctors				-3.704
				(10.650)
N	27	27	27	27
Adj. R^2	0.005	0.255	0.283	0.351
Model F-test p-value	[0.989]	[0.506]	[0.545]	[0.691]

Notes: Standard errors in parenthesis. *, **, and *** indicate statistical significance at the 10, 5, and 1% levels, respectively. ICU stands for Intensive Care Units. Variables with Δ reflect change from 2019 to 2020.

The 2019 data used in these regressions could be unrelated to lockdown policies if policymakers relied on *changes* in the existing infrastructure to guide policy choices. Thus, both states with previously low and high healthcare provision inputs could, at least in theory, optimally increase their availability to accommodate the demand during the pandemic. We test this hypothesis by including the changes in ICU beds, hospital beds,

and medical doctors from 2019 to 2020. However, none of the variables are distinguishable from zero. In the last row of Table 2, we also report the p-values for an F-test of the overall significance of the model. In all cases, we fail to reject the null hypothesis that the model has no explanatory power.

3.2 Political Determinants

Alternatively, we test whether political variables can explain lockdown policies. We test three hypotheses following McCannon and Hall (2021) and Miozzi and Powell (2023a): the share of votes to the right-wing presidential candidate, whether the state governor was running for reelection, and the pre-pandemic levels of economic freedom. Our results are reported in Table 3.

Columns (1) and (2) present the estimates for the share of votes for the right-wing candidate (and then president), Jair Bolsonaro, in the 2018 elections. The first column includes simple controls, and the second includes an additional set of controls. Bolsonaro repeatedly dismissed the impact of the pandemic in several public statements and was a critic of lockdown policies. A public choice perspective of public policy suggests that governors will implement policies that appeal to the median voters in their states. Thus, in states where more people sympathize with a candidate who criticizes lockdowns, we would expect looser restrictions. However, our findings suggest the opposite. Increased support for the right-wing candidate is a statistically and economically significant predictor of more restrictive lockdown policies. In both columns, a one standard deviation increase in the share of votes to the right is associated with 0.6 standard deviation more strict lockdown policies – or, a 13% increase in stringency relative to the mean Lockdown Regulatory Freedom.[9]

This reflects an interesting dynamic that occurred in Brazil. While Bolsonaro heavily criticized left-wing governors for their restrictive policies, his allies were able to implement relatively more stringent controls while being immune to criticisms and active legal opposition from the federal government.[10] While our focus is on documenting the ex-

istence of a policy bias, explaining the specific *direction* of the bias requires evaluating an intricate dynamic between several governmental actors. Although we consider it an important avenue of future research, we view this task as outside of the scope of this paper.

The second explanatory variable of interest is a dummy for whether the state governor was eligible for reelection in the 2022 elections. In column 3, we find some evidence that governors potentially running for reelection implemented more strict (0.8 st. dev.) lockdown policies, but the variable loses significance (p=0.242) when we include additional controls.

Thirdly, we test whether there is a relationship between pre-pandemic levels of economic freedom at the state level and lockdown policies. The results are presented in columns (5) and (6) of Table 3. We do not find any evidence that economic freedom is associated with the severity of lockdown restrictions.

Finally, for all models, we also perform a F-test for whether the health variables are jointly significant. In all cases we fail to reject the null hypothesis that all variables are equal to zero, with the lowest p-value across all tests at 0.439 (model 6).

Table 3: Political Determinants of Lockdown Restrictions

Dependent Variable:	*Votes to Right-Wing*		*Gov. Reelection*		*Economic Freedom*	
Avg. LRF (2020)	(1)	(2)	(3)	(4)	(5)	(6)
% Votes to Right-Wing	-2.835***	-2.844*				
	(0.955)	(1.504)				
Gov. Reelection dummy			-0.618*	-0.488		
			(0.341)	(0.402)		
State Econ. Freedom (2019)					0.255	0.100
					(0.258)	(0.298)
ICU Beds (2019)	-0.0390	-0.189	-0.0233	-0.416	-0.163	-0.462
	(0.279)	(0.496)	(0.309)	(0.499)	(0.364)	(0.515)
Hospital Beds (2019)	0.014	0.001	0.022	0.003	0.006	-0.029
	(0.046)	(0.068)	(0.051)	(0.074)	(0.055)	(0.073)
Doctors (2019)	0.050	-0.069	0.024	-0.107	0.003	-0.126
	(0.054)	(0.100)	(0.059)	(0.102)	(0.063)	(0.103)
% Health Insurance (2019)		0.044		0.084		0.095
		(0.080)		(0.077)		(0.080)
% Pop. $\geq$ 65 (2019)		0.086		0.166		0.220
		(0.158)		(0.155)		(0.167)
Avg. Min. Temp. (^{o}C)		-0.053		-0.036		-0.031
		(0.047)		(0.048)		(0.049)
GDP per cap. (2019)		0.036		0.041		0.013
		(0.051)		(0.054)		(0.065)
Week reach. 1 death/100k		0.079		0.049		0.116
		(0.090)		(0.098)		(0.110)
N	27	27	27	27	26	26
R^2	0.290	0.408	0.135	0.340	0.050	0.332

Notes: Standard errors in parenthesis. *, **, and *** indicate statistical significance at the 10, 5, and 1% levels, respectively. ICU stands for Intensive Care Units.

3.3 Investments in Healthcare Infrastructure

In this section, we consider that Covid-19 measures could have been implemented through the supply side. That is, governors invested in expanding their healthcare system instead of betting extensively in mandated restrictions. Again, we contrast political variables and pre-pandemic healthcare infrastructure in explaining changes in healthcare availability. We consider changes in doctors, hospital beds, and ICU beds between 2019 and 2020 as our dependent variables. Among these, changes in ICU beds are arguably the most relevant, since they were the major bottleneck in clinical care (e.g. Arabi et al., 2022).

Table 4 presents the results. Odd columns regress these variables on the stock of existing healthcare infrastructure. All else equal, we would expect states with greater healthcare facility availability before the pandemic to need less marginal investments to expand their capacity. Across all models, it is only in models (1) and (2) that we find the change in hospital beds to be associated with other health-related variables. It suggests that states with greater stock of medical doctors just prior to the pandemic had greater increases in hospital beds.

Additionally, we find that the share of the population in elderly age is related to increases in hospital beds. Notice, however, that it contradicts the expected sign. Given the well-known greater risk of Covid-19 for the elderly, we should expect that states with greater population in that age group to require more, not less, hospital beds.

On even columns, we include our three political variables in addition to health indicators. We only find evidence that the share of votes for the right-wing candidate is related to changes in ICU beds (column 4). Column (4) also suggests that states with greater ICU availability in 2019 made smaller marginal increases to their stock in 2020, but this relationship is only significant with the inclusion of political variables. Overall, this suggests that policy biases were also present in the "supply side" of Covid-19 policies.

Taken in conjunction with the results above, a potential interpretation is that states with greater right-wing electorate were relatively more aggressive in combating Covid, both in terms of more stringent lockdown policies and greater investments in healthcare.

Table 4: Investments in Healthcare Infrastructure: Healthcare and Political Determinants

Dependent Variable:	Δ *Hosp. Beds*		Δ *ICU Beds*		Δ *Doctors*	
	(1)	(2)	(3)	(4)	(5)	(6)
% Votes to Right-Wing		0.020		0.567**		0.039
		(0.146)		(0.233)		(0.062)
Gov. Reelection dummy		-0.016		0.009		-0.005
		(0.029)		(0.046)		(0.012)
State Econ. Freedom (2019)		0.012		-0.037		-0.009
		(0.018)		(0.029)		(0.008)
ICU Beds (2019)	-0.042	-0.041	-0.044	-0.098*	-0.018	-0.021
	(0.028)	(0.033)	(0.067)	(0.053)	(0.012)	(0.014)
Hospital Beds (2019)	0.000	0.001	0.005	-0.002	0.003	0.003
	(0.004)	(0.005)	(0.009)	(0.007)	(0.002)	(0.002)
Doctors (2019)	0.014**	0.016**	0.004	-0.003	-0.001	-0.002
	(0.005)	(0.006)	(0.013)	(0.010)	(0.002)	(0.003)
% Health Insurance (2019)	0.003	0.002	-0.002	0.004	-0.000	0.001
	(0.004)	(0.005)	(0.009)	(0.008)	(0.002)	(0.002)
% Pop. $\geq$ 65 (2019)	-0.022**	-0.024*	-0.013	0.035	-0.006	-0.002
	(0.008)	(0.013)	(0.020)	(0.021)	(0.004)	(0.006)
Avg. Min. Temp. (^{o}C)	0.005*	0.004	0.004	0.003	0.001	0.001
	(0.003)	(0.003)	(0.006)	(0.005)	(0.001)	(0.001)
GDP per cap. (2019)	-0.004	-0.007	0.002	-0.011*	0.001	0.001
	(0.003)	(0.004)	(0.007)	(0.006)	(0.001)	(0.002)
Week reach. 1 death/100k		0.079		0.049		0.116
		(0.090)		(0.099)		(0.110)
N	27	26	27	26	27	26
R^2	0.564	0.604	0.161	0.613	0.562	0.622

Notes: Standard errors in parenthesis. *, **, and *** indicate statistical significance at the 10, 5, and 1% levels, respectively. ICU stands for Intensive Care Units.

4 Robustness Checks

In this section, we provide several robustness checks to strengthen the confidence in our findings. We briefly discuss their results here and provide the full tables in Appendix A.

4.1 Jackknife test

To reduce concerns that our results are not being driven by a particular outlier, we employ a jackknife sampling test. This procedure involves iteratively dropping one of the observations of our sample and re-estimating our main results (Tables 2-3). Our results are largely unchanged. In the ten specifications across the two tables, only one coefficient of interest (Table 3, Column 2), changes from significant to insignificant under the jackknife test, and no cases turn significant. Results are reported in Tables A1–A2.

4.2 Alternative Measures of Restrictions

A major source of potential concern given our measure of regulatory freedom is that it omits all Covid-19 policies that are not "containment and closure" policies. Table A3 replicates the main specifications (all controls) of Table 3 using alternative measures of lockdown stringency. In columns 1-3, we use the average full stringency index by Hale et al. (2021) for 2020, and columns 3-6 consider the very first stringency index.[11] The correlation between our LRF measure and the Stringency Index (SI) is -0.3664 since the SI assigned higher values for more restrictive measures.

Our results are largely unchanged in terms of significance, and similar in magnitude for the political variables – see Table A3. The percentage of votes for the right-wing candidate is the only significant political variable. In column 1, a one standard deviation increase in the share of votes to the right is associated with a 0.64 standard deviation more strict restrictions – virtually identical to the main results. Column 4, however, suggests that a 0.73 standard deviation change for the the very first stringency index score. Since both variables share the same scale, we may conclude that the relationship

is somewhat stronger earlier in the beginning of the pandemic.

Additionally, we now find some evidence that a few healthcare variables were related to Covid restrictions. In special, we find that states with more doctors had more severe restrictions (columns 1-3). In columns 4 and 5, we find that the share of population 65 years old and above predicts more stringent policies in the first week of restrictions, but the sign is flipped for the year average in column 3. The opposite occurs for the number of hospital beds in columns 3 and 4. Finally, Columns (1 to 3) suggest that states with larger income per capita implemented less strict policies. The magnitude is impressive: a one standard deviation increase in GDP per capita is related to a 1.4 to 1.54 standard deviation decrease in the severity of restrictions.

4.3 Simultaneity

A major potential concern with our results is that of simultaneity. Restrictive regulatory measures, the evolution of Covid-19 cases and deaths, and the supply of healthcare facilities are all endogenous to each other. While in the main results we use 2019 data for healthcare facilities to partially address this problem, it leaves concerns that our measure of Covid (week in which the state reached one death per 100,000 population) is endogenous.

In this section, we follow Miozzi and Powell (2023a) in using data for the first five months of the pandemic (March to July 2020) to predict restrictions in the following five-month period (August to December 2020).Table A4 presents the results.

Much like previous results, Covid-related variables provide no explanatory power to lockdown regulatory freedom. Again, the share of votes for the right-wing candidate is economically and statistically significant, with a one standard deviation increase in that variable implying a 0.67 to 0.87 standard deviation reduction in lockdown regulatory freedom.

Columns (4-6) perform similar regressions using a dummy for governor reelection as the explanatory variable of interest. The first two columns suggest that governors up

for reelection implemented lockdown policies 0.9 to 1 standard deviation more stringent. With the inclusion of additional controls in column 6, the result falls out of the usual significance levels (p=0.151).

5 Conclusion

The findings of our paper contribute significantly to the burgeoning literature on the political economy of pandemic-related restrictions, emphasizing the paramount role of political determinants over health-related variables in shaping lockdown policies in our study of Brazil. Our research underscores several key insights.

First, we demonstrate that political affiliation was a consistent and significant predictor of lockdown stringency across Brazilian states. This aligns with similar findings in the United States (McCannon, 2021; Miozzi and Powell, 2023a), indicating a broader pattern where political ideology substantially influences public health policy decisions. However, unlike in the United States, the share of votes for right-wing candidates was related to stricter lockdown policies.

Second, the relationship between governors seeking re-election and the implementation of stricter lockdown measures, though less robust, suggests a political calculus where incumbents may use stringent policies to signal strong leadership or responsiveness to constituents' health concerns. Yet, this finding does not hold when vote share and reelection are controlled for simultaneously.

Third, unlike in the United States, pre-pandemic levels of economic freedom did not significantly influence the timing and severity of lockdowns in Brazil. This divergence highlights the unique political and economic landscape of Brazil and suggests that other factors, such as political ideology and electoral considerations, played a more dominant role.

Finally, our introduction of the Lockdown Regulatory Freedom measure for Brazilian states provides a novel tool for assessing the economic impact of pandemic restrictions,

offering a more comprehensive understanding of how these policies affect economic freedom. This measure, along with the adjusted economic freedom scores in the appendix, will be valuable for future research and policy analysis.

Not only in Brazil, the public opinion has tended to analyze the perils of policy biases through a dichotomy of elected politicians versus independent health officials. This incorrectly assumes that health officials are disinterested experts, who possess all the relevant information for implementing optimal policies. However, as both theoretical and empirical literature have shown, even independent health authorities face knowledge and incentive problems (Storr et al., 2021; Melo, 2023).

In parallel, scholars have suggested that optimal policy should focus on targeted restrictions (e.g. Acemoglu et al., 2021). Mallapaty (2020) contends that the opportunity costs of restricting some activities for young and healthy individuals is low, these marginal opportunity costs increase as activity is restricted, because the young and healthy make up most of the workforce. Moreover, externalities of Covid-19 were overestimated because of self-mitigating factors like voluntary isolation being ignored in policy proposals (Leeson and Rouanet, 2021).

Nevertheless, achieving "optimal" policy is not always politically feasible. Instead, we highlight an alternative view. Similar to the United States, we view the role of federalism as an important institutional feature of robust health policies. Multiple jurisdictions led to experimentation over, and learning from, a mix of policy strategies enacted in different states. Further, it allows marginal voters to move to jurisdictions that better align with their policy preferences and risk profiles, à la Tiebout (1956).

In conclusion, our study reveals that political economy considerations, particularly political affiliation and electoral incentives, were more critical than health-related variables in determining lockdown policies in Brazil. These findings contribute to a deeper understanding of the interplay between politics and public health during crises and highlight the need for further research into the political determinants of health policies, and the institutional features that promote more robust policy responses. Our work not

only complements existing studies on the United States but also provides unique insights into the Brazilian context, enriching the broader discourse on the political economy of pandemic responses.

Notes

[1]We also highlight the special issues of *Public Choice* on the political economy of public health (Volume 195, Issue 1-2, April 2023), and the *Southern Economic Journal* on the political economy of the Covid-19 Pandemic (Volume 87, Issue 4, April 2021).

[2]To our knowledge, Brazil is the only other country (besides the United States) for which subnational data for both lockdown policies and economic freedom is available. These scores are reported in Appendix B. The full dataset with monthly *Lockdown Regulatory Freedom* scores and revised economic freedom estimates can be accessed at jpmvbastos.com/projects-data/lockdown-regulatory-freedom.

[3]No state had any lockdown regulations prior to March, 2020. Therefore, 2020 scores are calculated from March through December of that year.

[4]Omitted from our analysis are vaccination policy, contact tracing, testing policy, and public information campaigns, as these do not directly impose coercive restrictions on economic freedom. The first three were excluded due to their emphasis on availability rather than mandatory requirements. Additionally, international travel restrictions were also dropped, as these restrictions were uniformly dictated at the federal- rather than state-level.

[5]Additionally, some of these measures are arguably linked and the use of one guarantees the use of another, such as stay-at-home orders implying school closures. However, stay-at-home orders focused on limiting movement and social interactions broadly, while school closures addressed specific educational operations. Governments might issue separate directives for schools, even though it seems they could naturally align, thus we include both measures in the overall lockdown regulatory freedom score.

[6]As a general note to all specifications that follow, we highlight that there are only so many controls that can be included at the same time. Given the extremely low number of observations (N=27), each additional variable significantly affects the degree of freedom in the model.

[7]We further address this concern below, in Section 4.3.

[8]There are many potentially relevant metrics related to Covid, and including such variables raises concerns about endogeneity. In the robustness check session we offer alternative specifications to ease such concerns.

[9]See Table A3 below for estimates with alternative measures.

[10]Bolsonaro filed a Complaint of Direct Unconstitutionality (*Ação Direta de Inconstitucionalidade*) at the Supreme Court, arguing that lockdowns were equivalent to state of siege declarations, which can only be made by the president (Reuters, 2021).

[11]There are two main differences from our LRF measure relative to OxCGRT's Stringency Index (SI). First, our measure only considers "containment and closure" policies, whereas SI includes "health system policies,' such as public information campaigns. Second, our LRF measure only considers *mandated* policies, while SI assigns a value of 1 for *recommended* policies, 2 to for partial (targeted) mandated (e.g. only high schools or certain business should close), and 3 when mandates apply to all. SI ranges from 0 to 100.

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Appendix

A Robustness Checks

Table A1: Robustness Check: Jackknife for Health Determinants of Lockdown Restrictions

Dependent Variable:	*Avg. Lockdown Regulatory Freedom (2020)*			
	(1)	(2)	(3)	(4)
ICU Beds (2019)	-0.085	-0.536	-0.495	-0.392
	(0.310)	(0.620)	(0.621)	(0.774)
Hospital Beds (2019)	0.012	-0.021	-0.025	-0.012
	(0.063)	(0.101)	(0.094)	(0.135)
Doctors (2019)	0.010	-0.111	-0.134	-0.209
	(0.0782)	(0.140)	(0.129)	(0.186)
% Health Insurance (2019)		0.065	0.093	0.091
		(0.074)	(0.102)	(0.103)
% Pop. $\geq$ 65 (2019)		0.233	0.221	0.282
		(0.194)	(0.193)	(0.307)
Avg. Min. Temp. (^{o}C)		-0.015	-0.017	-0.033
		(0.058)	(0.059)	(0.065)
GDP per cap. (2019)		0.055	0.050	0.074
		(0.065)	(0.071)	(0.092)
Week reach. 1 death/100k			0.081	0.117
			(0.110)	(0.124)
Δ ICU Beds				-1.054
				(2.886)
Δ Hosp. Beds				4.700
				(10.42)
Δ Doctors				-3.704
				(16.40)
N	27	27	27	27
Adj. R^2	0.005	0.255	0.283	0.351
Model F-test p-value	[0.989]	[0.506]	[0.545]	[0.691]

Notes: Standard errors in parenthesis. *, **, and *** indicate statistical significance at the 10, 5, and 1% levels, respectively. ICU stands for Intensive Care Units. Variables with Δ reflect change from 2019 to 2020.

Table A2: Robustness Check: Jackknife for Political Determinants of Lockdown Restrictions

Dependent Variable:	*Votes to Right-Wing*		*Gov. Reelection*		*Economic Freedom*	
Avg. LRF (2020)	(1)	(2)	(3)	(4)	(5)	(6)
% Votes to Right-Wing	-2.835**	-2.844				
	(1.093)	(2.223)				
			-0.618*	-0.488		
			(0.353)	(0.434)		
State Econ. Freedom (2019)					0.255	0.100
					(0.350)	(0.448)
ICU Beds (2019)	-0.039	-0.189	-0.023	-0.416	-0.163	-0.462
	(0.203)	(0.594)	(0.272)	(0.547)	(0.381)	(0.737)
Hospital Beds (2019)	0.014	0.001	0.022	0.003	0.006	-0.029
	(0.0538)	(0.0825)	(0.0585)	(0.0968)	(0.0737)	(0.0979)
Doctors (2019)	0.050	-0.069	0.024	-0.107	0.003	-0.126
	(0.053)	(0.104)	(0.070)	(0.122)	(0.089)	(0.135)
% Health Insurance (2019)		0.0441		0.0836		0.0947
		(0.138)		(0.109)		(0.122)
% Pop. $\geq$ 65 (2019)		0.086		0.166		0.220
		(0.153)		(0.188)		(0.185)
Avg. Min. Temp. (^{o}C)		-0.053		-0.037		-0.031
		(0.078)		(0.054)		(0.060)
GDP per cap. (2019)		0.036		0.041		0.013
		(0.053)		(0.065)		(0.092)
Week reach. 1 death/100k		0.079		0.0488		0.116
		(0.108)		(0.120)		(0.148)
N	27	27	27	27	26	26
R^2	0.290	0.408	0.135	0.340	0.050	0.332

Notes: Standard errors in parenthesis. *, **, and *** indicate statistical significance at the 10, 5, and 1% levels, respectively. ICU stands for Intensive Care Units.

Table A3: Robustness Check: Alternative Measures of Lockdown Stringency

Dependent Variable:	*Raw Avg. Stringency Index Score (2020)*			*First Stringency Index Score*		
	(1)	(2)	(3)	(4)	(5)	(6)
% Votes to Right-Wing	28.84**			69.78**		
	(11.83)			(30.87)		
Gov. Reelection dummy		3.022			8.528	
		(3.407)			(8.683)	
State Econ. Freedom (2019)			1.394			3.218
			(2.534)			(6.481)
ICU Beds (2019)	-1.069	1.540	2.047	-10.10	-3.990	-2.110
	(3.903)	(4.228)	(4.370)	(10.19)	(10.78)	(11.18)
Hospital Beds (2019)	0.886	0.978	1.158*	-2.690*	-2.535	-2.089
	(0.533)	(0.623)	(0.617)	(1.390)	(1.589)	(1.577)
Doctors (2019)	1.554*	2.047**	2.214**	-1.304	-0.179	0.424
	(0.788)	(0.862)	(0.877)	(2.057)	(2.197)	(2.242)
% Health Insurance (2019)	0.263	-0.176	-0.201	-0.974	-2.011	-2.116
	(0.605)	(0.650)	(0.676)	(1.579)	(1.658)	(1.728)
% Pop. $\geq$ 65 (2019)	-1.228	-2.255	-2.939*	8.945**	6.596*	5.181
	(1.240)	(1.313)	(1.419)	(3.235)	(3.346)	(3.629)
Avg. Min. Temp. (^{o}C)	0.732*	0.494	0.428	0.695	0.166	-0.299
	(0.368)	(0.407)	(0.418)	(0.961)	(1.036)	(1.069)
GDP per cap. (2019)	-1.139**	-1.223**	-1.240**	1.377	1.199	0.580
	(0.401)	(0.456)	(0.550)	(1.048)	(1.161)	(1.406)
Week reach. 1 death/100k	-1.199	-1.017	-1.075	-0.904	-0.383	-0.262
	(0.710)	(0.836)	(0.931)	(1.853)	(2.132)	(2.381)
N	27	27	26	27	27	26
R^2	0.602	0.486	0.433	0.405	0.267	0.246

Notes: Standard errors in parenthesis. *, **, and *** indicate statistical significance at the 10, 5, and 1% levels, respectively. ICU stands for Intensive Care Units.

Table A4: Robustness Check: Lockdown Regulatory Freedom from July to December

Dependent Variable:	*Votes to Right-Wing*			*Governor Reelection*		
LRF (August-December)	(1)	(2)	(3)	(4)	(5)	(6)
% Votes to Right-Wing	-4.590***	-5.868***	-5.686**			
	(1.256)	(1.864)	(2.092)			
Gov. Reelection dummy				-1.112**	-0.991*	-0.869
				(0.457)	(0.517)	(0.576)
ICU Beds (2019)	0.409	-0.0977	0.0805	0.446	-0.536	-0.365
	(0.367)	(0.613)	(0.701)	(0.415)	(0.665)	(0.773)
Hospital Beds (2019)	0.021	0.040	0.028	0.036	0.039	0.026
	(0.061)	(0.084)	(0.090)	(0.069)	(0.097)	(0.105)
Doctors (2019)	0.052	-0.058	-0.080	0.013	-0.155	-0.215
	(0.072)	(0.120)	(0.153)	(0.079)	(0.128)	(0.158)
% Health Insurance (2019)		0.015	0.030		0.119	0.123
		(0.087)	(0.094)		(0.091)	(0.098)
% Pop. $\geq$ 65		0.000	0.000		0.159	0.286
		(0.195)	(0.297)		(0.207)	(0.301)
Avg. Min. Temp. (^{o}C)		-0.029	-0.023		0.003	-0.005
		(0.0580)	(0.064)		(0.064)	(0.072)
GDP per cap. (2019)		0.103	0.091		0.109	0.109
		(0.063)	(0.070)		(0.072)	(0.0787)
Cases per 100k (Mar-Jul)			0.000			0.000
			(0.000)			(0.000)
Deaths per 100k (Mar-Jul)			-0.009			-0.010
			(0.015)			(0.018)
N	27	27	27	27	27	27
R^2	0.414	0.541	0.552	0.259	0.408	0.426

Notes: Standard errors in parenthesis. *, **, and *** indicate statistical significance at the 10, 5, and 1% levels, respectively. ICU stands for Intensive Care Units.

B Lockdown Regulatory Freedom Scores

Table B1: Lockdown Regulatory Freedom

State	LRF 2020	Ranking	LRF 2021	Ranking (Δ)
Acre	2.65	25	4.56	19 ($\downarrow$ 6)
Alagoas	3.92	9	5.55	6 ($\downarrow$ 3)
Amapa	3.53	14	3.58	26 ($\uparrow$ 12)
Amazonas	2.69	24	2.29	27 ($\uparrow$ 3)
Bahia	3.44	18	4.66	18 (0)
Ceara	3.51	16	4.49	21 ($\uparrow$ 5)
Distrito Federal	6.03	1	6.46	1 (0)
Espirito Santo	3.03	22	3.80	25 ($\uparrow$ 3)
Goias	4.50	3	5.57	4 ($\uparrow$ 1)
Maranhao	5.52	2	5.70	3 ($\uparrow$ 1)
Mato Grosso	2.91	23	3.91	23 (0)
Mato Grosso do Sul	3.56	13	5.57	5 ($\downarrow$ 8)
Minas Gerais	3.67	11	5.48	7 ($\downarrow$ 4)
Para	4.19	6	4.88	15 ($\uparrow$ 9)
Paraiba	3.66	12	5.09	12 (0)
Parana	4.08	7	4.79	16 ($\uparrow$ 9)
Pernambuco	4.01	8	4.89	14 ($\uparrow$ 6)
Piaui	3.15	21	5.30	10 ($\downarrow$ 11)
Rio de Janeiro	3.26	19	5.37	9 ($\downarrow$ 10)
Rio Grande do Norte	3.47	17	4.32	22 ($\uparrow$ 5)
Rio Grande do Sul	3.71	10	5.20	11 ($\uparrow$ 1)
Rondonia	2.38	26	5.00	13 ($\downarrow$ 13)
Roraima	2.11	27	4.52	20 ($\downarrow$ 7)
Santa Catarina	3.24	20	4.70	17 ($\downarrow$ 3)
Sao Paulo	4.34	4	6.11	2 ($\downarrow$ 2)
Sergipe	4.30	5	5.37	8 ($\uparrow$ 3)
Tocantins	3.51	15	3.83	24 ($\uparrow$ 9)

Notes: See section 2.1 in the main text for methodology.

C Adjusted State Economic Freedom Scores

We present updated economic freedom scores for Brazilian states, tailored for researchers in the field. These scores are derived by integrating *lockdown regulatory freedom* (LRF) with the the *Índice Mackenzie de Liberdade Econômica Estadual* (IMLEE) (Maciel et al., 2023), utilizing two distinct weighting schemes, as outlined in Miozzi and Powell (2023b,c, 2024).

Our first method adds lockdown regulatory freedom as a new fourth dimension of economic freedom, with each of the eight pandemic restriction measures equally weighted within this new dimension. In this case, LRF makes one-fourth of the total index – see Table C1. We do this for 2019, 2020, and 2021. In 2019, all LRF scores are 10 out of 10 so as to compare a consistent weighting scheme to the adjusted 2020 and 2021 scores. Had these restrictions been included in prior economic freedom measures they would, presumably, be columns of 10 since no states would've implemented Covid-related policies.

The second method revises the existing Dimension 3, which evaluates labor market regulations through three variables: *minimum wage legislation*, *government employment*, and *union density*. These indicators are restructured into a Labor Regulation component, equally weighted to form half of a state's overall Regulation score. We then add the eight equally-weighted pandemic restrictions as a Lockdown Regulation component, making up the other half of the Regulation score. Here, LRF receives one-sixth of the weights – see Table C2. Likewise, we do this for 2019, 2020, and 2021.

Lastly, Table C3 compares the different weighting schemes and how each state's ranking in economic freedom for 2020 and 2021 adjusts relative to its unadjusted rank.

Regardless of these metrics, our spreadsheets are available online,[12] enabling researchers to apply their own weighting schemes to the index as they see fit.

Table C1: Adjusted State Economic Freedom, Weighting Scheme 1

	2019					2020					2021				
Dimension	1	2	3	4	Full	1	2	3	4	Full	1	2	3	4	Full
Acre	6.84	5.77	5.27	10.00	6.97	3.53	1.99	3.82	2.65	3.00	5.88	1.99	3.96	4.56	4.10
Alagoas	8.40	5.26	6.01	10.00	7.42	4.15	0.00	4.87	3.92	3.24	5.89	0.00	6.19	5.55	4.41
Amapá	6.82	6.60	5.19	10.00	7.15	5.56	3.33	4.21	3.53	4.16	5.67	2.52	5.92	3.58	4.42
Amazonas	8.15	3.41	5.87	10.00	6.86	4.40	1.46	5.10	2.69	3.41	5.22	1.39	4.98	2.29	3.47
Bahia	8.66	6.06	5.84	10.00	7.64	6.18	1.75	5.18	3.44	4.14	6.17	0.24	4.91	4.66	3.99
Ceará	8.71	5.45	5.64	10.00	7.45	6.24	3.36	5.07	3.51	4.54	6.24	1.72	4.86	4.49	4.33
Espírito Santo	8.99	5.39	7.48	10.00	7.96	6.38	2.35	5.47	3.03	4.31	6.70	4.90	5.57	3.80	5.24
Goiás	8.85	1.77	7.78	10.00	7.10	6.97	0.00	5.70	4.50	4.29	7.58	0.06	6.43	5.57	4.91
Maranhão	8.47	6.64	5.06	10.00	7.54	5.18	2.18	4.23	5.52	4.28	6.06	1.87	4.40	5.70	4.51
Mato Grosso	8.13	0.60	7.81	10.00	6.64	6.54	0.00	5.73	2.91	3.79	6.82	0.00	9.01	3.91	4.94
Mato G. do Sul	8.41	2.04	7.45	10.00	6.97	6.11	0.00	5.57	3.56	3.81	6.81	0.00	9.40	5.57	5.44
Minas Gerais	8.71	4.93	7.73	10.00	7.84	6.94	1.01	5.55	3.67	4.29	6.61	0.85	5.43	5.48	4.59
Pará	8.52	6.85	6.03	10.00	7.85	5.78	3.08	5.59	4.19	4.66	5.85	2.41	5.38	4.88	4.63
Paraíba	8.77	6.19	5.10	10.00	7.52	5.35	1.38	4.05	3.66	3.61	6.29	1.23	5.30	5.09	4.48
Paraná	9.18	4.97	5.98	10.00	7.53	7.51	0.90	5.67	4.08	4.54	8.15	0.65	5.54	4.79	4.78
Pernambuco	8.68	5.71	5.98	10.00	7.59	4.72	0.64	5.43	4.01	3.70	5.47	0.33	5.05	4.89	3.93
Piauí	6.77	5.12	4.47	10.00	6.59	4.09	0.35	3.63	3.15	2.81	6.02	0.52	3.52	5.30	3.84
Rio de Janeiro	9.45	5.66	7.78	10.00	8.22	6.88	1.84	5.74	3.26	4.43	7.45	1.34	5.57	5.37	4.93
R. G. Norte	8.56	5.77	5.49	10.00	7.45	5.44	1.47	4.84	3.47	3.81	6.80	1.21	4.57	4.32	4.23
R. G. do Sul	8.83	5.00	7.38	10.00	7.80	6.99	0.77	5.33	3.71	4.20	7.29	0.78	5.37	5.20	4.66
Rondônia	8.77	3.88	5.36	10.00	7.00	6.71	0.73	4.72	2.38	3.63	6.46	0.00	5.30	5.00	4.19
Roraima	6.38	5.78	4.90	10.00	6.76	5.97	1.22	3.74	2.11	3.26	6.07	1.08	3.62	4.52	3.82
Santa Catarina	9.17	3.74	7.63	10.00	7.64	7.55	1.44	5.66	3.24	4.47	7.96	1.42	5.63	4.70	4.93
São Paulo	9.11	4.84	6.09	10.00	7.51	7.17	2.65	5.75	4.34	4.98	7.20	1.84	9.04	6.11	6.05
Sergipe	3.49	4.87	6.04	10.00	6.10	4.98	0.00	5.19	4.30	3.62	6.17	0.00	5.01	5.37	4.14
Tocantins	7.42	1.93	5.45	10.00	6.20	4.82	0.00	4.67	3.51	3.25	6.15	0.00	4.41	3.83	3.60

Notes: This weighting scheme creates a fourth dimension (Lockdown Regulatory Freedom, LRF) for the index. The full score is the simple average (unweighted) across all four areas. Thus, LRF receives 1/4 of the total weight.

Table C2: Adjusted State Economic Freedom, Weighting Scheme 2

Year	2019						2020						2021					
Dimension	1	2	3A (Labor)	3B (LRF)	3 Adj.	Full	1	2	3A (Labor)	3B (LRF)	3 Adj.	Full	1	2	3A (Labor)	3B (LRF)	3 Adj.	Full
Acre	6.84	5.77	5.27	10.00	7.63	6.75	3.53	1.99	3.82	2.65	3.23	2.92	5.88	1.99	3.96	4.56	4.26	4.04
Alagoas	8.40	5.26	6.01	10.00	8.00	7.22	4.15	0.00	4.87	3.92	4.40	2.85	5.89	0.00	6.19	5.55	5.87	3.92
Amapá	6.82	6.60	5.19	10.00	7.59	7.00	5.56	3.33	4.21	3.53	3.87	4.25	5.67	2.52	5.92	3.58	4.75	4.31
Amazonas	8.15	3.41	5.87	10.00	7.94	6.50	4.40	1.46	5.10	2.69	3.89	3.25	5.22	1.39	4.98	2.29	3.63	3.41
Bahia	8.66	6.06	5.84	10.00	7.92	7.55	6.18	1.75	5.18	3.44	4.31	4.08	6.17	0.24	4.91	4.66	4.78	3.73
Ceará	8.71	5.45	5.64	10.00	7.82	7.32	6.24	3.36	5.07	3.51	4.29	4.63	6.24	1.72	4.86	4.49	4.68	4.21
Espírito Santo	8.99	5.39	7.48	10.00	8.74	7.70	6.38	2.35	5.47	3.03	4.25	4.33	6.70	4.90	5.57	3.80	4.68	5.43
Goiás	8.85	1.77	7.78	10.00	8.89	6.50	6.97	0.00	5.70	4.50	5.10	4.02	7.58	0.06	6.43	5.57	6.00	4.55
Maranhão	8.47	6.64	5.06	10.00	7.53	7.55	5.18	2.18	4.23	5.52	4.88	4.08	6.06	1.87	4.40	5.70	5.05	4.33
Mato Grosso	8.13	0.60	7.81	10.00	8.91	5.88	6.54	0.00	5.73	2.91	4.32	3.62	6.82	0.00	9.01	3.91	6.46	4.43
Mato G. do Sul	8.41	2.04	7.45	10.00	8.72	6.39	6.11	0.00	5.57	3.56	4.57	3.56	6.81	0.00	9.40	5.57	7.48	4.76
Minas Gerais	8.71	4.93	7.73	10.00	8.86	7.50	6.94	1.01	5.55	3.67	4.61	4.19	6.61	0.85	5.43	5.48	5.45	4.30
Pará	8.52	6.85	6.03	10.00	8.01	7.79	5.78	3.08	5.59	4.19	4.89	4.58	5.85	2.41	5.38	4.88	5.13	4.46
Paraíba	8.77	6.19	5.10	10.00	7.55	7.50	5.35	1.38	4.05	3.66	3.86	3.53	6.29	1.23	5.30	5.09	5.20	4.24
Paraná	9.18	4.97	5.98	10.00	7.99	7.38	7.51	0.90	5.67	4.08	4.88	4.43	8.15	0.65	5.54	4.79	5.17	4.66
Pernambuco	8.68	5.71	5.98	10.00	7.99	7.46	4.72	0.64	5.43	4.01	4.72	3.36	5.47	0.33	5.05	4.89	4.97	3.59
Piauí	6.77	5.12	4.47	10.00	7.23	6.38	4.09	0.35	3.63	3.15	3.39	2.61	6.02	0.52	3.52	5.30	4.41	3.65
Rio de Janeiro	9.45	5.66	7.78	10.00	8.89	8.00	6.88	1.84	5.74	3.26	4.50	4.41	7.45	1.34	5.57	5.37	5.47	4.75
R. G. do Norte	8.56	5.77	5.49	10.00	7.75	7.36	5.44	1.47	4.84	3.47	4.16	3.69	6.80	1.21	4.57	4.32	4.45	4.15
R. G. do Sul	8.83	5.00	7.38	10.00	8.69	7.51	6.99	0.77	5.33	3.71	4.52	4.09	7.29	0.78	5.37	5.20	5.28	4.45
Rondônia	8.77	3.88	5.36	10.00	7.68	6.78	6.71	0.73	4.72	2.38	3.55	3.66	6.46	0.00	5.30	5.00	5.15	3.87
Roraima	6.38	5.78	4.90	10.00	7.45	6.54	5.97	1.22	3.74	2.11	2.93	3.37	6.07	1.08	3.62	4.52	4.07	3.74
Santa Catarina	9.17	3.74	7.63	10.00	8.82	7.24	7.55	1.44	5.66	3.24	4.45	4.48	7.96	1.42	5.63	4.70	5.16	4.85
São Paulo	9.11	4.84	6.09	10.00	8.04	7.33	7.17	2.65	5.75	4.34	5.05	4.96	7.20	1.84	9.04	6.11	7.57	5.54
Sergipe	3.49	4.87	6.04	10.00	8.02	5.46	4.98	0.00	5.19	4.30	4.75	3.24	6.17	0.00	5.01	5.37	5.19	3.79
Tocantins	7.42	1.93	5.45	10.00	7.72	5.69	4.82	0.00	4.67	3.51	4.09	2.97	6.15	0.00	4.41	3.83	4.12	3.42

Notes: This weighting scheme divides Dimension 3 (Regulation) into two areas Labor and Lockdown Regulatory Freedom (LRF) each with 50 percent of the weight. The full scores is the simple average (unweighted) across all three areas. Thus, LRF receives 1/6 of the total weight.

Table C3: Comparison of Weighting Schemes for Adjusted State Economic Freedom Scores

	Unadjusted IMLEE				Adjustment 1				Adjustment 2			
State	2020	Rank	2021	Rank	2020	Rank (Δ)	2021	Rank (Δ)	2020	Rank (Δ)	2021	Rank (Δ)
Acre	3.11	24	3.94	18	3.00	25 (-1)	4.10	20 (-2)	2.92	24 (0)	4.04	17 (1)
Alagoas	3.01	25	4.02	17	3.24	24 (1)	4.41	15 (2)	2.85	25 (0)	3.92	18 (-1)
Amapá	4.37	9	4.7	8	4.16	12 (-3)	4.42	14 (-6)	4.25	8 (1)	4.31	12 (-4)
Amazonas	3.66	18	3.86	20	3.41	21 (-3)	3.47	26 (-6)	3.25	21 (-3)	3.41	26 (-6)
Bahia	4.37	9	3.78	21	4.14	13 (-4)	3.99	21 (0)	4.08	11 (-2)	3.73	22 (-1)
Ceará	4.89	2	4.27	13	4.54	3 (-1)	4.33	16 (-3)	4.63	2 (0)	4.21	15 (-2)
Espírito Santo	4.73	6	5.72	2	4.31	7 (-1)	5.24	3 (-1)	4.33	7 (-1)	5.43	2 (0)
Goiás	4.22	12	4.69	9	4.29	9 (3)	4.91	7 (2)	4.02	13 (-1)	4.55	7 (2)
Maranhão	3.86	17	4.11	16	4.28	10 (7)	4.51	12 (4)	4.08	12 (5)	4.33	11 (5)
Mato Grosso	4.09	13	5.28	4	3.79	16 (-3)	4.94	4 (0)	3.62	16 (-3)	4.43	10 (-6)
Mato Grosso do Sul	3.89	16	5.4	3	3.81	14 (2)	5.44	2 (1)	3.56	17 (-1)	4.76	4 (-1)
Minas Gerais	4.5	8	4.3	12	4.29	8 (0)	4.59	11 (1)	4.19	9 (-1)	4.30	13 (-1)
Pará	4.82	4	4.54	10	4.66	2 (2)	4.63	10 (0)	4.58	3 (1)	4.46	8 (2)
Paraíba	3.59	20	4.27	13	3.61	20 (0)	4.48	13 (0)	3.53	18 (2)	4.24	14 (-1)
Paraná	4.7	7	4.78	7	4.54	4 (3)	4.78	8 (-1)	4.43	5 (2)	4.66	6 (1)
Pernambuco	3.59	20	3.62	23	3.70	17 (3)	3.93	22 (1)	3.36	20 (0)	3.59	24 (-1)
Piauí	2.69	26	3.35	26	2.81	26 (0)	3.84	23 (3)	2.61	26 (0)	3.65	23 (3)
Rio de Janeiro	4.82	4	4.79	6	4.43	6 (-2)	4.93	5 (1)	4.41	6 (-2)	4.75	5 (1)
Rio Grande do Norte	3.92	15	4.19	15	3.81	15 (0)	4.23	17 (-2)	3.69	14 (1)	4.15	16 (-1)
Rio Grande do Sul	4.37	9	4.48	11	4.20	11 (-2)	4.66	9 (2)	4.09	10 (-1)	4.45	9 (2)
Rondônia	4.05	14	3.92	19	3.63	18 (-4)	4.19	18 (1)	3.66	15 (-1)	3.87	19 (0)
Roraima	3.64	19	3.59	24	3.26	22 (-3)	3.82	24 (0)	3.37	19 (0)	3.74	21 (3)
Santa Catarina	4.88	3	5.01	5	4.47	5 (-2)	4.93	6 (-1)	4.48	4 (-1)	4.85	3 (2)
São Paulo	5.19	1	6.03	1	4.98	1 (0)	6.05	1 (0)	4.96	1 (0)	5.54	1 (0)
Sergipe	3.39	22	3.73	22	3.62	19 (3)	4.14	19 (3)	3.24	22 (0)	3.79	20 (2)
Tocantins	3.16	23	3.52	25	3.25	23 (0)	3.60	25 (0)	2.97	23 (0)	3.42	25 (0)

Notes: Each *Rank* (Δ) column reports the difference between the ranking using the adjusted and unadjusted scores of that year, e.g. Unadjusted (2020) vs. Adjustment 1 (2020). See the notes for Tables B1 and C2 for description of weighting schemes.