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The pre-pandemic political economy determinants of lockdown severity

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Abstract
We investigate the determinants of the severity of U.S. state-level lockdown regulations adopted during the COVID-19 pandemic. We employ a new measure of *Lockdown Regulatory Freedom* from Miozzi and Powell (Am J Econ Sociol, 2023b. https://doi.org/10.1111/ajes.12512) to investigate whether pre-pandemic measures of economic freedom, political variables, and measures of COVID-19 exposure and severity impacted the severity of subsequent lockdowns. Our main finding is that the severity of a state's lockdown regulations were primarily determined by pre-pandemic levels of economic freedom and pre-existing political ideology, as measured by the share of votes for the 2016 Democrat presidential candidate.

Keywords Economic freedom · Pandemic · COVID-19 · Lockdowns

JEL Classification D70 · I18 · H10

1 Introduction

National and sub-national governments around the world responded to the onset of the COVID-19 pandemic by instituting a wide range of new regulations. Many of these regulations significantly restricted individuals' freedom to engage in market exchanges or the terms on which exchanges were allowed to take place. However, these new regulations varied significantly in their degree of restrictiveness across jurisdictions (Powell & Miozzi, 2023a, b). This naturally leads to the public choice question of which factors contributed to the different public policy responses across jurisdictions. However, until recently, as pointed out by Leeson and Thompson, "public choice scholars have attended only modestly to issues in public health" (2023: 6) and public choice scholarship that "deals specifically

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with contagious disease" is "especially rare" (2023: 36). Leeson and Thompson suggest that among the many areas ripe for public choice scholars to investigate are that the determinants of "state and local policies demand consideration—from lockdowns to masks to social distancing" (2023: 36). This paper contributes to investigating that question by using a new measure of the restrictiveness of lockdowns to investigate how pre-pandemic levels of economic freedom, political factors, and measures of COVID-19 exposure, explain differences in restrictiveness of COVID-19 regulations across U.S. states.

Economic scholarship on contagious disease and COVID-19 has exploded since the onset of the pandemic. Similarly, public choice scholarship has begun to address the deficiency noted above. A recent symposium in *Public Choice* (see Furton et al., 2023 for an overview) and another in the *Southern Economic Journal* (see Boettke & Powell, 2021 for an overview) investigated the political economy of the pandemic. This paper builds on much of this recent literature.

Some of this recent literature argues that overestimation of the externality associated with COVID-19 led to the adoption of policies that were too restrictive. Leeson & Rouanet (2021) argue that the COVID-19 externality was significantly overestimated for three reasons. Perhaps most importantly, "on-site" transmission externalities are internalized to business owners because they take place on private property, so only the value of the "cross-site" transmission is an externality. Furthermore, the value of the remaining cross-cite externality is not the value of lost life, but rather the additional mitigation costs undertaken in response to that externality. Finally, unlike normal externalities, contagious disease externalities are self-limiting because the risky activity of uninfected people becomes privately more costly as infection is more widespread. Long before COVID, Coase (1990: 25) pointed out that, "externalities will be ubiquitous. The fact that governmental intervention also has its costs makes it very likely that most 'externalities' should be allowed to continue if the value of production is to be maximized."[1] Whether the factors Leeson and Rouanet point out reduce the COVID externality enough to make zero regulatory response optimal, they do call into doubt the optimality of the tremendously costly regulations that were adopted and lead us to ask what other factors might have influenced policy choices.[2]

Other scholarship questions whether COVID regulations also were implemented in the least costly manner. Standard law and economics approaches to externalities recognizes the reciprocal nature of externalities and recommends putting the burden of adjustment on least cost mitigators. However, Boettke & Powell (2021) and Powell (2022) argue that COVID regulations often did the exact opposite by placing the burden of restricting activity on high cost mitigators. Furthermore, they argue that standard economic theory indicates that in the presence of heterogenous mitigation costs, standard welfare economics indicates that taxing the externality, rather than command and control regulation, is a less costly way to correct the externality. Yet, COVID-19 regulation largely took the form of command-and-control regulation while largely failing to distinguish between low and high cost mitigators.

Similarly, Hebert & Curry (2022) argue that incentives created by political competition and faced by bureaucrats lead policy makers to overestimate the cost of externalities associated with people leaving their home during a pandemic and to underestimate the costs borne by individuals forced to stay home. They employ a Buchanan & Tullock (1962) style

[1] See Allen et al. (2022) for a further analysis of the Coasian nature of the COVID-19 externality.

[2] See Bentkowska, 2021; Dingle & Nieman, 2020; Fairlie, 2020; Greenstone & Nigam, 2020; Gupta et al., 2020; Redford & Dills, 2021; for a few of the costly impacts of COVID-19 regulation on economic activity.

framework of internal and external costs to show that under these conditions policy makers impose more strict lockdowns that are optimal. As Hebert and Curry note, their "model highlights the need for additional research to understand why local and state policy makers sometimes fail to rationally respond" to the pandemic (2022: 273).

Variation in "expert failure" (Koppl: 2018) is one possible explanation for variation in policies across jurisdictions. Politicians, pundits, and public health officials often claimed that we should "follow the science" when choosing pandemic mitigation policies. This often led to public health officials to focus narrowly on epidemiological science, while ignoring economic science. But as Koppl (2023) describes, expert failure is more likely "when scientific advice is provided by only one or a few disciplines" (2023: 101). Expert failure may have contributed to policy choices, but state level lockdown policies were often made in political processes that were informed by the same federal level health bureaucracies and prominent scientists. Yet, even when informed by the same national experts, state policy makers often chose very different pandemic policies.

Congleton provides a public choice account of the determinants of state level pandemic response that allows for "disagreements among experts, voters, and state policies observed during the first year of the COVID-19 pandemic that does not require self-delusion or systematic errors" (2023: 92). Similar to Boettke & Powell (2021), he argues that there are significant differences across individuals in terms of their health risks, risk preferences, and their valuations of the opportunities forgone when pandemic policies are implemented. However, he also notes that the median of these preferences can vary across jurisdictions and that "when policies are electorally driven, the policies adopted vary with the tradeoffs associated with voter circumstances, their ideas about a good life, and the political institutions through which such choices are made" (2023: 73–74). This implies that "democratic federal or otherwise polycentric systems of governance tend to achieve outcomes that are more in accord with voter ideals during pandemic than unitary governments that impose uniform top-down policies." Congleton's paper naturally leads to the question of whether we can empirically measure variation in political, long-run institutional, and health factors, across states that correlates with the pandemic policies these states adopted. This is our paper's contribution.

Our paper builds most directly on two recent empirical contributions studying similar questions. McCannon & Hall (2021) use state level economic freedom to predict the timing of when stay-at-home policies were adopted in response to COVID-19. They find that states that issued stay-at-home orders earlier had lower initial levels of economic freedom and were more likely to have Democratic governors.[3] McCannon (2021) studied the relationship between internet search data and stay-at-home orders and found that places where people showed a heightened interest early in the pandemic, as measured by internet searches, initiated stay-at-home orders earlier. This is some indication that governors followed voter preferences and opinion in deciding when to implement these orders.

Like McCannon & Hall (2021) we investigate how initial levels of economic freedom, political factors, and health indicators, influenced the adoption of COVID-19 regulations. However, unlike that study, we use a new broader measure of eight types of pandemic regulations (one of which is stay-at-home orders) rather than a single regulation, and our new measure indicates the degree of restrictiveness of the pandemic regulations and their duration, rather than just the timing of when they were adopted. The next section of this paper

[3] Similarly, Baaccini & Brodeur (2020) also find that democratic governors were more aggressive in issuing stay-at-home orders.

describes our data in more detail and the third section reports our empirical findings. The final section concludes.

2 Data

2.1 Lockdown regulatory freedom

Our study uses a state-level measure of pandemic restrictions, *Lockdown Regulatory Freedom*, from Miozzi & Powell (2023b) as our COVID response measure of interest for each state.[4] It is an equally weighted average of eight non-pharmaceutical pandemic response indicators scored from 0 to 10, 10 being the freest (or least stringent) regulatory response to COVID. The eight response indicators include mandatory *workplace closures*, mandatory *school closures*, mandatory *cancellations of public events*, *restrictions on gathering sizes*, *internal movement restrictions*, *stay at home orders*, mandatory *public transport closings*, and mandated *facial coverings*.[5]

The lockdown regulatory freedom measure is calculated using data from the Our World in Data *Covid-19 Stringency Index* (Hale et al., 2021) which measures each state's regulatory response to COVID for each day of the year. We modify that Stringency Index to include only mandatory restrictions on economic freedom and adjust it in order to not count non-coercive policy recommendations as restrictions on economic freedom.[6] The final calculated lockdown regulatory freedom scores for 2020 are the average daily scores for each of the indicators mentioned above.[7]

2.2 Economic freedom

We use two measures of economic freedom. The first is the *Economic Freedom of North America* (EFNA) index which measures economic freedom for each of the United States (Stansel et al., 2021). The EFNA index measures 10 variables across three broad areas: (1) *Government Spending*; (2) *Taxes*; (3) and *Regulation*. The areas are equally weighted to calculate each state's economic freedom score. The second measure of economic freedom comes from the Cato Institute's *Freedom of the 50 States* index (Ruger & Sorens, 2021). This index measures over two hundred variables and places them into twenty-five categories to create three different freedom scores. The scores are for *Personal*, *Fiscal*, and *Regulatory* freedom. The last two combined make up the *Economic Freedom* score—the focus of this paper. However, we do include the *Personal Freedom* score as one of our political control variables (discussed below). In both freedom indexes there is a two-year lag from

[4] This state level *Lockdown Regulatory Freedom* measure is itself derived from an international *Lockdown Regulatory Freedom* measure created in Miozzi & Powell (2023a) that was used to adjust the index of economic freedom in the *Economic Freedom of the World Annual Report*.

[5] While this study is only using the Lockdown Regulatory Freedom Component developed in Miozzi & Powell (2023a, b) it is worth noting that in both those studies they find the short-run trade off where pandemic responses substantially reduced economic liberty as posited in Koyama (2023).

[6] See Miozzi & Powell (2023a or b) for a thorough description of the *Lockdown Regulatory Freedom* measure.

[7] The Lockdown Regulatory Freedom scores for 2020 includes daily scores from March 1st through December 31st since no state had any significant lockdown policies before March.

the data to publication. Therefore, the EFNA and 50 States indexes use pre-pandemic 2019 scores.

2.3 Health and political variables

Like McCannon & Hall (2021) we investigate several health and political variables that can potentially influence the severity of a state's COVID response. We include most of the same variables as their study, and include additional controls as well.

We include several health variables that capture potential exposure to the COVID-19 virus, as the likelihood of exposure would potentially influence a state's regulatory response. First, we include the date of the first COVID-19 death and the number of COVID deaths as of March 19, 2020—the date of the first stay at home order—in each state like McCannon & Hall (2021). We also add variables for total COVID-19 deaths per 100,000 of population and COVID cases per 100,000 for all of 2020.[8] We also include two measures of hospital capacity, the percentage of hospital beds in use through April, 2020 and the average percent of hospital beds in use throughout all of 2020 for each state.[9] Recall that McCannon and Hall were only analyzing the timing of each state's stay-at-home order, while we are analyzing the overall restrictiveness of state lockdown policies throughout 2020. Thus, we follow them in using early pandemic health measures that predate the implementation of most lockdown policies. While these measures don't suffer from endogeneity concerns, they are limited by the fact that the subsequent evolution of the spread of COVID-19 could have influenced the severity of states' lockdown policies. So, we also include pandemic health measures averaged throughout the year. Endogeneity issues loom large with these contemporaneous health metrics, so as an additional check, we also examine how health metrics averaged through July 2020 correlate with the degree of lockdown severity in the second half of the year. Ultimately, data limitations constrain our ability to better address endogeneity concerns with these health metrics.

Additionally, like McCannon and Hall, we include a dummy variable for states that have one of the top 20 metropolitan statistical areas (MSAs), but we also, separately, include a variable measuring the percentage of the state's population living in an urban area, since densely populated cities were believed to increase the likelihood of COVID-19 exposure and spread. Moreover, urban areas and MSAs are travel hubs where people travel to from all over the world. With that in mind, we include two variables as proxies for exposure to populations in more frequent contact with China—where the virus originated. First, we include the proportion of the population that is Asian for each state (U.S. Census Bureau). Second, we include as a dummy variable, states that have at least one airport that had direct flights to and from China at the onset of the pandemic.[10]

We include several political control variables as regulatory responses were commonly thought to have been influenced by political incentives. We include two dummy variables that distinguish state governors based on their political party, and whether or not they were up for

[8] All variables related to COVID deaths and cases come from the Center for Disease Control's COVID Data Tracker, available at: https://covid.cdc.gov/covid-data-tracker.

[9] These variables come from the U.S. Department of Health & Human Services, available at: https://healthdata.gov/Hospital/COVID-19-Reported-Patient-Impact-and-Hospital-Capa/g62h-syeh.

[10] These states are: California, Georgia, Hawaii, Illinois, Massachusetts, Michigan, Nevada, New York, Texas, and Washington.

reelection in 2020.[11] We also included each governor's approval ratings from Morning Consult.[12] Like McCannon & Hall (2021), we adjust the approval rating to be the proportion of those approving or disapproving the governor who responded they "approve," since Morning Consult gives respondents the option to answer "do not know." We include a variable measuring the percentage of votes for the Democrat candidate in the 2016 presidential election as a measure of pre-pandemic partisan ideology of each state's voters. We include the *Personal Freedom* index from the overall *Freedom of the 50 States* index mentioned above. This index looks at alcohol and drug laws, marriage laws, incarcerations and arrests, and other categories of personal freedoms. Each category is weighted differently and the final score ranges from a low of -0.056 (New York) and a high of 0.302 (Nevada). Lastly, we include each state's real per capita GDP and bond rating from the Bureau of Economic Analysis and S&P, respectively, in 2019, as a state's financial position may influence its regulatory response. There are ten possible ratings from S&P, the lowest being BBB- and the highest being AAA. Thus, we create an ordered variable, on a scale from 1 to 10, where higher bond ratings receive a higher score. Summary statistics are presented in Table 1.[13]

3 Results

We first examine simple pairwise correlations. Table 2 reports the correlations between both measures of pre-pandemic economic freedom and their lockdown regulatory freedom in 2020. In both correlations higher levels of pre-pandemic economic freedom were associated with less stringent lockdown regulations and were statistically significant at the one percent level. Figure 1 illustrates the data with a simple scatter plot.

Table 3 reports the correlations between measures of potential virus exposure and the stringency of lockdown regulations. None of the measures for COVID deaths were statistically related to the stringency of lockdowns. Nor was the presence of a large metropolitan area, but a larger urban population was associated with stricter lockdown regulations. The early indicator for COVID cases was not statistically related to lockdown stringency. However, total COVID cases in 2020 were positively related and statistically significant at the one percent level. However, the direction of causation is unclear, as this could presumably be capturing the tradeoff between virus spread and economic freedom. Intuitively, one would expect the COVID virus to spread more in areas where citizens were less restricted and able to move freely rather than more virus spread leading policy makers to choose lighter lockdowns. Both April hospital bed usage and total hospital bed usage rates were negatively, and statistically related to lockdown severity. More hospital beds in use were associated with more stringent lockdown responses. The correlation coefficients for Asian population and share and direct China flights are both negatively correlated, and statistically significant, with lockdown regulatory freedom in 2020.[14]

[11] See https://www.nga.org/.

[12] See https://morningconsult.com/governor-rankings/.

[13] Date of First Death is omitted from this table as the variable tracks dates and not a quantitative value. For this variable, the state with the first COVID-related death was Alabama (2-27-20). The last state with its first reported COVID death was Wyoming (4-13-20)

[14] We run these correlations with 2021 lockdown regulatory freedom as well, but leave them unreported, finding that the 2021 relationship is also statistically significant. Exposure to Asia could presumably influence regulatory responses early in the pandemic. However, the fact that 2021 is also statistically significant suggests that perhaps these results don't indicate exposure because all U.S. states had widespread COVID exposure by 2021. What is, perhaps, more likely is this is capturing "backlash effects" such that voters in areas with large Asian populations become more concerned with the pandemic as time goes on.

Table 1 Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.	Source
Lockdown Regulatory Freedom 2020	50	5.75	1.13	2.65	8.21	Miozzi and Powell (2023b)
Lockdown Regulatory Freedom 2020 (Aug–Dec)	50	6.03	1.34	2.31	8.92	Miozzi and Powell (2023b)
Economic Freedom of North America (EFNA)	50	6.27	0.91	4.33	7.83	Stansel et al (2021)
Freedom of the 50 States: Economic Freedom	50	0.01	0.26	−0.76	0.45	Ruger and Sorens (2021)
Freedom of the 50 States: Personal Freedom	50	0.07	0.07	−0.06	0.30	Ruger and Sorens (2021)
Urban Population Percentage 2010	50	0.74	0.15	0.39	0.95	U.S. Census Bureau
Metropolitan Statistical Area	50	0.46	0.50	0	1	U.S. Census Bureau
Asian Share of Population	50	0.04	0.06	0.01	0.38	U.S. Census Bureau
Percentage of Votes for 2016 Democrat Presidential Candidate	50	0.44	0.10	0.22	0.62	Federal Election Commission
Democrat Governor	50	0.48	0.50	0	1	National Governors Assoc
Governor Re-election	50	0.18	0.39	0	1	National Governors Assoc
Governor Approval Rating	50	0.61	0.12	0.36	0.86	Morning Consult
Real per Capita GDP 2019	50	54,382.87	10,394.70	33,930.69	77,149.55	Bureau of Economic Analysis
State Bond Rating	50	8.36	1.78	1	10	Standard and Poor's
Deaths as of 3-19-20	50	5.64	14.10	0	74	Center for Disease Control
Total 2020 Deaths per 100,000	50	105.04	46.89	20	214	Center for Disease Control
Deaths per 100,000 through July, 2020	50	38.84	39.62	1	178	Center for Disease Control
Cases as of 3-19-20	50	475.70	1504.01	5	9239	Center for Disease Control
Total 2020 Cases per 100,000	50	6397.44	2176.69	1117	12,173	Center for Disease Control
Cases per 100,000 through July, 2020	50	1202.60	587.38	153	2501	Center for Disease Control
Percentage of Inpatient Beds Used (April, 2020)	50	0.51	0.10	0.22	0.72	Dept. Health and Human Services
Percentage of Inpatient Beds Used (2020)	50	0.63	0.08	0.45	0.84	Dept. Health and Human Services
Percentage of Inpatient Beds Used through July, 2020	50	0.58	0.09	0.40	0.76	Dept. Health and Human Services

Table 2 Pairwise correlations between lockdown regulatory freedom and economic freedom

Variable	Correlation coefficient 2020
50 States Economic Freedom Index	0.5524***
EFNA	0.5301***

Asterisks denote ***1%, **5%, *10% level of significance

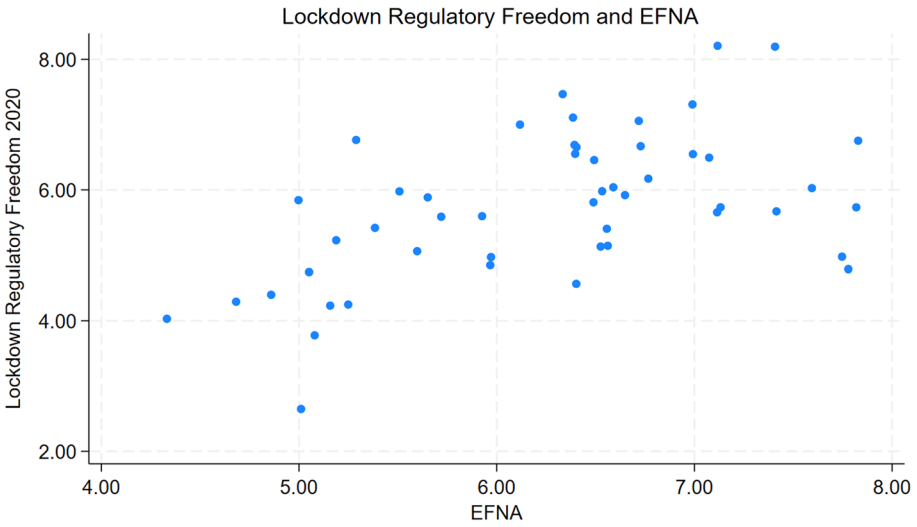

Fig. 1 Lockdown regulatory freedom and EFNA

Table 3 Pairwise correlations between lockdown regulatory freedom and virus exposure

Variable	Correlation coefficient 2020
Date of First Death	0.0466
Deaths as of 3-19-20	−0.1313
2020 Deaths/100,000	0.2228
Cases as of 3-19-20	−0.2134
2020 Cases/100,000	0.6471***
Beds in Use through April 2020	−0.4995***
Beds in Use 2020	−0.3342**
% Urban Population	−0.3491**
Metropolitan Statistical Area	−0.0724
Asian Population Share	−0.3952***
Direct China Flights	−0.3539**

Asterisks denote ***1%, **5%, *10% level of significance

Table 4 Pairwise Correlations between Lockdown Regulatory Freedom and Politics

Variable	Correlation coefficient 2020
50 States Personal Freedom Index	0.0719
2016 Democrat Vote Share	−0.6520***
Democratic Governor	−0.4707***
Governor Re-election	0.0807
Governor Approval Ratings	0.3396**
2019 Real per Capita GDP	−0.1381
State Bond Rating	0.1718

Asterisks denote ***1%, **5%, *10% level of significance

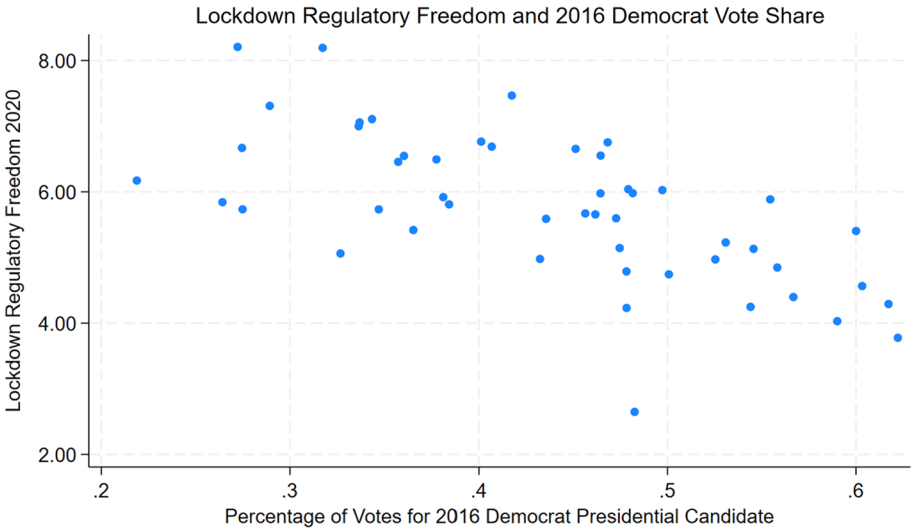

Fig. 2 Lockdown regulatory freedom and Democrat Votes

Table 4 reports the correlations between other freedoms and political variables and the severity of lockdown regulations. We find that states with higher vote shares for Hillary Clinton in 2016 and states with Democratic governors had more stringent lockdowns in 2020. Both of these correlations were significant at the one percent level. Figure 2 also illustrates the vote share and lockdown regulatory freedom data with a simple scatter plot. We also find that lockdown regulations were less severe in states where governors had higher approval ratings. We found no significant relationship between pre-pandemic personal freedoms, whether the governor was up for re-election, or the state's GDP and bond rating.

We next investigate which of these relationships retains its significance when we simultaneously control for pre-pandemic economic freedom, exposure variables, and political variables. We ran unreported regressions with all of the above control variables but with only a 50 observation cross-section our degrees of freedom are limited (and the tables were cluttered). So, we dropped several variables that were never statistically

significant and then ran the regressions we report below. The statistical significance and magnitude of the results reported below was largely the same in both the fully controlled unreported regressions and the more parsimonious ones reported below. Thus, each of the reported regressions control for the political affiliation of the governor, 2016 Democrat vote share, the Asian population share, urbanization, GDP, and one of the two measures of economic freedom. Then in each table we regress the various versions (early, total, 1st half on 2nd half) of our health metrics (deaths, cases, capacity) along with the above variables.

In Tables 5, 6, and 7 the dependent variable for models 1 through 4 is the average lockdown regulatory freedom score for all of 2020, while in models 5 and 6 in each table the dependent variable is the average lockdown regulatory freedom score from August through December of 2020. In models 1, 3, and 5 in each table, our measure of economic freedom is the *EFNA* index, and for models 2, 4, and 6 it is the *Freedom of the 50 States* economic freedom index. Like McCannon & Hall (2021) we drop the variable for direct flights to and from China and keep only the variable for Asian population share since both variables are highly correlated with each other.[15]

In each of the tables our first two specifications retain the measures of early pandemic exposure. For Table 5 these are date of first death and deaths as of 3/19/20 used in McCannon & Hall (2021). For Tables 6 and 7 these are cases as of 3/19/20 and the percentage of hospital beds in use during April of 2020, respectively. Then our next two specifications drop those early pandemic measures and use total COVID deaths per 100,000 of population in 2020, total COVID cases per 100,000 of population in 2020, and the average percentage of hospital beds in use in 2020 for Tables 5, 6, and 7 respectively. Finally, our last two specifications in each of the tables use each of those exposure measures only through July 30, 2020, while also changing the dependent variable to only measure lockdown regulatory freedom from August through the end of 2020. The early pandemic death measures have the advantage that the direction of plausible causation is straight forward, early deaths might influence the severity of subsequent lockdowns. The drawback of using these measures is that the subsequent development of the pandemic could also influence the severity of lockdowns. Thus, we include the specifications where we use total 2020 COVID deaths, cases, and beds in use. Unfortunately, the direction of causation for these variables is unclear. For example, more deaths might lead to more severe lockdowns or less severe lockdowns could lead to more deaths. Thus, in the final two specifications we also use COVID exposure and hospital capacity in the first half of the year to predict the severity of lockdowns in the second half of the year.

In Table 5, across all models, we consistently find that higher levels of pre-pandemic economic freedom are statistically associated with less severe pandemic regulatory lockdowns and the economic magnitude is significant. States that had a standard deviation higher pre-pandemic economic freedom score had lockdown regulatory freedom scores that ranged from 30 to 45 percent of a standard deviation higher in 2020.

Our next most consistent finding is that states with higher Democrat vote shares in 2016 imposed more stringent lockdowns. The results were statistically significant in all models and at the one percent level in four of the six. An increase of standard deviation in a state's vote share for Hillary Clinton is associated with a decrease in its 2020 lockdown regulatory freedom score by 20–50 percent of a standard deviation. It is worth noting that, despite the fact that Democratic vote share is negatively correlated with economic freedom (~ -0.4 at

[15] Our results remain largely unchanged when we retain the direct flights variable and drop the Asian population share variable.

Table 5 Economic Freedom, COVID Deaths, and 2020 Lockdown Severity

Dependent variable	Lockdown regulatory freedom 2020				Lockdown regulatory freedom 2020 (Aug–Dec)	
Model	(1)	(2)	(3)	(4)	(5)	(6)
EFNA	0.3566** (0.1524)	–	0.4181*** (0.1505)	–	0.5814*** (0.2164)	–
Freedom of the 50 States	–	1.1276* (0.6062)	–	1.4759** (0.6642)	–	1.9367** (0.9423)
Date of First Death	−0.0282* (0.0154)	−0.0296* (0.0159)	–	–	–	–
Deaths as of 3-19-20	−0.0066 (0.0099)	−0.0079 (0.0098)	–	–	–	–
2020 Deaths per 100,000	–	–	0.0066*** (0.0019)	0.0068*** (0.0021)	–	–
Deaths per 100,000 through July, 2020	–	–	–	–	−0.000002 (0.00003)	0.000003 (0.00003)
Asian Population Share	0.7668 (1.6396)	1.5050 (2.0398)	2.2806 (1.9360)	3.4101 (2.2886)	−3.1797 (2.5849)	−1.7973 (3.2022)
% Urban Population	−1.3291 (1.1418)	−1.1210 (1.2104)	−1.8197 (1.0848)	−1.6506 (1.1109)	−1.7579 (1.2920)	−1.4832 (1.4092)
Democratic Governor	−0.2635 (0.2529)	−0.3409 (0.2620)	−0.1958 (0.2270)	−0.2716 (0.2452)	−0.1014 (0.2522)	−0.2155 (0.2732)
2016 Democrat Vote Share	−5.6158*** (1.3701)	−5.6521*** (1.4317)	−5.0181*** (1.2637)	−4.9175*** (1.4170)	−3.4326* (1.7329)	−3.4975* (1.9062)
2019 Real per Capita GDP	0.00002 (0.00002)	0.00002 (0.00002)	0.00001 (0.00001)	0.00002 (0.00001)	0.00001 (0.00002)	0.00002 (0.00002)
Constant	626.5308 (338.2215)	659.6292 (349.1766)	5.2994 (1.1737)	7.3098 (0.7312)	4.9076 (1.4495)	7.8539 (0.9663)
R^2	0.57	0.55	0.60	0.59	0.51	0.48

Robust standard errors in parentheses; asterisks denote ***1%, **5%, *10% level of significance

1% significance), both economic freedom and vote share retain significance in explaining the severity of a states' lockdown regulation, when they are simultaneously controlled for. Interestingly, in a previous version of this paper that did not control for the pre-pandemic Democrat vote share, the dummy variable for a Democratic governor was consistently statistically significant and associated with stricter lockdowns, but once the vote share variable is included, the political affiliation of the governor no longer matters, even though many pandemic lockdown policies were made by governors' executive orders. We take this as an indication that governors' policies largely reflected the pre-existing political ideology of state voters.[16]

Our measures of virus exposure have the least consistent results. The early death indicator for date of first death are negative and weakly statistically significant (10 percent) in models 1 and 2. However, the magnitude is small, suggesting that a COVID-related death one day sooner led to 2.5 percent of a standard deviation more severe lockdown. In models

[16] We get the same result when we replace the Democratic Governor dummy with a dummy for only Democratic Governors that had unified governments.

3 and 4 the specifications for total COVID deaths per 100 K are statistically significant at the one percent level, but their magnitude is even smaller than the early death indicators and the direction switched (i.e., more death was associated with more freedom from lockdowns). A one standard deviation increase in deaths per 100 K led to only between 0.19 and 0.23 percent of a standard deviation less severe pandemic lockdown. Also, it is worth noting that where deaths showed the most statistical significance is where simultaneity concerns loom the largest. When we look at deaths in the first half of the year on lockdown severity in the second half of the year, the deaths lose their significance.

Table 6 reports our results when we replace COVID deaths with COVID cases in otherwise identical regressions. Here again, economic freedom is statistically significant and positively associated with less severe lockdowns across all models. States with a one standard deviation higher pre-pandemic economic freedom score had lockdown regulatory freedoms scores between 30 and 50 percent of a standard deviation higher.

Our measure for vote share remains negative across all models and statistically significant in four of the six. In our models controlling for early case specifications, vote share was significant at the one percent level. When looking at the first half of the year on the second half, vote share is significant at the 5 percent level. For each of those models, a one standard deviation increase in votes for Democrat in 2016 is associated with a 20–40 percent of a standard deviation lower 2020 lockdown regulatory freedom score. The political

Table 6 Economic Freedom, COVID Cases, and 2020 Lockdown Severity

Dependent variable	Lockdown regulatory freedom 2020				Lockdown regulatory freedom 2020 (Aug–Dec)	
Model	(1)	(2)	(3)	(4)	(5)	(6)
EFNA	0.4042** (0.1632)	–	0.3740** (0.1574)	–	0.5836*** (0.2105)	–
Freedom of the 50 States	–	1.3303* (0.6944)	–	1.2278* (0.7085)	–	2.0534** (0.9038)
Cases as of 3-19-20	0.00001 (0.00005)	−0.000001 (0.00004)	–	–	–	–
2020 Cases per 100,000	–	–	0.0002*** (0.00005)	0.0002*** (0.00006)	–	–
Cases per 100,000 through July, 2020	–	–	–	–	0.0006** (0.0003)	0.0007** (0.0003)
Asian Population Share	−0.0213 (1.7584)	0.8161 (2.1870)	2.2893 (1.7179)	3.1004 (2.1163)	−0.2297 (2.7033)	1.5373 (3.1809)
% Urban Population	−1.1225 (1.1589)	−0.8889 (1.2185)	−2.5692** (1.0045)	−2.3588** (1.0324)	−3.6235** (1.5073)	−3.5473** (1.5384)
Democratic Governor	−0.2267 (0.2409)	−0.3042 (0.2504)	−0.2193 (0.1923)	−0.2961 (0.2011)	0.0631 (0.2654)	−0.0271 (0.2780)
2016 Democrat Vote Share	−4.8249*** (1.4559)	−4.7818*** (1.5367)	−1.2827 (1.4187)	−1.2510 (1.5235)	−4.2701** (1.5923)	−4.2082** (1.7910)
2019 Real per Capita GDP	0.00001 (0.00001)	0.00002 (0.00002)	0.00001 (0.00001)	0.00001 (0.00001)	0.00002 (0.00002)	0.00003 (0.00002)
Constant	5.5126 (1.3181)	7.4738 (0.8154)	3.8370 (1.0969)	5.6660 (0.7242)	5.0662 (1.4057)	7.8937 (0.8052)
R^2	0.54	0.52	0.65	0.63	0.56	0.53

Robust standard errors in parentheses; asterisks denote ***1%, **5%, *10% level of significance

affiliation of the governor was again insignificant once this measure of pre-existing partisan ideology is controlled for.

Our variable for urbanization was negative and statistically significant at the five percent level in four of the six models, suggesting states with relatively higher urban populations implemented more stringent lockdowns. Specifically, an increase standard deviation of a state's urban population is associated with a 31–48 percent of standard deviation lower lockdown regulatory freedom score in 2020.

Early COVID cases were not statistically related to subsequent lockdowns. However, we do find an association between total COVID cases and lockdown regulatory freedom. While this relationship is significant at the 1 percent level, simultaneity concerns are greatest here, the association is positive, and the magnitude is relatively small. A one standard deviation increase in COVID cases per 100 K leads to only a 0.43 percent of a standard deviation less severe pandemic lockdown. This significance, however, remains (now at the 5 percent level) when looking at cases in the first half of the year on lockdown severity in the second half of the year. Still, the magnitude is very small. A one standard deviation increase in COVID cases leads to between a 0.35 and 0.41 percent of s standard deviation less severe pandemic lockdown.

Finally, Table 7 reports our results when controlling for hospital capacity rather than COVID deaths or cases in otherwise identical regressions. Our measures of economic freedom are again positive and statistically significant across all models with almost the same effect in terms of magnitude. The relationship between democratic presidential vote share and lockdown severity is still negatively associated with lockdown regulatory freedom, of similar magnitude, and statistically significant across models 1 through 4. The only significant change in our results is that the variable measuring urbanization is no longer statistically significant in any of the models.

Hospital bed capacity shows no consistent relationship with lockdown regulatory freedom. Hospital beds show no statistical significance in any of our models and the direction changes based on our specification. In models 1, 2, 5, and 6 our beds indicator is negative. In models 3 and 4 it becomes positive.

In sum, our evidence indicates that the severity of a state's lockdown during 2020 was predominately determined by pre-pandemic levels of economic freedom and pre-pandemic partisan political ideology, rather than determined by most measures of the severity of the pandemic in each state.[17] We place less confidence in the association between our various measures of the severity of COVID exposure and lockdowns as these measures suffer from greater simultaneity concerns, are inconsistent in sign, and are of a relatively smaller magnitude when they are statistically significant. Thus, due to these data limitations we think it would be a mistake to interpret our results as a "horse race" between differences in political economy variables and differences in health variables across states determining the differences in their degree of lockdown restrictiveness. Rather, we believe the correct interpretation of our results is that pre-pandemic levels of economic freedom and partisan political ideology were important determinants of the degree of lockdown restrictiveness and that this finding is robust to including a whole host of plausible health measures as controls.

[17] See Bazi et al. (2021) for a similar finding. They examine county level pandemic reactions and find that counties with greater "total frontier experience," which they use as a proxy for individualist values, had less social distancing, mask use, and local government pandemic restrictions. This finding is consistent with our findings, though we do not endorse their normative interpretation of their results.

Table 7 Economic freedom, hospital capacity, and 2020 lockdown severity

Dependent variable	Lockdown regulatory freedom 2020				Lockdown regulatory freedom 2020 (Aug–Dec)	
Model	(1)	(2)	(3)	(4)	(5)	(6)
EFNA	0.3832**	–	0.4021**	–	0.5772***	–
	(0.1492)		(0.1547)		(0.2004)	
Freedom of the 50 States	–	1.2538*	–	1.43748**	–	1.8611**
		(0.6412)		(0.6552)		(0.9118)
Percentage of Hospital Beds in Use (April, 2020)	−0.9131	−0.8938	–	–	–	–
	(1.5954)	(1.6827)				
Percentage of Hospital Beds in Use (2020)	–	–	1.2599	1.5306	–	–
			(2.1304)	(2.2053)		
Percentage of Hospital Beds in Use (through July, 2020)	–	–	–	–	−1.5093	−0.9823
					(2.2202)	(2.2688)
Asian Population Share	−0.3133	0.5004	0.6410	1.7339	−4.2979	−2.7222
	(1.7839)	(2.1831)	(2.2727)	(2.6625)	(2.9884)	(3.6936)
% Urban Population	−0.8715	−0.6488	−1.3004	−1.1323	−1.5244	−1.2534
	(1.2074)	(1.2739)	(1.1803)	(1.2348)	(1.3244)	(1.4698)
Democratic Governor	−0.2411	−0.3200	−0.2082	−0.2826	−0.1388	−0.2478
	(0.2388)	(0.2471)	(0.2394)	(0.2492)	(0.2602)	(0.2834)
2016 Democrat Vote Share	−4.3317**	−4.3369**	−5.5157***	−5.6058***	−2.4114	−2.8047
	(1.7228)	(1.8331)	(1.7669)	(1.8692)	(2.1813)	(2.2852)
2019 Real per Capita GDP	0.00001	0.00002	0.00002	0.00002	0.00001	0.00002
	(0.00002)	(0.00002)	(0.00001)	(0.00002)	(0.00002)	(0.00002)
Constant	5.7694	7.6529	5.0018	6.8493	5.3830	8.0938
	(1.3727)	(0.8784)	(1.7500)	(1.2907)	(1.9044)	(1.3325)
R^2	0.54	0.52	0.54	0.52	0.52	0.48

Robust standard errors in parentheses; asterisks denote ***1%, **5%, *10% level of significance

4 Conclusion

Congleton's recent contribution to the public choice pandemic literature pointed out that a polycentric pandemic response based on federalism at the state level "allows regional differences in normative theories to affect policies" (2023: 93). Our main findings support the idea that state level differences in these normative theories, to the extent that they manifest themselves in pre-pandemic levels of economic freedom and political partisanship, as measured by the 2016 democratic presidential vote share, do correlate with the restrictiveness of states' lockdown policies. We consistently found that pre-pandemic levels of economic freedom were statistically significantly associated with less severe lockdown policies and that the magnitude of the effect was substantial. We also found that states with greater vote shares for the 2016 Democratic presidential candidate were more likely to impose more severe lockdown restrictions and that this effect was statistically significant in most of our regressions and large in magnitude. The interpretation of the direction of causation for both of these associations is pretty straightforward as they measured pre-pandemic economic freedom and partisan affiliation. Our main finding is also related to Furton's recent (2023) argument that short-run tradeoffs between pandemic responses and liberty can lead to long-run sacrifices of liberty via Higgsian (1987) style ratchet effects.[18] If Furton is correct, our findings imply that the COVID-19 pandemic would lead to longer-run divergences in economic freedom across U.S. states, since it was the less free states that imposed more restrictive lockdowns. This is a topic for further study.

Our study also contributes to a second literature that has been the subject of public choice analysis but is unrelated to public health. Lawson et al. (2020) survey the literature studying economic freedom as a left-hand side variable. They document that the most consistent findings in that literature are that current levels of economic freedom are strongly correlated with past levels of economic freedom, freer countries have more difficulty improving their economic freedom, and that political and economic freedoms are strongly related. Although our study uses measures of pre-pandemic economic freedom as a right-hand side variable, we are essentially investigating the determinants of a new measure of economic freedom—Lockdown Regulatory Freedom—on the LHS. The previous literature studying economic freedom on the LHS finds it correlated with prior levels of economic freedom on the RHS *while measuring the same variables*. We differ in that we find pre-pandemic infringements on economic freedoms through state-level taxation, government spending, and labor market regulation, predict new infringements on economic freedom through mandatory workplace closures, mandatory school closures, mandatory cancellations of public events, restrictions on gathering sizes, internal movement restrictions, stay at home orders, mandatory public transport closings, and mandated facial coverings. This seems to indicate that the complex and not well understood historical, ideological, social processes that lead a population to maintain one set of economic freedoms, also lead them to maintain another set of economic freedoms.

[18] Also see Geloso et al. (2021) for an examination of the institutional tradeoff between liberty and health during pandemics and Goodman et al. (2021) for the relationship between infectious disease and government growth.

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