

RESEARCH ARTICLE

Measuring economic freedom during the Covid-19 pandemic

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Abstract

The Covid-19 pandemic in 2020 led to extensive new government regulations and lockdown policies that, according to some prominent definitions, severely reduced economic freedom. However, many of these new pandemic-related regulatory restrictions on economic freedom are largely missed by the *Economic Freedom of the World Report* (EFW). This paper first adjusts the Our World in Data *Covid-19 Stringency Index* into a measure of *lockdown regulatory freedom* and then merges it into the EFW index to better measure countries' 2020 cross-sectional relative economic freedom. We find significant differences in the relative ranking of economic freedom between countries once we adjust for lockdown regulatory restrictions.

Key words: Covid-19; economic freedom; institutions; pandemic

JEL Codes: I18; H1

1. Introduction

The Covid-19 pandemic led governments around the world to impose new non-pharmaceutical regulations on economic activity. Scholars have already published hundreds of papers estimating the impact lockdowns and other regulations on health outcomes (Abouk and Heydari, 2021; Courtemanche *et al.*, 2020; Fang *et al.*, 2020; Hsiang *et al.*, 2020; Nguyen *et al.*, 2021) and economic activity (Bentkowska, 2021; Dingle and Nieman, 2020; Fairlie, 2020; Greenstone and Nigam, 2020; Gupta *et al.*, 2020; Redford and Dills, 2021). Many economists assume that standard price theory provides a justification for regulation since private mitigation costs, such as decreasing social interactions and wearing facemasks, could provide a public good by lowering the transmission externality associated with Covid-19. However, a few studies have examined the nature of a Covid-19 transmission externality and challenged whether standard price theory would find that the type of regulations governments adopted were efficiency enhancing (Allen *et al.*, 2022; Boettke and Powell, 2021; Leeson and Rouanet, 2021; Powell, 2022). Regardless of whether the policies governments adopted in response to the Covid-19 pandemic enhanced efficiency, improved health, or economic outcomes, or not, these policies did constitute a significant decrease in individuals' freedom to engage in a wide range of economic activities, according to some prominent definitions of freedom. This paper is the first to measure how variation in pandemic regulatory policies impacted relative economic freedom in a large cross-section of countries.

Our institutional measure of economic freedom is the *Economic Freedom of the World Annual Report* (EFW) by Gwartney *et al.* (2022). The EFW index measures the consistency of a nation's policies and institutions with economic freedom. The EFW index measures the extent to which individuals and private groups are free to buy, sell, trade, invest, and take risks without interference by the state. To score high on the EFW index, a nation must keep taxes and public spending low, protect

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private property rights, maintain stable money, keep the borders open to trade and investment, and limit regulatory restrictions in the marketplace.

A small number of papers have examined how economic freedom is related to pandemic outcomes or the adoption of pandemic policies. Geloso *et al.* (2021) built on Troesken's (2015) argument that the United States' constitutional restraints that protected property rights both limited the government's ability to combat smallpox, while simultaneously creating wealth that better enabled investments in water facilities that decreased deaths from typhoid fever. Geloso *et al.* (2021) hypothesize that there is a bundled institutional tradeoff where higher economic freedom can lead to a greater number of deaths from diseases associated with human interactions that take place while engaging in commerce, while simultaneously leading to a lower number of deaths from diseases sensitive to income levels. In the sample of 16–19 countries (depending on specification) they find that higher levels of economic freedom in the 19th century led to lower levels of death from typhoid fever while having no statistically significant effect on deaths from smallpox. Geloso and Bologna-Pavlik (2021) investigate the impact of economic freedom on the economic consequences stemming from the 1918 Spanish Flu pandemic. They argue that higher levels of economic freedom better enable countries to reallocate resources in response to pandemic disruptions to mitigate the pandemic's negative economic consequences. They find that, while flu death rates had a negative impact on subsequent growth in GDP per capita, some of that impact was mitigated in countries with higher levels of economic freedom. McCannon and Hall (2021) use state-level economic freedom to predict when stay-at-home policies were adopted during the Covid-19 pandemic. They find that states that had lower economic freedom were more likely to adopt stay-at-home policies sooner than states that had higher economic freedom. Similarly, McCannon (2021) examined the relationship between stay-at-home orders and internet search data. He finds that areas where residents showed a heightened interest early in the pandemic initiated stay-at-home orders earlier, suggesting that governors follow voter preferences and opinion. McCannon and Hall's study is the most closely related study to our own. Although they don't measure how lockdowns impacted state-level economic freedom, they are the first to find a relationship between existing levels of economic freedom and the timing of when pandemic-related restrictions on economic freedom were adopted.

Understanding how pandemic regulations impact economic freedom is important because economic freedom has been shown to be an important determinant of a wide variety of desirable economic outcomes. Economic freedom is positively correlated with economic growth (Scully and Slottje, 1991; Williamson and Mathers, 2011), development (Bennett and Nikolaev, 2017), environmental progress (Barbier, 2019), and improved political and civil liberties (Benyishay and Betancourt, 2010; Dawson, 1998; Lawson and Clark, 2010). Economic freedom is also positively related to advances in human development including measures of education (Feldmann, 2017), life expectancy (Esposito and Zaleski, 1999), disease prevention (Stroup, 2007), and upward income mobility (Dean and Geloso, 2021; Callais and Geloso, 2021). Other research has studied economic freedom's role in institutional quality and reform (Bolen, 2019; Murphy, 2019; Sobel, 2017), income inequality (Holcombe and Boudreaux, 2016), and in historical case studies (Berggren and Nilsson, 2021; Bergh and Lyttkens, 2014). See Hall and Lawson (2014) for a somewhat dated survey of this literature which finds that in 402 papers using the index, economic freedom is associated with 'good' economic outcomes (growth, income, happiness, etc.) in more than two-thirds of the studies while economic freedom is associated with 'bad' outcomes (such as inequality) in less than 4% of the studies.¹ More recent studies, since that survey, employing causal inference techniques, continue to find a positive relationship between economic freedom and positive development outcomes (examples include Lawson *et al.* (2019) and Grier and Grier (2021)).

The Covid-19 pandemic was met with a flurry of government regulations that severely reduced economic freedom by restricting the people's activities and movements. School and workplace closures,

¹See Lawson *et al.* (2020) for a related survey on the determinants of economic freedom.

stay-at-home orders, restrictions on public and private gatherings, and other mandates were implemented to varying degrees by governments around the globe.

The responses to this novel virus were novel themselves. Unprecedented government regulations became the norm. Consequently, many of the new restrictions that emerged during the pandemic are not well captured within the existing EFW index. The Our World in Data *Covid-19 Stringency Index* – hereafter, known as the *Lockdown Stringency Index* – tracks the daily government responses to Covid-19, creating a measure of lockdown stringency (Hale *et al.*, 2021). However, while some measures within this index capture restrictions on economic freedom, there are also components of the index that measure policy responses that do not constitute a restriction on economic freedom. Thus, in section 2 we describe how we recalculate the index to create a *lockdown regulatory freedom* measure compatible with the existing EFW index.

The EFW index is the best institutional measure of economic freedom across countries. Unfortunately, due to the new regulations adopted during the pandemic that (1) constitute significant restrictions in economic freedom; (2) varied in restrictiveness across countries; and (3) are not captured in the existing data used to calculate the EFW index; if left unadjusted this index will not accurately reflect cross-country differences in economic freedom as well as it has in the past. This paper adjusts the EFW index to better measure the variation in economic freedom across countries during the first year of the pandemic.

Section 2 describes our data and how we adjust the *Lockdown Stringency Index*. Section 3 explains the two methods of adjustment used to update the EFW index. Section 4 discusses how our adjustments impact the relative ranking of economic freedom across countries. Section 5 concludes with future avenues of research that could make use of our *lockdown regulatory freedom* index and our adjusted EFW index.

2. Data

Our data come from two main sources: *The Economic Freedom of the World Annual Report* (Gwartney *et al.*, 2022) and the Our World in Data *Covid-19 Stringency Index* (Hale *et al.*, 2021). The well-known *Economic Freedom of the World Annual Report* measures economic freedom using 43 variables across five broad areas: (1) *Size of Government*; (2) *Legal System and Property Rights*; (3) *Access to Sound Money*; (4) *Freedom to Trade Internationally*; and (5) *Regulation of Credit, Labor, and Business*. Each of the five broad areas is weighted equally to calculate each country's economic freedom score. Individual variables, within each component, within each area, are weighted equally when calculating each area's score, however, since the 43 individual variables are not evenly distributed across the areas and their subcomponents (varying from a low of four variables in Area 3 to a high of 15 variables in Area 5) they are each implicitly weighted differently when calculating a country's overall score.

The *Lockdown Stringency Index* has daily lockdown stringency scores for each country starting in 2020. The data are made up of 13 pandemic response indicators for individual health and non-pharmaceutical interventions. Not all 13 of the indicators included in this index are policies that impact economic freedom, so we adjust the index to include only those pandemic policy responses that impact economic freedom. This results in eliminating four of the 13 indicators from the *Lockdown Stringency Index*. *Vaccination policy* was dropped since it rates countries based on the availability of Covid-19 vaccines, not mandatory vaccine requirements. Similarly, *Testing policy* was dropped because it measures who within the population was eligible to have access to tests, not mandatory testing requirements. *Contact tracing* was dropped because it measured whether there was extensive, limited, or no contact tracing, not whether people were coercively quarantined or simply informed if they had been exposed. Finally *public information campaigns* were also removed because campaigns that merely provide information do not constitute restrictions on economic freedom. Additionally, we dropped *international travel restrictions* from our measure of *lockdown regulatory freedom*. *International travel restrictions* are obviously a restriction on economic freedom, however,

the *Freedom to Trade Internationally* area of the EFW index already captures these restrictions with its measure 4Diⁱⁱⁱ *Freedom of Foreigners to Visit*. Thus, we would be double counting these restrictions if we included them in our adjustment. However, we include them in a recalculated overall *lockdown regulatory freedom* score in an online Appendix for researchers who want a standalone measure of lockdown restrictiveness not merged with an overall economic freedom index. Thus, for our measure of *lockdown regulatory freedom* we are left with the eight indicators explained below. Each of these indicators are policies that limited people's freedom to engage in economic exchange on mutually agreeable terms.

It should be relatively obvious how each of these lockdown indicators translate into limitations on economic freedom. Mandatory *workplace closures*, mandatory *cancellations of public events*, *restrictions on gathering sizes*, and *stay at home orders* clearly prohibit people from engaging in market activities. Similarly, *internal movement restrictions* prohibit the movement that is often a prerequisite for market exchanges. Mandatory *school* and *public transit closings* are a little more complicated in that much, but not all, of these sectors is government provided. However, a mandatory prohibition on educational exchanges or using public transit constitutes a restriction on economic freedom because it prohibits the entire demand side of the market from engaging in in-person educational exchange or transport and the portion of the supply side of the market that is privately provided. Mandated *facial coverings* are perhaps the least serious infringement on economic freedom among our included measures, but they still are an infringement on the terms of economic exchanges. Customers refusing to wear masks before being seated were barred from eating at restaurants (Ludlow, 2020). Airlines and the Federal Aviation Administration wouldn't let customers fly without wearing masks until recently (Shepardson and Singh, 2022). Gathering measures of pandemic restrictions on economic freedom that are consistently measured for a large cross-section of countries obviously causes us to miss many smaller idiosyncratic restrictions on economic freedom. However, we suspect that mandated *facial coverings* are correlated with myriad of these other micro regulatory infringements on economic freedom that are uncaptured by the main measures of the index. It's also worth noting that some economic freedoms were increased by pandemic response policies, such as the elimination of the prohibition on serving 'to go' cocktails in some jurisdictions, or the easing of licensure restrictions on practicing medicine across state borders. These pandemic regulatory roll backs differ in form across international jurisdictions and thus go unmeasured in our adjustments to the EFW index. While these pandemic-related increases in economic freedom are worth keeping in mind, they also strike us as significantly smaller in scale and scope than the new pandemic regulatory infringements on economic freedom.

We adjust the scoring of six of the eight measures of *lockdown regulatory freedom* because the existing measures increased a country's stringency score for jurisdictions that had only 'recommended' rather than required measures. For example, the *stay at home* indicators were scored a 0, 1, 2, or 3, with 3 being the most stringent stay at home orders while zero indicated no policy in place. However, a one on the scale indicates the jurisdiction recommended, but did not require, people to stay home. A non-coercive recommendation is not a restriction of economic freedom, so we adjusted scores for the six measures where a one indicated a recommendation, to a score of zero that was the equivalent of no restrictions.

The *Lockdown Stringency Index* scores each country on a 0–100 scale – 100 being the most stringent response (biggest decrease in economic freedom) for each measure, on each day of the year. In order to adjust this to match the EFW index we: (1) calculated the average score in 2020 for each indicator by averaging each daily score from March 1 through the end of the year, (2) we inverted the scores for each of the indicators, and (3) we rescaled the scores for each of the indicators to a 0–10 scale.² A score of 10 indicates that there were no lockdown restrictions in a category, in any day of the year, while a score of zero indicates that the country had the most restrictive lockdown, in that category,

²The only country with significant lockdown polices in place before March 1, 2020, was China. For China we include the February 2020 lockdown restrictions in the calculation of its scores.

for each day of the year that was measured. We then equally weight the eight indicators to get the 2020 *lockdown regulatory freedom* score for each country.

Unfortunately, the measures within the *Lockdown Stringency Index* fail to account for differences in the restrictiveness across jurisdictions within countries, so each country is scored based on its most restrictive jurisdiction, on each measure, each day of the year. The *Lockdown Stringency Index* includes subnational data for the Brazilian states, Canadian provinces and territories, Chinese provinces, the United Kingdom devolved nations, and each of the United States. The national-level scores for each of these countries all fall among the very most locked down countries in the world as a result significant regional variations in pandemic policies. For example, the United States national score is mostly a mix of Californian, Hawaiian, New Mexican, and New York policy, depending on the measure and day of the year, while never reflecting policy in Texas, Florida, or South Dakota. Although not accounting for regional differences is less likely to impact smaller countries, or those with a more unified national response to the pandemic, it can have a large impact on the scores of countries like the United States and China where responses to Covid-19 varied greatly across the states and provinces. To correct for regional variation, we use the available subnational indexes for each of these countries to construct a national score based on the average scores of the subregions. Specifically, we repeat the above steps for each of the subnational regions and then adjust scores based on their share of the national population and add them up to get the national *lockdown regulatory freedom* score. The average *lockdown regulatory freedom* score rises from 2.88 to 5.28 for these five countries once we adjust for their subnational data. Unfortunately, this process cannot be duplicated for all countries because of the lack of subnational data. India is perhaps the country most affected by lack of regional data as it is both large and experienced significant regional variation in policy (Choutagunta *et al.*, 2021). Regional variation in pandemic policy also likely results in biasing Australia's score downward since the stringency of its lockdowns varied by state, though this fact is somewhat mitigated by the fact that Australia only has six states (and two internal territories) despite its large geographical size.

Our measure of *lockdown regulatory freedom* measures policies consistently across countries but it is worth keeping in mind that lived/experienced decreases in economic freedom may differ across countries that have the same official pandemic policy. The same degree of restrictiveness of a stay-at-home or school closure policy will not decrease experienced economic freedom as much in countries with strong internet connectivity, where a greater portion of work and school can move online in response to pandemic restrictions. It's also worth keeping in mind that we are measuring *de-jure* policy, not *de-facto* enforcement. To the extent that poorer countries lacked the state capacity to enforce their pandemic restrictions, a policy of a given restrictiveness would decrease *de-facto* experienced economic freedom less in poorer countries than richer countries. We do not attempt to control for either of these complications but do note that they will tend to offset each other to some extent.

3. Adjusting economic freedom for pandemic regulations

Adjusting the economic freedom rankings based on pandemic restrictions is important because many countries that traditionally rank highly in economic freedom appeared to have more restrictive lockdowns, while other countries that are lower in economic freedom ranking have had relatively lighter lockdowns. For example, Australia and New Zealand historically score very high in the EFW index. Both countries implemented stringent lockdown policies following the outbreak of Covid-19 (Magness, 2020; McGregor, 2021). Other countries, such as Sweden and Japan, have avoided severe lockdown policies, and – while they tend to receive higher EFW scores – we expect them to move closer to the top of the list (O'Shea, 2020). Meanwhile, some poorer countries, who have low economic freedom scores in the EFW index, adopted few pandemic restrictions and thus they are likely to increase in their ranking among countries in economic freedom.

The initial 1995 publication of the EFW index was the outcome of a series of conferences from 1986 to 1994 exploring how to best measure economic freedom across countries. The index has been

published annually since 2000 and each year the authors, researchers, and think tank partners meet and discuss issues pertaining to the measurement of economic freedom. The issue of how to ‘weight’ components and areas came up numerous times over the years and the index authors settled on the equal weighting of the five areas, equal weighting of components within an area, and thus implicit different weights on individual policy measures, while making their data available to researchers who would like to recalculate an index based on different weights.

There is no *a priori* ‘right’ way to adjust the EFW index for pandemic regulatory restrictions. Any number of weighting schemes could plausibly be justified. As such, we will adjust the index using two methods, each tied directly to the methods and weightings that index authors (and index chapter contributors) have used in the past and, like them, make our spreadsheets available for researchers who believe a different weighting scheme is justified.

Our first adjustment follows a method used to adjust the 2017 EFW index for differences in economic freedom based on gender. Fike (2017) created a *Gender Disparity Index* from the World Bank’s *Women, Business, and the Law* and *50 Years of Women’s Rights* to create a disparity index ranging from zero (when women had none of men’s rights) to one (where women and men had equal rights). She then adjusted Area 2 (*Legal System and Property Rights*) of the EFW index with the formula:

$$\text{Adjusted Area 2 Score}_{it} = \frac{\text{Area 2 Score}_{it} + \text{GDI Adjustment}_{it} \times \text{Area 2 Score}_{it}}{2}$$

Fike’s averaging of the unadjusted and the adjusted area score reflects the fact that approximately half the population (women) potentially did not have the same property rights as men. Pandemic regulations applied to both genders, so there is no need to average the unadjusted and adjusted scores. As such, we follow Fike’s method by creating a zero to one *Lockdown Regulatory Freedom* adjustment to multiply EFW Area 5 scores against using the formula:

$$\text{Adjusted Area 5 Score}_i = (\text{Area 5 Score}_i \times \text{Lockdown Adjustment}_i),$$

where 5 is the EFW Area measuring *Regulation* and *i* is the country. Area 5 consists of three subcomponents measuring the regulation of credit, labor, and business and each of those subcomponents has multiple individual policy measures. We create a zero to one scaler based on an equally weighted measure of the eight pandemic regulatory policies. This adjustment method results in the median country in the sample losing 49.9% of their unadjusted Area 5 score. Or in total, almost 10% of its potential overall EFW score, though countries range from losing as little as 0–84.6% of their Area 5 score.

Our second adjusted economic freedom score simply adds our *lockdown regulatory freedom score* as a fourth equally weighted component within Area 5 of the index. Thus, our eight individual pandemic restrictions are equally weighted to create the lockdown regulatory freedom score that then comprises one-fourth (along with the credit, labor, and business components) of a country’s Area 5 (*Regulation*) score. Using this method of adjustment weights pandemic restrictions to count as 5% of a country’s overall economic freedom score.

4. Results

4.1 Lockdown regulatory freedom scores

Table 1 has the *lockdown regulatory freedom scores* for 2020, calculated using the process described in section 2, where countries are ranked from least stringent to most stringent lockdown regulations.³

A lack of state capacity to implement lockdown restrictions is apparent when looking at the least locked down countries. Burundi is ranked number one with a score of 10. Other countries that make

³Five countries were dropped since they didn’t have any data in the Lockdown Stringency Index: Armenia, Comoros, Guinea-Bissau, Montenegro, and North Macedonia.

Table 1. 2020 Lockdown regulatory freedom scores

Countries	Quintile 1	Countries	Quintile 2	Countries	Quintile 3	Countries	Quintile 4	Countries	Quintile 5
Burundi	10.00	Hungary	6.67	Korea, Rep.	5.53	United Kingdom	4.61	Bhutan	3.68
Nicaragua	9.67	Zambia	6.66	Haiti	5.51	Saudi Arabia	4.58	Gabon	3.63
Taiwan	9.61	Cote d'Ivoire	6.65	United Arab Emirates	5.51	Congo, Rep.	4.56	Kuwait	3.62
Japan	9.55	Mauritania	6.65	Eswatini	5.46	Ireland	4.55	Suriname	3.57
Belarus	8.69	Luxembourg	6.64	Mozambique	5.42	Jordan	4.48	Nepal	3.53
Seychelles	8.49	Croatia	6.64	Cyprus	5.37	Russian Federation	4.48	Rwanda	3.47
Niger	8.31	Lithuania	6.63	United States	5.36	Egypt, Arab Rep.	4.47	Algeria	3.42
Tanzania	8.21	Mali	6.57	Serbia	5.33	Madagascar	4.46	Guatemala	3.41
Finland	8.10	Senegal	6.56	Djibouti	5.32	Guinea	4.32	Morocco	3.29
Brunei Darussalam	8.08	Papua New Guinea	6.55	Greece	5.30	Zimbabwe	4.28	Iraq	3.28
Mauritius	7.94	Benin	6.54	Sudan	5.28	Kenya	4.25	Philippines	3.17
Timor-Leste	7.81	Burkina Faso	6.51	Congo, Dem. Rep.	5.23	Israel	4.23	Dominican Republic	3.15
New Zealand	7.73	Cameroon	6.49	South Africa	5.22	Trinidad and Tobago	4.23	Ecuador	3.05
Somalia	7.72	Czech Republic	6.42	Nigeria	5.10	Albania	4.22	Uganda	3.04
Estonia	7.71	Netherlands	6.28	Portugal	5.07	Australia	4.13	Azerbaijan	2.94
Yemen, Rep.	7.64	Switzerland	6.27	Belgium	5.04	Spain	4.13	Kyrgyz Republic	2.92
Uruguay	7.60	Malta	6.19	Bosnia and Herzegovina	4.98	Georgia	4.12	Mexico	2.87
Norway	7.59	Malawi	6.17	Qatar	4.94	Chad	4.10	Panama	2.87

(Continued)

Table 1. (Continued.)

Countries	Quintile 1	Countries	Quintile 2	Countries	Quintile 3	Countries	Quintile 4	Countries	Quintile 5
Denmark	7.49	Ghana	6.09	Bahrain	4.94	Malaysia	4.09	Oman	2.84
Sweden	7.35	Tunisia	6.09	Turkey	4.93	Ukraine	4.04	Italy	2.82
Iceland	7.29	Botswana	6.09	Sri Lanka	4.91	Angola	4.01	Kazakhstan	2.73
China	6.98	Austria	6.09	Slovenia	4.90	Belize	3.98	Venezuela, RB	2.46
Bulgaria	6.95	Fiji	6.05	Syrian Arab Republic	4.83	Indonesia	3.95	Bahamas, The	2.35
Sierra Leone	6.95	Hong Kong SAR, China	6.02	Costa Rica	4.83	Guyana	3.93	Bangladesh	2.31
Barbados	6.91	Namibia	6.01	Germany	4.83	Lebanon	3.91	Myanmar	2.28
Lesotho	6.87	Poland	5.97	Liberia	4.78	Brazil	3.89	Libya	2.27
Lao PDR	6.86	Slovak Republic	5.94	Moldova	4.78	Ethiopia	3.85	Bolivia	2.25
Cambodia	6.78	Singapore	5.92	France	4.77	Pakistan	3.85	Chile	2.17
Central African Republic	6.77	Gambia, The	5.83	Colombia	4.69	Cabo Verde	3.75	Peru	2.14
Thailand	6.76	Canada	5.58	Vietnam	4.68	El Salvador	3.73	Honduras	2.02
Tajikistan	6.75	Romania	5.57	Iran, Islamic Rep.	4.66	Jamaica	3.72	India	1.94
Latvia	6.69	Togo	5.57	Mongolia	4.62	Paraguay	3.71	Argentina	1.54

up the top 10, such as Nicaragua, Tanzania, Seychelles, and Niger, are relatively poor and underdeveloped. It is likely that these countries lack the capacity to effectively implement and enforce lockdown measures. Indeed, these countries score quite low in Area 2 of the EFW index (*Legal System and Property Rights*).

Taiwan is the highest ranked developed country in *lockdown regulatory freedom*. In 2020, Taiwan's *lockdown regulatory freedom score* was an 9.61. Taiwan received perfect 10 scores in all its lockdown indicators except for *facial coverings*, where it received a 6.88.

Japan's *lockdown regulatory freedom score* was a 9.55. Japan received 5% 10 scores among the lockdown indicators (*workplace closings, restrictions on gatherings, stay at home, close public transport, and restrictions on internal movement*). Japan's lowest score among the lockdown indicators was for *school closings* where it received a 7.03. Japan's lockdown policies were heavily concentrated on its borders and international travel but as mentioned above, this phenomenon is already captured in subcomponent 4Diii of the EFW index and thus left out of the *lockdown regulatory freedom score*.⁴

It's also worth noting that all of the Nordic countries score relatively high. Finland has the highest score among the Nordic countries (8.10) placing them in the top 10 countries for *lockdown regulatory freedom*. Finland had three perfect scores among the lockdown indicators (*stay at home, close public transport, and facial coverings*). Finland's lowest scoring lockdown indicators were *cancel public events* (5.36) and *restrictions on gatherings* (4.58). Norway and Denmark received *lockdown regulatory freedom scores* of 7.59 and 7.49, respectively. Both countries received perfect 10 scores for *stay at home* and *close public transport* and Denmark received an additional 10 out of 10 for *restrictions on internal movement*. Both countries lowest lockdown indicator was *restrictions on gatherings* at 1.97 for Denmark and 2.21 for Norway. Sweden, which was widely perceived to have relatively light Covid-19 restrictions, scored a 7.35 overall. Among the lockdown indicators, Sweden received perfect 10 scores for *stay at home, restrictions on internal movement, close public transport, and facial coverings*. Its lowest scores were for *cancel public events* and *restrictions on gatherings*, 0.92 and 2.60 respectively. Although Sweden was often singled out in the press, our measures indicate that the Nordic countries stand out more as a group. The few developed countries ranked higher in *lockdown regulatory freedom* than any of the Nordic countries are islands (except nearby Estonia) that regulated their international borders to initially keep Covid largely out of their countries in 2020 and, as a result, had relatively less restrictive internal Covid-19 regulations.

New Zealand and Australia, both covered in the news for their stringent lockdown policies, had starkly contrasting scores. New Zealand is toward the top of the list with a score of 7.73 overall. Like Japan, New Zealand's lockdown policies were heavily concentrated on the restriction of international movement, which is unsurprising considering it had the world's most restrictive Covid border policy.⁵

In contrast, Australia's overall score was a 4.13, ranking them 111th out of 160 countries. Australia's lockdown stringency indicators were low across the board. Two of its eight lockdown stringency indicators (*restrictions on gatherings* and *restrictions on internal movement*) were below 1. Its highest score was 6.10 for *stay at home*.

The United Kingdom and the United States fall in the middle of the pack with scores of 4.61 and 5.36, respectively. The United States' spot in the list masks the significant variation in lockdown policy across states. The top state (North Dakota) received an 8.21 while the bottom state (New Mexico) received a 2.65. The United States' lowest lockdown indicator score was a 1.96 for *school closings*. Its highest scores were for *stay at home* (8.09) and *close public transport* (9.67).

The United Kingdom's lowest scores were a 0.65 and 0.71 for *cancel public events* and *restrictions on gatherings*, respectively. Its highest score was for *stay at home* where it received an 8.06.

⁴Japan received a 2.93 score out of 10 for the *international travel restrictions* measure from the Lockdown Stringency Index.

⁵See <https://www.bloomberg.com/news/articles/2020-07-06/new-zealand-to-limit-returning-citizens-as-quarantines-over-flow> (accessed 22 March 2022). New Zealand scored a 0.16 out of 10 for international travel restrictions from the Lockdown Stringency Index.

China's score was surprisingly high at 6.98, placing it in the top 25. Given the authoritarian nature of China's government and media coverage of its strict lockdowns we might expect to see a much lower score.⁶ However, China's lockdowns, while strict, were targeted toward specific provinces. Lockdown policies varied month-to-month for each province. Some provinces faced strict lockdown policies, while others endured less restrictive measures, and these conditions would swap in any given month. In contrast, most of the individual US states remained committed to a given lockdown policy throughout most of 2020. China's relatively high *lockdown economic freedom score* reflects the targeted nature of its lockdowns. In each month, certain provinces were severely locked down, while much of the nation remained relatively open. Once the strict lockdowns are weighted by population, this approach led to China's relatively less restrictive scores. Six of its eight indicators were above 6 out of 10 and its lowest indicator score was for *facial coverings*, at 4.46.

4.2 2020 EFW lockdown adjusted scores

Table 2 lists the countries in the EFW index, their unadjusted 2020 EFW score ranked from most to least economically free, and their adjusted scores using each of the two methods described in section 3.

The first adjustment method – where the lockdown stringency indicators affect almost 50% of most countries' Area 5 scores – results in the largest drops in EFW scores and biggest changes in the relative rankings.

4.2.1 Biggest movers

The top five increasing countries are primarily poor and underdeveloped nations that have historically low EFW scores. These countries often likely lack the necessary state capacity to implement and enforce lockdown restrictions. Nicaragua – the top mover – is ranked 79th in the unadjusted EFW index. It has perfect 10 scores for all of the lockdown indicators but one, *school closings* (7.36). Following the first adjustment method, its ranking jumps 43 places to 36th in the world. Nicaragua is also the top mover when implementing the second adjustment method.

The other countries in the top five follow the same pattern. Burundi's adjusted EFW score improves by 31 spots after the first adjustment method. Burundi was ranked number one in *lockdown regulatory freedom* and 144th in the unadjusted EFW index. Seychelles ranked 69th in the unadjusted EFW index, and its ranking improved by 35 and 10 spots following adjustments 1 and 2, respectively. Belarus was ranked 80th in the unadjusted EFW index, improving 31 spots to 49th after the first adjustment method. Tanzania's ranking improved 28 spots from 96th to 68th in the world after adjustment 1.

In contrast, the top five decreasing countries after adjusting for lockdown regulations include several developed countries, who initially ranked high in economic freedom. The Bahamas' ranking fell the most, from 68th to 106th, after adjustment 1. It was in among the top five decreases after adjustment 2 as well, falling to 81st in the world. Italy is ranked 42nd in the unadjusted EFW index. Following adjustment 1, it drops 26 spots to 68th. Italy is among the five largest dropping countries in adjustments 1, and 2, and its lockdown indicators were extremely low across the board. Peru falls 25 spots in the rankings after the first adjustment method. Three of its eight lockdown indicators were below 1 (*school closings*, *cancel public events*, and *restrictions on gatherings*). Its highest lockdown indicators were for *close public transport* which was still a low 4.54.

Kazakhstan was also among the countries falling farthest in the rankings following both adjustment methods. It fell 26 spots from 47th to 73rd after adjustment 1. Oman rounds out the list of countries falling the most in the rankings by dropping 26 after adjustment 1, from 90th to 116th.

4.2.2 Other countries of interest

Taiwan moves up from 23rd to 7th in the EFW rankings after adjustment 1. Taiwan is also among the top five countries to increase their rank the most using adjustment 2, moving up 12 spots to 11th.

⁶See <https://www.nytimes.com/2021/01/13/world/asia/china-covid-lockdown.html> (accessed 15 April 2022).

Table 2. Adjusted EFW scores for each adjustment method (ranked from most to least free)

Countries	Unadjusted EFW score	Countries	Adjustment 1 EFW score	Countries	Adjustment 2 EFW score
Hong Kong SAR, China	8.59	Hong Kong SAR, China	7.89	Hong Kong SAR, China	8.45
Singapore	8.48	New Zealand	7.88	Singapore	8.34
Switzerland	8.37	Singapore	7.77	Switzerland	8.28
New Zealand	8.27	Switzerland	7.76	New Zealand	8.23
Denmark	8.09	Japan	7.74	Denmark	8.04
Australia	8.04	Denmark	7.66	Estonia	7.93
United States	7.97	Taiwan	7.62	Mauritius	7.91
Estonia	7.95	Estonia	7.58	Japan	7.89
Mauritius	7.88	Mauritius	7.57	United States	7.83
Ireland	7.86	Finland	7.35	Australia	7.83
Japan	7.82	Iceland	7.34	Taiwan	7.77
Lithuania	7.82	Lithuania	7.30	Lithuania	7.76
Canada	7.81	Latvia	7.24	Iceland	7.74
Georgia	7.78	United States	7.22	Latvia	7.70
Latvia	7.77	Bulgaria	7.21	Canada	7.69
Czech Republic	7.75	Norway	7.21	Ireland	7.69
Netherlands	7.75	Czech Republic	7.18	Czech Republic	7.67
Romania	7.74	Netherlands	7.17	Netherlands	7.67
Iceland	7.73	Sweden	7.15	Finland	7.66
Malta	7.72	Malta	7.11	Romania	7.65
United Kingdom	7.71	Canada	7.11	Bulgaria	7.65
Bulgaria	7.69	Romania	7.10	Malta	7.63
Taiwan	7.68	Australia	7.06	Georgia	7.61
Germany	7.65	Luxembourg	7.03	Norway	7.57
Albania	7.64	Austria	7.00	United Kingdom	7.57
Finland	7.64	Ireland	6.98	Sweden	7.54
Spain	7.63	Costa Rica	6.95	Costa Rica	7.54
Costa Rica	7.62	Georgia	6.91	Germany	7.51
Cabo Verde	7.60	United Kingdom	6.90	Austria	7.50
Guatemala	7.59	Brunei Darussalam	6.87	Albania	7.50
Norway	7.58	Germany	6.86	Luxembourg	7.49
Austria	7.56	Cyprus	6.83	Spain	7.48
Sweden	7.56	Albania	6.82	Cabo Verde	7.43
Chile	7.56	Seychelles	6.81	Guatemala	7.42
Luxembourg	7.54	Portugal	6.81	Cyprus	7.40

(Continued)

Table 2. (Continued.)

Countries	Unadjusted EFW score	Countries	Adjustment 1 EFW score	Countries	Adjustment 2 EFW score
Peru	7.50	Nicaragua	6.79	Portugal	7.37
Cyprus	7.49	Spain	6.78	Bahrain	7.34
Bahrain	7.47	Korea, Rep.	6.77	Korea, Rep.	7.34
Panama	7.45	Hungary	6.77	Chile	7.33
Portugal	7.43	Botswana	6.75	Botswana	7.27
Korea, Rep.	7.42	Uruguay	6.73	Panama	7.26
Italy	7.40	Slovak Republic	6.73	Slovak Republic	7.26
Jamaica	7.38	Cabo Verde	6.71	Peru	7.26
Belgium	7.37	Bahrain	6.70	United Arab Emirates	7.25
Jordan	7.37	Guatemala	6.70	Belgium	7.23
Dominican Republic	7.36	Cambodia	6.69	Hungary	7.22
Botswana	7.35	Croatia	6.68	France	7.21
Israel	7.35	United Arab Emirates	6.67	Israel	7.21
Malaysia	7.35	Belarus	6.65	Jordan	7.20
United Arab Emirates	7.35	Belgium	6.60	Dominican Republic	7.19
Kazakhstan	7.35	France	6.58	Brunei Darussalam	7.17
Slovak Republic	7.33	Gambia, The	6.57	Jamaica	7.17
France	7.33	Barbados	6.54	Italy	7.16
Mongolia	7.30	Israel	6.53	Croatia	7.14
Hungary	7.24	Chile	6.51	Mongolia	7.13
Gambia, The	7.23	Panama	6.50	Malaysia	7.13
Brunei Darussalam	7.21	Jordan	6.50	Cambodia	7.13
Uganda	7.18	Dominican Republic	6.46	Gambia, The	7.13
Croatia	7.16	Mongolia	6.45	Seychelles	7.11
Cambodia	7.13	Thailand	6.41	Kazakhstan	7.10
Mexico	7.12	Peru	6.40	Uruguay	7.10
El Salvador	7.12	Jamaica	6.37	El Salvador	7.00
Philippines	7.09	El Salvador	6.36	Barbados	6.98
Indonesia	7.09	Poland	6.36	Nicaragua	6.97
Uruguay	7.06	Malaysia	6.35	Indonesia	6.96
Moldova	7.05	Indonesia	6.31	Uganda	6.95
Honduras	7.04	Slovenia	6.31	Moldova	6.93

(Continued)

Table 2. (Continued.)

Countries	Unadjusted EFW score	Countries	Adjustment 1 EFW score	Countries	Adjustment 2 EFW score
Bahamas, The	7.02	Moldova	6.30	Mexico	6.92
Trinidad and Tobago	7.01	Italy	6.30	Belarus	6.92
Barbados	7.01	Tanzania	6.30	Slovenia	6.91
Seychelles	7.01	Greece	6.25	Trinidad and Tobago	6.89
Slovenia	7.00	Qatar	6.24	Philippines	6.89
Qatar	6.99	Trinidad and Tobago	6.23	Poland	6.87
Kyrgyz Republic	6.97	Kazakhstan	6.23	Qatar	6.87
Paraguay	6.96	Paraguay	6.18	Paraguay	6.84
Kenya	6.96	Kenya	6.16	Thailand	6.83
Poland	6.93	Tajikistan	6.16	Kenya	6.82
Rwanda	6.90	Serbia	6.15	Honduras	6.81
Nicaragua	6.84	Zambia	6.14	Greece	6.78
Belarus	6.83	Mexico	6.13	Kyrgyz Republic	6.76
Serbia	6.82	Uganda	6.11	Bahamas, The	6.73
Greece	6.81	Philippines	6.09	Serbia	6.73
Saudi Arabia	6.78	Lao PDR	6.09	Rwanda	6.71
Thailand	6.78	Lesotho	6.04	Saudi Arabia	6.66
Kuwait	6.73	Saudi Arabia	6.03	Sri Lanka	6.62
India	6.72	Sri Lanka	6.02	Bosnia and Herzegovina	6.61
Sri Lanka	6.72	Benin	6.00	Tanzania	6.61
Bosnia and Herzegovina	6.72	Bosnia and Herzegovina	6.00	Tajikistan	6.60
Nigeria	6.70	Kyrgyz Republic	5.98	Zambia	6.58
Oman	6.65	Honduras	5.97	Nigeria	6.56
Russian Federation	6.62	Ghana	5.96	Kuwait	6.54
Tajikistan	6.60	Namibia	5.96	Russian Federation	6.51
Haiti	6.57	Haiti	5.95	Lao PDR	6.51
Namibia	6.57	Nigeria	5.94	Haiti	6.50
Zambia	6.56	Rwanda	5.93	India	6.50
Tanzania	6.55	South Africa	5.90	Namibia	6.49
Colombia	6.55	China	5.89	Lesotho	6.48
Morocco	6.55	Turkey	5.89	Benin	6.47
South Africa	6.55	Russian Federation	5.89	South Africa	6.47

(Continued)

Table 2. (Continued.)

Countries	Unadjusted EFW score	Countries	Adjustment 1 EFW score	Countries	Adjustment 2 EFW score
Nepal	6.54	Fiji	5.89	Ghana	6.46
Fiji	6.53	Liberia	5.87	Liberia	6.44
Lesotho	6.52	Colombia	5.82	Oman	6.44
Liberia	6.51	Somalia	5.79	Colombia	6.44
Ecuador	6.51	Brazil	5.78	Turkey	6.44
Benin	6.51	Kuwait	5.78	Fiji	6.42
Lao PDR	6.50	Bahamas, The	5.77	Morocco	6.37
Bhutan	6.49	Niger	5.75	Nepal	6.35
Ghana	6.49	Mozambique	5.70	Ecuador	6.35
Turkey	6.48	Vietnam	5.68	Vietnam	6.31
Vietnam	6.42	Papua New Guinea	5.68	China	6.30
Brazil	6.33	India	5.68	Brazil	6.30
Mozambique	6.27	Burundi	5.67	Bhutan	6.30
China	6.27	Timor-Leste	5.67	Mozambique	6.23
Belize	6.23	Sierra Leone	5.67	Somalia	6.20
Azerbaijan	6.21	Burkina Faso	5.66	Togo	6.15
Djibouti	6.21	Senegal	5.65	Papua New Guinea	6.14
Togo	6.19	Oman	5.65	Burkina Faso	6.12
Papua New Guinea	6.17	Mauritania	5.64	Mauritania	6.10
Bolivia	6.15	Ecuador	5.64	Djibouti	6.09
Burkina Faso	6.15	Morocco	5.63	Senegal	6.09
Mauritania	6.13	Togo	5.62	Sierra Leone	6.07
Ukraine	6.11	Nepal	5.59	Tunisia	6.07
Madagascar	6.10	Tunisia	5.58	Niger	6.06
Tunisia	6.09	Cote d'Ivoire	5.55	Belize	6.05
Senegal	6.05	Bhutan	5.53	Madagascar	6.03
Pakistan	6.03	Yemen, Rep.	5.51	Timor-Leste	6.02
Somalia	6.03	Djibouti	5.50	Azerbaijan	6.01
Cote d'Ivoire	6.01	Malawi	5.46	Bolivia	6.01
Sierra Leone	5.98	Madagascar	5.45	Ukraine	6.00
Malawi	5.98	Mali	5.41	Cote d'Ivoire	6.00
Niger	5.97	Ukraine	5.38	Malawi	5.95
Timor-Leste	5.94	Bolivia	5.34	Pakistan	5.91
Myanmar	5.93	Belize	5.33	Yemen, Rep.	5.88
Angola	5.91	Cameroon	5.30	Mali	5.86

(Continued)

Table 2. (Continued.)

Countries	Unadjusted EFW score	Countries	Adjustment 1 EFW score	Countries	Adjustment 2 EFW score
Bangladesh	5.89	Pakistan	5.25	Burundi	5.85
Mali	5.85	Azerbaijan	5.22	Angola	5.79
Guinea	5.84	Angola	5.16	Cameroon	5.75
Guyana	5.82	Eswatini	5.11	Myanmar	5.73
Suriname	5.81	Guinea	5.07	Guinea	5.72
Eswatini	5.76	Central African Republic	5.06	Guyana	5.69
Cameroon	5.76	Egypt, Arab Rep.	5.03	Bangladesh	5.68
Gabon	5.72	Guyana	5.02	Eswatini	5.68
Yemen, Rep.	5.67	Suriname	4.97	Suriname	5.67
Burundi	5.67	Myanmar	4.96	Egypt, Arab Rep.	5.57
Egypt, Arab Rep.	5.61	Chad	4.92	Gabon	5.54
Ethiopia	5.58	Bangladesh	4.89	Chad	5.48
Chad	5.55	Congo, Dem. Rep.	4.84	Central African Republic	5.48
Iraq	5.51	Gabon	4.81	Ethiopia	5.43
Lebanon	5.45	Ethiopia	4.74	Congo, Dem. Rep.	5.35
Central African Republic	5.40	Lebanon	4.66	Iraq	5.33
Congo, Dem. Rep.	5.36	Iraq	4.58	Lebanon	5.32
Algeria	5.12	Congo, Rep.	4.53	Congo, Rep.	5.06
Congo, Rep.	5.08	Iran, Islamic Rep.	4.37	Algeria	5.00
Iran, Islamic Rep.	4.96	Algeria	4.36	Iran, Islamic Rep.	4.92
Libya	4.95	Libya	4.12	Libya	4.80
Argentina	4.87	Syrian Arab Republic	4.10	Argentina	4.68
Syrian Arab Republic	4.63	Argentina	3.95	Syrian Arab Republic	4.62
Zimbabwe	4.48	Zimbabwe	3.79	Zimbabwe	4.39
Sudan	4.21	Sudan	3.76	Sudan	4.23
Venezuela, RB	3.32	Venezuela, RB	2.95	Venezuela, RB	3.32

Japan moves closer to the top of the index with each adjustment method, taking the number five spot in the world following adjustment 1 with an adjusted EFW score of 7.74. Using either adjustment method, Japan enters the top 10 in economic freedom.

Sweden is the 32nd most economically free country in the unadjusted EFW rankings, but its ranking rises following each adjustment method. It enters the top 25 after adjustment 1, moving up 13 spots to 19th with an adjusted EFW score of 7.15. Finland improves 15 spots following adjustment 1, ranking 10th with an adjusted EFW score of 7.35. Denmark falls one spot after adjustment 1 from fifth to sixth, because Japan's very high *lockdown regulatory freedom* score moved it past Denmark. Denmark maintains the fifth ranked spot following the second adjustment method. Norway entered

the top 25 following both adjustment methods, jumping 16 spots in the EFW rankings from 31st to 15th with a EFW score of 7.21.

New Zealand remains in the top five following each adjustment method. Since its lockdown restrictions were concentrated on its borders and international travel, it's not surprising their ranking remains largely unchanged. However, New Zealand's *lockdown regulatory freedom score* and its spot in the EFW rankings will likely fall in 2021, after its border lockdown policies failed to keep Covid out and it adopted stricter domestic pandemic regulations in response to outbreaks.

Australia, the 6th most economically free country in the unadjusted EFW rankings, falls to 23rd following adjustment 1. Its EFW score decreases from 8.04 to 7.06 (a 12% decrease). Australia's changes are arguably the most striking, considering their historically high economic freedom scores. Yet, with a very stringent lockdown approach – spread broadly across the lockdown indicators mentioned above – their EFW scores and ranking fall significantly. India falls 25 spots to 111th after the first adjustment method, with an adjusted EFW score of 5.68. Only two of its eight lockdown indicators are above 3 (*close public transport* and *stay at home*). However, as mentioned above, part of Australia's and India's fall in the rankings could also be due to lack of subnational data.

The first adjustment method caused the United States' biggest drop where its score falls to 7.22 and it ranks 14th. However, the United States remains in the top 10 following the second adjustment method. Though, given that the United States' score suffers with each adjustment (over a 10% decrease following adjustment 1), the varied approaches to lockdowns across each of the states limited the United States' overall fall in the EFW rankings.

United Kingdom and Canada's EFW rankings move like the United States'. The United Kingdom fell eight spots following adjustment 1 to 29th in the world. Its adjusted EFW score decreased by almost 12% from 7.71 to 6.90. Canada fell seven spots to 20th in the world after adjustment 1. Its adjusted EFW score fell to 7.11 – almost a 10% decrease from its unadjusted score (7.81). Canada's lockdown indicators varied at the subnational level, but not to the same extent as the variation between US states. Canada's highest scoring province for *lockdown regulatory freedom* received a 6.74 (Alberta) while its lowest scoring province received a 4.80 (Quebec) compared to US states ranging between 8.21 (North Dakota) and 2.65 (New Mexico).

Although China's EFW score falls, its ranking increases following each adjustment method because other countries around it in the unadjusted EFW rankings fell more. This stems from both the fact that China's *lockdown regulatory freedom score* was relatively high and because they were ranked relatively low in the unadjusted EFW index (112th). Adjustment 1 causes their biggest jump where they move up to rank 97th.

4.3 Comparing economic freedom in 2019 and 2020

Global economic freedom decreased substantially from 2019 to 2020. Our focus, thus far, has been to better adjust relative cross-sectional economic freedom between countries to account for 2020 pandemic regulations. Prior to 2020, there was no meaningful counterpart to most of these regulations, in most countries. Thus, essentially all countries would have received a perfect 10 on these measures in 2019 and all other prior years. Our adjustment captures a time-series change in economic freedom to the extent that readers agree that one of our two weighting schemes is appropriate for how we included these new restrictions. Other weighting schemes could mechanically increase or decrease the change in the global time-series of economic freedom relative to our weighting. However, governments had other policy responses, beyond the lockdown regulations that we account for above, that are picked up in the existing economic freedom index that is consistently measured across time. This allows us to compare how global economic freedom changed from 2019 to 2020, both with, and without our additional lockdown regulatory adjustment. It also allows us to see if the *lockdown regulatory freedom* measure we incorporate impacts the change in relative ranks among countries from 2019 to 2020 compared to how the rankings in economic freedom change using the unadjusted index.

The unadjusted economic freedom index fell 2.61% from 2019 to 2020.⁷ This is the largest one-year decline in economic freedom ever recorded and more than twice as large as the next biggest drop, which occurred during the financial crisis from 2007 to 2008. In addition to the domestic lockdown regulations, most countries around the world significantly restricted international travel. This restriction is picked up in Area 4, *Freedom to Trade Internationally*, of the index with the 4Diii *Freedom of Foreigners to Visit* measure. That measure decreased from a global average of 7.07 in 2019 to 1.39 in 2020 contributing to the average Area 4 score decreasing 7%. Governments around the world also implemented large fiscal stimulus packages in the name of offsetting the contractionary nature of their pandemic regulatory restrictions and providing liquidity. These increases in government spending are picked up in Area 1, *Size of Government*, of the EFW index. The average Area 1 score fell 2.46% from 2019 to 2020. Area 2 (*Legal System and Property Rights*) and Area 3 (*Sound Money*) see small changes in the unadjusted EFW index. Area 2, somewhat surprisingly, increases from 2019 to 2020, though only by 0.86%. Area 3 decreases by 1.01%. While many countries monetized portions of their fiscal stimuli, this monetization did not make it into measured inflation rates until after 2020, thus limiting the impact on Area 3. Area 5, *Regulation*, decreased by 2.94% in the unadjusted index. This change was driven primarily by component 5A, *Credit Market Regulations*, of the index which decreased 6.3% from 2019 to 2020.

Although some areas of the unadjusted EFW index pick up decreases in economic freedom caused by pandemic responses, and this results in a substantial decrease in measured global economic freedom, it underestimates the true global decrease, since it misses the major regulatory responses that decreased economic freedom. The global decrease in economic freedom grows from 2.61 to 12.07% using our first adjustment method and to 3.83% using our second method.

Our adjustment also allows us to see how relative changes in rankings are impacted by our regulatory adjustment compared to how the unadjusted index rankings changed from 2019 to 2020. There are substantially larger changes in relative rankings once we include our *lockdown regulatory freedom* adjustment. The standard deviation in rankings between countries from 2019 to 2020 was 9.84 in the unadjusted index but that increases to 16.72 once we use adjustment 1 to account for the lockdown regulations. Our adjustment also impacts who the biggest movers are and significantly impacts how much the rankings of some major countries of interest change.

Table 3 lists the five countries that increase their rankings the most from 2019 to 2020 and decrease their rankings the most over that same period using both the unadjusted index and our adjustment method 1. Tajikistan is the only country that appears on both the adjusted and unadjusted list of five biggest increases in relative ranking and Lebanon and the Bahamas are the only two countries in common among the biggest decreases in rankings.

Table 4 contains major countries of interest and lists their unadjusted change in relative economic freedom rank from 2019 to 2020 and their change in rank using our first adjustment method. Australia, Canada, India, and Italy all increase their relative economic freedom ranking in the unadjusted index, while they all decrease their relative economic freedom ranking once we account for lockdown regulations. Conversely, Finland, New Zealand, and Taiwan decrease their relative economic freedom ranking in the unadjusted index, while they increase their rankings after we adjust for pandemic lockdown regulations. China remained unchanged in its ranking in the unadjusted index but rose 15 spots after our adjustment. The United States and United Kingdom both decrease their rankings with the unadjusted and adjusted index, but both fall significantly more spots once we adjust for the lockdown regulations. Similarly, Sweden, Norway, Iceland, and Japan all increase their relative rankings with both the unadjusted and adjusted indexes, but all rise significantly more spots with our lockdown regulation adjusted index.

Adjusting the EFW for lockdown regulations substantially impacts the change in the relative ranking of countries from 2019 to 2020. Overall, out of 160 countries, we find 22 that increased their

⁷This percentage is calculated after dropping the five countries mentioned above, who did not have lockdown data. Other statistics mentioned in this section take this into account.

Table 3. Biggest movers from 2019 to 2020 in unadjusted and adjusted EFW indexes

Unadjusted top 5 increases	Change in rank	Adjusted top 5 increases	Change in rank	Unadjusted top 5 decreases	Change in rank	Adjusted top 5 decreases	Change in rank
Bahrain	+25	Nicaragua	+43	Lebanon	−57	Lebanon	−58
The Gambia	+23	Tajikistan	+39	Seychelles	−28	The Bahamas	−56
Tajikistan	+23	Belarus	+36	Guyana	−25	Belize	−36
Haiti	+21	Brunei Darussalam	+34	Somalia	−22	Bhutan	−36
India	+19	Burundi	+33	The Bahamas, Bhutan, Zambia	−18	Rwanda	−33
<i>Average</i>	<i>22.2</i>		<i>37</i>		<i>−30</i>		<i>−43.8</i>

Table 4. Countries of interest and their change in rank from 2019 to 2020

Countries of interest	Change in unadjusted index rank	Change in adjusted index rank
Australia	3	-14
Canada	1	-6
China	0	15
Sweden	3	17
Finland	-5	10
Denmark	5	4
Norway	5	21
Iceland	3	11
India	19	-4
Italy	3	-23
Taiwan	-7	9
Japan	6	12
United Kingdom	-9	-17
United States	-1	-8
New Zealand	-1	1

economic freedom ranking in the unadjusted index from 2019 to 2020, but that decreased in ranking once we add in our *lockdown regulatory freedom* measure using adjustment 1, and 13 using adjustment 2. Similarly, we find 22 countries who decreased their economic freedom ranking in the unadjusted index from 2019 to 2020, but who increased in ranking once we add in our *lockdown regulatory freedom* measure using adjustment 1, and nine using adjustment 2. Overall, the direction of movement, within the rankings, switches direction for 27.5% of countries once we adjust for lockdown regulatory restrictions using adjustment 1 (13.75% using adjustment 2). We also find that our adjustment significantly impacted the magnitude of the change in rankings even for countries who moved in the same direction from 2019 to 2020 in both the unadjusted and adjusted index. Out of the countries that move in the same direction in the unadjusted and our adjusted index, the difference in the number of ranking spots they move between the unadjusted and adjusted indexes is greater than one standard deviation in 32% of those countries using adjustment 1 and 6% using adjustment 2.

Measured economic freedom decreased substantially around the globe because of governments' pandemic response policies. Some of these responses are picked up in the existing economic freedom index but a substantial number of the important regulatory policies were not picked up precisely because they were new areas of government intervention. Our adjustment for these lockdown economic freedom regulations can enrich discussions of the scale and scope of the global decrease in economic freedom caused by pandemic responses. Our lockdown adjustment also substantially changes our understanding of the relative ranking of countries in their 2020 economic freedom.

5. Conclusion

Governments around the world responded to the emergence of the Covid-19 pandemic by instituting new, and sometimes novel, regulations that significantly restricted people's economic freedom. We transform the *Lockdown Stringency Index* into a *Lockdown Regulatory Freedom* index that measures the extent to which countries' new pandemic regulations restricted economic freedom. We used the new *Lockdown Regulatory Freedom* indicators to adjust the 2020 economic freedom scores from the

Economic Freedom of the World Annual Report, to better account for how countries differed in their economic freedom during 2020.

The value of our contribution is twofold. First, our adjustment helps us better understand the scope and scale of the global decrease in economic freedom and how decreases in economic freedom stemming from the pandemic response impacts the relative ranking of countries' economic freedom in 2020. Unadjusted global economic freedom fell 2.61% from 2019 to 2020. Adding in the decreased economic freedom from pandemic lockdown regulations grows the global decline in economic freedom to 12.07% using our first adjustment method and to 3.83% using our second method. Our adjustment also substantially affects the relative rankings of which countries move the most and the direction within the rankings in which they move. Using our first adjustment method 27.5% of countries move in a different direction in the EFW rankings between 2019 and 2020 than they do if the index is left unadjusted.

Second, our contribution is a valuable input to future research. It was beyond the scope of this study to evaluate the tradeoffs associated with pandemic regulatory restrictions. The *Economic Freedom of the World Annual Report* has been a valuable input, as an institutional measure, to hundreds of papers that have investigated how institutions of economic freedom are related to a vast array of developmental and other outcomes. Our adjusted economic freedom index can be used in future research for cross-sectional research evaluating tradeoffs caused by pandemic responses in 2020.⁸ Additionally, our *lockdown regulatory freedom* index can be used as a standalone measure investigating tradeoffs involved with pandemic responses independent of how it impacted overall economic freedom.⁹

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⁸To access our adjusted 2020 economic freedom index presented in this article electronically please visit: <http://www.benjaminpowell.com/Lockdownadjustedefw.html>

⁹An online Appendix contains our lockdown regulatory freedom index with international travel restrictions added back in for researchers who want a more comprehensive lockdown measure when using it without the EFW index, which included its own measure of international travel restrictions. To access this index electronically please visit: <http://www.benjaminpowell.com/lockdownregulatoryfreedomstandalone.html>

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