The Economic Impact of COVID-19 Lockdowns on US States

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Abstract

This paper aims to provide an in-depth study on the economic impact of COVID-19 lockdowns on specific US states, which has not been completed to this specificity yet. Economic impact studies are used to help make both local and state policy decisions. These policy decisions are vitally important to ensure future pandemics can be effectively handled. This paper will include data about several economic and health statistics for each state in the hopes that it will help shape public policy for pandemics in the foreseeable future.

Introduction

Over two years ago, the world as we knew it changed forever. Transportation stopped, businesses closed, and millions lost their jobs -or worse. The COVID-19 pandemic has forced society to transform the way we live through its many variants and ever-changing health protocols. 2020, the year COVID-19 made its entrance to America, was also coincidentally a Presidential election year- one that promised to be one of the most controversial of all time. With the polarization of parties comes the polarization of policies, and responses to the pandemic were a hot topic going into November. Some states adopted policies that shut down economic activity for months, while others did little at all. Lockdowns brought with them unemployment, business closures, and the evaporation of tourism. Meanwhile, hospitals overflowed with patients, stores ran out of essential goods, and millions were stuck inside their homes.

With restrictions across the country starting to unwind, the goal of this study is to better understand if the economic impact of lockdowns was worth the control of COVID-19 cases, if there were any at all. For the future, inevitably, there will be another pandemic. The hope is that this study can help governments, businesses, and society in general with their pandemic response in the future. Such a study has not been completed on this scale before, and by comparing the differences between states, new inferences and conclusions can hopefully be drawn. In the paper, four states will be examined- California, Florida, New York, and Texas. Each of which had their own unique responses to the pandemic but can be split in half with their governors' political party- with California and New York being Democratic and Florida and Texas being Republican.

These four states are also the four most populated in America. Despite the political influence that surrounds the issue at hand, it is the hope that biases can be removed from the analysis and strictly look at the statistics that are involved.

Statistics in this study are from a variety of vetted sources, including the U.S. Bureau of Labor Statistics, the Federal Reserve Bank of St. Louis, and each state's Department of Health. All data that is used is public, with all of the sources being unbiased and without political party affiliation. As previously mentioned, this project is not intended to advance a political agenda, but instead help shape public policy in the event of a future pandemic. While interpretations of the data will be made, the average person reading this project should be able to come to similar conclusions, with any complex economic terminology being simplified for the average person outside the discipline to understand.

Speaking of economic terminology, each statistic, both economic and health, was chosen for a specific purpose. Gross domestic product (GDP) is the monetary value of all the finished goods and services made within a country over a period of time. GDP is one of the most common indicators used to track the health of an economy. A healthier economy will produce more goods and services, and vice versa. Evaluating a state's GDP by quarter (3 months out of the year) will allow the ability not only to see changes in output for an entire year, but also differences as lockdowns went into effect in the early months of the pandemic. Unemployment rates will also be examined. The unemployment rate is the number of unemployed workers divided by the labor force. To be considered unemployed, you must not have a job, but also have actively looked for a new one in the past four weeks. Unemployment rates are a great economic indicator of the health of an economy. It gives an insight into joblessness, as well as the growth rate of the economy. It's a lagging indicator, which means it measures the effect of an economic event like a recession. This is perfect to examine during the pandemic and the recession that followed. Like GDP, changes by quarter will be looked at to see any trends and changes. The third and final statistic that will be examined is the labor force participation rate (LFPR). A state's labor-force participation rate is the total number of employed and unemployed workers divided against the state's population. In layman's terms, it's the measure of labor force in an economy. When combined with unemployment rate, it helps give deeper insight as it also contains those who are unemployed and aren't looking for jobs. By using both statistics in this paper, it will allow for better inferences to be made by comparing the data collected.

Health wise, the statistics chosen are the most readily available when it comes to the pandemic, but also paint the clearest picture. A positive test means that the person who has taken the test has COVID-19. Testing is a very important resource to identify the spread of the virus and to take steps to mitigate any future outbreaks. A higher number of positive tests in a state indicates the amount COVID-19 has been known to spread, although the number is likely much larger due to asymptomatic cases. Other statistics that I will be including are hospitalizations and deaths caused by COVID-19. While these are more common statistics used when discussing the impact of the pandemic, their economic impact will reverberate long after they are gone. By utilizing these statistics for every state, they can be evaluated on a fair, level playing field.

When defining what lockdowns mean in this paper, the goal was to choose measures that limited economic activity in some way. These measures are calculated monthly starting when they were put into effect in each state. From there, regression analyses will be run to see if they had any effect on health statistics. The measures chosen include shutdown of indoor entertainment, reduced indoor capacity, travel quarantine requirements from state to state, company vaccine requirements, and mask mandates. All of these effect a business' ability to generate revenue and the labor force that they can employ.

As previously mentioned, each state was chosen with a purpose. This was not a case of throwing darts on a United States map and choosing where they landed, but rather a targeted effort to capture the big picture in America. Preliminary data has shown that excessive lockdowns haven't resulted in the positive health benefits officials were looking for in comparison to economic decrease, but there are a variety of other factors that need to be evaluated when coming to these conclusions, such as population density, population obedience, and cultural influences. Over the course of this paper, these factors and more will be analyzed, trying to discover what worked and what didn't.
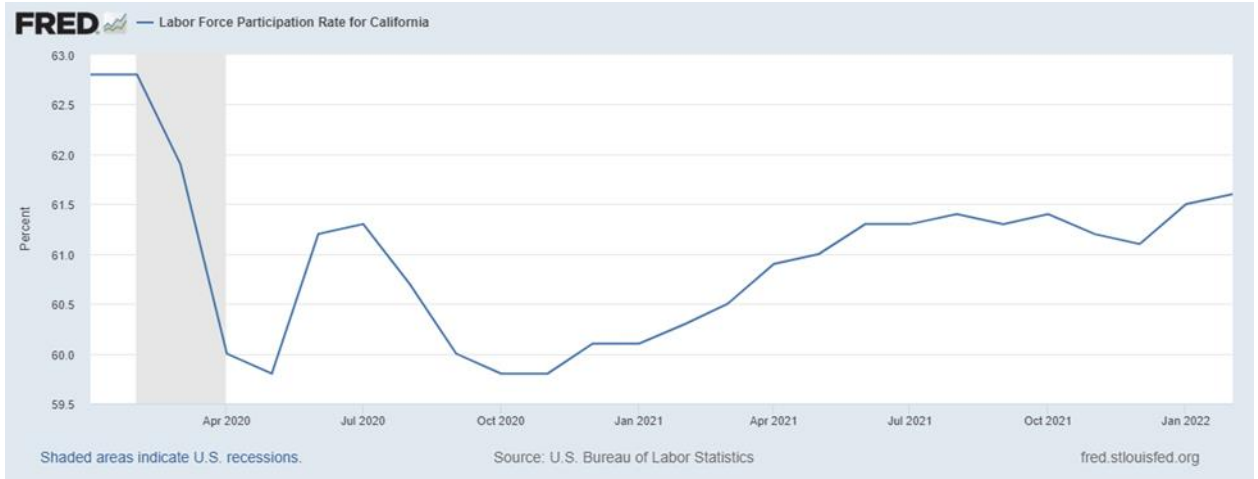
CALIFORNIA

Under Governor Gavin Newsom, California became the first state to issue a statewide stay-at-home-order in March of 2020. Within a month, several northern California counties expressed disagreement with the order, and by 6 weeks, counties were openly defying it. After a few months, the state began to re-open, but it was short-lived. A spike in cases led to a second lock-down in July. By November, California was the second state to reach a million cases (behind Texas), still cycling back and forth between curfews, lockdowns, and de-escalation of

regulations (Shannon). Up through early 2022, these cycles continued as new variants of COVID-19 wreaked havoc on America. Those cycles can coincidentally also be seen in a slow recovery in a few economic areas.

      Looking at unemployment rates, California was hovering around 4.1% in February 2020. Within the next three months, it experienced a 293% increase to a pandemic high of 16.1%. Its' recovery briefly slowed in July 2020 and has steadily declined since. However, as of February 2022, the unemployment rate has still exceeded pre-pandemic levels, at 5.4% (CAUR).
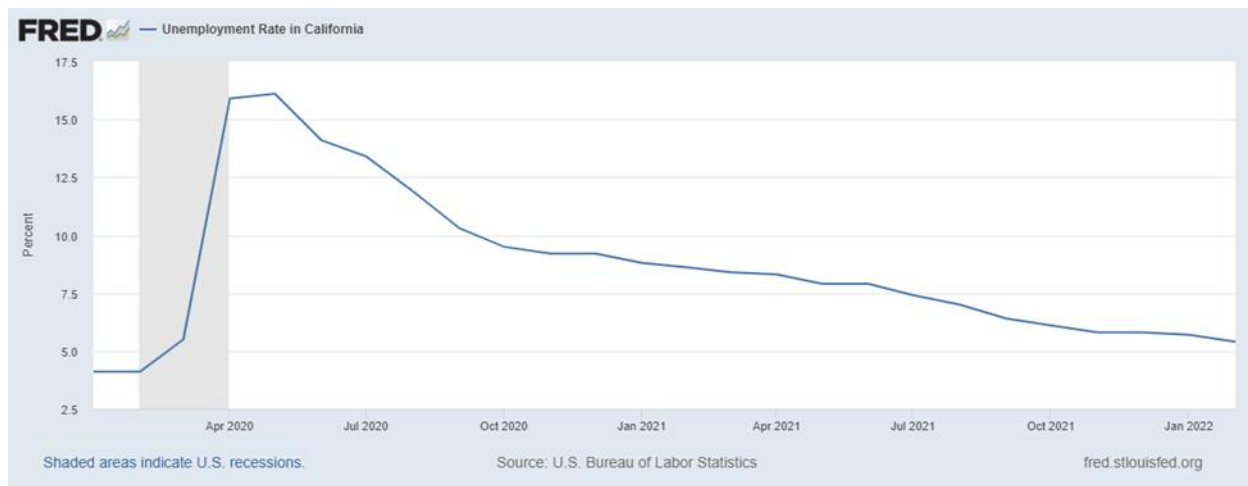
When looking at labor force participation rate (LFPR), lockdown effects can be seen even more clearly. Pre-pandemic, the LFPR for California stood at 62.8. By May, it was down to 59.8, the lowest level since the statistic began being calculated in 1976. Despite a brief recovery to 61.3 in July 2020, the ensuing lockdowns resulted in a drop back down to 59.8. It slowly recovered until December 2021, when Omicron's arrival resulted in a brief drop, until it rebounded to 61.5 as of February 2022. However, it should be noted that the LFPR has still not recovered to the pre-pandemic level (CALFPR).

After hearing about some of the labor statistics, one might be curious about gross state product. Q2 of 2020 was one of the worst in recorded history for the state of California, with a 9.24% decrease compared to Q1. Since that quarter, it has slowly increased and now is roughly 8.2% higher than pre-pandemic levels. Of course, the increase should be given with the context that it took over a year for the GSP to exceed pre-pandemic levels, with 2020 being the first year since the recession that this was the case (CAGSP). Why has California been able to climb out of the rut so successfully? A potential answer lies in Silicon Valley, with many tech companies being able to transition effectively to a remote work environment and business continuing to take off.
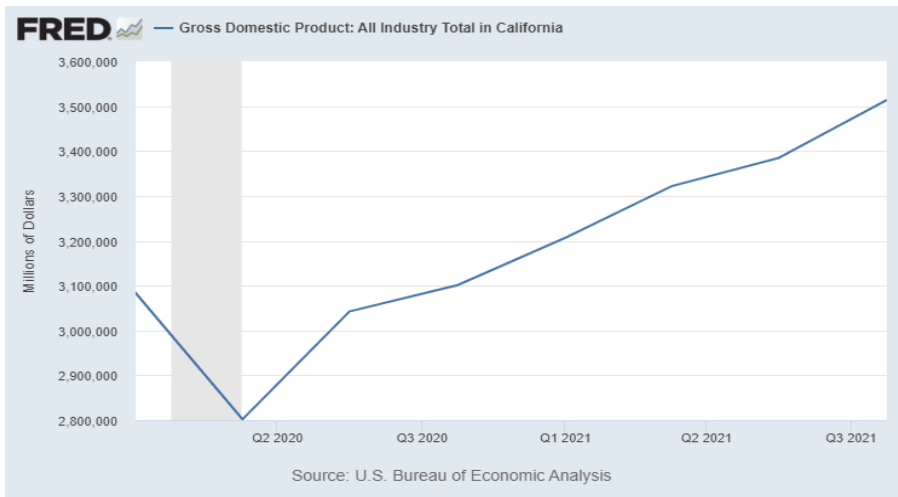
With the economic statistics examined, it's time for California's health statistics to be looked at. As of March 27th, 2022, according to the California Department of Health, there has been 8,503,930 cases of COVID-19, first in the United States, and roughly 10% of all cases in America. However, there must be context applied- there are over 39 million Californians,

making it the state with the largest population. Of those 8 million+ cases, 88,355 resulted in deaths as of March 13th, 2022, the most of any US state (NYT).
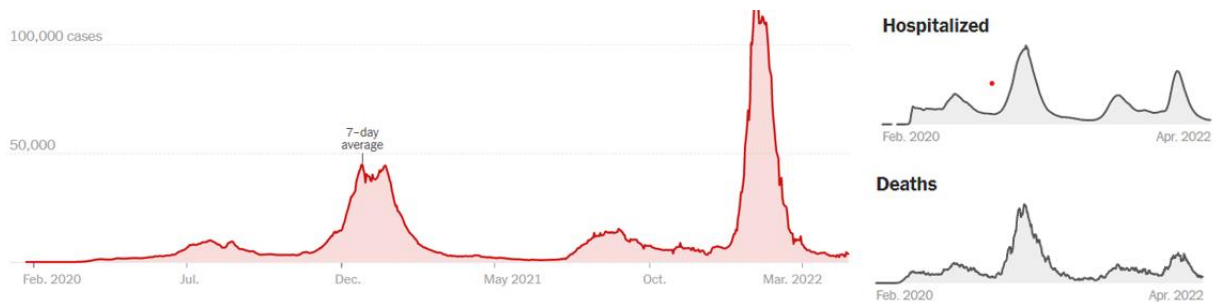
NEW YORK

The state of New York is no stranger to COVID-19 either. New York City was the epicenter of the pandemic early on, despite Governor Andrew Cuomo's confidence that New York was prepared for what was to come. In some cases, you could see the preparation Gov. Cuomo was talking about, with New York opening the country's first containment zone in New Rochelle in mid-March (Francescani). Cuomo's daily press briefings became national news, consistently broadcasted on major news networks, as other states braced for what was ravaging through New York.

For unemployment rates, levels were around 3.9% in February 2020 before shooting up to a high of 16.5% in May of that year, an increase of over 323%. It has steadily declined since then, now at 4.9%, still a point higher than two years earlier (NYUR).
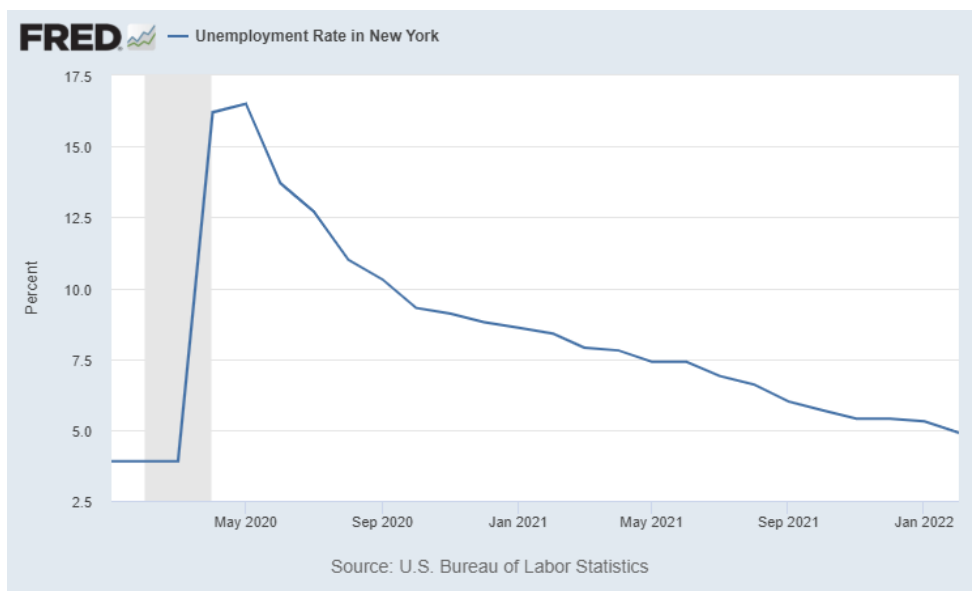
Labor force participation rate for New York, similarly to California, also shows the effects of lockdowns put in place for different variants. Pre-pandemic, LFPR was 61.0, before dropping to 57.7 in April 2020. It increased until July 2020, where a COVID resurgence brought to 58.2 for several months until February 2021. In March 2021, LFPR jumped up to 59.5, likely due to restrictions being lifted with the rollout of vaccines. It hovered around that number until a slight drop with the emergence of Omicron in late 2021 and has now leveled out at 59.1- 2 points below pre-pandemic levels (NYLFPR).


Gross state product for New York, as expected, experienced a sharp drop in quarter 2 of 2020, falling over 9.5%. It rebounded strongly in quarter 3, before a milder increase in

subsequential quarters. By quarter 2 of 2021, GSP had exceeded pre-pandemic levels (NYGSP).
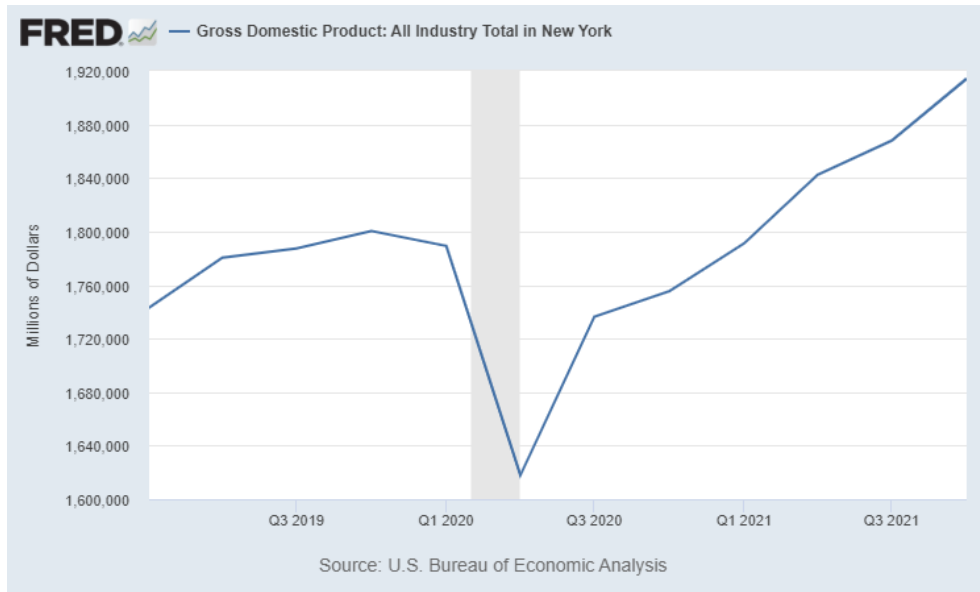
When looking at the health statistics, New York's early numbers were rather bleak. A total of 5,011,544 cases have been reported as of April 8th, 2022, with 67,387 of those cases resulting in fatalities. Most of New York's deaths came in the beginning of the pandemic, with April 2020 having the highest average deaths of any month for the state. Almost half the cases have come from New York City, the most densely populated municipality in the nation (NYT).
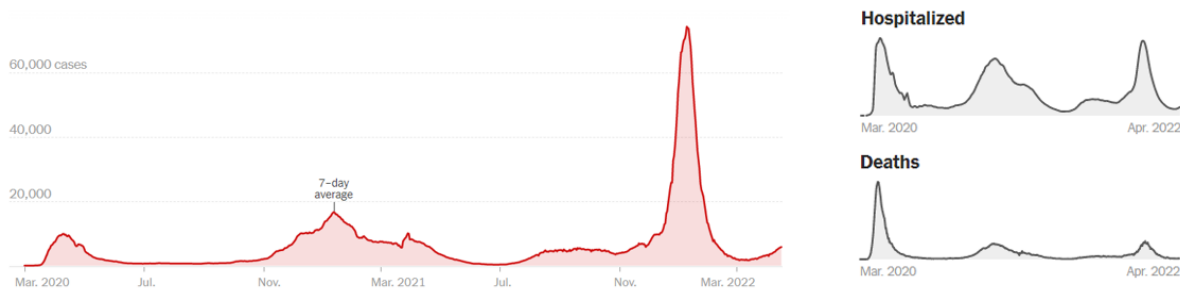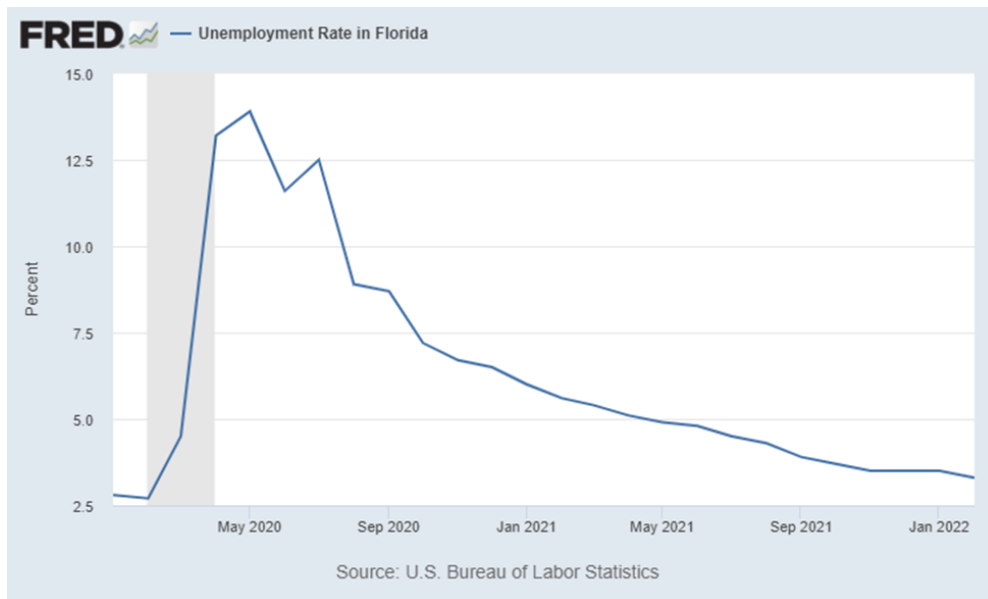

FLORIDA

While New York and California have been at least publicly hailed for their strict measures to combat the virus, there were several states who did not take the same approach. One of those states was Florida. For much of the pandemic, Florida posted more promising statistics than many states that had more imposing restrictions but battled large spikes in the second half of 2020 and late 2021 with Omicron. Governor Ron DeSantis has been vocal about his opposition

to lockdowns since the beginning of the pandemic in support of increased economic activity and keeping small businesses afloat. Has that been reflected in the statistics?

In February 2020, unemployment rate in Florida was at 2.7%, one of the lowest rates in the country. By May 2020, it peaked at 13.9%. It fell briefly, before a slight spike in July 2020. It has decreased, or stayed the same, every month since then, sitting at 3.3% as of February 2022 (FLUR).

Source: U.S. Bureau of Labor Statistics

Perhaps the biggest difference that can be seen from previous states is seen in the LFPR. In May 2020, LFPR reached its lowest point in recorded history for Florida, at 53.8. Within a month, it rebounded to 57.5 and has maintained mostly around that level, growing now to 58.6. While this number is lower than other states, it must also be noted that many Floridians are retired and/or elderly, with 20.9% being over the age of 65 in the 2020 Census. That's 4 points higher than the national average of 16.5% (Census Bureau). It should be more recognized how quickly Florida recovered unlike other states, taking only one month in comparison to

multiple ups and downs seen elsewhere (FLLFPR).
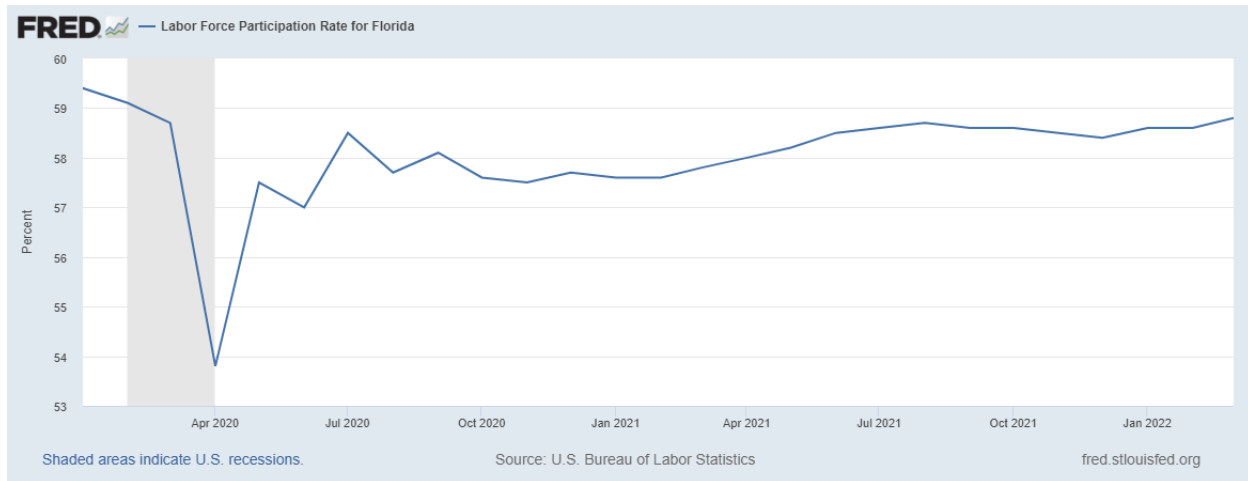
When looking at gross state product, Florida experienced an 8.7% decline in Q2 of 2020, but rebounded with an 8.15% increase in Q3. Since then, it has slowly increased every quarter (FLGSP).
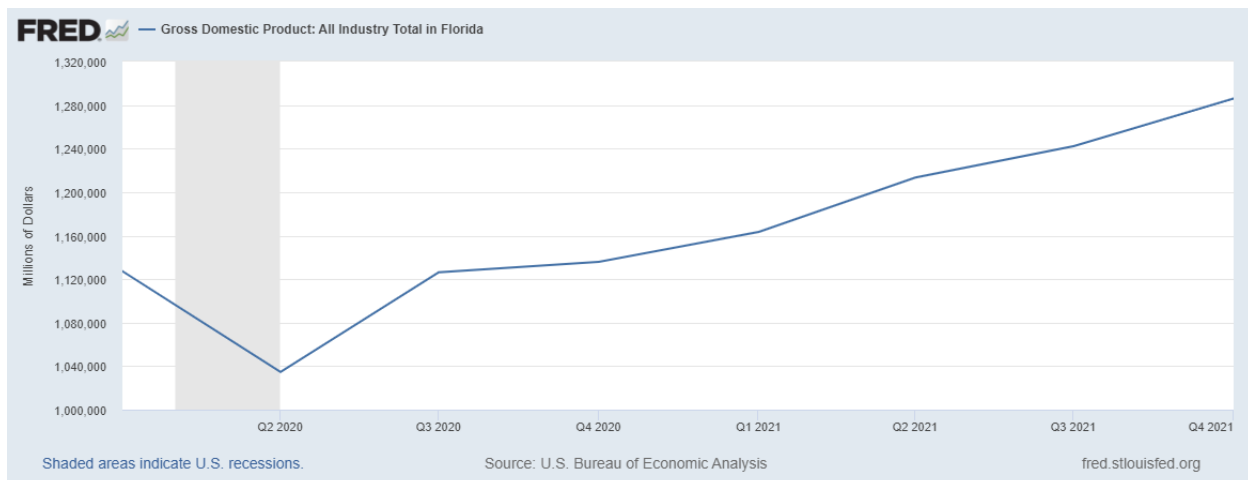

As of April 8th, there have been 5,862,817 confirmed cases of COVID-19 in Florida, with 73,538 deaths (NYT). As previously mentioned, it should be noted that Florida's population, unsurprisingly, is quite old- the most senior citizens by percentage in the nation (Census Bureau). With old age comes increased health risks, particularly with tougher strains of the virus.
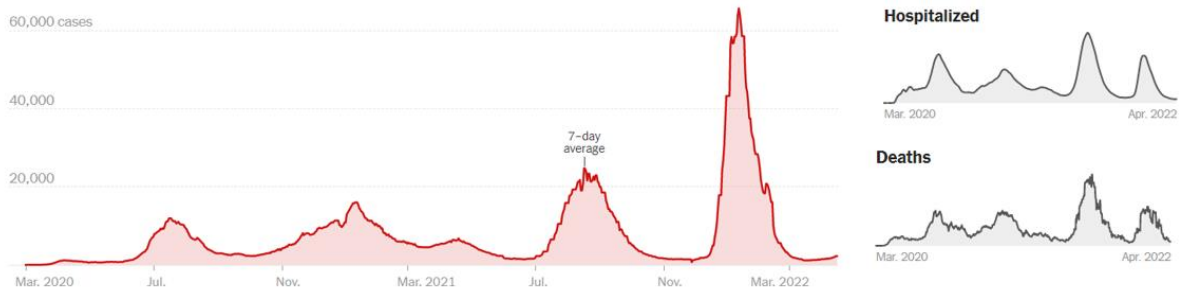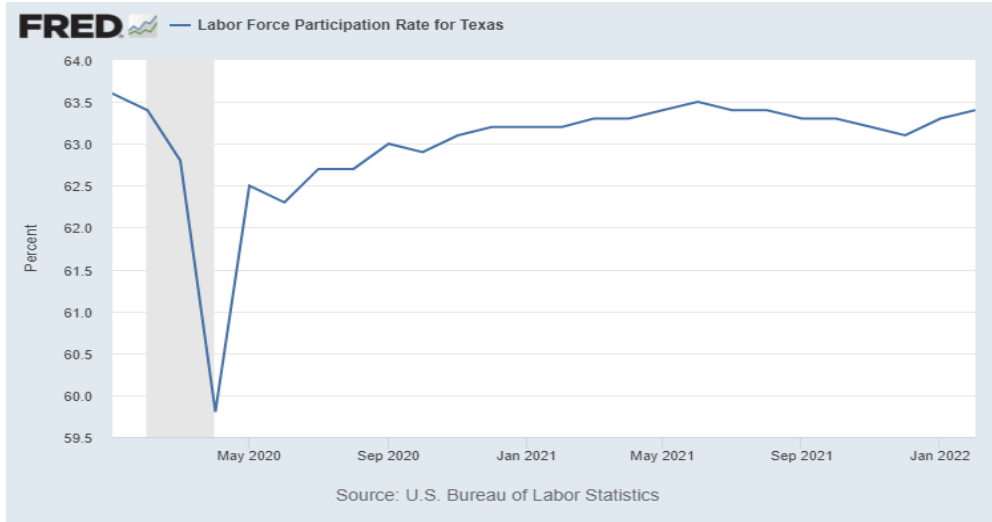
TEXAS

Finally, the Lonestar State – Texas. Texans have historically been known to be anti-government influence on their daily lives, but Governor Greg Abbott had several cycles of lockdowns throughout long stretches of 2020.

When looking at unemployment rate, pre-pandemic levels of 3.5% peaked at 12.6% in April 2020, and have decreased every month since, now at 4.7%. Despite some restrictions extending several months during the summer of 2020, it appears that this did not have a major effect on the unemployment rate (TXUR).
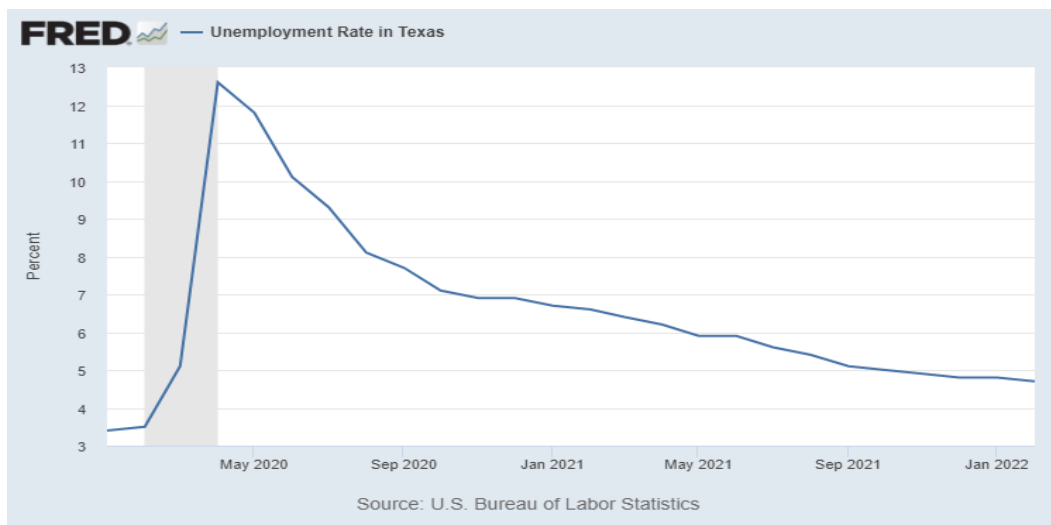
For labor force participation rate, a similar situation can be seen. Pre-pandemic levels of 63.4 dipped to a low of 59.8 in April 2020, before rebounding by June of that year to 62.5. Despite a couple ups and downs, it has steadily grown, and now sits at 63.4, once again at pre-pandemic levels (TXLFPR).

Source: U.S. Bureau of Labor Statistics

Gross state product, like all other states we've examined so far, dropped in Q2 by 11.2%, before rebounding and increasing every quarter since (TXGSP).

Source: U.S. Bureau of Economic Analysis
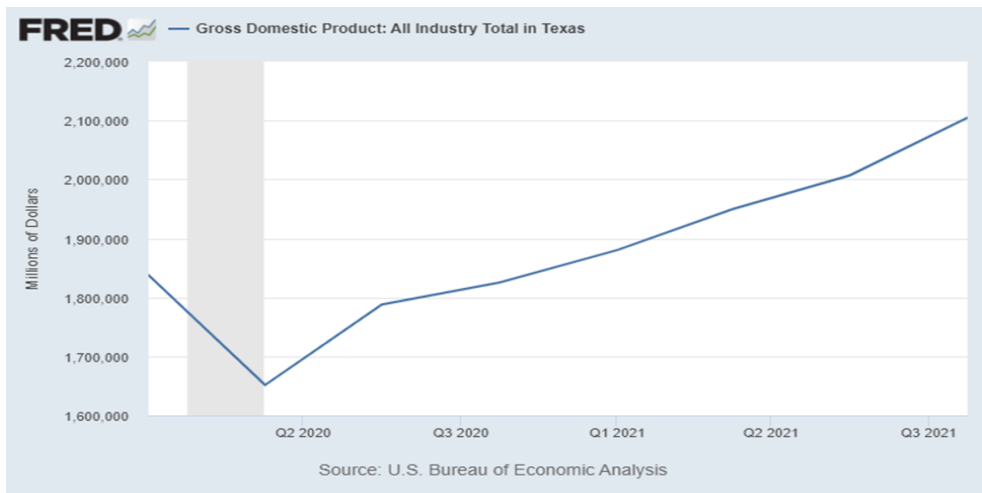
As of April 11th, 2022, Texas has 5,518,419 confirmed cases of COVID-19, with 86,241 of those cases resulting in fatalities, making it the state with the 2nd highest amount (NYT).
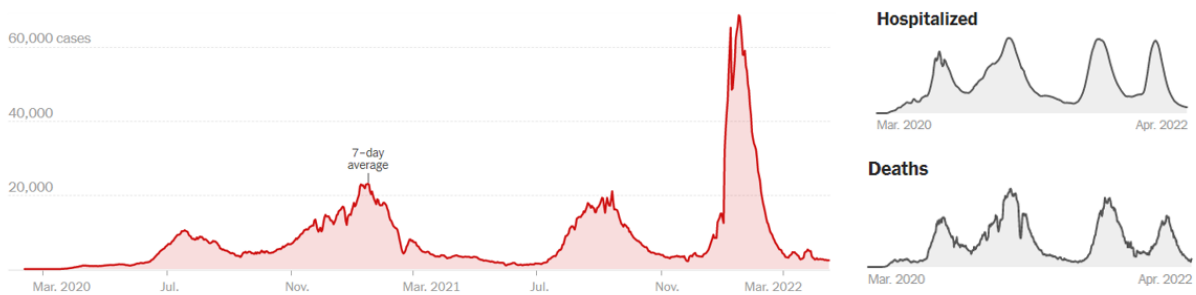
COMPARING STATES

After describing each state, it might be a little difficult to compare without putting them all together. By looking at graphs that include all four states, differences can be seen more clearly.

For unemployment rate, one can immediately tell that the peak for Florida and Texas was much lower than California and New York. Perhaps most notably in terms of takeaway, particularly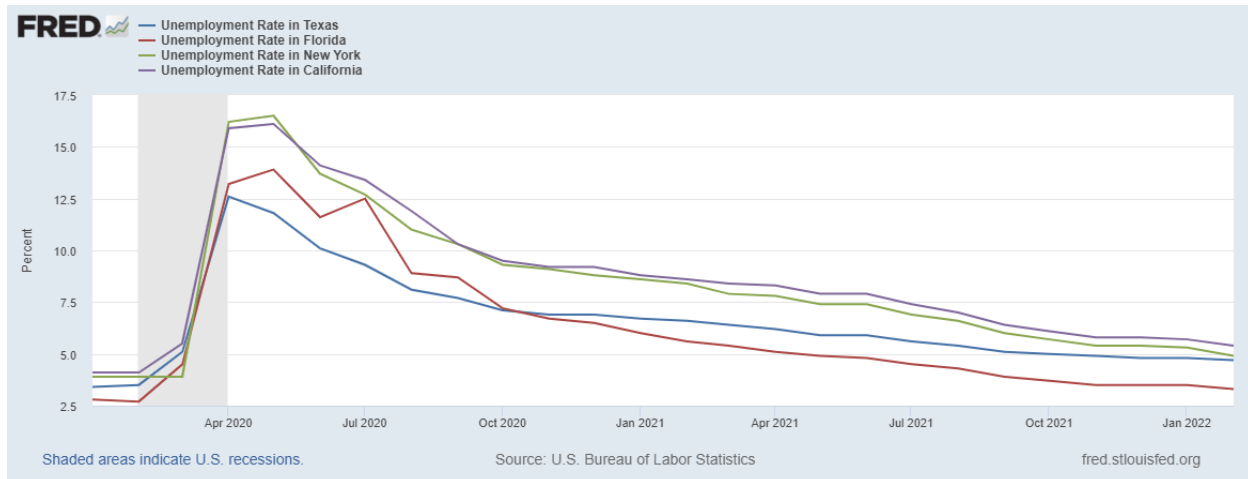 in Florida, recovery was much faster. An observation made was that the order of unemployment rates prior to the pandemic (from highest to lowest; California, New York, Texas, Florida) is the same order as of February 2022. In this statistic, it can be observed that those with more lockdowns implemented experienced higher unemployment rates and a slower recovery (FRED).

For labor force participation rate, differences are even more noticeable. When looking at decreases during the mass shutdowns of March and April, it can be noted that Florida's drop was the largest, but its recovery was the most pronounced. Texas and Florida did not experience the same up and down waves felt through the summer of 2020 as compared to California and New York, coinciding with increased lockdowns in those two states. Similarly, with

unemployment rate, the order of states prior to the pandemic is the same as of February 2022, however, it is clear to see the gap has been narrowed between Florida and New York (FRED).
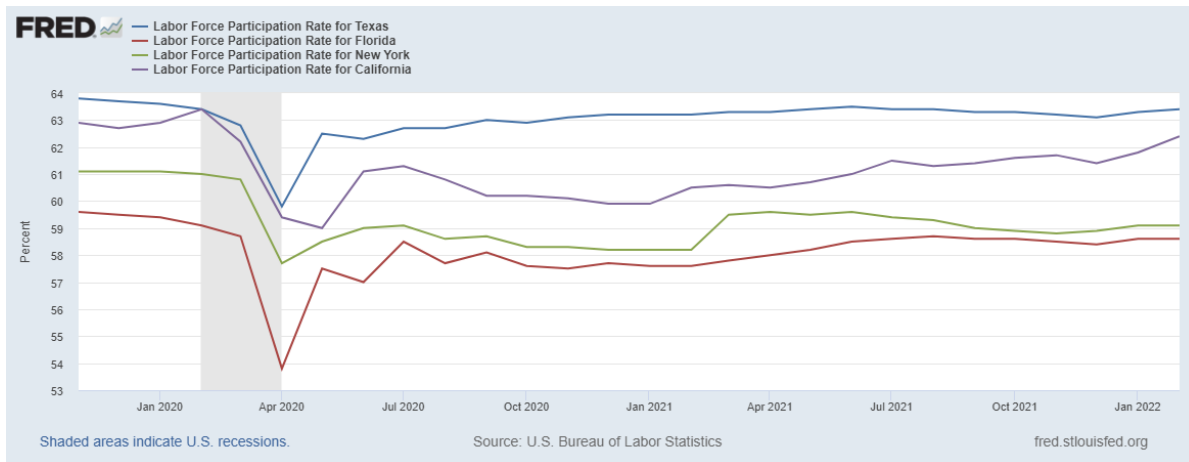
Gross state product is where the least differences can be seen. Every state has a higher GSP than pre-pandemic. One can observe that the gap between Texas and New York has expanded in the past couple months. That being said, every state experienced a decrease in Q2 of 2020, but has increased every quarter since (FRED).
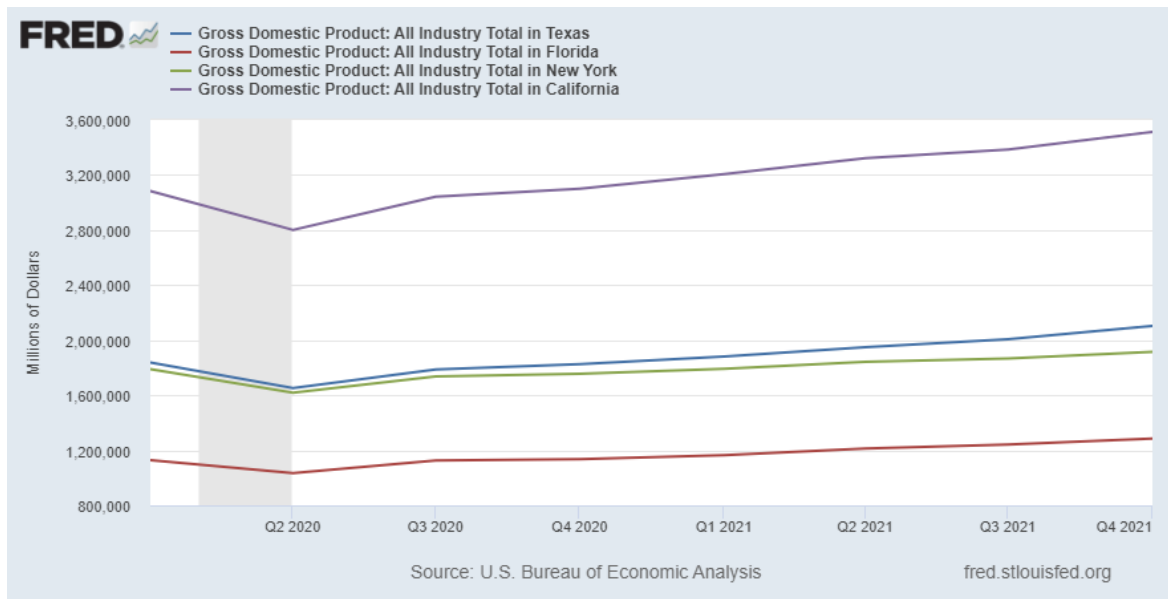
In terms of actual effectiveness of lockdowns considering their intentions, health statistics provide the greatest insight. When looking at cases, one might notice that the graphs are similar in many of their peaks, particularly when looking at the Omicron outbreak a few months ago. The Delta peak in the summer of 2021 is certainly more pronounced in Texas and Florida

than in CA and NY. Is this the result of lockdowns? It is not that simple to make such a conclusion. There are a variety of factors, most notably the introduction of vaccines. Texas and Florida have significantly less of their populations vaccinated, with gaps of 9% to the low teens (Johns Hopkins). However, vaccines themselves are not considered a lockdown, and thus are not within the specific scope of my paper. I decided to run a multiple regression analysis on different lockdown measures, with the dependent variable being measured of positive cases. Not every state publicly allows for the download of data, and only California and New York did so out of the four states that I researched from their respective Departments of Health. What I found they did not create particularly solid regression models, and rarely demonstrated any significance. Essentially, any relation the variables had were up to chance.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.59
R Square	0.34
Adjusted R Square	0.25
Standard Error	456708.95
Observations	26.00

ANOVA

	df	SS	MS	F	Significance F
Regression	3.00	2401175435397.55	800391811799.18	3.84	0.02
Residual	22.00	4588827462341.83	208583066470.08		
Total	25.00	6990002897739.38			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	174777.75	161471.00	1.08	0.29	-160092.60	509648.10	-160092.60	509648.10
Mask Mandate	962050.92	309193.42	3.11	0.01	320823.01	1603278.83	320823.01	1603278.83
Indoor Shutdown	710593.75	427212.11	1.66	0.11	-175389.93	1596577.43	-175389.93	1596577.43

Reduced	-839780.1				-1451166.	-228393.3	-1451166.	-228393.3
Capacity	7	294804.36	-2.85	0.01	99	4	99	4

As one can see in this analysis of Californian cases, the p-values of the mask mandate and reduced indoor capacity would indicate those lockdowns are statistically significant, but the adjusted R square of 0.25 indicates only 25% of the variability in the cases is explained by the independent variables (lockdown types). The 26 months that represent the observations can also be considered too low for a strong regression model, so it could be better in the future to examine weekly or daily data if possible. Another interesting takeaway is that, according to this model, during months with mask mandates, there were over 960,000 cases more, on average, than months without one. This doesn't make particular sense given the rhetoric around mask usage, and I would caution that statistical significance does not mean practical significance.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.64
R Square	0.41
Adjusted R Square	0.33
Standard Error	223585.93
Observations	26.00

ANOVA

	df	SS	MS	F	Significance F
Regression	3.00	771492898471.11	257164299490.37	5.14	0.01
Residual	22.00	1099794731211.51	49990669600.52		
Total	25.00	1871287629682.62			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	151279.82	76011.95	1.99	0.06	-6359.31	308918.95	-6359.31	308918.95
Mask Mandate	450364.31	128762.65	3.50	0.00	183326.92	717401.70	183326.92	717401.70
Reduced Capacity	-418302.91	137363.08	-3.05	0.01	-703176.51	-133429.31	-703176.51	-133429.31

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Indoor shutdown	-35695.50	119778.33	-0.30	0.77	-284100.55	212709.54	-284100.55	212709.54

When looking at the regression analysis for cases in New York, a lot of similarities can be seen with California's model. Mask mandates and reduced capacity are the only lockdown measures that returned with a statistically significant p-value. Like California, the data is saying that each month with a mask mandate actually increases cases in the state compared to months without one, on average. Reduced capacity once again has shown to decrease cases with a significant p-value. However, the model itself only returns an adjusted R square of 0.33, meaning only 33% of the variability in cases is explained by the independent variables. With the low number of observations, there's likely other variables out there that better explain the change in cases.

When looking at hospitalizations and deaths, the differences become more visible. TX and FL had very similar peaks and valleys, while CA and NY did not have the same spikes in later 2021 and early 2022. When looking at regression analysis at those two statistics, the lockdown policies were not found to be particularly significant as is displayed below.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.38
R Square	0.14
Adjusted R Square	0.02
Standard Error	4032.61
Observations	26.00

ANOVA

	df	SS	MS	F	Significance F
Regression	3.00	58921122.50	19640374.17	1.21	0.33
Residual	22.00	357763125.54	16261960.25		
Total	25.00	416684248.04			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	1641.13	1425.74	1.15	0.26	-1315.69	4597.94	-1315.69	4597.94
Mask Mandate	2356.88	2730.09	0.86	0.40	-3304.99	8018.74	-3304.99	8018.74

Indoor Shutdown	-863.79	3772.16	-0.23	0.82	-8686.78	6959.20	-8686.78	6959.20
Reduced Capacity	788.00	2603.04	0.30	0.76	-4610.37	6186.37	-4610.37	6186.37

In this model regarding Californian COVID-19 deaths, not a single lockdown measure returns a statistically significant p-value. Not only that, but an adjusted R square of 0.02 means only 2% of the variability in deaths can be explained by the lockdown variables. Essentially, this model is showing that the lockdowns did little to nothing when it comes to stopping COVID-19 deaths.

New York's publicly available data is not quite what would help answer our research question, unfortunately, so California's fatalities are the only ones we can currently run a regression on.

With such low adjusted R square values, you might be wondering what is responsible for the reduction in fatalities. Is it vaccines? Perhaps, but as previously mentioned, that is not an example of a lockdown, and thus does not fall within the scope of the paper.

To conclude, I wanted to bring it back to four main takeaways and conclusions. I have come to these four points through examination of the data and the analysis that follows. For starters, the lockdowns themselves are not statistically significant when it comes to mitigating hospitalizations and deaths, and only reduced indoor capacity has initially shown to be statistically significant with preventing cases, but improved models are needed. This doesn't mean that there weren't individual cases where it might have done so, but it is not a major influence. Economically, it's clear that lockdowns slow down economic recovery and lead to larger negative spikes in the statistics. My research would support the hypothesis than lockdowns are not worth the economic damage in exchange for health benefits, as it appears there is little to none. It appears that vaccines are the likely cause for the differences in hospitalizations and deaths, and if given more time, I would do deeper dives into the regression analyses to narrow down any potential influences. I would also dedicate more time and effort to gaining the ability to access health data from states to run additional regression analyses. It is my hope that one day this study can be further developed by myself or others to make positive change on our response to future pandemics in the hopes that it can benefit the entire country, not just the states I have studied.

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