# Current status and influence of Covid-19 in U.S.

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**Abstract:** The recent outbreak of coronavirus disease 2019 (COVID-19) is a global crisis. The regional and local impact of the COVID-19 crisis is highly heterogeneous. This paper takes an in-depth look at the territorial impact of the COVID-19 crisis from different dimensions, i.e., health, economic and social and discusses the potential reasons of the impacts. Finally, the paper offers a forward-looking perspective to discuss the crisis' implications for multi-level governance as well as points for policy makers.

## 1. Introduction

The COVID-19 impacts almost every aspect of life. At present, COVID-19 spreads to almost all countries and affects more than 50 million people around the world, resulting in more than 5.2 million deaths (World Health Organization, WHO, https://www.who.int/). As the COVID-19 has attacked and spread widely in the US, the overall economy and daily lives have been seriously affected and changed because of the pandemic. Recently, local governments and some economic institutions have been working on reopening the society, but they faced several problems. Thus, knowing how to live with the existence of the COVID-19 is of great importance to us.

With the COVID-19 still spreading in the world, numerous investigations have been attracted. For example, researches covering the wider Asia region include: estimating clinical severity of COVID-19 from the transmission dynamics in Wuhan, China [1]; investigation into the outbreak on board the Diamond Princess cruise ship in Japan, using a Bayesian framework with a Hamiltonian Monte Carlo algorithm [2]; modelling the basic reproduction number in India with a classical Susceptible-Exposed-Infectious-Recovered-type compartmental model [3]; forecasting numbers of cases in India states using deep learning – based models [4].

Focusing on Africa, much of the literature has centered on simulating and predicting the spread of the disease of South Africa, Egypt, and etc. Such as, apply a six-compartmental model to model the transmission in South Africa [5]; predicting the spread of the disease using travel history and personal contact in Nigeria through ordinary least squares regression [6].

Analysis on North and South America have also used similar classical methods, for example, modelling the progression of the outbreak in the United States until the end of 2021 with the simple Susceptible-Infected-Recovered model [7]; analyzing the spatial variability of the incidence in the United States using spatial lag and error models, and geographically weighted regression [8]; Preliminary estimation of the basic reproduction number of novel coronavirus (2019-nCoV) in China, from 2019 to 2020: A data-driven analysis in the early phase of the outbreak[9]; GIS-based spatial modeling of COVID-19 incidence rate in the continental United States [10]; estimating the number of deaths in the United States using a modified logistic fault-dependent detection model [11]; estimating COVID-19 Prevalence in the United States: A Sample Selection Model Approach [12]; Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial , etc., [13].

Most of the investigations around the world mainly focus on the prediction model or the treatment of COVID-19, but analysis about the influence of COVID-19 is limited. Thus, this paper does some investigations to fill the potential research gap. And the investigation process can be generalized as follows. First, the current status of COVID-19 in the United States is comprehensively analyzed. Second, the influence of COVID-19 on gross domestic product (GDP), travel numbers, public attitudes is discussed.

The structure of this paper is as follows. Section 2 summarizes the current status of Covid-19 in the United States. Section 3 shows the impacts of Covid-19 and Section 4 presents the conclusion of the research and provides certain suggestions.

## 2. Covid-19 In The United States

### 2.1 Confirmed cases and deaths in the U.S.

The national confirmed cases and deaths have been relatively flat in recent weeks (see Figure 1, data source: https://covidactnow.org/?s=25371450), this may be beneficial for the society to inject vaccines. However, it is almost impossible to provide sufficient and effective therapeutic regimens to every person in the next few years. Hence, this pandemic may undeniably last for a long time. As one of the most developed countries in the world, the United States declared a public health emergency on January 31st, 2020, and took preventive and proactive measures, for example suspending the unnecessary entrance to U.S. and the quarantining the foreign nationals who seek to entry, to control the spread of the virus and treat the affected. However, it has become one of the most severely affected nations as the total numbers of confirmed cases and deaths account for one fifth of the whole world. The spread of this pandemic in the USA became a global concern.

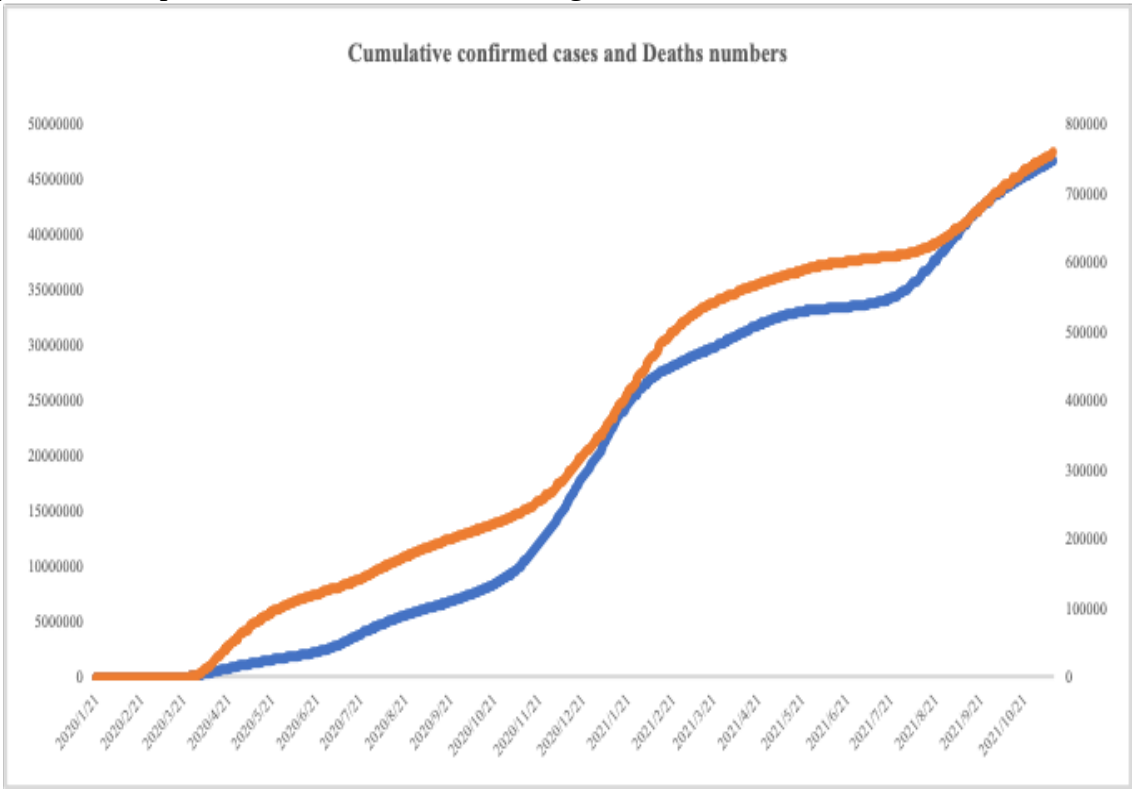


Figure 1. Cumulative confirmed cases and deaths

The state of the whole U.S. is not sufficient to illustrate each state, as the difference in the population structure between different states is often huge. To better depict the COVID-19 in U.S., it is of interest to look at the number of confirmed

cases per million people in each state (see Figure 2) The Figure 2 shows some details on the confirmed cases in the last two weeks.

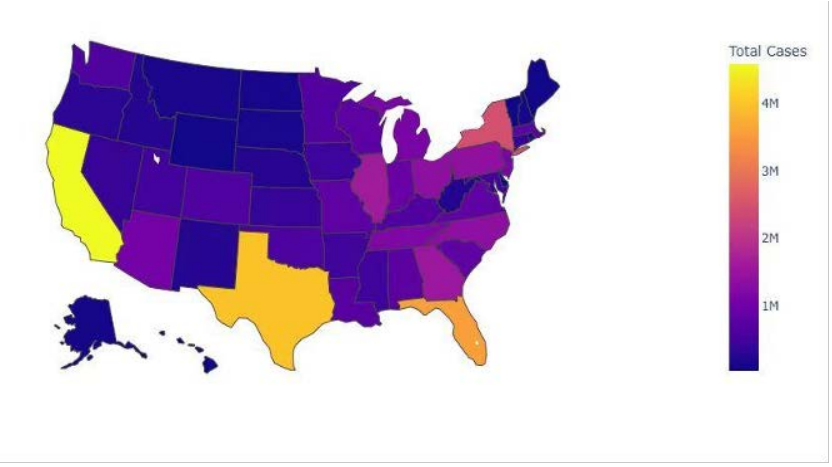


Figure 2. Total confirmed cases among the United States

Notes: The states with deep blue color all those means that it is more severe than the states with red or yellow color.

Confirmed cases and deaths are widely considered to underestimate the actual situation of COVID-19, as these cases are confirmed by a molecular laboratory test and lose the case of potential cases of COVID-19. Therefore, in order to better evaluate the epidemic situation in different states, this

paper uses the sum of confirmed cases and probable cases to represent the total cases in states (see Figure 3 and Figure 4, data source: https://covidactnow.org/?s=25371450). As shown in the following Figures, due to November 2021, the number of total cases in California, Florida, New York, and Texas exceeded six million people and California, Florida and Texas surpass New York regarding the total cases.

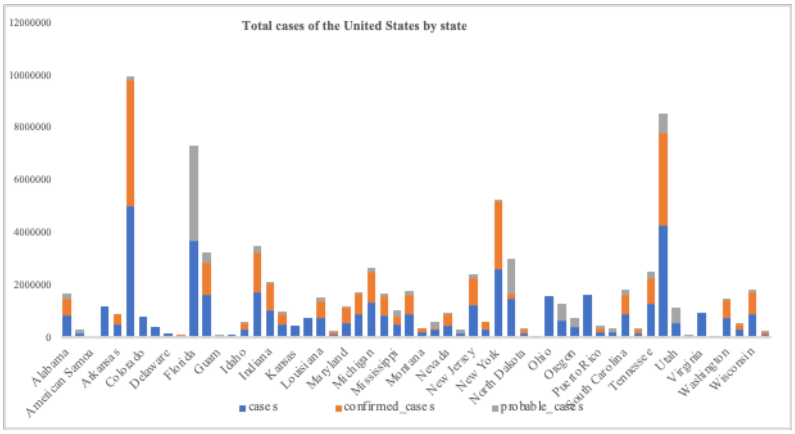


Figure 3. Total cases of the United States by state

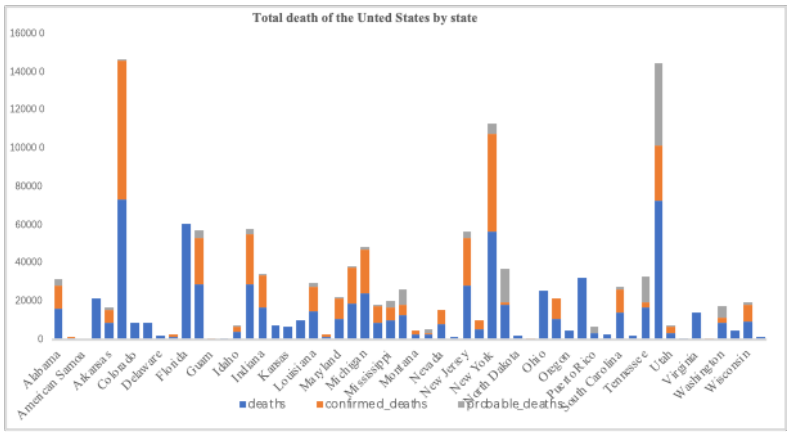


Figure 4. Total deaths of the United States by state

## 2.2 Comparison of California, Florida, New York, and Texas

New York had the highest number of confirmed cases of any state from the start of U.S. outbreak until July 22, 2021, when it was first surpassed by California, and later by Florida, Texas. Following will be examining the four typical states - California, Florida, New York, and Texas.

The Figure 5 details the number of confirmed cases and deaths in California due to Nov 2021. The statistics summarize the details in regions inside California. As shown in Figure 5. the southern part of California is more severely affected by COVID-19, e.g., Los Angeles. With its unique characteristics

including overcrowding, a large population of essential workers, and lower health restrictions. Los Angeles ranks high on the 'social vulnerability index', an index proposed by Centers for Disease Control and Prevention (CDC) to gauge how severely a disease outbreak might affect a region. Compared with Los Angeles, the Bay Area's saw far fewer cases and deaths than Los Angeles. San Francisco continued to have one of the lowest death rates in the country. With restaurants and businesses slowly returns to normal, indoor dining is not limited in most counties and public-school students start going back to the classroom, close focuses should be paid on the pandemic in California with its current COVID-19 situation.

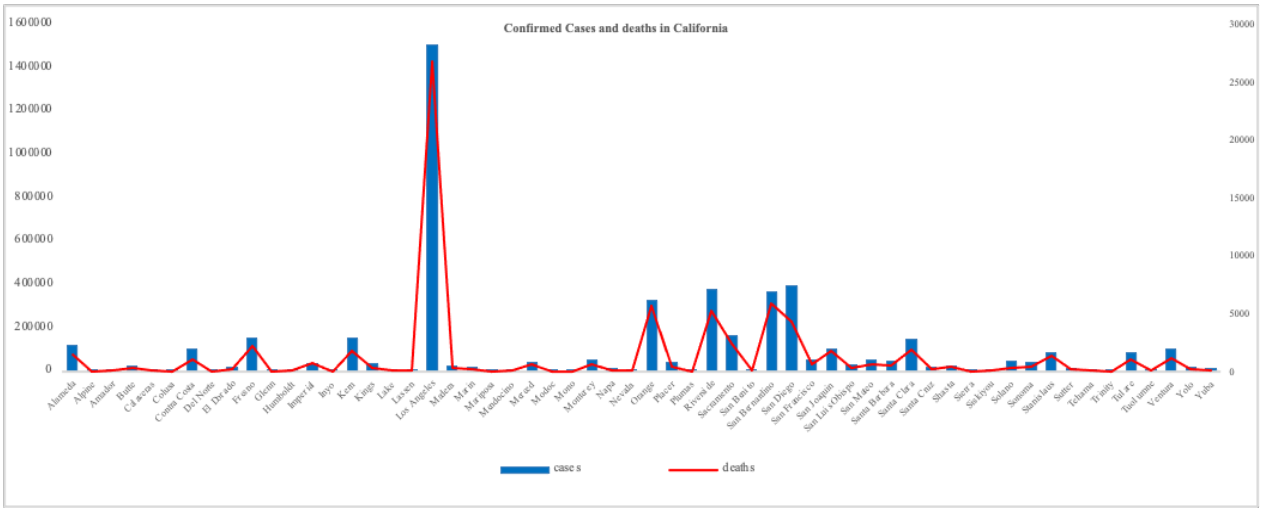


Figure 5. Confirmed cases and deaths in California

As of Nov 2021, the Florida Department of Health had reported 3,674,505 COVID-19 cases and 61,827 deaths among residents of the state. Among all US states Florida has the eight-highest per capital case rate. One in every five new COVID-19 cases recorded in the United States from Florida. (data source: https://floridahealthcovid19.gov/) The following Figure 6 provides some details of Florida. Miami-Dade, which

is Florida's most populous county, has far exceeded the average levels during the pandemic. Miami-Dade continues to be the coronavirus epicenter of Florida and the county's social vulnerability score is 0.83, which is far more than average. The related phenomenon may be accounted for by the tourism-based economy and high immigration rates.

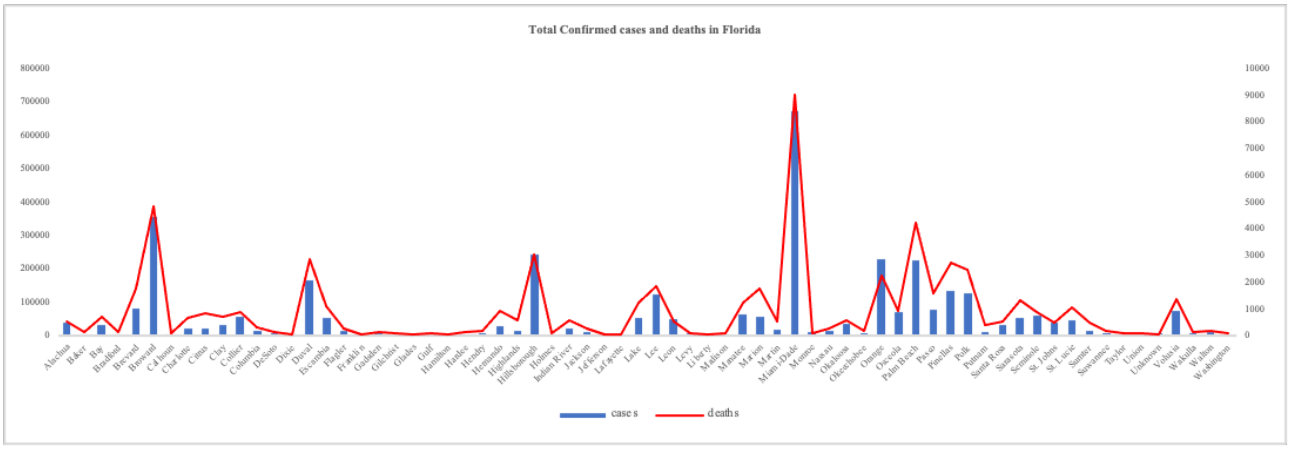


Figure 6. Confirmed cases and deaths in Florida

Until Nov 2021, New York did not see a spike or “second wave” in the daily new case rate, although New York has been hit particularly hard throughout the pandemic and is among the states with the highest number of deaths during the “first wave”. There have been almost 57,702 COVID-19 deaths in New York State due to November 4, 2021. (data source: https://www.worldometers.info/coronavirus/usa/new-york/) Approximately half of the state’s reported cases have been in New York City, where some 40% of the state’s population lives. (see Figure 7). High population density should be the

important reason attributed to this phenomenon. Government response to the pandemic in New York began with mandatory of vaccination against COVID-19 or regular tests. And also, four-phase reopening plan by region following a full lockdown. Some modification to the policy was also announced, such as a micro-cluster strategy, which means shutting down areas of the state to varying degrees by ZIP code when cases increase. These measures all benefited New York when faced with the pandemic and worth imitating by other states.

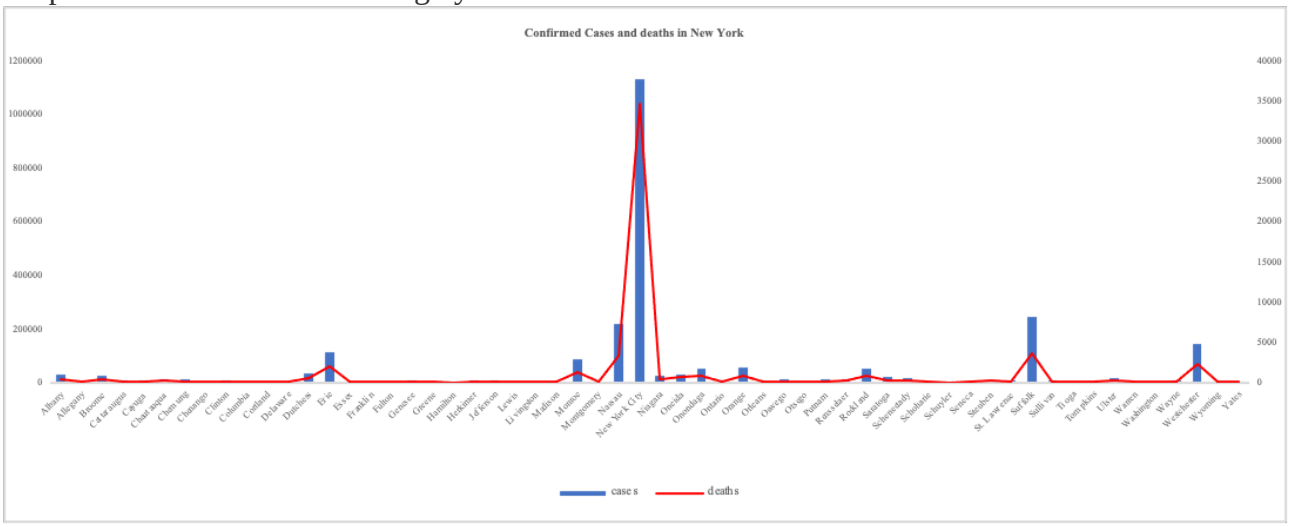


Figure 7. Confirmed cases and deaths in New York

Due to November 11th, Texas reported around 4.3 million cases around the state since the pandemic began. As shown in Figure 8, Dallas, San Antonio, Harris, and Bee, have more confirmed cases and deaths compared with other regions. This discrepancy may be the result of the characteristics of Texans, for example, a large homeless population, pockets of poverty, and essential workers who live in multigenerational

households. According to the Viewpoints, COVID-19 cases have been resurging, and Texas is reopening too quickly. Therefore, more strict measures should be taken, for example, mask requirements in indoor public spaces and public schools. (source: https://khn.org/morning-

breakout/viewpoints-reopening-texas-too-soon-will-only-cause-more-suffering-bold-steps-needed-now-to-help-our-kids/)

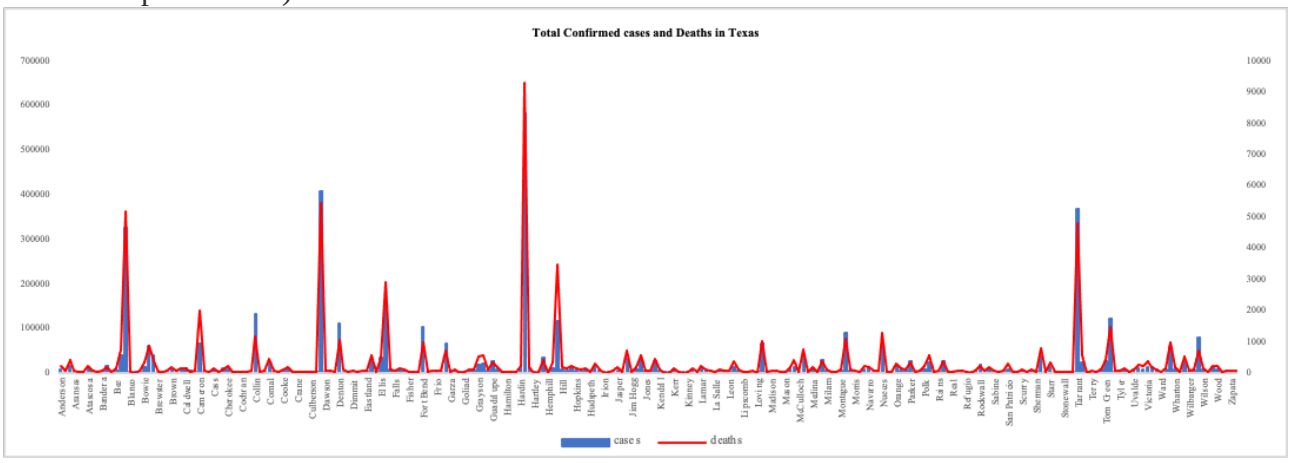


Figure 8. Confirmed cases and deaths in Texas

## 2.3 Comparison of COVID-19 situation between New York City (NY) and Los Angeles (CA)

New York and Los Angeles, the two cities were hit earliest and hardest by the pandemic, are severely influenced by the epidemic. New York City, with roughly 8.5 million residents, had nearly 2,000 cases and at least 15 deaths as of Aug.21, according to the Figure 9 below. Los Angeles County, which contains its namesake city of 4 million people plus an

additional 6 million residents, had nearly 14,000 cases and 10 deaths (see Figure 10). As shown in Figure 9 and 10, both cities are experiencing the explosion of COVID-19 and generally, the increase of Los Angeles is relatively stable compared with New York. The following aspects may explain the phenomenon to some extent, i.e., urban density, differences in the use of mass transportation and actions put forward by authorities to enact social distancing policies. In New York City, residents live in large multi-unit buildings, with small elevators and tight hallways, and the sidewalks are choked. New York City is a more densely packed community than Los Angeles. However, other factors may still explain the issue, for example, tests aiming to certify the disease.

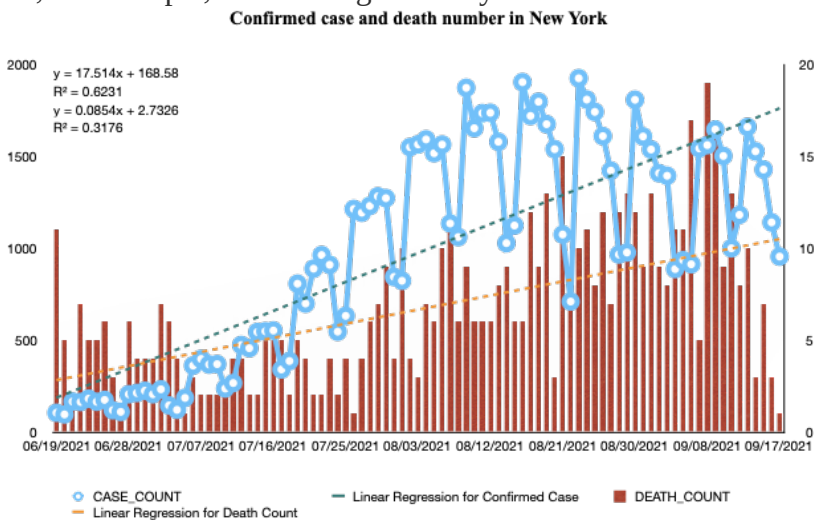


Figure 9. Confirmed case and death number in New York

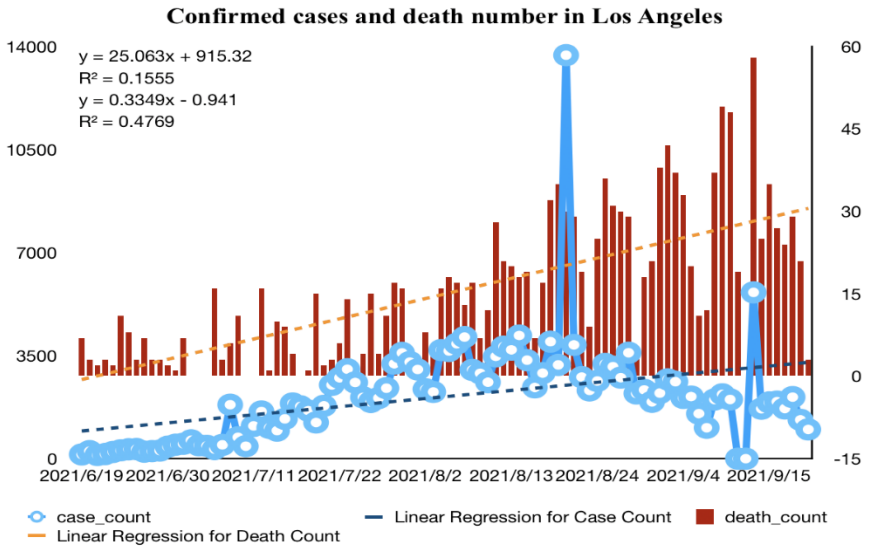


Figure 10. Confirmed case and death number in Los Angeles

### 2.4 Public attitudes toward Covid-19

Misinformation has hampered the control of COVID-19 pandemic since limited treatment have been reported and no vaccine in the early of COVID-19. It is widely accepted that improving the public's knowledge, attitudes, and practices are critical to reducing the spread of COVID-19. Currently, there are huge differences over how to deal with the epidemic, which may be resulted by several tweets, speeches and social media. For example, in some social media, such as, Facebook, Instagram, and Twitter, the persistence of vaccine-related hoaxes will further erode confidence among people who hesitate to get the shot (URL: https://www.gavi.org). It should be taken seriously, and further steps should be done to deal with the issue. Social media can be used as a tool to capture public perspectives, identify misinformation, and aid public

health efforts. First, health departments, political leaders, and influencers should leverage social media to support science on health issues, especially during pandemics. Second, social media analysis can be used to and should be used to explore information on Covid-19.

## 3. The Influence of Covid-19

### 3.1 The influence of COVID-19 on gross domestic products (GDP)

It is widely accepted that the economy has been affected seriously due to the pandemic. Thus, we collect the quarterly GDP in two representative cities, i.e., NY and CA, to analyze the difference performance during COVID-19 (see Figure 11). The GDP decreased in California in the first quarter of 2021 at an annual rate of 4.7 percent, according to Figure 11, and the percent change in GDP of the same period in New York decreased by 8.2 percent. The change rate of GDP growth rate of NY is larger than that of CA during the reopening stage. This phenomenon makes the authors interested in how COVID-19 affects GDP and what methods are used by the government to deal with the problem.

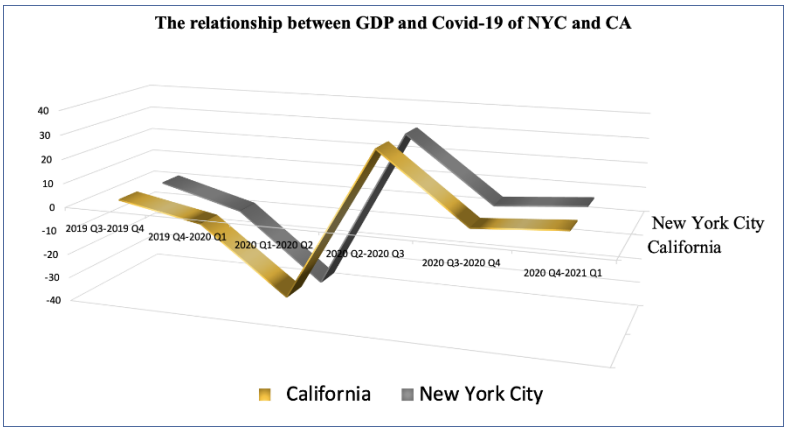


Figure 11. Relationship between GDP and COVID-19

On the one hand, when the epidemic is severe and not under control, many national and local governments require residents to stay-at-home, which restrict people's travel activities to a certain extent, leading to a decline in people's demand for consumption. Thus, the private consumption decreases. Meanwhile, COVID-19 can be said to be an unprecedented global public health event that has spread to a large scale around the world. At the beginning of the epidemic, public opinion and some strict health control systems caused psychological panic among people, leading residents to believe that there will be a lot of uncertain factors in the future. Thus, the residents and entities are unwilling to do investments, so that the gross investment part decreases as well. The government needs to ensure the safety of public health, so during the epidemic, a lot of resources are invested in medical health.

Many developed-countries encourage pharmaceutical companies to research vaccines against COVID-19 and provide them with funding. Therefore, during the epidemic, the government's investment has also been relatively reduced; On the other hand, many industries have been forced to stop or some infrastructure projects have been suspended, resulting in a reduction in export and an increasing in import. These aspects may account for decline in GDP in the two developed cities of New York and Los Angeles during the epidemic.

### 3.2 The influence of COVID-19 on fiscal and monetary policy

Since the beginning of 2020, the U.S. economy falls into the worst recession since the Great Depression, and COVID-19 is the culprit of the U.S. economy falling into the recession. The governments of US are taking many economic responses to limit the human and economic impact of the COVID-19 pandemic.

The COVID-19 pandemic has had a catastrophic impact on the economy and resulted in massive job losses. The employment rate of February 2020, before the epidemic hit US, is 3.5%, two months later, that rate increased to 14.8%. In order to

solve this problem, the government issued a Legal American Rescue Program, which provides another round of coronavirus relief, is estimated to cost US$1,844 billion (approximately 8.8% of GDP in 2020). The focus of the plan is to invest in public health response measures and provide time-limited assistance to families, communities, and businesses. It expanded the unemployment benefits program (including supplementary unemployment benefits), sent a direct stimulus payment of $1,400 to eligible individuals, provided direct assistance to state and local governments, increased resources for the vaccination program, and increased funding for the reopening of schools. (Source: https://www.imf.org/en/Home)

In March, the federal funds rate was lowered by 150 basis points to 0-0.25 basis points. Expand capacity overnight and repurchase regularly. Reduce the cost of discount window loans. Reduce the current cost of swap lines with major central banks and extend the duration of foreign exchange operations; expand the US dollar swap line to more central banks; provide temporary repurchase facilities for foreign and international monetary authorities (Source: https://www.imf.org/en/Home).

Although the federal funds rate does not directly affect consumers, the chain reaction caused by the fall in the federal funds rate will bring huge benefits. For example, consumers enjoy lower interest rates when using credit cards, auto loans, home mortgage loans, and other interest-based products, and their interest expenses can be reduced.

The economic difficulties of certain groups are even greater. People of color, low-paid service workers and mothers have been hit particularly hard. Although it is true that some people have been hurt more than others in all economic recessions, the severity of this recession has magnified the suffering of the hardest-hit groups. In addition, even in the best of times, most families do not have enough financial buffers to withstand lost wages. Policymakers recognize the novelty and traditional characteristics of this crisis. In March 2020, Congress enacted a $2.2 trillion Coronavirus Aid, Relief, and Economic Security (CARES) bill. It combines targeted relief, such as an extra $600 a week for the unemployed, and broad support for a stimulus check of $1,200 for each adult. In contrast, during the Great Depression, the American Recovery and Reinvestment Act was less than $1 trillion, and the additional weekly payment was $25, and each adult's check was $500. (Source: https://www.imf.org/en/Home)

### 3.3 The influence of COVID-19 on Americans' daily activities

It is widely Known that after the outbreak of COVID-19, there are travel bans. In this section, we aim to find out how the travel numbers have changed during the COVID-19, and how the government is trying to reopen cities and recover the economies. Figure 12 shows the lines for the travel number of US of 2019, 2020, and 2021 respectively.

From Figure 12, it can be found that the traffic volume in 2019 is the highest in the past three years and is the most stable with the least fluctuation. For 2020, the number of traffic in January is still a regular value. When it comes to February and March, when COVID-19 spreads in the United States, we can see that the number of traffic has faced a sharp drop. Until April, this plummeted to its lowest point, which also means that the epidemic was gradually brought under control. From the lowest point, the US government began to try to recover the economy and society. Although there are bottlenecks in the process of recovery, we can still see the overall success of the U.S. government in reopening.

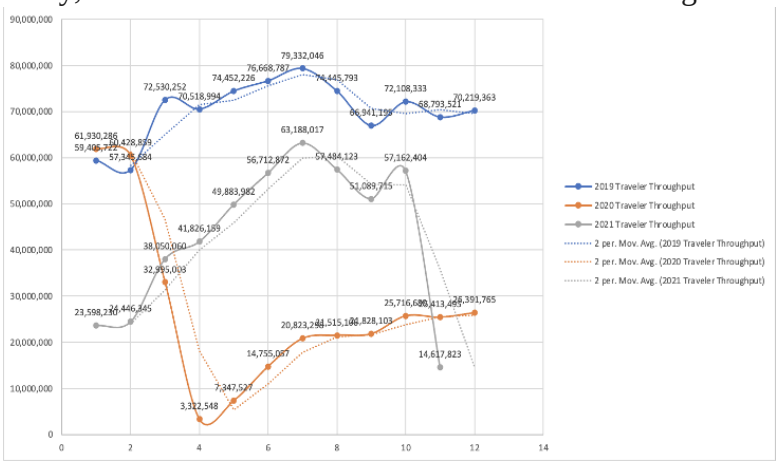


Figure 12. TSA checkpoint travel numbers

The COVID-19 has undoubtedly affected the seated Dinner change rate in the US (Figure 13), some representative cities in the US and worldwide (Figure 14 and Figure 15). In Figure 13, Hawaii is of particular interest. The Hawaiian economy is mainly based on tourism, the tourism industry was restricted during the epidemic, and the reduction of tourists to Hawaii has caused Hawaii's catering economy to have been affected. Therefore, the Hawaii is more severe than other states. From Figure 14, it is noticed that the changes in dine-in in these cities are very similar to the changes in the states of the United States. Considering the

fact that the governments of different parties have different restrictions on residents' activities, we especially pay attention to Miami and New York as Miami in Florida is a typical Republican government, and New York City in New York is a typical Democratic government. From Figure 14,

we can see that the overall impact of the epidemic on Miami's dine-in economy is smaller than that of New York which may be accounted by the reason that the Republican government's restrictions on residents' travel are relatively looser than the restrictions issued by the Democratic government.

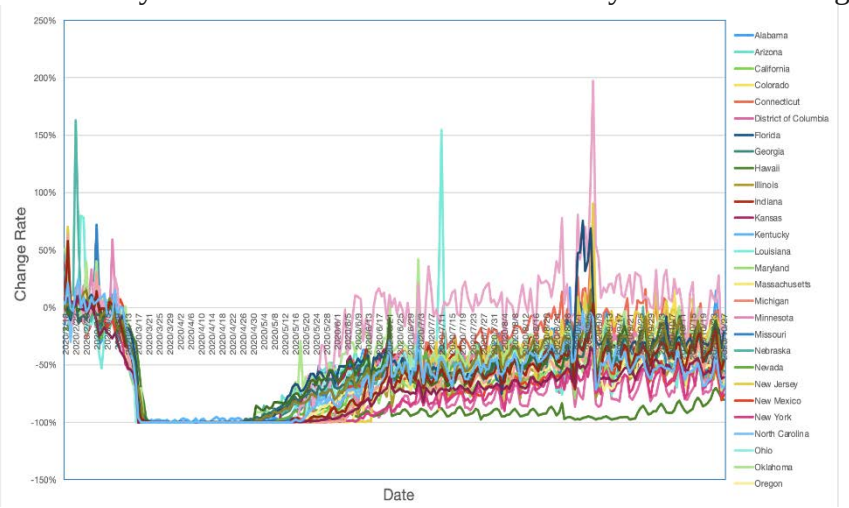


Figure 13. Seated Dinner Change Rate by States

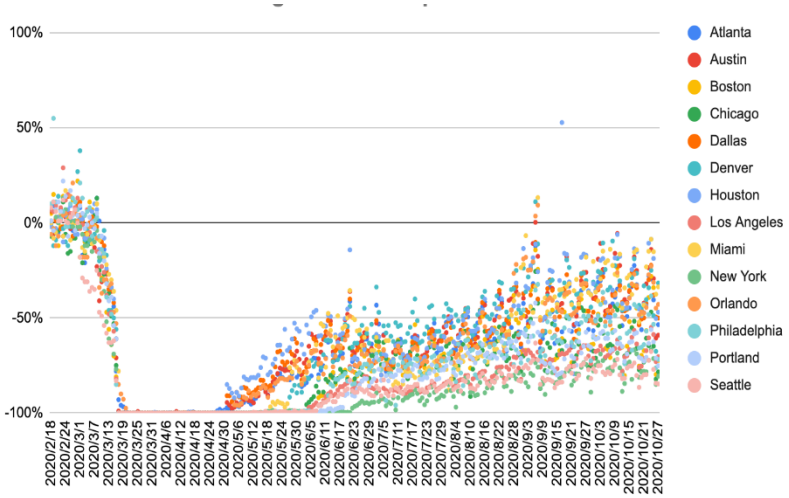


Figure 14. Seated dinner change rate for representative cities in the U.S.

## 4. Conclusion:

The COVID-19 pandemic has had a negative effect on GDP, which may be caused by changes in consumer investment and net exports. After the epidemic is brought under control, there has been a significant increase on the change rate of GDP. It also has caused millions of Americans to suspend their normal daily activities and stay at home, and therefore travelling numbers and seated outdoors' rate are also facing a sharp decrease from the beginning of the COVID-19. However, over time, the generally accepted result is that these effects are gradually being diluted, and these changes are being adapted by everyone. In terms of GDP, the proportion of GDP in countries where the epidemic is under control has gradually begun to balance the proportion before the epidemic. Regarding the catering industry and transportation, local governments have gradually begun to loosen social restrictions and start to stimulate the economy, and traffic controls between countries have also been lifted, all of which indicate

That all industries are in a recovery period. The covid-19 period is gradually receding.

Although American governments has already taken many actions to help economy recovery. But there is opportunity to recouple economic growth and social progress. Some guiding principles can

help governments and businesses create a more efficient working relationship to achieve this vision that the U.S. economy will recover quickly from this COVID-19 pandemic.

### 4.1 Improve centralized and subnational governments' corporation

Given the territorial differentiation of COVID-19's impacts, it is crucial for recovery strategies to have an explicit territorial dimension. Thus, actively involvement between subnational governments is required in the implementation of these strategies early on. We also suggest that the specific measures regarding masks, school and restaurant closures, and full lockdowns are adopted for specific localities or territories, rather than applied nationally to limit the economic impact.

### 4.2 Customize the stimulus for different local government and help to drive national GDP growth

What will best drive America's immediate economic recovery? First, the COVID-19 pandemic is requiring all levels of governments to act and bound together when facing with this uncertainty and recession economy. These governments have an opportunity to build their resilient and adaptable multi-level governance system in order to revitalize local industries and, by extension, local communities, which serve as a bridge to the local economies that drive national GDP growth. The central government can also help manage disparities between these organizations by coordinating the sharing of knowledge and best practices among local partners and customizing the stimulus and incentives they offer to different local governments. Second, it will be important to identify industries which are at the foundation of the nation's economy. In areas of targeted or burgeoning investment, governments need to monitor key indicators, such as industry growth and employment, to understand the impact of their investment. And upskilling will be vital to ensuring that local industries are staffed with people who have the know-how to help drive growth.

### 4.3 Strengthen or build communications channels.

In order to work together, governments and businesses must cooperate, and then build or strengthen channels which could allow them to have a communication with each other. Roundtables, liaison offices, and other solutions should be considered and widely implemented to ensure open, impartial and effective dialogues.

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