A Comparison of the Effect of COVID-19 on Economic Consequences in China and The United States of America

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Abstract

The COVID-19 is a new virus which outbroke in China in middle February. It spread through the whole China in less than 1 month, and infiltrated into other parts of the world very quickly. Till June 1st, 6,271,571 people in the world were infected, and 375,656 people died (source: https://www.cdc.gov/coronavirus/2019-ncov/ index. html). Not only have the pandemic caused deaths, economic impacts are significant, including a fall in GDP (growth rate), a rise in unemployment, trade dynamics, and so on. This study investigates the difference of economic impacts caused by the pandemic between the largest economy—the USA, and the second largest one—China. To represent economic impacts, three relevant indicators are used: GDP growth rate, unemployment rate and balance of trade. The result shows that China has a larger decline in GDP growth rate, the USA has a more significant rise in unemployment rate, and no significant difference between trend of balance of trade. Based on current situations and policies, the USA and Chinese GDP are projected to fall furtherly and unemployment rate will rise for both countries, but more severe for USA for both cases. In terms of balance of trade, that of China should be constant, whereas the US trade balance may improve continuously as imports are being cut.

Keywords

Economic growth, The USA, China, Coronavirus (COVID-19), Balance of trade, GDP growth rate, Unemployment rate. Etc.

1. Introduction

Coronaviruses are common throughout the world. There are many different coronaviruses identified in animals but only a small number of these can cause disease in humans. The majority of the case-patients initially identified were dealers and vendors at a seafood, poultry and live wildlife market in China. Since then, the virus has spread to more than 100 countries, including South Africa.

Current symptoms reported for patients with COVID-19 have included mild to severe respiratory illness with cough, sore throat, shortness of breath or fever. In severe cases there can be organ failure. As this is viral pneumonia, antibiotics are of no use. [1] The antiviral drugs we have against flu will not work. If people are admitted to hospital, they may get support for their lungs and other organs, as well as fluids. Recovery will depend on the strength of their immune system. Many of those who have died were already in poor health.

A key unknown, of which scientists should get a clearer idea in the coming weeks, is how contagious Covid-19 is. A crucial difference is that unlike flu, there is no vaccine for the new coronavirus, which means it is more difficult for vulnerable members of the population – elderly people or those with existing respiratory or immune problems – to protect themselves.

Hand-washing and avoiding other people if you feel unwell are important. More than 3.6 million people worldwide have tested positive for the coronavirus, according to data from Johns Hopkins University, and over 254,000 have died. In the United States, there have been over 1.2 million confirmed COVID-19 cases.

This pandemic outbreak not only put people's lives at risk, it also causes serious problems for the global economy. As people are forced into quarantine, the worldwide consumption (including transportation) dropped dramatically. The economic fallout from the COVID-19 outbreak has put the jobs of many American workers in jeopardy (Coronavirus could drive unemployment up to 20% in April), but it has also put in doubt the economic fortunes of many of the business owners who employ them. Furthermore, global risks can have profound effects on politicians' ability to govern, business-government relations, the efficiency of government spending and reform implementation, public trust, anti-corruption measures, and provision of services to improve business performance.

China and USA are considered to be the two largest economies in the world, where USA is the larger one. However, the two countries are completely different in numerous aspects. For instance, USA is a typical developed country, but China, although classified as an emerging economy, is not a developed country, as referred to some indicators of economic development, like HDI. There are also massive differences in economic structure and so on. Therefore, the similarity in size of economy and difference in other aspects act as a motivation to study the difference in economic consequences caused by the COVID-19 pandemic. In this study, the economic effects of the COVID-19 pandemic on China and the USA are compared. The comparison is according to three indicators we use—GDP growth rate, unemployment rate and balance of payments.

Extensive previous literature gives ideas to this study. HIV impedes economic growth in African nations to a large extent. Projections show that, if left unchecked, the long-run impacts of HIV/AIDS will cause South Africa's GDP to be 60% lower than that if the disease was absent [2] (Roe, R & Smith, R (2008)). Just like HIV, the COVID-19 pandemic will also cause a global fall in GDP growth rate (negative growth in many regions) because of a decrease in productivity of human capital and a reduction in capital deepening. The news 'low-skilled workers, developing countries are at risk of steep economic decline as coronavirus advances' published by UN news provides insights to external trade between developed economies and developing countries and emerging economies. [3] It points out that the drastic hit on service sector, including retail trade, leisure and recreation, will contribute to a large increase in unemployment rate for all countries.

The effects to developing countries mainly come from two aspects:

1. A sharp reduction of consumer spending in Europe and the North America and Australia will reduce imports from developing countries.

2. The countries whose tourism occupies a large proportion of GDP face heightened economic risks because of plummeting number of travelers. The sharp decline of tourism is likely to cause large amount of structural and cyclical unemployment as millions of low skilled-workers are employed in tourism in some small island developing states.

In 2018, before the pandemic, tourism revenues occupy about 11% of GDP, whereas that of the USA only occupy about 2.6% (sources: https://tradingeconomics.com/china/tourism-revenues; https://data.oecd.org/industry/tourism-gdp.htm).

Therefore, it is obvious that, in terms of trade in services, China will suffer a larger deficit, which also means that unemployment arising from decline in tourism may also be more serious in China. The publication named 'Coronavirus: the economic impact' gives insights in trade and investment. [4] Besides GDP growth, volume of trade will also decline significantly. IMF predicts that the volume of trade in goods and services will decline by 9%, and the WTO, which measures

trade in terms of the average change in exports and imports of merchandise (excluding services), predicts a decline of between 13% and 32%. Although there is a significant increase in trade of medical materials like masks, the decline of trade of services like tourism and education is more drastic. There is an important observation that there are unprecedented outflows of capitals from emerging economies, probably meaning that China will experience an unprecedented reduction in capital deepening and a fall in total output, GDP and total expenditure. All of these will have an impact on total output of the economy in both countries we investigate, which can be analyzed by two models—the Solow Growth Model and the Health-income Model. These two models will be explained in more detail in the next section.

2. The model

The effect of this pandemic on total outputs of all countries can be analyzed by the Solow Growth Model and the Health-Income Model. Let the Cobb-Douglas production function be $Y = AK^aL^{1-a}$, where:

Y is the total output of the country

K is the physical capital portion.

L is the labor portion.

A is the efficiency of production for physical capital.

a is the share of output that goes to physical capital, so $(1 - a)$ is the share of output that goes to human capital.

The labor portion can be broken up to $(h * L)^{1-a}$, where h is the productivity, and L is the quantity of labor. Because of the pandemic, h will definitely fall because of a reduction in general health level and inconvenience in working (like wearing mask all day). L will also fall because of unemployment, a lockdown period (when the time of returning to work of most firms is delayed because of the pandemic), and the quarantine and death of sick workers. Therefore, which countries are less affected by the pandemic is determined by h and L, which are determined by the health level of the country. The health level is determined by two main factors: the healthcare system and general income level. In terms of income level, the Health-income Model suggests the effect of income per capita (y) on health (h) such that when income increases, health increases at a decreasing rate ($\frac{d^2h}{dy^2} < 0$) (see figure 1). A higher income will lead to better health. USA has a much higher income per capita than that of China, but it is still difficult to decide which country wins at the human capital portion because the healthcare systems of the two countries are different in numerous dimensions.
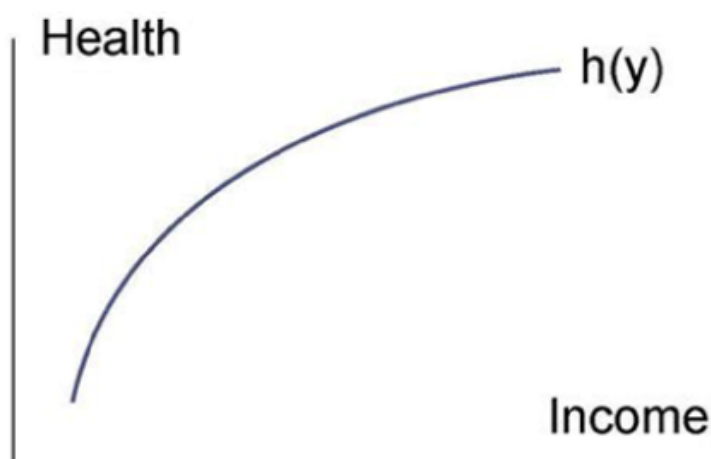

Figure 1: The effect of income on health

In terms of the physical capital portion, the rate of accumulation of physical capital determines the total output, so capital flow of the country is the key factor.

So far, the background knowledge of CODIV-19 and several factors which may cause difference in economic consequences of the pandemic are discussed. It seems that China is at a disadvantage in most of the factors discussed above. In the data section, we will look at the actual data to see which country is performing better, and discuss possible reasons and prediction of the future according to current situation and policies.

3. The Data

3.1. The relevant indicators

We use 3 indicators which are GDP growth, unemployment and balance trade.

GDP growth: A region's gross domestic product, or GDP, is one of the ways for measuring the size of its economy. The GDP of a country is defined as the market value of all final goods and services produced within a country in a given period of time. It is also considered the sum of value added at every stage of production of all final goods and services produced within a country in a given period of time. Until the 1980s the term GNP or gross national product was used in the United States. The two terms GDP and GNP are almost identical - and yet entirely different; GDP being concerned with the region in which income is generated and GNP (or GNI - Gross National Income) being a measure of the accrual of income to a region. The most common approach to measuring and understanding GDP is the expenditure method:

GDP =consumption +investment +(government spending) +(exports −imports)

We found GDP growth in the first quarter of 2020 and the whole year of 2019.

The outbreak of coronavirus happened in the first quarter of 2020, we can directly see the impact of the outbreak on the GDP of developed and developing countries by comparing the GDP growth in the first quarter of 2020 with that in 2019.

Unemployment rate: The unemployment rate refers to the number of workers who have not yet worked in a certain period of time, aiming to measure the idle labor capacity, which is the main indicator reflecting the unemployment situation of a country or region.

We can know the impact of epidemic on people's work in developing and developed countries by comparing the unemployment rate during the peak period of corona virus. The unemployment rate can directly reflect the economic situation of a country

Balance of trade: The balance of trade refers to the difference between a country's total exports and imports in a certain period of time, which is used to indicate the balance of payments of a country's foreign trade.

 Trade surplus: The phenomenon that the export amount of each country or region is greater than the import amount in a certain period of time. Generally, it shows that a country's foreign trade is in a more favorable position.

 Trade deficits: The phenomenon that the import amount of each country or region is greater than the export amount in a certain period of time. Generally speaking, foreign trade of a country is in a disadvantageous position.

To a great extent, the size of trade surplus reflects a country's foreign trade activities in a specific year. Generally speaking, a country should not be aware of a large foreign trade surplus for a long time. We can know the impact of the epidemic on national trade by comparing the trade balance between developed and developing countries during the epidemic period.

3.2. The data

The sources of data we use are shown in the 'data source' in the 'reference' section. The following tables and graphs display the data in a visual form.

3.2.1. GDP growth rate

Table 1: GDP growth rate of China

China	First quarter	Second quarter	Third quarter	Fourth quarter
2019	+6.4%	+6.2%	+6%	+6%
2020	-6.8%			

Source: https://www.ceicdata.com/en/indicator/china/real-gdp-growth

Table 2: GDP growth rate of the USA

USA	First quarter	Second quarter	Third quarter	Fourth quarter
2019	+3.1%	+2.0%	+2.1%	+2.1%
2020	-4.8%			

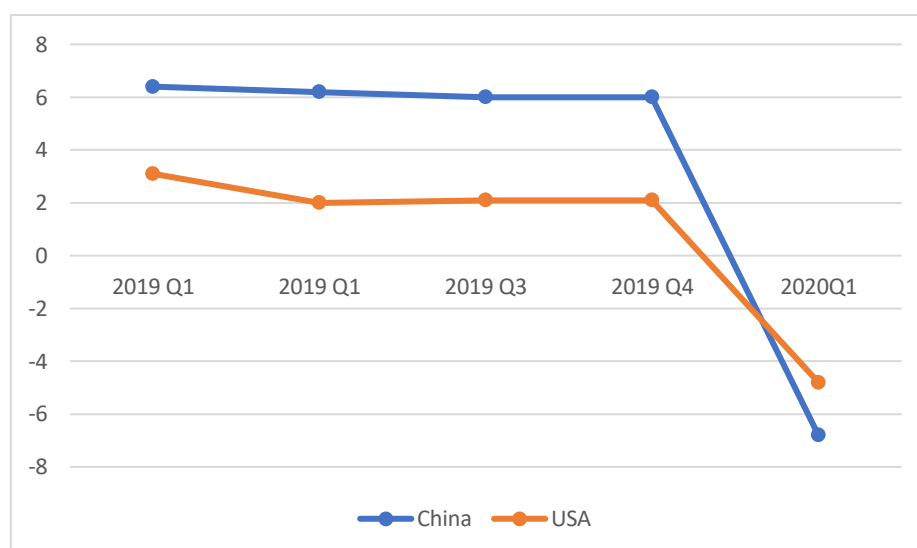Source: https://fred.stlouisfed.org/

Figure 2: A comparison of GDP growth rate

3.2.2. Unemployment rate

Table 3: Unemployment rate of China

China	March	June	September	December
2019	3.7%	3.6%	3.6%	3.6%
2020	3.7%			

Source: https://www.ceicdata.com/datapage/en/indicator/china/unemployment-rate

Table 4: unemployment rate of the USA

USA	March	June	September	December
2019	3.8%	3.7%	3.5%	3.5%
2020	4.4%			

2020 April	14.7%

Source: https://fred.stlouisfed.org/

The unemployment rate of USA in April has been published, but that of China hasn't been published yet. Figure 3 will not include unemployment rate of USA in April, but the data will be discussed later, as it shows a sudden significant increase in unemployment.
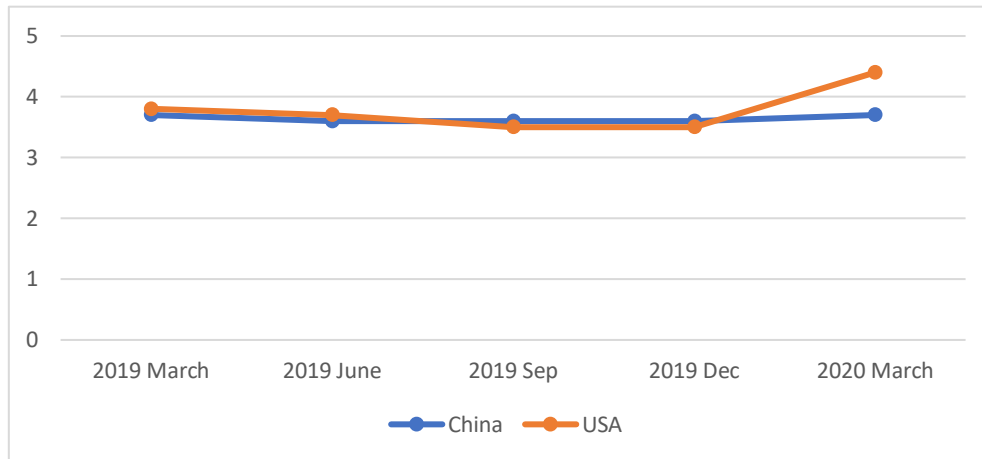

Figure 3: A comparison of unemployment

3.2.3. Balance of trade/million US dollar

Table 5: Balance of trade of China

China				
	First quarter	Second quarter	Third quarter	Fourth quarter
2019	+13 833.541	+50 976.072	+39 648.260	+47 210.344
2020	+45 340.000			

Source: https://www.ceicdata.com/datapage/en/indicator/china/trade-balance

Table 6: Balance of trade of the USA

USA				
	First quarter	Second quarter	Third quarter	Fourth quarter
2019	-71 362.000	-74 608.000	-71 087.000	-68 484.000
2020	-64 219.000			

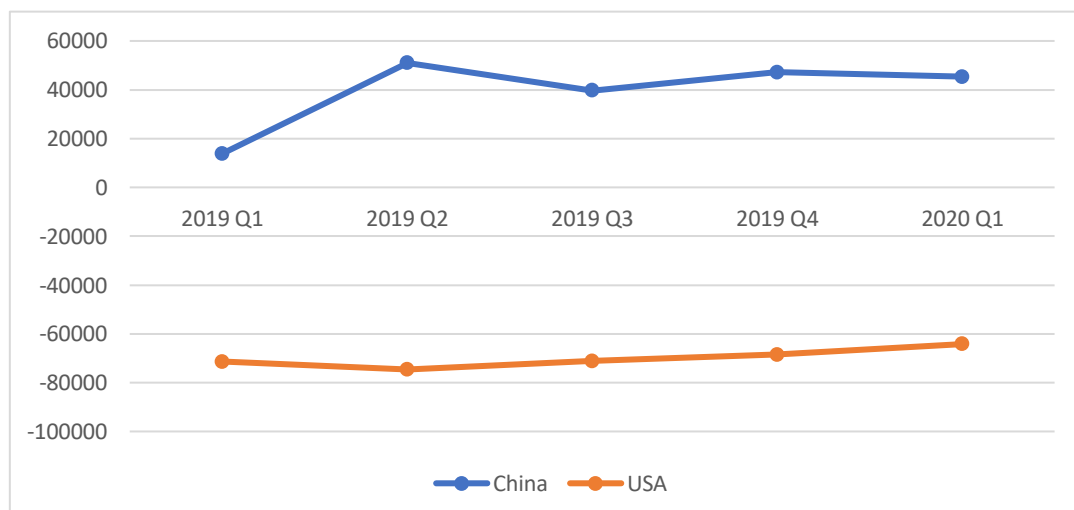Source: https://fred.stlouisfed.org/

Figure 4: A comparison in balance of trade

4. Analysis

For the GDP growth, it is clear from the table that there are minimum points at 2020 quarter 1 for both countries. The reason is also obvious. GDP is related closely to aggregate demand, which includes consumption, government spending, investment and net trade exports. It is also clear that, before the pandemic, China has a much higher economic growth rate than USA, which is because China's capital stock is smaller than that of USA, meaning that China is farther from steady state in the Solow Model.

Because the outbreak has led to significant cooling in industry and services. First of all, the impact on the industry is that the overall industrial capacity is greatly reduced, which is manifested in the fact that the factory cannot produce normally and the products produced cannot be sold in time at the sales end. It is deadly for the service sector. The service industry, especially the tourism industry and the aviation industry, will be abandoned this year, because there will be contact between people in the service industry. The outbreak of the epidemic will lead to the isolation of people, which will definitely hit the service industry hard. The economy of some countries and regions dominated by the service industry will be very ugly this year. The most fatal thing to the economy is that the government has to keep closing and quarantining people, which is costly in itself, and it has to spend money to save infected people, which is even worse for the economy. Most notably, due to the particularity of consumption in the first quarter, especially during the Spring Festival, it is almost impossible to make up for it in the following period, because there will be no more Spring Festival holiday in 2020. Compared with the same period in 2019, the investment scale in the first quarter of 2020 decreased a lot mainly due to the decrease in real estate investment, government infrastructure investment and large state-owned enterprises' investment delayed in January and February due to the epidemic.

The economic effects of the coronavirus outbreak, and the preventive measures adopted around the world, are still largely unknown. In addition, standard macroeconomic models based on fundamentals may be slow to adapt in this fast-changing environment. This column uses high-frequency data on dividend futures to evaluate the impact on growth expectations. Dividend growth and GDP growth expectations in the US and EU begin to deteriorate after the lockdown in Italy, and these effects are exacerbated by the travel restrictions imposed thereafter. The lower bound on dividend growth is as severe as during the Global Crisis, at least in the short run (Gormsen, N & Koijen, R (2020)).

For the unemployment, there are still maximum points in 2020 March for both countries, especially the US. The are several main reasons. The first reason is that the pandemic forces people to stay at home, which means people have to try different ways to telecommute. However, some people are lack of skills on remote office work, so they were threatened with dismissal. What is worse, there are some occupations where telecommuting is not possible, such as household appliance industry and film-television industry. [5] This may result in occupational unemployment, which is a horrible result. The second reason is that, many foreign trade enterprises will not survive this year. In this year, the epidemic has spread from China to foreign countries. With great difficulty, China has resumed work, and foreign countries have closed down the city again. The global economy is closely connected, the epidemic is serious abroad, but it will also be affected at home. Most of the enterprises have overseas business, which will be affected now. For enterprises that depend on foreign trade, it is even more devastating. So, this will lead to many job losses. The third reason is the tight capital chain leads to layoffs. The current outbreak in China has made it even worse for many enterprises that are already short of capital chain. Many enterprises cannot support themselves because of the broken capital chain. [6] In those months when the pandemics are the most serious, many

industries and firms stop work and production, which may give rise to the loss of profits in the first quarter. The only way to help ease the crisis for these businesses is to reduce the staff.

The pandemic has accelerated the need to ensure that people around the globe have the necessary technology skills and access to do their jobs. Even as China shows signs of recovery and the number of new daily infections worldwide appears to have stabilized, the US has seen an unprecedented number of people file for unemployment, and 57% of Americans surveyed recently report feeling worried about losing their jobs.

Many of the skilled people need to be employable during and after COVID-19 are digital, which will enable, but not guarantee, resilience, creativity and the ability to collaborate with others. In areas where the pandemic is still an active threat, people need to be able to get work done while operating at a distance from co-workers. Managers and team leaders need the skills required to motivate and manage distributed teams. Job seekers may find themselves having to compete in a digital, fast-changing digital work with which they are unfamiliar (Rio-Chanona, R & Mealy, P & Pichler, A & Lafond, F & Farmer D (2020)).

Trade is very important. Despite the positive role trade has played, the COVID crisis has witnessed the rise of several protectionist policies (González 2020). For instance, numerous nations have imposed export restrictions on medical supplies in an effort to boost local availability. Also, the possibilities of further and wider trade restrictions have multiplied as US-China trade tensions have reignited (Baldwin, R & Freeman, R (2020)).

For the trade balance, there are no obvious and extreme maximum or minimum points lately. For China, in order to avoid imported pandemic cases, China has implemented strict control over airports and ports, which to some extent restricts the import and export of commodities. At the same time, With the spread of the epidemic in the world, some countries are short of masks and protective clothing. Most of the enterprises in China have resumed work, and the capacity of medical supplies has expanded, providing a basis for export support to other countries. However, as almost 80% of trade is carried by sea, it is evident that disruptions to sea transport can damage trade flows and disrupt supply chains. COVID-19 containment policies have hit sea transport severely. Many key ports have imposed restrictions on vessels and crew, including prohibitions that have stopped crew changes. Satellite data for ships show that sailings to destinations with crew-change restrictions are down by almost 20% for container ships compared to previous years. More flexible regulations based on screening and discretion are needed to ensure the continuity of freight distribution in order to secure that supply chains do not get a double hit (An unintended crisis: COVID-19 restrictions hit sea transportation by Inga Heiland, Karen-Helene Ulltveit-Moe 17 May 2020). [7] As a result, the trade balance will not change dramatically to generate maximum or minimum points. The trade balance graph of the US can be explained in the same way.

5. Qualitative projections

Predictions about the future economic situation are risky but necessary, because countries and firms need to make better economic decisions to prevent further costs in advance by predicting. Based on our existing data and resources, we will predict the trend of GDP growth rate, unemployment rate and trade.

By observing the GDP growth rate graph, we can tell that there are downward sloping trends between 2019 Q4 to 2020 Q1 for both countries. The reasons for that are obvious, that is, people are reducing their commuting, consumption and daily activities in order to prevent the virus. Let us take the travel to the parks as a simple example to explain. Anonymized data from mobile phones, smart devices and applications show how mobility patterns changed in response to COVID-19 lockdown. Travel plummeted, including in private vehicles, public transit and other transport modes. In many cities, the data show that travel over that past few months has been

60-90% below normal for this time of year. Lockdown is also affecting where people spend their time. Because of drastic declines in visits to other destinations, parks are now the most durably popular non-residential destinations, though use varies considerably by country and city. [8]
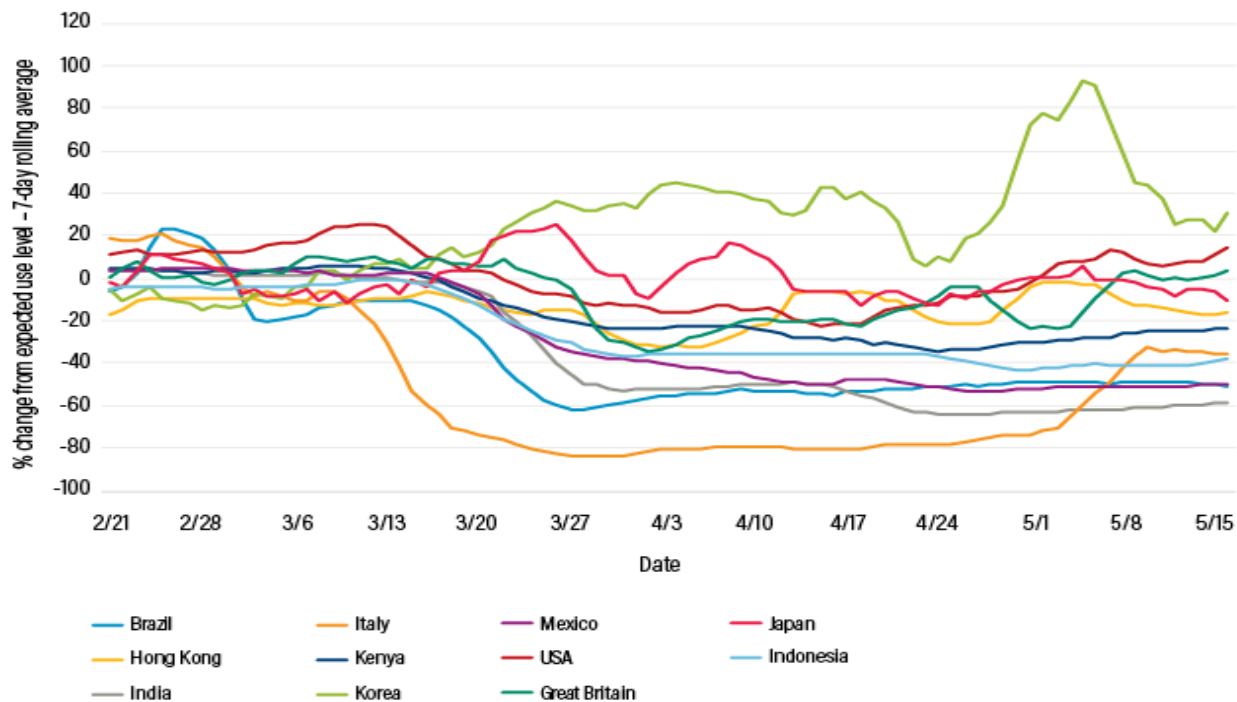
Figure 5: Change in amount of travelling to park during COVID-19
(Source: Insights from Big Data on How COVID-19 Is Changing Society by Eric Mackres - May 28, 2020)

In a severe scenario, the supply-side impact is estimated to be 2.25%. On the demand side, the decline in GDP due to the outbreak is estimated at 2%.Combining supply-side and demand-side analysis, it is estimated that the epidemic caused a decline in GDP of 4.25%. In a mild scenario, the supply-side impact is estimated to be 0.5%. On the demand side, the drop in GDP due to the outbreak is estimated at 0.5%. A combination of supply-side and demand-side analysis estimates that the epidemic has led to a 1% drop in GDP. The information above is all included in GDP growth rate. The trend of lines in the graph above shows us that people are doing less activities in most areas because of the virus. As the condition of virus in the US are still serious, plus observing the gradient, we can predict that the GDP growth rate in the US will fall to -8% or worse in the next quarter. However, in China, the outbreak has been largely contained and most people start to go out again. We can predict from the information above and that the GDP growth rate in China may remain about -7% or rise to -5% or even better.

For the unemployment rate, only in last week, at least 2.1 million Americans lost their jobs, meaning 41 million Americans have applied for unemployment benefits since economic activity of the country was suspended in mid-march because of the pandemic lockdown. California's job mar is deteriorating so rapidly that it is unlikely to recover soon, according to a new forecast from the university of California, Los Angeles. As the impact of covid-19 on California's economy

worsens, the state's unemployment rate is likely to peak at 16.4% in the second quarter of this year before gradually falling back. California's unemployment rate will hit double digits by 2021, said jerry Nickelsburg, director of the Anderson institute for forecasting at the university of California, Los Angeles. Even in the first quarter of 2022, nearly two years from now, California's unemployment rate could be as high as 8.5%, according to the projections. That would be more than double the unemployment rate for the same period this year. Projections also suggest that California, like the United States, will not return to its previous employment peak until the second half of 2022. However, for China, most people return to their work as before. We predict that the unemployment rate in China will stay constant in the short run.

As for the trade part, with domestic and foreign risks and challenges clearly on the rise, China's foreign trade in 2019 showed an overall trend of stability and improvement in quality. According to customs statistics, China's import and export of goods totaled 31.54 trillion yuan in 2019, an increase of 3.4 percent over 2018.Of this, exports totaled 17.23 trillion yuan, up 5%; Imports reached 14.31 trillion yuan, up 1.6%; The trade surplus was 2.92 trillion yuan, an increase of 25.4 percent. However, considering the impact of RMB exchange rate fluctuations against the US dollar, especially in the context of long-term and complex trade frictions between China and the US, China's foreign trade development is under great pressure in the future. From the graph we made about the data, we can tell that the balance of trade will remain about +42000 million dollars in the next quarter as the slope is mild. However, for the balance of trade in the US, there is a rising gradient, which means the balance of trade situation is getting better (the current account deficit is reducing). So, we can predict that the balance of trade in the US may rise to -58000 million dollars in the next quarter.

6. Conclusion

In conclusion, this study provides an empirical evidence on difference in economic consequences caused by the COVID-19 pandemic in the two largest economies in the world, the USA and China, in terms of figures and trends of three indicators of economic performance— GDP growth rate, unemployment rate and balance of trade.

In the 'introduction', possible difference in economic outcomes is discussed, which may be related to difference in level of economic development, income level and difference in service sector. Through numerous sources of data, we can see that China experiences a more severe decline in GDP growth rate and a smaller rise in unemployment than the USA. However, only the GDP part is fully consistent with our discussion in the 'introduction', but the reason why the other two indicators are not consistent is related to many factors that are not currently clear and may be beyond the scope of this study. Balance of trade in both countries is relatively stable. After some descriptions and analysis of the data, qualitative projections according to trend of graphs and subjective predictions based on facts and policies, are given such that the GDP growth rate in the USA will fall furtherly, but that of China may rise; unemployment rate in China may be constant or even rise, but that of the USA will stay high; the balance of trade in China may stay constant, and that of the USA may improve.

As mentioned above in 'data' section, some data are still unavailable, like unemployment rate of China of April 2020. Also, reasons why outcomes of unemployment rate and balance of trade are not consistent with discussion in 'introduction' are not investigated in this study. After obtaining more data and facts, further research may look back on this pandemic and try to solve these two problems, thus providing a clearer image.

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