

Interim Report:  
Economic Response Forecast to COVID-19



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## Introduction

The economic condition of the United States has changed significantly in the last 20 days. On March 1, 2020 the US had roughly 100 confirmed cases of COVID-19 - by March 20, 2020 there were more than 14,000 confirmed cases<sup>1</sup>. The increase in US cases and the classification of COVID-19 as a pandemic has brought the US to a unique economic crisis. The Governor of California has mandated that all non-essential businesses shut down, the Governors of New York and Illinois have closed all bars and restaurants, airlines have decreased flights and have furloughed or fired thousands of workers. Every day presents a new set of challenges and changes.

What is in store for the economy and where are we headed? In forecasting the next stages of our economy, we are relying, in part, on the shape and trends shown by the economy under other disaster scenarios. We will draw some similarities to the economic conditions presented in New Orleans after Hurricane Katrina<sup>2</sup> and then examine other possible scenarios.

## Benchmark Case: New Orleans and Hurricane Katrina

In late August 2005, Hurricane Katrina (a Category 5 storm) hit landfall on the Mississippi and Louisiana coast. Katrina slammed into Biloxi, Mississippi on August 29 and then moved onto Louisiana, impacting the city of New Orleans and the surrounding parishes<sup>3</sup>. Katrina was responsible for more than 1,800 deaths and more than \$41 billion in property damages<sup>4</sup>. The economic damage to New Orleans and Louisiana as a result of Hurricane Katrina was significant. Within a few days of the hurricane the population of New Orleans plummeted<sup>5</sup> and the unemployment rate increased. Figure 1 shows the spike in unemployment resulting from Katrina. In August 2005, the New Orleans unemployment rate stood at 5.5%. Within

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<sup>1</sup> <https://finance.yahoo.com/news/dr-oz-says-coronavirus-could-result-deaths-more-million-americans-125346404.html>

<sup>2</sup> A possible reference to gauge economic impact would be to look at the impact of SARS on China. See <https://www.cnbc.com/2020/02/11/coronavirus-4-charts-show-how-sars-hit-chinas-economy-in-2003.html>. However, it is not clear that the data from China is always reliable and accurate. Additionally, because of the quasi-free-market-Government-market condition in China, it is not clear that we can easily translate the impact of a catastrophe in China on China's economy to that of the US economy.

<sup>3</sup> <https://www.livescience.com/22522-hurricane-katrina-facts.html>

<sup>4</sup> <https://www.cnn.com/2013/08/23/us/hurricane-katrina-statistics-fast-facts/index.html>

<sup>5</sup> The population of New Orleans fell from 484,674 before Katrina (April 2000) to an estimated 230,172 after Katrina (July 2006) — a decrease of 254,502 people and a loss of over half of the city's population. See: <https://www.datacenterresearch.org/data-resources/katrina/facts-for-impact/>

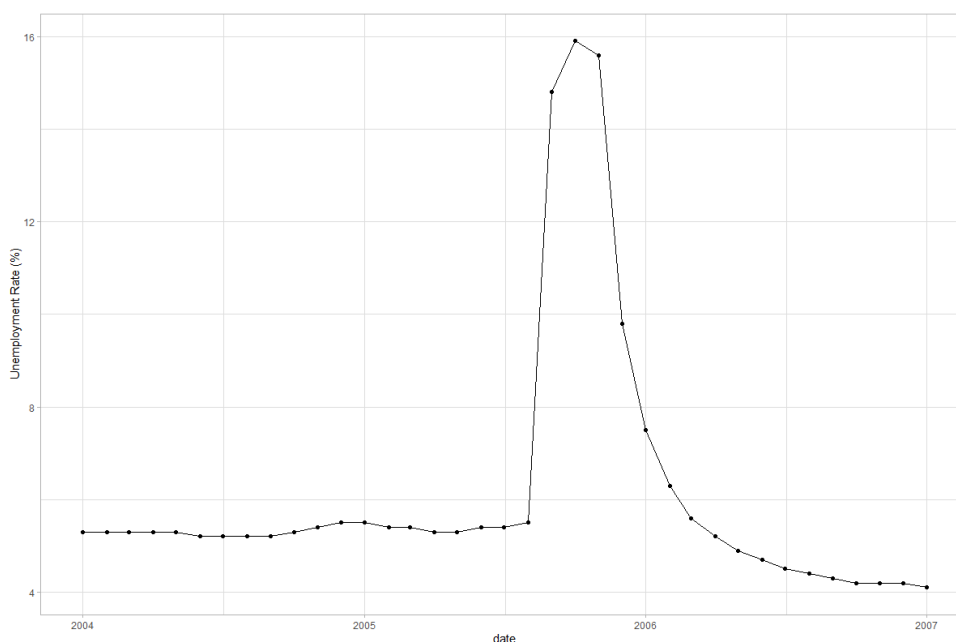
one month, the unemployment rate nearly tripled to 14.8% and then rose again to 15.9% in October.

Figure 2 shows the percentage change in the number of private establishments (by quarter) for New Orleans, LA from 2004 through 2007. After Katrina, the number of private establishments dropped by 0.25%, 3% and 6.8% in consecutive quarters. Long run consequences of the hurricane and subsequent change in consumer behavior resulted in an additional drop in businesses of more than 13%.

Figure 3 shows the number of employees dropping significantly in the two months directly preceding Katrina. The number of employees did increase by November 2005, but the increases never reached the levels of pre-Katrina employment.

Figure 4, Figure 5 and Figure 6 show the percentage of home mortgages in New Orleans, LA that were classified as 30 days past due (30 dpd), the percentage of home mortgages that became classified as delinquent (30, 60, or 90 dpd) relative to the start of a natural disaster, and the progression of 30 dpd mortgages in New Orleans. These figures reveal a story about disruptions and mortgages; mortgage defaults increase in frequency in a municipality/region when a catastrophe occurs.

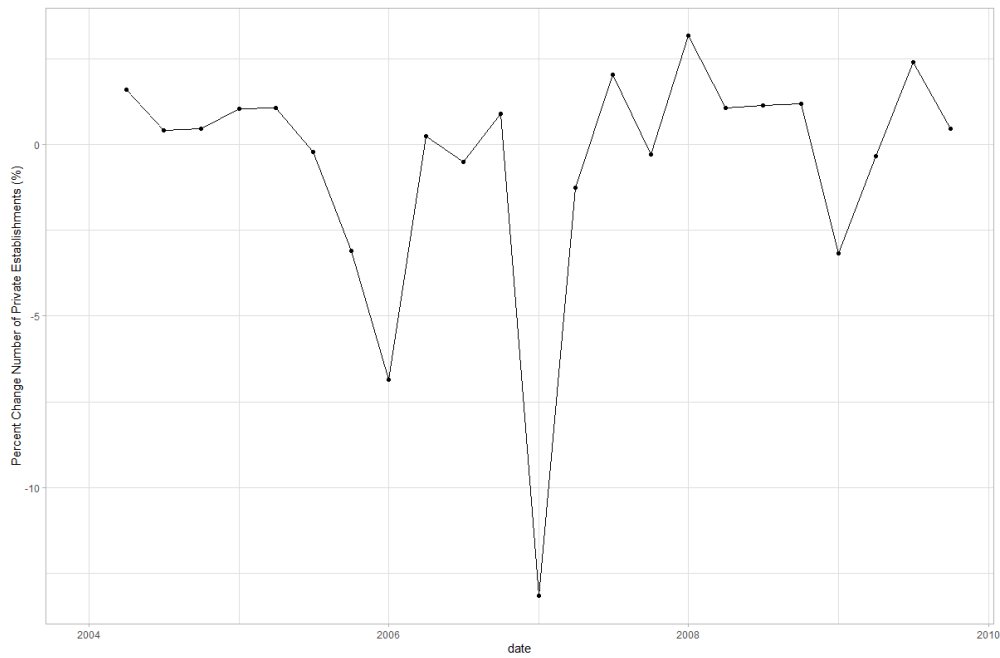
*Figure 1: New Orleans Unemployment Rate (2004 - 2007)*



Source: <https://fred.stlouisfed.org/series/NEWO322UR>

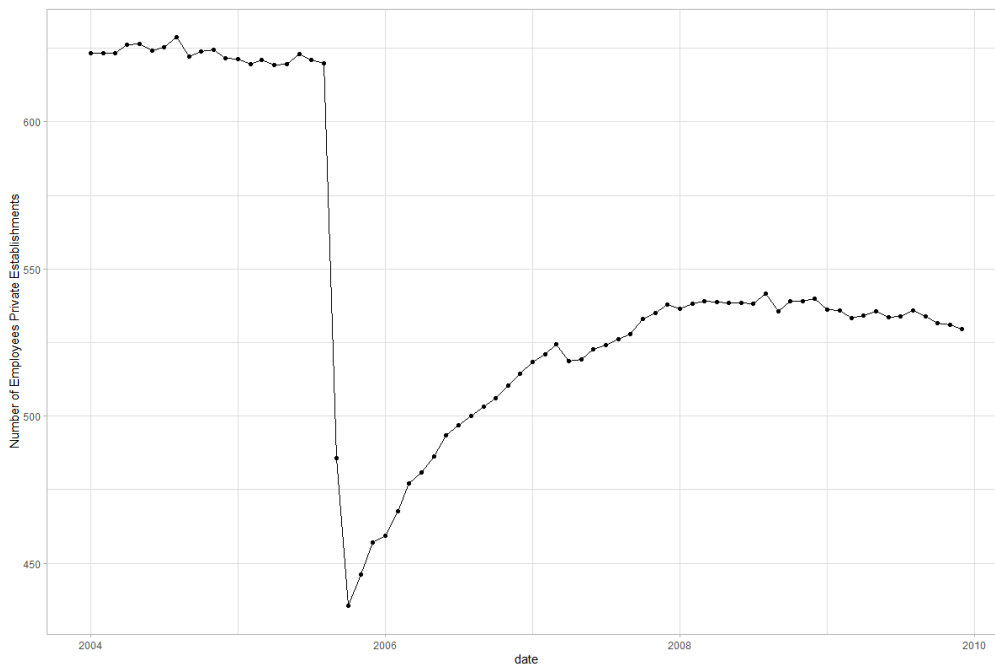
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Figure 2 Percent Change in Number of Private Establishments Orleans Parish (New Orleans, LA) 2004-2007



Source: <https://fred.stlouisfed.org/series/ENU2207120510>

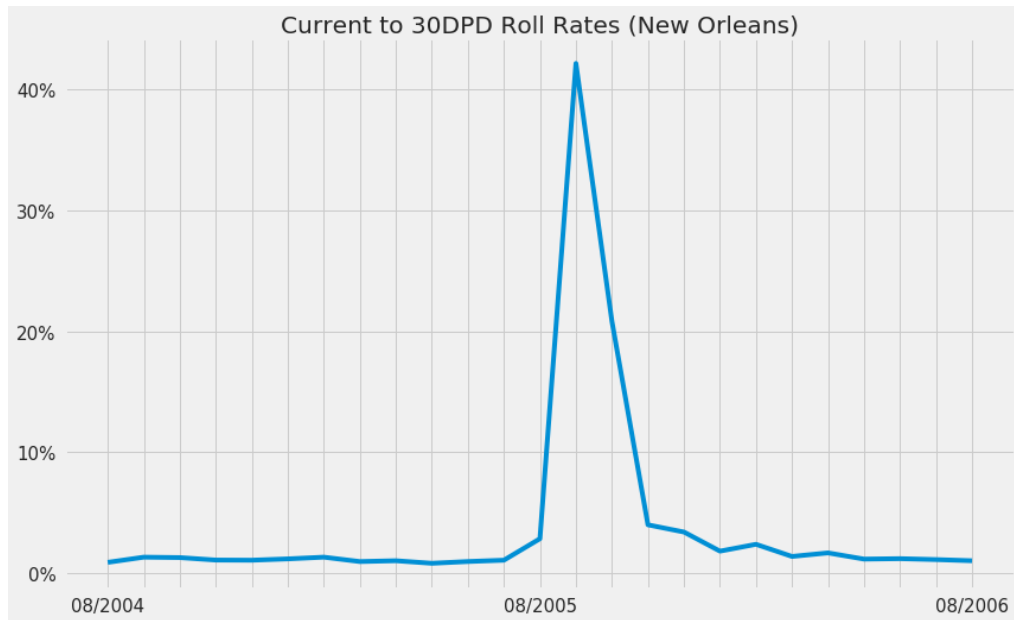
Figure 3: Number of Employees (Total Non-Farm) New Orleans 2004 - 2010



Source: <https://fred.stlouisfed.org/series/NEWO322NA>

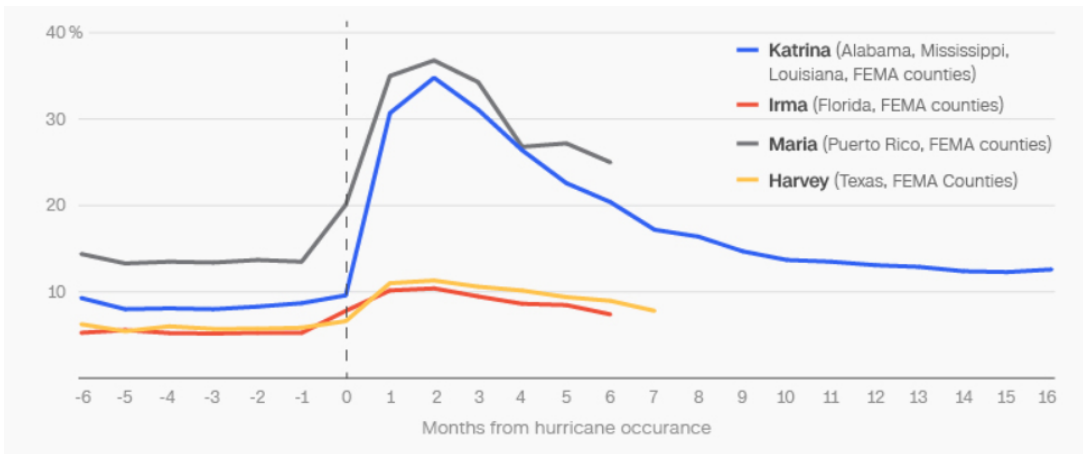
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Figure 4: Percentage of Residential Mortgages Moving from Current to 30 Days Past Due in New Orleans 2004 - 2006



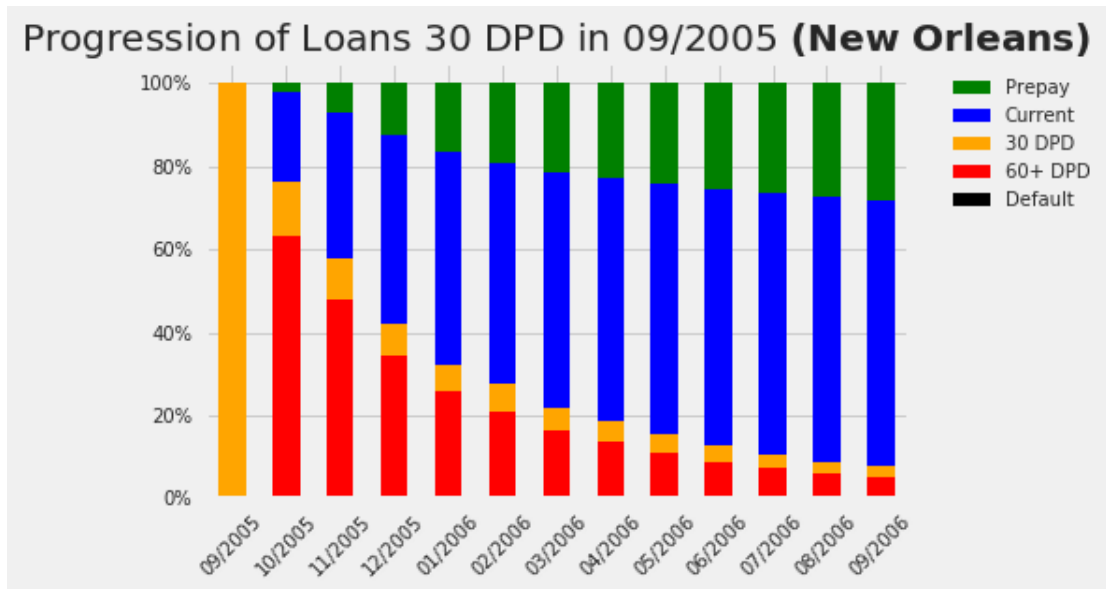
Source: [https://riskspan.com/news-insight-blog/hurricane\\_mortgage\\_recovery/](https://riskspan.com/news-insight-blog/hurricane_mortgage_recovery/)

Figure 5: Percentage of Mortgages at 30 Days Past Due Relative to Start of Disruption



Source: <https://money.cnn.com/2018/04/22/news/economy/hurricane-foreclosures-houston/index.html>

Figure 6: Progression of 30 Days-Past-Due Mortgages in New Orleans 9/2005 - 9/2006



Source: [https://riskspan.com/news-insight-blog/hurricane\\_mortgage\\_recovery/](https://riskspan.com/news-insight-blog/hurricane_mortgage_recovery/)



## COVID-19 in 2020

We believe that the economic fallout in New Orleans, LA related to Hurricane Katrina is a compelling case study for the COVID-19 outbreak. The current situation includes the following characteristics:

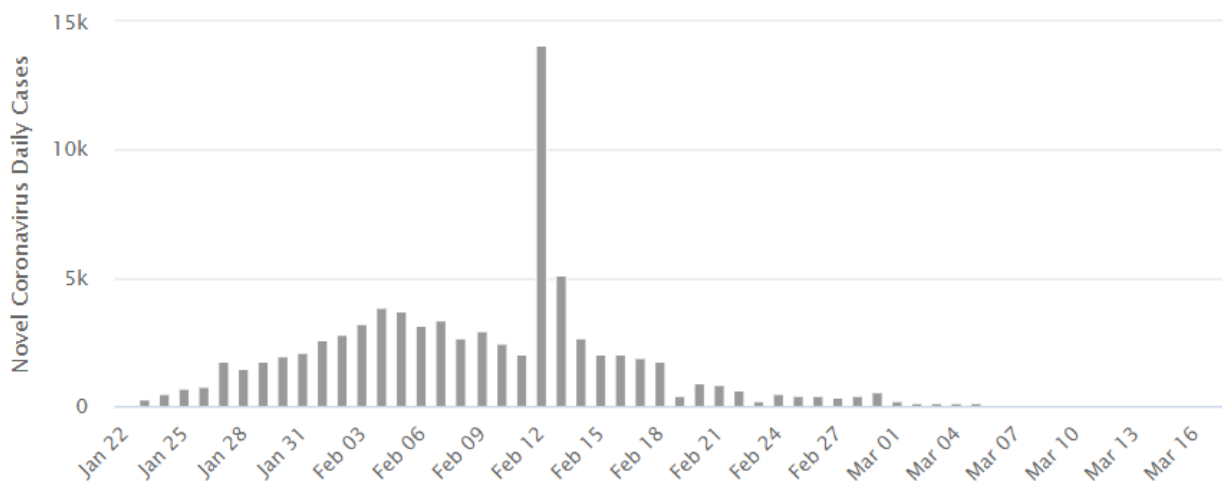
- A swift and sudden decrease in the number of people available to work;
- A disruption in supply chains;
- The inability for businesses to control their environment; and,
- A delay in government responses to the disruption.

The economic forecast built from a Katrina-like disaster but expanded to a much larger region (the contiguous United States) can go in one of three general directions.

### Case 1: A Quick Hit and Recovery by Q4

The flow of COVID-19 cases and deaths is still being evaluated. However, we've seen a pattern emerge from both China and South Korea regarding the number of new cases.

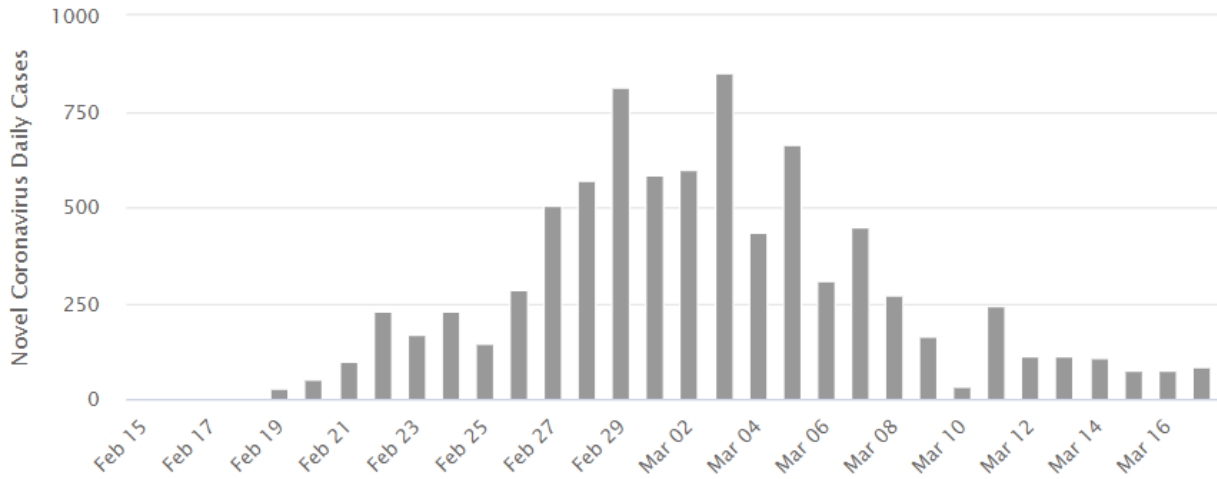
*Figure 7: Number of Daily COVID-19 Cases- China*



Source: <https://www.worldometers.info/coronavirus/>

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Figure 8: Number of New Cases COVID-19 - South Korea

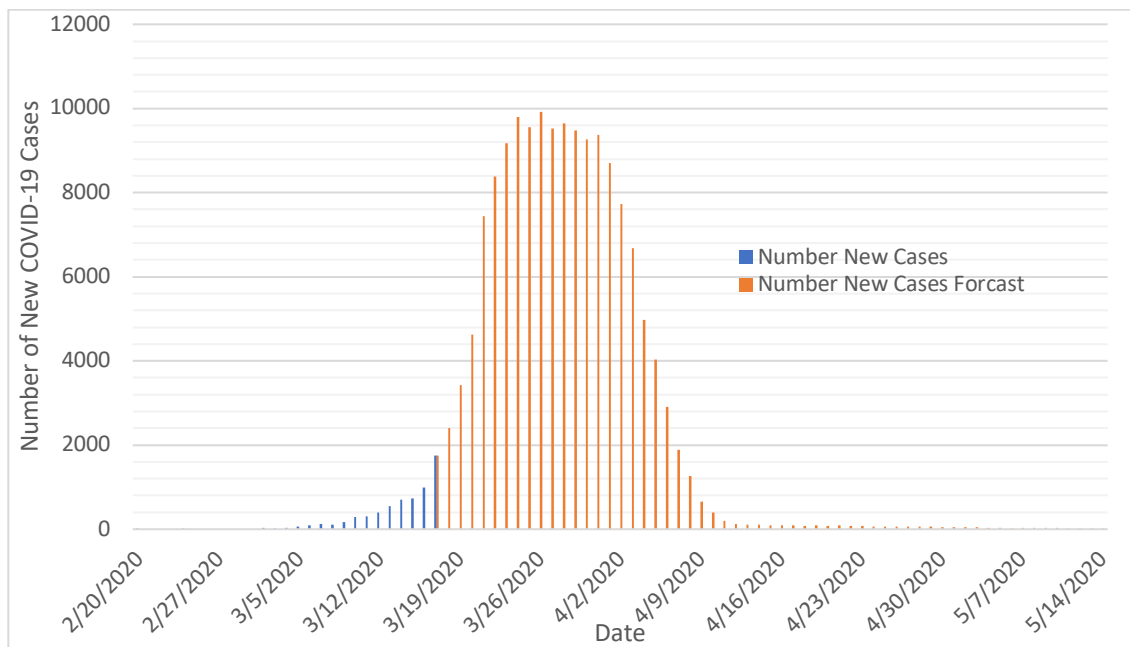


Source: <https://www.worldometers.info/coronavirus/>

These scenarios suggest a trend where the country hits the maximum number of new cases within 14 to 21 days after an initial intrusion of the virus followed by a longer decrease in the number of cases over the next three weeks. Both China and South Korea showed a slow-down of new COVID-19 cases within two months.

If the US were to follow a similar trend, we are likely to see the following:

Figure 9: New and Forecast New Cases COVID-19 - US (Modest Recession)



In this scenario we are showing a very short but very extensive spread of the virus. China, at its peak, showed approximately 5,000 new cases in a single day (with one day of 15,000 new cases). Given that the US has roughly 6 times the population of Hubei<sup>6</sup> province, and the US has been very slow to self-quarantine, social-distance and shelter-in-place<sup>7</sup>, it is likely the number of new cases in the US will escalate to a higher number than what we saw in China.

Under this scenario, we are likely to see the following:

- Unemployment rates between 16 - 22 % by June 1, 2020
- Sustained higher unemployment rates 8 - 12% through September 1, 2020 as firms re-solidify, re-open, and re-capitalize
- New mortgage delinquencies (30 dpd) to increase to 55 - 70% of mortgages
- A drop in private establishments by 50 - 75%
- Real GDP dropping by 5 - 8% over the next two quarters
- Significant rebound by fourth quarter 2020 with a large consumer spend on entertainment and travel.

These economic trends are extrapolated from the trends seen in New Orleans after Katrina with firms shuttering their doors across the country<sup>8</sup>.

### Case 2: A Large Recession with a Relapse, “Waves of Uncertainty”

It appears that South Korea and China have been able to keep the trend of new cases looking similar to a ‘bell curve’ by engaging in significant quarantining of the population. Iran, however, has had less success with this technique and has seen a ‘double-dip’ or consecutive waves of new cases.

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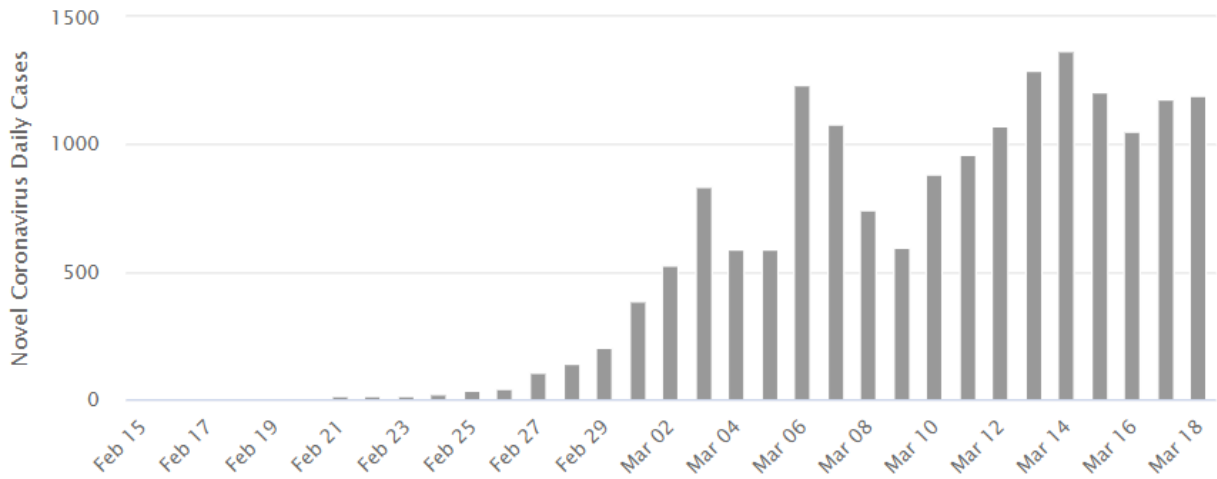
<sup>6</sup> <https://www.forbes.com/sites/kenrapoza/2020/03/12/china-and-south-korea-models-seem-like-only-way-to-contain-covid-19/#5f99ca5c47d3>

<sup>7</sup> San Francisco ordered a ‘shelter in place’ nearly two weeks after the COVID-19 took hold in Washington: <https://abc7news.com/health/coronavirus-everything-you-need-to-know-about-the-bay-areas-shelter-in-place-order/6019152/>

<sup>8</sup> <https://www.nytimes.com/2020/03/15/nyregion/new-york-coronavirus.html>,

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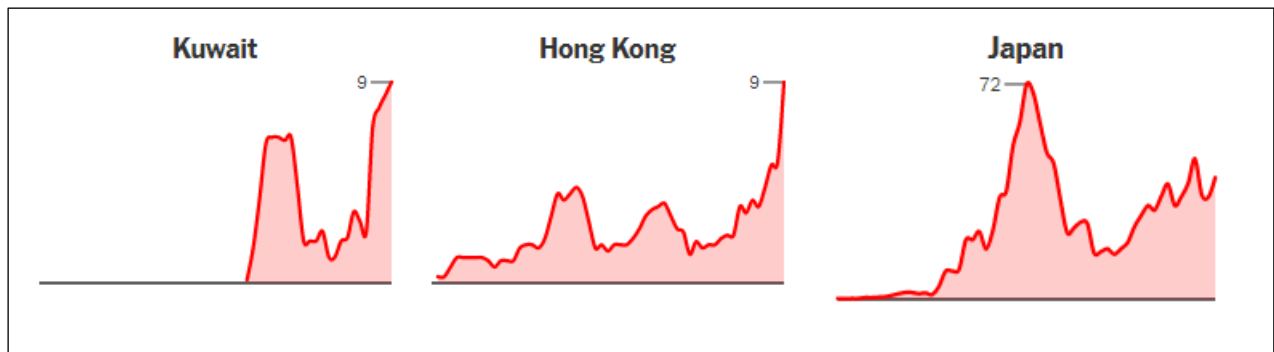
Figure 10: Number of New COVID-19 Cases - Iran



Source: <https://www.worldometers.info/coronavirus/>

We are seeing a similar pattern emerge in other countries as well: Kuwait, Hong Kong and Japan have all exhibited this 'wave' pattern of new COVID-19 cases.

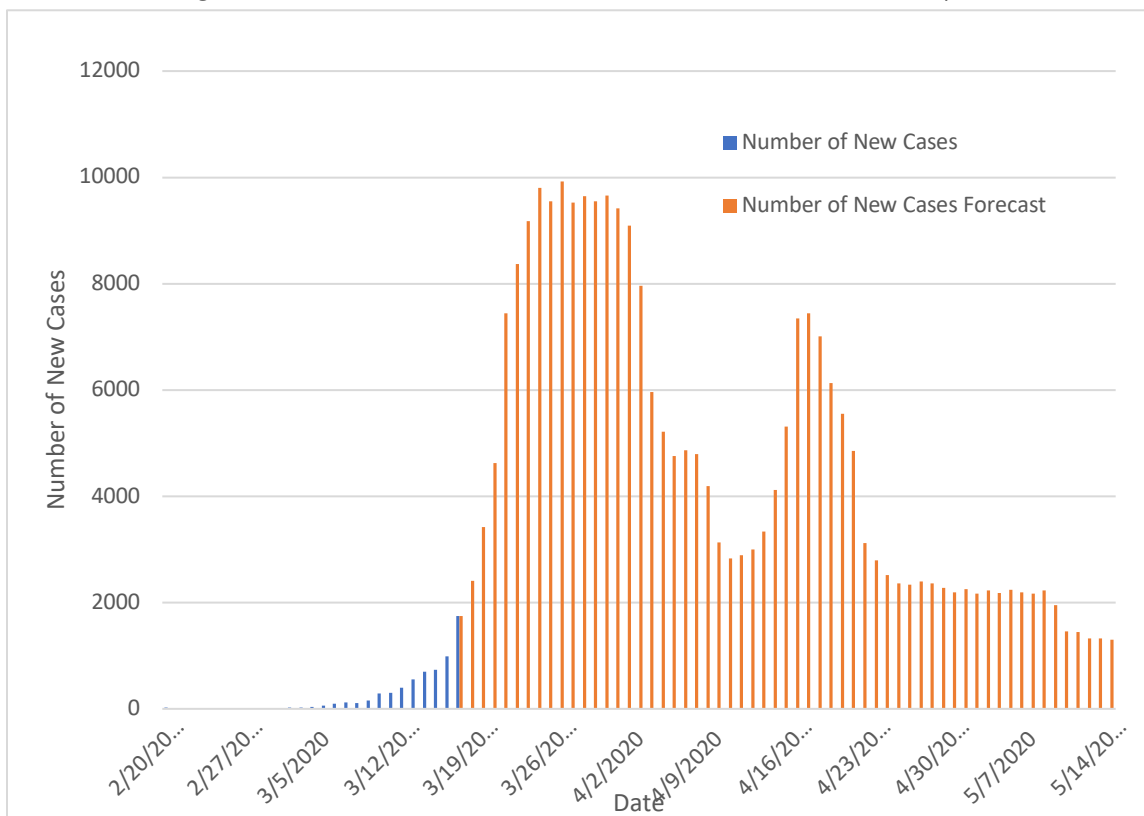
Figure 11: New Cases COVID-19 - Kuwait, Hong Kong, Japan



Source: <https://www.nytimes.com/interactive/2020/03/19/world/coronavirus-flatten-the-curve-countries.html>

## FORECASTED ECONOMIC RESPONSE TO COVID-19 - DRAFT VERSION

Figure 12 New and Forecast New Cases COVID-19 - US (Recession With Relapse)



Under this scenario, the US might see a spike in cases within the next two to three weeks, followed by a drop in the number of cases. If agents in the economy (consumers, businesses, and government leaders) relax social distancing, school closures and other suppressive measures, COVID-19 cases are likely to surge. In the scenario established above the second wave is smaller than the first wave. However, the second wave/spike could be equal in size or larger, depending on how complacent we become.

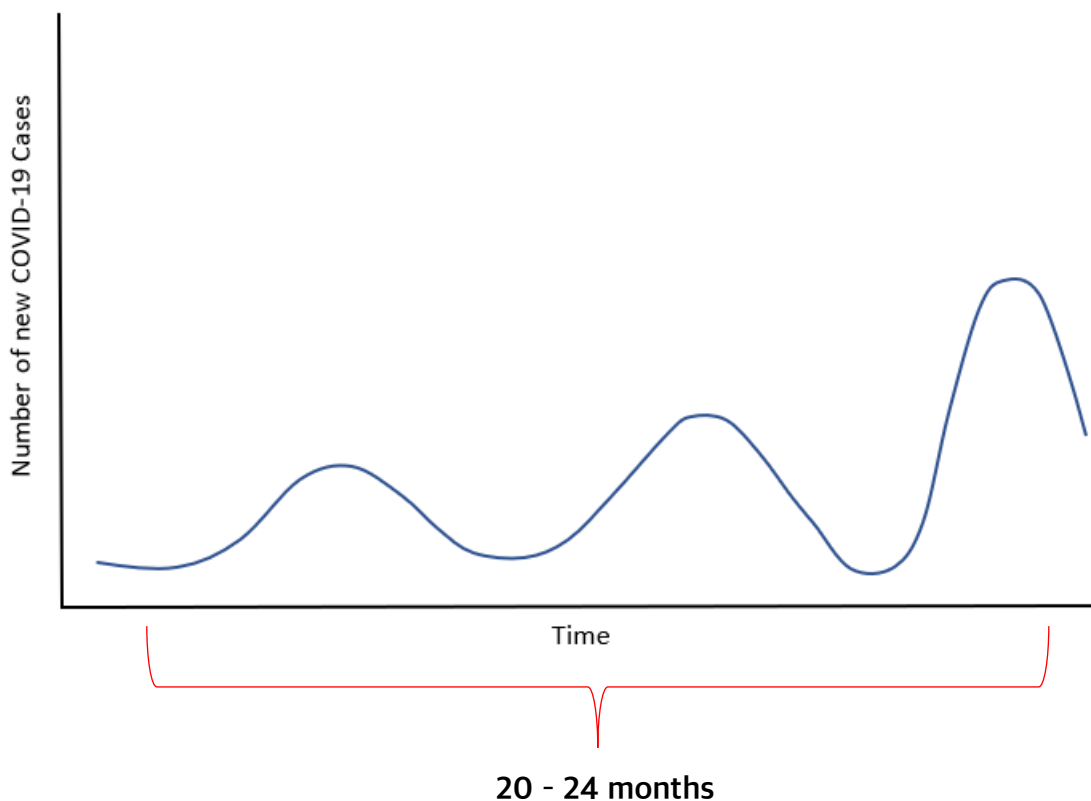
The economic conditions under this scenario are likely to be as follows:

- Unemployment rates between 45 - 70%
- Sustained higher unemployment rates 20% through January 2021
- New mortgage delinquencies (30 dpd) to increase to 65- 85% of mortgages
- A drop in private establishments by 60-85%
- Real GDP dropping by 10-20% over the next 9 -12 months

Case 3: Massive Recession with Consistent Relapses

Clearly this is a doomsday scenario that we would like to avoid. However, internal government documents (for example, U.S. Government COVID Response Plan<sup>9</sup>) is suggesting an 18-month pandemic with waves of new cases and extreme shortages. If this scenario plays out, we could see an extended recession lasting 20 - 24 months.

*Figure 13: New COVID-19 Cases Forecast - US Extreme*

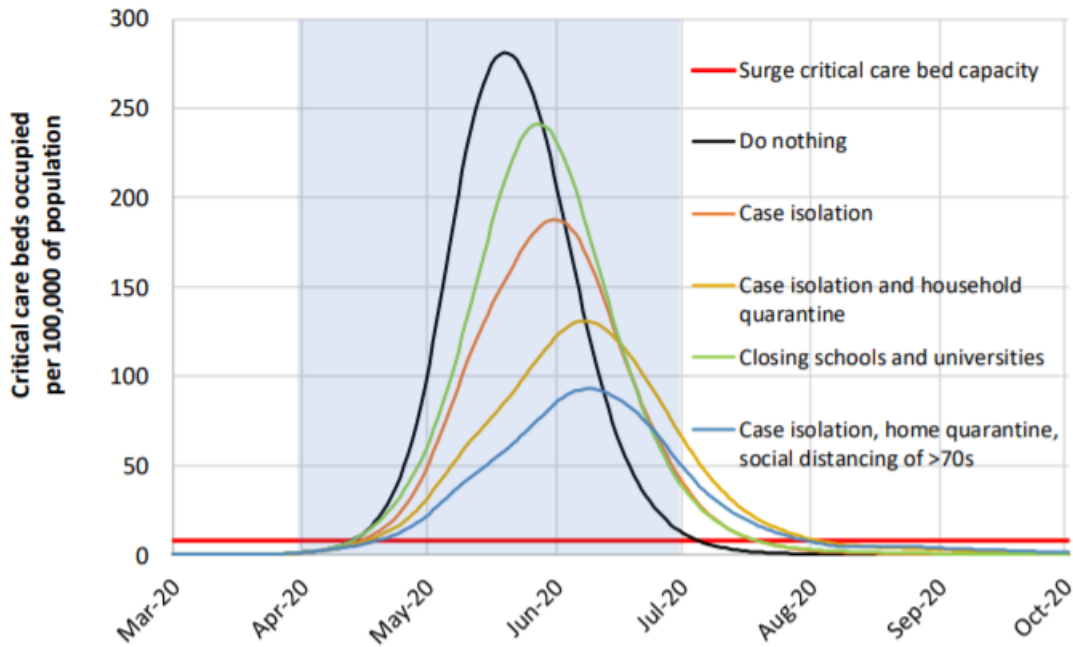


This scenario is not unlike one possible pattern of COVID-19 outbreak forecast by Neil M. Ferguson et. al<sup>10</sup>.

<sup>9</sup> <https://int.nyt.com/data/documenthelper/6819-covid-19-response-plan/d367f758bec47cad361f/optimized/full.pdf#page=1>

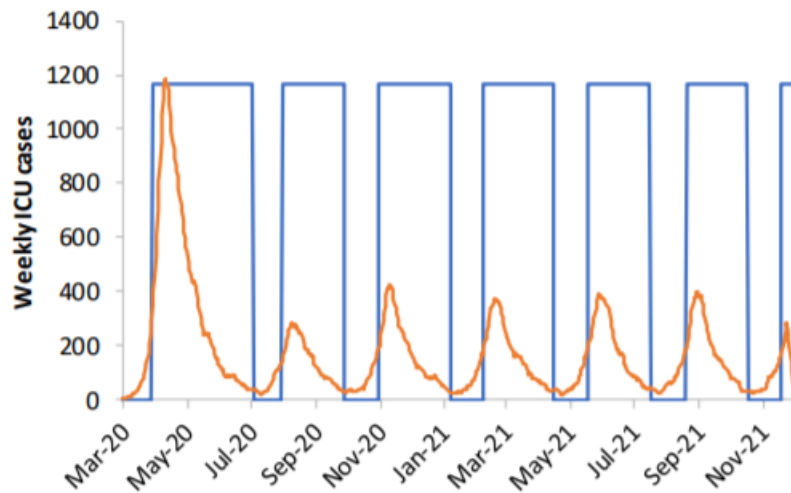
<sup>10</sup> <https://www.imperial.ac.uk/media/imperial-college/medicine/sph/ide/gida-fellowships/Imperial-College-COVID19-NPI-modelling-16-03-2020.pdf>

Figure 14: Critical Care Beds Occupied by COVID-19 (Scenarios)



Source: <https://www.imperial.ac.uk/media/imperial-college/medicine/sph/ide/gida-fellowships/Imperial-College-COVID19-NPI-modelling-16-03-2020.pdf>

Figure 15: Long-Run Trend of COVID-19 ICU Cases



Source: <https://www.imperial.ac.uk/media/imperial-college/medicine/sph/ide/gida-fellowships/Imperial-College-COVID19-NPI-modelling-16-03-2020.pdf>

The economic conditions under this scenario are likely to be as follows:

- Unemployment rates bouncing between 15 - 30% quarterly with highs above 70%
- Sustained higher unemployment rates above 10% for the next two years
- New mortgage delinquencies (30 dpd) to increase to above 70% of mortgages consistently
- A drop in private establishments by 80-90%
- Real GDP dropping by 30 - 50% across the next two years

### **Fiscal Stimulus and Impact on the Economy**

The current news regarding the fiscal stimulus include the following elements:

- Checks to individuals/families in the amounts of \$1,200 - \$2,000 for individuals earning less than \$100,000 and families earning less than \$150,000. Sums of up to \$500 may be added per dependent child<sup>11</sup>.
- Small business loans, delays in loan repayments<sup>12</sup>
- Free COVID-19 testing<sup>13</sup>
- Significant changes to FMLA for companies with less than 500 employees<sup>14</sup>

These stimulus packages are likely to soften the blow to the large scale disruption. However, the impact of a Keynesian-style fiscal stimulus (money in consumer's hands) is likely to be less effective because so many businesses are now closing. If consumers have money but do

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<sup>11</sup> <https://www.politico.com/news/2020/03/19/senate-negotiates-third-coronavirus-package-137607>

<sup>12</sup> <https://www.cnn.com/2020/03/19/politics/read-senate-gop-stimulus-bill/index.html>

<sup>13</sup> ibid

<sup>14</sup> ibid



not have goods and services to purchase the stimulus is not going to have any traction within the economy.

### **Overall Economic Impact and Long Run Trajectory**

We feel that the most likely economic outcome stemming from the COVID-19 crisis is what we've outlined in Case 2: waves of recovery & relapse from COVID-19, accompanied by waves of economic panic & recovery. Because the current approach by the US Government is to close large portions of the economy -- restaurants, bars and all non-essential businesses -- considerable sections of the economy will become unemployed all at once. Even with stimulus packages - rebate checks or tax deferments - the lack of goods and services to purchase will not improve the trend of the economy in any significant magnitude. When the number of new cases slows or ceases, consumers will "hit the streets running", so to speak, and make large purchases at the businesses lucky enough to still be open. If the models regarding the re-emergence of COVID-19 are correct, the virus will strike again and send the economy back into panic mode. If this were to happen, we could face an even larger shock to a fragile economic state.

If, however, the US and its trading partners -- Canada, Mexico, China, and the European Union -- were to establish a strict quarantine for an extended period, perhaps 8 to 12 weeks, it is possible that COVID-19 shock would be a very large V-shaped recession. In this scenario, the economy would virtually hit rock bottom but could rebound relatively quickly. We should know by the end of March 2020, if not sooner, if the US and other developed countries are bold enough to push a restrictive quarantining policy. If the US and other developed countries do take this step, the US may be fortunate enough to recover through scenario similar to that established in Case 1; if not -- if the US is more passive in its response -- the country is much more likely to face wave upon wave of economic recession and a recovery lasting the next 18 to 24 months.