

Impact of COVID-19 on Taxi Operation in Chicago

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Coronavirus disease (COVID-19) is a respiratory illness that significantly impacted the world in the beginning of 2020: Many countries announced lockdowns for months, the demand for some items (such as surgical face masks and disinfectants) skyrocketed, the schools, universities, and restaurants were shut down, the value of US oil price became negative, and supply-chain around the world was highly disrupted.

As a consequence of COVID-19 pandemic, transportation services including taxi operations have been impacted. In this report, we examine the immediate effects of COVID-19 on taxi operation in Chicago based on [the data](#) published on the city's data portal as of March 31st, 2020. The analysis shows a nearly 50% decrease in total number of rides in March compared to February, and 95% reduction in weekly ridership and 85% reduction in the number of operating taxis during stay-home order.

Timeline of Events

A summary of the relevant events is shown in Table 1.

TABLE 1 Date and description of relevant events

Date	Event
Jan 20, 2020	First case of confirmed COVID-19 in the United States
Jan 24, 2020	First case of confirmed COVID -19 in state of Illinois
March 11, 2020	World Health Organization (WHO) characterized the COVID-19 outbreak as a pandemic
March 11, 2020	“Gubernational Disaster Proclamation” in Illinois
March 13, 2020	Gatherings of 1,000 or more people are prohibited in Illinois
March 17, 2020	All public and private K-12 schools must close
March 17, 2020	Bars and restaurants must suspend on-premises consumption
March 20, 2020	Stay-home order

Ridership

Figures 1-3 show the daily, weekly, and monthly taxi ridership in Chicago. **Figure 2** shows that number of rides peaks in the week of February 10th. The ridership slightly increases week by week till week of March 9th, where a sharp decrease in the number of trips is observed. The decreasing trend continues in the following weeks and the number of trips gets to its minimum

after stay-home order issued on March 20th. The weekly number of trips has dropped from approximately 280,000 in early February to nearly 15,000 over the last week of March.

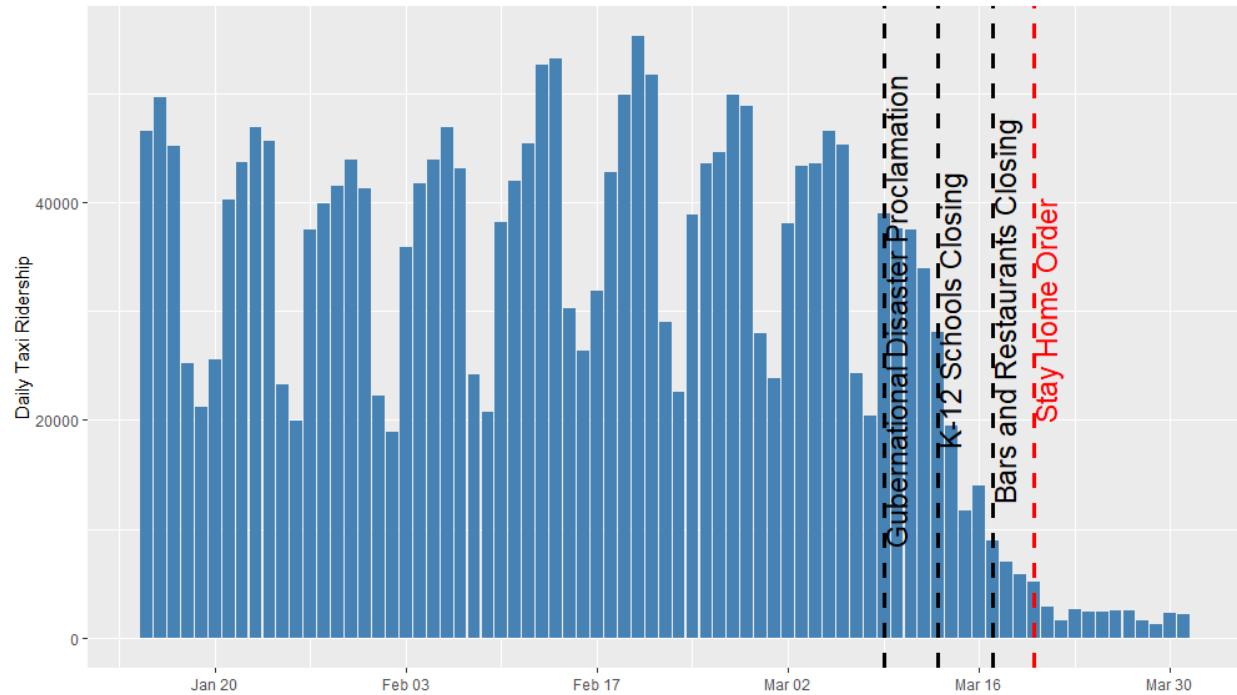


Figure 1 Daily taxi ridership in City of Chicago in 2020

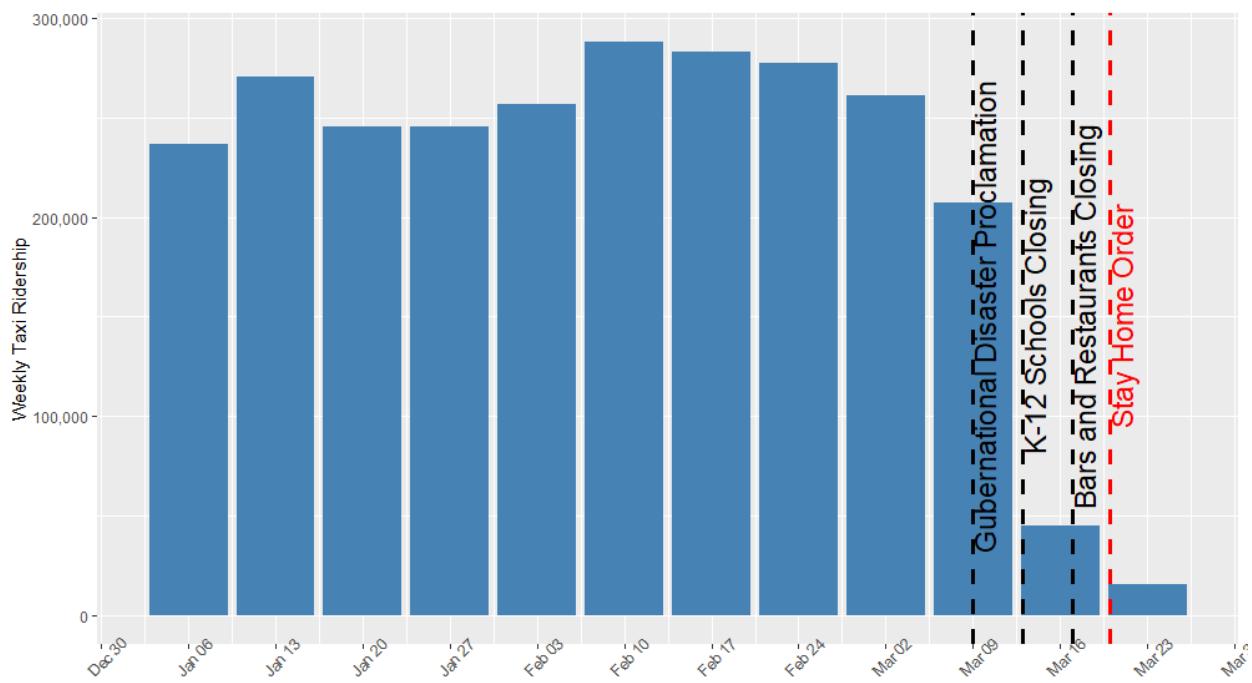


Figure 2 Weekly taxi ridership in City of Chicago

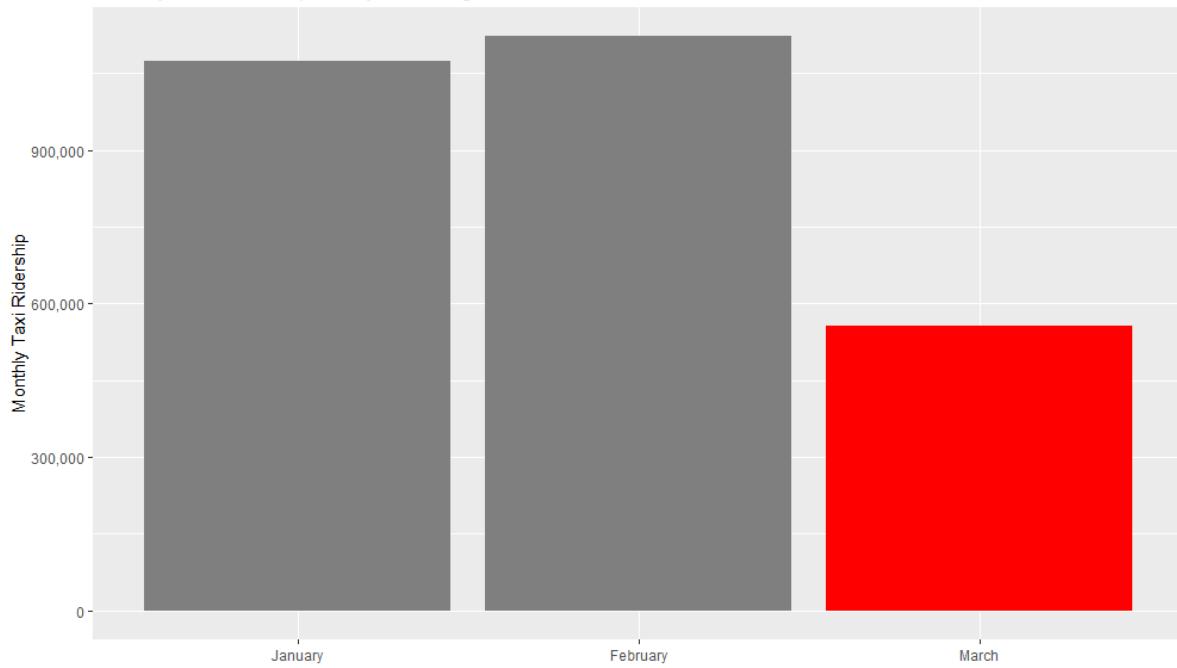


Figure 3 Monthly taxi ridership in City of Chicago

Figure 3 implies that the number of taxi trips has decreased approximately 50% in March compared to February.

Essential vs. Nonessential Taxi Trips

As seen in **Figure 1**, the number of trips after ‘stay-home’ order seems to have reached its minimum and does not show further decrease in March. We define the trips that were served after ‘stay-home’ order as *essential taxi trips*. On the other hand, there are some origin-destination (OD) pairs with significant number of trips in February and few or zero trips over ‘stay-home’ period. These trips are defined as nonessential taxi trips.

Figure 4 and **5** show the average daily of essential and nonessential trips, respectively. **Figure 4** depicts how average number of trips served during ‘stay-home’ period has decreased for all OD pairs compared to February. Some OD pairs show significant difference in the average values over the two periods. **Figure 5** illustrates the number of trips for OD pairs that have significant average daily trips in February and close to zero trips during ‘stay-home’ period. The graph shows that there are OD pairs that their average daily trips has dropped from 300 to almost zero.

The spatial distribution of these OD pairs is shown in **Figure 6**. This figure illustrates that the taxi trips in downtown Chicago have been impacted the most during ‘stay-home’ period. Additionally, while many OD pairs between downtown Chicago and O’Hare International Airport show significant reduction in number of trips, there are still some trips being served between downtown Chicago and O’Hare International Airport over ‘stay-home’ period.

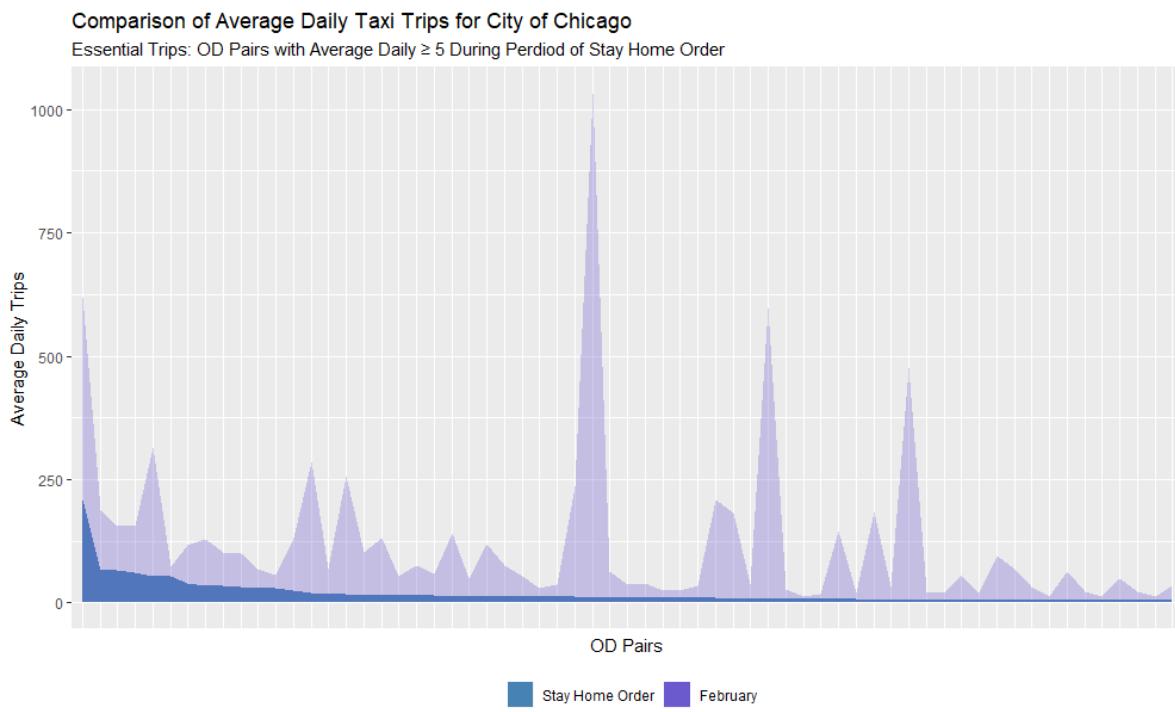


Figure 4 Comparison of average daily trips for essential trips in February and during the 'stay-home' period

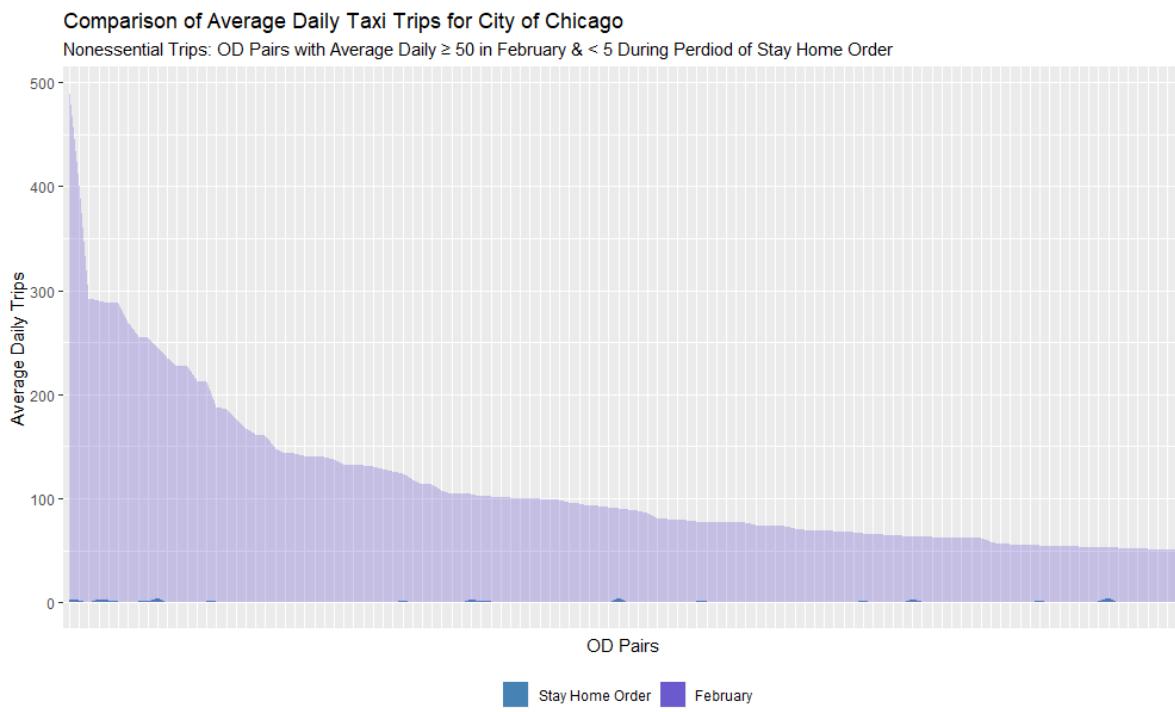


Figure 5 Comparison of average daily trips for nonessential trips in February and during the 'stay-home' period

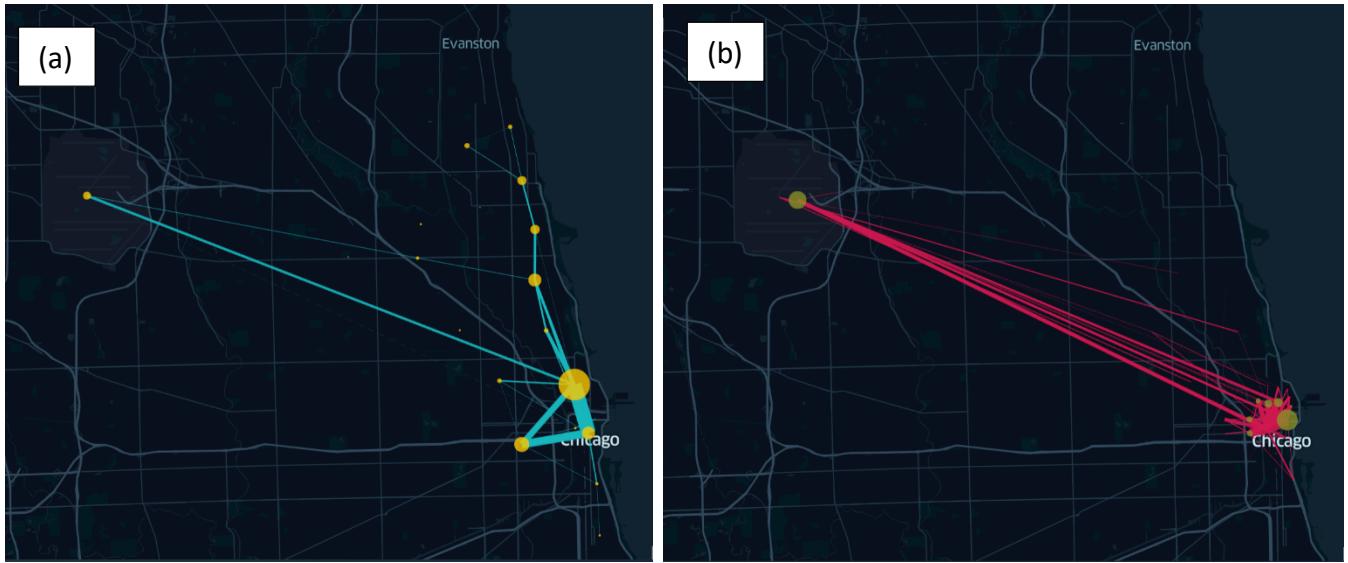


Figure 6 Spatial distribution of OD pairs with (a) essential taxi trips, and (b) nonessential taxi trips

Operating Taxis

Figure 7 shows the daily number of operating taxis in Chicago. The number of operating taxis has dropped from more than 3500 taxis in the beginning of March to nearly 500 during the ‘stay-home’ period.

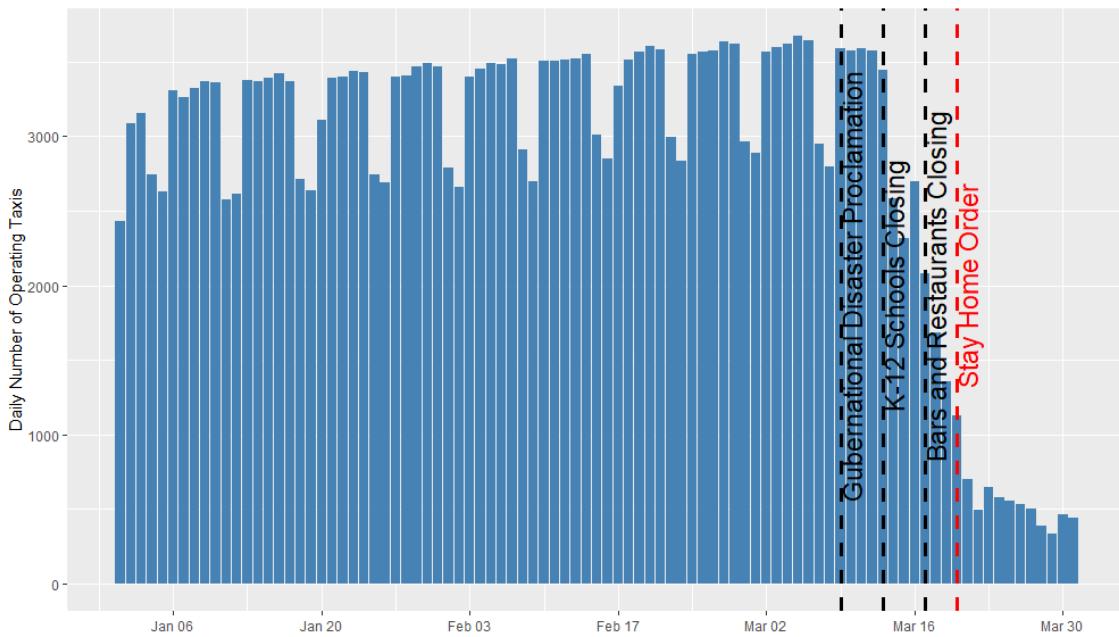


Figure 7 Daily number of operating taxis in City of Chicago in 2020