Rideshare Services and Their Impact on Chicago Public Transit

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Introduction and Background

The Chicago public transit system, known as the CTA, is the second largest public transportation system in the nation. It consists of a network of busses and rail, serving Chicago and the surrounding suburbs. It has a service population of 3.5 million people, and its average weekday has 1.6 million rides. The CTA is administered by the Chicago Transit Board and is hosted under the authority of the large RTA system, which services the greater Chicagoland area through suburban busses and commuter rail.

CTA fares are responsible for half of the system's funding, while state and local funding makes up the rest.[1] In 2014, the CTA fully transitioned to the Ventra farecard system, the nation's first contactless transit card system. The Ventra system streamlined the process of buying fares and unified the rail and bus fare system. Overall, it was seen as a way of making the CTA more user-friendly, incorporating automatic fare reloads and a digital app with service information.[2] Overall, a robust public transit system is an affordable and efficient way to travel throughout Chicago. Transit has been shown to be better for the environment than driving, help reduce traffic congestion, and increase economic activity in the area it services.[3]

Until recently, most Chicagoans moved around the city through the CTA, private car ownership, taxis, biking, and walking. In 2011, Uber was the first rideshare company to service

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[1] https://www.transitchicago.com/facts/

[2] https://www.transitchicago.com/cta-and-pace-to-complete-transition-to-ventra-by-july-1/

[3] https://www.southuniversity.edu/whoweare/newsroom/blog/environmental-benefits-of-public-transportation-31178

the Chicago area.[4] Rideshare services have great potential to serve populations that currently live far from the transit system. Often times, individuals are unable to make it between their home and the nearest public transit stop, cutting them out of the transit service population. If they had a means to get to the transit system, then they would be able to travel throughout the city more easily. Some urban areas have partnered with Uber, seeing it as a solution to this first-mile, last-mile problem.[5]

However, rideshare services can also be a cause for concern. They are known to cause increased congestion and carbon emissions due to the increase in cars on the road. Uber is especially known for treating its drivers poorly, fighting many legal battles to ensure that the drivers are seen as independent contractors, rather than full employees. Drivers have recently striked and protested at the Chicago City Hall, demanding stricter regulations.[6] Finally, one concern with rideshare services is that they will decrease the ridership numbers on the CTA, in turn decreasing the system's funding and quality of service.

Until 2015, the city of Chicago restricted rideshare services from carrying out rides to and from O'Hare and Midway airports (both of these airports are also serviced by CTA L stations). Today, Chicago does allow rideshares to service these airports, with an additional $5 fee per ride.[7] Chicago has also implemented a rideshare fee of 67 cents per ride. In 2018, $179 was raised from these fees and is allocated to further improve the CTA system.[8] The way the

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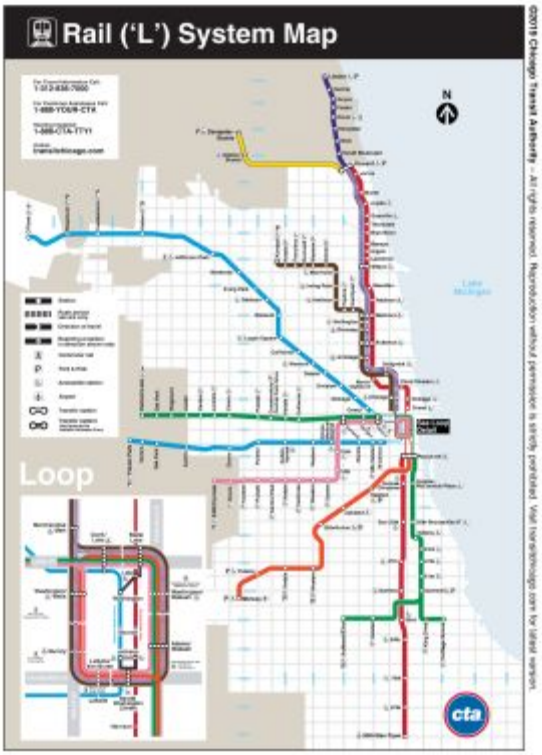
[4] https://techcrunch.com/2011/09/22/uber-brings-its-disruptive-car-service-to-chicago
[5] https://nytransit.org/resources/transit-tncs/205-transit-tncs
[6] https://www.chicagobusiness.com/transportation/uber-lyft-demand-common-sense-regulation-city-hall-protest
[7] https://www.chicagotribune.com/politics/ct-rahm-emanuel-ride-share-airport-rules-met-20151103-story.html
[8] https://chicago.curbed.com/2018/2/5/16973960/uber-lyft-fee-city-budget-cta-improvements

rideshare industry and the CTA impact each other is nuanced as they both compete with each other and provide benefits to each other.

Mobility and issues regarding the way people move around Chicago impacts nearly everyone living in the city and the surrounding areas. Middle and low-income individuals are likely to support and use the CTA as it is much more affordable than paying for a car, car insurance, and other costs associated with owning a car in Chicago. The Chicago government and the Chicago Transit Board have a vested interest in supporting and expanding the CTA as it can spur economic development and increase the quality of life for Chicagoans. Environmental agencies and advocacy groups, as well as environmentally-conscious individuals are also likely to support and use the CTA as it has a better impact on the environment than driving. Those who use private cars to move around Chicago may be concerned about the increase in traffic that rideshares have. Rideshare drivers likely have many concerns with their working conditions and compensation.



There are large portions of Chicago that are not well-serviced by the CTA rail system. The south and northwest sides of the city in particular may have more people who rely on rideshare services to get to the CTA or to their final destination. Rideshare services may also be more popular among wealthier individuals as it is both more expensive and more luxurious than using public transit. Rideshare

companies themselves are very powerful corporations that have a vested interest in promoting their product. Additionally, consumers and consumer advocates may be against the rideshare fees as the cost burden is paid by the riders rather than the companies themselves. However, all of the previously-discussed supporters of the CTA are likely to support regulations on rideshares and policies that increase transit ridership.

Analysis

With all of this information in mind, I conducted an analysis of transit ridership in order to evaluate whether rideshare companies' impact. I used the Chicago Open Data portal to download datasets that included information on rideshare rides in Chicago, CTA L ridership numbers by stop and day, and CTA bus ridership numbers by line.

I first wanted to see where rideshare services were most popular in Chicago, and how these corresponded to transit ridership in those same areas. I used python numpy to process the data on rideshares. Each line in the rideshare file was an individual ride, and the file contained every rideshare trip in Chicago in 2018 and 2019. Due the massive size of the file (11 gigabytes), I was unable to load it into Rstudio, and any analysis would take far too long, so I took a random sampling of the data. Using a python script, I processed it to get the total number of pickups and dropoffs in each census tract. I used ArcGis to map the census tracts that had the most rideshare activity and how it corresponds to the CTA L stations in those same areas.

I also wanted to find the L stations with the largest ridership, and I used a numpy python script to process the data and construct those numbers and analyze how they changed over time. Finally, I used R studio to carry out a time series analysis in order to find the trend of CTA ridership over time.

Results

The ten census tracts with the highest rideshare ridership had an average of 19,660 rides per day, compared to the overall average of 753 rides per day. These census tracts were located at either airport and in downtown Chicago, particularly in the wealthier areas of Streeterville and River North. Despite being very well serviced by the CTA, the downtown area had very high use of rideshare services. This may be associated with the increased levels of wealth in that area, and in turn, an increase in willingness to pay extra to take a rideshare. However, these areas also correspond with a higher population density, as indicated in figure 3.

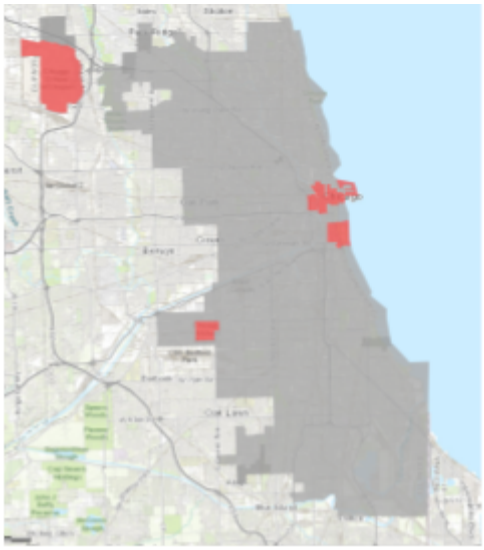


Fig. 1 Tracts in red have highest rideshare usage

Fig. 2 Top rideshare tracts and L stops

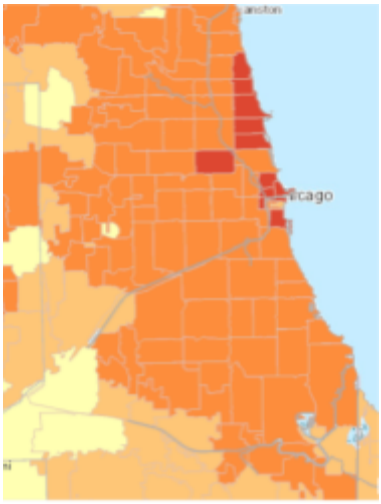
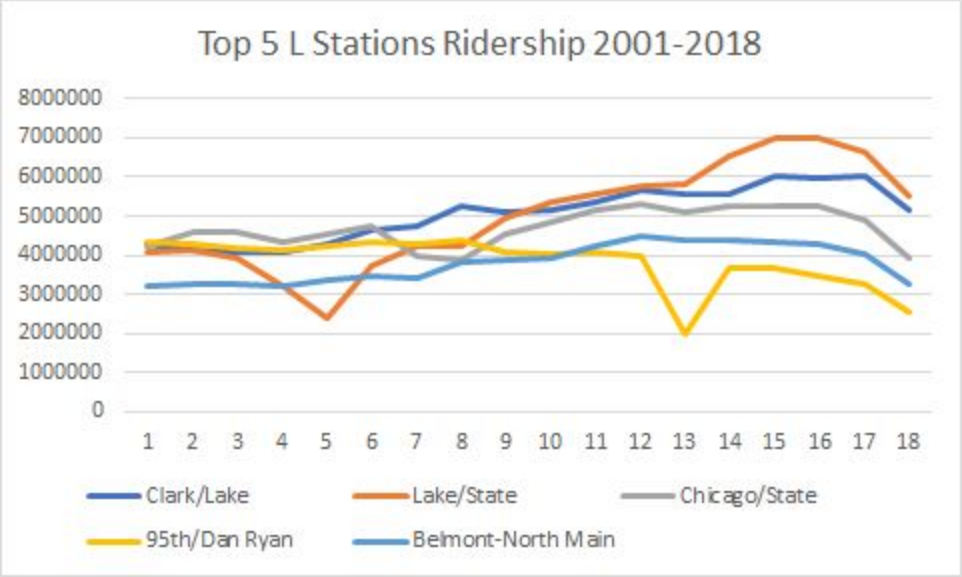
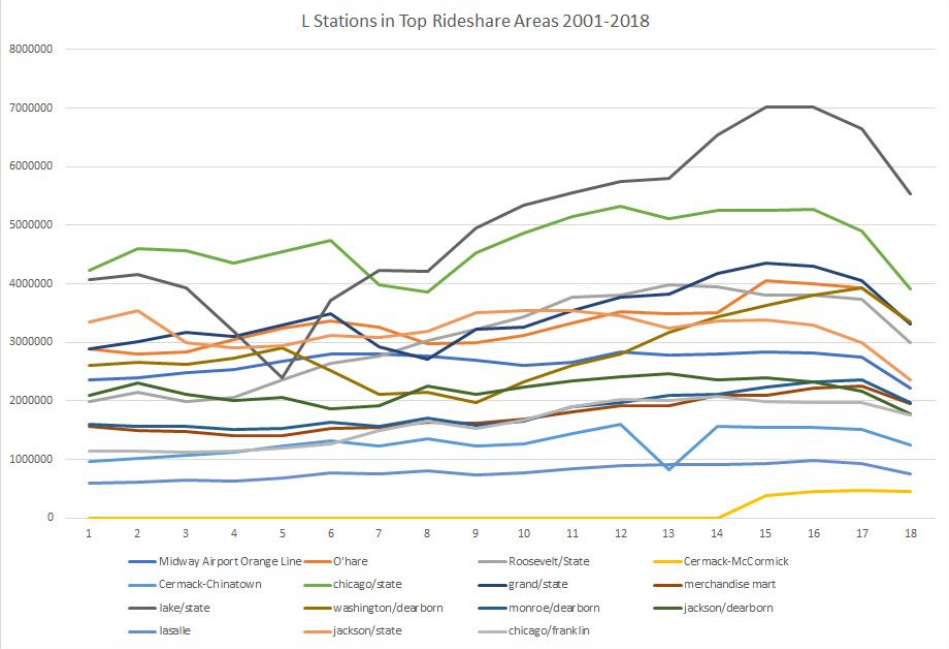


Fig. 3 Population Density in Chicago

When analyzing L ridership, I found that the five most-used L stations from 2001-2018 were Clarke/Lake, Lake/State, Chicago/State, 95th/Dan Ryan, and Belmont North Main. The first three listed are all found in the loop area, while 95th/Dan Ryan is found on the south side, and

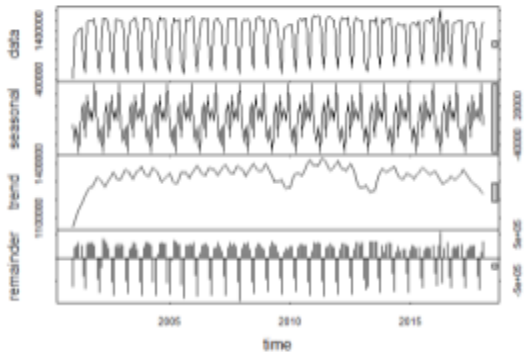


Belmont North Main is north of the loop. Looking at the ridership patterns of these top 5 L stations, it does not seem that rideshare services impacted ridership. Between 2011 and 2014, rideshare usage greatly increased, and we could anticipate a corresponding decrease in CTA ridership. However, looking at these top five L stations, ridership mostly held steady or increased in that period. However, in all five stations, we do see a ridership decrease from 2017-2018.



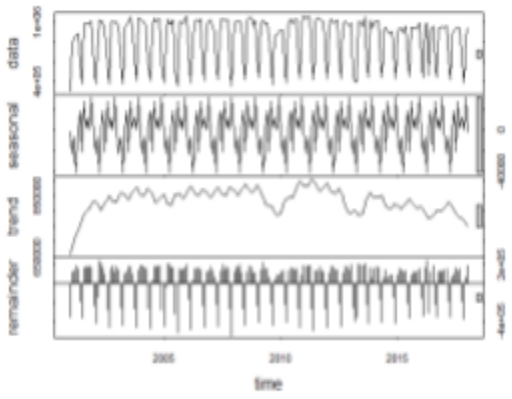
I also looked at the ridership trends of the L stations that are found in the top rideshare usage census tracts. Most of these also did not show a decrease in ridership during the 2010's, but we do see a ridership decrease from 2017 to 2018. These L stations had an

average yearly ridership of 37, 852,580 compared to the total system's yearly ridership of 1,198,789. These above-average ridership numbers are likely due to the high population density of those areas.

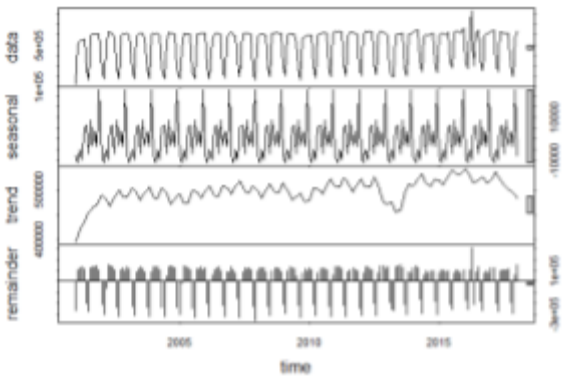


CTA Total Ridership Time Series

I also used R to conduct a time series analysis of CTA total ridership as well as the bus and rail systems individually. When analyzing the trend, there is a clear dip around the year 2013. This could potentially be attributed to rideshares gains in popularity. However, the ridership numbers quickly recovered. One notable trend is the decrease in ridership from the year 2017. It is unclear whether this is a blip, or the beginning of a larger trend.



CTA Bus Ridership Time Series



CTA Rail Ridership Time Series

Assumptions and Next Steps

Greater statistical analysis is needed in order to draw any strong conclusions on the impact of rideshare services on CTA ridership. Throughout this analysis, I also made a variety of assumptions. I did not include analysis on the changes of taxi ridership data, Metra commuter rail, biking, or walking. These are all ways that Chicagoans move around, and could have borne the brunt of the impact of rideshare services. I also did not take ADA accessibility needs into account. Most rideshare services are not legally obligated to be ADA accessible, while the CTA is. This has large implications for transportation access and equity. The CTA's service efficiency should also have large impacts on ridership, as would gas prices. Neither of these were taken into account in the analysis as well. A large assumption going into the analysis was that rideshare services would take ridership away from the transit system, rather than from other modes of transportation. Greater analysis into causality is necessary in order to draw this conclusion.