Rideshare Services in NYC

For those who do not own a car, there are four main modes of transportation: walking, biking, public transportation, and rideshare service. While walking and biking are cost effective and environmentally friendly, it might not be practical for long distance trips or bad weather. Public transportation offers affordable service and widespread availability in most cities, but can be inconvenient due to their fixed schedules. Rideshare services provide the most flexibility and convenience, but it is also the most expensive option. This analysis examines a dataset of rides in NYC to determine the best times to book a ride for the lowest fare per mile.
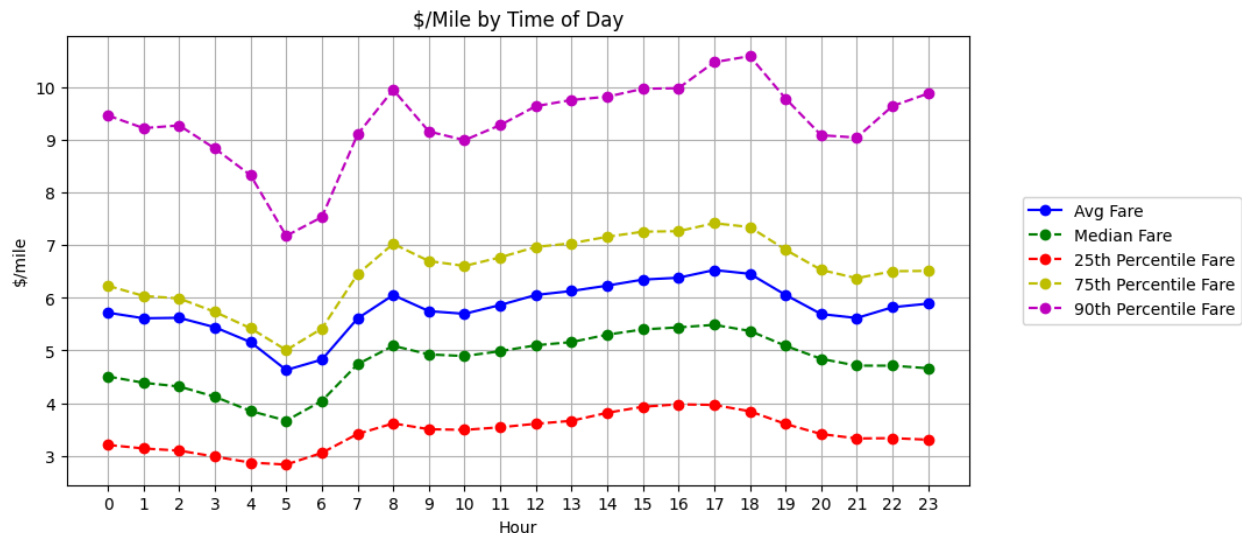
Hypothesis
Rideshare prices tend to be highest during rush hours due to increased demand, making non-peak hours the most affordable times to book a ride. Although different rideshare services may use different pricing algorithms, ride fares should follow the same trend because they are all influenced by the same supply and demand dynamics.

Rush hour definition: 7AM - 10AM, 4PM - 7PM

Rates Over Time of Day
The variable pickup_datetime is used to query the rates by the hour because it directly reflects when the ride was requested, a key factor that rideshare apps use to determine pricing. In this analysis the price only includes the base_passenger_fare.


We can see that the cost per mile generally peaks at around 8AM and then 5PM - 6PM. Both of these peaks fall during rush hour periods, which supports the hypothesis. However, the times outside of rush hour aren't significantly lower, with the exception of 5AM. For example, the rates from 12PM - 4PM nearly match the first peak at 8AM.

To find out why the peaks and troughs aren't well defined, we can split the data by the days of the week and then by the hour.

Avg $/Mile by Time of Day (Weekdays)
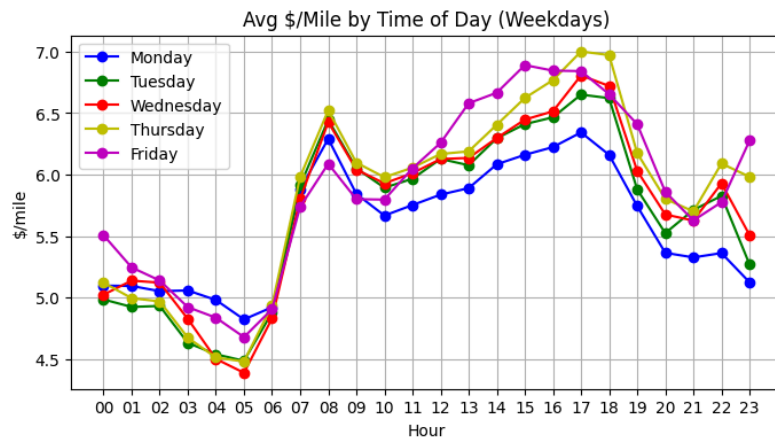
On weekdays we see similar peaks to the graph above: the first peak is at 8AM and the second peak is around 5PM. The main difference is that from 8PM - 6AM the cost per mile is significantly lower. Prices are higher around 8AM - 5PM, which supports our hypothesis since this time frame corresponds to a typical work schedule.


Avg $/Mile by Time of Day (Weekends)
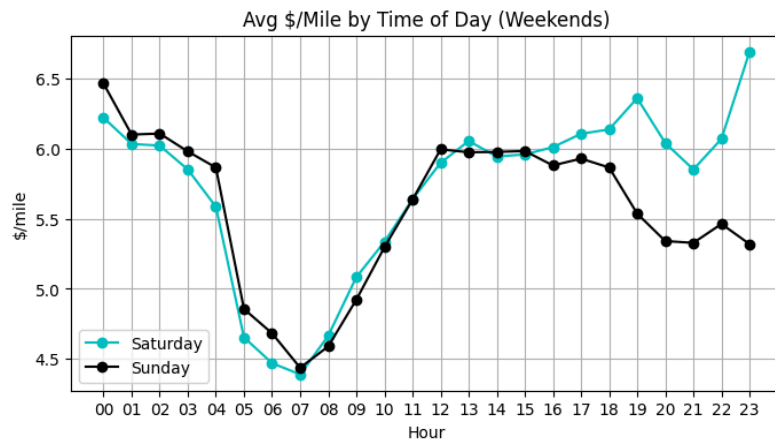
On the weekends, the trend differs from the two graphs above. Because most people don't work over the weekends, they might choose to sleep in or stay at home, which can explain why there is a trough at 7AM.

Interestingly there is a peak at 11PM on Saturday, but this pattern does not appear on Sunday. We can make an inference that people tend to stay out on Saturday night but not Sunday night because they need to go to work tomorrow.

Different Rideshare Services

Avg $/Mile by Time of Day
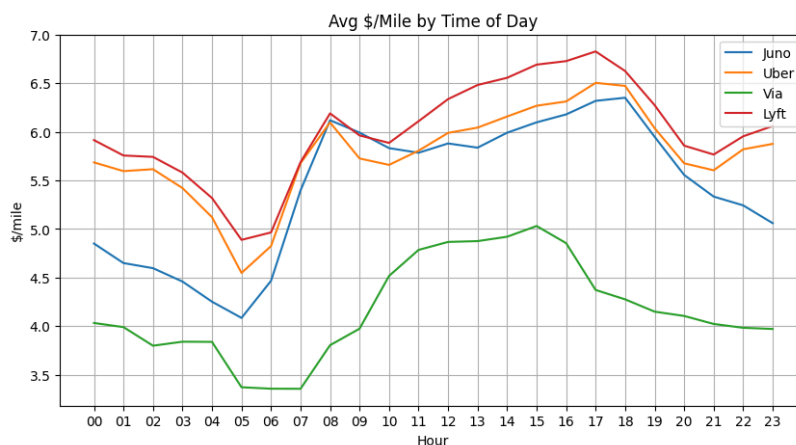
If we examine the rates of different rideshare services, we can see that they all follow a similar trend. Peak fares occur during rush hours and lower fares in the late night to early morning periods.

However, there are some slight differences in price fluctuations between services, which highlights the differences in their pricing algorithms.