

Uber Express: A Case of Study

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Abstract

In the following document an analysis is presented about Uber’s product, Express, which was launched to a polarizing market and management team, since it was similar to any Pool service, with only the setbacks being two: the service required the user’s walking to a pick-up point and the waiting time for the algorithm to match as many users as possible. The analysis is a brief comparison between the experiment result of Express with two minutes of waiting time against five minutes, some suggestions and overview of the experiment in general.

1 Introduction

2 The effects of waiting time

Uber’s main experiment involved switching between 2 minutes and 5 minutes of waiting time, to see its effects on different quantitative variables. If we wanted to know **what was the effect of extending the waiting time from 2 to 5 minutes on the total of completed trips, proportion of trips correctly matched and driver’s earnings**, we would need to make a comparison between these three variables when the app’s waiting time was 2 and 5 minutes.

Such comparison is shown in Figure 1, where the three plots correspond to trips, matched trips and driver’s pay, each compared with 2 and 5 minutes of waiting time. The first plot is a stacked horizontal histogram of trips, which contain three categories: Express Trips, Pool Trips and Cancelled trips, where the last two were added for contrast purposes. We would read the plot, and thus the effects on the first variable, as follows: the number of Express trips decreased by 7.4% with 5 minutes of waiting time, compared to the amount of Express trips done with 2 minutes; the number of Pool trips decreased by 7.4% when the waiting time changes from 5 to 2 minutes; and finally, the amount of cancelled trips decreased 13% when the waiting time changes from 5 to 2 minutes, or increased 13% when the waiting time changes from 2 to 5 minutes. Overall, even though the percentage lost in Express trips (7.4%) is quite similar to the percentage gained of Pool trips (7.2%) when the waiting time is 5 minutes, the plot shows that the difference in numbers of trips is 12 thousand against 6 thousand trips, respectively. Pool trips are more expensive to the user, sometimes even **by half**, which is an exact recovery in this case, since the Pool trips increased by half the amount of the decrease of Express trips, and the cost is twice the Express trips, so the loss is recovered with Pool, economically speaking. What Uber lost with Express, is recovered by Pool.

The middle plot of Figure 1 presents the effects of the increase in waiting time as follows: Simple matches decreased by 7.4% when the waiting time changed from 2 to 5 minutes, but the amount of double matches (that means the app matched a rider with two or more people for the same Express ride) increased by 5.2% when the waiting time was 5 minutes, since the algorithm was able to make more efficient matches

with more computation time.

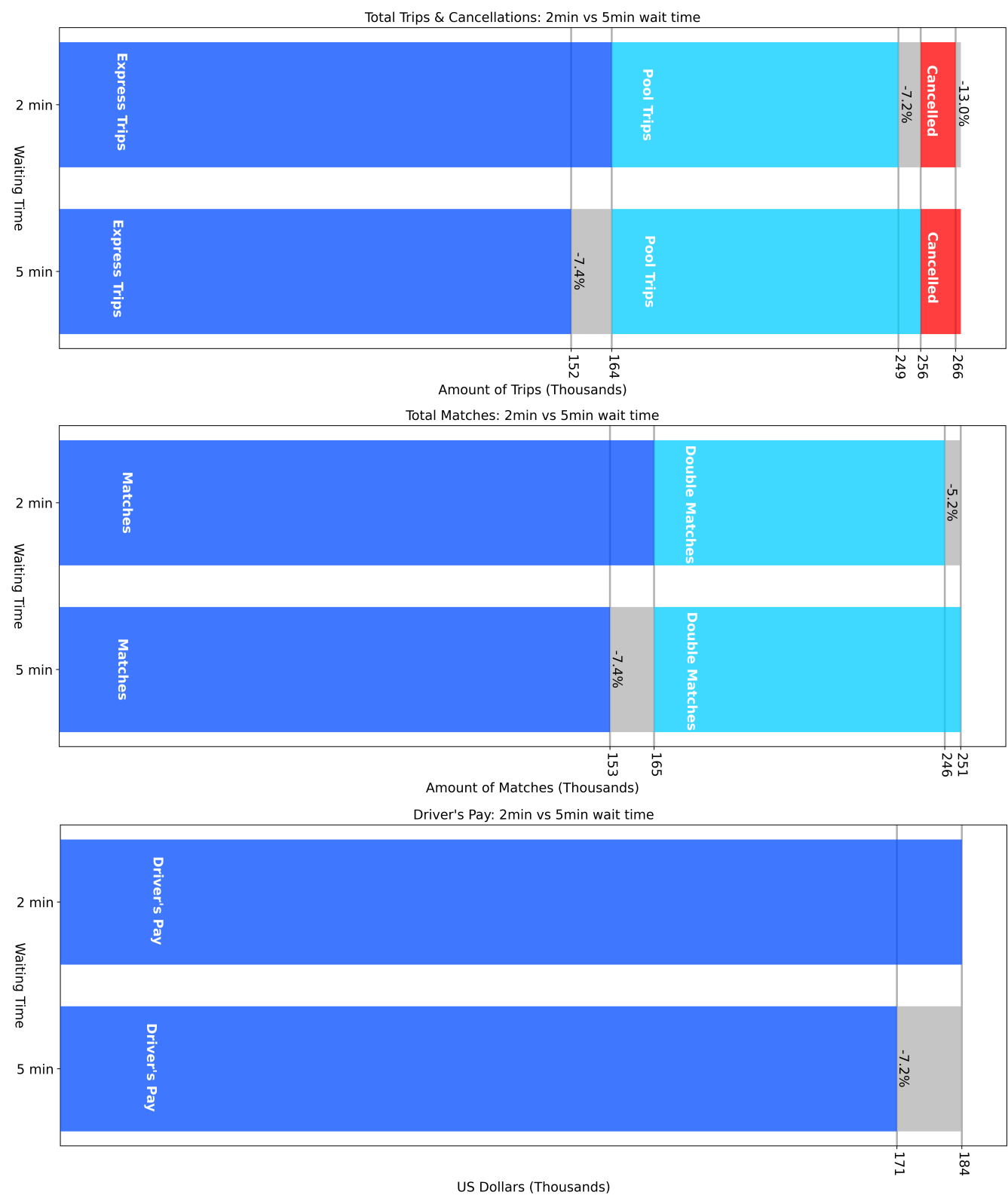


Figure 1: Completed trips, proportion of matched trips and driver’s pay with 2 and 5 min of waiting.

The last effect shown on Figure 1 is the one with the driver’s earnings, or *Uber’s costs*, and it shows

again similar numbers: when the waiting time increases to 5 minutes, the driver's earnings drop by 7.2%, but that also means that Uber's costs, since the drivers are their contractors, drop as well by 7.2%, which is a positive effect added on top of the recovery that Pool's services offer.

3 Recommendations: is 5 minutes of waiting advisable?

Given the previous analysis, we can grab a few conclusions, but **should Uber's data science team increase the waiting time of Uber Express?, or when is this increment applicable?** For such purposes, the amount of Express, Pool and Cancelled trips was counted *per hour of the day* during Uber's experiments and plotted as a time series in Figure 2. In addition, Cancelled trips during the day is plotted in the right side of the figure, since in the left side plot the numbers for Cancelled are so small in comparison that the plot looks almost horizontal.

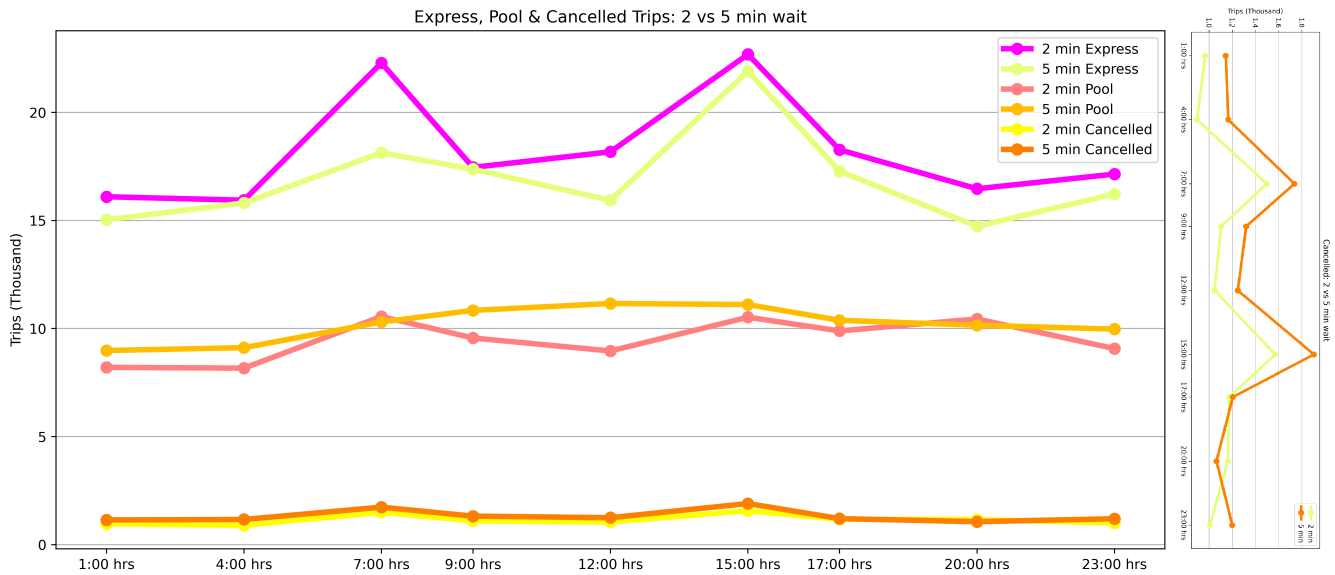


Figure 2: Express, Pool and Cancelled trips during the hours of a day.

From Figure 2, the data shows that Express trips are much more requested than Pool trips, and thus when the waiting time increases to 5 minutes, the decrease in Express trips is quite notorious, but more prominent in peak hours such as the morning hours from 7 am until around noon. Interestingly, an increase in Pool trips happens at these exact hours as well, confirming that Pool is a very strong substitute for Express. But in more detail, the numbers that Pool trips reach after this increase are still very low compared to the level of numbers that Express trips have. Pool increases when Express decreases during 5 minutes of waiting, but can Uber profit from this? Let's look at Figure 3.

In Figure 3, a time series of the cost per trip for Uber during the day is shown. The trend is noticeable: when **the waiting time increases to 5 minutes, the cost per trip for Uber is almost always lower than when the waiting time is 2 minutes**. This cost decrease during almost all day represents quite an opportunity for Uber, since Express proves to be cheaper when the algorithm is given 5 minutes to match the best possible riders, resulting in more matched users and thus less resources are used and Uber's expenses decrease. The fact that the costs are lower during almost all day is the base for our main advice: since the costs are almost always lower when waiting 5 minutes for a match in Express, the increase of waiting time to 5 minutes is suggested and even convenient for Uber **during the hours from 3 pm until 4 am** where the numbers for Express trips with 5 minutes are fairly close to those with 2

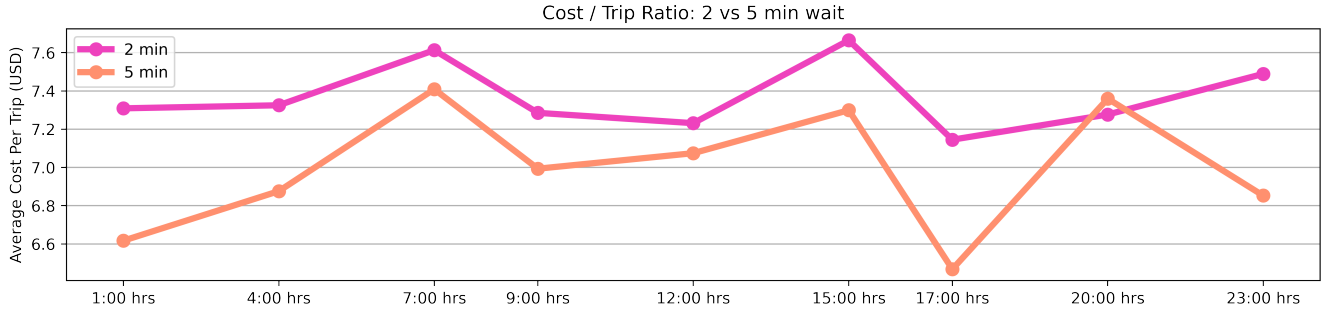


Figure 3: Average Cost per trip during the hours of a day.

minutes; and **from 5 am to 2 pm, the waiting time can be left at 2 minutes**, given that peak hours marked a decrease in Express trips and a Pool increase that shows a smaller growth ratio than the enormous decrease ratio in Express trips, thus suggesting that a waiting time of 5 minutes might not be convenient for Uber at peak hours. Therefore, what could benefit Uber would be a **dynamic waiting time rather than a fixed waiting time**: 2 minutes from 5 am to 2 pm, and 5 minutes from 3 pm until around 4 am. The adoption of a 5 minute waiting time during these hours benefits Uber since the costs per trip are constantly lower for the company when Express is chosen.

4 Future Improvements