

Overpriced? Researchers explain artificial price increases in the taxi app Uber

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Apps such as Uber are an important mobility feature in many big cities. Driving others from A to B in their own car has become a job for many people. However, many drivers complain that their income is too low. In

May 2019, the US television station ABC reported how Uber drivers at Washington airport artificially inflated the price of the service by all going offline at the same time. Within a few minutes, the price of the service had risen by 13 dollars, which almost doubled the amount.

How exactly does this strategy work and when is it used? This is what Dr. Malte Schröder and Professor Marc Timme from the Chair for Network Dynamics at the Center for Advancing Electronics Dresden (cfaed) and the Institute for Theoretical Physics at TU Dresden have been investigating alongside Ph.D. students David-Maximilian Storch and Philip Marszal. The two researchers published a study in the journal *Nature Communications*: The applied dynamic price mechanisms generally provide incentives to artificially reduce offers and consequently increase the price.

With the dynamic price adjustment, the providers want to bring the market into balance: If demand exceeds the availability, travel costs increase. The idea is to attract more drivers to meet the high demand. At the same time, customers will have an incentive to wait.

Nevertheless, the drivers can activate the price increase themselves. "If many drivers go offline at the same time, the algorithm 'thinks' there is a shortage of drivers," explains Schröder. "It tries to attract more drivers by increasing the price: A flexible surcharge is added to the basic price for the service, which can double or even triple its cost."

By using [analytical methods](#) from [game theory](#), Schröder and his colleagues demonstrate when the strategy is profitable. First, the demand must be sufficiently high. Otherwise, the drivers risk not finding customers after their offline phase. Moreover, people should be willing to pay the high price instead of waiting for a taxi or taking the bus. "For the drivers, these are empirical values," Storch assumes. "They have learned over time when the planes arrive with stressed business people

whose journey is paid for by their employers anyway."

Moreover, the tactics are only optimal for all drivers if each of them participates in the game. Otherwise, any one of them could run the risk of being the only one to go offline and miss potential customers.

Therefore, drivers have to trust each other or make arrangements—like in Washington. "The drivers at the airport know each other and all wait in the same car park," says Marszal. "Of course, communication is much easier this way than if they are spread all over the city."

The researchers have developed a model that enables the identification of offline tactics based on price trends without knowing the exact ratio of availability to demand. They analyzed price data of the service in 59 cities around the world. At over 15 locations in America, Asia and Europe, the price developments for services from airports, train stations or exhibition centers were similar to those in Washington. In these cases, Uber limited the surcharge to ten dollars. "This is the most inefficient way to prevent increases in prices," says Schröder. "The trip will cost a maximum of ten dollars more, but this does not change the general incentives or the behavior of the drivers. In principle, research has only just begun: "The collective dynamics of these kinds of apps are difficult to understand, and many questions are still open, especially in the rapidly changing mobility sector." In any case, an approach would be to offer customers alternatives, such as good local transport, and to pay [drivers](#) sufficiently. Until then, travelers should think about having a quick coffee when the journey is too expensive. Outside rush hours, [prices](#) usually fall quickly back to their normal level.

More information: Malte Schröder et al. Anomalous supply shortages from dynamic pricing in on-demand mobility, *Nature Communications* (2020). [DOI: 10.1038/s41467-020-18370-3](https://doi.org/10.1038/s41467-020-18370-3)

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