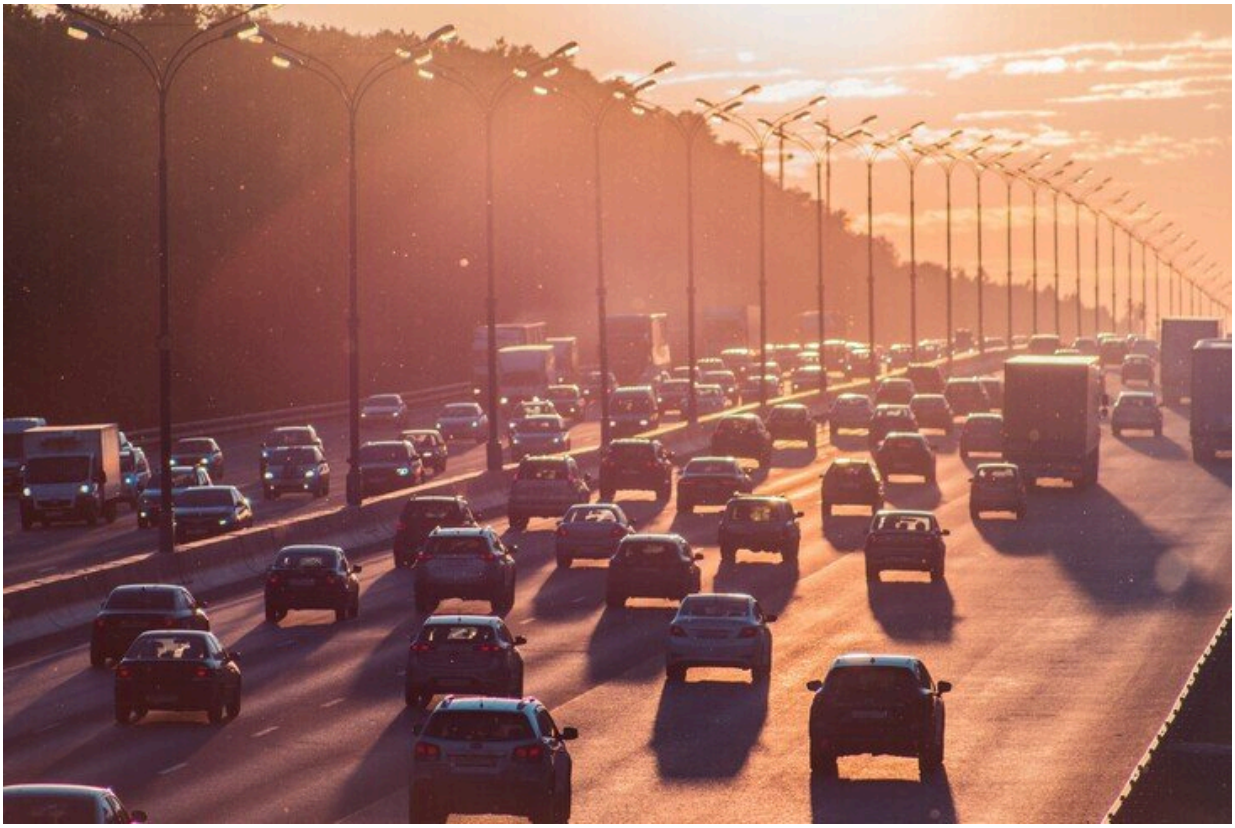
Ride-hailing services may not always increase traffic congestion, study finds

September 27 2021, by Sara Lajeunesse



Credit: Alexander Popov/Unsplash

Ride-hailing services, like Uber and Lyft, are lauded by some for their ability to decrease traffic congestion. Yet, others claim that ride-hailing services increase traffic congestion. A recent study by researchers at

Penn State and Boston University analyzed traffic data from across California and found that whether ride-hailing services increase or decrease traffic congestion depends on a variety of factors, including the day of the week and whether the region previously had high public-transportation use.

"Urban cities across the world are grappling with issues related to traffic congestion," said Suvrat Dhanorkar, associate professor of supply chain management, Smeal College of Business, Penn State. "Persistent traffic congestion can have significant implications for environmental quality, and it can also adversely affect commerce and human productivity by increasing costs associated with fuel and lost time."

Proponents of ride-hailing claim that the services reduce traffic congestion by providing carpooling opportunities and efficiently matching patrons with drivers, thereby lowering overall automobile use. On the other hand, ride-hailing services may increase traffic congestion because of the convenience of travel they provide. This can lead to greater trip volumes and lengths, which may increase overall traffic. In addition, users may turn to ride-hailing services in lieu of public transportation, such as buses and metros, which may further exacerbate traffic congestion.

In its study, the team—which also included Gordon Burtch, Kelli Questrom Associate Professor in Management, Boston University—aimed to reconcile these opposing perspectives. Taking advantage of Uber's staggered entry into various geographic markets in California, the researchers used monthly data from approximately 10,000 vehicle detector station units located across California to conduct a statistical analysis to estimate the impact of ride-hailing services on traffic volumes. They focused specifically on Uber, as the company is the market leader with respect to market valuation and penetration. In fact, by 2016, Uber had entered more than 66 countries and 507 cities

worldwide.

Overall, the researchers found that Uber's effect on traffic depends on various contextual factors. For example, the team found some evidence of pooling effects on weekdays, leading to a decrease in traffic congestion by about 0.5%. On weekends, Uber was associated with significant crowding effects, increasing traffic congestion by up to 8.5%.

In regions with high prior public transportation use, however, Uber was associated with a higher crowding effect on weekdays of up to 8.451% and on weekends of up to 8.841%.

Prior car-sharing behaviors also significantly impacted the way patrons used Uber, with higher crowding effects on weekdays of up to 1.152% and on weekends of up to 3.407% in regions with low prior carpooling use.

Finally, the availability of Uber Black, a premium ride-hailing service that lends itself to exclusivity and lower use rates almost exclusively led to a crowding effect, with increases in traffic congestion of up to 7.144% on weekends.

"Despite their promise, popularity and rapid growth, the transit implications of ride-hailing platforms are not altogether clear," said Dhanorkar. "On the one hand, ride-hailing services can provide traffic reductions by efficiently matching customer demand with resources or by facilitating car-sharing. But on the other hand, ride-hailing may induce extra travel because of increased convenience and travel mode substitution, which may create crowding. Our study, which to our knowledge is the most comprehensive analysis of Uber's traffic effects, suggests a possible explanation for the contradictory evidence in past work that may be resolved by accounting for heterogeneity."

The results appeared in a recent issue of the journal *Transportation Science*.

More information: Suvrat Dhanorkar et al, The Heterogeneous Effects of P2P Ride-Hailing on Traffic: Evidence from Uber's Entry in California, *Transportation Science* (2021). DOI: 10.1287/trsc.2021.1077