

Economist publishes research on traffic camera effectiveness

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Between 300 and 400 cities in the U.S. employ traffic camera programs, according to Montana State University assistant professor Justin Gallagher. Even so, there has long been debate over whether the programs are effective at maximizing public safety and reducing traffic accidents.

Gallagher, a faculty member in MSU's Department of Agricultural Economics and Economics in the College of Agriculture and the College of Letters and Science, wondered if he could narrow down an answer to that question. In a paper published in the American Economic Journal of Economic Policy, Gallagher and University of Arizona researcher Paul Fischer examine the concept of offsetting risks using more than a decade's worth of data from one of the country's largest red-light camera programs in Houston, Texas.

"In debates about this issue, one side argues that these cameras improve safety, while the other side is often concerned with having computers give out [traffic](#) tickets when there wasn't a police officer to see what happened," said Gallagher. "As an economist, what struck me was that it wasn't at all obvious that this program should work."

Houston, Gallagher said, has about 1,000 major intersections and only 66 with red-light cameras, even with the city's comparatively large red-light camera program. Because [local authorities](#) could choose where cameras were placed, often with the result that the cameras were installed at intersections with a higher number of recorded [accidents](#). However, Gallagher said, many prior studies into red-light cameras neglected a critical factor called mean reversion. If an intersection had an unusually large number of accidents one year, it could be expected—due to mean reversion, the tendency for trends to vary in ways that center on an average over time—that there would be fewer accidents the following year.

"It sounds great in theory, to target resources at places where there have been spikes in accidents, but it makes it very hard to evaluate the effectiveness of the program," he said. "With mean reversion, you'd expect these intersections that had spikes in accidents the previous year to naturally have fewer accidents the following year. So, when we see a reduction in accidents the next year at an intersection where there's a

camera, we don't know if it's because of the camera or if it's just a naturally occurring reduction that would have happened anyway."

An opportunity to offset that mean reversion occurred in the traffic data from 2014, when the camera program in Houston was abruptly shut down after a voter referendum. Immediately after the referendum passed, all of Houston's cameras were turned off. That termination gave Gallagher the opportunity to compare traffic data from both situations: with and without cameras watching for drivers running red lights.

What he found was that in a very narrow sense, the cameras had achieved their aim of reducing the number of red-light violations. Fewer drivers ran red lights when the cameras could capture their license plate number and issue them a ticket. When drivers reached the [intersection](#) when the light was yellow, they were less likely to continue through the light even in situations when it would have been safer to do so, a phenomenon Gallagher calls "the dilemma zone." As a result, different types of accidents saw a corresponding increase during the years of the camera program, particularly rear-end collisions as drivers began to slam on their brakes to avoid a traffic fine. Overall, there was a change in the frequency of certain types of accidents, but no reduction in total accidents.

If the total number of accidents stayed the same, the next question to answer was whether the severity of those accidents changed. On examining the data, Gallagher and Fisher found that the severity also stayed the same. They found no increase in either the total number of people injured or the number of severe injuries.

But the authors found one other factor that helped determine the overall social welfare impact of the camera program: how drivers valued their time.

The camera program largely slowed down traffic at the 66 intersections where cameras were placed, meaning drivers sat longer in traffic, Gallagher said. Five minutes of extra traffic time may not sound like much, but, compounded daily across each driver who passes through those intersections, those minutes added up.

"There's a lot of other things that could be done in those minutes," Gallagher said. "That's where we find that, since this [program](#) didn't achieve its goal of increasing [public safety](#) but did increase the amount of sitting in traffic that people did, it has a net negative social welfare impact for the city."

Gallagher and Fisher's publication is timely, as states continue to debate the utility of red-light [camera](#) programs. Twenty-three states plus Washington, D.C., currently allow the programs, but Texas, Massachusetts and other states continue to debate whether to employ them. Montana banned the use of red-light cameras in 2009.

More information: Justin Gallagher et al. Criminal Deterrence when There Are Offsetting Risks: Traffic Cameras, Vehicular Accidents, and Public Safety, *American Economic Journal: Economic Policy* (2020).
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