



# Detecting racial bias in speed discounting: Evidence from speeding tickets in Boston



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## ABSTRACT

We focus on a particular kind of discretionary behavior on the part of traffic officers when issuing speeding tickets – what we term *speed discounting*. It is anecdotally said that officers often give motorists a break by reporting a lower speed on their citation than the actual speed that they observe the vehicle doing. Verifying the level of police discretion in the speed discounting behavior and ascertaining the presence of racial bias among police officers are the main objectives of this paper. Using a unique dataset that contains the race of the officer and of the motorist and cited vehicle speed, we apply the rank order test and the difference-in-differences method to detect racial prejudice in the speed discounting behavior.

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Although [the officer] wrote the man a ticket for only 10 m.p.h. over the 35 m.p.h. limit, he made a note in the top right-hand corner of the ticket: “64.” Through a Boston police spokeswoman, [he] said that notation meant the driver was actually going 64 m.p.h., or 29 m.p.h. over the limit. The spokeswoman said [the officer] would sometimes lower the speed on a ticket, to save a driver a high fine. But the notation was there in case the driver challenged the ticket in court (Bill Dedman and Francie Latour, *The Boston Globe*, July 20, 2003).

## 1. Introduction

Police officers are allowed to exercise a significant amount of street-level discretion. A crucial issue is to ascertain whether or not they use their bestowed power appropriately (e.g., overlooking mildly speeding vehicles to facilitate the traffic flow). When an officer enforces traffic laws strictly, when observing a speeding vehicle, he or she will stop it, give a ticket to the motorist reporting its actual speed when it was stopped, and impose a fine according to the statutory formula. An officer using discretion, on the other

hand, could (1) not stop the vehicle in the beginning, (2) stop it but just let it go with an oral warning, (3) give a written warning, or (4) issue a ticket but discount the speed and/or the fine. Various factors, such as the motorist's age, gender, race, attitude, and financial situation, apparently play significant roles in officers' decisions.<sup>1</sup>

In this paper, we focus on a particular type of discretionary behavior: what we term *speed discounting*. It is anecdotally said that officers often give a “break” to motorists by reporting a lower speed than their actual speed (as the quote in the beginning of the paper indicates). Verifying the level of the police discretion in the speed discounting behavior and the presence of racial bias among officers are crucial points that we will focus on in this paper.

Fig. 1 is a good starting point to illustrate the presence of speed discounting. The histogram shows the distribution of the speed cited on 25,738 speeding tickets issued by Boston police officers between April 2002 and November 2003. The most outstanding feature is that more than 30% of tickets are cited for driving at exactly 10 m.p.h. over the limit (hereafter, unless otherwise noted,

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<sup>1</sup> “There are always mitigating circumstances in a stop,” an officer said in an interview with the *Boston Globe*. “Anything could be said or could happen. Attitudes, people talking back to you. The circumstances change with each individual motorist.” The officer also admitted that he rarely gave fines to elderly motorists, “presuming they were on a fixed income” (Dedman and Latour, 2003).

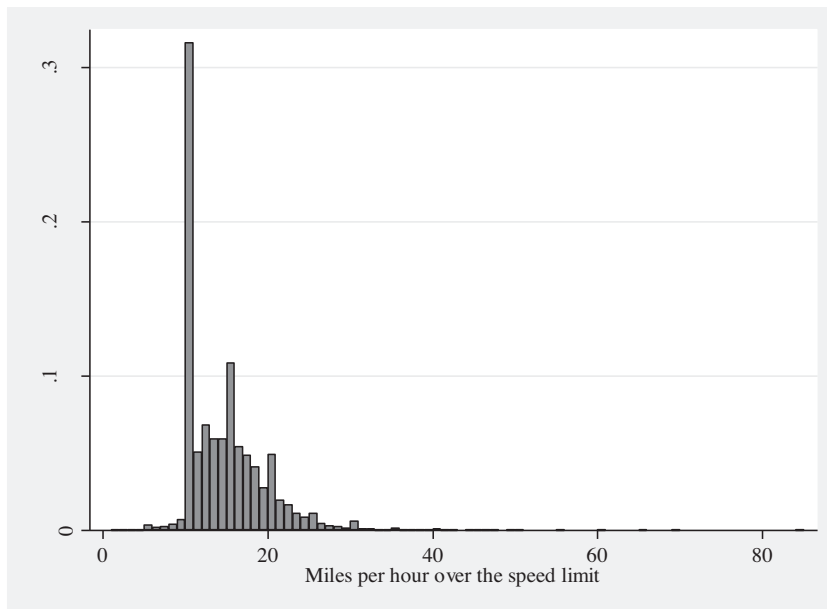


Fig. 1. Histogram of speeds on tickets.

the speed is always denoted as the miles per hour above the limit). There also exist other less outstanding spikes at some specific speed levels, such as 15 and 20. It is hard to believe that the speed reported on tickets – especially at the spike – is the actual speed.<sup>2</sup> Rather, it is likely that officers' discretionary speed reporting yields such a distorted distribution, especially in the range of 10–14. As we will elaborate later, the fact that a motorist gets cited for driving at exactly 10 most likely indicates that the officer gives the speed discounting to the motorist. Our identification strategy is to exploit the unique spike at speed 10 to elicit officers' discretionary behavior and to test for the presence of racial bias in that particular behavior.

To test for racial bias, we employ two empirical approaches, both of which are well recognized in the racial profiling literature. First, in the same spirit of Anwar and Fang (2006), we set up a theoretical model in which unbiased officers (legitimately) care about the likelihood of violating traffic laws and becoming a threat to public safety when motorists are leniently treated. Based on the model, we apply the rank-order test with the null of no racial bias. Second, following Price and Wolfers (2010) and Antonovics and Knight (2009), we employ the difference-in-difference (DD) approach. The DD approach is only valid for identifying racial bias under the assumption that motorists are similar in terms of hidden criminality (i.e., the tendency of breaking traffic laws in our context). To mitigate the risk of violating the assumption, we control for a rich set of control variables and restrict the sample to a homogenous group of motorists. The rank-order test does not require such a strong assumption. However, it is limited in that the power of the test is less than one. That is, even if the test fails to reject the null of no racial bias, it is possible that racial bias exists.

To summarize our main findings, first, we find that the rank-order test rejects the null of no relative racial bias. Specifically, we find that either white or Hispanic officers (or both) are racially biased. Interestingly, our results suggest that at least one racial group is biased against their own race. This is intriguing since in the case of racial profiling, we expect, if any, inter-group rather than intra-group bias. Second, the regression results using the DD

approach show that the racial disparity in speed discounting varies by the race of officers. Specifically we find that minority officers are less likely to give the speed discounting to minority motorists. If the DD approach is valid in our context, our results show that minority officers are stricter to minority motorists. Since the DD approach hinges on the assumption that we mentioned above, we will later discuss it in more detail.

## 2. Related literature

It is worth discussing, at the outset, how this paper and its research topic are related to the recently growing body of literature on racial profiling in vehicle searches (Knowles et al., 2001; Anwar and Fang, 2006; Antonovics and Knight, 2009). The main point here is that officers' ticketing and vehicle-searching behaviors are *different* in nature. First, in the case of speeding violation, officers can – albeit with some error – directly observe the degree of the offense, i.e., the speed over the limit. Thus, officers' subsequent decisions only relate to how strictly they should handle the case. On the other hand, officers decide whether to conduct vehicle searches without having observed the presence and degree of any illegal behavior. Thus, officers necessarily infer the probability of an offense by processing all available information before making a decision as to how to proceed. This mind process is unobservable even to the motorist, so it is difficult for any third party to figure out whether or not the officer utilized the motorist's race as a productive resource.<sup>3</sup>

<sup>3</sup> The identification approaches in the literature are various, and the results are mixed. Knowles et al. (2001) show that racially biased monitoring implies that the equilibrium rate at which contraband is seized (the "hit rate") is lower for the groups subject to bias. However, Dharmapala and Ross (2004) generalize that model by allowing that potential offenders are not always observable to officers and differ by offense severity and show there exist multiple equilibria, again hindering identification of racial bias. In some data sets, the race of officers is also observable, which makes different approaches feasible. Antonovics and Knight (2009) use the same Boston data that we use in this paper, and test whether officers are more likely to conduct a search if the race of the officer differs from that of the motorist. Anwar and Fang (2006) propose the rank-order test for relative racial prejudice. Using the Florida highway data, they cannot reject the null hypothesis of no racial bias, which, however, as they warn readers in their paper, does not mean that racial bias does not exist. Close and Mason (2007) develop a pairwise-comparison outcome test and,

<sup>2</sup> Clarke (1996), using about 16.5 million observations in Illinois, found that the speed distribution – recorded mechanically, not by officers – is normally distributed and centered at the speed limit under free flow conditions.

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