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Do Driver Decisions in Traffic Court Motivate Police Discrimination in Issuing Speeding Tickets?

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Abstract

This research provides new insights into police discrimination by following individuals' decisions in the court process from the time a speeding ticket is issued to trial. Quintanar (2011) finds that African-Americans and women are more likely to receive a speeding ticket from a police officer as opposed to an automated source, but is unable to determine whether this is evidence of statistical or preference-based discrimination. This paper expands upon those results by using a unique dataset which contains detailed information about the court procedural choices of individuals ticketed by police. African-Americans are more likely to fight their speeding ticket, while there is no significant behavioral difference by gender. This contradicts a motive of statistical discrimination by police; targeting individuals who are likely to pay immediately rather than use court resources to fight the ticket. Potential discrimination in prosecutor and judge behavior is also investigated.

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I. Introduction

Discrimination on the basis of race, gender, age, and/or religion has been a focus of extensive research since Becker (1957). Relatedly, researchers have also focused more specifically on verifying that “Justice is Blind” is applied in practice in the U.S. court system (Mustard, 2001; Schanzenbach, 2005; Anwar, Bayer, and Hjalmarsson, 2010). Court discrimination has been investigated using judge and jury characteristics and sentencing decisions, but the present work is the first to follow individuals through each stage of the court process from receiving a speeding ticket, to pre-trial meetings with the prosecutor, and finally to the trial itself. In addition to court discrimination, researchers have investigated police discrimination in vehicle searches as well as ticket issuing, where some identify evidence of statistical or preference-based discrimination (Antonovics and Knight 2009, Makowsky and Stratmann 2009), but others find no such evidence (Grogger and Ridgeway 2006, Knowles et al. 2001, for example).

Quintanar (2011) used automated traffic enforcement as a measure of the population to compare against police-issued speeding tickets. Controlling for location and violation characteristics as well as a host of other determinants, police issued a higher proportion of speeding tickets to women and African-Americans, as opposed to the proportion issued to those groups by automated sources. Quintanar (2011) provides evidence of racial and gender discrimination by police in issuing speeding tickets, but does not identify whether police are engaging in statistical or preference-based discrimination. The present paper extends Quintanar (2011) by analyzing individual behavior in the court system to provide evidence regarding the type of discrimination police engage in when issuing speeding tickets.

While previous research has investigated police discrimination in traffic offenses, ranging from vehicle stop and search to maintenance and speeding violations, these studies generally employ police ticket data without considering individual responses to those tickets. For instance, Makowsky and Stratmann (2009) investigate the impact of police preferences in issuing speeding tickets and assigning speeding fines: specifically, whether their motives as agents of the government influence who receives speeding tickets.³ The authors find that police are more likely to issue speeding tickets to individuals traveling at high speeds and those who have a high opportunity cost of fighting the ticket, and therefore, those individuals who are less likely to contest their speeding ticket. They identify opportunity cost in terms of distance from the driver's residence to the courthouse. Makowsky and Stratmann (2009) provide evidence that police officers in Massachusetts are not race and gender blind: Hispanics and men in general were more likely to be fined when stopped and the likelihood of a fine decreases with age. These findings provide insight into relevant variables for this type of analysis.

In existing studies, with the exception of Quintanar (2011), data issues arise due to police knowledge of data collection as well as nonreporting. If police know that a study on differential treatment is being conducted, they may alter their behavior to avoid punishment. Similarly, data are collected as a stipulation of a lawsuit in the majority of previous studies. Police may be asked to record stops, searches, and/or tickets issued; however, if they only report a portion of actual incidents, the measure of the population will be biased (Grogger and Ridgeway 2006 for example).⁴ These issues are not relevant in the current work, because the data were collected without any prior knowledge of the study by the police department, and the dataset is comprised

³ Police officers in Massachusetts are able to decide who to issue speeding tickets to, as well as how much their fine should be. This is different from the law in Louisiana, where the police officer has the discretion to issue tickets, but a fine schedule determines the speeding ticket fine for drivers.

⁴ Also see Makowsky and Stratmann 2009, Knowles et al. 2001, Knowles and Todd 2007.

of the entire population of issued speeding tickets. Also, the research design in this paper is unique because the dataset includes not only police issued tickets, but also each driver's response to those tickets throughout the court system.

This is the first paper to follow individuals through the court process, from speeding ticket to trial, to investigate whether individual behavior supports the theory of statistical discrimination by police. If women and African-Americans are more likely to pay their ticket fine as opposed to asking for a trial, they may be targeted by police since the associated marginal cost is lower for issuing tickets to these individuals. Individuals are able to make a series of choices when determining how to proceed through the legally specified court process. By following all individuals who receive a speeding ticket, it is possible to determine if behavior differs by race or gender in regards to who is more likely to fight a speeding ticket in court.

Discrimination within the court system has been the focus of extensive research; at all stages from initial police contact, to the jury determinance of guilt, to sentencing for those found guilty of a crime (Mustard, 2001; Schanzenbach, 2005; Anwar, Bayer, and Hjalmarsson, 2010). Though the United States criminal justice system is founded on the idea of justice being race and gender blind, existing research is inconclusive as to whether that is true in practice. While previous research investigates discrimination in court more broadly, this is the first to employ such information as a motive for police discrimination, as well as the first to follow individual decisions in dealing with a speeding ticket.⁵

II. Modeling the Court Process

The court procedure for speeding tickets is explicitly defined by the law, but ticketed individuals are in some ways able to decide how to navigate the process. Court protocol can be

⁵ Other researchers have followed individual or prosecutorial decisions through different stages of the court process for assaults and other crimes (eg. Wooldredge et al. 2004, Kingsnorth et al. 1998, and Leiber and Mack 2003).

defined as four decision stages: some of which are reliant on the individual, while others depend on prosecutor discretion (the representative of the court). The best way to understand this process is to first examine each stage individually.

Stage 1: Driver Decision to Attend Initial Hearing

A driver's first decision is whether to pay the fine associated with their speeding violation or to attend an initial hearing (called an arraignment). Each individual has the option to pay their ticket fine without attending a hearing either by mail or at payment windows located at the Lafayette City Courthouse. Though it is relatively easier to pay a ticket fine by mail than to attend a hearing, individuals may choose to attend an arraignment to try and get a reduced charge (a deal) from the prosecutor. A ticketed driver will choose to attend an arraignment if they believe there is a positive net benefit of doing so. For each individual, i , this unobservable net benefit of contesting can be defined as the difference between the expected value of the benefit of attending a hearing minus the expected cost of paying the ticket:

$$B_i^* = E(\text{BenefitCourtAttendance}_i^* - (p_{i,s+1})(\text{TicketCost}_i)). \quad (1)$$

and the equation for expected benefit of attending a hearing can be defined as:

$$\begin{aligned} E_{i,s}[\text{BenefitCourtAttendance}_i^*] \\ = E[(1 - p_{i,s+1})(\text{ReducedFine}) - \text{OpptyCost} + \varepsilon_{CC}], \end{aligned} \quad (2)$$

where the subscript s ($s = 1, 2, 3, 4$) is implemented to denote a decision stage, since expected action in future stages is now relevant and $p_{i,s+1}$ is the probability of not receiving a deal from the prosecutor in the next stage. The error term, ε_{CC} , is assumed to be distributed standard normal.

Individual drivers can determine the amount of their fine, TicketCost_i , by calling Lafayette City Court. Though the schedule of fines is not published, fine amounts are based on

the severity of the violation, other violation characteristics, and the driving history of the ticketed individual (the number of previous moving violations or other infractions). All of this information is available in the data and will be discussed in greater detail in Section III.⁶

The net benefit of contesting also depends on the probability of not receiving a deal from the prosecutor in the next stage and the driver's opportunity cost of fighting the ticket. If individuals believe that they have a very low chance of receiving a deal, they will be less likely to choose to fight their ticket. This probability depends on variables which the individual driver assumes are relevant to the prosecutor's decision: severity of the violation, the driver's driving record, and perhaps even personal characteristics. Relatedly, individuals who have a higher opportunity cost, i.e. those who earn higher wages, are going to face a lower expected net benefit of contesting a ticket.

The reduced form of equation (1) is:

$$B_{i1} = \beta'_{i1}X_i + \epsilon_{i1} \quad (3)$$

$$B_{i1} = 1 \text{ iff } B_{i1}^* > 0, \text{ and } 0 \text{ otherwise}$$

where the vector X_i includes individual specific and violation related variables which influence the net benefit of contesting, and ϵ_{i1} is an error term, which will be explained in detail later.

Recall that the true net benefit of contesting (B_i^*) is unobservable, and we only observe each individual's decision (B_i) once they have considered this expected benefit. In the first

⁶ It is important to note that what is observed in the data is the fine amount paid by the driver. Therefore, if an individual chooses to attend an arraignment, it is impossible to determine what the fine would have been if they had instead chosen to pay the fine initially by mail. Though this is a limitation of the data, lack of knowledge of the fine at alternative stages of the court process does not affect the investigation of the existence of discrimination, since we are merely interested in individual choices at each stage, and we are aware when an individual receives a deal from the prosecutor.

stage, individuals either choose to attend an arraignment ($B_{i1} = 1$) or they choose to pay by mail or at a ticket window ($B_{i1} = 0$), where B_{i1} is each individual's decision in Stage 1.

Stage 2: Prosecutor Decision Not to Grant a Deal at Initial Hearing

The second stage of the court process is the prosecutor's decision to grant a deal or not to grant a deal. In this context, a deal is either a reduction in the cited severity of the ticket (eg. travelling between 16 and 20 miles over the limit instead of more than 21 miles over the limit) or the speeding ticket is amended to a non-moving violation (not wearing a seatbelt for example).⁷ Notice that this decision is only relevant if the ticketed individual chose to contest the ticket and attend a hearing (if $B_{i1} = 1$). Those drivers who paid by mail or at a ticket window are no longer observed in the data.

Prosecutors grant the majority of deals for two main reasons: to give "good" drivers a break or to convince someone with other, more serious offenses to pay their fine without attending a trial. Prosecutors are less likely to be concerned with enforcing a strong punishment on "good" drivers because they received a ticket for minor speeding violations and have zero or few prior violations. At the other extreme, severe violators with multiple tickets may be more willing to pay all of their fines if they receive some sort of deal for one violation. For example, a driver who received a ticket for speeding and a ticket for driving without insurance at the same traffic stop has the right to go to trial for both tickets. The prosecutor may make a deal with the driver: agree to pay both tickets in exchange for a lesser penalty associated with the speeding

⁷ Prosecutors also have complete discretion to grant a more extreme type of deal: a dropped charge. These drivers are likely different from the remaining sample in unobservable ways since prosecutors are more likely to give these types of deals to individuals to whom they are personally connected, as well as a few "fluke" cases where there is a ticket error. These individuals are dropped from the sample for these reasons.

ticket. In this way, the prosecutor can avoid the costs associated with a trial, while still obtaining ticket revenue for the city.⁸

The probability that an individual will continue to fight their ticket in the next stage also may influence the prosecutor's decision. The prosecutor's goal as a member of the court is to punish the guilty without punishing the innocent at the lowest possible cost to society (Reinganum 1988). Therefore, on the margin the prosecutor will prefer to grant a deal to those drivers he considers likely to attend trial, in order to reduce the costs to the court.⁹ These prosecutorial decisions are entirely discretionary, and there are no rules or regulations regarding how deals should be granted.¹⁰ For these reasons, it is assumed that the general prosecutor's decision is based on violation as well as individual-specific characteristics about the driver (X_i), as well as the probability that the individual will continue to contest their ticket in the following stage ($p_{i,s+1}$):

$$ND_{is}^* = X_i\gamma_1 + p_{i,s+1}\theta + \delta \quad (4)$$

Notice that the probability that the individual will contest their ticket again in the following stage is driven by the same violation and driver specific variables mentioned previously for Stage 1: the potential net benefit of contesting in terms of a reduced fine. Similar to the equation describing the structural model of driver's decision, equation (4) above defines the structural model of prosecutorial decision in Stages 2 and 4. This formulation leads to the following characterization of the prosecutor's decision for Stage 2:

$$ND_{i2} = \beta_2'X_i + \epsilon_{i2} \quad (5)$$

⁸ The information in the preceding paragraph was obtained through personal communication with individuals directly involved in traffic court and employed by Lafayette City Court.

⁹ This probability will play a larger role for less severe offenders, because more severe offenders will require a higher punishment, and thus the prosecutor may not care if those offenders continue to trial. However, the severity of the crime is controlled for explicitly.

¹⁰ This information was obtained through personal communication with individuals directly involved in traffic court and employed by Lafayette City Court.

$$ND_{i2} = 1 \text{ iff } ND_{i2}^* > 0, \text{ and } 0 \text{ otherwise}$$

$$ND_{i2} \text{ is only observed if } B_{i1} = 1.$$

where $ND_{i2} = 1$ means that the individual did not receive a deal from the prosecutor ($ND_{i2} = 0$ means the individual did receive a deal). Again, X_i is a vector of the relevant personal and violation attributes of the ticketed individual. The data explicitly specify when an individual receives a deal from the prosecutor as opposed to when the driver continues on within the court process without a deal. Similarly, if a driver pays their ticket, the data will specify whether they did so after receiving a deal from the prosecutor.

Stage 3: Driver Decision to Request a Trial

The remaining two stages of the court process follow exactly from Stages 1 and 2. After Stage 2, those individuals who did not receive a deal have another decision to make: ask for a trial or “give up” and pay their fine. This decision defines Stage 3. Again, ticketed drivers weigh the cost of the ticket with the expected benefit of attending another hearing. This decision is modeled in the same manner as equation (3):

$$B_{i3} = \beta_3' X_i + \epsilon_{i3} \tag{6}$$

$$B_{i3} = 1 \text{ iff } B_{i3}^* > 0, \text{ and } 0 \text{ otherwise}$$

$$B_{i3} \text{ is only observed if } D_{i2} = 1$$

where $B_{i3} = 1$ if the individual decides to go to court for a trial, and $B_{i3} = 0$ if the individual pays their fine without attending an additional hearing.

Though this decision is very similar to the decision made at Stage 1, one main difference is the structure of an arraignment versus a trial. Trials are much longer processes than arraignments: numerous cases are heard at arraignments where general details are discussed. However, trials focus on the details of one case, and much more time is spent investigating those

details. Relatedly, individuals who choose to attend trial must have some experience with the court system, judge, and prosecutor, since they all attended an arraignment in Stage 1.

Stage 4: Prosecutor Decision to Grant a Deal at Trial

Lastly, individuals reach Stage 4 if they chose to attend a hearing initially, did not receive a deal from the prosecutor, and then decided to continue fighting their ticket. Analogous to Stage 2, the prosecutor has the opportunity to grant deals to some of these individuals. Stage 4, the final prosecutor decision, is modeled following equation (5), where $ND_{i4} = 1$ if the individual did not receive a deal from the prosecutor and $ND_{i4} = 0$ if they did receive a lesser sentence:

$$ND_{i4} = \beta'_4 X_i + \epsilon_{i4} \quad (7)$$

$$ND_{i4} = 1 \text{ if } D_{i4}^* > 0, \text{ and } 0 \text{ otherwise}$$

$$ND_{i4} \text{ and } X_{i4} \text{ are only observed if } B_{i3} = 1.$$

Now that the theoretical model is established, a closer look at ϵ_{is} is in order. If the four stages are independent, the model may be estimated by using four independent probit equations (Greene 2008). However, if the error terms between stages are related through unobservable variables, the model needs to account for any selection bias driving some individuals and not others deeper into the court process. If such a correlation across error terms exists, coefficients estimated by independent probit models will be biased.

III. Data and Descriptive Statistics

1. Data

This paper follows individuals through the court process who received a speeding ticket in Lafayette, Louisiana between August 2007 and February 2008. Lafayette is a city in southern

Louisiana with a population of 133,985, about 60 miles west of Baton Rouge. About 65% of Lafayette residents are white and about 30% African-American.¹¹

The data were collected from Lafayette City Court's computerized log of misdemeanor charges, and include information about the speeding violation itself, as well as choices made by both the driver and prosecutor throughout the court process. The explanatory variables (some driver characteristics are primary variables of interest) used throughout this analysis can be grouped into four categories: driver characteristics, violation specifics, court-related variables, and socioeconomic characteristics. Driver characteristics include: race, gender, age, age squared, and the number of moving violations in the past year.

Quintanar (2011) found that African-Americans and women receive proportionately more speeding tickets from police officers than they do from automated sources. This paper uses identical ticket data, appended with driver and prosecutor choices through the court process to test whether those findings are the result of statistical discrimination or tastes for discrimination.¹² Race and gender are the main variables of interest: a negative, significant coefficient on these variables in Stages 1 or 3 would provide supportive evidence for statistical-discrimination by police in issuing speeding tickets. A negative coefficient implies that African-Americans (women) are less likely to fight their speeding ticket, and instead, are more likely to pay their fine upfront, by mail or at a ticket window. Therefore, police ticket individuals who are more likely to pay their fines instead of attending court, saving the court time and money.

If the marginal effect of being female or African-American is positive, the data are in opposition to the statistical discrimination story, and instead provide support for preference-based discrimination. A positive coefficient implies that women and/or African-Americans are

¹¹ Census 2000 and American Community Survey 2005-2009. (<http://factfinder.census.gov>)

¹² Quintanar (2011) only analyzed tickets issued between October 2007 and February, whereas the sample in this paper also includes tickets issued in August and September 2007.

more likely to fight their speeding tickets by attending an arraignment or trial, and thus police are targeting individuals who are likely to consume more judicial and court resources. Therefore, police are likely targeting these groups for some other reason, which may be a preference for ticketing these individuals.

Age is included because previous studies have found an impact of age on police and judge behavior (Makowsky and Stratmann, 2009). The remaining driver characteristic is more specific to the court system: the number of prior moving violations that the driver has on his/her record. Prosecutors will likely be harsher on individuals with a history of committing traffic violations than those who have a clean record. If individuals are aware of these prosecutorial behaviors, they will consider those behaviors when making decisions.

Severity of the speeding violation is coded in ranges of 5 miles per hour over the limit: 5 to 10 miles over the limit, 11 to 15 miles over the limit, 16 to 20 miles over the limit, and the omitted category of more than 21 miles over the limit. This is an important control, since a more severe speeding violation carries a higher fine, and thus a greater potential benefit for ticketed drivers if they are successful in requesting a deal. Despite the higher potential benefit, it is likely that prosecutors are harsher on drivers with more severe violations, since these violators are more dangerous. It is also known whether the ticket was issued in a school zone.

Some drivers receive a speeding ticket as well as another ticket during the traffic stop; for example, they may receive a ticket for no insurance in addition to a ticket for speeding 10 miles over the limit. These additional tickets may indicate to the prosecutor that this driver is more dangerous, conditional upon the severity of that additional ticket, thus increasing the likelihood of not receiving a deal.

There is one court-related variable relevant to driver and prosecutorial decisions throughout the court process: an indicator for which judge is assigned to the case. Each driver is assigned to one of two traffic court judges when they are issued a ticket, though they are not aware of which judge they have been assigned until attending an arraignment. If the two judges behave differently, judge assignment may impact decisions made by both the ticketed driver and the prosecutor.¹³

Lastly, socioeconomic variables linked to the driver's home zip code include: log per capita income, percent of individuals whose education level is a high school degree up to some college, percent of individuals whose education level is a college degree or higher, miles from the Lafayette City Courthouse to the home zip code, and more specific controls for the length of time it takes to drive to the courthouse.¹⁴ These controls provide information about the individual's socioeconomic status as well as proxy for the opportunity cost of contesting a speeding ticket.¹⁵

2. Court Process and Descriptive Statistics

Diagram 1 displays the choices made in the sample of 1,618 speeding ticket cases and illustrates the sample size at each decision stage, as defined in Section II. The majority of individuals (67%) choose to pay their fines initially by mail or at the ticket windows. Of those who do not pay at the window at Stage 1, few individuals receive a deal at arraignment (8%).

¹³ To protect the anonymity of the judges, I call this variable "Judge A." This variable equals 1 for one of the two judges and 0 for the other. The letter "A" is not an identifiable piece of information.

¹⁴ Socioeconomic variables were collected from the 2000 Census Demographic Profile Highlights by zip code. Miles to the courthouse and minutes from the courthouse were collected using Google maps from the home zip code to the Lafayette City Courthouse address: 105 E. Convent Street Lafayette, LA 70501.

¹⁵ A total of 1,707 tickets were issued between August 2007 and February 2008, however, the sample used in the present study excludes some of these tickets because the drivers are different in unobservable ways. Individuals who choose jail time or are allowed to perform community service instead of paying their fine (12), those who receive the maximum deal from the prosecutor (54), and individuals who never pay or take care of their speeding tickets are not included in the estimation sample (23).

Those who do not get a deal then face Stage 3; they must decide if they would like to keep fighting their ticket by attending a trial or if they would rather “give up” and pay the fine. Most individuals stop fighting the ticket and pay their fine (89%). Again, in the last stage, the majority of individuals do not receive a deal from the prosecutor (72%).

Table 1 presents means and standard deviation of the control variables overall, and for each stage of the court process. Approximately half of the ticketed drivers are female, whereas only 27% are African-American.¹⁶ The majority of drivers were traveling between 11 and 15 miles over the speed limit when ticketed, and about 38% of tickets were issued for speeding in a school zone. Very few drivers received other tickets in addition to the speeding ticket when they were stopped, and the majority of drivers had not received a speeding ticket in the past year (a mean of .471 prior violations). A little less than half of drivers are assigned to Judge A.¹⁷

Some major differences can be seen in the average number of African-Americans and women by stage; the proportion of African-Americans increases as the stages progress, while the percentage of women decreases. More severe violators comprise a larger proportion of drivers as they progress from Stage 1 to Stage 3, and drivers who received other tickets in addition to their speeding ticket are more prevalent once we reach Stage 4.

The raw data suggest that police are not statistically discriminating against women or African-Americans on the basis of likelihood to fight a ticket, since women seem to be just as likely as men to pay their tickets immediately, but less likely to attend trial. Conversely, African-Americans actually seem to be more likely to contest their ticket at both stages.

¹⁶ In 2000 the fraction of African-Americans in Lafayette was 28.5% (Census Bureau fact sheet for Lafayette, LA). In 2009, it was 31.1%, therefore, the 27% is only slightly lower than the underlying population (American Community Survey 2005-2009 estimates).

¹⁷ Judge A is a fictional identifier of one judge versus the other and is not an abbreviation for the name of the judge. Though all drivers are assigned to one of the two traffic court judges when issued a ticket, individuals are not aware of their assignment until they attend an arraignment hearing.

Statistical discrimination implies that police would target drivers who are more likely to pay their tickets outright, thereby avoiding court costs associated with trials. However, considering simple means alone is not sufficient to test for statistical discrimination.

IV. Results

1. Probit Models Assuming Independent Error Terms

The initial analysis of court behavior is presented in Tables 2A and 2B: where the entries are marginal effects for Stages 1-4 estimated by independent probit equations. This specification is valid if the error terms are not correlated across equations. It is reasonable, as an initial investigation, to assume that each decision is independent, since individuals make choices at Stages 1 and 3 while prosecutors make decisions at Stages 2 and 4. Similarly, an individual may use completely different criteria in deciding whether to fight their ticket in Stage 1 and Stage 3, especially if they view trials and arraignments as two distinct events. If this is the case, the error terms for these equations should not be correlated. Supportive evidence of independence will be provided in a later sub-section.

In Tables 2A and 2B, all equations control for driver characteristics, violation characteristics, and court-related variables. The second and fourth columns add controls for socioeconomic characteristics. The signs of the coefficients for a majority of controls coincide with theoretical predictions, although some driver characteristics and court-related variables are insignificant.

In Stage 1 African-Americans are consistently more likely to fight the ticket, while there is no effect based on gender or age. This contradicts the proposition that police statistically discriminate against African-Americans and women because they might be more likely to pay a speeding ticket (Quintanar, 2011). According to these results, African-Americans are less likely

to pay their tickets and women behave no differently than men. Police cannot be statistically discriminating based on likelihood to pay tickets since they are ticketing individuals who are not more likely to pay their fines. Therefore, the results found in Quintanar (2011) cannot be based on statistical discrimination and may indicate police are ticketing individuals due to preference based discrimination. Potential other discrimination stories will be explored later in the paper.

Drivers committing less severe violations are less likely to fight their tickets than their speedy counterparts (the omitted category represents those individuals traveling more than 21 miles over the limit). However, drivers who were ticketed in a school zone were much more likely to attend an arraignment to fight the ticket. Individuals who received another ticket at the traffic stop where they were cited for speeding were consistently more likely to attend an arraignment, which is logical since those individuals have more to gain by attempting to receive a deal from the prosecutor. In Stage 1, no socioeconomic controls were significant and neither was the judge indicator.¹⁸

Stage 2 results are similar to Stage 1, though their interpretation is quite different. The marginal effect of being African-American is positive and significant, which implies that African-Americans are more likely to *not receive a deal* from the prosecutor than drivers of other races. There is no significant difference between the likelihood of men and women to receive a deal. This provides little insight into the investigation of statistical discrimination. However, African-Americans should be less likely to fight their tickets if they know they have a smaller likelihood of receiving a deal. This finding does not necessarily imply discrimination by prosecutors, but could instead be a result of different rates of asking by African-Americans and individuals of other races. The present study cannot distinguish between these two scenarios.

¹⁸ This is unsurprising since drivers are not aware which judge they are assigned until they attend an arraignment.

While it is reasonable to assume that individuals in Stages 1 and 3 who have higher incomes are less likely to fight a ticket due to higher opportunity costs of time, the influence of higher incomes on prosecutors' decisions is less clear. Prosecutors may be harsher on those with higher incomes because these individuals are more able to afford their fines, or because the prosecutor believes these individuals are more likely to continue to speed. Conversely, prosecutors may treat wealthy individuals more leniently, which likely results from political status or influence within the court. Income is generally insignificant in the estimation results, but when significant it seems that prosecutors are actually more likely to grant deals to individuals from wealthier neighborhoods.

Table 2B presents the results for Stages 3 and 4. In Stage 3, the marginal effect of being African-American remains positive and significant, though it is much smaller in magnitude (.053 as opposed to .141). Therefore, African-Americans are still more likely to choose to fight their speeding ticket but racial disparity in behavior is smaller. This could be a result of the differences between attending an arraignment and attending a trial. Once more, gender and age are insignificant. These results again contradict the theory that police statistically discriminate based on likelihood to contest.

One interesting difference in Stage 3 is that the coefficient on Judge A is positive and statistically significant. Individuals who are assigned to Judge A are more likely to ask for a trial. In later sections I explore whether this occurs in response to differential fines assigned by the judges, or if it is due to some other unobservable difference between the two judges.

In Stage 4, the coefficient on African-American is positive, but only significant in the regression with fewer controls. This implies that African-Americans are more likely not to receive a deal at trial, but again, could result from prosecutorial discrimination or a difference in

asking. It is important to note that controls in Stage 4 are generally consistent with theoretical predictions; however, the sample size is only 32 so not much should be inferred from these results. They are provided for completeness.

2. Independent Probit Models Including Probability of Continuing in the Next Stage

Recall that the court process is defined in four stages: two as “driver choice” and two as “prosecutor choice.” However, the meaning attributed to these titles needs clarification: each stage may not necessarily be independent, and theoretically they each could have a forward-looking component. For instance, in Stage 1 a driver’s decision of whether to fight their ticket or pay immediately may be impacted by the likelihood of their receiving a deal in the following stage. This forward-looking component can be defined simply as the probability of a driver continuing on in the court process in the next stage (for instance, in Stage 1, the probability of continuing on in the court process in the next stage is the likelihood that the driver does not receive a deal in Stage 2). There is a simple way to test whether predicted “performance” in the next stage is a factor in the decision made in the present stage.

These probabilities of continuing are estimated conditionally, beginning with Stage 4. A probit model for Stage 4 is estimated and used to predict likelihood of not receiving a deal for the entire sample. Next, a probit model for Stage 3 is estimated including the predicted likelihood of not receiving a deal in Stage 4. If this predicted probability in Stage 3 is statistically significant, it implies that individuals decide whether to attend a trial in part based on the likelihood of receiving a deal in Stage 4. These results are then used to predict the likelihood of a driver fighting their ticket in Stage 3, for the entire sample. This procedure is continued for the remaining stages.

Theoretically, the coefficient on the probability of continuing should be negative for driver decision stages (Stage 1 and Stage 3). Expanding upon the above example of Stage 1's probability of continuing, an individual who has a very high likelihood of not receiving a deal in Stage 2 (a very high probability of continuing in the next stage) should be less likely to fight their ticket because of the high likelihood that they are wasting their time. Conversely, someone who has a low probability of not receiving a deal should be more likely to fight their ticket, because there is a large chance they will get a reduced charge.

In Stage 2, the prosecutor decision stage, the relationship between the probability of continuing in the next stage and likelihood of not receiving a deal in the current stage may be negative or irrelevant. If prosecutors are concerned with minimizing court costs and their own time costs, they will be more willing to grant a deal to an individual who seems likely to continue fighting their ticket in Stage 3 (Reinganum 1988). Therefore, if the probability of continuing on through Stage 3 is large (the driver is very likely to fight the ticket and go to trial), then the prosecutor is going to be less likely to not grant a deal to the driver in Stage 2 (the probability of continuing will be negative). However, if the prosecutor's motives to avoid spending resources in court are outweighed by their desire to punish the guilty, they will be unwilling to grant deals based on the likelihood of a driver fighting their ticket. This could still result in a negative probability of continuing in the next stage, but the probability should be insignificant.

Table 3 provides marginal effects for this model estimated as independent probit equations by stage, including the predicted probability of continuing for each individual in the following stage. The overall results are similar to findings from Tables 2A and 2B. African-

Americans are more likely to fight their ticket in both Stage 1 and 3, while they are more likely to not receive a deal in Stage 2. Again, gender and age are insignificant in all stages.

In Stages 1 and 3, the sign of the probability of continuing is negative, consistent with theory, although estimated imprecisely for Stage 1. This probability is only significant in Stage 3, implying that drivers consider their likelihood of receiving a deal at trial, but may not really use this information when deciding whether to attend an arraignment. It may also be the case that drivers at Stage 3, since they have more information about the prosecutor than they did at Stage 1, have a better understanding of how prosecutors decide to grant deals and thus are better able to predict their likelihood of success in the next stage.

Stage 2 provides slightly different results than the driver decision stages; the probability of continuing in the next stage is insignificant and positive. These results imply that prosecutors are not influenced by driver behavior, and instead issue deals based on violation and socioeconomic characteristics as seen in Tables 2A and 2B.

Though the probabilities are consistent with theory, note that each is estimated using an out of sample prediction. For example, individuals who choose to attend a trial are observed in Stage 3, and the probability of attending trial is estimated by using this subsample. This probability is predicted for all individuals in Stage 2, even those who choose not to attend trial and were no longer observed in the data in Stage 3. These drivers made the decision to pay their ticket instead of attending trial because they had a low expected benefit of continuing on in the court process, but their predicted probabilities will be based on the sample of individuals who had high expected benefits of contesting. This over-estimation as well as the fact that these probabilities are measured with error results in estimates which suffer from attenuation bias.

3. Assuming Correlated Error Terms: A Selection Model

As previously mentioned, independent probit estimates are appropriate only if the driver/prosecutor decision is unrelated to the decision made in the previous stage, or if each stage's error term is uncorrelated. This section aims to investigate the accuracy of this assumption, by estimating a model of selection where the equations are in essence linked together through a selection equation. This specification is relevant if for example, an unobserved driver characteristic impacts the driver's decision not to pay at the window and is also correlated with a control in the prosecutor's decision to grant a deal at arraignment.

Table 4 relaxes the assumption of independent error terms between stages: assuming first that the error terms for Stages 1 and 2 are related, and secondly assuming Stages 2 and 3 are related. This estimation strategy, linking two subsequent stages instead of the entire model, has been employed extensively in the criminology literature to investigate sentencing for numerous crimes: sexual assault offenders, intimate assault, juvenile crimes (Wooldredge and Thistlewaite 2004 and Kingsnorth et al. 1998, for example).

The following is the specification employed in Table 4 for Stages 1 and 2, which merely links equations (3) and (5):

Selection Model for Stages 1 and 2 (8)

$$D_{i2} = \beta'_2 X_{i2} + \epsilon_{i2}$$

$$\beta'_{i1} X_{i1} + \epsilon_{i1} > 0 \quad \text{Selection equation}$$

$$\epsilon_{i1} \sim N(0, \sigma)$$

$$\epsilon_{i2} \sim N(0, 1)$$

$$\text{corr}(\epsilon_{i1}, \epsilon_{i2}) = \rho$$

The basic controls, which were employed in previous tables, are also included in X_{i2} and X_{i1} : violation and driver characteristics, as well as socioeconomic variables. However, *forced arraignment*, *driver is from a small city*, *in state*, *eligible for driving class*, and *received ticket in home zip code* are used as instruments to aid identification of the selection model. A likelihood ratio test of independent equations is performed, and estimates for ρ are presented (for Stages 1 and 2 as well as Stages 2 and 3). In both model specifications the null of $\rho=0$ cannot be rejected.

Forced arraignment and *driver is from a small city* are excluded from Stage 2 to aid in identification of the selection model. By law, individuals ticketed for travelling more than 25 miles over the limit or those ticketed in a school zone for traveling more than 10 miles over the limit must attend an arraignment and are ineligible to pay their tickets by mail or at a ticket window. A dummy variable, *forced arraignment*, is included in Stage 1 to control for this lack of choice. By Stage 2, being forced to attend an arraignment has no further impact on outcomes, because court procedure is not mandated past the first stage. Relatedly, conditional on the prosecutor knowing an individual was speeding in a school zone or was travelling more than 10 miles over the limit, the fact that the individual was required to attend an arraignment should not factor into the prosecutor's mind. Also, there is no reason to believe that individuals will use this requirement as a factor in deciding to attend trial (therefore is irrelevant in Stages 2-4).

Driver is from a small city is an indicator for whether the driver is from a city with fewer than 10,000 residents. Ticketed drivers from small cities may have different beliefs about how courthouses function than individuals from large cities. For instance, drivers from small cities may know their own court officials, and thus may be less intimidated by courts in general (especially since Lafayette, though not very small, is not considered a big city). This could

influence the driver's initial belief about success in fighting a ticket, and they may be more likely to attend the initial arraignment.

Prosecutors have information about where drivers are from, however, it is unlikely they know (or care) how many residents a city has. Conversely, the prosecutor is more likely to be influenced by distance that the driver must travel and not by the size of the city itself. There is no theoretical reason why this variable should impact the prosecutor's decision in Stage 2. Upon reaching Stage 3 of the court process, drivers have had some experience with Lafayette city court to make an informed decision on whether to attend a trial, and where they are from should no longer be relevant.

Stages 2 and 3 are linked in the same way as Stages 1 and 2 (see equation (8)). I employ the following instruments: *in state*, *eligible for driving class*, and *received ticket in home zip code*. *In state* is an indicator for whether a driver has a license from Louisiana. This instrument can be excluded from Stage 3 because; conditional on travel time to court (already included in the model) individuals should not base the decision to attend trial on the state they live in. However, since police are more likely to ticket out of state drivers (Makowsky and Stratman 2009), prosecutors may consider the state where the driver's license is issued at the initial arraignment. Though *in state* is important in Stage 2, there is no theoretical reason it needs to be included in Stage 3.

Received ticket in home zip code is an indicator equal to 1 if the driver was ticketed in the zip code where they live. This can only equal one for residents of Lafayette, since all tickets are issued within the city limits. However, residents of Lafayette may also receive tickets in zip codes other than where they live. If prosecutors are more forgiving or harsh to individuals who were speeding in a very familiar area, being ticketed in their own zip code may impact the

driver's likelihood of receiving a deal (Stage 2). Otherwise, it is unlikely that individuals fighting a speeding ticket are going to decide whether or not to attend a trial (Stage 3) merely based on being ticketed in their own zip code versus another.

In Louisiana, an individual has the option to take a defensive driving course once a year to "erase" a speeding ticket from their record, and in so doing, avoid associated insurance increases resulting from the violation. Only drivers who were ticketed for traveling less than 25 miles over the limit and who have not received another violation in the past year are eligible to take this course (*eligible for driving class*). According to representatives of the court, this control is especially relevant in deal issuance because prosecutors have a tendency to grant deals to ineligible individuals to enable them to take the driving course. For example, assume an individual who was ticketed for traveling 26 miles over the limit receives a lesser charge of traveling 24 miles over the limit. This driver will now be eligible to take a defensive driving course. Therefore, *eligible for driving class* is important in Stages 1 and 2. By Stage 3, eligibility for driver course will have been accounted for at arraignment and no longer should affect an individual's decision to go to trial.

Table 4 presents estimates of the selection models estimated by full information maximum likelihood, where Columns II and IV list conditional marginal effects. First, looking at Columns I and II, where Stages 1 and 2 are assumed to be related, African-Americans are still less likely to pay at the window initially and more likely not to receive a deal in Stage 2, though now only the first difference is statistically significant. These results are consistent with the main result, which is that police are not statistically discriminating against African-Americans based on likelihood to contest. However, the lack of significance in Stage 2 differs from previous results. Recall that the significant racial effect found in earlier specifications could be a

result of a difference in asking or prosecutorial discrimination, which is still the case here, except that the Stage 2 marginal effects are calculated based on the conditional likelihood. There is no difference when considering gender or age.

As before, African-Americans are more likely not to receive a deal in Stage 2, and are more likely to continue to trial in Stage 3. There is still no significant difference in comparing the behavior of women to the behavior of men in dealing with their tickets and age controls remain insignificant as well. Therefore, even controlling for selection effects, evidence for statistical discrimination by police on the basis of likelihood to contest a speeding ticket cannot be supported.

Besides the marginal effects estimates, estimates for rho are also presented. For both selection models, rho is insignificant, and the null hypotheses of the likelihood ratio test of independent equations cannot be rejected. Though this does not rule out correlation between the errors, this provides suggestive evidence that the previous estimates assuming independence may not be biased. If the error terms are not related, it is appropriate to estimate the process by individual probits as in Tables 2A and 2B (Greene 2008).

V. Additional Questions

1. Are Driver Behavioral Differences Driven by Differences in Fines Issued by Judges?

As was seen in the previous section, individuals alter their behavior based on which judge they face at arraignment (the same judge that will preside during the trial). This is intriguing, and the next step is to determine if this behavior is a response to differential fine issuance by judges and whether those differences are motivated by race or gender. Fines in traffic court are legally dictated by a fee schedule. However, judges have the ability to alter fines of drivers who

attend arraignments and/or trials.¹⁹ Previous literature has found that judges alter sentences and/or fines based on the race and gender of the offender as well as the race and gender of the victim (Schanzenbach 2005, for example).

The fine schedule is officially based on the speed traveled over the limit, whether the ticket was in a school zone, and the number of previous violations the driver has on his record. The fine schedule is not public information, and the court will not release the actual rule for assigning fines. However, controlling for the factors which determine fines should provide the information necessary to investigate the extent that judges deviate from the fine schedule.

In order to investigate whether judges impose fines differentially, Table 5 investigates determinants of fines assigned to drivers who face the judge. The severity of the speed violation is the main component of the fine amount: someone traveling 5 to 10 miles over the limit would receive a fine that was about 54 dollars less than a severe speeder (who travelled more than 20 miles over the limit). Similarly, individuals who were speeding in a school zone pay slightly over \$8 more on average. Past violations are not significant. A control is included for individuals who owe the court money for prior charges, and individuals' fines increase by approximately the amount of those previous charges (eg. a prior charge of \$10 increases the fine by \$9.22 in the first column).

Column II adds controls for other violation characteristics which may influence the fine in court. Then, Column III adds demographic and socioeconomic characteristic controls. The only significant violation characteristic is whether the driver was eligible for a driving course (if so, their fine was almost \$12 less). African-Americans pay about \$3 less in fines than white individuals. This is statistically significant; however, the average fine is \$145.77, so this racial

¹⁹ This information was obtained from a representative of Lafayette City Court, but the fine schedule itself is not publicly available information.

difference amounts to about 2%. Similarly, older individuals pay significantly less, but only by about 60 cents per year.²⁰ None of these controls should be significant if the fines are truly determined by a fixed schedule. However, these results show that judges are not issuing fines in a discriminatory manner.²¹

The final column adds the indicator for judge assignment, and the coefficient is insignificant, implying that drivers who face Judge A do not receive significantly different fines than those who face the other judge, all else equal. We previously saw that individuals who face Judge A are more likely to continue to trial, which seems to imply they expect a better outcome from Judge A. Since the fine amounts do not differ based on the judge, some unobservable judge characteristics may explain this behavior. If Judge A is less intimidating or more friendly, then individuals may not experience as much discomfort in having to face Judge A and thus may be more willing to attend trial.²²

IV. Conclusion

The primary goal of this paper is to determine whether statistical discrimination or preference-based discrimination is the motive behind police issuing a greater proportion of speeding tickets to African-Americans and women. The existing research on police discrimination in traffic stops, searches, and ticketing finds inconsistent results regarding racial as well as gender based discrimination (Blalock et al. 2007, Makowsky and Stratmann 2009, Knowles and Todd 2007, Grogger and Ridgeway 2006). For example, Knowles et al. (2001)

²⁰ One possible explanation for this age difference is that the court may wish to punish young violators more severely in an attempt to prevent recidivism. This has been cited as a common influence in the court system (ex. Wooldredge and Thistlethwaite (2004)).

²¹ This illustrates that the judges as a whole do not discriminate. I also estimate fine determinants on restricted samples by race and gender of the ticketed driver to ensure that neither judge individually is discriminating. Again, there is no indication that either judge considers race or gender when assigning speeding fines. These results can be provided upon request.

²² The current paper excludes individuals who received the maximum deal from the prosecutor (where the ticket was completely dropped), but even when these individuals are considered, there is no difference in receiving the maximum deal based on the judge you were assigned to for trial.

show that police engage in statistical discrimination when searching vehicles for drugs, however, using the same data Antonovics and Knight (2009) provide evidence that police are actually discriminating based on preferences.

The present paper expands upon Quintanar (2011), which found police issue a greater proportion of speeding tickets to African-Americans and women than automated sources. Using the same police ticket data, appended with individual court outcomes, I investigate whether police are engaging in statistical discrimination based on a driver's likelihood to pay a speeding ticket as opposed to fighting the ticket through several stages of the court process.

If police have an interest in saving the court money and eliminating their requirement to attend a hearing, the officers should ticket individuals who are more likely to pay their tickets outright. This would be statistical discrimination; however, by analyzing individual driver behavior throughout the court process of dealing with a speeding ticket, I find evidence to the contrary. African-Americans are less likely to pay their tickets immediately, and more likely to fight their tickets through the entire court process by attending a trial.

Relatedly, there is no significant difference between women and men's behavior in fighting tickets. Again, statistical discrimination does not coincide with women being more likely to receive tickets (Quintanar 2011). Therefore, no "advantage" exists in targeting either gender when issuing speeding tickets and a higher ticket frequency for African-Americans actually uses more court resources. This evidence diminishes the likelihood of statistical discrimination as a viable explanation for police behavior, but further analysis is required to determine whether police are engaging in preference based discrimination or are issuing a greater proportion of speeding tickets to women and African-Americans for some other unknown reason.

The unique dataset employed in this paper allows the researcher to account for many of the variables which influence driver and prosecutor behavior in the court process. It does not seem to be the case that unobservable variables are driving both individual and prosecutorial choices at different stages, and in fact, evidence has been provided to illustrate that these decisions are actually independent. This is the first paper to explore individual choices in dealing with a speeding ticket throughout the entire court process, along with prosecutorial decisions and judge behavior. Similarly, due to the uniqueness of the dataset, this research does not suffer from two of the most common issues in this realm of literature: nonreporting and post-lawsuit data. The data were collected directly from the courthouse database without the prior knowledge of police and thus there is no reason to suspect ticketing behavior was altered. In the same way, nonreporting is not a concern since the data include all police issued-speeding tickets during the sample time period.

Similar to previous research, the present paper investigates prosecutor decisions as well as judge sentencing. African-Americans are generally less likely to receive a deal than white defendants, both when initially meeting with the prosecutor and when meeting with the prosecutor a second time at trial. It is tempting to interpret this finding as prosecutorial discrimination based on race, but as a result of the data structure this finding may simply illustrate a racial difference in the rate of asking for deals. The data indicate only whether an individual attended a hearing, and not if they spoke to the prosecutor and requested a deal. The question of prosecutorial discrimination is beyond the scope of this paper, but its implications for present and future work should be considered.

If the prosecutors in Lafayette City Court have a widespread pattern of discriminatory behavior against certain groups, ticketed drivers may form expectations about the likelihood of

receiving a deal with this behavior pattern in mind. Because African-Americans are less likely to receive a deal, they may be less willing to invest time and effort into contesting the ticket. If this were the case, police would be aware that African-Americans were more likely to pay instead of fighting a ticket, and may statistically discriminate for this reason. However, the findings show that African-Americans are actually less likely to pay, which is in opposition to this theory. If discrimination by the prosecutor exists, it should not alter the implications for the current result that statistical discrimination does not seem to explain why police target women and African-Americans in issuing speeding tickets.²³

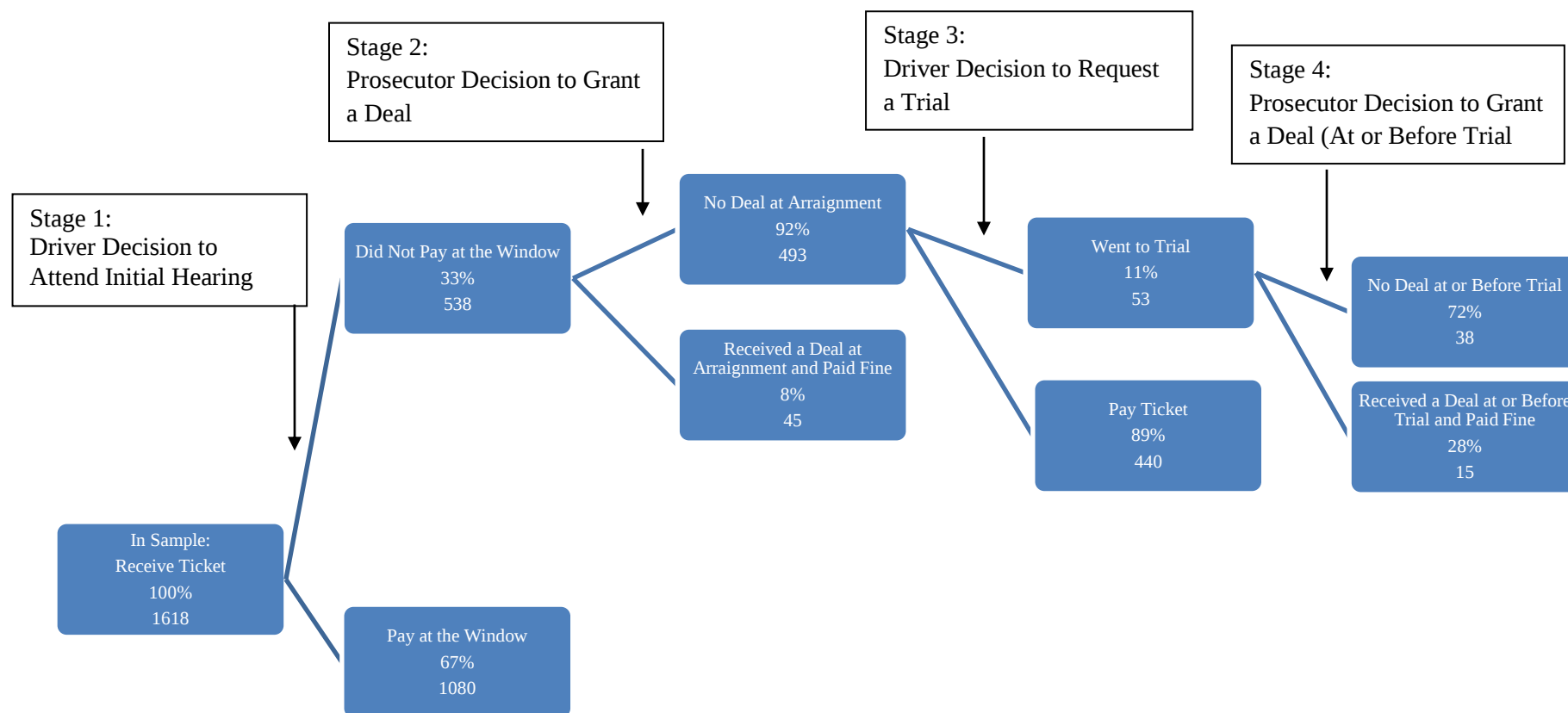
Analyzing speeding fines is a useful way to analyze judge behavior, since judges in Lafayette City Court are able to change fines based on their discretion. Though violation characteristics are very important in determining the amount of a speeding fine, older individuals receive lower fines after facing a judge and prosecutor. African-Americans also pay lower fines after facing a judge or talking to the prosecutor.

Interestingly, individuals seem to behave differently depending on which judge they face in traffic court, but their motives for doing so are unclear. One possibility is that individuals perceive one judge as more pleasant or less intimidating, and thus their expected cost of continuing to trial is lower. In this example, people may be more willing to attempt to get a lower fine when facing the “nice” judge. Even if this is the underlying cause for differences in decisions of ticketed drivers, there is no difference in driver outcomes based on which particular judge is faced in court. Therefore, this differing driver behavior does not seem to be a result of leniency by any one judge. The true motive for driver behavior in regards to the judge is a

²³ One related theory is that African-Americans fight their tickets, knowing that prosecutors behave discriminatorily, because they expect fairness from the judge at trial. African-Americans who do not pay initially do pay a statistically significantly lower fine than other races of drivers, all else equal (though the monetary difference is quite small). This theory cannot be fully investigated due to the structure of the data, since we cannot distinguish whether the prosecutor is behaving in a discriminatory manner.

question for future research, since for now we cannot explain different individual choices, but can only determine that the judges are not behaving discriminatorily.

Diagram 1: Decision Tree



The figure above illustrates choices of 1,618 individuals through the court process, once receiving a speeding ticket. Stages are denoted at relevant decision nodes, and each box contains a description of the choice made as well as two numbers: the percentage of the sample choosing that option and the sample size.

Table 1:
Means and Standard Deviation by Stage

Variable	Entire Sample	Stage 1 =1 if Driver Attends Arraignment, =0 if Pays	Stage 2 =1 if No Deal, =0 if Deal	Stage 3 =1 if Driver Attends Trial, =0 if Pays	Stage 4 =1 if No Deal, =0 if Deal
Driver Identifiers					
African-American	.267 (.443)	.259 (.438)	.344 (.476)	.364 (.482)	.469 (.507)
Female	.505 (.500)	.518 (.500)	.502 (.501)	.492 (.500)	.406 (.499)
Age	31.214 (12.766)	31.178 (12.678)	30.451 (12.326)	30.395 (11.973)	35.531 (13.464)
Age Squared	1137.193 (996.873)	1132.69 (988.001)	1078.913 (974.818)	1066.865 (927.798)	1438.094 (1003.986)
Violation Identifiers					
Past Violations	.471 (.997)	.468 (.976)	.496 (1.077)	.523 (1.110)	.5 (1.459)
Five to 10 Miles Over	.034 (.181)	.035 (.183)	.026 (.160)	.022 (.147)	.094 (.296)
Eleven to 15 Miles Over	.472 (.499)	.469 (.499)	.273 (.446)	.266 (.442)	.313 (.471)
Sixteen to 20 Miles Over	.393 (.489)	.393 (.489)	.547 (.498)	.561 (.497)	.406 (.499)
More than 21 Miles Over	.101 (.302)	.103 (.304)	.154 (.361)	.151 (.358)	.188 (.397)
School Zone	.379 (.485)	.395 (.489)	.605 (.489)	.632 (.483)	.313 (.471)
Driving History and Judge Identifier					
Another Less Severe Ticket	.062 (.242)	.060 (.238)	.091 (.288)	.091 (.288)	0 (0)
Another More Severe Ticket	.030 (.171)	.025 (.155)	.069 (.253)	.073 (.261)	0 (0)
Judge A	.462 (.499)	.457 (.498)	.466 (.499)	.475 (.500)	.656 (.483)
Identifiers Based on Driver's Home Zip Code: Opportunity Cost Proxies					
Lafayette Resident	.593 (.491)	.603 (.489)	.587 (.493)	.581 (.494)	.531 (.507)
High School/Some College	.539 (.052)	.539 (.052)	.540 (.050)	.541 (.049)	.541 (.051)

Table 1, Concluded:
Means and Standard Deviation by Stage

Variable	Entire Sample	Stage 1 =1 if Driver Attends Arraignment, =0 if Pays	Stage 2 =1 if No Deal, =0 if Deal	Stage 3 =1 if Driver Attends Trial, =0 if Pays	Stage 4 =1 if No Deal, =0 if Deal
College Degree or Higher	.236 (.133)	.238 (.133)	.221 (.128)	.215 (.124)	.206 (.127)
Log Per Capita Income	9.787 (.286)	9.791 (.286)	9.748 (.274)	9.734 (.266)	9.716 (.283)
Miles from Courthouse	19.304 (55.985)	17.393 (48.548)	16.951 (57.374)	16.916 (58.916)	21.219 (38.862)
45-90 Min. Drive to Court	.057 (.232)	.056 (.229)	.053 (.224)	.049 (.216)	0 (0)
>90 Min. Drive to Court	.052 (.222)	.041 (.199)	.036 (.188)	.038 (.191)	.094 (.296)
N		1495	494	451	32

Means and standard deviations are estimated based on the sample from Tables 3A and 3B for consistency. Two controls predict success perfectly for Stage 4: Another Less Severe Ticket and Another More Severe Ticket. For all individuals who receive another ticket in addition to their speeding ticket, they do not receive a deal from the prosecutor in Stage 4.

Table 2A: Probit Model Assuming Independent Errors Between Decision Stages

	Stage 1		Stage 2	
	=1 if Driver Attends Arraignment, =0 if Pays		=1 if No Deal, =0 if Deal	
African-American	.166** (.031)	.141** (.033)	.060** (.019)	.044** (.016)
Female	-.015 (.026)	-.012 (.026)	-.028 (.020)	-.024 (.018)
Age	.001 (.006)	-.001 (.006)	.006 (.004)	.005 (.003)
Age Squared	-.000 (.000)	-.000 (.000)	-.000* (.000)	-.000 (.000)
Past Violations	.015 (.013)	.017 (.013)	.029* (.014)	.027* (.014)
5 to 10 Miles Over	-.182** (.052)	-.184** (.051)	-.036 (.072)	-.032 (.066)
11 to 15 Miles Over	-.361** (.037)	-.362** (.037)	-.021 (.034)	-.007 (.029)
16 to 20 Miles Over	-.098** (.039)	-.096** (.039)	.015 (.031)	.020 (.028)
School Zone	.329** (.026)	.329** (.026)	.092** (.029)	.073** (.025)
Another Less Severe Ticket	.152** (.059)	.151** (.059)	-.029 (.052)	-.035 (.051)
Another More Severe Ticket	.635** (.048)	.634** (.050)	.052 (.019)	.042 (.017)
Judge A	.013 (.026)	.017 (.026)	.028 (.020)	.021 (.018)
Lafayette Resident		-.003 (.043)		-.014 (.031)
High School/Some College		-.060 (.332)		.566** (.256)
College Degree or Higher		-.064 (.519)		.713** (.383)
Log Per Capita Income		-.075 (.211)		-.366** (.155)
Miles from Courthouse		.000 (.000)		.000 (.000)
45-90 Min. Drive to Court		-.058 (.051)		-.109* (.079)
>90 Min. Drive to Court		-.089 (.072)		.042 (.016)
N	1511	1495	500	494
ln L	-770.19	-757.12	-129.15	-117.41

The coefficients are marginal effects. The models are estimated with robust standard errors.

Table 2B: Probit Model Assuming Independent Errors Between Decision Stages

	Stage 3		Stage 4	
	=1 if Driver Attends Trial, =0 if Driver Pays		=1 if No Deal, =0 if Deal	
African-American	.042*	.053**	.453*	.207
	(.027)	(.029)	(.203)	(.269)
Female	-.026	-.025	-.145	-.211
	(.024)	(.023)	(.213)	(.248)
Age	.003	.004	.087	.047
	(.005)	(.005)	(.077)	(.077)
Age Squared	-.000	-.000	-.001	-.001
	(.000)	(.000)	(.001)	(.001)
Past Violations	-.009	-.007	.162	.309
	(.013)	(.012)	(.181)	(.209)
5 to 10 Miles Over	.185*	.206*	.473**	.308
	(.153)	(.155)	(.124)	(.222)
11 to 15 Miles Over	.018	.026	.394	.168
	(.040)	(.039)	(.210)	(.244)
16 to 20 Miles Over	.005	.006	.534**	.194
	(.035)	(.033)	(.206)	(.277)
School Zone	-.117**	-.119**	.231	.463
	(.034)	(.033)	(.240)	(.195)
Another Less Severe Ticket	.073	.068	-	-
	(.057)	(.054)		
Another More Severe Ticket	.157**	.168**	-	-
	(.080)	(.083)		
Judge A	.052**	.051**	.088	.083
	(.024)	(.024)	(.229)	(.248)
Lafayette Resident		-.043		.172
		(.039)		(.468)
High School/Some College		.248		5.910*
		(.279)		(3.088)
College Degree or Higher		.620		5.711
		(.454)		(5.223)
Log Per Capita Income		-.223		-2.164
		(.191)		(2.129)
Miles from Courthouse		-.000		.022
		(.000)		(.024)
45-90 Min. Drive to Court		-.050		-
		(.026)		
>90 Min. Drive to Court		.099		-.892
		(.100)		(.165)
N	455	451	32	32
ln L	-127.73	-124.60	-15.24	-14.23

Probit marginal effects are listed, with robust standard errors. Two controls predict success perfectly for Stage 4: Another Less Severe Ticket and Another More Severe Ticket. For all individuals who receive another ticket in addition to their speeding ticket, they do not receive a deal from the prosecutor in Stage 4. The control for living 45-90 minutes from the courthouse is dropped due to collinearity in Stage 4.

Table 3: Independent Probit Model, Including Probability of Continuing in the Next Stage

	Stage 1 =1 if Driver Attends Arraignment, =0 if Pays	Stage 2 =1 if No Deal, =0 if Deal	Stage 3 =1 if Driver Attends Trial, =0 if Pays	Stage 4 =1 if No Deal, =0 if Deal
African-American	.159** (.039)	.039** (.017)	.066** (.031)	.207 (.269)
Female	-.023 (.028)	-.020 (.019)	-.035 (.023)	-.211 (.248)
Age	.001 (.006)	.004 (.004)	.006 (.005)	.047 (.077)
Age Squared	-.000 (.000)	-.000 (.000)	-.000 (.000)	-.001 (.001)
Past Violations	.024 (.016)	.030** (.014)	.001 (.012)	.309 (.209)
5 to 10 Miles Over	-.194** (.049)	-.070 (.111)	.255** (.168)	.308 (.222)
11 to 15 Miles Over	-.365** (.037)	-.011 (.029)	.041 (.040)	.168 (.244)
16 to 20 Miles Over	-.088** (.040)	.018 (.027)	.021 (.030)	.194 (.277)
School Zone	.356** (.037)	.089** (.038)	-.076** (.032)	.463 (.195)
Another Less Severe Ticket	.133** (.061)	-.039 (.053)	.129** (.071)	-
Another More Severe Ticket	.642** (.048)	.037 (.022)	.267** (.107)	-
Judge A	.026 (.028)	.015 (.021)	.050** (.023)	.083 (.248)
Lafayette Resident	-.005 (.043)	-.008 (.031)	-.053 (.038)	.172 (.468)
High School/Some College	.196 (.437)	.550** (.255)	.478* (.270)	5.910* (3.088)
College Degree or Higher	.212 (.594)	.630* (.373)	.995** (.469)	5.711 (5.223)
Log Per Capita Income	-.230 (.264)	-.332** (.148)	-.379* (.196)	-2.164 (2.129)
Miles from Courthouse	.000 (.000)	.000 (.000)	.000 (.000)	.022 (.024)
45-90 Min. Drive to Court	-.091 (.059)	.090 (.076)	-.042 (.029)	-
>90 Min. Drive to Court	-.070 (.078)	.041 (.017)	-.002 (.054)	-.892 (.165)
Predicted Probability of Continuing Next Stage	-.261 (.279)	.106 (.170)	-.142** (.056)	N/A
N	1495	494	451	32
ln L	-756.65	-117.26	-122.15	-14.23

For Stage 4 estimates, the controls for receiving another less or more severe ticket are excluded because they perfectly predict success. Probability of success in Stage 4 is forced to equal 1 if these variables equal one.

Table 4:
Probit Selection Model Assuming Correlated Errors Between Decision Stages

	I	II	III	IV
	Selection Model: Stage 1	Stage 2	Selection Model: Stage2	Stage 3
African-American	.150** (.035)	.050 (.031)	.036* (.019)	.060** (.028)
Female	-.009 (.027)	-.038 (.031)	-.022 (.018)	-.024 (.023)
Age	-.001 (.005)	.006 (.005)	.004 (.003)	.005 (.005)
Age Squared	-.000 (.000)	-.000 (.000)	-.000 (.000)	-.000 (.000)
5 to 10 Miles Over	-.083 (.074)	.009 (.087)	.001 (.046)	.189 (.151)
11 to 15 Miles Over	-.338** (.041)	.049 (.061)	.013 (.024)	.017 (.038)
16 to 20 Miles Over	-.067 (.045)	.076 (.053)	.041 (.029)	.005 (.033)
School Zone	-.132 (.166)	.332 (.375)	.061** (.024)	-.115** (.032)
Past Violations	-.009 (.020)	-.014 (.027)	-.008 (.017)	-.005 (.011)
Another Less Severe Ticket	.145** (.060)	-.062 (.072)	-.038 (.044)	.072 (.058)
Another More Severe Ticket	.635** (.051)	.051 (.040)	.030 (.022)	.139* (.076)
Judge A	.021 (.026)	.040 (.030)	.022 (.017)	.045* (.023)
Lafayette Resident	.048 (.067)	.006 (.086)	.031 (.042)	-.053 (.040)
High School/Some College	-.086 (.343)	.994** (.477)	.532** (.248)	.334 (.299)
College Degree or Higher	.046 (.557)	.956 (.794)	.521 (.415)	.728 (.478)
Log Per Capita Income	-.116 (.228)	-.553* (.332)	-.307* (.170)	-.261 (.198)

Table 4, Concluded:
Probit Selection Model Assuming Correlated Errors Between Decision Stages

	I	II	III	IV
	Selection Model: Stage 1	Stage 2	Selection Model: Stage2	Stage 3
Miles from Courthouse	.000 (.000)	.000 (.000)	.000 (.000)	-.000 (.000)
Drive to the Courthouse is 45-90 Minutes	-.040 (.064)	-.158 (.135)	-.113 (.091)	-.046 (.032)
Drive to the Courthouse is Longer than 90 Minutes	-.071 (.079)	.078** (.025)	.042** (.014)	.109 (.130)
Forced Arraignment	.475** (.164)			
Driver is from a Small City (less than 10,000)	.079 (.068)			
In State License	.023 (.117)	.327 (.300)	.194 (.235)	
Received Ticket in Home Zip Code	.017 (.036)	-.092 (.059)	-.064 (.040)	
Eligible for Driving Class	-.112* (.064)	-.103** (.025)	-.063** (.017)	
N	1476	485	485	444
ln L	-849.48		-228.98	
Rho	.908 (.291)		.719 (.789)	

Probit marginal effects are listed, with robust standard errors. Conditional marginal effects are reported for Columns II and IV. The likelihood ratio test fails to reject the null of independent equations for either model (P-values of 0.404 and 0.296 respectively).

Table 5: Explaining Fines: Individuals Who Attend a Hearing

	I	II	III	IV
5 to 10 Miles Over	-56.66** (5.19)	-53.48** (5.59)	-54.17** (5.71)	-54.39** (5.78)
11 to 15 Miles Over	-48.49** (4.52)	-45.53** (4.80)	-45.40** (4.80)	-45.48** (4.81)
16 to 20 Miles Over	-31.22** (4.49)	-28.40** (4.72)	-28.36** (4.76)	-28.45** (4.77)
School Zone	8.76** (1.90)	8.89** (1.99)	8.54** (2.10)	8.48** (2.13)
Past Violations	-.14 (1.68)	-2.75 (2.41)	-2.51 (2.59)	-2.44 (2.57)
\$10 Prior Charge	9.22** (3.43)	8.65** (3.35)	8.07** (3.36)	8.20** (3.31)
\$20 Prior Charge	15.98** (5.40)	14.02** (5.92)	13.41** (6.15)	13.45** (6.12)
\$30 Prior Charge	28.78** (4.84)	25.59** (4.52)	24.96** (4.86)	24.86** (4.71)
Another Less Severe Ticket		1.66 (3.17)	2.16 (3.22)	2.17 (3.24)
Another More Severe Ticket		.81 (3.08)	.71 (3.06)	.79 (3.07)
Eligible for Driving Class		-11.66** (5.16)	-11.36** (5.14)	-11.05** (5.05)
High School/Some College		1.44 (21.43)	-2.77 (21.36)	-2.97 (21.29)
College Degree or Higher		25.41 (28.49)	23.55 (28.29)	24.20 (28.59)
Log Per Capita Income		-13.82 (13.08)	-15.30 (12.80)	-15.76 (13.09)
Miles from Courthouse		-.00 (.01)	-.01 (.01)	-.01 (.01)
Received a Reduced Charge		-2.39 (4.27)	-3.28 (4.15)	-3.31 (4.16)
African-American			-3.18** (1.42)	-3.20** (1.43)
Female			.26 (1.56)	.27 (1.56)
Age			-.65** (.29)	-.64** (.29)
Age Squared			.01* (.00)	.01* (.00)
Judge A				-1.29 (1.54)
N	509	503	494	494
R ²	.495	.509	.516	.517

Coefficients estimated by OLS are reported, along with robust standard errors in (parentheses).

References

- Antonovics, Kate L. and Brian G. Knight. (2009). "A new look at racial profiling: Evidence from the Boston police department," *The Review of Economics and Statistics* 91(1), pp.163-77.
- Anwar, Shamena, Bayer, Patrick, and Randi Hjalmarsson. (September 2010). "Jury discrimination in criminal trials," NBER Working Paper 16366.
- Greene, William H. (2008). Econometric Analysis: Sixth Edition.
- Kingsnorth, Rodney, John Lopez, Jennifer Wentworth, and Debra Cummings. (1998) "Adult sexual assault: The role of racial/ethnic composition in prosecution and sentencing," *Journal of Criminal Justice* 26(5), pp.359-371.
- Leiber, M. and Mack, K. (2003). The individual and joint effects of race, gender, and family status on juvenile justice decision making," *Journal of Research in Crime and Delinquency* 40, pp.34-71.
- Makowsky, Michael and Thomas Stratmann. (2009). "Political economy at any speed: What determines traffic citations," *American Economic Review* 99 (1), pp. 509-527.
- Mustard, David B. (2001). "Racial, ethnic, and gender disparities in sentencing: Evidence from the U.S. federal courts," *Journal of Law and Economics* XLIV.
- Persico, Nicola. (December 2002). "Racial profiling, fairness, and effectiveness of policing," *The American Economic Review* 92(5).
- Reinganum, Jennifer F. (September 1988). "Plea bargaining and prosecutorial discretion," *The American Economic Review* 78(4).
- Schanzenbach, Max. (January 2005). "Racial and sex disparities in prison sentences: The effect of district-level judicial demographics," *Journal of Legal Studies* 34.
- Wooldredge, John and Amy Thistlethwaite. (May 2004). "Bilevel disparities in court dispositions for intimate assault," *Criminology* 42(2), pp.417-456.