Jury Discrimination in Criminal Trials

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Abstract

This paper examines the impact of jury racial composition on trial outcomes using a unique dataset of all felony trials in Sarasota County, Florida between 2004 and 2009. We utilize a research design that exploits day-to-day variation in the composition of the jury pool to isolate quasi-random variation in the composition of the seated jury. We find strong evidence that all-white juries acquit whites more often and are less favorable to black versus white defendants when compared to juries with at least one black member. Using the Anwar-Fang rank order test, we find strong statistical evidence of discrimination on the basis of defendant race. These results are consistent with racial prejudice on the part of white jurors, black jurors, or both. Using a simple model of jury selection and decision-making, we replicate the entire set of empirical regularities observed in the data, including the fact that blacks in the jury pool are just as likely as whites to be seated. Simulations of the model suggest that jurors of each race are heterogeneous in the standards of evidence that they require to convict and that both black and white defendants would prefer to face jurors of the same race.

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1. Introduction

As specified in the Sixth Amendment to the U.S. Constitution, a trial by an impartial jury of one's peers is a fundamental right of defendants in criminal trials.[1] Yet the history of American criminal justice is replete with cases where the abstract promise of jury impartiality has been called into question. Of special concern are settings where a minority member of a population is tried in a setting in which few, if any, members of the same minority are likely to serve on the jury. This concern has arisen repeatedly in the context of race, as blacks generally constitute a small fraction of the population, and therefore seated juries, in the majority of U.S. states and counties. Vastly unequal outcomes – the proportion of blacks in the prison population is almost four times that in the general population – along with anecdotal evidence from many cases have led numerous observers to question whether the criminal justice system treats black defendants (and victims) fairly.[2]

In its most idealized form, the equal and impartial application of criminal justice would include two core elements regarding juries: (i) *jury impartiality*: each jury member forms an opinion based solely on the evidence presented in the case and, importantly, not the identity or attributes of the defendant and (ii) *equal application of justice*: all jurors perceive the evidence presented in the case identically and apply the same standard of evidence in deciding the case. If both of these elements hold, the same verdict would be reached in a case regardless of the jury's composition, which suggests an obvious empirical test for the equal application of the law: any variation in the composition of a jury due to randomness in the selection process should have no effect on trial outcomes.

Of course, it is entirely reasonable to expect impartial jurors to form different perceptions about the quality of the evidence presented in a case or to apply different standards as they reach a verdict. As a result, while empirical evidence that random variation in jury composition affects trial outcomes is sufficient for establishing the unequal application of justice, such evidence alone would not be sufficient

[1] The 6th Amendment states that "In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed."
[2] Sommers and Ellsworth (2003) highlight some of the higher profile cases where there have been questions about the role of race in jury decisions.

to prove that that jurors lack impartiality or discriminate against any particular group of defendants. In fact, proving that jurors apply different standards of evidence to heterogeneous groups of defendants is incredibly difficult. Any observed differences in average trial outcomes for groups of defendants, for example, could be attributed to corresponding differences in the quality of evidence in their cases. As a result, any test for discrimination in the application of the law needs to go beyond simple comparisons of average trial outcomes.

Anwar and Fang (2006) propose a test for discrimination that can be applied when jurors use heterogeneous standards of evidence to convict. The intuition for their test is straightforward: if a jury of Type A requires a lower standard of evidence than a jury of Type B to convict, Type A juries ought to convict all groups of defendants more often than Type B juries. Evidence that Type A juries convict one group of defendants more often and another group less often than Type B juries, would instead imply that at least one of these jury types applies different standards of evidence to the two groups of defendants.

Despite the fundamental importance of the equal and impartial application of the law for the American criminal justice system, the empirical literature on the effect of jury composition on trial outcomes is very limited. Studies that examine the correlation between the composition of the seated jury and trial outcomes, on the one hand, are few and problematic because the seated jury results from a complex and certainly non-random selection process.[3] Experimental evidence based on mock trials, on the other hand, suffers from the fact that these experiments are fundamentally much lower stakes than actual trials and often simplified tremendously for expediency.[4]

Given the limitations of the existing literature, the main goal of this paper is to provide the first empirical evidence of the effects of jury composition on trial outcomes based on quasi-random variation in jury composition and data from real criminal trials. We do so by combining a unique dataset and a novel research design that seeks to isolate random variation in jury composition.

[3] See, for instance, Bowers et al. (2001) study of capital cases and Daudistel et al (1999) study of non-felony cases.
[4] For instance, mock jurors typically hear a substantially condensed version of a case, i.e. a one-page write-up, and decide the verdict individually rather than coming to a unanimous decision as a group. In addition, they are rarely representative of the population and are actually often white college students.

Our dataset contains information on all felony trials in Sarasota County, Florida for which jury selection began between January 1, 2004 and June 1, 2009. The data are especially rich in characterizing the jury, providing information on the age, race, and gender of each member of both the seated jury and the jury pool along with the race and gender of the defendant, the criminal charge(s), and the final jury verdict. On average, jury pools include twenty-seven potential jurors, of which seven are seated as part of the jury (including alternates). Because the eligible jury population of Sarasota County is less than four percent black, there are no blacks in the jury pool about half of the time and no blacks on the seated jury in over 80 percent of the trials.

Our research design exploits the variation in the composition of the jury pool across trials, which is primarily driven by which eligible jurors in the county are randomly called for jury duty on a given day.[5] We provide strong direct evidence that the composition of the jury pool is quasi-random, demonstrating that the attributes of the jury pool are uncorrelated with the characteristics of the defendant and the criminal charges.

Our main analysis begins by examining how trial outcomes vary with the racial composition of the defendant and the jury pool. The evidence is straightforward and striking: the presence of even one or two blacks in the jury pool results in significantly higher conviction rates for white defendants and lower conviction rates for black defendants. In cases with no blacks in the jury pool, 84 percent of black defendants are convicted and 68 percent of white defendants are convicted. But, when the jury pool includes at least one black potential juror, conviction rates are nearly identical at 72-74 percent, and when the jury pool includes two or more blacks, conviction rates reverse: 86 percent for white and 77 percent for black defendants. Given these reduced-form results, not surprisingly, IV estimation of the effect of the race of the seated jury on trial outcomes (using the composition of the jury pool as an instrument)

[5]Though we are not aware of other studies that use random variation in jury composition as a source of identification, there are a handful of studies utilizing random variation in other aspects of the criminal justice system. Abrams et al. (2009), for instance, take advantage of the random assignment of cases to judges to study whether there are disparities across judges in the racial gap in sentencing. Kling (2006) uses random judge assignment as a source of exogenous variation in sentence length. Abrams and Yoon (2007) use the random assignment of felony cases to public defenders in Las Vegas to study the effect of attorney ability on case outcomes.

yields significant evidence that all white juries (i) acquit white defendants far more often than juries with one black member and (ii) are much more favorable to white versus black defendants. Overall, our analysis provides clear evidence that the application of justice in Sarasota County is wildly uneven, with even small changes in the composition of the jury pool resulting in sizeable changes in trial outcomes.

To formally test for racial discrimination on the part of juries, we apply the rank-order test of Anwar and Fang (2006) described above. Given that trials with all-white jury pools result in *higher* conviction rates for black defendants and *lower* conviction rates for whites relative to jury pools with at least one black potential juror, the data clearly violate the rank-order condition that should hold in the absence of discrimination. Statistically, the results imply roughly an 86 percent probability that the rank-order condition is violated, which also serves as a lower bound on the likelihood of discrimination on the basis of the defendant's race.[6] Importantly, the Anwar-Fang test does not provide direct evidence on the direction of discrimination, as a violation can occur for four reasons: because all-white juries convict blacks too often or whites not often enough or because mixed-race juries convict whites too often or blacks too infrequently.

Given the substantial impact of the racial composition of the jury pool on trial outcomes, two aspects of the data related to jury selection and trial outcomes may at first seem surprising. First, blacks and whites in the jury pool are about equally likely to be seated on the jury. Second, in the subset of trials where blacks are present in the jury pool, trial outcomes are more favorable to black versus white defendants regardless of whether a black juror is actually seated. To make sense of these empirical facts as well as the key results discussed above, we close the paper by introducing a simple model of jury selection and decision-making in which heterogeneous black and white potential jurors are drawn from distributions that characterize the standard of evidence they use in cases involving white and blacks defendants. We show that such a model can qualitatively fit all of the empirical regularities observed in Sarasota County jury trials if standards of evidence required for conviction are sufficiently heterogeneous

[6]Importantly, a violation of the Anwar-Fang rank-order condition is a sufficient but not necessary implication of discrimination. Thus, the statistical likelihood that the rank-order condition is violated provides a lower bound, and probably not a very tight one, on the likelihood that juries are discriminating on the basis of defendant race.

within race and black jurors use a more demanding standard of evidence than white jurors to convict black defendants, on average, and white jurors are more lenient than black jurors in cases involving white defendants. We remain unable to tell whether black or white (or both) jurors apply different absolute standards to black and white defendants, respectively.

The remainder of the paper proceeds as follows. Section 2 provides background information on jury selection in the United States, jury trials in Florida, and relevant literature, while Section 3 describes the data. In Section 4, we document the effect of jury racial composition on conviction rates for black and white defendants. Section 5 presents the results of the rank order test of discrimination and Section 6 interprets our main findings in the context of a number of additional empirical regularities. Section 7 presents a simple model of the jury selection and decision-making process, along with simulation results. Section 8 concludes.

2. The Jury Trial

Overview of the Jury Selection Process

The jury trial is a prominent part of the U.S. justice system. Hannaford-Agor et al. (2007) estimate that there are 154,000 jury trials per year in the U.S., 66 percent of which are criminal trials. They also estimate that 32 million people are summoned each year for jury service and that 1.5 million jurors are impaneled each year.

While many details are determined at the state level, the core elements of jury selection are fairly standard across jurisdictions. Each jurisdiction has a master jury list, a list of individuals that are considered to be potential jurors.[7] Eligibility criteria for jury service are also fairly consistent across states: an individual must be a U.S. citizen, a resident of the geographic jurisdiction served by the court, able to speak/understand English, and not under a legal disability (felony conviction or incompetence) (Rottman and Strickland, 2006). Individuals from the master jury list are randomly selected to receive a

[7] Nineteen states use a combined list of registered voters and licensed drivers (Hannaford-Agor, Mize, and Waters, 2007).

summons for jury service, which requests that the individual appear at the courthouse on a given date for jury selection (voir dire).

To give a brief overview of the process, let us suppose that 100 individuals receive a summons to appear (and that they actually do appear) on a given day. For simplicity, assume that the jury for just one trial is to be chosen. Of the 100 potential jurors, 30 are called into the courtroom to be in the venire, i.e. the actual pool of jurors from which the jury is chosen. The prosecutor and defense attorneys (or the judge, depending on the state) then ask the potential jurors a series of questions, which are designed to determine whether the individual is fit to serve as an impartial member of the jury. Some individuals are simply excused from service, perhaps because of a medical condition. Other individuals are removed for cause by the judge because they cannot be impartial or follow the law; for instance, they may have a personal relationship with the defendant or state that they are unwilling to impose a particular punishment, like the death penalty. Both prosecutor and defense attorneys can request a removal for cause, and there is generally no limit to the amount of such requests.

Finally, both the prosecutor and defense attorneys have the option to use peremptory challenges to strike potential jurors from the jury. Such challenges are differentiated from removals for cause in that the attorneys do not have to state the reason for the strike and there are a limited number of peremptory challenges available to both the prosecution and defense.[8] Though the attorneys do not have to provide a reason for dismissing a juror, a peremptory challenge cannot be used to strike a juror solely on the basis of race or gender.[9] Numerous studies, however, indicate that the use of the peremptory challenge is not race neutral; rather, they often find that prosecutors are more likely to strike black venire members and defense attorneys are more likely to strike white venire members (Diamond et. al., 2009; Baldus et. al,

[8] The number of challenges allocated to both sides depends on the state and type of trial (criminal or civil, felony or misdemeanor, capital or non-capital); in some states, the prosecution and defense are allotted different numbers of strikes.

[9] The Supreme Court first confronted the issue of race-based peremptory challenges in 1965 in *Swain v. Alabama*, in which they ruled that the "State's purposeful or deliberate denial to Negroes on account of race of participation as jurors in the administration of justice violates the Equal Protection Clause". However, the burden of proof on the defendant of such bias was very high, as they had to show that there was a systematic striking of black jurors in the whole county, and not just in their own case. *Batson v. Kentucky* (1986) significantly lessened the burden of proof on the defendant, as they now could rely on the record only in their own case.

2001; McGonigle, Becka, LaFleur, and Wyatt, 2005; Rose, 1999; Sommers and Norton, 2007; Turner, Lovell, Young and Denny, 1986).[10] Though race appears to play a role in both prosecutor's and defense's use of peremptory challenges, studies have also shown that these opposing challenges cancel each other out, in the sense that there is no overall effect on the racial composition of the jury (Diamond et. al., 2009 and Rose, 1999). Importantly, however, even without affecting the number of seated jurors of each race, the use of peremptory challenges may affect trial outcomes by altering the attributes (potentially unobserved in the data) of the seated jurors of each race.

If jury selection begins with a pool of 30 individuals, potential jurors are interviewed in sequence and potentially excused, removed for cause, or struck via the peremptory challenge. Those who survive voir dire make up the jury, the size of which depends on the jurisdiction and type of trial. Historically, juries were composed of 12 individuals; 12-member juries are still used in many states and especially in serious criminal trials. In part to reduce court costs, however, many states now use smaller juries (6-8 jurors) for civil trials and less serious criminal trials (Hannaford-Agor, 2009; Waters, 2004). In addition, one or two alternates are often chosen at this time (through the same set of questioning and dismissing procedures).

Jury Trials in Sarasota County, Florida

In Florida, circuit courts have jurisdiction over felonies, family law matters, civil cases of over $15,000, probate/guardianship/mental health, and juvenile dependency and delinquency. County courts have jurisdiction over misdemeanors, small claims (up to $5,000), civil cases of $15,000 and less, and

[10] Baldus et. al. (2001) provides anecdotal evidence that race plays a role in jury selection. He describes a 1986 attorney training video created by Philadelphia prosecutor Jack McMahon, which says that the 'best' jurors to obtain a conviction are conservative, middle class individuals of comparable intellectual ability. He says the 'worst' jurors are blacks from low-income areas who resent law enforcement and have a general tendency to resist authority. He also says that prosecutors should particularly avoid black female jurors, but that older black men were less problematic. Additional anecdotal evidence is provided by Stevenson and Friedman (1994), who describe the trial of Albert Jefferson in Alabama. The prosecutor exercised his discretionary challenges against 24 of the 26 African Americans among the prospective jurors, resulting in an all white jury. Long after the trial, the defense discovered the prosecution's juror ranking system: strong, medium, weak, and black (the least desirable category).

traffic offenses. We will be studying felony jury trials in Sarasota County and hence are using data from a circuit court (i.e., Sarasota County Circuit Court).

Chapter 913 of The 2009 Florida Status provides details about the jury trial in Florida. First, all non-capital cases have 6-person juries with 0-2 alternates; capital cases have 12-person juries. Second, the state and the defendant are both allocated equal numbers of peremptory challenges, which depend on the type of offense. If the offense is punishable by death or life imprisonment, then there are ten challenges; if the offense is punishable by imprisonment of more than 12 months, then there are six challenges; for all other offenses, there are three challenges.

We obtained the following details specific to jury trials in Sarasota County Circuit Court from the Court's website and communications with an administrator of the court.[11] Sarasota County uses one source list, driver's licenses from the Department of Highway Safety and Motor Vehicles, to compile the master jury list. A jury management software program randomly chooses individuals from this master list to receive a summons requesting that they appear at the courthouse on a particular date. Some individuals who receive a summons are eligible for an automatic exemption and need not appear in court.[12] The eligibility criteria (also listed on the website) are in line with those described in the general overview in the previous section. Perhaps of particular relevance for this jurisdiction, however, is the fact that individuals are only eligible for jury duty if they are a legal resident of the State of Florida and Sarasota County and they possess a valid Florida driver's license or identification card. Thus, individuals who are permanent residents of other states, such as Illinois or New York, but spend the winter months in Sarasota County, Florida would not be eligible for jury duty.[13] Thus, while there is potentially seasonal variation in the composition of the population in Sarasota County, Florida, this seasonal variation should not affect the composition of the jury pool or jury.

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[11] http://www.sarasotaclerk.com/default.asp?Page=68

[12] Individuals can be automatically excused if: (i) they are an expectant mother, (ii) they are a parent who is not employed full time and has custody of a child under 6, (iii) they are a full time law enforcement officer, (iv) they served as a juror in Sarasota county in the last 365 days, (v) they are responsible for the care of another who is incapable of caring for himself, or (vi) they are 70 or older and wish not to report (at this time or permanently).

[13] In fact, if they do not have a Florida driver's license, their names will not even appear on the master list.

Individuals who do not excuse themselves for the reasons stated above and who are eligible to serve check-in on the date summoned; upon check-in, they are entered into the jury management software program. From the sample of checked-in individuals, this software randomly chooses individuals to participate in a particular panel. An administrator for the courts calls these individuals out by name (as opposed to a number in some jurisdictions). It is important to note that the jury management software program only utilizes data about jurors and does not have information about the defendants or case characteristics. Individuals whose names are called out enter the courtroom to participate in voir dire, during which questioning is done by both the attorneys (defense and prosecution) and the judge.[14]

Literature Review

The majority of the literature that has examined the impact of jury composition on trial outcomes has used mock jury trials. Participants or "mock jurors" hear a condensed version of a trial, typically a one-page write-up of a court case and are asked individually whether they want to convict or acquit the defendant. These studies test for discrimination by keeping the summary of the case the same, but varying the race of the defendant.

Sommers (2007) provides a recent review of this literature and notes that the findings from these studies are mixed. Some studies (McGuire and Bermant, 1977 and Skolnick and Shaw, 1997) find that the defendant's race does not have a consistent effect on white jurors; others (McGowen and King, 1982, and Poulson, 1990) find that white jurors treat white versus non-white defendants more severely; and still others show the exact opposite (DeSantis and Kayson, 1997; Hymes et. al., 1993; Klein and Creech, 1982). Sommers (2007) highlights the fact that there is very little research that looks at whether black and white jurors are differentially affected by a defendant's race. One exception, Skolnick and Shaw (1997), finds that white mock jurors rendered comparable decisions for black and white defendants while

[14] Details about compensation are also available on the website. Jurors whose employers continue to pay them during jury service do not receive any additional compensation from the courts for the first three days of service. Jurors who are unemployed (or whose employers do not pay them while they are serving) receive $15.00 per day for the first three days. After three days of service, all jurors are paid $30.00 per day.

black mock jurors are more likely to convict white defendants. In contrast, Bernard (1979) found that white jurors showed less compassion, particularly towards black defendants, and that black jurors as a whole were more likely to acquit, regardless of race.

Several studies by Sommers (2002, 2006) examine the difference in behavior of diverse versus homogenous juries. In these studies, Sommers created mock juries using jury eligible citizens for a rape trial with a black defendant and varied the racial composition of the jury. He found that the racial composition of the jury influenced both the content and scope of the discussions between the jurors: compared to all white juries, racially mixed juries tended to deliberate longer, discuss more case facts, and raise more questions about what was missing from the trials. Diverse juries were also more likely to discuss race issues, such as profiling, during deliberations, with white jurors often raising these issues. Finally, he found that white jurors on racially mixed juries were less likely to vote to convict than white jurors on all white juries, even when the vote was taken before the deliberations occurred. This implies that white jurors can behave quite differently when they are seated with other whites versus when they are seated with black jurors. Consistent with this, Hans and Vidmar (1982) suggest that a diverse jury composition motivates whites to avoid the appearance of bias.

The main drawback to these mock jury trials is their external validity. Of particular concern is the fact that most of these mock jurors are white college students with trial conditions and stakes that are much lower than those in a real criminal trial. Moreover, in the vast majority of studies, individuals reach their decision in isolation, quite unlike actual jury deliberations where jurors must deliberate collectively and reach a unanimous verdict. Furthermore, the role of race may be much less central in mock trials, where the defendant's race is simply noted when compared to an actual trial in which the defendant is seated in the same room as the jury.

A small handful of studies have used data from actual trials to examine the correlation of jury composition and trial outcomes. Bowers et al. (2001) examined 340 capital trials and found that the greater the proportion of whites to blacks on the jury, the more likely a black defendant was to be sentenced to death, especially when the victim was white. Daudistel et al. (1999) find similar results for

317 non-felony juries in Texas comprised of whites and Latinos.[15] The main limitation of all of the previous studies that use data from actual trials is that the conclusions are based entirely on the correlation between jury composition and trial outcomes and, therefore, subject to serious concerns related to the non-random jury selection process.

3. Data

Description of Sarasota County Jury Data

The dataset for our analysis was provided by the office of the Clerk of the Sarasota County Circuit Court and contains information on all felony trials for which jury selection began between January 1, 2004 and June 1, 2009. Note that because of the (oftentimes long) lag between the date at which an offense is filed with the courts and the date at which a verdict is rendered, our data set contains trials for offenses dating as far back as 1999. For each trial, we have data for both the defendant and the jury.

The defendant data includes the name, race, and gender of the defendant as well information about the charged offenses, including a detailed crime code, the date that the offense was filed, the date that the judgment was handed down, and the verdict. For our main analysis, we restrict our sample to trials in which at least one of the charged offenses resulted in a verdict of guilty, not guilty, or not guilty by reason of insanity.[16] The jury data includes the name, date of birth, gender, and race of each individual in the jury pool as well as whether or not they were seated. The inclusion of the race of each jury member, let alone each member of the jury pool, makes this dataset particularly unique.[17] Unfortunately, we do not

[15] Also of note, Lee (2009) finds evidence that states that switched from key-man jury selection procedures to more random selection procedures saw a resulting drop in the share of new admissions to prison accounted for by non-whites and infers that having more blacks on the jury resulted in blacks being less likely to be convicted. In addition to the possibility that other unrelated factors (changes in the criminal behavior of whites versus non-whites over this period) had an effect on new prison admissions, it is impossible to tell whether Lee's result is obtained simply because black and white jurors use different standards for all defendants or discriminate on the basis of defendant race.

[16] Charges for which the verdict was neither guilty nor not guilty had the following possible outcomes: dropped, Noelle prosequi, filed, dismissed due to speedy trial, dismissed with no reason given, consolidated, adjudication withheld by judge and unable to stand trial.

[17] Few courts maintain records that identify the race of each jury member and even fewer identify the race of the jury pool member; in fact, many do not even keep records of who was on the jury pool. To obtain the data used in

know the reason for which members of the jury pool may not have been seated: not questioned, excused, challenged for cause, or peremptory challenge. Nor do we know which party (prosecution or defense) dismissed them. Finally, we also know the judge who presided over jury selection and the date that jury selection began.

Since all felony trials in Florida other than capital trials have six-member juries, we exclude the seven capital trials during this time period from our analysis. We also exclude the one trial in which just five jurors appear to have been seated. We are left with a dataset of 401 felony jury trials, which have 6-8 jurors seated. In each trial, there are six jurors and zero, one, or two alternates; we cannot distinguish the alternates from the seated members of the jury.

Summary Statistics

Table 1 presents descriptive statistics for both the defendant and jury variables for all 401 felony trials broken down by the race and ethnicity of the defendant (e.g. black, white, or Hispanic). 38 percent of the defendants are black and 55 percent are white. The average number of charges is 2.55. We categorize offenses as murder (non-capital), robbery, other violent offenses, property offenses, drug offenses, sex offenses, weapons offenses, and other offenses. Overall, the most common crime categories are other offenses (33 percent) and drug offenses (28 percent). Just 2.7 percent of defendants are charged with murder and 8 percent for weapons and robbery. There are some differences in the distribution of crime types across defendant race: 44 percent of black defendants have at least one drug charge compared with 16 percent of white defendants. In contrast, 7.2 percent of black defendants are charged with a sex offense compared to 18.1 percent of white defendants.

We consider two possible outcome measures or verdicts: whether the defendant was found guilty of the first (most serious) offense and the percent of the first five offenses for which the defendant was

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this paper, we sent data request letters to every felony court in fifteen states: Maryland, Pennsylvania, Arizona, California, Connecticut, Florida, Georgia, Illinois, Massachusetts, New Jersey, New York, North Carolina, Texas, Virginia, and Washington.

found guilty. 81 percent of black defendants and 74 percent of white defendants were convicted of their most serious offense.[18]

On average, seated juries have seven members (85 percent of the juries have one alternate and 4 percent have two alternates) drawn from jury pools with 27 individuals. The average composition of the seated jury is 54 percent female, 20 percent age 40 or younger, and 50 percent between the ages of 40 and 60. These statistics are fairly constant across defendant race.

Table 2 shows how the number of black jurors in the jury pool and the seated jury varies with the race of the defendant. The average proportion of blacks in the jury pool is 2.8 percent and on seated juries is 3.1 percent, implying that blacks are seated in proportion to their presence in the jury pool. The small fraction of black jurors is not surprising given that the population of Sarasota County, Florida was 4.8 percent in 2008.[19] There are no blacks in the entire jury pool 48 percent of the time and just a single black member of the pool 35 percent of the time. Seated juries (including alternates) include no blacks in roughly five out of six trials and we observe two blacks on the jury in only six of the 401 trials in the sample.

Table 3 examines whether variation in the demographic composition of the jury pool across trials is uncorrelated with defendant and case characteristics, consistent with the notion that the jury pool varies quasi-randomly from trial to trial. Specifically, we regress a particular demographic characteristic, such as the proportion of black jurors in the pool, on several observable defendant and case characteristics.[20] If the jury pool were truly randomly assigned to cases, the regression coefficients should be close to zero and statistically insignificant. This is essentially what we find, as just six of the 84 coefficients presented

[18] Note that in a handful of cases the first offense does not result in either a guilty or not guilty verdict but the second or higher offenses do. Thus, as will be seen in the regressions, there are a few cases in which the first offense variable is not defined but the conviction rate for the first five offenses is.

[19] Fukurai, Butler, and Booth (1991) and Sommers (2008) suggest numerous reasons that the jury pool is disproportionately less black than the population, including: (i) many blacks are disqualified because of criminal records, (ii) master lists are based on driver licenses and voter registration lists, which are disproportionately nonblack, (iii) blacks are less likely respond to a summons because they mistrust the judicial system, and (iv) source lists are often not updated as often as they should be, which could result in mobile citizens (renters) being difficult to reach.

[20] Note that two cases are dropped from these regressions due to incomplete charge information.

in this table are statistically significant at the 5 percent level, and, of special concern for our analysis, none of the defendant and case characteristics are significantly related to the racial composition of the jury pool (see columns (1) – (3)). While these regressions cannot rule out the possibility that the composition of the jury pool is related to attributes of the defendant or case that are unobserved to us, they suggest that this should not be a major concern. These results are also consistent with the jury management software randomly choosing potential jurors from the master list to receive summons for jury duty.

4. The Effect of Jury Racial Composition on Conviction Rates

In this section, we estimate the impact of jury racial composition on conviction rates for white and black defendants. Table 4 presents cross-tabulations that show how conviction rates vary with the number of blacks *in the jury pool*.[21] When there are no blacks in the pool, black defendants are significantly more likely than whites to be convicted of their most serious crime (86 percent for blacks versus 70 percent for whites). However, as the number of blacks in the pool increases, this differential first goes away and then reverses: with exactly one black member of the jury pool, conviction rates are almost identical (74 percent for blacks and 72 percent for whites) and with two or more blacks in the jury pool, conviction rates are significantly higher for white defendants (86 percent) than for black defendants (77 percent). The striking pattern revealed in these simple cross-tabulations is the central result of this paper.

The first column of Table 5 expresses these results in regression form: regressing an indicator for whether the defendant was convicted of the most serious crime on an indicator for whether the defendant is black, the proportion of black jurors in the pool, and the interaction of these two variables. The coefficient on each of these three variables is statistically significant at the five percent level, leading to three key conclusions: (i) all-white jury pools result in higher convictions rates for black versus white defendants, (ii) all-white jury pools result in lower conviction rates for white defendants than pools with

[21] Recall that, on average, jury pools include 27 individuals.

at least one black juror and (iii) when compared to mixed race jury pools, all-white jury pools result in significantly worse outcomes for black defendants relative to their white counterparts.[22] Taken together, these conclusions imply that the application of criminal justice in Sarasota County is wildly uneven, as even small changes in the jury pool have large effects on trial outcomes for both white and black defendants.

These three key conclusions are extremely robust to a variety of specification changes. First, the same pattern of results holds in the specification shown in column (2) of Table 5, which uses the percent of the first five offenses that resulted in a conviction as the dependent variable.[23] Additional robustness checks are presented in Table 7. Row (1) of Table 7 shows the baseline results, i.e. when there are no additional controls and the dependent variable is a conviction of the most serious offense. The remaining rows show how these regression coefficients change when additional control variables are added as regressors. Rows (2) and (3) add year and month dummies, respectively, to address the possibility that there have been trends in crime patterns or convictions rates over time or that there is seasonality in the characteristics of crimes, defendants, or the composition of the jury. Row (4) adds defendant and case characteristics while row (5) controls for judge dummies.[24] We also estimate specifications where verdicts that did not end in guilty or not guilty were treated as guilty as opposed to being dropped (see row (6)), and where the racial composition of the jury is measured as an indicator of whether there was at least one black juror in the pool (see Row (7)). Rows (8) – (13) present these same robustness tests when the dependent variable is the proportion of the first five offenses that resulted in a conviction. No matter how the model is specified, the regression results, and thus the central conclusions of the paper, are qualitatively identical.

[22] Panel A of Table 6 shows what the estimated coefficients imply about the conviction rate of white and black defendants for jury pools of 27 whites, 26 whites and 1 black, and 25 whites and two blacks, respectively. The results essentially mirror the crossing pattern revealed in the simple cross-tabulations presented in Table 4.
[23] Note that the difference in the number of observations between columns (1) and (2) arises as a result of a handful of first offenses not resulting in either a guilty or not guilty verdict.
[24] Note that judge identifiers were missing in three of these cases.

Columns (3) – (6) of Table 5 examine how the conviction rates of white and black defendants are related to the proportion of blacks on the *seated jury*. Columns (3) and (4) show the results from specifications estimated by OLS and Columns (5) and (6) show the results from an IV specification that uses the proportion of blacks in the jury pool as an instrument for the proportion of blacks on the seated jury.[25] The IV specification accounts for the endogeneity of the racial composition of the jury, which arises due to the non-random nature of the jury selection process.[26]

We return to a more complete discussion of the OLS results in Section 6 below and for now focus on the IV specifications. To get a sense of the magnitude of the results, Panel B of Table 6 compares the implied average conviction rates from the specification reported in Column (5) of Table 5 for all-white seated juries and mixed-race juries consisting of six whites and one black. Mirroring the reduced form results, the conviction rates for white and black defendants reverse when moving from an all-white jury to a jury with one black member. White conviction rates rise from 68 percent to nearly 100 percent, while black conviction rates fall from 84 percent to 71 percent. In interpreting these findings, it is important to keep in mind that it would take roughly four blacks in the jury pool to shift the likelihood of a black member being on the seated jury to one.[27] Since exactly one trial in the sample has four or more blacks in the jury pool, a shift of this size is essentially outside the data. Instead the main variation in the data is between 0, 1 and 2 blacks in the jury pool and thus the magnitude of the IV effect is really identified by quasi-random movements of approximately 0.25 or 0.5 blacks on the seated jury. In any event, the magnitudes of the effect of jury composition on trial outcomes for both black and white defendants estimated here are substantial.

[25] The proportion of blacks seated on the jury is instrumented by the proportion of blacks in the jury pool for both the actual variable and for the interaction term. The F-statistic associated with the first stage regression for the proportion of the seated jury that is black is 43.38.

[26] The instrumental variable also deals with the measurement error problem that arises as a result of not being able to explicitly identify the alternate juror(s).

[27] Table 2 shows that when there is one black juror in the pool, they get on the seated jury 26 percent of the time. This implies we need to increase the number of blacks in the pool by about four to ensure one additional black gets seated.

5. Testing for Discrimination

Having presented the key empirical findings in Section 4, we now seek to test whether the decision making process of juries exhibits racial prejudice. The fundamental difficulty in testing for discrimination is that black and white defendants in our data are likely to differ in unobserved ways, which means a valid test for discrimination cannot rely on a simple comparison of the relative conviction rates for blacks and whites. To get around this omitted variables problem, we use the rank order test developed in Anwar and Fang (2006).

To implement the rank order test, we must make a couple of important assumptions regarding the nature of the evidence presented in the trial and decision-making by juries. In particular, we first assume the strength of evidence against a particular defendant can be summarized in a single dimensional index. We also assume juries will require a particular standard of evidence to convict such that if the strength of evidence against a particular defendant is higher than this threshold, the jury will convict; if the strength of evidence against the defendant is below this threshold, the jury will acquit.[28] Mixed juries and all-white juries might have different absolute thresholds and thus might have different average conviction rates. Racial prejudice (discrimination) occurs if a given jury uses a different threshold for white versus black defendants.

The Anwar-Fang test is based on an important theoretical insight that follows from the above modeling assumptions.[29] Specifically, in the absence of racial discrimination, a jury that holds a lower threshold should convict both black and white defendants more on average than a jury with a higher threshold.[30] Put another way, different types of juries should convict defendants of each race in the same *rank order*. A violation of this rank order condition is thus a rejection of the absence of racial discrimination. In this way, our finding that mixed race juries convict white defendants more often *and*

[28] In Section 7, we discuss how a particular jury forms their threshold for conviction. The only thing relevant to the current discussion is that juries do indeed have a threshold.

[29] Anwar and Fang (2006) formally show why this result can only occur if racial prejudice is present. In the discussion that follows, we will explain how the test works at a more intuitive level.

[30] Note that because juries are randomly assigned to cases, all juries face the same black defendants and the same white defendants in expectation.

black defendants less often than all-white juries implies a substantial statistical likelihood that juries discriminate on the basis of the defendant's race.

Two limitations of the Anwar-Fang test are important to point out. First, while a violation of the rank order condition allows one to conclude that racial discrimination occurs, it does not distinguish the direction of the discrimination. That is, it is possible that all-white juries favor white defendants over black defendants, that mixed race juries favor black defendants over their white counterparts, or both. Second, a rank-order violation is a sufficient but not necessary implication of discrimination. As such, the Anwar-Fang test has low power to detect discrimination. Put another way, the estimated statistical likelihood that the rank-order condition is violated serves only as a lower bound, and possibly not a very tight one, on the likelihood that juries discriminate on the basis of the defendant's race.

To implement the Anwar-Fang test, we can use either the reduced form results presented in column (1) of Table 5 or the IV specification presented in column (5); the results are almost identical either way. Focusing on the reduced-form specification, the estimated coefficients on the variables involving the composition of the jury pool imply an 86 percent likelihood that the rank-order condition is violated.[31] Thus, under the maintained modeling assumptions, we can conclude that the probability of discrimination on the basis of defendant's race is at least this great.

6. Interpreting Our Main Results

[31] To find the significance level, we first run the following regression separately for black and white defendants:

$$\text{foff\_guilty} = \beta_0 + \beta_1 * \text{prop\_black}.$$

Define B as the β_1 coefficient for black defendants and W as the β_1 coefficient for white defendants. The significance level of the rank order test is just the probability that the signs actually do not switch between groups. Assuming independence between black and white defendants, this can be calculated as:

$$P(\text{signs don't switch}) = P(B>0)*P(W>0) + P(B<0)*P(W<0)$$

To find these probabilities, we use the p-values from a sequence of one-tail tests on the β_1 coefficient. For black defendants, we obtain a test statistic of -1.18. This implies P(B>0)=.123 and P(B<0)=.877. For white defendants, we obtain a test statistic of 1.98, which implies P(W>0)= .9767 and P(W<0)=.023. This results in P(signs don't switch) = .14.

The main findings presented in Section 4 above imply that the racial composition of the jury pool, and apparently the seated jury, has a substantial impact on conviction rates for black and white defendants. Given this finding, the fact that blacks in the jury pool are seated on the jury at an almost identical rate to whites in the pool may seem puzzling at first glance. If, for example, all potential jurors of a given race required identical (homogeneous) standards of evidence, it would make sense for the prosecution to use its peremptory challenges to strike potential black jurors when the defendant is black and for the defense to strike all potential black jurors when the defendant is white. Given the small numbers of blacks in the jury pool, it would be possible for the attorneys to strike all of the potential black jurors fairly easily. Thus, the fact that black jurors are seated as often as they are suggests that standards of evidence are in fact heterogeneous within race – i.e., that black and white potential jurors begin a case with a range of likelihoods of ultimately convicting the defendant. If the attorneys can distinguish between potential jurors with high versus low probabilities of conviction, they will tend to use their peremptory challenges to dismiss potential jurors in the tail of the distribution most unfavorable to their own side, and both white and black jurors requiring more middling standards of evidence for conviction will be seated.

This last point has two important implications regarding the interpretation of the OLS and IV specifications presented in columns (3) and (5) of Table 5. First, if the members of the jury pool that make it through voir dire to be seated are those with the least extreme standards for conviction, OLS estimates of the effect of the racial composition of the seated jury on trial outcomes will generally tend to be subject to attenuation bias, which is what we find. Second, it is important to be extremely careful in interpreting the IV results, as adding a potential black juror to the pool can have either a *direct* or *indirect* effect on the outcome of the trial depending on whether the juror is seated. If seated, a black member of the jury pool has a direct effect by changing the composition of the jury. If instead one of the attorneys uses a peremptory challenge to strike the potential black juror, that attorney will have one fewer challenge to use in striking other potentially extreme jurors, thereby shifting the composition of the seated jury indirectly.

We can get a sense of the relative sizes of the direct (if seated) and indirect (if struck) effects of adding a black potential juror to the pool by examining how trial outcomes vary with the composition of both the jury pool and seated jury. Column 2 of Table 8 reports the coefficient estimates of an OLS regression that includes controls for both the racial composition of the pool and the seated jury simultaneously; Column 1 repeats the corresponding baseline results from Table 5. In this specification, the coefficients on the proportion of black jurors in the pool are almost identical to the baseline results, and the coefficients on the proportion of black jurors seated are essentially zero (although these are imprecisely measured). Thus, the effect of an additional black member in the jury pool is nearly identical regardless of whether the potential black juror is seated, for both white and black defendants.

7. A Simple Model of Jury Selection and Decision Making

We close the paper by introducing a simple model of the jury selection and decision-making processes. The goal of this section is to see whether a relatively simple model of these processes can reconcile the qualitative pattern of the full set of empirical regularities documented above. In particular, for cases involving white and black defendants respectively, we use Monte Carlo simulations to pin down distributions of standards of evidence for white and black jurors that can explain: (i) the observed conviction rates for an all white jury pool, (ii) the observed conviction rates when the jury pool includes a single black member, (iii) the rate at which black potential jurors are seated, and (iv) the fact that the effect of adding a black member to the jury pool is nearly identical whether or not he or she is actually seated.

We continue to assume that the strength of evidence against defendants can be summarized by a one-dimensional index and that each juror has his or her own individual threshold such that if the index of guilt for a defendant exceeds this threshold, the juror votes to convict. While there are typically twenty-seven members in the jury pool in the data, we assume that only the first thirteen of these are actually interviewed by the attorneys in our simulations. We assume that the prosecution and defense can perfectly

observe the strength of evidence required by each potential juror to convict and both attorneys strike the three jurors most unfavorable to their side via peremptory challenges.[32, 33]

Consider a case in which a white defendant is on trial. The following diagram shows a situation where the thirteen jurors' propensities to convict are relatively spread out:

```
|---x---x---x---x---x---x---x---x---x---x---x---x---|
0%                    50%                    100%
```

Each *x* on the diagram corresponds to the particular percentage of white defendants an individual juror would convict. For example, a juror that has a propensity of 0 percent requires such a strong amount of evidence to convict that they would end up not convicting any white defendants. A juror with a propensity of 50 percent requires a certain standard of evidence to convict such that, if white defendants were ordered from lowest to highest according to the strength of evidence against them, the juror would convict the upper 50th percentile.[34] Each juror's propensity to convict a white defendant is a random draw from a distribution that is race-specific.

The prosecution uses their strikes on the three jurors that are least likely to convict, shown as o's in the figure below. Likewise, the defense strikes the three jurors most likely to convict. The seven central-most jurors are seated:

[32] Alternatively, one could imagine that of the 27 initial members of the jury pool, 14 are excused for legitimate reasons or via challenges for cause. This leaves 13 individuals, not necessarily the first 13 individuals in the pool, subject to peremptory challenges.

[33] Although there are actually only six seated jurors in Sarasota, we use seven because it simplifies our model; the results are not sensitive to this simplification.

[34] Note that a juror's propensity to convict a white defendant is just a monotonic transformation of that juror's individual threshold. Specifically, define θ as the strength of evidence against a defendant, and $G(\theta)$ as the CDF of this distribution for white defendants. Then, if juror *j* convicts any defendant that has $\theta>\theta_j$, the proportion of white defendants juror *j* will convict (i.e., their propensity) is just $1-G(\theta_j)$. In the discussion that follows, we use propensities to convict, as opposed to thresholds, since we are ultimately trying to determine the effect of adding a black juror on conviction rates. As these monotonic transformations are defendant race-specific, we analyze the situation of adding a black juror separately for white and black defendants.

```
|---o---o---o---x---x---x---x---x---x---x---o---o---o---|
0%                                                  100%
   prosecution                                  defense
     strikes                                    strikes
```

Suppose jurors face a white defendant where the strength of evidence puts the defendant in the upper 40th percentile of the white defendant distribution. This means that any seated juror that has a propensity to convict that is 40 percent or greater will choose to convict this defendant. Any seated juror with a propensity to convict that is less than 40 percent will choose to acquit this defendant. The following diagram shows an example where a propensity of 40 percent lies in between the 3rd and 4th seated juror:

```
                  A  A  A | C  C  C  C
|---x---x---x---x---x---x---x---x---x---x---x---x---x---|
0%                        |                        100%
                        40%
```

This results in three jurors voting to acquit the defendant and four jurors voting to convict the defendant.

During the deliberation process, the seven jurors must form a unanimous verdict from their individual decisions. Previous literature speaks to how these unanimous decisions are formed. Specifically, Kalvin and Ziesel (1966) find evidence of a majority effect: whatever the majority position is at the beginning of deliberations predicted the eventual verdict 90% of the time. Subsequent literature has continued to substantiate this (see Hastie, Penrod, and Pennington, 1983, and Sandys and Dillehay, 1995). We incorporate this majority effect into our model by assuming that whatever position (acquittal or conviction) is in the majority becomes the eventual unanimous verdict. Thus, in the example above, where four of the seven jurors vote to convict, the eventual unanimous decision is a conviction.[35] Note that implementing the majority effect implies the median juror is the deciding factor.

[35] To avoid a hung jury there is considerable social pressure for jurors in the minority position to switch to the majority (Overland, 2009). We assume that jurors that switch to the majority do not change their threshold nor does the strength of evidence against the defendant change. Instead, jurors simply vote against their personal preference out of social pressure.

Within the context of this model, we can now examine the effect of going from an all-white pool of thirteen white jurors to a mixed pool with twelve white jurors and one black juror. The following diagram shows the effect of replacing the left-most white juror with a black juror that comes in to the right of the median white juror:

```
|-----W----W---W---W---W---W---W---W---W---W---W---W--W---W--|
 0%                                                          100%

|------------W---W---W---W---W---W---W---W---W--W-B-W--W--|
0%                                                          100%
```

One can see that this replacement shifts the median juror to the right, increasing the conviction rate for white defendants. If the black distribution lies almost completely above the median of the white distribution, replacing a random white juror with a black juror essentially shifts the decisive juror from the 7th juror out of 13 to the 7th juror out of 12 randomly drawn whites jurors.

Given appropriate choices for the distributions of conviction rates for white and black jurors, this simple model of jury selection and decision-making can be used to replicate the empirical regularities observed in the data. First, in order for conviction rates to increase in response to adding a black juror to the extent we see in the data, the distribution of black juror conviction rates must lie towards the upper tail of the white juror distribution. Second, in order for black members of the jury pool to be seated about as often as whites, the black distribution must have significant overlap with at least the upper half of the

---

We suspect this to happen relatively rarely in Sarasota, though, unfortunately, we cannot explicitly identify hung juries in our dataset. The National Center for State Courts conducted a survey of hung jury rates using felony case data from all federal courts and 30 state courts in 75 of the most populous counties (Hannaford-Agor et. al. 2002). The NCSC project found that state courts in large urban areas had an average hung jury rate of 6.2%, with substantial variation across courts, ranging from a low of .1% in Pierce County, Washington to a high of 14.8% in Los Angeles County, California. Federal hung jury rates were found to be particularly low, averaging about 2% of all federal jury trials: federal civil trials had lower rates than federal criminal trials. One possible explanation for the low hung jury rate in civil trials is the fact that civil juries typically have just 6 members while many courts have 12 jury members for a felony trial. Given that Sarasota non-capital felony trials have 6-member juries, we would expect the hung jury rate in Sarasota to be on the low end of the spectrum.

white distribution. Third, in order for the presence of a black juror in the pool to have the same effect on conviction rates regardless of whether they are actually seated, the vast majority of the black distribution must lie above the median white potential juror. In the diagram above, the black juror is too extreme to be seated. However, consider the situation where the black juror comes in between the 9th and 10th white jurors:

```
|---W---W---W---W---W---W---W---W---W---W---W---W---W---|
0%                                                      100%

|---------W---W---W---W---W---W---W---W--W-B-W--W---W---W---|
0%                                                      100%
```

In this situation, the black juror will be seated, but the effect on conviction rates is exactly the same. Finally, because the effect of adding a black juror to the pool is essentially to shift the median juror from the 7th white juror of 13 to the 7th out of 12, the distribution of white juror standards must be reasonably spread out in order to explain the large changes in conviction rates observed in the data.

Similar reasoning for the case of black defendants suggests that again the distribution of standards among white jurors needs to reasonably spread out and that the majority of the distribution for black jurors must overlap the lower tail of the white juror distribution. Again, the distributions for white and black jurors also need to overlap sufficiently to ensure that black jurors are seated reasonably often when they are in the pool.

Simulation Results[36]

[36] The actual data are drawn from a heterogeneous set of trials in which attorneys have between three and six peremptory strikes each and the average size of the jury pool is twenty-seven. Rather than attempt to conduct separate simulations for each possible trial environment, we focus on a single set of simulations that characterize the effect of adding a black juror with certainty to a jury pool of thirteen in trials in which the attorneys have three peremptory challenges each. In general, we expect the effects of adding a black juror to the pool in these simulations to slightly overstate the effects observed in the data. The main purpose of including these simulations in the paper is to characterize a set of distributions of standards of evidence for jurors of each race that result in jury selection and conviction rates that fit the broad qualitative pattern observed in the data for defendants of each race.

We now parameterize the distributions of conviction rates for white and black jurors in order to fit the following empirical regularities observed in the data: the results presented in Panel A of Table 6, which imply that adding a single black juror to the pool increases the conviction rate for white defendants from 68% to 75%, and decreases the conviction rate for black defendants from 84% to 79%; potential black jurors are seated on the jury slightly more often than whites when the defendant is black and slightly less often when the defendant is white.

We assume that black and white potential jurors are drawn from truncated normal distributions over the interval between zero and one, where the draw corresponds to the proportion of a particular racial group of defendants the juror would convict.[37] If the draw from the normal distribution is less than zero, the probability of conviction is set to zero; if the draw is greater than one, the probability of conviction is set to one, resulting in mass points at zero and one.

Figure 1A shows distributions that fit the observed stylized facts well for cases involving white defendants. White jurors are drawn from a truncated normal distribution with mean 0.68 and standard deviation 0.75, while black jurors are drawn from a truncated normal distribution with mean 1.1 and standard deviation 0.3. For white potential jurors, the relatively high standard deviation results in large mass points at both zero and one and the distribution between zero and one is relatively flat, thus spreading the required standards of evidence for white jurors pretty thinly. On the other hand, the distribution for black jurors is much tighter (with a large mass point only at one) and located largely in the upper half of the white distribution.

To conduct the simulations, we first draw thirteen white jurors from the white distribution. We repeat this 10,000 times and the average of the median jurors from each run is the estimated conviction rate for white defendants when the pool is all-white. For each of these runs, we then randomly replace a white juror with a randomly drawn black juror, and record whether or not the black juror is seated. We then find the average of the median jurors drawn for this mixed jury pool, which is the conviction rate for

[37] The use of truncated normal distributions in our simulations is admittedly somewhat arbitrary, but this parameterization allows us to fit the qualitative pattern of the data reasonably well.

white defendants when there is one black juror in the pool. With the distributions given above, the conviction rate for white defendants increases from 67 percent to 73 percent in going from an all-white jury to a mixed jury pool. A random black member of the pool is seated on the jury about 80 percent as often as a random white member. This matches the data quite well as blacks are actually 87 percent as likely as whites to be seated when the defendant is white.

We compute analogous simulations for black defendants. We assume that white jurors are drawn from a truncated normal distribution with mean 0.9 and standard deviation 0.7, while black jurors are drawn from a truncated normal distribution with mean 0.45 and standard deviation 0.4. Figure 1B illustrates these distributions. Note that the bulk of the black juror distribution now lies in the lower tail of the white juror distribution. With these distributions, we find that conviction rates decline from 84 percent to 80 percent when a black juror is added to the pool. A random black member of the pool is seated about 120 percent as often as a random white member. Again this matches the data quite well – as blacks in the jury pool are about 135 percent as likely as whites to be seated when the defendant is black.[38]

It is important to note that although the above distributions for black and white jurors fit the overall results quite well, we are not asserting that this is the only explanation for the results we find. If the jury selection and/or deliberation process worked in a different manner than what was laid out in our model, other less extreme distributions might allow us to fit the data.[39] Also, while the distributions for white and black jurors described above might at first seem somewhat extreme, the plausibility of these distributions depends on what the strength of evidence distributions look like for black and white

[38] In our simulations with a black juror in the jury pool, conviction rates for both black and white defendants are similar regardless of whether the black juror is seated. For black defendants, conviction rates are 80 percent in both cases; for white defendants, the conviction rates is 76 percent when the black juror in the pool is seated and 73 percent when not.

[39] Another potential explanation for the results we see is that whites behave differently when they are in a jury pool with another black. This would result in large changes in conviction rates when one black is added to the pool. This explanation seems unlikely, however, because we have already documented that whether blacks get on the seated jury has no effect.

defendants. If these distributions are quite tight, there might in fact be a number of jurors that would be inclined to rarely convict anyone and a number that would vote to convict nearly everyone.

Finally, even if these distributions are in fact correct, we still are unable to say anything about whether it is black or white jurors that discriminate. If, on the one hand, the strength of the evidence is generally strong for cases involving white defendants and generally weak for cases involving black defendants, the conviction rates of black jurors might be correct on average and white jurors might be discriminating in favor of white defendants and against black defendants. If, on the other hand, the strength of evidence is reversed for black and white defendants, it is entirely possible that the conviction rates of white jurors are correct on average and black jurors are instead discriminating. In this way, it is generally not possible to say anything about the direction of discrimination without some sort of objective way to evaluate the evidence in each case.

8. Conclusion

This paper is the first rigorous empirical study that uses data from actual trials and a research design that deals with non-random jury selection to study the impact of jury racial composition on trial outcomes. Our dataset includes information on the race, gender and age of all individuals in both the jury pool and the seated jury and we exploit the quasi-random day-to-day variation in the jury pool to identify the effects of jury composition on trial outcomes for black and white defendants, respectively. Very few courts maintain and make available data with the necessary features to implement this empirical strategy, which likely accounts for the lack of similar studies in the existing literature.

We find direct evidence that the application of justice in Sarasota County is clearly uneven. All-white jury pools are much more favorable to white versus black defendants when compared to juries with at least one black member. Making modest further assumptions, we implement the Anwar-Fang rank order test for discrimination, concluding that, at a minimum, there is an 86 percent chance that juries discriminate on the basis of defendant's race, although we cannot determine if it is white and/or black jurors that are prejudiced.

Our findings speak to the substantial impact that variation in the composition of the jury pool can have on trial outcomes. If, for example, the jury pool in Sarasota County was 10 or 20 percent black instead of the 3 percent observed in the data, conviction rates for black defendants would be much lower and those for white defendants much higher than those observed in the data. Moreover, the resulting change in the expected jury composition for each trial might affect the set of cases that prosecutors decide to bring to trial or that defendants are willing to settle in a pre-trial plea bargain. While we are unable to draw firm conclusions about the rates of conviction that should hold objectively for the defendants observed in the data, the magnitude of the impact of small changes in racial composition on conviction rates suggests that future research in this area is badly needed to ensure that all defendants receive fair trials.

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Table 1. Summary Statistics

	All Cases		Black Defendants		White Defendants		Hispanic Defendants	
	Mean	Sd	mean	sd	mean	sd	Mean	Sd
def_black	0.382	0.486	1	0	0	0	0	0
def_hisp	0.06	0.238	0	0	0	0	1	0
def_white	0.551	0.498	0	0	1	0	0	0
def_male	0.908	0.29	0.941	0.236	0.878	0.328	0.958	0.204
Drugs	0.284	0.452	0.444	0.499	0.163	0.37	0.375	0.495
Murder	0.027	0.164	0.039	0.195	0.018	0.134	0.042	0.204
Other	0.334	0.472	0.275	0.448	0.362	0.482	0.458	0.509
other_violent	0.267	0.443	0.261	0.441	0.258	0.438	0.333	0.482
Property	0.209	0.407	0.19	0.393	0.222	0.416	0.25	0.442
Robbery	0.082	0.275	0.131	0.338	0.059	0.236	0	0
Sex	0.135	0.342	0.072	0.259	0.181	0.386	0.125	0.338
Weapons	0.082	0.275	0.118	0.323	0.068	0.252	0	0
total_charges	2.551	2.18	2.355	2.008	2.686	2.346	2.625	1.689
foff_guilty	0.776	0.417	0.808	0.395	0.739	0.44	0.913	0.288
pct_guilty	0.756	0.401	0.775	0.387	0.727	0.418	0.904	0.288
jury_seated	6.928	0.384	6.895	0.366	6.941	0.406	7	0.295
jury_pool	27.613	7.175	26.771	6.41	27.914	7.532	30.417	8.124
prop_fem_seat	0.536	0.194	0.548	0.185	0.531	0.197	0.5	0.222
prop_fem_pool	0.51	0.095	0.511	0.097	0.505	0.095	0.541	0.082
prop_young_seated	0.199	0.164	0.199	0.171	0.203	0.158	0.18	0.177
prop_young_pool	0.224	0.091	0.231	0.096	0.221	0.085	0.217	0.107
prop_middle_seated	0.502	0.188	0.506	0.19	0.502	0.192	0.477	0.139
prop_middle_pool	0.495	0.099	0.496	0.101	0.498	0.101	0.466	0.072
prop_black_seated	0.031	0.068	0.03	0.067	0.029	0.061	0.071	0.119
prop_black_pool	0.028	0.032	0.024	0.029	0.03	0.033	0.039	0.044
prop_white_seated	0.953	0.083	0.955	0.083	0.955	0.077	0.923	0.119
prop_white_pool	0.952	0.04	0.957	0.039	0.949	0.039	0.943	0.047
prop_other_seated	0.015	0.047	0.015	0.045	0.017	0.05	0.006	0.029
prop_other_pool	0.02	0.027	0.02	0.028	0.021	0.026	0.018	0.029
Anyblack_seated	0.192	0.394	0.183	0.388	0.190	0.393	0.292	0.464
N	401		153		221		24	

Table 2: Cross Tabulations of Number of Blacks in the Pool and Number Seated for Black and White Defendants

		# Blacks Seated for Black Defendants			# Blacks Seated for White Defendants			
		0	1	2	0	1	2	Total
# of Blacks in the Pool	0	81 (100%)	0 (0%)	0 (0%)	100 (100%)	0 (0%)	0 (0%)	48%
	1	35 (71%)	14 (29%)	0 (0%)	61 (75%)	20 (25%)	0 (0%)	35%
	2	8 (44%)	9 (50%)	1 (6%)	17 (52%)	15 (45%)	1 (3%)	14%
	3	1 (25%)	1 (25%)	2 (50%)	4 (50%)	3 (38%)	1 (13%)	3%
	4	0 (0%)	0 (0%)	1 (100%)	0 (0%)	2 (100%)	0 (0%)	1%

		# Blacks Seated for Black Defendants			# Blacks Seated for White Defendants			
		0	1	2	0	1	2	Total
Any Blacks in the Pool	0	81 (100%)	0 (0%)	0 (0%)	100 (100%)	0 (0%)	0 (0%)	48%
	1	44 (61%)	24 (33%)	4 (6%)	82 (66%)	40 (32%)	2 (2%)	52%

Table 3: Randomness of Jury Pool

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	prop_black pool	prop_white_ pool	prop_other_ pool	prop_fem_ pool	prop_young_ pool	prop_middle_ pool	prop_old_ pool
Defendant Characteristics							
def_black	-0.006	0.007	-0.001	-0.001	0.022**	-0.007	-0.015
	[0.004]	[0.005]	[0.003]	[0.011]	[0.011]	[0.011]	[0.011]
def_hisp	0.009	-0.007	-0.002	0.031	0.003	-0.035	0.032
	[0.007]	[0.009]	[0.006]	[0.021]	[0.020]	[0.022]	[0.022]
def_male	0	0.001	-0.002	0.007	-0.004	0.005	-0.001
	[0.006]	[0.007]	[0.005]	[0.017]	[0.016]	[0.018]	[0.017]
Case Characteristics							
drugs	0.001	0	0	0.016	-0.027*	0.007	0.02
	[0.005]	[0.006]	[0.004]	[0.014]	[0.014]	[0.015]	[0.015]
murder	0	-0.003	0.003	0.063**	-0.015	0.018	-0.003
	[0.011]	[0.013]	[0.009]	[0.031]	[0.030]	[0.033]	[0.032]
other	-0.003	0.005	-0.002	0.001	-0.007	-0.002	0.009
	[0.004]	[0.005]	[0.003]	[0.011]	[0.011]	[0.012]	[0.012]
other_violent	-0.005	0.001	0.004	-0.01	-0.019	-0.005	0.024*
	[0.004]	[0.005]	[0.004]	[0.013]	[0.012]	[0.013]	[0.013]
property	0.004	-0.001	-0.003	-0.006	-0.01	-0.001	0.011
	[0.005]	[0.006]	[0.004]	[0.014]	[0.014]	[0.015]	[0.015]
robbery	-0.006	0.003	0.004	0.017	-0.035**	0.012	0.024
	[0.006]	[0.008]	[0.005]	[0.018]	[0.018]	[0.019]	[0.019]
sex	-0.004	0.002	0.002	-0.002	-0.003	-0.027	0.03
	[0.006]	[0.007]	[0.005]	[0.018]	[0.017]	[0.018]	[0.018]
weapons	-0.006	0.003	0.004	-0.012	-0.008	-0.006	0.014
	[0.006]	[0.008]	[0.005]	[0.018]	[0.018]	[0.019]	[0.019]
total_charges	0	0	0	0.002	0.002	0.003	-0.006**
	[0.001]	[0.001]	[0.001]	[0.002]	[0.002]	[0.003]	[0.002]
Constant	0.032***	0.947***	0.022***	0.494***	0.235***	0.489***	0.275***
	[0.007]	[0.008]	[0.005]	[0.019]	[0.019]	[0.020]	[0.020]
Observations	399	399	399	399	399	399	399
R-squared	0.03	0.01	0.01	0.03	0.03	0.02	0.03

Standard errors in brackets.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Cross Tabulations of Number Blacks in Pool and Conviction for First Offense

		Guilty of First Offense for Black Defendants		Guilty of First Offense for White Defendants	
		0	1	0	1
# of Blacks in the Pool	0	11 (14%)	66 (86%)	27 (30%)	63 (70%)
	1	12 (26%)	35 (74%)	21 (28%)	54 (72%)
	2+	5 (23%)	17 (77%)	5 (14%)	32 (86%)

Table 5: Effect of Racial Composition of Jury on Conviction Rates

	(1) foff_guilty	(2) pct_guilty	(3) foff_guilty	(4) pct_guilty	(5) foff_guilty	(6) pct_guilty
Constant	0.682***	0.672***	0.724***	0.711***	0.679***	0.669***
	[0.043]	[0.041]	[0.035]	[0.033]	[0.044]	[0.042]
Def_Black	0.157***	0.114**	0.097*	0.073	0.157***	0.116**
	[0.058]	[0.057]	[0.050]	[0.048]	[0.058]	[0.056]
Prop_Black Pool	1.926**	1.877**				
	[0.802]	[0.780]				
Def_Black * Prop_Black Pool	-3.230**	-2.334*				
	[1.404]	[1.398]				
Prop_Black Seated Jury			0.523	0.551	2.205**	2.143**
			[0.565]	[0.530]	[1.038]	[0.997]
Def_Black * Prop_Black Seated Jury			-0.918	-0.828	-3.103**	-2.457*
			[0.769]	[0.734]	[1.322]	[1.281]
Observations	348	352	348	352	348	352
Method	OLS	OLS	OLS	OLS	IV	IV

Note: Each of these regressions are restricted to the sample of black and white defendants. The IV specifications presented in columns (5) and (6) use the composition of the jury pool (and any interactions) to instrument for the composition of the seated jury.
No additional controls are included. Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Impact of Jury Composition on White and Black Conviction Rates

A. Reduced Form Results - based on specification reported in column (1) in Table 5

	27 WH, 0 BL in ***jury pool***	26 WH, 1 BL in ***jury pool***	25 WH, 2 BL in ***jury pool***
Black Defendants	84%	79%	74%
White Defendants	68%	75%	82%

B. IV Results – based on specification reported in column (5) in Table 5

	7 WH, 0 BL on ***seated jury***	6 WH, 1 BL on ***seated jury***
Black Defendants	84%	71%
White Defendants	68%	100%

Table 7: Robustness Checks

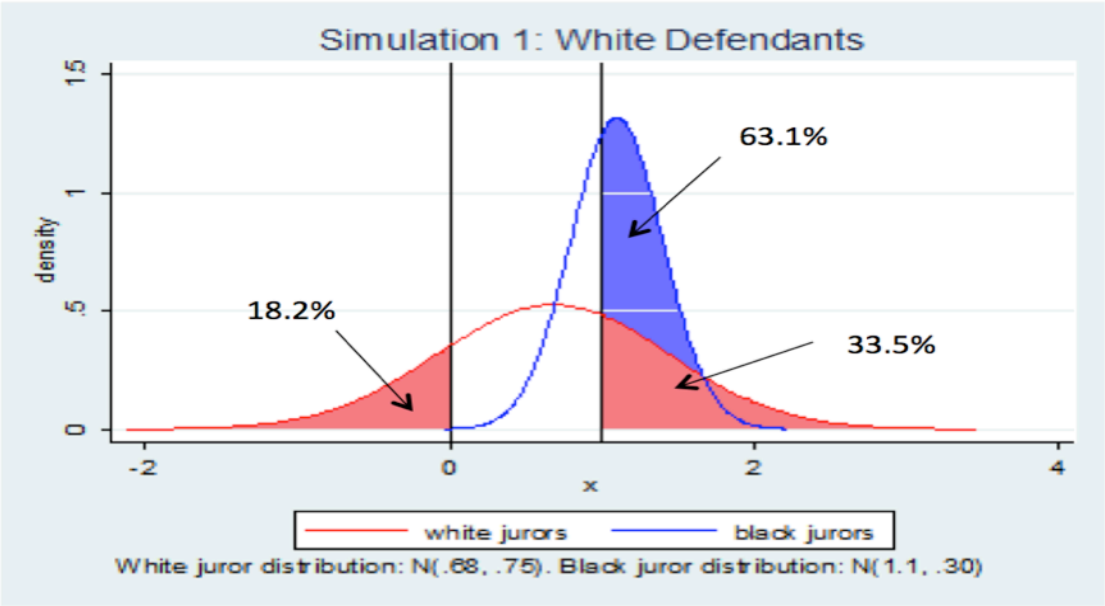
	Description	Constant	Def_Black	Prop_ Black Pool	Def_Black * Prop_Black Pool	N
	Dependent variable = foff_guilty					
(1)	Baseline Specification	0.682***	0.157***	1.926**	-3.230**	348
(2)	Include year dummies in baseline	0.661`***	0.157***	1.926**	-3.272**	348
(3)	Year dummies + month dummies	0.670***	0.139**	2.121**	-2.955**	348
(4)	Year and month dummies + defendant and case characteristics	0.705***	0.142**	2.122**	-2.967**	348
(5)	Year and month dummies + def and case characteristics + judge dummies	0.609***	0.117*	2.277**	-2.208	345
(6)	Assign cases that didn't end in guilt or not guilty verdict as guilty	0.625***	0.175***	1.368	-2.603*	377
(7)	Baseline spec using *any blacks in the pool* rather than proportion black	0.700***	0.157**	0.068	-0.171*	348
	Dependent variable = pct_guilty					
(8)	Baseline Specification	0.672***	0.114**	1.877**	-2.334*	352
(9)	Include year dummies in baseline	0.631***	0.116**	1.869**	-2.471*	352
(10)	Year dummies + month dummies	0.680***	0.100*	2.100**	-2.358*	352
(11)	Year and month dummies + defendant and case characteristics	0.723***	0.103*	2.101**	-2.372*	352
(12)	Year and month dummies + def and case characteristics + judge dummies	0.696***	0.08	2.189**	-1.528	349
(13)	Baseline spec using *any blacks in the pool* rather than proprotion black	0.681***	0.118*	0.081	-0.131	352

Table 8: Correlation of Jury Pool and Seated Jury with Conviction Rates

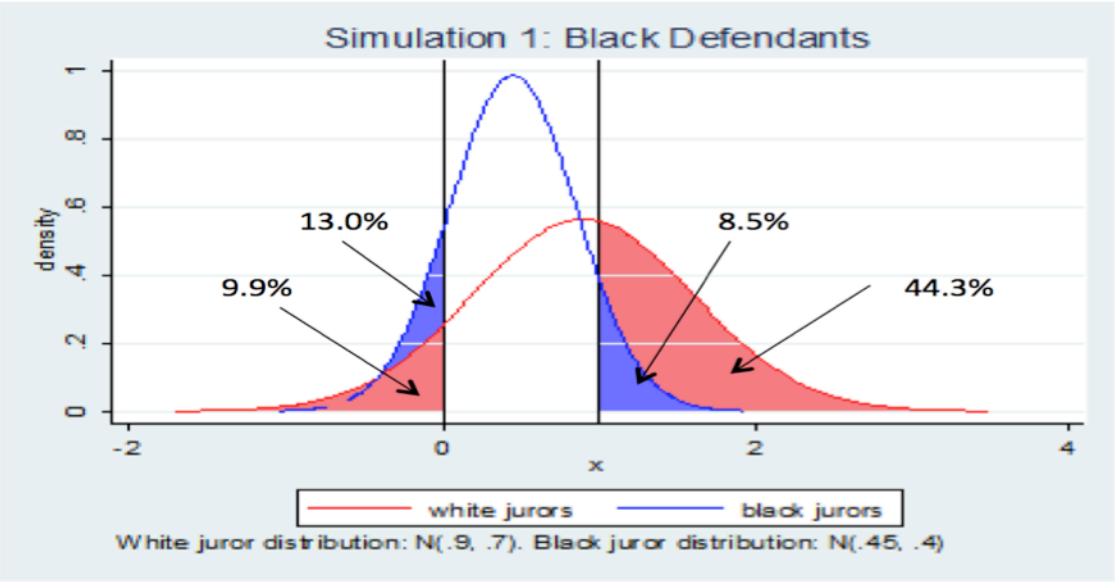
	Convicted on First Offense	Convicted on First Offense
def_Black	0.157***	0.157***
	[0.058]	[0.058]
prop_Black pool	1.926**	1.925**
	[0.802]	[0.852]
def_Black*prop_Black pool	-3.230**	-3.108*
	[1.404]	[1.815]
prop_Black seated		0.000
		[0.607]
def_Black*prop_Black seated		-0.084
		[0.940]
Constant	0.682***	0.682***
	[0.043]	[0.043]
Observations	348	348
Method Used	OLS	OLS

Robust standard errors in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1: Distributions of Black and White Jurors



A. White Defendants



B. Black Defendants