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Unequal Jury Representation and Its Consequences*

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Abstract

We analyze the extent and consequences of unequal representation on juries in Harris County, Texas. We first document that residents from predominantly white and high-income neighborhoods are substantially over-represented on juries. Using quasi-random variation in those called for jury duty each day, we next establish that Black defendants are more likely to be convicted and receive longer sentences from juries with more residents from these over-represented neighborhoods. We estimate that equal representation would reduce Black defendants' median sentence length by 50 percent and the probability of receiving a life sentence by 67 percent. Straightforward remedies could mitigate this severe bias.

JEL Codes: K4, J15

Keywords: jury, crime, sentences, representation, inequality, race

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1. Introduction

Following the English legal tradition, the right to a trial by a jury of one's peers is a bedrock of American criminal law. While the legal definition of peers varies somewhat across jurisdictions, juries are generally expected to reflect a fair cross-section of the community in the district in which a court convenes.¹ Yet, in practice, juries across the United States are often highly unrepresentative of their communities – especially with respect to the young, poor, transient, and racial minority populations – as a result of a sequence of selection processes that determine who ultimately sits on the jury. Legal scholars highlight that this underrepresentation begins with the decision of who is eligible for jury service and included in a jurisdiction's 'master list' (15, 22). Second, it has been demonstrated in multiple jurisdictions that unequal response (or non-response) rates to jury summons across these sub-populations severely exacerbates the unrepresentativeness of the jury pool (8, 12, 19). Finally, researchers have shown that attorney biases exist during the pre-trial jury selection process (5, 11, 10, 18). These patterns have been seen in a wide range of settings, including state and federal courts: researchers studying federal courts concluded that “some amount of underrepresentation in jury pools is the norm” (23).

An almost completely disjoint body of research, conducted by criminologists, psychologists, and economists, studies the effects of specific jury characteristics (as opposed to community representation more generally) on trial outcomes. The earliest studies provide correlational evidence in the real-world of a relationship between jury race and trial outcomes (7, 9) or causal evidence in laboratory mock-jury settings (see 24, 25 and more recently, 6). Using quasi-experimental research designs, which take into account the non-random nature of the seated jury, economists provided the first causal evidence that a jury's race (1, 13), age (2), gender (3, 16), political affiliation (4) and experiences (21) affect trial outcomes in the real world.

Taking these two literatures together, the unrepresentativeness of juries raises serious doubts about the fundamental fairness of the jury trial system under the current practices of many American jurisdictions. The goal of this paper is to bring together in a single study, for the first time in the literature, analyses of both jury representation and its causal effect on trial outcomes, allowing us to assess the consequences of jury representation for the fair and impartial application of the law. To do so, we have assembled detailed jury and trial data for a

¹ This language is drawn from Title 28 (Section 1861) of the U.S. code describing judiciary and judicial procedure.

large jurisdiction, Harris County, Texas, which includes the city of Houston and has a population of about 4.7 million.

Our analysis proceeds in three main parts. The results of each are striking and statistically robust. We first document how well each neighborhood in the study area is represented in pre-trial jury panels and seated juries. An important contribution of our paper is that we measure representation based on juror micro-geography (zip codes), opening new possibilities for remedying unequal representation. Jury representation from zip codes within Harris County varies widely, with some zip codes having as little as 30 percent, and many over 200 percent, of their expected share of seated jurors. Representation is highly correlated with zip code characteristics. Residents of predominantly white and high-income neighborhoods are substantially over-represented on seated juries, while those from predominantly Black, Hispanic, and low-income neighborhoods are under-represented, sometimes severely so. Importantly, the vast majority of the variation in representation on seated juries is already reflected in the pool of potential jurors, with jury selection in the pre-trial *voir dire* process playing a comparatively small role.

We next estimate the causal impact of jurors from each neighborhood on trial outcomes using a research design that isolates quasi-random day-to-day variation in the composition of potential jurors. Most notably, Black defendants are much more likely to be convicted, receive more severe jury-determined sentences, and are much more likely to receive life sentences when eligible, if they (randomly) draw jury pools with a relatively high share of potential jurors from over- versus under-represented neighborhoods. Further analysis suggests that the effect of jury neighborhood is most strongly associated with the neighborhood's racial composition, as opposed to a variety of other socioeconomic and demographic factors.

Finally, we combine the first two parts of our analysis and use the causal estimates of the impact of jury neighborhood composition on trial outcomes to simulate the distribution of conviction rates and sentence lengths if juries were instead representative of the entire community in Harris County. The results imply that the unequal representation of existing juries increases mean and median sentence lengths for Black defendants by over 50 percent and more than triples the likelihood that eligible Black defendants receive life sentences. Thus, taken as a whole, the results of our study imply that unequal jury representation in Harris County results in severe racial bias in the application of the law.

Our analysis naturally suggests an immediate set of potential policy remedies that would mitigate this bias as well as a basic test for representativeness by micro-geography that, along

with an appropriate remedy, would make jury trials fundamentally fairer in any jurisdiction that implemented them. We discuss these possibilities in the conclusion.

2. Jury Trials: Harris County, Texas

The process of choosing jurors for a trial begins with the master jury list: in Harris County this consists of those individuals in the county who are registered to vote or hold a Texas driver's license or identification card.² Citizens on the list are randomly selected and mailed a summons to report for jury service on a given date. If summoned individuals do not meet eligibility requirements (e.g. age 18, citizen, literate, no prior felonies) or have grounds for an exemption (e.g. older than 70, primary caretaker, attending school), they do not need to appear in court. Historically, only about one-third of summoned jurors in Harris County show up for jury duty (14). Eligible individuals who show up for jury duty are randomly assigned to a panel of roughly 65 individuals, which forms the jury pool for a particular trial.

Members of the jury pool then go through the *voir dire* process to determine who is seated on the jury (12 members plus 1-4 alternates). Potential jurors can be removed for cause if there is a known reason they cannot be impartial. Prosecutors and defense attorneys can also use peremptory challenges (10 each for a felony trial) to strike potential jurors without providing a reason; though it is illegal for strikes to be based solely on race or gender, this is difficult to enforce in practice. Thus, while the jury pool is randomly assigned to cases from the set of individuals who report for jury duty, the *voir dire* process implies the seated jury may be correlated with case and defendant characteristics.

Texas is one of six states that allow juries to sentence defendants in non-capital cases. Before seeing the jury pool, the defendant must decide whether they want a trial by jury and who will do the sentencing upon conviction (judge or jury). The same jury decides both convictions and sanctions (27).

3. Data

The Harris County court clerk provided us with two data sets – a defendant data set and a jury data set – for all felony trials (about 2,400) from June 2005 through March 2012. The former includes defendant demographic characteristics (name, race, birth date, gender, zip code of residence), current offense and criminal history characteristics, and verdict and sentencing outcomes. We organized the data at the defendant-case level, so that a defendant with multiple

² See <http://www.txcourts.gov/about-texas-courts/juror-information/jury-service-in-texas/>.

charges that went to the same jury was coded as one observation. The juror demographic data set has the following information for about 300,000 potential jurors that were empaneled for a jury trial (i.e., all who received a summons and showed up at the courthouse): case number, panel identification number, panel status (i.e., on the seated jury, struck, or dismissed), the juror's position in the panel, gender, birth date, and zip code of residence, as well as the date and time they were assigned to the panel, and the date and time they were released from the panel.³ Using the juror's zip code, we merged 2010 census data on the juror's neighborhood, including the racial composition, median income, population size, high school graduation rate, share with income below poverty, and share foreign born. The descriptive analysis of juror and defendant representation in Section 4 utilizes these two raw data sets.

The analyses of the causal effects of representation on trial outcomes, presented in Sections 5-7, necessitates matching the defendant and jury data sets. The matching procedure (see supplementary appendix), along with the restriction of only examining cases in which the jury will make both the conviction and sentencing decisions, results in a sample of 981 non-capital felony trials, which are matched to jury pools and seated juries.⁴ In 75% of these trials, the defendant is eligible for a life sentence, which in Harris County is technically a sentence of 99 years in prison. As described in the Texas statutes, minimum sentences for these cases depend on the defendant's criminal history and can be as low as five years (e.g. if convicted of a 1st degree felony with no history).⁵ Our analysis in Sections 5-7 focuses on the 734 life sentence-eligible cases, because this set of cases constitutes the majority of our sample and allows juries the most discretion in their sentencing decisions. We include results for the full set of non-capital felony trials in the appendix.

4. Geographic Representation in the Jury Pool, Seated Jury, and Defendant Population

This section measures the extent to which individuals from various neighborhoods (zip codes) are over- or under-represented in two populations at the core of the criminal justice system: the jury pool that decides the outcome of cases and the defendants subject to these decisions. We calculate jury and defendant representation ratios for the sample of 299,945 jury

³ Not all jury pools that were empaneled for a trial actually tried a case. Sometimes the case they were empaneled for was delayed and the entire panel was dismissed.

⁴ As explained in the appendix, our ability to match the jury data with the defendant data was limited by the fact (highlighted by the court clerk) that the case number attached to a jury panel was sometimes wrong. We only included those cases in which we were confident on the quality of the match. Appendix Table ST1 demonstrates the relative comparability of the matched and unmatched cases; the only exception is that the matched sample has more female defendant and murder cases, which we tried more aggressively to match.

⁵ See <http://www.statutes.legis.state.tx.us/Docs/PE/htm/PE.12.htm>.

pool members and 1,754 defendants (with observable zip code information) from 129 Harris County zip codes. Equation (1) demonstrates how the jury pool ratio is calculated. Specifically, for each zip code z (of the Z Harris County zip codes), we calculate the ratio between the share of all individuals in the pooled sample of jury pools ($N=299,945$) from zip code z and the share of the population (over age 16) in the census from zip code z . This ratio will be greater (less) than one for zip codes that are over (under)-represented in the jury pool relative to the census. We follow the same procedure to create representation ratios for defendants and seated jurors (as opposed to the pool from which the jury is chosen).⁶

$$(1) \quad Representation_z^{pool} = \frac{(N_{jury\ pool}_z / \sum_{z=1}^Z N_{jury\ pool}_z)}{(N_{census}_z / \sum_{z=1}^Z N_{census}_z)}$$

The introduction of this novel measure of representation based on micro-geography (zip codes) is an important contribution of our paper. Examining whether certain neighborhoods are systematically over- or under-represented on juries not only provides a direct and easily implementable test of whether juries reflect a fair cross-section of the community as required by the law, but also naturally suggests straightforward remedies designed to equalize representation across neighborhoods.

Our analysis of jury and defendant representation reveals four key results. First, many zip codes have jury pool representation ratios far from one. (See Supplementary Appendix Figure SF1.) In fact, 25% of zip codes have jury pool representation ratios less than 0.61 and 25% have ratios greater than 1.39. Panel 1A of Figure 1 plots these ratios in a map of Harris County zip codes, revealing that the over-represented zip codes (shaded darker) are in the outskirts or suburbs.

Second, the wide dispersion in jury representation ratios originates in the jury pool itself and not the process through which the seated jury is selected. This result implies that remedies designed to ensure fair representation must focus not only on the *voir dire* process used to select jurors but, importantly, on the system used to develop the jury pool. (See Figure SF2).

Third, certain zip codes are severely over- and under-represented amongst the defendant population as well, but in the opposite direction. In particular, Panel 1B of Figure 1 shows that

⁶ Though the raw data indicate whether the potential juror was seated, Harris County informed us of measurement error in this variable. As described in the appendix, we have confirmed using time stamps of juror release that the vast majority of seated jury flags are correct but indeed there are some errors.

the same zip codes that are under-represented in the jury pool are over-represented amongst defendants and vice versa.

Fourth, perhaps unsurprisingly given these geographical differences, zip code representation in the jury pool is closely related to other zip code characteristics. Panels 1C and 1D of Figure 1 highlight the differential racial composition of these zip codes. It is clear from visual inspection that the most represented zip codes in the jury pool also have the highest proportion of white residents, while those most represented amongst defendants have the highest fraction of Black residents. Table 1 demonstrates how stark this contrast is (e.g., on average, 25.0% and 12.6% of the population is Black in the under- and over-represented zip codes, respectively) and that race is not the only dimension in which these neighborhoods differ. Under-represented areas have twice as many Hispanic residents, 50% lower median income, three times as many residents in poverty, higher unemployment rates, lower educational attainment, and more foreign-born residents than over-represented neighborhoods.

5. The Causal Effect of Unequal Representation on Trial Outcomes

We now turn to investigating the impact of jury pool representation on trial outcomes using the matched jury pool-defendant data. Summary statistics for the sample of life sentence-eligible cases are shown in Appendix Table ST2. About 59%, 26% and 14% of defendants are classified as Black, Hispanic, and white respectively; just 6% of defendants are female. The distribution of charges is heavily skewed towards serious violent offenses (28% and 24% of cases include a murder and robbery charge respectively) and sex offenses (19% of cases), consistent with this being a life-sentence eligible sample. We consider two main trial outcomes. The first is whether a defendant is convicted of a life sentence (versus either an acquittal or a sentence of less than 99 years); about 15% of our sample is convicted of a life sentence. The second outcome considered is the sentence length (in years) the jury assigns, where we code acquittals as a sentence of zero years. Using this measure, the average sentence length in our sample is almost 39 years.

Our research design is motivated by the quasi-random way in which jury pools are assigned to trials. Specifically, the approximately 65 individuals who constitute the jury pool for a given trial are randomly assigned to a trial after having been randomly called for jury duty on a given day. The only aspect of the process that is not completely random is the choice of individual jurors to show up for jury duty. These choices would only create a problem for our analysis if they were somehow systematically correlated with case and defendant characteristics. Tables ST3 and ST4 present empirical evidence that jury pools are effectively

randomly assigned by regressing jury pool characteristics (jury pool representation ratios in ST3 and jury pool gender, age, and zip code characteristics in ST4) on 14 defendant and case characteristics. If the jury pool were truly randomly assigned to cases, the regression coefficients would be close to zero and statistically insignificant. This is indeed what we find: only 5 (16) of the 168 coefficients are significant at the 5% (10%) levels and F-tests that jointly determine whether all coefficients equal zero are insignificant in each regression.

In this way, as a result of the random and quasi-random processes that generate the jury pool for each trial, some trials are effectively randomly assigned to jury pools with many potential jurors from over-represented zip codes, while others are assigned to pools with a relatively high percentage of jurors from under-represented zip codes. By isolating this quasi-random variation in the composition of jury pools, we can identify the causal impact of variation in the neighborhoods from which jurors are drawn on trial outcomes. Though these institutional features ensure that the jury pool is random, the voir dire process ensures that the seated jury is not; as we therefore cannot identify the causal effect of the seated jury on trial outcomes, our analysis only estimates the causal effect of representation in the jury pool.⁷

Figure 2 graphically examines the relationship between sentence length and the proportion of the jury pool from zip codes in the fourth (or first) quartile of the distribution of representation ratios among jury pool members. Jurors in the fourth quartile consist of the 25% of jury pool members that come from zip codes with the highest representation ratios.⁸ The graphs present the results from local polynomial regressions, which smooth the scatterplot between two variables so that their relationship can be represented by a simple curve.

Figure 2 shows that, for Black defendants, increasing the share of the jury pool that comes from the fourth quartile of the representation index distribution (i.e., the zip codes that are the most over-represented) results in substantial increases in sentence lengths. We assess the significance and robustness of these graphical patterns by regressing trial outcomes on the proportion of the jury pool from quartiles one and four of the representation ratio, where the reference group includes those in quartiles two and three. We estimate these regressions separately for the sub-samples of White, Black, and Hispanic defendants in Appendix Table ST5. These results indicate that the impact of increasing the share of jurors from the fourth

⁷ Using the composition of the jury pool to instrument for the composition of the seated jury cannot remedy the non-random nature of the seated jury because it requires the strong assumption that the only channel through which the presence of jurors with certain characteristics in the pool affects trial outcomes is by increasing their likelihood of being seated. This assumption is unrealistic because jurors in the pool can impact trial outcomes even if they are not seated due to the fact that having to strike them impacts the jurors that do get on.

⁸ These quartile cutoffs were defined with the full jury pool sample used for the analysis in Section 4.

quartile on the length of sentences Black defendants receive is strong and statistically significant. This significant effect is seen in both the entire sample of matched cases as well as the analysis sample of life sentence eligible cases, though the effects in the life cases are larger. Moreover, ST6 demonstrates that this effect on Black defendants is robust to concerns about our measure of sentence length, which may have a number of outliers in the sentencing distribution given that Texas codes life sentences as 99 years. Yet, regardless of how sentence length is measured (in log forms, recoding sentences to be truncated when the individual reaches age 90, or the sentence length upon first eligibility for parole), Black defendants have longer sentences when more jurors from quartile four are present. Additionally, ST6 shows that this relationship is not just observed at the mean of the distribution but also at the median and some higher percentiles (70th and 80th) of the sentence length distribution for Black defendants.

The panel for white defendants in Figure 2 indicates their sentences are somewhat longer when a higher fraction of the jury pool comes from zip codes in the first quartile of the representation index distribution, although Table ST5 shows this impact is not statistically significant. Table ST5 also indicates that the fraction of jurors from over- and under-represented neighborhoods does not have a statistically significant impact on outcomes for Hispanic defendants.

6. Simulating Equal Representation

Section 4 showed clear evidence that individuals from certain zip codes are over-represented in jury pools, and Section 5 showed that having a higher concentration of these types of jurors in the pool impacts sentence length for Black defendants. Ideally, jury pools should reflect the local population, and thus a natural question to ask is: how would sentences change if residents from Harris County neighborhoods were equally represented in jury pools?

To answer this question, we simulate the average sentence length for defendants under equal jury representation. We do this in two steps. First, we estimate equation (2) below, which relates the sentence length to the proportion of members of the jury pool in each quartile of the zip code representation distribution.

$$(2) \quad \text{Sentence Length}_i = \beta_1 * \text{Proportion_Quartile1}_i + \beta_2 * \text{Proportion_Quartile2}_i + \beta_3 * \text{Proportion_Quartile3}_i + \beta_4 * \text{Proportion_Quartile4}_i + \varepsilon$$

We then use the resulting estimated coefficients to predict average sentences for Black and white defendants if the proportion of jury pool members from each quartile reflected the

proportion of the Harris County population (over age 16) that actually resides in the neighborhoods within the respective quartile. In particular, while the proportion of the jury pool that comes from the zip codes in each quartile is 0.25 (by construction), the proportions of the jury pool that *should* come from zip codes in the quartile 1 through 4 bins are: 0.46, 0.24, 0.18, and 0.12, respectively. Adjusting these values provides an estimate of what sentence lengths would be if the jury pool accurately reflected the distribution of the Harris County population across neighborhoods.

We extend this initial simulation in two key ways. First, we increase the number of bins used to group zip codes from the initial four quantiles to 19 evenly spaced intervals of the representation ratio index. This approach more effectively re-weights zip codes so that the simulated representation ratio is close to one for each neighborhood. Second, in addition to examining simulated changes in average sentence length, we also consider how equal representation would change both the proportion of defendants convicted of a life sentence (using a logit model) and the median and 75th quantiles of sentence length (using quantile regressions). We look at these outcomes to gauge the extent to which the likelihood of receiving a life sentence drives the results for average sentence length.

The simulation results are presented in Table 2. Each row corresponds to a different simulation for white or Black defendants, varying the number of bins in which zip codes are grouped (4 versus 19) and the outcome parameter simulated. The first two columns show a comparison between the actual value of the parameter of interest and that predicted by the model — i.e., the fitted value using the proportion of the jury pool that comes in a given representation bin in the data. In all cases, the model produces estimates that are close to the actual values. The next column then presents the simulated results when the proportions are adjusted to zip code population shares.

The results for Black defendants are striking. If the jury pool were reflective of the county, the average sentence would fall by almost 15 years (using the 19-bin specification), and the median sentence length would essentially be cut in half, from 31.5 to 16 years. The likelihood Black defendants would be convicted of a life sentence would also fall by more than 50 percent. The magnitudes of these reductions in sentence length under equal representation are substantial precisely because they sharply reduce the proportion of jurors from quartile 4 neighborhoods, who are particularly harmful to Black defendants.

The simulation results for white defendants generally indicate that they would have longer sentences if juries were more representative of the population, although these impacts are never close to being statistically significant. This pattern of results is consistent with the pattern shown

in Figure 2— i.e., increasing the fraction of jurors from quartile 1 neighborhoods increases sentence lengths for white defendants. But given the limited sample size, we lack the statistical power to make precise predictions for white defendants.

7. What Aspects of Over-Represented Neighborhoods Matter?

The results from Sections 5 and 6 clearly show that the current pattern of unequal neighborhood representation in Harris County sharply increases the severity of punishment for Black defendants; no further analysis is needed to reach a strong causal conclusion. We now try to get a sense of which aspects of these over-represented neighborhoods might be driving this causal result. Recall from Table 1 that over-represented neighborhoods have a higher proportion of white, high-income, highly educated, and US-born residents. To investigate whether each of these characteristics is associated with sentence severity for Black defendants, the first column of Table 3 regresses whether an individual was convicted of a life sentence on controls for the composition of the jury pool, including age, gender, and neighborhood racial composition.⁹ Successive columns then add other neighborhood controls, including median family income, percentage of residents who are high school graduates and percentage foreign born. Except for age and gender, all other jury pool characteristics reflect the characteristics of the zip codes in which members of the jury pool reside.

For the analysis presented in Table 3, we use average neighborhood measures for the jury pool designed to distinguish neighborhoods that are more likely to be in the most over-represented quartile (i.e., the 4th quartile in Figure 2). For example, our preferred measure of neighborhood racial composition is the fraction of the jury pool that resides in zip codes that are at least 60 percent white, as a quarter of jury pool members meet this criterion. As a result, the interpretation of the results for racial composition in Table 3 should be thought of as the impact of adding more jurors from the most predominantly white zip codes in Harris County.

The results indicate that jury pools with more members from predominately white neighborhoods are associated with a sharp increase in the likelihood that Black defendants receive a life sentence. That this measure of neighborhood racial composition does not significantly impact outcomes for white defendants is not surprising, as the proportion of jurors

⁹ We focus on the likelihood of being convicted of a life sentence in this analysis (as opposed to sentence length) because Table 2 indicates the strongest impacts of jury representation are felt at this decision point.

in the most over-represented zip codes does not impact trial outcomes for this group, as shown in Figure 2.^{10, 11}

8. Conclusions and Policy Implications

The main goal of this paper has been to examine the consequences of unequal jury representation on trial outcomes and the severity of punishment for defendants. With potential remedies in mind, we introduce a novel measure of jury representation based on the neighborhoods from which jurors are drawn. While the law requires juries to reflect their local communities, our analysis shows that juries, and indeed jury pools, in Harris County, Texas, are highly unrepresentative and that the geographic composition of jurors matters. Black defendants receive much harsher punishments when they face a jury pool with a higher fraction of potential jurors from the most over-represented neighborhoods. Simulating outcomes under fair representation implies that the current unequal jury representation doubles the median sentence length for Black defendants and more than triples their likelihood of receiving a life sentence when eligible.

Although only a small fraction of criminal cases make it to a jury trial, the events that happen at this stage can have a dramatic impact on the overall criminal justice process for all criminal incidents—in particular, prosecutors’ decisions to go forward with a case, as well as the plea deals they are willing to accept, will depend in part on how they think the case might be perceived by the set of jurors that typically show up for jury duty (26). This indicates that addressing the unrepresentativeness of jury pools can have important consequences for fairness far beyond what happens in jury trials. Though a number of potential policy and legal remedies are available to mitigate the bias observed in the Harris County jury system, the effectiveness of each measure will depend on the various sources of the unequal jury representation. As highlighted at the very beginning of this article, the first step in the selection process is the source list itself. Texas currently only includes on its jury source lists residents who have registered to vote or who have a state driver’s license or identification card. Though these are by far the most common mandated source lists across states, a number of states permit the courts to supplement the master list with additional sources (e.g. income and property tax rolls,

¹⁰ There appears to be a positive relationship between the fraction of foreign-born residents and sentence length for white defendants.

¹¹ Table ST7 presents parallel results for alternative measures of neighborhood racial composition and outcomes. Because most jury controls vary only at the zip code level and are relatively coarse, the results are somewhat sensitive to specification choice. We thus view the analysis of this section as suggestive rather than conclusive.

unemployment compensation lists, and welfare lists) that may be more likely to include the under-represented populations (17).

Yet, expanded source lists can only do so much if non-response is markedly unequal across neighborhoods and populations. Non-response can arise through multiple channels, including: (i) summons not actually reaching the intended recipient, perhaps due to an out-of-date address, (ii) court-sanctioned reasons, such as having a criminal record or being the sole care-giver of a small child, and (iii) an active choice, which could, for instance, arise out of not being able to miss work (due to both job-security or income related issues), as well as due to a general distrust in the criminal justice system (12). It is reasonable to expect that all three non-response channels are more prevalent in poor, less educated, minority neighborhoods. Though more frequent updating of source lists can potentially address concerns about transient individuals and informational campaigns (on the significant impact a single minority juror can have on trial outcomes (1)) can potentially increase active choice, none of the above-mentioned policy responses can deal with the unequal eligibility.

This brings us to a final possible policy response – and one that is a direct implication of the analyses presented here. A straightforward way to ensure a balanced distribution of jurors across neighborhoods would be to oversample residents from under-represented neighborhoods in calls for jury duty, so that jury panels properly reflect the community. An attractive feature of this remedy is that it equalizes representation across neighborhoods regardless of the underlying reason for any systematic unequal representation. A handful of jurisdictions have implemented this kind of over-sampling policy at a relatively low administrative cost (20). Even if the extent or causal impact of unequal representation on juries is not as severe as in Harris County, this kind of simple test for representativeness by neighborhood (zip code), along with a corresponding remedy for any systematic unrepresentativeness, would make juries more representative of their communities, as the law requires, and jury trials fundamentally fairer in any jurisdiction that implements them.

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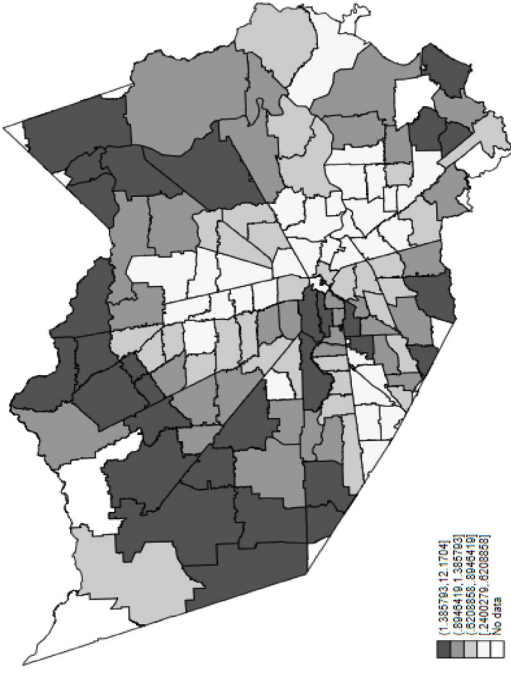
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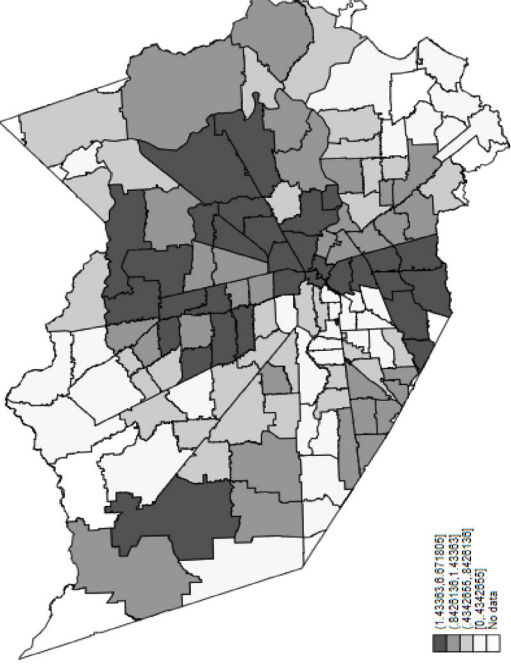
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Figure 1. Harris County Maps of Zip code Race and Representation in Jury Pools and Defendant Populations

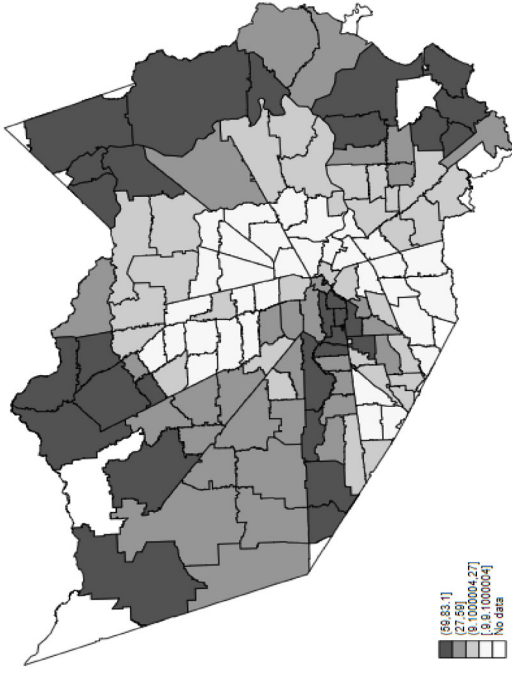
Panel 1A: Jury Pool Representation Ratio



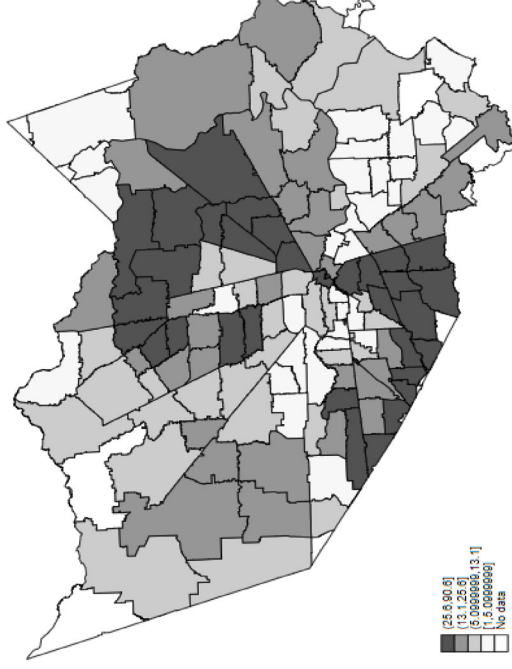
Panel 1B: Defendant Representation Ratio



Panel 1C: Zip Code % White

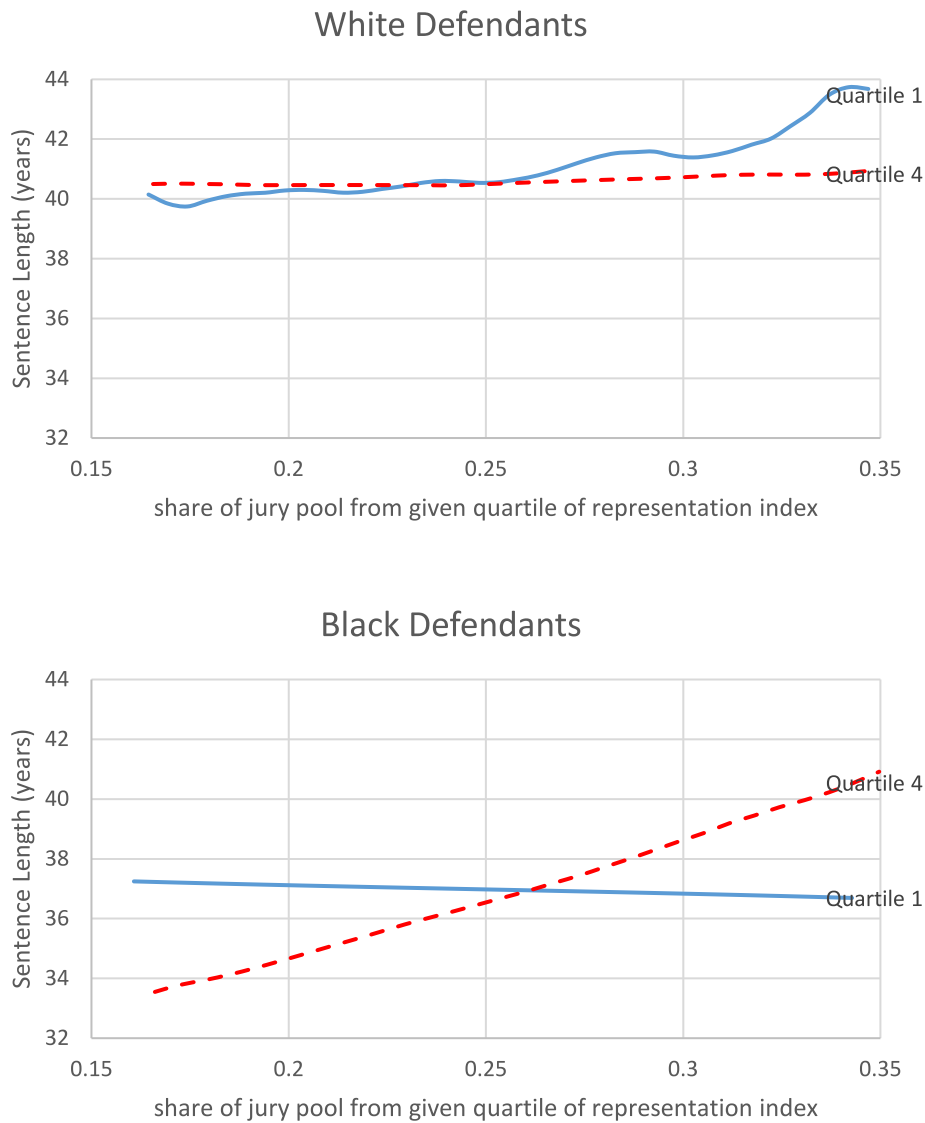


Panel 1D: Zip Code % Black



Note -- Panels 1A-1D present maps of Harris County zip codes, using Harris County zip code shape files obtained from: <https://koodinates.com/layer/97880-harris-county-tx-zipcodes/>. Panels A and B present representation ratios for the jury pool and defendants, while Panels C and D present the share white and black in each zip code according to the 2010 Census. In all figures, darker shading corresponds to higher values.

Figure 2: The Relationship Between Jury Pool Representation and Trial Outcomes



Note – For white defendants (upper panel) and black defendants (lower panel), these figures plot the relationships using local polynomial regressions between sentence length and the shares of the jury pool from the first (solid blue line) and fourth (dashed red line) quartiles of the jury pool representation ratios. Jurors in the fourth quartile consist of the 25% of jury pool members from zip codes with the highest representation ratios. Quartile cutoffs were defined with the full (non-matched) jury pool sample. The figures are truncated so that the x-variable only went from 0.16 - 0.35, i.e. at the 5th and 95th percentiles, as the data are notably noisier beyond these cutoffs.

Table 1. Census Characteristics of Zip Codes Under- and Over-Represented in Harris County Jury Pool

<i>zip code measure</i>	Underrepresented (<1) N = 71 zip codes		Overrepresented (>1) N = 58 zip codes	
	Mean	SD	Mean	SD
pool representation ratio	0.6	0.2	1.8	1.5
% white	17.9	16.3	53.0	20.8
% black	25.0	22.6	12.6	12.2
% hispanic	51.7	23.2	24.9	13.3
% labor force (over 16)	61.1	9.8	70.0	5.4
zip code median family income	38238.9	11574.6	76572.7	30282.9
% income < poverty	17.7	8.3	5.6	3.9
% high school graduates	63.8	15.9	87.5	9.3
% foreign born	25.0	12.4	14.3	6.7
total population in zip	30384.9	13603.3	33302.0	20206.6
population > age 16	20984.7	9612.0	17893.1	9107.5

Note – Zip codes are classified as under- and over-represented based on their representation in the raw jury pool data relative to that in the census.

Table 2: What Would Trial Outcomes be if the Jury Pool was Representative of Harris County?

Parameter	Actual Value		Estimated Actual Value	Simulated Value where Jury Pool Reflective of Population		p-value (simulated ≠ actual)
	Actual Value	Actual Value	Actual Value	Value	where Jury Pool Reflective of Population	
White Defendants	Mean Sentence Length (using 4 bins)	41.4	41.4	41.4	49.0 (15.7)	0.642
	Mean Sentence Length (using 19 bins)	41.4	41.4	41.4	46.2 (19.1)	0.806
	Median Sentence Length (using 19 bins)	30.0	29.0	29.0	47.0 (31.2)	0.559
	75th Quantile of Sentence Length (using 19 bins)	70.0	70.4	70.4	52.1 (34.0)	0.586
	Prop. Conv of Life Sentence (using 4 bins)	0.192	0.188	0.188	0.313 (.249)	0.614
	Prop. Conv of Life Sentence (using 19 bins)	0.192	0.153	0.153	0.229 (.264)	0.773
Black Defendants	Mean Sentence Length (using 4 bins)	37.0	37.0	37.0	24.8 (5.9)	0.031
	Mean Sentence Length (using 19 bins)	37.0	37.0	37.0	22.4 (6.86)	0.029
	Median Sentence Length (using 19 bins)	27.5	31.5	31.5	16.0 (8.21)	0.055
	75th Quantile of Sentence Length (using 19 bins)	53.5	56.2	56.2	27.8 (17.7)	0.103
	Prop. Conv of Life Sentence (using 4 bins)	0.131	0.119	0.119	0.042 (.024)	0.001
	Prop. Conv of Life Sentence (using 19 bins)	0.131	0.107	0.107	0.023 (.017)	0.0000

Note – Each row corresponds to a different simulation for white and black defendants, varying the number of bins to group zip codes (4 versus 19) and the outcome or parameter simulated. In the 19-bin simulations, the first 18 bins are intervals with a width of 0.1 beginning at a representation ratio of 0.2; the last bin includes all zip codes with a ratio greater than 2. We use a logit model when estimating the proportion convicted of a life sentence, and a quantile regression when predicting the median and 75th percentile. The table presents the actual value of the parameter of interest, and the simulated value when jury pools are reflective of the population, where standard errors of simulated value are in parentheses.

Table 3: Which Jury Pool Characteristics Impact the Likelihood of Being Convicted of a Life Sentence?

	Dependent Variable = Convicted of a Life Sentence					
	<u>White Defendants</u>			<u>Black Defendants</u>		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Proportion of Jury Pool from Zip Codes > 59% White</i>	-0.456 (0.919)	-0.589 (1.219)	-0.480 (1.190)	0.909** (0.364)	0.784* (0.422)	0.797* (0.434)
<i>Average % Hispanic in Jury Pool's Zip Codes</i>	0.00455 (0.0238)	-0.00434 (0.0310)	0.0308 (0.0307)	0.00350 (0.00738)	0.0111 (0.0120)	0.0104 (0.0127)
<i>Average Age of Jury Pool</i>	0.00720 (0.0194)	0.00832 (0.0197)	0.00357 (0.0192)	0.000967 (0.0110)	0.000740 (0.0110)	0.000952 (0.0112)
<i>Proportion Male in Jury Pool</i>	-0.139 (0.692)	-0.0895 (0.699)	-0.285 (0.704)	0.126 (0.259)	0.112 (0.260)	0.113 (0.261)
<i>Average Median Income in Jury Pool's Zip Codes</i>		0.00000543 (0.0000250)	0.00001119 (0.0000247)		0.00000369 (0.0000106)	0.00000348 (0.0000107)
<i>Average % High School Graduates in Jury Pool's Zip Codes</i>		-0.0168 (0.0366)	-0.0286 (0.0384)		0.00957 (0.0187)	0.00984 (0.0188)
<i>Average % Foreign Born in Jury Pool's Zip Codes</i>			-0.0920* (0.0473)			0.00253 (0.0165)
<i>Constant</i>	-0.0770 (1.268)	1.208 (3.402)	2.505 (3.593)	-0.403 (0.626)	-1.601 (1.656)	-1.646 (1.698)
Observations	104	104	104	436	436	436
R-squared	0.010	0.011	0.050	0.022	0.024	0.024

Note – All regressions use OLS and standard errors are in parentheses. *, **, and *** indicate the coefficient is significant at the 10%, 5%, and 1% level, respectively.

Supplementary Appendix Materials for:

Unequal Jury Representation and Its Consequences

Shamena Anwar
RAND Corporation

Patrick Bayer
Duke University

Randi Hjalmarsson
University of Gothenburg

This PDF file includes:

Data Appendix

Supplementary Figures SF1-SF2

Supplementary Tables ST1-ST7

1. Data Appendix

1.1. Data Description and Sample Creation

We received two data sets from the Harris County Clerk's Office: a defendant data set and a jury data set. The defendant data includes information on every felony case a jury made a decision on (verdict and/or sentencing) between May 31, 2005 and March 29, 2012. The defendant data included information on the name, date of birth, gender, zip code of residence, and criminal history of the defendant, as well as the case number, offense category and degree, verdict, sentence, date of filing and disposition. The defendant's race was provided, but their ethnicity was not; we used the defendant's name to code whether they were Hispanic or not.¹² To find information on the start and end dates of the defendant's jury trial, and whether convicted defendants chose either a jury or a judge to sentence them, we used the defendant's name and case number to look up that information in the online Harris County Criminal Records system.¹³

We organized the data at the defendant-jury level, so that a defendant with multiple charges that went to the same jury was coded as one observation. We only kept cases where a jury verdict was listed, and then dropped the subset of these cases where the jury only did the sentencing (after the defendant had already pled guilty), leaving us with 2,365 cases. There are three types of case categories that remain: (1) cases where the jury made the decision to convict, but a judge did the sentencing; (2) cases where the jury made the decision to convict and did the sentencing; and (3) cases where the jury made the decision to acquit. For the cases in the last category, we do not observe who the defendant chose to do the sentencing if the jury had convicted them. However, we treat cases in this category as the jury sentencing the defendant to a sentence of zero years.

The juror demographic data set has the following information for each of the approximately 309,000 jurors that were empaneled for a jury trial between May 31, 2005 and March 14, 2012: case number, panel identification number, panel status (i.e., on the seated jury, struck, or dismissed), the juror's position in the panel, gender, birth date, and zip code of residence, as well as the date and time they were assigned to the panel, and the date and time they were released from the panel.¹⁴ Using the juror's zip code, we merge census data on the juror's neighborhood, including the racial composition, median income, population size, high school graduation rate, share with income below poverty, and share foreign born.

Samples for Descriptive Analyses of Jury Pool and Defendant Representation in Section 4

Section 4 of the paper presents a separate descriptive analysis of zip code representation in the jury pool and defendant populations and thus does not require a match of these two data sets. These analyses are thus based on the full datasets outlined above, with a few sample restrictions as described here related to the validity of the zip code variable in each dataset. Specifically,

¹² To determine whether a defendant was Hispanic, we first identified the list of the 600 most popular Hispanic surnames using census data. If a defendant's surname was on that list, we classified them as Hispanic. However, after doing this we found there were still many defendants that were coded as "white" that had distinctively Hispanic names. We thus went through the white defendants and manually coded them as Hispanic based on whether their name sounded Hispanic. For defendants that were subsequently incarcerated, one can manually look up these defendants in the Department of Corrections records where Hispanic status is coded. We did this for a random sample of the cases we manually coded (where the defendant was subsequently incarcerated) and found that our manual classifications were always correct. We also pulled out defendants that were classified as white but had distinctively Arab sounding names and coded them as "other".

¹³ See <http://www.hcdistrictclerk.com/Edocs/Public/search.aspx>.

¹⁴ Not all jury pools that were empaneled for a trial actually tried a case. Sometimes the case they were empaneled for was delayed and the entire panel was dismissed.

we exclude jurors and defendants with missing zip code information, zip codes not matched to the 2010 Census, and zip codes outside Harris County. This yields an analysis sample of 299,945 jury pool members and 1,754 defendants from 129 zip codes from which we calculate jury and defendant representation ratios.

Constructing the Sample to Examine the Effect of Jury Composition on Trial Outcomes Used in Sections 5-7

Examining the impact of jury pool composition on trial outcomes required matching the defendant and jury pool data sets. Before conducting this match there were a few additional drops we made.¹⁵ With respect to the defendant data set, we dropped 65 cases where the defendant was not a white, Black, or Hispanic individual. We also dropped all of the 172 capital cases as there was no real outcome variation among these cases; only one defendant was not convicted. With these sample restrictions there are 2,128 cases remaining that can be potentially matched to the jury data. With respect to the jury data, we dropped jury panels for which we could not identify a seated jury. As noted to us by the court clerk, the panel status variable is not fully reliable, as sometimes everyone in the pool is incorrectly listed as struck. We thus used the jury panel's assignment and release dates to help determine who on the seated jury was seated or not, and dropped panels where this determination could not be made.¹⁶

A key issue that limited the ability to match the jury data with the defendant data is that the case number attached to a jury panel was sometimes wrong; this problem was noted to us by the court clerk when the data was provided. The court clerk also provided us with 62 defendant-jury panel matches from the sample (the "test sample") that the office had manually matched and knew to be correct. This test sample allowed us to determine in what specific situations the case number attached to a jury panel would be incorrect, and to develop an algorithm that would allow the defendant data to be matched to the jury data. We detail the algorithm we developed in the next section. Our algorithm only allows us to match 1,316 of the 2,128 cases. However, we are very confident in the matches for those cases, as all cases in the test sample for which our algorithm could find a match were correct. As we show in Table ST1, the matched sample is relatively similar to the unmatched sample, except the matched sample has more female defendant and murder cases, as we more aggressively tried to match these cases.

This sample of 1,316 cases includes 329 cases where the jury makes the conviction decision and the judge makes the sentencing decision. Because in the majority of the cases the jury makes both decisions, and we want to look at both the conviction and sentencing stage simultaneously for our main outcome, we drop the 329 cases where the judge conducts the sentencing and consider only those remaining cases where the jury makes both decisions.

¹⁵ Note that the defendant and jury data sets we start with here are not the same as those used in Section 4, because we do not make the same zip code drops as were done there. Specifically, the only drop made based on zip code is that any panel where the jurors zip codes were missing were dropped—this was done at the end of the matching process and resulted in six cases being dropped.

¹⁶ Any panel for which the panel status identified between 12-15 members as being on the seated jury was treated as correct, as this is the expected number of seated jurors for a trial (including alternates). For cases that did not fall into this category, we used the jury panel's assignment and release dates to help identify the seated jurors. Specifically, jurors that are seated should be released at a time that will be equal to the time at which the last juror in that panel is released. If the number of potential jurors that are released at the latest time is between 12-15, we identify these jurors as the seated jurors. We could not identify a seated jury in cases that did not fall into either of the above two categories. This could either be because there was no seated jury, or because the data does not allow us to identify it. Note that we are only identifying jurors that are seated versus not. For jurors that are not seated, we do not seek to distinguish between whether they were struck for cause, dismissed via peremptory challenge, or not reached.

Finally, we omit 6 cases where the main variables of interests – i.e. zip code characteristics and representation ratios – cannot be created because the juror zip codes were missing for these cases.

Of these 981 cases that remain, about 75% are life sentence eligible, either because of the severity of the current offenses or a combination of the current offense and criminal history. As noted in Section 3, all results presented in Sections 5-7 are run on the sample of 734 trials where a life sentence is a possible outcome.

1.2. Matching Jury Pool and Defendant Trial Data Sets

This section details the reasons why it was difficult to match the defendant data to the jury data, and describes the matching algorithm we developed. The Harris County Clerk's office provided information regarding why some of the cases were difficult to match; they also manually matched 62 defendant cases to the correct jury panel and provided this to us. This test sample is what allowed us to better understand the specific reasons the cases were difficult to match, and allowed us to develop an algorithm whose accuracy could be checked. While the eventual algorithm we developed only allowed us to match 62% of our defendant sample, the accuracy of this matching method for the test sample was 100%.

The key difficulty in developing a crosswalk for the jury and defendant datasets was that the case number that was attached to a jury panel was sometimes incorrect. As noted by the court clerk, a jury panel would be pulled for a case that was supposed to go to trial that day. The jury panel would then be assigned the case number for that trial. However, sometimes that jury trial got delayed, or a plea deal was struck, and the jury panel ended up being assigned to a different case that went to trial that day. Unfortunately, the old case number remained linked to the jury panel. Thus matching cases and jury panels up on case number alone is not a sufficient matching method.

A second related issue is that because jury trials get delayed, there are sometimes multiple panels that are assigned to a given case number. The first few panels that were called for case A could have then been seated for another case, or dismissed completely. Again, one cannot just do a straight case number match between the data sets, as it would result in many different panels being assigned to a case, when only one actually saw the case.

A third issue is that sometimes a defendant is on trial for multiple charges, where each charge has a different case number. The jury panel is only attached to one of those case numbers, even though they issued verdicts on all of the charges. However, sometimes a defendant will have some of the charges dismissed right before the jury trial, but the jury panel will still be attached to one of these dismissed charges. As this dismissed charge is not one where a jury rendered a verdict, there is no case number match in the defendant data set.

Below we discuss the specific matching algorithm we used:

1) Only jury panels that had an identifiable seated jury were eligible to be matched. Note that if a jury panel assigned to case A did not have any seated jurors, it implies that while it was originally assigned to case A, it was dismissed because case A ended up not going to trial that day. However, as we discussed above, it was sometimes difficult to tell if a jury had seated jurors. There is thus a possibility we are dropping some juries that in fact did have a seated jury, which eliminates some potential matches.

2) **If there was a case number match between a defendant and a jury panel, and the disposition date in the defendant data was within 6 days of the last release date for the matched jury panel, this was classified as a match.** Note that if the jury trial was pulled for case A on day X, and case A went to trial on day X, the match should be correct. This is because cases only get incorrectly matched when the original trial is delayed and the new panel seated for case A is also misclassified; however, if this were to happen, the dates for case A's trial would not match the jury panel start and release date. Because there is likely to be some margin of error on the date variables, we allowed the dates to be within 6 days of each other.^{17,18} Note that often there were multiple panels associated with one case number. If we could not identify a unique panel whose release date was within six days of the disposition date, we did not classify it as a match.

3) **If a jury panel had a case number that corresponded to a dismissed charge for defendant A, we classified that panel as having tried the other charges for defendant A that did go to trial.** This matching process was conducted by first pulling a defendant's name that had not been matched by the previous process. We looked the defendant's name up in Harris County's online criminal records system and found all charges (which will have unique case numbers) that would have gone to trial at around the same time. We often found that some of the charges had been dismissed right before the case for the other charges went to trial. For each of these dismissed charges, we tried to match the associated case number to a jury panel. If we found a jury panel that had a matching case number, and the trial disposition and juror release dates were within 6 days, this was classified as a match. This was an extremely tedious matching process, and thus we only attempted to do this with defendant groups we wanted to increase the sample size for. These groups included cases with murder charges (as these were the most serious charges in our sample), and cases with female defendants (as we thought we might be able to conduct comparisons of female and male defendants).

To analyze how our match process performed we used the test sample provided by the county clerk which provided the correct defendant-jury panel matches for 62 defendant cases. Using our above described matching procedure, we could identify matches for 57 of the 62 cases. Comparing our identified matches with the correct matches the clerk provided indicated that our algorithm got all of these matches correct. Thus, the upside to our match algorithm is that all of the matches it makes seem to be correct. The downside is that there will be cases (five in the test sample) for which we cannot find a match. For the five test cases we couldn't match, we used the jury panel that was identified to be correct in the test sample.

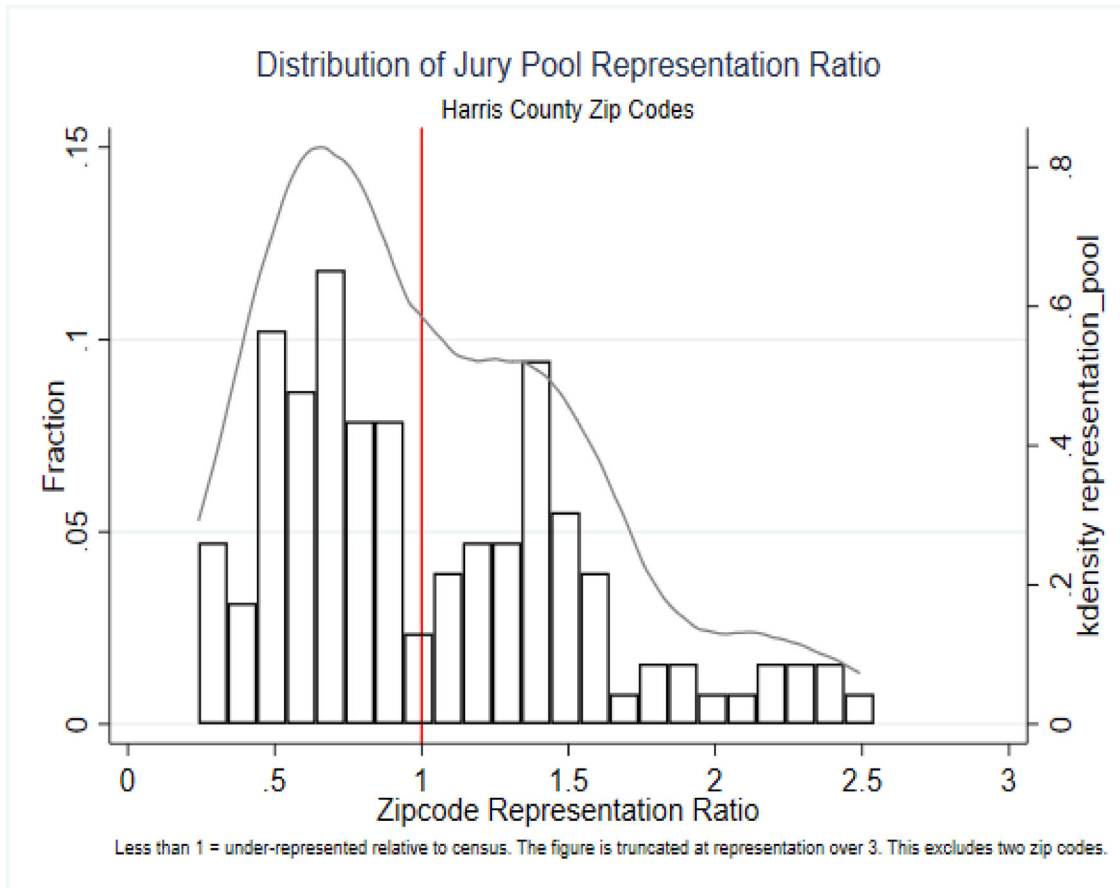
Applying our matching algorithm to the full sample of 2,128 cases allowed us to match 1,316 cases. Note that a likely reason the fraction of cases we were able to match in the full sample was smaller than in the test sample is because we only used step 3 in our algorithm described above on a select sample of cases, although we performed this step for all cases in the test sample. Because we are unable to match a reasonable fraction of the defendant sample, it is important to examine how the unmatched sample compares to the matched sample. Table ST1 compares the defendant and case characteristics between the matched and the unmatched sample. The results reveal that the matched sample has more females and more murder cases. This is to be expected as we only tried step 3 in our algorithm on these cases, and thus they

¹⁷ 93.4% of the resulting matched sample has a defendant disposition date that is within one day of the jury's last release date.

¹⁸ If the original trial is cancelled (e.g. the defendant takes a plea deal), there is no possibility of a match, as the case number the jury was pulled for will correspond to a defendant that did not have a jury trial and is thus not in the defendant data set.

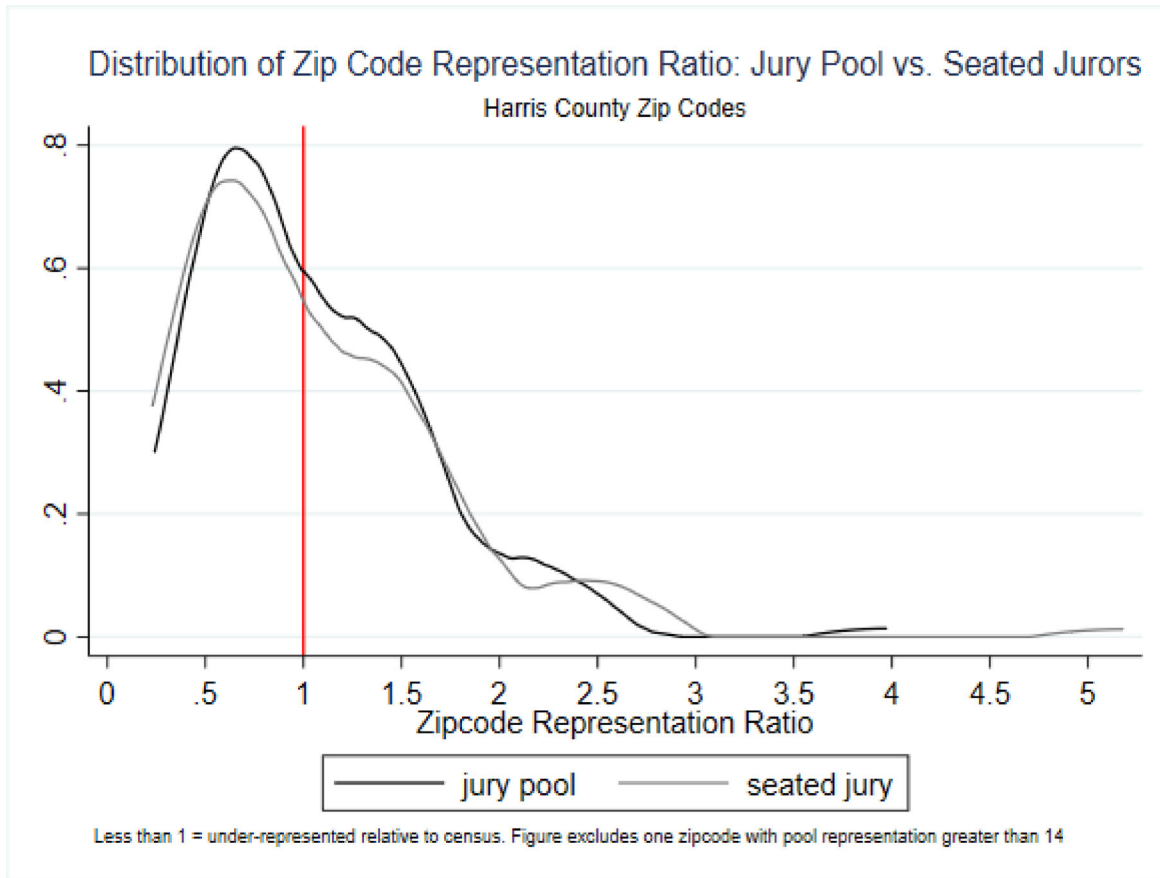
compose a higher fraction of the matched sample. The fact that the matched sample has roughly double the murder cases than the unmatched sample is likely the reason that we find the matched sample has a larger proportion of life-sentence eligible cases and first and second degree felonies, and that the average incarceration length is longer. This implies that if we had not tried to overmatch female defendant and murder cases, the ability to match a defendant to their jury panel would have been relatively random.

SF1. Distribution of the Zip Code Representation Ratio for the Jury Pool



Note – This figure plots the distribution (histogram on the left axis and kernel density on the right) of the representation ratio for zip codes in the Harris County jury pool data.

SF2. Distribution of Zip Code Representation Ratios: Jury Pool versus Seated Jurors



Note -- For Harris County zip codes, this figure plots kernel densities of the distribution of zip code representation in the jury pool (black line) and seated jury (gray line). The seated jury information is based on the raw data provided from Harris County, with the caveat that there is some measurement error in classifying individuals as seated.

ST1: A Comparison of the Defendant Sample That Can be Matched to a Jury with the Defendant Sample That Cannot be Matched to a Jury

	Matched Sample	Unmatched Sample	p-value for difference
<i>Defendant Characteristics</i>			
Black Defendant	0.575	0.578	0.915
Hispanic Defendant	0.262	0.281	0.347
White Defendant	0.163	0.142	0.194
Female Defendant	0.082	0.043	0.001
Average Age of Defendant	34.6	34.4	0.617
<i>Case Characteristics</i>			
Total Charges	1.15	1.16	0.769
Life Sentence Eligible	0.714	0.670	0.034
1st Degree Felony	0.553	0.509	0.045
2nd Degree Felony	0.239	0.207	0.083
3rd Degree Felony	0.102	0.127	0.075
State Jail Felony	0.084	0.119	0.007
Any Drug Charge	0.132	0.183	0.001
Any Murder Charge	0.198	0.097	0.000
Any Robbery Charge	0.176	0.197	0.231
Any Other Violent Charge	0.116	0.123	0.634
Any Property Charge	0.110	0.121	0.459
Any Sex Charge	0.184	0.175	0.600
Any Weapons Charge	0.020	0.030	0.147
<i>Criminal History</i>			
Any Past 1st Degree Felonies	0.114	0.105	0.506
Any Past 2nd Degree Felonies	0.223	0.240	0.373
Any Past 3rd Degree Felonies	0.200	0.193	0.715
Any Past State Jail Felonies	0.141	0.169	0.087
Any Past Misdemeanors	0.530	0.505	0.268
Any Past Times in Prison	0.318	0.314	0.834
Any Past Times in Jail	0.510	0.493	0.439
<i>Sentence Variables</i>			
Jury does Sentencing	0.250	0.282	0.103
Any Conviction	0.913	0.898	0.253
Incarceration Length (years w/acquittal=0)	29.8	25.3	0.001
Observations	1316	812	

ST2: Summary Statistics for Life Sentence Eligible Cases

	All Cases	White Defendants	Black Defendants	Hispanic Defendants
<i>Defendant Characteristics</i>				
White Defendant	0.142			
Black Defendant	0.594			
Hispanic Defendant	0.264			
Female Defendant	0.060	0.115	0.057	0.036
Average Age at Filing	33.2	37.9	32.4	32.4
<i>Case Characteristics</i>				
More Than One Charge	0.124	0.135	0.110	0.149
1st Degree Felony	0.812	0.808	0.775	0.897
2nd Degree Felony	0.144	0.135	0.177	0.077
3rd Degree Felony	0.044	0.058	0.048	0.026
Any Drug Charge	0.097	0.029	0.117	0.088
Any Murder Charge	0.283	0.317	0.271	0.294
Any Robbery Charge	0.240	0.144	0.280	0.201
Any Other Violent Charge	0.086	0.058	0.112	0.041
Any Property Charge	0.076	0.096	0.078	0.062
Any Sex Charge	0.188	0.279	0.128	0.273
Any Weapons Charge	0.018	0	0.028	0.005
<i>Criminal History</i>				
Any Past 1st Degree Felonies	0.127	0.067	0.158	0.088
Any Past 2nd Degree Felonies	0.252	0.212	0.294	0.180
Any Past 3rd Degree Felonies	0.211	0.202	0.250	0.129
Any Past Times in Prison	0.339	0.279	0.397	0.242
Any Past Times in Jail	0.515	0.442	0.569	0.433
<i>Outcome Variables</i>				
Any Conviction	0.903	0.942	0.894	0.902
Convicted of a Life Sentence	0.147	0.192	0.131	0.160
Incarceration Length (years w/acquittals=0)	38.8	42.0	37.2	40.5
Observations	734	104	436	194

Note – This table presents summary statistics for the sample of defendants (overall and by race/ethnicity) eligible for a life sentence. The sample is restricted to those cases for which the jury and defendant data sets could be matched.

ST3: The Relationship Between Case Characteristics and Zip Code Representation in Jury Pools

	Proportion of Jury Pool in Each Quartile of Representation Ratio:			
	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Male Defendant	-0.00341 (0.00936)	-0.00642 (0.00865)	0.00329 (0.00866)	0.00654 (0.00949)
Black Defendant	0.00807 (0.00654)	-0.00164 (0.00605)	-0.0105* (0.00606)	0.00403 (0.00664)
Hispanic Defendant	0.0111 (0.00712)	-0.00737 (0.00658)	-0.0117* (0.00659)	0.00796 (0.00722)
Age at Filing	0.000243 (0.000212)	-0.000342* (0.000196)	0.000191 (0.000196)	-0.0000919 (0.000215)
Number of Charges	-0.00407 (0.00460)	0.000619 (0.00426)	-0.00225 (0.00426)	0.00570 (0.00467)
Any Drug Charge	0.0194* (0.0113)	-0.00883 (0.0105)	-0.000697 (0.0105)	-0.00989 (0.0115)
Any Murder Charge	0.00944 (0.0101)	-0.0100 (0.00935)	-0.00639 (0.00936)	0.00696 (0.0103)
Any Robbery Charge	0.00658 (0.0101)	-0.00605 (0.00939)	-0.00636 (0.00939)	0.00583 (0.0103)
Any Other Violent Charge	0.0225** (0.0107)	-0.0155 (0.00990)	-0.000796 (0.00991)	-0.00617 (0.0109)
Any Property Charge	-0.000196 (0.0111)	0.000801 (0.0103)	-0.0115 (0.0103)	0.0109 (0.0113)
Any Sex Charge	0.000641 (0.0109)	-0.00481 (0.0101)	-0.00389 (0.0101)	0.00806 (0.0111)
Any Weapons Charge	0.0123 (0.0172)	-0.0169 (0.0159)	0.00769 (0.0159)	-0.00312 (0.0175)
1st Degree Felony	0.00115 (0.00727)	-0.00161 (0.00673)	-0.00249 (0.00673)	0.00295 (0.00738)
Any Prior Felonies	0.00333 (0.00524)	0.00171 (0.00485)	-0.00604 (0.00485)	0.000988 (0.00532)
Constant	0.233*** (0.0156)	0.273*** (0.0144)	0.258*** (0.0144)	0.236*** (0.0158)
Observations	734	734	734	734
p-value for whether all coeff jointly equal zero	0.1855	0.7084	0.7699	0.5234
R-squared	0.025	0.015	0.014	0.018

Note: All regressions use OLS and standard errors are in parentheses. *, **, and *** indicate the coefficient is significant at the 10%, 5%, and 1% level, respectively.

ST4: The Relationship Between Case Characteristics and Jury Pool Characteristics

	Avg. % White in Jury Pool's Zip Codes	Avg. % Black in Jury Pool's Zip Codes	Avg. % Hispanic in Jury Pool's Zip Codes	Avg. Age of Jury Pool	Proportion of Males in Jury Pool	Avg. Median Family Income in Jury Pool's Zip Codes	Avg. High School Graduation Rate in Jury Pool's Zip Codes	Avg % of Foreign Born Individuals in Jury Pool's Zip Codes
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Male Defendant	0.0726 (0.519)	0.299 (0.351)	-0.528 (0.412)	0.152 (0.272)	-0.00764 (0.0103)	502.2 (551.2)	0.320 (0.326)	-0.157 (0.208)
Black Defendant	-0.248 (0.363)	0.213 (0.245)	0.136 (0.288)	-0.203 (0.191)	0.00227 (0.00720)	-481.4 (385.6)	-0.182 (0.228)	-0.0666 (0.145)
Hispanic Defendant	0.0561 (0.395)	0.123 (0.267)	-0.145 (0.314)	-0.0573 (0.207)	0.00297 (0.00783)	-235.7 (419.4)	0.00300 (0.248)	-0.0981 (0.158)
Age at Filing	-0.00722 (0.0117)	0.00863 (0.00793)	-0.000111 (0.00933)	0.00452 (0.00616)	0.000388* (0.000233)	-6.353 (12.47)	-0.00712 (0.00736)	-0.00364 (0.00470)
Number of Charges	-0.158 (0.255)	-0.0923 (0.172)	0.184 (0.203)	0.121 (0.134)	-0.000774 (0.00506)	-8.851 (271.1)	0.0141 (0.160)	0.0673 (0.102)
Any Drug Charge	-0.705 (0.628)	-0.0464 (0.424)	0.865* (0.499)	0.513 (0.330)	0.0145 (0.0125)	-687.6 (667.0)	-0.663* (0.394)	0.451* (0.251)
Any Murder Charge	-0.694 (0.561)	0.122 (0.379)	0.689 (0.445)	0.274 (0.294)	0.0167 (0.0111)	-431.1 (595.6)	-0.600* (0.352)	0.205 (0.224)
Any Robbery Charge	-0.364 (0.563)	-0.0691 (0.380)	0.462 (0.447)	0.462 (0.295)	0.0215* (0.0112)	32.75 (597.8)	-0.340 (0.353)	0.206 (0.225)
Any Other Violent Charge	-0.995* (0.594)	0.133 (0.401)	1.004** (0.472)	0.322 (0.312)	0.0128 (0.0118)	-493.8 (630.7)	-0.892** (0.372)	0.503** (0.237)
Any Property Charge	-0.141 (0.617)	-0.0995 (0.416)	0.317 (0.490)	0.106 (0.324)	0.0242** (0.0122)	310.2 (654.9)	-0.263 (0.387)	0.0279 (0.247)
Any Sex Charge	-0.0199 (0.606)	0.0251 (0.410)	0.0402 (0.482)	0.154 (0.318)	0.00783 (0.0120)	179.8 (644.0)	-0.156 (0.380)	0.154 (0.243)
Any Weapons Charge	0.963 (0.956)	-0.727 (0.645)	-0.431 (0.759)	0.362 (0.501)	0.00743 (0.0190)	1483.1 (1014.8)	0.189 (0.599)	0.355 (0.382)
1st Degree Felony	0.0821 (0.403)	0.107 (0.272)	-0.127 (0.320)	-0.0221 (0.212)	-0.00874 (0.00800)	28.42 (428.4)	0.0275 (0.253)	-0.152 (0.161)
Any Prior Felonies	0.0108 (0.291)	-0.0840 (0.196)	0.106 (0.231)	-0.0258 (0.153)	-0.00443 (0.00577)	-101.9 (308.8)	-0.0214 (0.182)	-0.0324 (0.116)
Constant	42.97*** (0.864)	15.37*** (0.583)	33.12*** (0.686)	46.92*** (0.453)	0.469*** (0.0171)	63072.3*** (916.9)	81.34*** (0.542)	17.95*** (0.345)
Observations	734	734	734	734	734	734	734	734
p-value for whether all coeff jointly equal zero	0.6001	0.9613	0.124	0.8163	0.671	0.5285	0.2484	0.4542
R-squared	0.017	0.009	0.027	0.013	0.015	0.018	0.023	0.019

Note: All regressions use OLS and standard errors are in parentheses. *, **, and *** indicate the coefficient is significant at the 10%, 5%, and 1% level, respectively.

ST5: Relationship Between Jury Pool Representation and Trial Outcomes

	Sentence Length (years w/acquittals=0)						Convicted of a Life Sentence		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Proportion of Pool in Q1</i>	21.15 (52.52)	1.506 (25.75)	12.93 (38.56)	38.25 (68.85)	3.229 (29.13)	1.836 (44.23)	-0.0283 (0.793)	0.0161 (0.310)	0.0876 (0.494)
<i>Proportion of Pool in Q4</i>	-14.20 (46.23)	59.45** (25.24)	27.66 (38.01)	35.91 (62.00)	92.06*** (29.36)	-15.38 (43.88)	-0.275 (0.714)	0.884*** (0.313)	-0.566 (0.490)
<i>Constant</i>	28.03 (20.59)	15.62 (10.97)	19.85 (17.06)	23.06 (26.89)	12.64 (12.63)	43.40** (19.58)	0.269 (0.309)	-0.0996 (0.135)	0.286 (0.219)
Full Sample or Life Sent. Elig. (LSE)?	Full White	Full Black	Full Hispanic	LSE White	LSE Black	LSE Hispanic	LSE White	LSE Black	LSE Hispanic
Defendant Race	166	551	264	104	436	194	104	436	194
Observations	0.003	0.012	0.002	0.005	0.026	0.001	0.002	0.022	0.010
R-Squared									

Note: All regressions use OLS and standard errors are in parentheses. *, **, and *** indicate the coefficient is significant at the 10%, 5%, and 1% level, respectively.

ST6: Robustness of Relationship Between Jury Pool Representation and Trial Outcomes for Black Defendants

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Sentence Length	Log of Sentence Length	Sentence Length Topcoded at Age 90	Years Until Parole Eligible	Median Sentence Length	70th percentile of Sentence Length Distribution	80th percentile of Sentence Length Distribution
<i>Proportion of Pool in Q1</i>	3.229 (29.13)	-0.375 (1.283)	-2.129 (18.79)	0.414 (9.483)	35.54 (32.78)	-1.620 (66.00)	-50.17 (91.56)
<i>Proportion of Pool in Q4</i>	92.06*** (29.36)	3.369*** (1.293)	52.13*** (18.94)	26.70*** (9.558)	132.7*** (33.04)	113.6* (66.52)	170.9* (92.29)
<i>Constant</i>	12.64 (12.63)	2.272*** (0.556)	16.49** (8.148)	6.126 (4.112)	-12.29 (14.22)	15.50 (28.62)	37.07 (39.71)
Regression Method	OLS	OLS	OLS	OLS	quantile	quantile	quantile
Observations	436	436	436	436	436	436	436

Note: Standard errors are in parentheses. *, **, and *** indicate the coefficient is significant at the 10%, 5%, and 1% level, respectively.

ST7: Impact of Alternative Jury Pool Race Measures on Trial Outcomes

	<u>White Defendants</u>			<u>Black Defendants</u>				
	Sentence Length (1)	Sentence Length (2)	Convicted of a Life Sentence (3)	Convicted of a Life Sentence (4)	Sentence Length (5)	Convicted of a Life Sentence (6)	Convicted of a Life Sentence (7)	Convicted of a Life Sentence (8)
<i>Proportion of Jury Pool from Zip Codes > 59% White</i>	-25.60 (84.90)	-2.982 (103.6)	-0.456 0.974	-0.480 1.187	77.94** (33.17)	51.75 (40.91)	0.909** (0.352)	0.797* (0.435)
<i>Proportion of Jury Pool from Zip Codes <5% Black</i>	-40.20 (61.15)	-29.82 (70.56)	-0.170 (0.704)	-0.061 (0.810)	50.37* (29.32)	32.25 (32.66)	0.643** (0.311)	0.555 (0.347)
<i>Avg. % Black in Jury Pool's Zip Codes >16%</i>	6.535 (6.925)	2.740 (8.509)	0.056 (0.080)	0.010 (0.098)	-8.067*** (3.029)	-6.408* (3.616)	-0.0765** (0.0322)	-0.0542 (0.0385)
<i>Avg. % Black in Jury Pool's Zip Codes</i>	0.536 (1.706)	-1.297 (2.397)	0.009 (.0196)	-0.007 (0.028)	-1.691** (0.713)	-1.129 (1.052)	-0.0187** (0.0076)	-0.0168 (0.0112)
Observations	104	104	104	104	436	436	436	436
Control for jury pool age, proportion male, and zip code % Hispanic?	yes	yes	yes	yes	yes	yes	yes	yes
Control for jury pool zip code income, education, and foreign born?	no	yes	no	yes	no	yes	no	yes

Note: All coefficients presented were estimated from separate OLS regressions, where the outcome variable is given by the column header, the measure of percent of Black (or White) individuals in the jury pool zip code is given by the row, and the additional controls included are noted in the last two rows of the table. Only the coefficient on the core race variable is presented in the table. Standard errors are in parentheses. *, **, and *** indicate the coefficient is significant at the 10%, 5%, and 1% level, respectively.