

To Plea or Not to Plea: Evidence from North Carolina

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To Plea or Not to Plea: Evidence from North Carolina

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Abstract

The decision to accept a plea bargain is one of the highest stakes decisions under uncertainty that an individual can make. It is also an extremely important source of unwarranted disparity in the criminal justice system. This paper undertakes the most detailed empirical study to date of the plea bargain decision. We use a dataset of over 300,000 observations from 15 years of court cases across North Carolina. In order to overcome omitted variables bias, we make use of an instrumental variables strategy. In North Carolina a defendant seeking to minimize likelihood of incarceration is generally better off rejecting a plea, while one who wishes to minimize expected sentence length will take the plea. But underlying these general findings we find that the decision to plea or not is complex and varies substantially by race, type of crime, jurisdiction, attorney type, and judge. These findings have important implications both for optimal decision-making by defendants and for structure of the criminal justice system.

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1 Introduction

For those interested in decision-making under uncertainty or high-stakes negotiation, the criminal plea bargain should be of paramount importance. Here is a situation where an individual literally bargains for years of his life to be spent largely as he chooses or in a prison. Theorists have recognized the importance of this situation and a number of important papers have modeled it (Landes, Reinganum, Daugherty and Reinganum, Grossman and Katz)¹. But given the immensely high stakes of the defendant decision to accept or reject a plea offer, it has been severely understudied by empirical economists. Nor is the plea bargain a rare scenario rather, it is one that individuals in the U.S. face millions of times each year.

In criminal proceedings, prosecutors often make defendants an offer of a specific recommended sentence or sentencing range in exchange for the defendants guilty plea. The defendant, usually through his attorney, may accept the offer, reject it, or make a counter-offer. Well over 90% of sentences in the U.S. are determined through plea bargaining².

This paper makes the broadest and most in-depth empirical economic study of plea bargaining to date. We examine data on over 300,000 cases prosecuted in North Carolina state courts from 1995 to 2009. The depth of data allows us to uncover more nuanced phenomena about plea bargaining than previously possible.

If defendants are risk-neutral sentence-minimizers, we should expect the expected sentence to be approximately the same regardless of whether a defendant accepts or rejects a plea bargain. In Section III we elaborate on this simple equilibrium model of sentencing. There is also an out-of-equilibrium belief in a trial penalty that is widely held by practitioners in the criminal justice system. This view holds that defendants who reject a plea offer receive higher expected sentences as there are penalized for using extra judicial resources. We are able to test both of these theories in several ways.

We run OLS regressions using both statewide data and that from Charlotte, the largest metro area in North Carolina. We are able to control for defendant, case, attorney, judge, and jurisdiction characteristics. We find that on average defendants receive longer sentences when they reject pleas, providing some support for the trial penalty belief. But the findings are more complex; defendants seeking to minimize the likelihood of any imprisonment are better served by rejecting

¹ William M Landes *An Economic Analysis of the Courts* (1971), Jennifer F. Reinganum, *Plea Bargaining and Prosecutorial Discretion* (1988), Andrew F. Daugherty and Jennifer F. Reinganum *Economic Theories of Settlement Bargaining* (2005), and Gene M. Grossman and Michael L. Katz *Plea Bargaining and Social Welfare* (1983)

² See Bureau of Justice Statistics *Plea and Charge Bargaining: Research Summary* (2011).

a plea offer. Doing so decreases the probability of imprisonment by 5 to 7 percentage points, depending on the specification. This disparity is substantially larger statewide than in Charlotte.

In addition, the expected sentencing gap (between accepting and rejecting a plea) varies substantially by type of crime. While it is generally advantageous to plead guilty in order to minimize the expected sentence, for several white collar crimes, the estimates go in the other direction. This variation by crime type is not observed when focusing on any incarceration, where rejecting a plea is almost uniformly advantageous³.

Much has been written about racial disparities in the criminal justice system. Thus it may come as little surprise that the plea decision also varies substantially by race, with blacks suffering a 20% greater trial penalty than whites, in expectation. For incarceration rate, however, the racial difference goes away.

Attorneys and judges have enormous impact on case outcomes. They also vary substantially in how they affect plea bargain outcomes. The clients of most attorneys seeking to minimize their expected sentence would do better by pleading, but approximately 35% would be better served rejecting a plea deal⁴. The same can be said about judges, where 27% of defendants appearing before a judge would be better served rejecting a plea⁵. There also appears to be a correlation between attorney type and the sentence obtained from a plea; court appointed private attorneys are associated with significantly longer average sentences after a plea than either public defenders or individually retained private attorneys⁶

Of course, even when including controls for all observable characteristics there is the possibility that unobservable variables will bias the results. This we make use of an IV strategy to address this. We use the fact that agreement between defense and prosecution attorneys is more likely when there are less diffuse priors about the likely outcome at trial. Since attorneys gain information about a judges sentencing tendencies with experience, the distribution of priors should become tighter as the number of interactions with a judge increases. This should then lead to a greater likelihood of a plea. We find that, in fact, this relationship does hold and use it attorney-judge interactions as our instrument. We obtain statistically significant estimates of a positive trial penalty statewide. However, when we restrict analyses to circumstances where our instrument

³ For weapons crimes, there is no significant effect of pleading on incarceration.

⁴ This percentage represents the percentage of observations where defendants are represented by lawyers whose average plea bargain (controlling for observable characteristics described in Equation 5.1) produces a worse outcome than their average trial. For this we restrict to lawyers observed more than 350 times (212 different lawyers)

⁵ This estimate is similar to that for lawyers. Controlling for observable characteristics, 27% of defendants are facing a judge where their expected sentence is longer from pleading than from trial.

⁶ We estimate a fixed effect of 0.25 years associated with taking a plea while represented by a court appointed attorney rather than a private attorney or public defender. This estimate controls for all observable characteristics.

is the strongest, we fail to obtain significance on our estimate of a trial penalty. That said, even in these subsets, we struggle with weak instrumentation because of the particularly high plea rate.

The findings presented in this paper substantially extend the closest previous work on the topic, presented in Abrams (2011,2013). These papers found that rejecting plea bargains in Chicago lowered average sentences, but the data examined was not detailed enough to allow for separate estimates by type of crime, race, location, or attorney type.⁷ In Sections 4 and 6, we discuss several possible explanations for these findings, most notably North Carolina's use of a sophisticated structured sentencing scheme. This structured sentencing scheme reduces judicial leeway and may constrain the ability to negotiate substantial sentence length reductions.

This paper takes important steps forward in our understanding of defendant decision-making and clarifies the important role played by plea bargaining in the criminal justice system. The fact that both expected sentence and probability of incarceration are unequal depending on the decision to plea is evidence that the risk-neutral defendant is too simple. Rather, it is likely that defendant risk-aversion, agency problems, racial bias, and behavioral phenomena are behind some of our findings. We explore these further in Section VI.

The remainder of this article proceeds as follows: Section 2 situates our article within the relevant literature and Section 3 presents our model of the plea decision. Section 4 introduces the data and discusses features specific to the North Carolina court system and Section 5 presents the empirical findings. We end with a discussion of our results in Section 6 and conclude in Section 7.

2 Background

To situate this article within the relevant literature, we must understand how authors understand the choice of defendant to go to trial or take a plea bargain. As Jones (1978) describes this choice,

Plea bargaining results from an agreement between the prosecutor, defense attorney, and occasionally the defendant. The prosecutor offers the defendant a *quid pro quo* (charge reduction or sentence recommendation) for pleading guilty. . . . Moreover, the participants wield such discretion that in most cases they serve as the final arbiters in the sentencing decision.⁸

⁷ As will be discussed further in Section 2, Abrams (2011) found evidence that plea bargains produce sentences between 4 and 21 months longer than those produced from trial.

⁸ J. B. Jones *Prosecutors and the Disposition of Criminal Cases: An Analysis of Plea Bargaining Rates* (1978)

This negotiation described by Jones is fundamentally similar to the theory of The Shadow of the Law proposed by Mnookin and Kornhauser in their 1979 article discussing divorce settlements. The authors assert that despite the vast majority of divorces resolving with a negotiated settlement, the possibility of trial inherently frames any negotiation. It is natural to extend this theory to criminal cases — despite the vast majority of criminal cases resolving with plea bargains, the outcomes are inherently framed by the possibility of jury trials⁹.

One important difference in Jones's story and the Shadow of the Law theory is the question of timing. Jones describes the trade as largely a discussion about *ex-post* outcomes. By pleading, the defendant obtains a reduced sentence as compared to what the defendant would have received were they convicted at trial (i.e. conditional on a finding of guilt). Similarly, the prosecutor willingly gives up sentence length in order to avoid to cost (both in time and effort) of going to trial. The Shadow of the Law theory, however, considers the defense and prosecution having an *ex-ante* negotiation. The defendant obtains a sentence from a plea bargain less than the *expected* sentence they receive from declining the plea bargain¹⁰, and the prosecution both avoids the cost of trial and secures the benefit from a conviction with certainty.

The 'correct' way to understand outcome of plea bargaining is objectively contextually dependent. The *ex-post* discussion would be more appropriate for a lawmaker trying to determine the appropriate statutory punishment for a crime. Similarly, someone interested in understanding the punishments faced by individuals convicted of a certain crime should analyze the *ex-post* outcomes. When a defense attorney is advising their client on whether or not to accept a plea bargain, however, they arguably should focus on the *ex-ante* choice. Even if facing a potential 3 years in prison given conviction, no defendant would accept a plea bargain of 1 year in jail if they believe there is only a 1% chance of conviction at trial. A defendant who believes they face a 75% chance of conviction at trial, however, would be much more inclined to accept the offer.

More recently, the application of the Shadow of the Law theory to criminal cases has faced some criticism. Bibas discusses how institutional features of the court system as well as well-documented Behavioral Economics phenomena complicate the Shadow of the Law¹¹. Stuntz points out how

⁹ The shadow of the law theory has been employed by many others in a variety of contexts. For examples, see Cooter, Marks, and Mnookin *Bargaining in the Shadow of the Law: A Testable Model of Strategic Behavior* (1982) and Priest and Klein *The Selection of Disputes for Litigation* (1984).

¹⁰ When we say expected sentence, this effectively is the sentence a defendant expects conditional on being found guilty at trial weighted by the probability that they would be found guilty at trial. Mathematically:

$$E[\text{Sentence}] = \text{Sentence} \cdot \text{Pr}(\text{Found Guilty}) + 0 \cdot \text{Pr}(\text{Found Not Guilty})$$

¹¹ Stephanos Bibas *Plea Bargaining Outside the Shadow of Trial* (2004).

prosecutor discretion in case selection and differing prosecutor goals may be problematic for the Shadow of the Law theory¹².

While imperfect, the Shadow of the Law theory still provides a natural entry point to understand the plea bargaining decision. Additionally, because this article focuses on the defendant's choice to accept a plea bargain of a certain length, we will exclusively use the *ex-ante* perspective. This choice of focus distinguishes our work from the majority of the existing empirical literature on plea bargaining, and puts us theoretically squarely in the Shadow of the Law mindset.

The earliest empirical discussion of the plea bargaining process was published by Rhodes (1979), who examine ex-post sentences from plea bargains compare to ex-post sentence from trial¹³. Using data on arrests in Washington, D.C. in 1974, Rhodes shows no distributional differences for charges of larceny, burglary, and assault. Rhodes does find that probation is a more common sentence and jailtime of 3+ years is less common after pleading guilty to the charge of robbery (as opposed to sentences condition on conviction at trial).

This ex-post analysis of plea bargaining continued with the work of Brereton and Casper¹⁴. Using data from three California jurisdictions in the late 1970s, the authors test for the equality of rates of imprisonment between those who plead guilty and those who go to trial. While the authors control for some relevant observable measures¹⁵, they examine only the fraction of defendants who were imprisoned. This is problematic on two fronts: 1) by looking at imprisoned rather than incarcerated, the authors ignore the sentences less than a year, and 2) the authors only examine the rate of imprisonment and not sentence lengths. The first problem causes sentences of less than a year to be discounted unnecessarily. The second, more severe problem, prohibits the authors from assessing the more plausible margin to observe a difference in outcomes; differences in outcomes reasonably manifest in differences in sentence lengths and not necessarily a difference in the rate of jailtime¹⁶

The discussion of ex-post outcomes from trials and plea bargains continued to be a popular topic, with authors analyzing the dynamics of a variety of different court systems. Schulhofer and Nagel (1989, 1992, and 1997) discuss how the federal sentencing guidelines build in a 35 percent sentence

¹² W. Stuntz *Plea Bargaining and Criminal Laws Disappearing Shadow* (2004)

¹³ W.N. Rhodes *Plea Bargaining: Its Effect on Sentencing and Convictions in the District of Columbia* (1979)

¹⁴ Brereton and Casper *Does it Pay to Plead Guilty?* (1982)

¹⁵ The authors include controls for: jurisdiction, two types of crime (robbery and burglary), prior record, number of charges, and seriousness of charge.

¹⁶ For example, as North Carolina uses a structured sentencing scheme with minimum active sentences proscribed given guilt of many crimes, we would expect no difference in ex-post incarceration rates.

reduction in sentence length for pleading¹⁷. This happens as a consequence of the U.S. Sentencing Guidelines Manual permitting a reduction in sentence for “accepting responsibility” for one’s action¹⁸. Despite the possibly 35 percent ex-post discount, Ulmer et al. (2010) estimate only between a 3 and 15 percent penalty¹⁹ reduction in sentences from plea bargains.

Prior to Abrams (2011), the only author to empirically discuss how defendants make the ex-ante choice to plea or go to trial was Smith (1986), who examined whether a defendant receives a prison sentence of at least a year²⁰. Controlling for several observable case and defendant characteristics, he finds that there was no statistically significant difference between the unconditional expected sentence from trial and that obtained after a plea bargain. As the author does not address potentially unobserved selection issues, we still may worry of bias in these estimates.

It is in this conceptual position in Abrams (2011,2013) that the literature must empirically understand the ex-ante choice to plead. Using data from Cook County, Illinois state courts²¹, he finds direct evidence that defendants are not minimizing expected sentences through plea bargains. In fact, his OLS estimates provide evidence that a risk-neutral defendant could expect a shorter sentence by declining a plea bargain than by accepting. Unlike previous literature, Abrams (2011) used IV regression to control for unobservable selection issues. These estimates provide no evidence against his first surprising result.

Abrams (2011) presented a counter-intuitive result, that defendants would on average be better off going to trial, and unsurprisingly was received with some skepticism²². The most compelling critique comes from Alschuler (2013), who criticized (among other features) the construction of the dataset from Cook County, Illinois²³. In particular, Alschuler commented “He [Abrams] was confident that had he actually compared post-trial sentences to post-guilty-plea sentences, the

¹⁷ See Schulhofer and Nagel *Negotiated Pleas Under the Federal Sentencing Guidelines: The First Fifteen Months* (1989), Nagal and Schulhofer *Tale of Three Cities: An Empirical Study of Charging and Bargaining Practices Under the Federal Sentencing Guidelines* (1992), and Schulhofer and Nagel *Plea Negotiations Under the Federal Sentencing Guidelines: Guideline Circumvention and its Dynamics in the Post-Mistretta Period* (1997).

¹⁸ See U.S. Sentencing Guidelines Manual 3E1.1 (2010).

¹⁹ Ulmer, Eisenstein, and Johnson *Trial Penalties in Federal Sentencing: Extra-Guidelines Factors and District Variation* (2010).

²⁰ Douglas Smith *The Plea Bargaining Controversy* (1986).

²¹ See Abrams (2011,2013)

²² It is worth mentioning A.C. Kim *Underestimating the Trial Penalty: An Empirical Analysis of the Federal Trial Penalty and Critique of the Abrams Study* (2014). This paper seems to fundamentally misunderstand the conceptual difference between the ex-ante and ex-post outcomes. Additionally statements such as “Abrams’s methodology implicitly assumes that defendants who pled guilty would have had the same odds of being acquitted as those defendants who actually went to trial” suggests a lack of understanding about the entire discussion of observable and unobservable endogenous group selection. This is explicitly not the assumption that is made in Abrams (2011,2013). This assumption would obviate the need for instrumental variables thereby rendering pages 206-207 and 214-218 unnecessary.

²³ See Albert Alschuler *Lafler and Frye: Two Small Band-Aids for a Festering Wound* (2013).

posttrial sentences would have been less severe. Abrams might be correct, and it would be worth the effort to find out. The following section of this article considers circumstances that might explain findings like Abrams if these findings were replicated in a better conceived and better executed study " (691).

With Alschuler's request squarely in mind, the current paper proceeds as a conceptual descendant of Abrams (2011,2013). The current article uses a significantly larger dataset involving all felony cases in the state of North Carolina between 1995 and 2009. After significant cleaning of the data to ensure it truly characterizes the observed incidents, we retain over 300,000 observations²⁴.

3 Theory

We begin with a simple mathematical model describing a criminal defendant's choice to go to trial rather than accept a plea bargain. This conceptual framework was introduced by Priest and Klein (1994) and has been subsequently used in Abrams (2011) in analyzing the choice to take a plea in Chicago.

Assume that for every criminal defendant, all information relevant to the case is known, and that this information can be summarized by a single variable Y . We may think of Y as the weight of evidence that a given defendant is guilty of their charged crimes. Let Y^* represent the burden of proof necessary for a finding of guilt. We denote the realized value of Y for a particular case as Y' . Therefore, the outcome of a trial will be:

$$\begin{aligned} \text{Defendant is found guilty if } Y' > Y^* \\ \text{Defendant is found not guilty if } Y' \leq Y^* \end{aligned}$$

As in any situation, however, there is uncertainty about the true value of Y' . We will model this uncertainty as if the defendants and prosecutors receive a noisy signal about the true value of Y' :

$$\begin{aligned} \hat{Y}'_p &= Y' + \varepsilon_p \\ \hat{Y}'_d &= Y' + \varepsilon_d \end{aligned}$$

Where ε_p and ε_d are the prosecution and defendant's uncertainty about Y' respectively. We will assume that ε_p and ε_d are drawn from the same distribution, specifically:

$$\varepsilon_p, \varepsilon_d \sim N(0, \sigma^2)$$

²⁴ It is important to acknowledge, and will be described in Section 4 that these remaining observations are not capturing the entire universe of felony cases in North Carolina. For example we exclude homicide cases, cases only involving the violation of probation, and crucially for the identification strategy, cases where we cannot identify the judge.

As $E[\varepsilon_p] = E[\varepsilon_d] = 0$, this means that $E[\hat{Y}'_p] = E[\hat{Y}'_d] = Y'$. Thus, in expectation, both the prosecution and defendant's beliefs about Y' are correct (i.e. they have rational expectations). Without any loss of generality, we can normalize $Y^* = 0$.

As both the prosecution and the defendant know $\varepsilon_p, \varepsilon_d \sim N(0, \sigma^2)$, given their respective signals \hat{Y}'_p and \hat{Y}'_d , they form beliefs about the probability of a finding of guilt at trial:

<i>Prosecution</i>	<i>Defendant</i>
$P_p = \Pr(Y' > 0 \hat{Y}'_p)$	$P_d = \Pr(Y' > 0 \hat{Y}'_d)$
$= \Pr(\hat{Y}'_p - \varepsilon_p > 0)$	$= \Pr(\hat{Y}'_d - \varepsilon_d > 0)$
$= \Pr(\hat{Y}'_p > \varepsilon_p)$	$= \Pr(\hat{Y}'_d > \varepsilon_d)$
$= F(\hat{Y}'_p)$	$= F(\hat{Y}'_d)^{25}$

Now, for a given charge, let us temporarily assume that the length of a jail sentence is fixed upon conviction is fixed at a length of J . Given this assumption, the expected jail time that the defendant and prosecution can expect given a trial is:

$$E[J \text{ at trial}] = E[P_p \cdot J] = E[P_d \cdot J] = F(Y') \cdot J$$

3.1 Choice to Plea vs. Trial

Let us define:

<i>Prosecution</i>	<i>Defendant</i>
$C_p \equiv$ cost of going to trial	$C_d \equiv$ cost of going to trial
$S_p \equiv$ cost of settling	$S_d \equiv$ cost of settling

If we assume that both the prosecutor and the defendant are risk neutral and linearly value jail time, then the prosecutor would be willing to accept any sentence length A , so long as:

$$A - S_p \geq P_p \cdot J - C_p$$

Thus, we can define the minimum sentence, \underline{A} , the prosecutor would accept as:

$$\underline{A} \equiv P_p \cdot J - C_p + S_p$$

²⁵ Because we have assumed that $\varepsilon_p, \varepsilon_d \sim N(0, \sigma^2)$, we know that $F(\hat{Y}'_p) = \Phi(\frac{\hat{Y}'_p}{\sigma})$ and $F(\hat{Y}'_d) = \Phi(\frac{\hat{Y}'_d}{\sigma})$, where $\Phi(\cdot)$ corresponds to the standard normal distribution.

Similarly, we can define the maximum sentence the defendant would be willing to accept, \bar{B} as:

$$\bar{B} \equiv P_d \cdot J + C_p - S_p$$

This allows us to conclude that the two parties will go to trial if:

$$\underline{A} > \bar{B} \text{ or } P_p - P_d > \frac{C - S}{J}$$

where $C = C_d + C_p$ and $S = S_d + S_p$.

From this logic, we conclude that a trial will occur if the minimum sentence a prosecutor will accept is greater than the maximum sentence that a defendant will accept. This model has features that match intuition. Trials are more likely in cases where prosecutors have a high expectation of conviction, while defendants have a lower expectation. Increasing the cost of going to trial makes a trial less likely to occur, while increasing the cost of settling makes a trial more likely to occur. Trials are also more likely as the length of sentence given conviction increases (assuming settlement costs are less than trial costs). This occurs because the relative cost savings from settling rather than going to trial decrease in sentence length²⁶

If, however, $\underline{A} \leq \bar{B}$, then any negotiated sentence length $J' \in [\underline{A}, \bar{B}]$ from a plea bargain would be preferable to going to trial for both the prosecution and defendant. If we assume that $C_p = S_p$ and $C_d = S_d$, then the defense and prosecution would be willing to accept any negotiated sentence length $J' \in [P_p \cdot J, P_d \cdot J]$. By our assumption of rational expectations, we have that $E[P_p] = E[P_d]$, and therefore:

$$E[J \text{ from plea}] = E[P_p \cdot J] = E[P_d \cdot J] = J \cdot F(Y')$$

Inspecting above, we see that this produces the result that $E[J \text{ from plea}] = E[J \text{ at trial}]$. So, if there is no cost difference between going to trial and settling, we would expect to see no difference between the expected negotiated sentence and the expected sentence at trial.

Allowing now the costs to differ, we can discuss the “shadow of the law” result. Let us define:

$$D \equiv \frac{C - S}{J}$$

Assuming $D > 0$, our decision to go to trial can be reframed as²⁷:

$$\text{Trial if } F(\hat{Y}'_p) - F(\hat{Y}'_d) > D \tag{1}$$

²⁶ This is directly visible from the term equation $P_p - P_d > \frac{C-S}{J}$. Assuming $C - S > 0$, then $\frac{C-S}{J}$ falls as J increases. This increases the likelihood that $P_p - P_d$, or that the two parties go to trial.

²⁷ This assumption is not strictly necessary. If $C < S$, then $D < 0$ for all possible sentence lengths. Since the prosecutor and defendant will end at trial if $P_p - P_d > \frac{C-S}{J} = D$, and because $E[P_p - P_d] = 0$, having $D < 0$ would imply that in expectation each case will go to trial. Moreover, it will imply that, in actuality, a majority of cases will go to trial. This result would be wildly inconsistent with reality where fewer than 10% of cases go to trial. Thus, we can safely restrict our attention to the case where $D > 0$.

Additionally, because of our assumption of rational beliefs,

$$E \left[F(\hat{Y}'_p) - F(\hat{Y}'_d) \right] = 0 < D \quad (2)$$

Equation (2) tells us that in expectation, cases will be settled with a plea bargain and not a trial, a feature that matches both intuition and reality. Equation (1) tells us that *some* cases will go to trial, and that these cases will be those with the greatest divergence between prosecutor confidence and defendant pessimism.

This paper seeks to determine whether the expected sentence length differs between a plea bargain and a trial. We as researchers cannot possibly observe \hat{Y}'_p and \hat{Y}'_d . Moreover, we cannot even observe a complete panel of variables necessary to fully determine \hat{Y}'_p and \hat{Y}'_d , as there are unobservable characteristics. As such, we will almost certainly have estimation bias if we ignore the fact that the choice to take a plea bargain is a function of unobservable case quality²⁸

To properly handle this estimation bias, we will need to construct an instrument for the probability of taking a plea bargain that is unrelated to the probability of guilt at trial. Given our above model, any factor that randomly disturbs settlement costs, trial costs, sentence lengths, the distribution of Y , or the distribution of the ϵ 's would suffice – all variables that enter into Equation (1).

Any variable that increases (decreases) $Var \left[F(\hat{Y}'_p) - F(\hat{Y}'_d) \right]$ increases (decreases) the probability that Equation (1) is satisfied (i.e. that the parties go to trial). Thus, any such variable that satisfies our exclusion restriction²⁹ could serve as a good instrument for whether the case goes to trial.

Up to this point, we have introduced uncertainty only insofar as the defense and prosecutor receive a noisy signal about the true case quality Y' . We could easily change the source of uncertainty to be Y^* , the bar for conviction. This uncertainty, $\epsilon_p, \epsilon_d \sim N(0, \sigma^2)$ would manifest because different judges will have idiosyncratically different definitions of “reasonable doubt” in a case, and the formulae above will be functionally unchanged³⁰. Given this new source of error, any information about judge proclivities will decrease the variance of ϵ_p and ϵ_d . This will directly decrease σ^2 , which reduces $Var \left[F(\hat{Y}'_p) - F(\hat{Y}'_d) \right]$.

The primary way where prosecutors and defendants learn about judge proclivities is through

²⁸ One unobservable characteristic is the underlying true guilt of the defendant. It is possible that in situations where the defendant is actually guilty, the defendant and prosecutor gets a higher value for \hat{Y}'_p and \hat{Y}'_d . This would raise both P_p and P_d causing a change in defendant and prosecutor behavior that is completely unmeasurable to us as researchers.

²⁹ We have a situation where the choice to go to trial is correlated with unobserved case characteristics. Prosecutors are more likely to require a trial for cases with smaller ϵ_p (ie. easier cases to prosecute), as such $E[\epsilon_p | trial] \neq 0$. Thus, our exclusion restriction is that we need a variable that is related to the choice to go to trial that is uncorrelated with ϵ_p .

³⁰ We have chosen to present the above model with the error on the case quality and not judge proclivity for ease of exposition only. The intuition is slightly more natural, but the logic is identical.

inspection of prior decisions. Judges new to the bench will have few prior decisions, thereby providing little information about σ^2 for that judge. Conversely, an experienced judge will have a large amount of prior casework, allowing both parties to develop accurate assessments of σ^2 . We will now show that changing σ^2 changes, $Var [F(\hat{Y}'_p) - F(\hat{Y}'_d)]$, and can serve as an instrument for the likelihood of pleading:

First, let us denote $Var [F(\hat{Y}'_p) - F(\hat{Y}'_d)]$ as σ_τ^2 . Then, by definition:

$$\begin{aligned}\sigma_\tau^2 &= E \left[\left(F(\hat{Y}'_p) - F(\hat{Y}'_d) \right)^2 \right] - \underbrace{E^2 [F(\hat{Y}'_p) - F(\hat{Y}'_d)]}_{=0 \text{ from Equation 2}} \\ \sigma_\tau^2 &= E \left[\left(F(\hat{Y}'_p) - F(\hat{Y}'_d) \right)^2 \right] \\ \sigma_\tau^2 &= E \left[F(\hat{Y}'_p)^2 - 2F(\hat{Y}'_p)F(\hat{Y}'_d) + F(\hat{Y}'_d)^2 \right]\end{aligned}$$

As ϵ_p and ϵ_d are drawn from the same distribution, we have:

$$\sigma_\tau^2 = 2E [F(Y')^2] - 2E [F(\hat{Y}'_p)F(\hat{Y}'_d)]$$

Lastly, since ϵ_p and ϵ_d are independent, we have:

$$\begin{aligned}\sigma_\tau^2 &= 2E [F(Y')^2] - 2E^2 [F(Y')] \\ \sigma_\tau^2 &= 2Var [F(Y')]\end{aligned}$$

As $F(Y') = \Phi(\frac{Y'}{\sigma})$, we have that σ_τ^2 is monotonically increasing in σ . This result is shown using numerical methods.

3.2 Comparative Statics

The above model allows us to also make predictions about how case outcomes should vary with changes to parameters. By identifying circumstances with predictable differences in parameters levels, we can empirically evaluate the consistency of our model. We will first focus on how the plea rate changes with our various parameters, and then talk about the rate of guilt at trial.

Equation (1) tells us that for a given Y'_p and Y'_d , a trial will happen if $F(\hat{Y}'_p) - F(\hat{Y}'_d) > \frac{C-S}{J}$. Accordingly, the probability that a trial happens is:

$$\begin{aligned}Pr(trial) &= Pr \left[F(\hat{Y}'_p) - F(\hat{Y}'_d) > \frac{C-S}{J} \right] \\ &= Pr \left[\Phi\left(\frac{\hat{Y}'_p}{\sigma_p}\right) - \Phi\left(\frac{\hat{Y}'_d}{\sigma_d}\right) > \frac{C-S}{J} \right]\end{aligned}$$

Without needing to specify the exact form of this probability, we can directly see how this probability will change with the parameters. So, let us consider how the parameters impact the probability a case goes to trial:

1. $\frac{\delta Pr(trial)}{\delta C} < 0$: Increasing C (either C_d or C_p) will make the inequality harder to satisfy.
2. $\frac{\delta Pr(trial)}{\delta S} > 0$: Increasing S (either S_d or S_p) will make the inequality easier to satisfy.
3. $\frac{\delta Pr(trial)}{\delta J} > 0$: Increasing J will make the inequality easier to satisfy.
4. $\frac{\delta Pr(trial)}{\delta \sigma_d} > 0$: This effect is harder to see as raising σ_d increases $\Phi(\frac{\hat{Y}'_d}{\sigma_d})$ if $Y'_d < 0$ and decreases $\Phi(\frac{\hat{Y}'_d}{\sigma_d})$ if $Y'_d > 0$. Overall, since $\Phi(\frac{\hat{Y}'_p}{\sigma_p}) - \Phi(\frac{\hat{Y}'_d}{\sigma_d}) > \frac{C-S}{J}$ is hardest to satisfy when \hat{Y}'_d is large, these two effects net to increase $Pr(trial)$.
5. $\frac{\delta Pr(trial)}{\delta \sigma_p} > 0$: Similarly, since $\Phi(\frac{\hat{Y}'_p}{\sigma_p}) - \Phi(\frac{\hat{Y}'_d}{\sigma_d}) > \frac{C-S}{J}$ is hardest to satisfy when \hat{Y}'_p is small, increasing $\Phi(\frac{\hat{Y}'_p}{\sigma_p})$ increases $Pr(trial)$.
6. $\frac{\delta Pr(trial)}{\delta Y'} < 0$: If we assume the pool of defendants have Y' coming from a symmetric distribution centered at 0, then increasing the mean above 0 will reduce the probability Equation (1) will be satisfied.

Given these predictions, we can now ask under what circumstances can we reasonably make predictions about changes to our parameters. We have identified five margins along which comfortable making predictions about the impact on the parameters: 1) defendant race, 2) defendant sex, 3) defense attorney ability, 4) defense attorney type, and 5) average sentence for the crime.

1. Race: The presence of any manifestation of taste based discrimination against black defendants would manifest as if Y' for a black defendant were increased. Thus, the distribution of Y' for black defendants would have their mean increased, which makes satisfying Equation (1) harder. This lowers the probability of trial for black defendants relative to white.
2. Female: We might expect a female defendant to be harder to convict at trial than an equal male defendant. This manifests with lower average Y' for female defendants, which would lower the rate of trials relative to male defendants.
3. Defense attorney ability: We might expect a better defense attorney to be able to secure a lower sentence at trial J . This should make trials more appealing, thereby raising the rate of trials relative to lower skilled attorneys.
4. Defense attorney type: The pay-structure and other caseload of public defenders, privately appointed, and privately retained attorneys all differ. The substantial caseloads of public defenders should make going to trial a more costly. The higher C_d for public defenders should mean a lower rate of trials.

5. Average Sentence for Crime: A low-level offense should have a lower J than a more serious crime. As such, we expect more trials for more serious offenses.

Now let us turn our attention to the probability of guilt at trial. To analyze how the rate of guilt changes with our parameters, we are going to make a simplifying assumption — $F(\hat{Y}'_p) = g$. That is, the prosecution doesn't receive a noisy signal about guilt but simply has a fixed belief about the likelihood of guilt at trial. As such, we modify Equation (1) and have:

$$\begin{aligned} Pr(trial) &= Pr \left[g - F(\hat{Y}'_d) > \frac{C - S}{J} \right] \\ &= Pr \left[g - \Phi\left(\frac{\hat{Y}'_d}{\sigma_d}\right) > \frac{C - S}{J} \right] \end{aligned}$$

This means that the probability of guilt at trial can be expressed as:

$$Pr(guilty | trial) = \mathbb{E} [Pr [Y' > 0 | Y'_d, trial]]$$

Again, without needing to specify the exact probability we can characterize the changes to the probability of guilt at trial:

1. $\frac{\delta Pr(guilty | trial)}{\delta C} < 0$: Increasing C (either C_d or C_p) will make the inequality harder to satisfy, so only lower Y'_d go to trial. As probability of guilt is lower if Y'_d is lower, the average rate of guilt at trial should decline..
2. $\frac{\delta Pr(guilty | trial)}{\delta S} > 0$: Increasing S (either S_d or S_p) will make the inequality easier to satisfy, which should raise the average Y'_d at trial.
3. $\frac{\delta Pr(guilty | trial)}{\delta J} > 0$: Increasing J will make the inequality easier to satisfy, which should raise the average Y'_d at trial.
4. $\frac{\delta Pr(guilty | trial)}{\delta Y'} > 0$: If we assume the pool of defendants have Y' coming from a symmetric distribution centered at 0, then increasing the mean above 0 will raise the probability of guilt at trial. Raising Y' 's mean should increase the share of Y' at trial that are greater than 0.

So, given these predictions, we can again ask what we would predict across our five margins:

1. Race: Raising Y' for black defendants should increase the probability of guilt at trial.
2. Female: Lowering Y' for female defendants should decrease the probability of guilt at trial.
3. Defense attorney ability: Lower J should make worse cases go to trial, thereby raising the rate of guilt.
4. Defense attorney type: The higher C_d for public defenders should mean a lower guilt rates at trial.

5. Average Sentence for Crime: A low-level offense should have a lower J than a more serious crime. As such, we expect more guilt at trials for more serious offenses.

Lastly, let us examine how the average sentence from a plea bargain should change with our parameters. To do so, we continue with our above simplified Equation (1). Without specifying exactly how a plea bargain is reached when it is, let us denote $q(C_d, S_d, C_p, S_p, J, Y'_d)$ the length. Given this, the average sentence from plea is:

$$\mathbb{E}_{Y'} [\mathbb{E} [q(\cdot, Y'_d)] \mid Y' \text{ and } plea]$$

That is, the average sentence at plea can be thought of as the average sentence at plea for each Y' averaged over all Y' . If we assume that Y' is symmetrically distributed around 0, then the following can be shown³¹

1. $\frac{\delta q(\cdot)}{\delta C} > 0$: Increasing C makes trials less appealing, so defense attorneys will accept higher sentences for any Y'_d .
2. $\frac{\delta q(\cdot)}{\delta S} < 0$: Increasing S makes pleading less appealing, so defense attorneys will demand lower sentences for any Y'_d .
3. $\frac{\delta q(\cdot)}{\delta J} > 0$: Increasing J makes trials more appealing, so defense attorneys will accept higher sentences for any Y'_d .
4. $\frac{\delta q(\cdot)}{\delta Y'} > 0$: If we shift the distribution of Y' up, we will increase the likelihood of large Y' . This increases the likelihood of observing larger Y'_d . Since $q(\cdot)$ is increasing in Y'_d , this raises our expected $q(\cdot)$.

Given these predictions, we can again hypothesize that we'll see:

1. Race: Raising Y' for black defendants should raise the average sentence from plea for black relative to white defendants..
2. Female: Lowering Y' for female defendants should lower the average sentence from plea relative to male defendants.
3. Defense attorney ability: Lower J should lower the average sentence from plea bargains

³¹ Given our modification to Equation (1), then for each Y' , plea bargains will happen based on the following cutoff rule: Plea if: $Y'_d \geq \sigma_d \Phi^{-1} \left[\frac{S-C}{J} + g \right] = \underline{Y}_d$. Given this, if we assume $Y' \sim N(0, \sigma_y)$, then the average sentence from pleas can be expressed as:

$$\int_{-\infty}^{\infty} \left[\int_{\underline{Y}_d}^{\infty} \frac{q(\cdot, Y'_d) \cdot \phi\left(\frac{Y'_d - Y'}{\sigma_d}\right)}{1 - \Phi(\underline{Y}_d)} dY'_d \right] \phi\left(\frac{Y'}{\sigma_y}\right) dY'$$

The above partial derivatives can be verified from this with assumptions about the sign of $\frac{\delta q(\cdot)}{\delta X}$ for various relevant X .

4. Defense attorney type: The higher C_d for public defenders should mean a higher average sentences from plea for public defender clients
5. Average Sentence for Crime: A low-level offense should have a lower J than a more serious crime. Accordingly, we expect average sentence from plea to increase with charge severity.

4 Data

The data we analyze in this paper comes from the North Carolina courts. With nearly 10 million residents, North Carolina is a tremendously diverse state with substantial geographic and socio-economic variation. The state is broken into 100 counties including eight metropolitan areas³² with county populations ranging from 4,115 people in Tyrrell County to 1,012,539 people in Mecklenburg County (Charlotte)³³.

North Carolina has a uniform court system, with two original trial courts. The District Court Division handles misdemeanors and the Superior Court Division is the trial court for felonies. We restrict attention in this paper to felony charges, so our data primarily comes from cases resolving in the Superior Court. The Superior Court is broken into 50 districts, which are aggregated into eight divisions. These divisions and districts are shown in Figure 1³⁴. In the 2005-6 fiscal year, 109,815 felony cases were filed in Superior courts. There were a total of 109 Superior Court judges, 514 prosecutors and 197 public defenders.

Another feature of the North Carolina court system is the use of a strong structured sentencing scheme. Implemented through the Structured Sentencing Act of 1993, North Carolina's structured sentencing program separates felony charges into ten classes (Class A as the most severe and Class I the least) and convicted felons into six different criminal history levels (Level I the least severe and Level VI the most). Over the 20 years of North Carolina's structured sentencing scheme's use, several small tweaks have been implemented, including a revision to the criminal history levels, and the formalization of aggravating and mitigating factors³⁵. Table 11 presents the current sentencing guidelines.

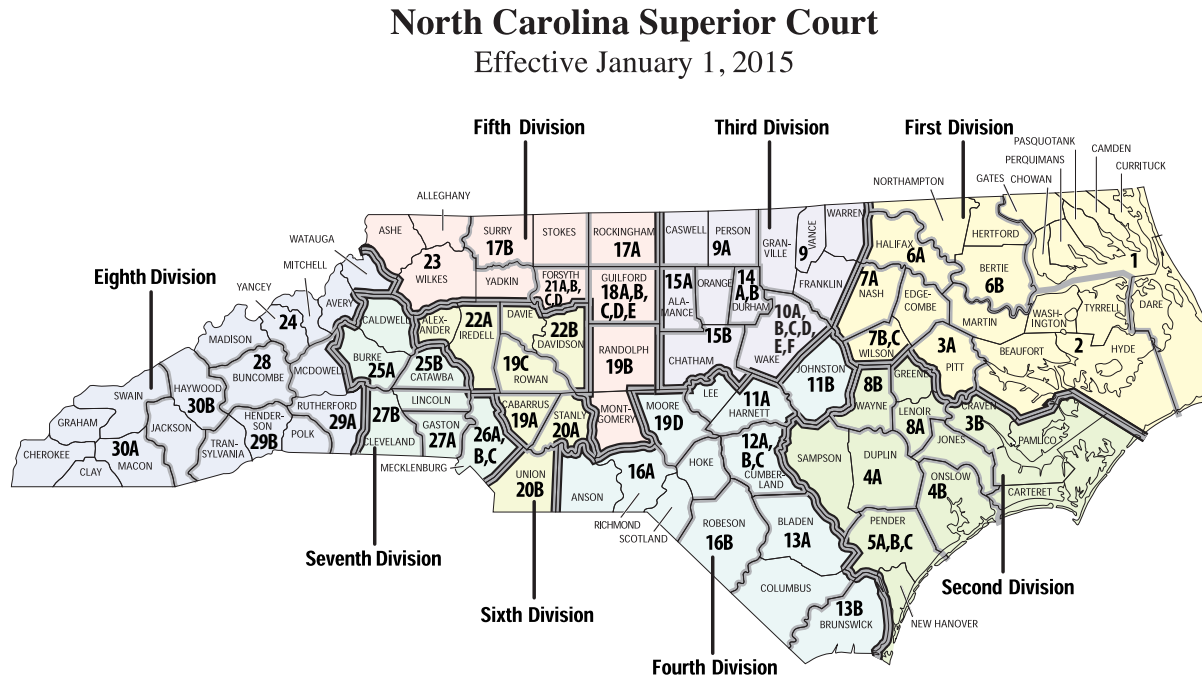
³² We use the Office of Management and Budget's definition of a combined statistical area (CSA) as our definition of a metropolitan area. The eight CSAs in North Carolina are: 1) Charlotte-Gastonia-Salisbury, 2) Raleigh-Durham-Cary, 3) Greensboro-Winston-Salem-High Point, 4) Rocky Mount-Wilson, 5) Asheville-Brevard, 6) Fayetteville-Lumberton-Laurinburg, 7) Greenville-Washington, and 8) New Bern-Morehead City.

³³ Population estimates from the U.S. Census Bureau's 2014 population estimates. See: http://quickfacts.census.gov/qfd/maps/north_carolina_map.html

³⁴ This map is current as of 2015 and is available at <http://www.nccourts.org/Courts/Trial/District/Documents/SuperiorCourtmap.pdf>.

³⁵ For an overview of North Carolina's sentencing, see "The North Carolina Sentencing and Policy Advisory Commission: A History of its Creation and its Development of Structured Sentencing" available at http://www.nccourts.org/Courts/CRS/Councils/spac/Documents/commission_history_aug2011.pdf.

Figure 1: North Carolina Superior Courts



Note: Districts that have more than one letter associated with the district number (i.e., 10A, B, C, D) are divided into separate districts for electoral purposes. For administrative purposes, they are combined into a single district.

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The main data set includes 316,161 cases³⁶ with a final date of disposition between 1995 and 2009. In order to ensure that our estimates are correct, we have extensively cleaned the data including manual cleaning of judicial and lawyer information. The entire data cleaning procedure is described in Appendix 1.1. Of this initial pool of cases, 289,676 or 91.7 percent were resolved through plea bargain. The other 9.3% are either resolved at trial or dismissed.

In the ensuing sections we use the term “No plea” rather than “Trial” as the alternative to “Plea” since foregoing a plea offer may result in a trial or dismissal. Thus the analysis takes the perspective of an ex-ante comparison before the decision to plead is made. This is in contrast to a number

³⁶ We use cases to mean all charges that were resolved for an individual on a single date. See Appendix 1.1 for further detail.

of prior papers that have focused on comparing plea sentences to those from a guilty verdict at trial³⁷.

Table 1 presents summary statistics for the statewide data by method of case resolution. Cases that resolved with a plea have 1.25 more charges. While there is no racial difference, plea bargained cases have somewhat younger defendants and a slightly lower share of female defendants. First offenders are far less likely to plea, accounting for 38% of the plea bargain cases and 63% of the rest.

About a quarter of defendants are incarcerated overall, although the rate is 10 percentage points higher for those who agree to a plea bargain. Incarceration is a dummy variable indicated any non-zero prison sentence beyond time served; it does not count probation. Sentences for those who take a plea bargain are lower on average, although we will see shortly that there is substantial variation based on crime type and other characteristics. The sentencing disparity is even greater when restricting attention to non-zero sentences.

Cases resolved via plea have substantially higher prior points (a measure of criminal history). This fact, along with the higher number of charges and lower rate of first offense would seem to suggest that those who plea face more serious consequences. However, the lower average age and bond amount point in the opposite directions. We examine plea rates by type of charge below to delve into this further. The distribution of attorney type also varies by plea decision, with public defenders comprising a far higher share of cases resolved via plea and private attorneys the opposite. This could be due to resource constraints or other factors or selection. We explore this further later in the paper.

Table 2 presents summary statistics for just the Charlotte CSA. In general, Charlotte mirrors what we see statewide, with one main differences — defendants are nearly 50% more likely to be represented by a public defender than we see statewide. This increase appears to come directly from a drop in court appointed attorneys. The increase in plea bargaining associated with this shift is consistent with our hypothesis that $Pr(trial)$ would be lower for public defenders, and an increase in public defender representation would increase average plea rates.

It is useful to compare the full sentencing distribution and not just look at averages. Figure 2 shows the distribution of nonzero sentences determined by our two methods of resolution and is truncated at 10 years for ease of display. Sentence length includes time served but not probation. We immediately observe that both sentencing distributions are highly skewed, and the distribution of sentence lengths for cases settled through a plea is substantially more concentrated between 0 and 2 years, while the sentencing distribution for those cases settled without a plea is

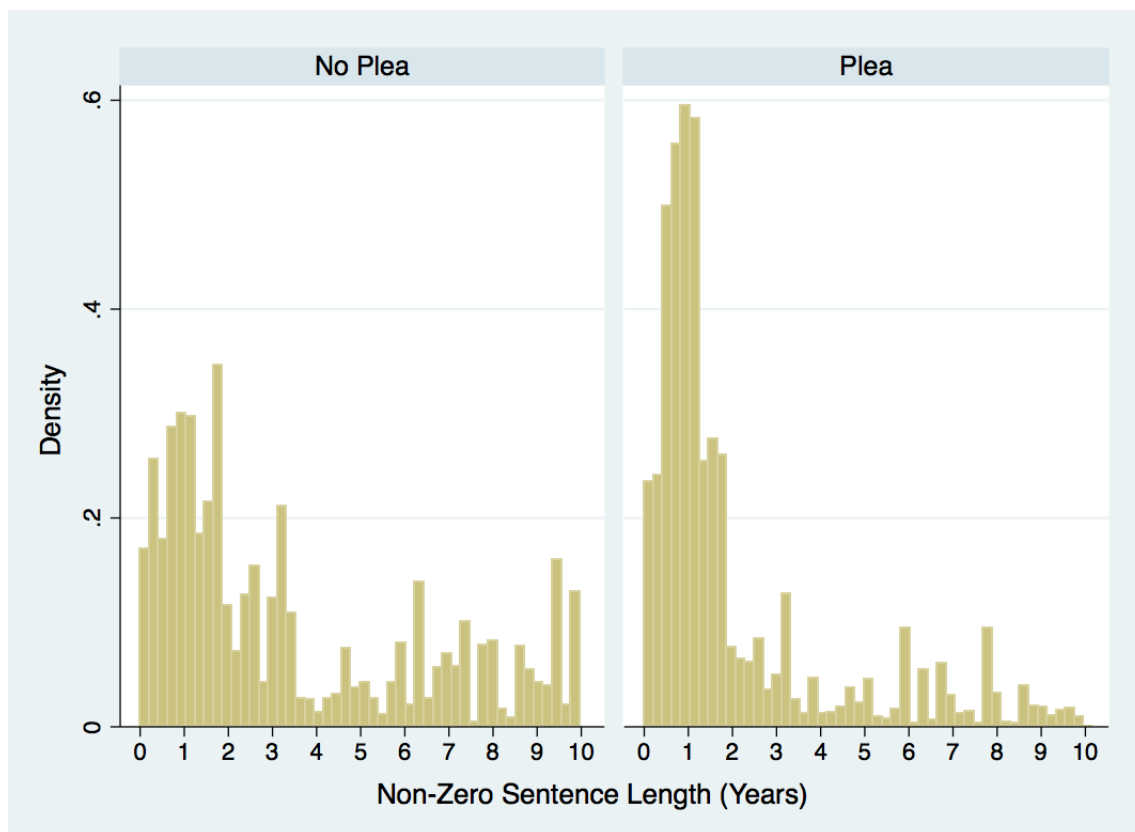
³⁷ Examples of such papers include Rhodes (1979), Brereton and Casper (1982), and Schulhofer and Nagel (1989,1992, and 1997).

more dispersed. Figure 3 depicts roughly the same distributions for the Charlotte CSA, with cases settled through a plea even further concentrated between 0 and 2 years.

Table 3 also illustrates that we have substantial variation in the method of case resolution by type of crime. We see that burglary represents 15% of all plea bargains but only 7% of cases that are resolved without a plea. Drug possession is more likely to be resolved without a plea, whereas drug distribution, which is generally more severe, comprises a substantially higher fraction of pleas. Weapon related crimes are slightly less likely to be resolved via a plea, but theft, which is generally less serious, makes up a higher proportion of pleas than trials.

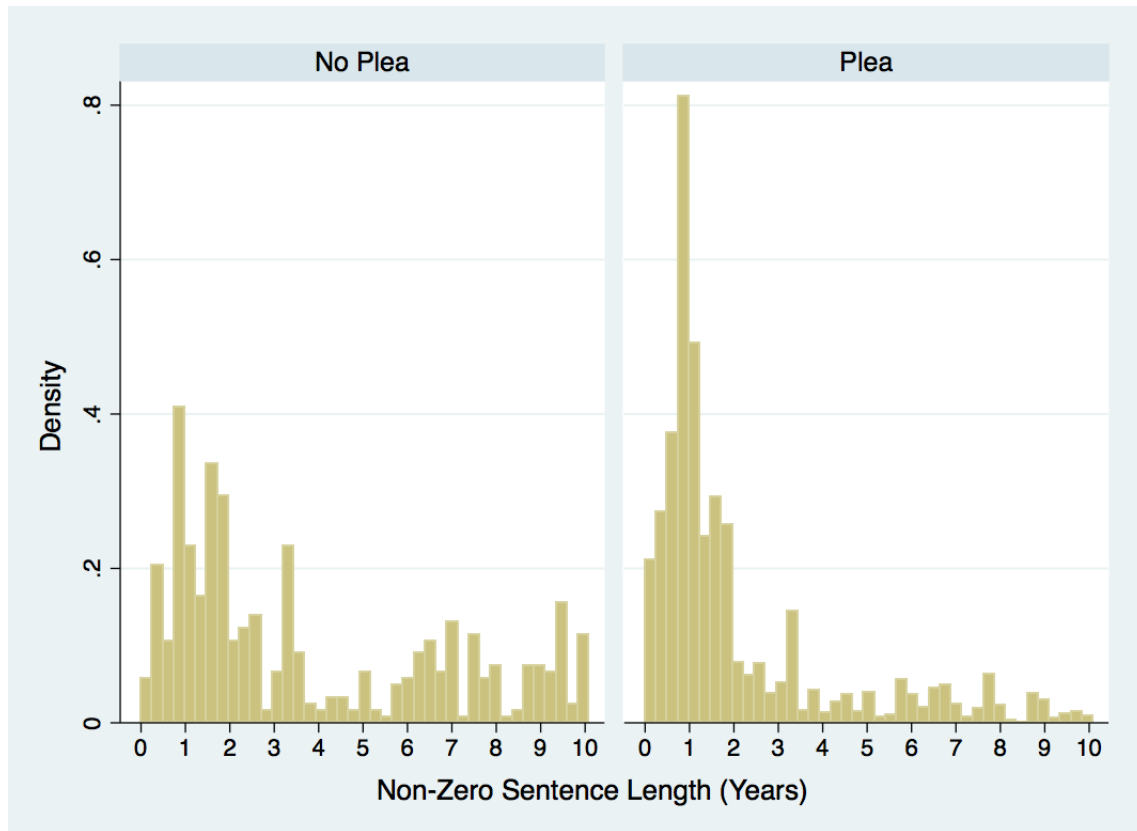
This breakdown is consistent with the idea that more serious crimes are less likely to be resolved with a plea bargain; this feature would drive up the unconditional trial penalty as shown in Table 1. Our hypothesis that $\frac{\delta Pr(trial)}{\delta J} > 0$ is further supported by Figure 4, which plots the average plea rate against the minimum sentence a defendant is facing. We can see a strong decline in the rate of pleading as the minimum sentence given conviction rises.

Figure 2: Distribution of Non-Zero Sentences by Method of Resolution - Full State



We see evidence that these properties may differ when we inspect incarceration rates for different

Figure 3: Distribution of Non-Zero Sentences by Method of Resolution - Charlotte



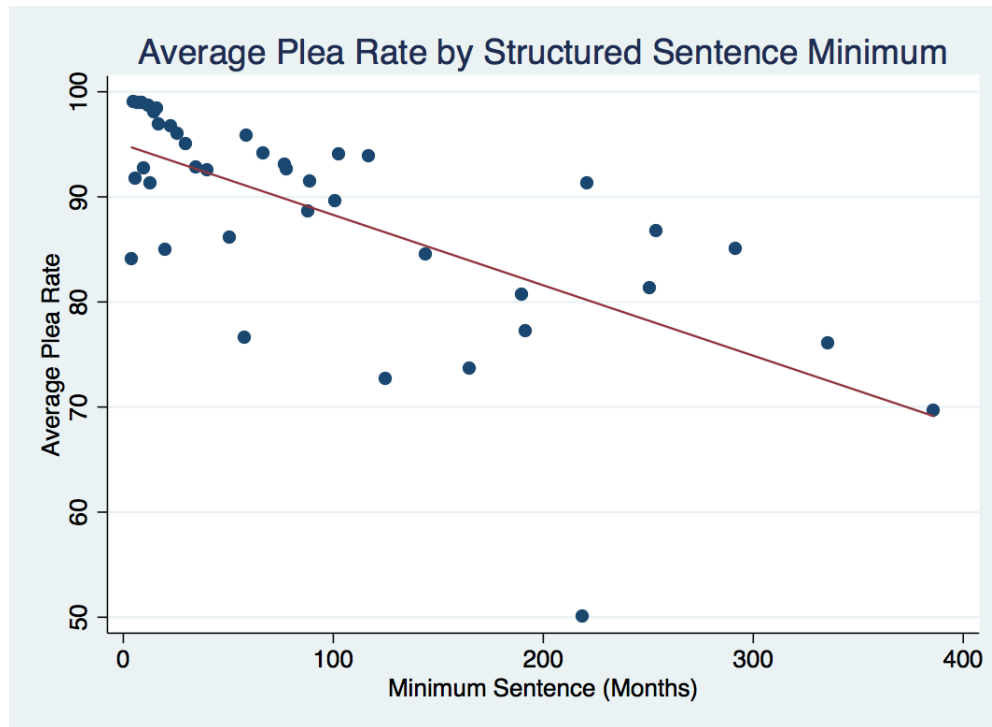
types of crimes. As shown in Table 4, incarceration rates vary after a plea bargain for different types of crime. Some categories of crimes appear to, unconditionally on any selection issues, have shorter sentences after a plea bargain is accepted while others have longer sentences.

Another feature evident in Table 4 is that there is a negative relationship between the average sentence after declining a plea bargain and the rate at which defendants accept a plea. That is, the lowest rate of pleading are seen in the crimes with the highest average sentence. This is consistent with the sign of $\frac{\delta Pr(trial)}{\delta J} > 0$ discussed earlier. Interestingly, Table 4 does not show the anticipated positive relationship between guilt at trial and the average sentence at trial.

Table 4 also shows higher rates of incarceration after a plea bargain. This could be the directly product of the structured sentencing scheme used by North Carolina coupled with the fact that defendants who choose to plead have significantly more prior points (more felony convictions)³⁸. This combination produces a situation where those accepting plea bargains are inherently facing longer jail sentences even conditional on committing identical crimes with identical observable and unobservable characteristics (except prior points).

³⁸ This fact can be seen in Table 12.

Figure 4: Plea Rate by Minimum Structured Sentence Length



Thus, Tables 1 to 4 provide strong evidence that we are going to need to control for both observable variation (e.g. a defendant's prior points) and unobservable variation (e.g. presence of eye witnesses) in cases to measure a causal relationship between method of case resolution and expected sentence length. In order to handle observable variation, we use ordinary least squares (OLS) regression specifications, and to handle unobservable variation, we use instrumental variable (IV) regressions with several possible instruments (discussed in Section 5).

Table 1: Summary Statistics - Full State

<i>Variable</i>	<i>Overall Mean</i>	<i>Overall SD</i>	<i>No Plea Mean</i>	<i>Plea Mean</i>	<i>Difference</i>	<i>t-Statistic</i>
Offender & Case Characteristics						
Charges	3.12	4.02	2.05	3.23	-1.18	-47.72
Race (black = 1)	0.56	0.50	0.56	0.56	0	1.22
Sex (female = 1)	0.15	0.36	0.17	0.15	0.02	7.49
Age	30.77	10.42	32.18	30.63	1.55	23.7
First Offense	0.41	0.49	0.63	0.38	0.25	81.76
Incarceration	0.26	0.44	0.17	0.27	-0.11	-39.31
Sentence (Years)	1.06	4.30	1.18	0.73	0.45	27.25
Non-zero Sentence	3.79	7.45	8.12	2.56	5.56	82.68
Guilty	0.93	0.26	0.24	1	-0.76	-948.21
Bond Amount (\$Thousands)	26.11	134.89	29.62	25.01	4.61	4.72
Prior Points	3.84	5.07	1.11	4.11	-3.01	-97.19
Lawyer Types						
Court Appointed Private Attorney	0.50	0.50	0.51	0.5	0.01	4.1
Public Defender	0.20	0.40	0.14	0.21	-0.07	-28.91
Private Attorney	0.24	0.43	0.3	0.24	0.07	25.51
Waived	0.05	0.22	0.04	0.05	-0.01	-6.71

Notes: This table reports summary statistics on 306,302 observations of felony cases in across NC from 1995-2009. Cases not before regularly-serving judges are excluded (see text for further detail). Homicides are excluded due to non-random judicial assignment.

Table 2: Summary Statistics - Charlotte

<i>Variable</i>	<i>Overall Mean</i>	<i>Overall SD</i>	<i>No Plea Mean</i>	<i>Plea Mean</i>	<i>Difference</i>	<i>t-Statistic</i>
Offender & Case Characteristics						
Charges	2.85	3.62	1.94	2.92	-0.98	-16.42
Race (black = 1)	0.55	0.50	0.51	0.55	-0.04	-5.44
Sex (female = 1)	0.16	0.36	0.17	0.15	0.02	3.29
Age	30.53	10.34	32.05	30.38	1.66	9.66
First Offense	0.42	0.49	0.65	0.4	0.26	31.61
Incarceration	0.24	0.43	0.19	0.25	-0.06	-8.02
Sentence (Years)	0.91	3.55	1.37	0.65	0.72	18.51
Non-zero Sentence	3.49	6.27	7.64	2.47	5.18	35.19
Guilty	0.94	0.23	0.28	1	-0.72	-341.92
Bond Amount (\$Thousands)	17.79	78.46	19.29	16.52	2.77	2.03
Prior Points	3.85	5.13	1.39	4.07	-2.69	-31.97
Lawyer Types						
Court Appointed Private Attorney	0.41	0.49	0.43	0.41	0.02	2.44
Public Defender	0.33	0.47	0.23	0.34	-0.11	-14.76
Private Attorney	0.23	0.42	0.32	0.22	0.1	14.67
Waived	0.03	0.18	0.03	0.03	-0.01	-2.18

Notes: This table reports summary statistics on 49,721 observations of felony cases in Charlotte/NC from 1995-2009. Cases not before regularly-serving judges are excluded (see text for further detail). Homicides are excluded due to non-random judicial assignment.

Table 3: Summary Statistics - Types of Crime - Full State

<i>Variable</i>	<i>Share of</i>			<i>Shares of Method of Disposition</i>			
	<i>Total Cases</i>	<i>Plea Rate</i>	<i>Share Black</i>	<i>No Plea</i>	<i>Plea</i>	<i>Difference</i>	<i>t-Statistic</i>
Offense Type							
Drug Distribution	28 %	93 %	69 %	0.21	0.25	-0.04	-14.64
Burglary	16 %	96 %	43 %	0.07	0.15	-0.08	-36.71
Drug Possession	10 %	85 %	59 %	0.15	0.08	0.06	36.81
Robbery	7 %	92 %	74 %	0.06	0.07	-0.01	-3.67
Fraud	6 %	90 %	47 %	0.06	0.05	0.01	5.07
Assault	6 %	88 %	59 %	0.06	0.05	0.02	12.05
Sex Offenses	5 %	87 %	35 %	0.06	0.04	0.02	17.41
Forgery	4 %	96 %	41 %	0.02	0.04	-0.02	-15.84
Larceny	4 %	94 %	42 %	0.03	0.04	-0.01	-10.55
Weapon	4 %	91 %	70 %	0.03	0.03	0	1.18
Stolen Property	4 %	95 %	49 %	0.02	0.03	-0.02	-14.63
Auto Theft	2 %	94 %	62 %	0.01	0.02	-0.01	-6.42
Criminal Homicide	2 %	75 %	61 %	0.04	0.01	0.03	38.67
Embezzlement	2 %	92 %	38 %	0.01	0.01	0	-0.83
Rape	1 %	77 %	56 %	0.02	0.01	0.02	26.65
Arson	0 %	91 %	40 %	0	0	0	-0.42

Notes: This table reports summary statistics on 306,302 observations of felony cases in across NC from 1995-2009. Cases not before regularly-serving judges are excluded (see text for further detail). Homicides are excluded due to non-random judicial assignment.

Table 4: Case Outcomes by Offense and Method of Disposition - Full State

Offense	Share of Total Cases	Plea Rate	Pct. Black	No Plea		Plea		Difference		
				Finding of Guilt		Incarceration		Incarceration		
				Sentence	Incarceration	Sentence	Incarceration	Sentence	Incarceration	
Drug Distribution	28 %	93 %	69 %	0.4	0.09	18 %	0.39	0.21	-0.02	0.11
Burglary	16 %	96 %	43 %	0.45	0.11	18 %	0.4	0.28	-0.05	0.17
Drug Possession	10 %	85 %	59 %	0.03	0.01	5 %	0.11	0.14	0.08	0.13
Robbery	7 %	92 %	74 %	3.17	0.41	45 %	2.15	0.53	-1.02	0.12
Fraud	6 %	90 %	47 %	0.05	0.03	10 %	0.23	0.2	0.18	0.18
Assault	6 %	88 %	59 %	1.79	0.28	38 %	1.07	0.33	-0.72	0.05
Sex Offenses	5 %	87 %	35 %	4.58	0.26	31 %	2.03	0.35	-2.55	0.09
Forgery	4 %	96 %	41 %	0.02	0.01	10 %	0.1	0.11	0.08	0.10
Larceny	4 %	94 %	42 %	0.11	0.04	13 %	0.21	0.2	0.1	0.16
Weapon	4 %	91 %	70 %	0.39	0.15	23 %	0.52	0.32	0.13	0.16
Stolen Property	4 %	95 %	49 %	0.11	0.06	18 %	0.15	0.15	0.05	0.09
Auto Theft	2 %	94 %	62 %	0.12	0.04	9 %	0.3	0.28	0.18	0.24
Criminal Homicide	2 %	75 %	61 %	31.76	0.75	77 %	14.34	0.85	-17.42	0.10
Embezzlement	2 %	92 %	38 %	0.06	0.03	11 %	0.13	0.07	0.07	0.04
Rape	1 %	77 %	56 %	7.64	0.36	40 %	5.8	0.51	-1.84	0.15
Arson	0 %	91 %	40 %	1.32	0.19	24 %	0.86	0.33	-0.46	0.14

Notes: This table reports expected sentence length and incarceration rate by type of crime and plea decision. It is based on 306,302 observations of felony cases from across NC from 1995-2009. Cases not before regularly-serving judges are excluded (see text for further detail). Homicides are excluded due to non-random judicial assignment.

5 Results

In the previous Section, we discuss the myriad of observable and unobservable ways where cases settled via plea bargain differs substantially from those resolved by other means. As a first step for controlling for these differences, we begin with an OLS specification to control for observable characteristics. Specifically, we estimate:

$$Sentence_{i,j} = \alpha + \beta_1 \cdot plea_i + \sum \gamma X_{i,j} + \varepsilon_{ij} \quad (3)$$

where $X_{i,j}$ includes: 1) *race_i*, *gender_i*, *age_i*, *charges_i*, and *first offense_i*

2) *Crime Class_i* (See Table ??)

3) *Year_i*

4) *Defense Lawyer Type_i*

5) *Prior Points Level_i* (See Table ??)

6) *Crime Level_i* (See Table ??)

7) *Judge_j*

Where $Sentence_{i,j}$ is the non-probation sentence in years, $plea_i$ is a indicator for whether the case was resolved via a plea bargain. The subscript i indexes the incident, and the subscript j the superior court judge. The term $\sum \gamma X_{i,j}$ is the set of case, defendant, and judge controls that differ depending on the specific regression specification.

The results of estimating Equation 3 are presented in Table 5. Specifications (1) includes controls for observed defendant and case characteristics including: race, sex, age, number of charges, and a flag for whether it is the defendant's first offense. Additionally, we include county, year, and judge, and crime type fixed effects. Specification (2) introduces controls for the type of lawyer representing the defendant. Specification (3) includes two variable for the structured sentencing cell the defendant faces: one variable representing the minimum specified sentence given conviction and the other a punishment style indicator³⁹. All regressions have clustered the estimated standard errors at the judge to allow for intrajudge correlation.

Across all specifications we see a consistently negative and significant effect for pleading guilty on expected sentence length, with a coefficient around -0.5 years and a standard error near 0.016. This result suggests that on average, defendants who plead guilty can expect a half a year shorter sentence than those who do not. The decrease in our estimated coefficient from specification (1) to (3) matches intuition; as shown in Tables 1 and 12, defendants who take plea bargains tend to

³⁹ As described in Table 11, some crimes have active, inactive or community punishments. The variable for punishment style indicates whether we have: 1) only active punishment available, 2) both active and inactive punishment available, or 3) only inactive punishment available.

have more serious cases (based on observable features such as the number of charges, the class of the charge, and the level of prior points). Therefore, by controlling partially for measures of case severity should remove some of the impact of this selection, and make the choice to plead seem more appealing.

Table (5) also allows us to examine several of our hypotheses presented in Section (4). First, we predict that black defendants may see a higher average sentence from pleas than white defendants. While specification (1) shows black defendants accepting nearly 1.5-month longer sentences, this disappears when we control for structured sentencing. Second, our prediction that female defendants should accept lower average sentences seems robust to the sentencing scheme. Lastly, our hypothesis that defendants represented by public defenders may accept longer sentences is not supported; defendants with court appointed attorneys accept the longest sentences, even controlling for different defendant backgrounds.

In general, we see broadly similar results when we strict our attention to just the Charlotte CSA. Interestingly, we see nearly a 2 month longer trial penalty in Charlotte, but no other systematic differences from the full state. This larger trial penalty is not explainable by simple defendant composition, as it is robust to controlling for crime types and defendant criminal histories. Additionally, our observation that court appointed attorneys accept longer sentences is even more extreme in Charlotte.

Table 6 presents similar regressions as in Table 5, but with incarceration and not sentence length as the dependent variable. Unlike Table 5, in Table 6, we see a trend that higher incarceration rate after pleading guilty decline when we control for the panel of observable characteristics. In our specifications (3), we see that controlling for the defendant's criminal record causes this elevated incarceration rate to drop. In fact, in Charlotte, controlling for criminal record completely removes significance for our estimate of this difference.

This result should be unsurprising given North Carolina's structured sentencing scheme. We expect defendants with longer criminal histories to be more likely to face jail time, so controlling for criminal history should account for much of the unconditional difference. In specifications (1) and (2), the flag for first offense serves as a proxy for the amount of prior points⁴⁰, and in (3), we fully control for the lead charge and structured sentencing cell. Thus, this is suggestive that much of the difference in incarceration rates evident in Tables 1 and 2 is attributable to observable case characteristics and North Carolina's structured sentencing scheme.

Tables 8a and 8b summarize our OLS analysis done separately for different types of crime. These

⁴⁰ The first offense variable is functionally an indicator variable that equals 1 if the defendant has 0 prior points.

analyses, which use our full panel of controls, suggest substantial heterogeneity. We see large and statistically significant trial penalties for assault and sex offenses, but no evidence of a trial penalty for drug possession and fraud. While this heterogeneity is predictable without any controls as different crimes have wildly disparate sentencing guidelines, it is important to understand that this heterogeneity persists even with our controls.

Similarly Tables 9 and 10 present our OLS analysis separate for black and white defendants. Table 9 presents evidence that black defendants face nearly a 2.5-month longer trial penalty. Interestingly, for a white defendant, having a public defender halves the trial penalty from 5.25 months to 2.75 months. A black defendant, however, sees a decrease from 7.5 months to only 6.35 months.

5.1 Addressing Unobservable Variation

Up to this point, we have explored only those observable differences between cases resulting with and without a plea. As originally described in Section 3.1, we have reason to believe that there are important selection effects occurring based on unobservable heterogeneity. This selection on unobservables may bias the coefficient on plea and prohibit causal interpretation of our OLS results.

As described in Table 12, we have reason to think potentially worse cases go to trial, while defendants with longer criminal histories are more likely to plead⁴¹. We could easily expect to see similar trends with unobservables. District attorneys may be less inclined to plead unobservably worse cases in order to not seem “light on crime.” Were such unobserved selection occurring, our estimate of the trial penalty would be inflated (i.e. our coefficient on plea would be overly negative). On the other hand, we could also construct a story where defendants with unobservably worse cases may plead guilty knowing that they have an idiosyncratically higher chance of losing at trial. If this form of selection were occurring, we would expect a lower trial penalty (i.e. our coefficient on plea should be more negative).

Regardless of the direction that bias manifests, we have sufficient fear of unobservable selection to motivate the use of instrumental variable regression. To do so we use the number of judge and

⁴¹ For example, 36% of trials involve a lead charge of a class above H whereas only 32% of plea bargains are above class H. Based on the observables, it appears that more severe cases are not resolved with a plea bargain. Cases resolving with a plea involve a defendant with a prior points level of 2 or higher 67% of the time, as compared to 15% in cases that do not plead.

defense attorney interactions as our instrument⁴². The IV specification is as follows:

$$\text{First Stage: } plea_i = \tilde{\alpha} + \tilde{\beta}_1 \cdot instrument_{i,j} + \sum \tilde{\gamma} X_{i,j} + v_{ij} \quad (4)$$

$$\text{Second Stage: } Sentence_{i,j} = \alpha + \beta_1 \cdot \widehat{plea}_i + \sum \gamma X_{i,j} + \varepsilon_{ij} \quad (5)$$

Where \widehat{plea}_i is the estimated value of $plea_i$ that comes from first first stage regression, and $instrument_{i,j}$ is the instrument(s) used in the specific regression⁴³.

As we discuss at the end of Section 3.1, we require an instrument that is related to the propensity for a defendant to plead guilty but unrelated to the idiosyncratic probability of guilt at trial. As such, a variable such as the defendant's prior points would not work as an instrument as it is suggestive of a criminal propensity that may be related to the probability of guilt at trial.

We propose an instrument that relates to the knowledge of defense attorneys about judge proclivities. Defense attorneys primarily learn about judge behavior through direct experience. Accordingly, we look at the number of times the specific defense attorney and judge have previously met. To create this measurement, we restrict our attention to cases where: 1) the lawyer was barred in North Carolina after 1995, 2) the judge took their seat after 1995, or 3) we see no judge-lawyer interactions before 1998. We make this restriction to ensure that we are accurately counting all interactions between the specific judge and lawyer. If we did not make these cuts, we would only be measuring the number of interactions observed in our data and not that the pair has *ever* had. We as we expect learning to be greatest early in the process, we restrict our attention to the early periods of our instrument. As such, we restrict our attention to the first twenty five times the judge and lawyer have met.

Additionally, curvature is evident in the relationship between our instrument and the propensity to plead. This suggests that the squared number of encounters may be worth including as instruments rather than just the base level. As such, equation (3) in Tables 7 has a first stage with squared versions of the instruments. This alternative specification takes the form:

$$\text{Second Stage: } Sentence_{i,j} = \alpha + \beta_1 \cdot \widehat{plea}_i + \sum \gamma X_{i,j} + \varepsilon_{ij} \quad (4)$$

$$\text{First Stage: } plea_i = \tilde{\alpha} + \tilde{\beta}_1 \cdot instrument_{i,j} + \beta_2 \cdot instrument_{i,j}^2 + \sum \tilde{\gamma} X_{i,j} + v_{ij} \quad (5a)$$

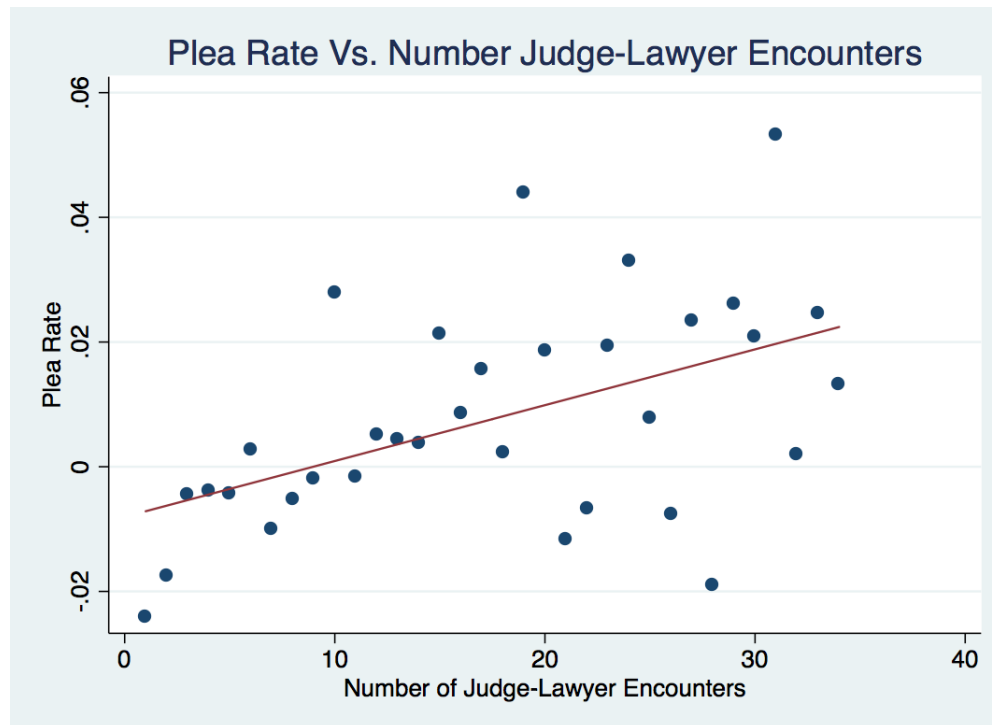
The inclusion of the squared instrument term is both appropriate due to the visible curvature of the relationship as well as to address the possibility of weak instruments.

⁴² This is not the only possible instrument. Abrams (2013) used judicial tenure as an instrument. We believe that the number of defense attorney-judge interactions more accurately captures the knowledge of the attorney.

⁴³ Our estimates are obtained using two stage least squares regression (2SLS), but are qualitatively similar if we use generalized method of moments (GMM) to estimate.

Lastly, it is important for our identification strategy, cases are randomly assigned to judges. Using a similar methodology to that employed in Abrams et al. (2012), we simulate the distribution of observable case characteristics under random assignment.⁴⁴ We then compare the empirical interjudge dispersion for observable case characteristics with the simulations. Figure (7) in the Appendix 1.4 reports results for charge severity, defendant race, sex, age, and criminal history. The results are consistent with randomly assigned cases, which is consistent with multiple conversations with officials in the North Carolina court system.

Figure 5: Instrument: Judge Lawyer Encounters - Charlotte



As shown in Table 7, our IV regressions suggest a significant difference between sentences received as a result of a plea bargain from those received after choosing not to plead. Our point estimates of nearly a 4-year trial penalty, are substantially higher than the 9-month penalty from our OLS estimates.

As shown in Tables 15 and 16 in the Appendix, however, these significant point estimates are not robust to different cuts of the data. This happens, because our instrument is only valid for class D-I felonies, and is stronger in urban settings. For the most severe felonies (classes B1-C), there is no significant relationship between judge-lawyer interactions and the choice to plead. Similarly, we see the strongest relationship in the largest urban settings. This non-random weakness of our instrument for the most severe cases may artificially inflate our point estimates.

⁴⁴ See Abrams, Bertrand, and Mullainathan *Do Judges Vary in Their Treatment of Race?* (2012).

Table 5: Effect of Pleading on Sentence Length (OLS)

	Full State			Charlotte		
	(1)	(2)	(3)	(1)	(2)	(3)
Plea	-0.50** (0.056)	-0.51** (0.056)	-0.55** (0.047)	-0.72** (0.102)	-0.74** (0.100)	-0.73** (0.091)
Black	0.13** (0.012)	0.10** (0.012)	0.00 (0.010)	0.11** (0.029)	0.09** (0.026)	-0.02 (0.024)
Female	-0.31** (0.010)	-0.33** (0.010)	-0.22** (0.008)	-0.29** (0.018)	-0.31** (0.016)	-0.21** (0.014)
Age	0.01** (0.001)	0.01** (0.001)	0.01** (0.001)	0.01** (0.001)	0.01** (0.001)	0.01** (0.001)
Number of Charges	0.05** (0.003)	0.05** (0.003)	0.04** (0.003)	0.04** (0.006)	0.04** (0.007)	0.02** (0.005)
First Offense	-0.49** (0.017)	-0.46** (0.017)	-0.31** (0.012)	-0.46** (0.034)	-0.44** (0.033)	-0.26** (0.032)
Minimum Structured Sentence Length (Months)			0.03** (0.001)			0.03** (0.002)
Appointed		0.56** (0.020)	0.38** (0.013)		0.61** (0.060)	0.43** (0.051)
Public Defender		0.23** (0.030)	0.16** (0.027)		0.08 (0.090)	0.00 (0.078)
Private		0.16** (0.014)	0.09** (0.012)		0.20** (0.045)	0.14** (0.045)
Observations	299170	298509	284904	49139	49071	47456
Adjusted R^2	0.151	0.156	0.313	0.158	0.165	0.325

Notes: (**) refers to significance at the 1% level and (*) at the 5% level. Clustering in regression (8) is done at the judge level to handle heterogeneity across charges.

Dependent variable in all regressions is the length of sentence in years.

Control variables not displayed explicitly include: 1) county fixed effects, 2) year fixed effects, 3) judge fixed effects, 4) crime type fixed effects, and 5) structured sentence punishment style fixed effects by sentence style. All regressions cluster standard errors at the judge level. Waived is the reference category for the lawyer type fixed effects.

If we look at regressions (3)-(6) in Tables 15 and 16, we see that when our instrument is the strongest, our point estimates fall and become insignificant. We find no evidence of a trial penalty for class E-I felonies or for D-I in the largest counties and CSAs. As discussed in Sections 6 and 7, these results should not necessarily be taken as evidence suggesting that there is no difference, as

Table 6: Effect of Pleading on Incarceration (OLS)

	Full State			Charlotte		
	(1)	(2)	(3)	(1)	(2)	(3)
Plea	0.07** (0.008)	0.07** (0.008)	0.05** (0.008)	0.03** (0.008)	0.02** (0.008)	0.01 (0.008)
Black	0.03** (0.003)	0.02** (0.003)	0.00 (0.002)	0.02** (0.006)	0.02** (0.005)	-0.01 (0.005)
Female	-0.09** (0.003)	-0.09** (0.002)	-0.08** (0.002)	-0.09** (0.004)	-0.10** (0.004)	-0.08** (0.003)
Age	0.00** (0.000)	0.00** (0.000)	0.00** (0.000)	0.00** (0.000)	0.00** (0.000)	0.00** (0.000)
Number of Charges	0.00** (0.000)	0.00** (0.000)	0.00 (0.000)	0.00** (0.001)	0.00 (0.001)	0.00 (0.001)
First Offense	-0.20** (0.004)	-0.19** (0.004)	-0.17** (0.003)	-0.18** (0.006)	-0.18** (0.006)	-0.15** (0.006)
Minimum Structured Sentence Length (Months)			0.00 (0.000)			0.00 (0.000)
Appointed		0.19** (0.007)	0.17** (0.006)		0.19** (0.017)	0.17** (0.017)
Public Defender		0.12** (0.009)	0.11** (0.009)		0.02 (0.027)	0.01 (0.026)
Private		0.07** (0.005)	0.07** (0.005)		0.07** (0.015)	0.07** (0.015)
Observations	299170	298509	284904	49139	49071	47456
Adjusted R^2	0.167	0.182	0.246	0.149	0.170	0.241

Notes: (**) refers to significance at the 1% level and (*) at the 5% level. Clustering in regression (8) is done at the judge level to handle heterogeneity across charges.

Dependent variable in all regressions is a binary for whether the defendant received any positive sentence.

Control variables not displayed explicitly include: 1) county fixed effects, 2) year fixed effects, 3) judge fixed effects, 4) crime type fixed effects, and 5) structured sentence punishment style fixed effects by sentence style. All regressions cluster standard errors at the judge level. Waived is the reference category for the lawyer type fixed effects.

we struggle with weak instruments. That said, the loss of significance of our estimate of the trial penalty on the subsets where our instrument is best should give us some pause about the earlier significance.

Table 7: Effect of Pleading on Sentence Length (IV) - Full State

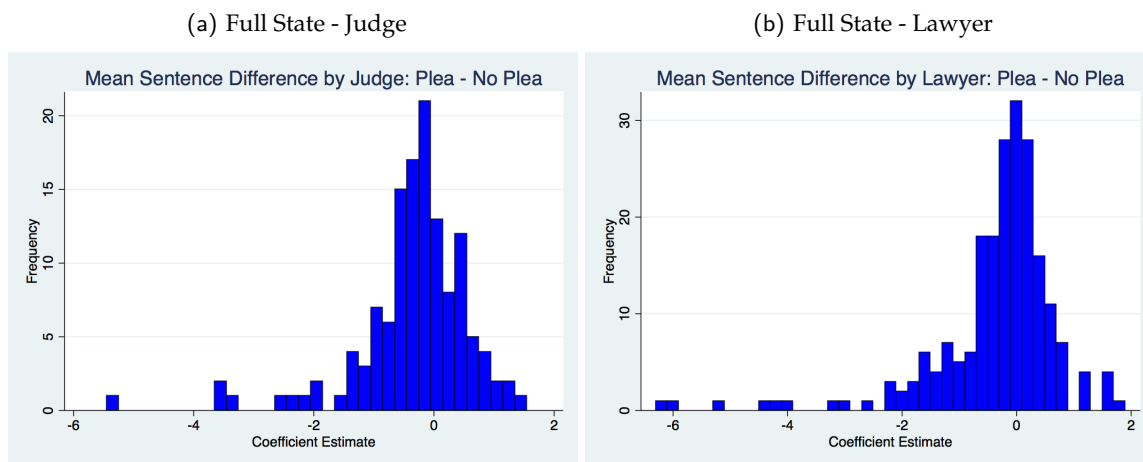
	(1)	(2)	(3)
Instrument	First Stage	J-L Meetings	J-L Meetings, J-L Meetings ²
Judge & Lawyer Meetings	0.001** (0.0001)		
Plea		-3.75** (1.385)	-4.03** (1.407)
Crime Class FE		y	y
Year FE		y	y
Structured Controls		y	y
First Stage F-stat	28.07	28.07	27.99
Observations	103,206	103,206	108,172
Adjusted R ²	0.07	0.24	0.23

Notes: (**) refers to significance at the 1% level and (*) at the 5% level. Clustering is done at the judge level to handle heterogeneity across judges. In order to improve the strength of the instrument, judge-lawyer encounters were excluded over 25, as we expect the greatest learning to occur early.

Dependent variable in all regressions is the length of sentence in years.

Control variables not displayed explicitly include: 1) county fixed effects, 2) year fixed effects, 3) judge fixed effects, 4) crime type fixed effects, 5) minimum sentence for the structure sentence category, and 6) structured sentence punishment style fixed effects by sentence style.

Figure 6: Judge and Lawyer Fixed Effects



6 Discussion

The results presented above provide the first evidence of the existence of an *ex-ante* trial penalty. From simple summary statistics, we find that the average sentence from a plea bargain is 5 months shorter than the average sentence of those who did not plead. After controlling for observable

Table 8a: Effect of Pleading on Sentence Length By Type of Crime (OLS) - Full State

Crime Type	Coefficient	SE	p-value	Observations	Adjusted R^2
Drug Distribution	-0.19	0.03	0	68895	0.34
Burgulary	-0.23	0.06	0	42895	0.16
Drug Possession	0.01	0.01	0.33	26602	0.11
Robbery	-1.28	0.15	0	19938	0.24
Fraud	0.01	0.02	0.71	15949	0.17
Assault	-0.98	0.1	0	14670	0.26
Sex Offense	-3.04	0.29	0	12185	0.24
Forgery	0.02	0.02	0.15	11037	0.11
Larceny	-0.04	0.05	0.44	10933	0.19
Stolen Property	-0.04	0.04	0.33	9573	0.13
Weapon	-0.31	0.08	0	9459	0.24
Criminal Homicide	-16.94	0.91	0	4464	0.42
Embezzelment	0.02	0.03	0.62	4345	0.18
Auto Theft	-0.07	0.07	0.37	4294	0.25

Notes: (**) refers to significance at the 1% level and (*) at the 5% level. Clustering is done at the judge level to handle heterogeneity across judges.

Table 8b: Effect of Pleading on Incarceration By Type of Crime (OLS) - Full State

Crime Type	Coefficient	SE	p-value	Observations	Adjusted R^2
Drug Distribution	0.03	0.01	0	68895	0.19
Burgulary	0.1	0.02	0	42895	0.25
Drug Possession	0.06	0.01	0	26602	0.31
Robbery	0.15	0.02	0	19938	0.22
Fraud	0.09	0.02	0	15949	0.20
Assault	0.04	0.01	0	14670	0.25
Sex Offense	0.16	0.01	0	12185	0.25
Forgery	0.02	0.02	0.14	11037	0.28
Larceny	0.06	0.02	0.01	10933	0.27
Stolen Property	0.08	0.02	0	9573	0.25
Weapon	-0.02	0.03	0.48	9459	0.21
Criminal Homicide	0.05	0.02	0.01	4464	0.23
Embezzelment	0.02	0.01	0.15	4345	0.13
Auto Theft	0.17	0.05	0	4294	0.25

Notes: (**) refers to significance at the 1% level and (*) at the 5% level. Clustering is done at the judge level to handle heterogeneity across judges.

heterogeneity (OLS regressions in Table 5), this difference actually increases to 6 months. Our use of instrumental variables to control for additional unobserved heterogeneity provides no contra-

Table 9: Effect of Pleading on Sentence Length By Race (OLS)

	Black			White		
	(1)	(2)	(3)	(1)	(2)	(3)
Plea	-0.61** (0.072)	-0.61** (0.072)	-0.65** (0.063)	-0.39** (0.062)	-0.41** (0.063)	-0.44** (0.054)
Female	-0.39** (0.016)	-0.39** (0.016)	-0.23** (0.012)	-0.20** (0.011)	-0.24** (0.011)	-0.18** (0.011)
Age	0.01** (0.001)	0.01** (0.001)	0.01** (0.001)	0.01** (0.001)	0.01** (0.001)	0.01** (0.001)
Number of Charges	0.05** (0.005)	0.05** (0.004)	0.04** (0.004)	0.04** (0.004)	0.04** (0.004)	0.03** (0.003)
First Offense	-0.57** (0.021)	-0.54** (0.021)	-0.38** (0.016)	-0.46** (0.022)	-0.41** (0.022)	-0.29** (0.018)
Minimum Structured Sentence Length (Months)			0.03** (0.001)			0.00 (0.000)
Appointed		0.57** (0.028)	0.38** (0.021)		0.49** (0.021)	0.34** (0.016)
Public Defender		0.17** (0.038)	0.12** (0.034)		0.31** (0.032)	0.21** (0.030)
Private		0.21** (0.020)	0.13** (0.018)		0.08** (0.019)	0.02 (0.019)
Observations	167098	166668	158868	115108	114899	110223
Adjusted R^2	0.178	0.183	0.341	0.132	0.137	0.297

Notes: (**) refers to significance at the 1% level and (*) at the 5% level. Clustering in regression (8) is done at the judge level to handle heterogeneity across charges.

Dependent variable in all regressions is the length of sentence in years.

Control variables not displayed explicitly include: 1) county fixed effects, 2) year fixed effects, 3) judge fixed effects, 4) crime type fixed effects, and 5) structured sentence punishment style fixed effects by sentence style. All regressions cluster standard errors at the judge level. Waived is the reference category for the lawyer type fixed effects.

dictory evidence to this penalty. That said, when we restrict our analyses to those subsets of cases where our instrument is the strongest, we cannot obtain significant evidence of a trial penalty.

The results presented here are consistent with prior empirical literature measuring sentences received from pleading or trial. As shown in Table 1, we see a substantially longer sentence after a

Table 10: Effect of Pleading on Incarceration By Race (OLS)

	Black			White		
	(1)	(2)	(3)	(1)	(2)	(3)
Plea	0.08** (0.011)	0.08** (0.011)	0.06** (0.011)	0.06** (0.006)	0.06** (0.006)	0.03** (0.005)
Female	-0.10** (0.003)	-0.10** (0.003)	-0.08** (0.003)	-0.06** (0.003)	-0.07** (0.003)	-0.06** (0.003)
Age	0.00** (0.000)	0.00** (0.000)	0.00** (0.000)	0.00** (0.000)	0.00** (0.000)	0.00** (0.000)
Number of Charges	0.00 (0.001)	0.00 (0.001)	0.00* (0.001)	0.00** (0.000)	0.00** (0.000)	0.00** (0.000)
First Offense	-0.22** (0.005)	-0.21** (0.005)	-0.19** (0.004)	-0.19** (0.004)	-0.18** (0.004)	-0.16** (0.004)
Minimum Structured Sentence Length (Months)			0.00 (0.000)			0.00** (0.000)
Appointed		0.20** (0.008)	0.18** (0.008)		0.15** (0.006)	0.14** (0.005)
Public Defender		0.12** (0.011)	0.11** (0.011)		0.12** (0.008)	0.11** (0.009)
Private		0.09** (0.007)	0.08** (0.006)		0.05** (0.005)	0.04** (0.005)
Observations	167098	166668	158868	115108	114899	110223
Adjusted R^2	0.171	0.188	0.257	0.175	0.189	0.245

Notes: (**) refers to significance at the 1% level and (*) at the 5% level. Clustering in regression (8) is done at the judge level to handle heterogeneity across charges.

Dependent variable in all regressions is a binary for whether the defendant received any positive sentence.

Control variables not displayed explicitly include: 1) county fixed effects, 2) year fixed effects, 3) judge fixed effects, 4) crime type fixed effects, and 5) structured sentence punishment style fixed effects by sentence style. All regressions cluster standard errors at the judge level. Waived is the reference category for the lawyer type fixed effects.

finding of guilt at trial than after a plea bargain⁴⁵ This corresponds to the *ex-post* trial penalty, and is robust to the inclusion of our panel of controls for observable case differences. That said, despite push-back against the analysis of the *ex-ante* trial penalty, we still believe it to be the proper

⁴⁵ Specifically, we can look at variables “Non-zero Sentence” and “Non-zero Sentence No Prob”, which excludes observations where probation is received and the sentence is not active. In both these rows, we see nearly 4 times longer average sentences from trial than pleas.

measurement for understanding the implications of the shadow of the law theory.

The theory of The Shadow of the Law was first proposed by Mnookin and Kornhauser in their 1979 article discussing divorce settlements. The authors propose the notion that despite the vast majority of divorces resolving with a negotiated settlement, the law shapes these negotiations. As either party is always free to opt out of the negotiations and request judicial intervention, the divorce negotiations are inherently framed by this outside option. The shadow of the law has proven compelling, with many other authors employing the framework⁴⁶ It is straightforward to extend Mnookin and Kornhauser's original idea to both criminal and civil cases. This paper and most every paper concerning a trial penalty fundamentally rests on the shadow of the law argument to provide a logical connection between plea bargains and trials.

In recent years, the shadow of the law argument has come under pragmatic scrutiny. Bibas addresses many features of the criminal justice system that complicate the real-world function of the shadow of the law model⁴⁷. Bibas also invokes well-documented Behavioral Economics results as problematic for the assumptions of the model. Stuntz's criticism focuses on the motivation and discretion of prosecutors⁴⁸. Stuntz questions whether prosecutors' goal is to maximize sentences, and questions the functioning of the shadow of the law model when prosecutors have discretion in what cases to see.

At this point, let us consider how the shadow of the law argument translates into the trial penalty. Essentially the formal model presented in Section 3 mathematically characterizes the shadow of the law; defendant and prosecutors are able to negotiate any plea they choose⁴⁹, and their willingness to accept a given plea deal is made only in comparison to the opt-out value of a trial. Recalling the notation of Section 3, if $\underline{A} \leq \bar{B}$, then any negotiated sentence length $J' \in [\underline{A}, \bar{B}]$ from a plea bargain would be preferable to going to trial for both the prosecution and defendant. That is, prosecutors and defendants are willing to accept any plea bargain sentence length that is above the minimum required by the prosecutor, \underline{A} , and below the maximum permitted by the defendant, \bar{B} .

We must then ask: what will the outcome of the negotiated plea be? If the defendant has all power in negotiation, then the prosecutor will be pushed to accept his least desired outcome, \underline{A} . If, on the other hand, the prosecutor has all bargaining power, the defendant will be driven up to their least desired outcome, \bar{B} . Translating in terms of trial penalty, the trial penalty is largest

⁴⁶ For two early examples of its use see: Cooter, Marks, and Mnookin *Bargaining in the Shadow of the Law: A Testable Model of Strategic Behavior* (1982) and Priest and Klein *The Selection of Disputes for Litigation* (1984).

⁴⁷ Stephanos Bibas *Plea Bargaining Outside the Shadow of Trial* (2004).

⁴⁸ W. Stuntz *Plea Bargaining and Criminal Laws Disappearing Shadow* (2004)

⁴⁹ In the model only. Innumerable constraints exist on plea bargain negotiations in the real world.

when the defendant has all the bargaining power, and smallest when the prosecutor has all the power⁵⁰.

Given the enormous time cost to trial relative to a plea bargain for prosecutors and the cost to failing to obtain a conviction at trial, one may suspect that the defendant has *some* power in the negotiation. Given this, we may then ask: “what impact would structured sentencing have on the outcome of the negotiation?” Temporarily ignoring the option of allowing the defendant to plead to a lesser charge, we may think of a structured sentencing scheme as imposing bounds on the range of acceptable plea bargains. An unconstrained prosecutor may be willing to accept a sentence length of \underline{A} , but the structured sentencing scheme may not allow any sentence less than $\underline{J} > \underline{A}$ for the given crime. Were this the case, the imposition of the structured sentencing scheme would have the same effect as raising prosecutor power in negotiation⁵¹.

Now, let us permit the prosecutor and defendant to agree to a plead to a lesser charge. Introducing this power increases the span of feasible bargains on the lower end of sentence lengths only. Consider a first-time defendant currently facing a charge of assault with intent to kill in North Carolina. Given the structured sentencing scheme, this defendant if convicted at trial faces 44 to 92 months in jail. If he were to plead instead to assault with intent to inflict serious injury, he faces only 15 to 31 months in jail.

Now, let us consider the case where $\underline{A} = 30$ and $\bar{B} = 60$, and let us say the defendant’s bargaining power is sufficient to always force the prosecutor to agree to a sentence 20% of the way between the minimum and maximum available. Without the ability to plead to a lesser charge, this means that the defendant and prosecutor would settle on a sentence of 53.6 months⁵². With the ability to plead to a lesser charge, the minimum possible sentence length is reduced without any change to the maximum. This then means that the defendant and prosecutor will settle on a charge of only 30.4 months⁵³.

Without the structured sentencing guidelines, we might think that the negotiated plea would be more of a direct product of \underline{A} and \bar{B} . For example, we might think that a similar defendant’s bargaining power would be sufficient to always force the prosecutor to agree to a sentence 20% of the way between the minimum and maximum available. Without the formality of the structured sen-

⁵⁰ To see this, we assume that $J * Pr(\text{guilt at trial})$ doesn’t depend on power. Then, we have $J * Pr(\text{guilt at trial}) - \bar{B} < J * Pr(\text{guilt at trial}) - \underline{A}$. That is the trial penalty is maximized with full defendant bargaining power.

⁵¹ Theoretically, it could also be the case that the upper sentence limit is binding. That is, $\bar{J} < \bar{B}$. In this case, the structured sentencing scheme would have the effect of reducing prosecutor power.

⁵² The math behind this is straight forward. The minimum sentence is 44 months and the maximum 92. The sentence 20% of the way between 44 and 92 months is 53.6 months.

⁵³ The underlying math: $((92 - 15) \cdot 0.2 + 15) = 30.4$.

tencing scheme, this would yield a sentence from pleading of 36 months in jail⁵⁴. Now, assuming the expected sentence from trial is unchanged, at $E[J]$, we can see that the imposition of a structured sentencing scheme actually increases the trial-penalty: $E[J] - 30.4 > E[J] - 36$, regardless of $E[J]$.

This discussion is not meant to necessarily reconcile the positive ex-ante trial penalty observed in North Carolina with previous literature. Rather, this discussion is important to understand the immeasurable ways in which the structure of the criminal law may intentionally or unintentionally shape the shadow of the law.

7 Conclusion

The article seeks to further our understanding of whether defendants are better off accepting or rejecting a plea bargain. Unlike the vast majority of previous scholarship, we focus on comparing the unconditional average sentence from taking a plea bargain or declining to do so. While asking ex-post whether taking a plea bargain would have yielded a lower sentence is certainly of some interest, we assert that the shadow of the law model is predicated on the ex-ante decision. Using OLS regression to control for issues of selection based on observable case characteristics, we find evidence suggesting that on average the expected sentence is longer in North Carolina's for those who reject a plea, but that there is substantial heterogeneity. One particularly interesting form of heterogeneity is the type of crime committed⁵⁵. Early results suggests that the benefits acquired via a plea bargain may vary substantially depending on the nature of the crime the defendant is facing.

There are real concerns that unobservable case characteristics may bias these estimates. For example, we might worry that the underlying true guilt of a defendant may influence the choice to take a plea bargain and may be (hopefully) related to the ex-post sentence lengths, but is not directly observable to even the courts. As such, we employ instrumental variable regression using judge-lawyer encounters as the instrument for likelihood of plea bargain. The underlying logic justifying this instruments is straight-forward: uncertainty about case outcomes changes the propensity to go to trial. As experience (both judge and council) is one of the primary way that uncertainty about case outcomes is reduced, then we should be able to use experience to instrument for the propensity to accept a plea bargain.

We obtain statistically significant estimates of a positive trial penalty. That said, when we re-

⁵⁴ The underlying math: $((60 - 30) \cdot 0.2 + 30) = 36$.

⁵⁵ At time of writing, this particular avenue of heterogeneity has not been fully explored, but will be in the immediate future.

strict our analyses to those subsets of cases where our instrument is the strongest, we fail to obtain significance on our estimate of a trial penalty. This result provides no evidence to counter the results from the OLS regression estimates. We should, however, be somewhat careful of the IV estimates, as we have issues with weak instruments, given the low F statistic and large standard errors.

1 Appendix

1.1 Description of Data Cleaning

The data cleaning process was extensive, with two major steps. We begin with 1,074,641 felony cases that are finalized between 1995 and 2009⁵⁶. After the cleaning process, we remain with 306,302 individual incidents for analysis. The process by which we reach the final 306,302 incidents is described below.

1. Consolidate Charges to Single Incident

North Carolina's court system enters case information into the Administrative Office of the Courts' Automated Criminal/Infractions System. This system provides a unique ID number for each case. Another ID number is provided if cases are subsequently consolidated for judgment. With a similar intention to that employed by the North Carolina Sentencing and Policy Advisory Commission⁵⁷, we aggregate cases into a single incident (or sentencing episode). Multiple cases may be consolidated into a single incident if a defendant has multiple cases resolved on a single day. The consolidation from cases to incidents reduces us from 1,074,641 observations to 557,626.

It is important to note that this consolidation process is partially formalized by the court. If a defendant is currently facing a felony charge and a new case is filed against them, the original is dismissed and the continued as part of the second. Practically, for the purposes of this paper, the dismissal of the superseded case is not a meaningful dismissal, as it simply continues into the second.

Additionally, at this step, we consolidate all the charges a defendant is facing into a single lead charge. To define the lead charge, first we calculate the average non-zero sentence of each crime in our data. Then, if a defendant is facing multiple different charges, the lead charge is that charge, which has the highest average sentence if convicted⁵⁸.

2. Cleaning Judges

The data identifies judges by their initials. Using principally the member registry from

⁵⁶ Some cases in our database do not have dates in this range, and will be excluded.

⁵⁷ See "Structured Sentencing Statistical Report for Felonies and Misdemeanors Fiscal Year 2009/2010".

⁵⁸ Probation violations are excluded from the top charge, because the sentences corresponding to these violations stem from whatever the underlying previous offense was.

the State Bar of North Carolina⁵⁹ and Balletopia⁶⁰ on judges in North Carolina, we identify (where possible) which judge is assigned to a given case. There are several ways this process can fail:

- (a) No judge is assigned to an incident.
- (b) The acronym assigned to a case does not correspond to any judge. That is, while an acronym is provided, no corresponding judge can be found.
- (c) The acronym assigned to a case does not correspond to a judge who is plausibly hearing the case. This could happen, for example, if the acronym provided corresponds to a judge who took the bench in 2002, but the case was disposed of in 1996.
- (d) There are multiple judges who plausibly could be hearing the case. This can happen if there are multiple superior court judges whose acronyms are included or if there are multiple judges with the same acronym.

Restricting ourselves to only those incidents where we can identify the judge cuts our sample from 557,626 observations to 338,800. Further restricting ourselves to only the judges with at least 100 cases in the data reduces the number of observations to 336,507.

3. Additional Restrictions

The final drop from 336,507 observations to 306,302 observations comes from a few smaller remaining cuts. First, we restrict our data to cases that were settled between 1995 and 2009, as we have the full universe of cases only for these years. This drops us to 311,338 observations. Finally, we exclude Criminal Homicide incidents, which takes us to our final 306,302 observations.

⁵⁹ The historic member directory is searchable at http://www.ncbar.gov/members/member_directory.asp, but is available as a excel file upon purchase.

⁶⁰ Balletopia is a website founded in 2007 that attempts to catalog all state and federal elected officials. See https://ballotpedia.org/North_Carolina_Superior_Courts.

1.2 Structured Sentencing

Table 11: Share of Cases: Crime Class Vs. Prior Points Table

		<i>Level 1</i>	<i>Level 2</i>	<i>Level 3</i>	<i>Level 4</i>	<i>Level 5</i>	<i>Level 6</i>
Factor		0-1	2-5	6-9	10-13	14-17	18+
A		Death or Life Without Parole					
B1	Aggravated	240-300	276-345	317-397	365-456	Life Without Parole	
	Presumptive	192-240	221-276	254-317	292-365	336-420	386-483
	Mitigated	144-192	166-221	190-254	219-292	252-336	290-386
B2	Aggravated	157-196	180-225	207-258	238-297	273-342	314-393
	Presumptive	125-157	144-180	165-207	190-238	219-273	251-314
	Mitigated	94-125	108-144	124-165	143-190	164-219	189-251
C	Aggravated	73-92	83-104	96-120	110-138	127-159	146-182
	Presumptive	58-73	67-83	77-96	88-110	101-127	117-146
	Mitigated	44-58	50-67	58-77	66-88	76-101	87-117
D	Aggravated	64-80	73-92	84-105	97-121	111-139	128-160
	Presumptive	51-64	59-73	67-84	78-97	89-111	103-128
	Mitigated	38-51	44-59	51-67	58-78	67-89	77-103
E	Aggravated	25-31	29-36	33-41	38-48	44-55	50-63
	Presumptive	20-25	23-29	26-33	30-38	35-44	40-50
	Mitigated	15-20	17-23	20-26	23-30	26-35	30-40
F	Aggravated	16-20	19-23	21-27	25-31	28-36	33-41
	Presumptive	13-16	15-19	17-21	20-25	23-28	26-33
	Mitigated	10-13	15-19	13-17	15-20	17-23	20-26
G	Aggravated	13-16	14-18	17-21	19-24	22-27	25-31
	Presumptive	10-13	12-14	13-17	15-19	17-22	20-25
	Mitigated	8-10	9-12	10-13	11-15	13-17	15-20
H	Aggravated	6-8	8-10	10-12	11-14	15-19	20-25
	Presumptive	6-8	6-8	8-10	9-11	12-15	16-20
	Mitigated	4-5	4-6	6-8	7-9	9-12	12-16
I	Aggravated	6-8	6-8	6-8	8-10	9-11	10-12
	Presumptive	4-6	4-6	5-6	6-8	7-9	8-10
	Mitigated	3-4	3-4	4-5	4-6	5-7	6-8

The only categories that do not automatically yield an active sentence are: E(1-2), F(1-3), G(1-4), H(1-5), and I(1-6). Community punishment is an option only for H(1), and I(1-2). An active sentence isn't available for only I(1-3). Community punishment is the only option for I(1).

Table 12: Share of Cases: Crime Class Vs. Prior Points Table By Plea - Full State

	<i>Level 1</i>	<i>Level 2</i>	<i>Level 3</i>	<i>Level 4</i>	<i>Level 5</i>	<i>Level 6</i>	<i>Total</i>
<i>No Plea</i>							
Crime A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crime B1	2.69	0.48	0.31	0.21	0.07	0.06	3.83
Crime B2	0.25	0.09	0.09	0.04	0.03	0.01	0.51
Crime C	3.64	0.76	0.74	0.64	0.20	0.21	6.19
Crime D	3.76	0.79	0.69	0.51	0.15	0.08	5.99
Crime E	3.42	0.47	0.28	0.16	0.04	0.03	4.38
Crime F	4.30	0.47	0.39	0.24	0.05	0.03	5.48
Crime G	1.87	0.49	0.42	0.29	0.10	0.05	3.22
Crime H	25.50	1.40	1.02	0.60	0.15	0.16	28.82
Crime I	28.26	0.84	0.43	0.20	0.07	0.03	29.84
Total	84.94	5.95	4.45	3.03	0.93	0.71	100.00
<i>Plea</i>							
Crime A	0.01	0.01	0.00	0.00	0.00	0.00	0.03
Crime B1	0.88	0.50	0.20	0.12	0.02	0.01	1.73
Crime B2	0.07	0.05	0.02	0.02	0.00	0.00	0.16
Crime C	1.38	1.15	0.83	0.77	0.26	0.20	4.60
Crime D	2.26	1.77	1.04	0.63	0.16	0.13	5.99
Crime E	1.39	1.31	0.59	0.27	0.06	0.04	3.65
Crime F	1.96	1.56	1.02	0.52	0.14	0.11	5.30
Crime G	2.44	3.12	2.25	1.45	0.32	0.23	9.81
Crime H	13.54	13.85	8.02	4.77	1.25	0.91	42.35
Crime I	7.59	7.97	3.93	2.06	0.53	0.43	22.50
Total	32.98	32.33	18.46	11.07	2.94	2.22	100.00

Notes: This table reports summary statistics on 306,302 observations of felony cases in across NC from 1995-2009. Cases not before regularly-serving judges are excluded (see text for further detail). Homicides are excluded due to non-random judicial assignment.

1.3 Charlotte CSA Additional Tables

Table 13: Summary Statistics - Types of Crime - Charlotte

<i>Variable</i>	<i>Share of</i>			<i>Shares of Method of Disposition</i>			
	<i>Total Cases</i>	<i>Plea Rate</i>	<i>Share Black</i>	<i>No Plea</i>	<i>Plea</i>	<i>Difference</i>	<i>t-Statistic</i>
Offense Type							
Drug Distribution	29 %	95 %	69 %	0.18	0.27	-0.09	-12.18
Burglary	15 %	96 %	40 %	0.08	0.14	-0.07	-11.49
Drug Possession	11 %	86 %	61 %	0.18	0.1	0.08	16.57
Robbery	8 %	93 %	73 %	0.07	0.07	0	-1.01
Fraud	5 %	91 %	43 %	0.05	0.05	0.01	2.70
Larceny	5 %	93 %	37 %	0.04	0.04	0	-1.21
Sex Offenses	4 %	88 %	33 %	0.06	0.04	0.02	7.60
Forgery	4 %	95 %	37 %	0.03	0.04	-0.01	-4.19
Assault	4 %	89 %	54 %	0.06	0.04	0.02	6.28
Weapon	4 %	93 %	74 %	0.03	0.04	0	-1.07
Auto Theft	3 %	96 %	67 %	0.02	0.03	-0.01	-4.86
Stolen Property	2 %	95 %	42 %	0.01	0.02	-0.01	-3.47
Criminal Homicide	2 %	82 %	62 %	0.03	0.01	0.02	10.24
Embezzlement	1 %	93 %	33 %	0.01	0.01	0	-1.06
Rape	1 %	77 %	53 %	0.02	0.01	0.02	11.18
Arson	0 %	90 %	36 %	0.01	0	0	1.66

Notes: This table reports summary statistics on 49,721 observations of felony cases in Charlotte/NC from 1995-2009. Cases not before regularly-serving judges are excluded (see text for further detail). Homicides are excluded due to non-random judicial assignment.

Table 14: Case Outcomes by Offense and Method of Disposition - Charlotte

Offense	Share of Total Cases	Plea Rate	Pct. Black	No Plea		Plea		Difference			
				Finding of Guilt				Sentence		Incarceration	
				Sentence	Incarceration	Sentence	Incarceration	Sentence	Incarceration	Sentence	Incarceration
Drug Distribution	29 %	92.5 %	68.64 %	0.69	0.14	25.6	0.4	0.2	-0.3	0.07	
Burglary	15 %	95.92 %	43.45 %	0.46	0.11	23.42	0.35	0.25	-0.1	0.13	
Drug Possession	11 %	84.92 %	58.87 %	0.05	0.01	6.06	0.1	0.11	0.04	0.10	
Robbery	8 %	91.77 %	73.76 %	3.63	0.5	54.1	1.89	0.49	-1.73	-0.01	
Fraud	5 %	90.47 %	46.61 %	0.06	0.03	11.56	0.19	0.16	0.13	0.13	
Larceny	5 %	93.85 %	41.54 %	0.28	0.07	21.21	0.2	0.18	-0.08	0.10	
Sex Offenses	4 %	87.01 %	35.49 %	4.87	0.29	34.41	1.79	0.35	-3.08	0.07	
Forgery	4 %	95.57 %	40.65 %	0.06	0.03	15.09	0.08	0.09	0.02	0.06	
Assault	4 %	88.35 %	59.26 %	2.45	0.33	43.42	0.97	0.3	-1.48	-0.03	
Weapon	4 %	90.82 %	70.01 %	0.61	0.2	25.93	0.43	0.27	-0.17	0.07	
Auto Theft	3 %	93.52 %	61.86 %	0.06	0.06	14.93	0.23	0.2	0.17	0.14	
Stolen Property	2 %	95.3 %	48.71 %	0.04	0.04	21.82	0.16	0.15	0.13	0.11	
Criminal Homicide	2 %	75.3 %	60.6 %	28.41	0.74	77.1	12.96	0.86	-15.44	0.11	
Embezzlement	1 %	91.5 %	37.69 %	0.22	0.02	8.7	0.1	0.05	-0.12	0.03	
Rape	1 %	76.6 %	56.05 %	7.31	0.42	44.32	6.25	0.54	-1.06	0.12	
Arson	0 %	91.35 %	39.79 %	1.24	0.15	20	0.51	0.22	-0.74	0.07	

Notes: This table reports expected sentence length and incarceration rate by type of crime and plea decision. It is based on 49,721 observations of felony cases in Charlotte/NC from 1995-2009. Cases not before regularly-serving judges are excluded (see text for further detail). Homicides are excluded due to non-random judicial assignment.

1.4 Judicial Randomization Check

Figure 7: Randomization Check Through Simulations

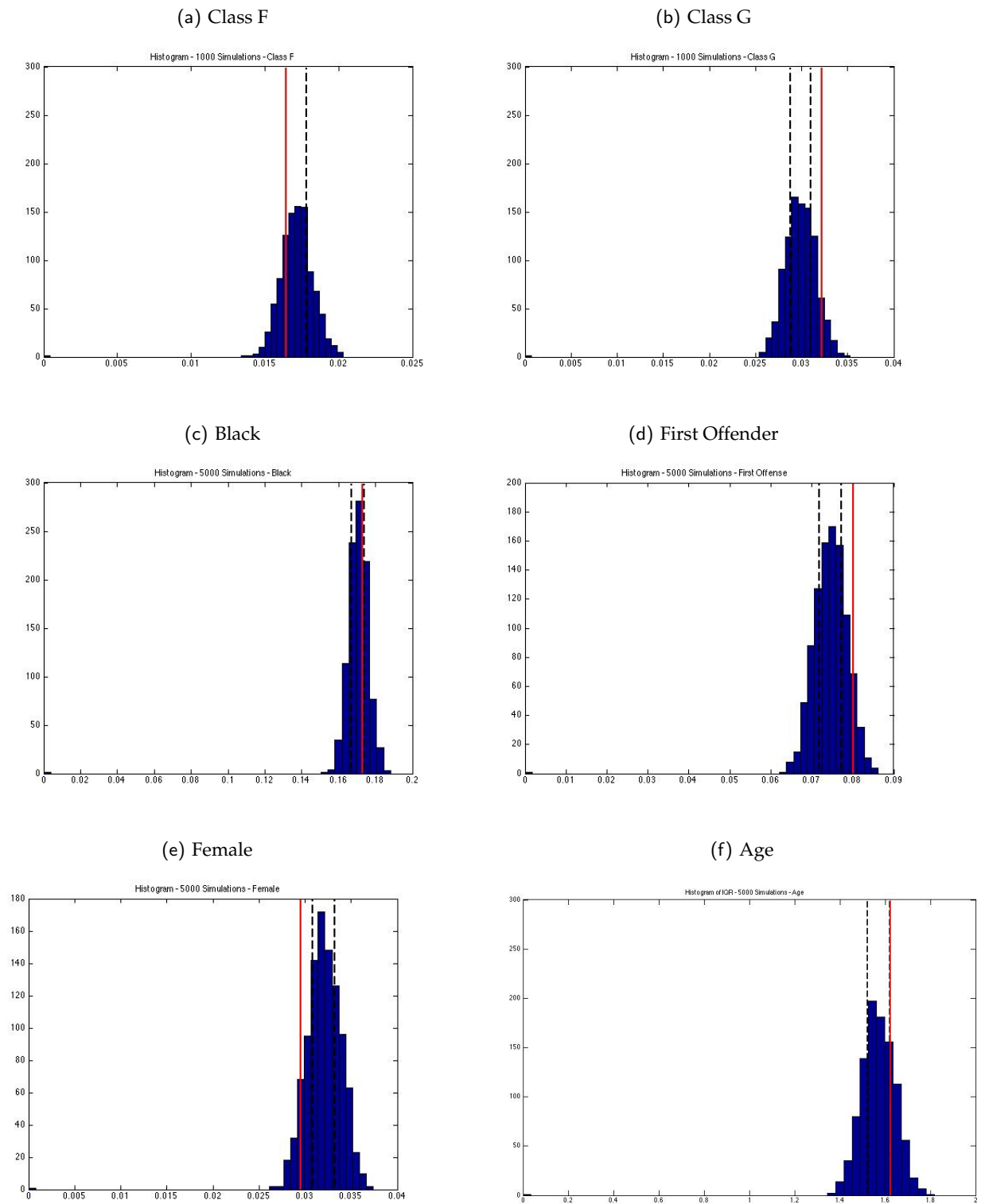


Table 15: Effect of Pleading on Sentence Length - IV - Subset Restrictions

	(1)	(2)	(3)	(4)	(5)	(6)
	Full State	Largest Counties	Levels D-I	Levels E-I	Largest Counties & Levels D-I	Largest Counties & Levels E-I
<i>J-L Meeting</i>						
First Stage						
Judge & Lawyer Meetings	0.0008** (0.0001)	0.0008** (0.0002)	0.0006** (0.0001)	0.0004** (0.0001)	0.0007** (0.0002)	0.0005* (0.0002)
F-Stat	28.07	25.91	26.72	28.34	25.28	27.17
Adjusted R^2	0.07	0.07	0.07	0.08	0.08	0.09
Second Stage						
Plea	-3.76 (1.385)	-2.64 (1.624)	-2.13* (1.074)	-0.59 (1.166)	-2.34 (1.407)	-0.26 (1.319)
Adjusted R^2	0.24	0.31	0.20	0.19	0.20	0.20
<i>J-L Meeting + J-L Meeting²</i>						
Second Stage						
Plea	-4.03** (1.407)	-2.85 (1.660)	-2.15* (1.032)	-0.66 (1.064)	-2.41 (1.400)	-0.44 (1.325)
Adjusted R^2	0.23	0.30	0.20	0.19	0.19	0.20
Corresponding OLS						
Plea	-0.61** (0.057)	-0.65** (0.075)	-0.20** (0.028)	-0.07** (0.017)	-0.22** (0.037)	-0.08 (0.024)
Adjusted R^2	0.34	0.35	0.31	0.21	0.32	0.21
Observations	103,206	63,502	94,890	87,440	58,436	53,181

Notes: (**) refers to significance at the 1% level and (*) at the 5% level. Clustering in regression (8) is done at the judge level to handle heterogeneity across charges.

Dependent variable in second stage regressions and OLS regressions is the length of sentence in years.

Control variables include: 1) demographic controls from Table 5, 2) county fixed effects, 3) year fixed effects, 4) judge fixed effects, 5) crime type fixed effects, and 6) structured sentence punishment style fixed effects by sentence style. All regressions cluster standard errors at the judge level.

Regression (2) limits observations coming from the largest 20 counties in the state.

Regression (3) limits observations to cases where the most severe charge is of structured sentencing class D to I (i.e. excludes A, B1, B2, and C).

Regression (4) limits observations to cases where the most severe charge is of structured sentencing class E to I (i.e. excludes A, B1, B2, C, and D).

Regression (5) combines the restrictions from (2) with those from (3).

Regression (6) combines the restrictions from (2) with those from (4).

“Corresponding OLS” estimates report the results from regression (3) in Table 5 when run on the subset of the data in each column.

Table 16: Effect of Pleading on Sentence Length - IV - Subset Restrictions 2

	(1)	(2)	(3)	(4)	(5)	(6)
	Full State	Top 3 CSA	Levels D-I	Levels E-I	Top 3 CSA & Levels D-I	Top 3 CSA & Levels E-I
<i>J-L Meeting</i>						
First Stage						
Judge & Lawyer Meetings	0.0008** (0.0001)	0.0012** (0.0002)	0.0006** (0.0001)	0.0004** (0.0001)	0.0007** (0.0009)	0.0006** (0.0002)
F-Stat	28.07	17.00	26.72	28.34	15.71	16.82
Adjusted R^2	0.07	0.07	0.07	0.08	0.07	0.07
Second Stage						
Plea	-3.76 (1.385)	-1.54 (1.535)	-2.13* (1.074)	-0.59 (1.166)	-0.79 (1.068)	0.49 (1.079)
Adjusted R^2	0.24	0.35	0.20	0.19	0.32	0.20
<i>J-L Meeting + J-L Meeting²</i>						
Second Stage						
Plea	-4.03** (1.407)	-1.50 (1.530)	-2.15* (1.032)	-0.66 (1.064)	-0.79 (1.029)	0.46 (1.066)
Adjusted R^2	0.23	0.35	0.20	0.19	0.32	0.21
Corresponding OLS						
Plea	-0.61** (0.057)	-0.82** (0.085)	-0.20** (0.028)	-0.07** (0.017)	-0.31** (0.045)	-0.12 (0.032)
Adjusted R^2	0.34	0.35	0.31	0.21	0.32	0.23
Observations	103,206	48,903	94,890	87,440	45,080	41,133

Notes: (**) refers to significance at the 1% level and (*) at the 5% level. Clustering in regression (8) is done at the judge level to handle heterogeneity across charges.

Dependent variable in second stage regressions and OLS regressions is the length of sentence in years.

Control variables include: 1) demographic controls from Table 5, 2) county fixed effects, 3) year fixed effects, 4) judge fixed effects, 5) crime type fixed effects, and 6) structured sentence punishment style fixed effects by sentence style. All regressions cluster standard errors at the judge level.

Regression (2) limits observations to counties in the Charlotte-Gastonia-Salisbury, Raleigh-Durham-Cary, and Greensboro-Winston-Salem-High Point Combined Statistical Areas (CSAs).

Regression (3) limits observations to cases where the most severe charge is of structured sentencing class D to I.

Regression (4) limits observations to cases where the most severe charge is of structured sentencing class E to I.

Regression (5) combines the restrictions from (2) with those from (3).

Regression (6) combines the restrictions from (2) with those from (4).

"Corresponding OLS" estimates report the results from regression (3) in Table 5 when run on the subset of the data in each column.