Does the Threat of the Death Penalty Affect Plea Bargaining in Murder Cases? Evidence from New York's 1995 Reinstatement of Capital Punishment

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This article investigates whether the death penalty encourages defendants charged with potentially capital crimes to plead guilty in exchange for lesser sentences. I exploit a natural experiment in New York State: the 1995 reinstatement of capital punishment, coupled with the public refusal of some prosecutors to pursue death sentences (N.Y. Penal Law § 125.25 [McKinney 1975]). Using individual-level data on all felony arrests in the state between 1985 and 1998, I find the death penalty leads defendants to accept plea bargains with harsher terms, but does not increase defendants' overall propensity to plead guilty. A differences-in-differences analysis of a national cross-section of homicide defendants confirms these results.

Economists have long attempted to measure the death penalty's deterrent effect. This emphasis on deterrence has led the current research to neglect the possible effects of capital punishment on other aspects of the criminal justice system. Instead of looking at whether (potential) criminals

respond to the threat of the death penalty *before* committing a murder, this article looks at whether they respond *ex post*. Specifically, I seek to determine whether the threat of the death penalty affects plea bargaining between the district attorney (DA) and the murder defendant. I examine the death penalty's influence on both the defendant's propensity to plead guilty and the crime to which he pleads.

That the death penalty would encourage plea bargains is perhaps more plausible than that it would deter murders. Studies seeking to demonstrate that capital punishment deters would-be murderers assume both that potential murderers have reliable information regarding the application of the death penalty and that they behave rationally at the moment of the offense—two strong assumptions.[1] However, in the plea bargaining setting, the assumptions of information and rationality are more realistic. Information on death penalty policy is typically provided to the defendant by both his defense attorney and the DA. Moreover, the defendant is more likely to be in a rational state of mind weeks and months after his arrest, when plea bargains are struck, than at the moment of the crime. On the other hand, if the death penalty makes prosecutors more aggressive or recalcitrant, they may be less willing to strike deals with defendants. Hence, the effect of the death penalty on the probability that a murder defendant pleads guilty is ambiguous.

Determining the effect of the death penalty on pretrial negotiations is important for several reasons. First, plea bargains in capital cases offer states substantial savings. Studies of California, New York, and North Carolina suggest that a capital trial alone (not including any subsequent appeals) costs the state anywhere from $200,000 to $1,500,000. Capital trials rarely reduce prison costs, as less than 10% of those sentenced to death are executed (see Cook and Slawson, 1993). Though capital trials are clearly costly, capital *statutes* could still save the state money if the mere threat of execution discouraged defendants from pursuing trial. Thus, studying the connection between the death penalty and plea bargaining enriches our understanding of the cost of capital punishment to the state.

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1. Among the many articles that examine the deterrent effect of capital punishment are Ehrlich (1975), Ehrlich (1977), Cover and Thistle (1988), Avio (1988), Chressanthis (1989), Grogger (1990), and Katz, Levitt, and Shustrovich (2003). Cameron (1994) provides a good survey of the literature.

Second, plea bargaining raises constitutional issues. Plea bargains entail that defendants—perhaps even innocent ones—relinquish their constitutional right to a criminal trial. Civil libertarians may well view a positive correlation between the death penalty and plea bargaining as evidence that risk-averse defendants are willing to surrender an important individual right when they are faced with the threat of execution.

Finally, determining the connection between sentence structure and plea bargaining augments our understanding of the guilty plea—a fundamental element of the criminal justice process. As over 90% of convictions in criminal cases are obtained by guilty pleas (Grossman and Katz, 1983), studying the incentives of prosecutors and defendants in pretrial negotiations is essential to understanding the operation of the criminal justice system itself.[2]

This article utilizes both time-series and cross-sectional data. I first examine suspects arrested on felony charges between 1985 and 1998 in New York, which changed its state law in 1995 to allow executions for those convicted of first-degree murder. However, DAs in some counties decided against pursuing the new sentencing option. The reinstatement of the death penalty, coupled with the refusal of certain prosecutors to pursue death sentences, provides a natural experiment to estimate the effect of the death penalty on plea bargaining. Those defendants arrested for murder after the statute was passed in counties where DAs pursue death sentences serve as the treatment group in a differences-in-differences-in-differences (DDD) estimate of the effect of the death penalty on plea bargaining.

I augment these results with analysis of a cross-section of murder cases in 33 large, urban United States counties in 1988. The data set includes defendants arrested for first-degree murder, as well as a variety of other homicides. Since defendants charged with second-degree murder or lesser charges do not face the death penalty, I use these defendants as a control group in a differences-in-differences estimate.

Section 1 reviews the features of the 1995 New York statute relevant to my empirical work. Section 2 describes the New York data set and the empirical strategy. Section 3 discusses the results. Section 4 provides results

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2. Only a few studies have examined the economics of plea bargaining. See Rhodes (1976), Adelstein (1984), and Ostram (1988).

of several robustness checks. Section 5 analyzes the 1988 cross-sectional data. Section 6 concludes.

1. A Brief Review of the New York Statute

In New York State the capital-case process begins with a first-degree murder arraignment. Once an arrest is made, law enforcement officials have 24 hours to arraign a suspect; otherwise, he is released. At the arraignment the suspect is officially charged in court, bail is set, and a trial date is discussed. The arraignment charge is usually similar to the arrest charge, but might add a level of specificity. For example, a suspect might be arrested for second-degree murder (§ 125.25 in the New York criminal code) and arraigned for second-degree murder by a depraved indifference toward human life (§ 125.25.2 in the New York criminal code). Before the death penalty statute became law, prosecutors had a sentence range of 25 years to life imprisonment in first-degree murder cases. The statute gave prosecutors full discretion in choosing whether to seek the death penalty in cases involving a defendant arraigned for first-degree murder, but they were not permitted to seek the death penalty in cases involving any other murder charge.

After the arraignment of a defendant on first-degree murder charges, the prosecutor has 120 days to issue a death notice. A death notice signifies the prosecutor's intention to seek the death penalty instead of life imprisonment. After the arraignment the prosecutor must first convince a grand jury that the evidence against the suspect justifies a criminal trial. If he does so, the defendant is officially indicted. During the period of time between the arraignment and indictment, plea bargains can be made. Even after indictment, most prosecutors continue to offer and accept plea bargains. One important peculiarity of the New York law is that any defendant charged with capital murder has the option to plead guilty and receive a life sentence without the possibility of parole.[3]

If no plea bargain can be brokered between the prosecutor and the defendant, the case proceeds to a two-part trial. In the first phase the only question before the jury is the defendant's guilt. The jury can find the

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3. This provision was later challenged in court but was in effect throughout my entire sample.

defendant guilty of first-degree murder or a lesser charge. If the jury finds the defendant guilty of first-degree murder, the same jury proceeds to the sentencing phase of the trial. The jury's decision must be unanimous for the defendant to receive a death sentence. In the case of gridlock, the sentence reverts to life imprisonment. Because each juror knows that he can vote to convict and then later veto a death sentence, he should not feel compelled to vote "not guilty" for fear that he would send a defendant to his death.[4]

First-degree murder in New York has been narrowly defined for decades. Before the death penalty statute passed, only the willful killing of a law enforcement official was considered first-degree murder. After the law changed, several new categories were added. Today, contract murder, serial murder, murder involving torture, murder of witnesses, murder while serving a life sentence or while escaped from prison, and intentional murder during another felony are all considered first-degree murder.[5] The change in definition will impact the empirical work in this article, because the 1995 law did not simply introduce capital punishment, but may also have changed the pool of defendants charged with first-degree murder.

In New York, as in other states, a prosecutor has several alternatives when he is confronting a defendant charged with a certain crime. First, he may offer a *sentence bargain*. There is typically a range of sentences rather than a single punishment associated with a given crime. For example, in many states those convicted of manslaughter can receive prison sentences of anywhere from three to 12 years. The range of sentences permits the prosecutor to adjust favorably the sentence within its legal range in return for a guilty plea. Second, a prosecutor may offer a *charge bargain*. In this case, he offers to lower the charge to which the defendant pleads, and the defendant thus receives a sentence within a range strictly less than that of the original charge. Clearly, charge bargains benefit the defendant more than do sentence bargains.[6] The New York data allow me to distinguish

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4. See Andreoni (1991) for a discussion of how sentence severity may affect the probability of conviction.

5. For a good summary of New York's capital punishment statute, see Dao (1995).

6. There has been very little research distinguishing the two types of bargains, though McCarthy (1985) finds that a 1975 ban on sentence bargaining in Alaska substantially lowered the number of guilty pleas.

cases in which sentence bargaining took place from cases in which charge bargaining took place.

2. New York Data and Empirical Strategy

The Capital Defenders' Office, a state agency charged with representing defendants in New York capital cases, provides information on the propensity of DAs to seek the death penalty in each of New York's 62 counties. As explained in section 1, if a New York DA intends to seek the death penalty, he must issue a "death notice" to ensure that the defense attorney has sufficient time to prepare for a capital case. New York DAs issued 36 death notices between 1995 and 2000. Table 1 shows the number of death notices and death sentences by county during this period. Brooklyn DAs have issued the most of any county, while Manhattan DAs have issued none. By 2000 only six men sat on the state's death row, because the majority of the death notices were withdrawn after plea bargains were brokered between DAs and the defendants. Because of the recent timing of the New York death penalty legislation and the numerous appeals most capital cases inspire, no one has yet been executed under the new state law.[7]

From the State of New York Division of Criminal Justice Services (DCJS), I obtained individual-level data on all felony arrests in the state between 1985 and 1998, including the approximately 500 first- and second-degree murder cases each year in the state. This data set includes information on each suspect's demographic characteristics, prior record, arrest charge, the final disposition of his case (acquittal, trial conviction, or plea), and the final disposition charge. The data set also includes a variable that identifies the county in which the case was tried. One of the key advantages of the data is that the universe is all suspects arrested, not all defendants indicted or convicted. Thus, there are no selection issues to address. Summary statistics appear in Table 2.

The first part of the empirical work employs a differences-in-differences estimation strategy. My treatment group consists of those arrested for first- or second-degree murder. As mentioned in section 1, New York changed its definition of first-degree murder when it reinstated the death

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7. This is unlikely to change in the near future, as the state supreme court declared the current death penalty law unconstitutional in its 2004 decision, *People v. LaValle*.

Table 1. Propensity of New York DAs to Seek the Death Penalty, 1995–1999

County	Death Notices Since April 1995	Death Notices Since April 1995 (as % of First-Degree Murder Indictments)	Death Sentences Since April 1995
Albany	2	29%	0
Bronx	1	2%	0
Cortland	1	100%	0
Dutchess	2	50%	0
Erie	1	11%	0
Essex	1	50%	0
Genessee	1	50%	0
Jefferson	1	100%	0
Kings (Brooklyn)	5	15%	1
Monroe (Rochester)	3	50%	1
Onandaga	2	33%	1
Queens	4	33%	0
Rensselaer	2	50%	0
Schoharie	3	100%	0
Suffolk	3	30%	2
Sullivan	2	67%	0
Ulster	1	100%	0
Wyoming	1	100%	0
Total, counties that issued at least one death sentence	36	18.6%	5
Total, all counties	36	7.16%	5

Notes: Figures provided by the Capital Defenders Office. If a county does not appear in the table, then no DA in that county had served a defendant a death notice. In 44 of the 62 counties, no death notices had been issued.

penalty. To keep the treatment group consistent across time, I aggregate first- and second-degree murder defendants, because only this larger group did not change over time.[8] My control group consists of defendants arrested for burglary, forcible rape, or armed robbery. Like murder defendants, these felony defendants, if convicted, face long sentences. However, they are not affected by the change in the death penalty law.

I follow the typical differences-in-differences strategy of comparing the treatment and control groups before and after the policy change. The

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8. I more carefully explore the implications of this change in classification in section 4.

Table 2. Summary Statistics, New York Felony Data

Variable	Mean	SD
Plead guilty to original charge	.0961	.295
Plead guilty to lesser charge	.431	.495
Plead guilty to any charge	.527	.499
Male (dummy variable)	.914	.281
Black (dummy variable)	.548	.498
Hispanic (dummy variable)	.304	.460
Age	27.3	8.19
Prior convictions	.721	1.11
New York City (dummy variable)	.784	.411
Murder*New York City	.0456	.209
After (dummy variable)	.376	.484
Murder (dummy variable)	.0532	.224
Death notice (as % of first-degree murder indictments)	.121	.148
Murder*After	.00608	.0777
Notice*After	.0519	.119
Murder*Notice	.00232	.0260
Murder*Notice*After	.000852	.0165
Observations	145,894	

Note: Results based on the New York arrest data.

following equation yields an estimate of the effect of the policy change on plea bargaining:

$$
Pr(\text{Plea}_{iabt}) = \alpha + \beta_1 X_{iabt} + \beta_2 Y_b + \beta_3 Z_{at} + \beta_4 \text{After}_t + \beta_5 \text{Murder}_a \\
+ \beta_6 \text{After}_t{}^* \text{Murder}_a + \varepsilon_{iabt}, \tag{1}
$$

where i indexes the defendant, a indexes the county, b indexes the charge, and t indexes time; X is a vector of individual defendant information (prior record, age, race, and sex); Y is a vector of county characteristics; Z is a vector of separate time trends for murder and nonmurders; *After* is a dummy variable coded as one if the defendant was arrested after April 1995 (when the death penalty became effective) and zero otherwise; *Murder* is a dummy variable coded as one if the defendant was charged with first- or second-degree murder and zero otherwise; and *After**Murder is the interaction term between *After* and *Murder*. Recall from section 1 that prosecutors can offer either sentence or charge bargains. The detailed nature of the New York data set allows me to distinguish between the two types of bargains. Thus, I define

the dependant variables as "plead guilty to original arraignment charge" (i.e., secured a *sentence* bargain), "plead guilty to a lesser charge" (i.e., secured a *charge* bargain), or "plead guilty, regardless of charge."

The *Murder* dummy variable picks up any effect on plea bargaining of facing murder charges, regardless of whether the arrest took place before or after the new death penalty law was enacted. Similarly, the *After* dummy variable picks up any effect of the new law—or other changes occurring simultaneously—on plea bargaining in felony cases in general. The coefficient on the interaction term is the differences-in-differences estimate of the effect of the new law on plea bargaining in murder cases. Two different scenarios could account for a statistically significant coefficient on the interaction term: there could be a true effect of the death penalty on plea bargaining, or New York state merely could have become relatively tougher on murder defendants vis-à-vis other defendants at the same time it passed the death penalty law. There is some reason to suspect the second scenario. Governor George Pataki, a Republican who ran against Mario Cuomo in part on a "get-tough-on-crime" platform, took office in 1995, promising tougher treatment of murder defendants. Separating any "Pataki effect" from the effect of the death penalty is difficult if one uses only variation across time, because only a couple of months separate the swearing in of the new governor and his signing into law the new death penalty act.

Using county-level variation in the percentage of first-degree murder indictments resulting in death notices allows me to distinguish between these two scenarios. Such a test can be accomplished by estimating the following equation:

$$
\begin{aligned}
Pr(\text{Plea}_{iabt}) = {} & \alpha' + \gamma_1 X_{iabt} + \gamma_2 Y_a + \gamma_3 Z_b + \gamma_4 \text{After}_t + \gamma_5 \text{Murder}_a \\
& + \gamma_6 \text{Notice}_b + \gamma_7 \text{After}_t{}^*\text{Murder}_a + \gamma_8 \text{Murder}_a{}^*\text{Notice}_b \\
& + \gamma_9 \text{Notice}_b{}^*\text{After}_t + \gamma_{10}\text{Murder}_a{}^*\text{Notice}_b{}^*\text{After}_t + \eta_{iabt},
\end{aligned}
\tag{2}
$$

where *Notice* is the share of first-degree murder indictments resulting in death notices, by county. Note that *Notice* does not vary over time. It is calculated by dividing, for each county, the total number of death notices issued since the new law became effective, by the total number of first-degree murder indictments in that same period (recall that this ratio is

listed by county in Table 1). This variable serves as a measure of how aggressive each county is in pursuing the death penalty. Section 4 examines whether this statistic is indeed an appropriate measure of county-level death-penalty policy and experiments with alternative measures.

The coefficient on the triple interaction term *Murder**Notice*After is the differences-in-differences-in-differences (DDD) estimate of the effect of the new statute on plea bargains in murder cases, as distinguished from other state-level policy changes that might have occurred simultaneously. If the effect is only at the state level and does not respond to the varying degrees to which counties used the new the death penalty statute, then we would observe a positive coefficient on the *After**Murder variable, and a coefficient of zero on the triple interaction term. Such a result would not allow us to distinguish between the effect of the death penalty and the "Pataki effect." If, however, estimating equation (2) yields a significant coefficient on the triple interaction term, there is reason to believe that the threat of the death penalty is driving the change in defendants' behavior. A credible alternative hypothesis would have to identify some other factor *W* that is related to plea bargaining in murder cases but not plea bargaining in other felony cases, that changed at roughly the same time as the death penalty law, and that changed to a different extent in each county. This county-level variation in *W* would have to correspond roughly to the county-level variation in death notice frequency. The difficulty in identifying such a factor inspires confidence in the DDD estimates, though I later test several alternative hypotheses.

3. Results

Differences-in-Differences Results

Before turning to the regression results, I present graphical evidence of trends in the raw data. Figure 1 tracks the share of defendants pleading guilty to their original arraignment charge. The trend is virtually flat for the control crimes (rape, robbery, burglary). The largest positive shock occurs the year the legislation was enacted, 1995 (though, as the plea bargain share in 1993 was quite low, there was also a substantial gain between 1993 and 1994). Except for 1997, each year after the death-penalty law was passed saw higher plea bargain rates than did any year before the law. Though obviously noisy, the trend for plea bargains in murder cases suggests that the probability of pleading guilty to the original arraignment charge changed substantially in 1995.
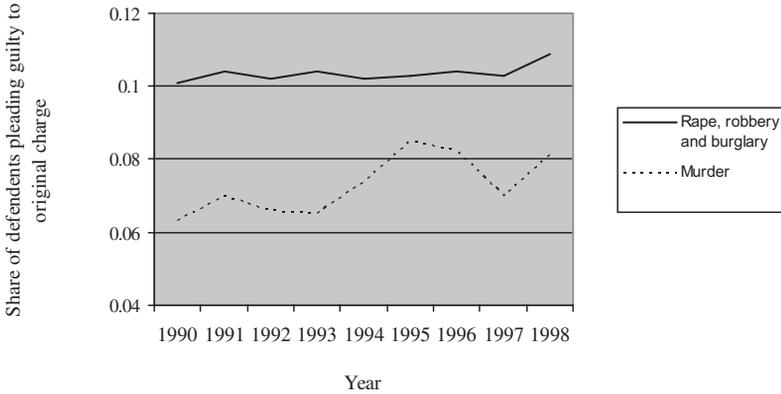
Figure 1. Plea Bargains in New York, 1990–1998.

The results reported in Table 3 confirm this finding. The first column estimates the effect of the reinstatement of capital punishment on a defendant's probability of pleading guilty to the original arraignment charge. The insignificant coefficient on *Murder* suggests that the treatment group (murder defendants) and the control group (rape, robbery, and burglary defendants) did not have significantly different propensities to plead guilty before the law changed. The insignificant coefficient on *After* suggests that the control group was not significantly more likely to plead guilty after the law was passed. However, the positive and significant coefficient on the differences-in-differences estimator (*Murder**After) suggests that, as predicted, murder defendants were more likely to plead guilty to the original arraignment change after the law changed. Specifically, their probability of pleading guilty rose by 2.8 percentage points, or 26% relative to the baseline probability of 10.6%.

The regression reported in the second column is identical to that in the first, with the exception that the dependent variable indicates whether the defendant pleads guilty to a lesser charge (i.e., received a charge bargain). Recall that defendants prefer charge bargains, because the charge is actually lowered and they thus face less severe punishments. The negative coefficient on *Murder* suggests that murder defendants were less likely to receive charge bargains both before and after the law was enacted. The negative coefficient on *After* suggests that charge bargains became less common for all serious offences in the period after the law passed (perhaps suggesting a general get-tough mindset of the Pataki administration). The negative and significant

Table 3. Differences-in-Differences Results, New York Felony Data

Variable	Plead Guilty to Original Arraignment Charge	Plead Guilty to a Lesser Charge	Plead Guilty, Regardless of Charge
Murder (dummy variable)	−.033	−.132*	−.181**
	(.028)	(.074)	(.0908)
After (dummy variable)	−.00061	−.0230**	−.0237**
	(.0028)	(.0086)	(.0113)
Murder*After	.0280**	−.0390*	−.0156
	(.015)	(.0229)	(.0238)
Male (dummy variable)	.030**	−.047**	−.0183**
	(.0023)	(.0036)	(.00407)
Black (dummy variable)	−.014**	−.037**	−.0541**
	(.0028)	(.0040)	(.00696)
Hispanic (dummy variable)	.0064*	.0023	.00613
	(.0034)	(.0033)	(.00386)
Age	−.0014**	−.0017**	−.00299**
	(.00009)	(.00021)	(.000264)
Number of prior felony convictions	.016**	.0096**	.0276**
	(.0013)	(.0029)	(.00203)
New York City (dummy variable)	−.031**	−.155**	−.186**
	(.0077)	(.0087)	(.0126)
Murder*New York City	−.016	.202**	.188**
	(.010)	(.019)	(.0199)
Observations	145,894	145,894	145,894
Mean of dependent variable	.106	.460	.566
Pseudo r^2	.0124	.0147	.0249

Notes: Standard errors are adjusted for clustering at the *Murder*year* level. Each regression includes linear and quadratic time trends, allowing separate trends for murders. Coefficients (and adjusted standard errors) on *Murder*After* from county and year fixed-effects estimates, reported in the same order as the columns in this table, are .0258 (.0169), −.0445 (.0149), and .0229 (.0166). Probit results are reported as changes in probability (adjusted standard errors in parentheses).
*Significant at the .1 level.
**Significant at the .05 level.

coefficient on the interaction term suggests that the probability a murder defendant would receive a charge bargain differentially fell after the law changed. As predicted, the death penalty seemed to decrease the chance that a murder defendant would receive an especially favorable deal. The point estimates suggest that the policy decreased the probability that a murder defendant would receive a charge bargain by about 4 percentage points.

Finally, the regression reported in the last column is identical to the previous two, with the exception that the dependent variable indicates whether the defendant pleaded guilty, regardless of the charge. Given the

results in the first column, it is not surprising that the coefficient on the differences-in-differences estimator is insignificant. Although the death penalty is associated with an increase in the probability that a defendant agrees to a sentence bargain, it is associated with a decrease in the probability that he will receive a charge bargain, and the effect on plea bargains in general is not statistically different from zero.[9]

The coefficients on the interaction terms suggest that the reinstatement of the death penalty made murder defendants more likely to sentence bargain and less likely to charge bargain, but did not significantly affect their tendency to plea bargain in general. These results indicate that DAs gained bargaining power in murder cases after April 1995, because defendants seem more willing to accept harsher deals and less likely to receive generous ones. However, it is unclear if this effect is merely statewide (a "Pataki effect") or sensitive to county-level death-penalty policy.

DDD Results

Table 4 displays the DDD results. The first column, which uses "plead guilty to original arraignment charge" as the dependent variable, suggests that the positive effect of the reinstatement of the death penalty on sentence bargaining in Table 3 is not merely a "Pataki effect."[10] In the DDD results, the significance of the coefficient on the interaction term between the *After* dummy variable and the *Murder* dummy variable disappears, and the coefficient on the triple interaction term is positive and significant. The results in the differences-in-differences analysis thus seem to be driven only by those counties that actually do pursue death sentences.

The DDD results reported in columns 2 and 3 suggest that, unlike sentence bargaining, charge bargaining and overall plea bargaining were not significantly affected by the new law. Though the differences-in-differences results reported in Table 3 suggested a negative effect of the death penalty on charge

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9. The results in Table 3 are robust to the inclusion of county and year fixed effects. See the notes to Table 3 for the fixed-effects estimates of the coefficient on the interaction term.

10. Though not reported here, the results in Table 4 are robust to adding indicators of the party affiliation of each county's DA. Thus, the results do not seem to be driven by Republican DAs' prosecuting defendants more aggressively after Pataki's election or to changes in DA party affiliation correlated with the law change.

Table 4. DDD Results, New York Felony Data

Variable	Plead Guilty to Original Arraignment Charge	Plead Guilty to a Lesser Charge	Plead Guilty, Regardless of Charge
After (dummy variable)	.00461	–.0231	–.0178
	(.00851)	(.0343)	(.0372)
Murder (dummy variable)	–.0627	–.0520	–.133
	(.0310)	(.112)	(.111)
Death notice (as % of first-degree murder indictments)	–.0902	.183	.0722
	(.0606)	(.171)	(.154)
Murder*After	–.00381	–.0178	–.0245
	(.0179)	(.0504)	(.0504)
Notice*After	–.0400	.00149	–.0479
	(.0452)	(.123)	(.120)
Murder*Notice	.366	–.809	–.0479
	(.295)	(.508)	(.120)
Murder*Notice*After	.227**	–.163	.0755
	(.115)	(.244)	(.232)
Male (dummy variable)	.0298**	–.0468**	–.0184**
	(.00302)	(.00617)	(.00655)
Black (dummy variable)	–.0138**	–.0354**	–.0524**
	(.00273)	(.00742)	(.00854)
Hispanic (dummy variable)	.00670**	.00388	.00809
	(.00322)	(.00611)	(.00694)
Age	–.00134**	–.00167	–.00296**
	(.000132)	(.000200)	(.000232)
Number of prior felony convictions	.0161**	.00958**	.0276**
	(.00106)	(.00236)	(.00179)
New York City (dummy variable)	–.0296**	–.153**	–.183**
	(.00651)	(.0174)	(.0202)
Murder*New York City	–.0153	.203**	.188**
	(.0119)	(.0294)	(.0277)
Observations	145,894	145,894	145,894
Mean of dependent variable	.106	.460	.566
Pseudo r^2	.0127	.0150	.0252

Notes: Standard errors are adjusted for clustering at the *Murder*year*Notice* level. Regressions include linear and quadratic time trends, with separate trends for murders and each value of *Notice* and *Notice*Murder*. Coefficients (and adjusted standard errors) on *Murder*Notice*After* from county and year fixed-effects estimates, reported in the same order as the columns on this table, are .228 (.108), –.148 (.248), and .117 (.221). Probit results are reported as changes in probability (Adjusted standard errors in parentheses).
*Significant at the .1 level.
**Significant at the .05 level.

bargaining, this result is not borne out by the DDD estimates. Table 4 indicates that, all else equal, a defendant in a county where 10% of first-degree murder defendants are issued death notices is 2.3 percentage points (or 21%) more likely to plead guilty to his original arraignment charge than is a murder defendant in a county where the death penalty is never sought.[11] Like the differences-in-differences results, the DDD results suggest that defendants exposed to the threat of capital punishment are more likely to accept plea bargains with harsher terms.

4. Robustness Checks

One possible objection to the results in the first column of Table 4 concerns the potential endogeneity of the share of first-degree murder indictments that result in death notices. This variable is meant to proxy for the DA's aggressiveness in pursuing death sentences. However, if defendants know that they are up against a tough DA, they may plead guilty before a death notice can even be issued. Such behavior may bias the estimate of the effect of death notices on plea bargains toward zero, so I would expect a more perfect measure of prosecutorial zeal to yield even larger estimates of the effect in question.

One way of testing the direction of the bias is to use a less continuous measure of county-level death-penalty policy. First, I substitute for the share of first-degree murder indictments resulting in a death notice a dummy variable coded as one if the county has ever issued a death notice, and as zero otherwise. The logic behind this estimation is that the strategic behavior of defendants might contaminate the exact share of murder cases resulting in death notices, but is less likely to contaminate whether a county has ever issued a death notice. Where DAs unequivocally oppose capital punishment, the dummy variable will equal zero. Where DAs support the death penalty, there is likely to have been at least one case in which a death notice was issued. Measurement error will persist in those counties whose DAs support the death penalty but, perhaps because of small populations, have yet to process a case in which a death notice could be issued.

The first column of Table 5 reports the results of a regression identical to that in the first column of Table 4, with the exception that I substitute the

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11. The results in Table 4 are robust to inclusion of county, *County*Murder* and *County*Effective* fixed effects. See the notes to Table 4 for the fixed-effects estimates of the coefficient on the triple interaction term.

Table 5. DDD Results When a Dummy Variable Is Used to Measure County Death Penalty Policy, New York Felony Data

Variable	Plead Guilty to Original Arraignment Charge	
After (dummy variable)	.0105**	.00581
	(.00113)	(.00575)
Murder (dummy variable)	−.0521**	−.0414**
	(.0112)	(.0162)
Death notice (dummy variable)	−.122**	−.123**
	(.015)	(.0191)
Murder*After	−.00621	−.00984
	(.00810)	(.0146)
Notice dummy*After	−.0162**	−.0137*
	(.00476)	(.00689)
Murder*Notice dummy	.0702	−.0142
	(.0363)	(.0311)
Murder*Notice dummy*After	.0528**	.0583**
	(.0203)	(.0296)
Sample restrictions	All counties	New York City
Observations	145,894	114,458
Mean of dependent variable	.106	.0998
Pseudo r^2	.0134	.0102

Notes: All controls included in Tables 3 and 4 are also included in these regressions, though I do not report the estimated coefficients here. Standard errors are adjusted for clustering at the *Murder*year*Notice* level. Each regression includes linear and quadratic time trends, allowing separate trends for murders, and separate trends for each value of *Notice* and *Notice*Murder.* Probit results are reported as changes in probability (adjusted standard errors in parentheses).
*Significant at the .1 level.
**Significant at the .05 level.

above-mentioned dummy variable for the death notice percentage. The results are very similar to those in Table 4. Though the triple interaction term using the dummy variable loses some significance, it is still positive and significant at the .1 level. The results indicate that defendants facing murder charges in a county where the DA has *ever* issued a death notice are 5.3 percentage points (or 49.8%) more likely to plead guilty to the original arraignment charge than murder defendants in counties where the DA has *never* issued a death notice.

How does this compare to the results in Table 4? As Table 1 reports, conditional on a county's ever issuing a death sentence, the average (weighted by the number of defendants) share of murder cases resulting in death notices is 0.186. Hence, the coefficients in Table 4 indicate that a defendant in a county that has ever issued a death sentence is 0.186*0.227 = 4.2 percentage points more likely to plead guilty to his original arraignment charge. Comparing this

result to the 5.3 percentage-point effect found when the death notice dummy variable is used suggests that, as suspected, the strategic behavior of defendants downwardly biases the estimated effect of the policy when the exact share of murder cases resulting in a death notice is used as the explanatory variable.

As mentioned, it is possible that some counties with zero death notices have prosecutors who are actually zealous proponents of capital punishment. To address this concern, I limit the sample to New York City, where the DA in each of the five counties made public his position on the new law (those in Manhattan, the Bronx, and Staten Island were opposed, whereas those in Brooklyn and Queens supported it). Thus, there is no need to glean from county death notice statistics the DAs' probable positions. The second column of Table 5 reports the results when only the most conservative measure of death penalty policy is used: a simple for-or-against dummy variable for each of the five boroughs. The coefficient is slightly larger than in the second column and highly significant, consistent with the results in the second column being contaminated by some measurement error.[12]

Another possible objection to the results in Table 4 relates to the fact that the same 1995 act that legalized the death penalty in New York also expanded the definition of first-degree murder. Before the 1995 act first-degree murder was limited to those who willfully killed a law enforcement official, while second-degree murder was a catchall category including murders ranging from contract killings to actions displaying a "depraved indifference toward human life." As discussed in section 1, the death penalty legislation added several new categories to the first-degree murder classification. As a result of this redefinition, my "murder" category includes both first- and second-degree murder defendants, since only this aggregate group did not change over time.

The change in murder definitions raises two issues. First, since the first-degree share of murder arrests rose after the death penalty law, the law's effect on plea bargains could be merely a "first-degree" effect—that is, defendants may be more likely to plead guilty to first-degree murder than to second-degree murder. However, such a first-degree effect would bias

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12. When restricted to cases outside New York City, the coefficients on the regressions in Tables 3–5 do not change sign but usually lose their significance because of, perhaps, the much smaller sample size (New York City accounts for more than three-fourths of the data).

the DDD results only if the increase in the first-degree share of murder arrests were disproportionately higher in counties that tended to use the death penalty.

I examine the data to see whether this is in fact the case. In counties with DAs who have issued at least one death notice, the percentage of first- and second-degree murder arrests that are for first-degree murder rose from 1.0 before the death penalty law was enacted, to 2.4 after the enactment. In counties with DAs who have not sought the death penalty, that same figure rose from 2.1 to 4.5. Thus, the first-degree share of first- and second-degree murder arrests rose at roughly the same rate in the two sets of counties. Additionally, it is not clear that there is any first-degree effect with respect to plea bargaining. Before the law changed—when the death penalty did not affect the decisions of first-degree murder defendants—the percentage of first-degree murder defendants who pleaded guilty to their original charge is nearly identical to (actually, slightly less than) the percentage of second-degree murder defendants who pleaded guilty to their original arraignment charge.

The second issue relates to the interpretation of the results in Tables 4 and 5. The coefficient on the triple interaction term estimates the increased propensity of those arrested for first- and second-degree murder to plead guilty after the law changed. However, for most of those defendants, the death penalty is not relevant, because it applies only to those arraigned on first-degree murder charges, suggesting that the true effect on first-degree murder defendants is underestimated by the results in Tables 4 and 5. These estimates are roughly analogous to an "intent to treat" measure, in the parlance of program evaluation.

To determine the effect of the "treatment on the treated," one first needs to determine who exactly is in the treatment group. As Table 1 shows, only 36 defendants have been issued death notices in New York. However, the death penalty's effect may not be limited to these 36 defendants, because its specter may have encouraged some defendants to secure plea bargains after the DA merely mentioned a death sentence as a possibility but before he actually issued a death notice.

As a rough estimate of the effect of the death penalty on those who actually face it, I scale the effect measured in the DDD estimate by the inverse of the ratio of first-degree murder indictments to all murder arrests.

Table 1 reports that this ratio is 0.0716. Taking the coefficient from the first column of Table 4, 0.227, as the preferred estimate of the effect of the law, I calculate that a murder suspect in a county where 5% of the first-degree murder defendants are issued a death notice is roughly 16 percentage points ($0.227*0.05*(1/0.0716) = 15.9$) more likely to plead guilty to his original arraignment charge than is a first-degree murder defendant in a county where the DA does not pursue the death penalty.

Note that this calculation implicitly assumes that the positive coefficient on the triple interaction term is being driven *only* by the increased propensity of those who actually face the possibility of capital punishment to plead guilty. If this is not the case, then the scale factor is too large and the effect on the treatment group is overestimated. Although providing an exact value is difficult, the true measure of the treatment on the treated probably lies somewhere between the value of coefficient on the triple interaction term in Table 4 and the scaled estimate just reported.

I address one final issue related to the death notice share variable. As Table 1 reports, one death notice was issued in Bronx County. However, Robert Johnson, the county's longtime DA, did not issue it. When Johnson announced that he would not seek the death penalty against first-degree murder suspect, Angel Diaz, Governor Pataki removed Johnson from the case and replaced him with a prosecutor from the state's Attorney General's office who would seek the death penalty.[13]

Although this move has a number of interesting jurisdictional and legal implications, only the rather mundane question of how to code the death notice variable for Bronx County will be addressed here. The share of first-degree murder indictments resulting in death notices ostensibly represents the tendency of DAs to seek the death penalty. However, the death notice issued in the Bronx does *not* represent the tendency of Johnson, a staunch opponent of capital punishment, to seek the death penalty. Though not reported, all of the results in Tables 4 are robust to recoding the explanatory variables as if the Diaz death notice had never been issued, and to excluding the Bronx from the sample altogether.

Although the New York results appear to be quite robust, there are a number of issues surrounding the state's statute that limit my ability to

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13. Johnson challenged Pataki's action in court and lost. Because Diaz committed suicide while awaiting trial, Pataki's prosecutor never actually tried the case.

generalize these results to the rest of the nation. First, New York's law is rather limited.[14] Perhaps pretrial negotiations might proceed differently if prosecutors wielded a more expansive statute. Second, New York's unusual provision allowing defendants the right to plead guilty and receive life imprisonment makes generalization risky. Finally, as already mentioned, the state initiated a Capital Defenders Office (CDO) as part of the capital punishment statute. Because the CDO attracts many well-trained attorneys who oppose capital punishment, murder defendants tried after the new statute was passed may have been represented by better attorneys than those tried before 1995. Thus, in the absence of the CDO, we might have seen an even greater increase in the likelihood that defendants would accept plea bargains with relatively harsher terms. In order to address the potential idiosyncrasies of the New York experiment, I turn to a nationally representative sample of murder defendants.

5. National Cross-Section of Murder Defendants in 1988

This section examines murder defendants across the country and exploits state-level variation in death penalty policy. I draw primarily upon one source of data: *Murder Cases in 33 Large Urban Counties in the United States*, a cross-section of about 3,000 murder cases processed in 33 counties in 1988, gathered by the U.S. Bureau of Justice Statistics (1996). The data set provides information on each case's disposition, including whether the defendant was acquitted or convicted, and whether the defendant pleaded guilty to the original arraignment charge or pleaded guilty to a lesser offense. The data set also includes demographic characteristics of the defendant and the victim in each case. I supplement this data source with two others. First, I merge the *Murder Cases* data with data on city and county demographic and crime rate information provided by the U.S. Census and the Federal Bureau of Investigation's *Uniform Crime Reports* to control for heterogeneity among counties and states. Second, I merge the data with the *Capital Punishment, 1996*, data set

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14. Unlike most other states, New York does not permit the execution of the mentally retarded or of defendants who committed their capital offense before their eighteenth birthday. In addition, felony murder, of which the majority of U.S. death row inmates were convicted, is not subject to the death penalty in New York unless the prosecutor can show that the murder itself was intentional.

from the U.S. Bureau of Justice Statistics (1999), which provides the number of death sentences and executions per year per state. Summary statistics are reported in Table 6.

The obvious problem with comparing murder defendants in states where death sentences are commonly issued with those in states where they are rarely or never issued is the possibility that other state-level difference are correlated both with states' death penalty use and with defendants' tendencies to plead guilty. If, for example, states that send a large share of their murder defendants to death row also underfinance public defenders' budgets (increasing the caseload of defense attorneys and making them more willing to accept plea bargains), then regressing a guilty plea dummy variable on the percentage of murder defendants sent to death row in each state would yield a positively biased coefficient.

To address this omitted-variables problem, I employ, once again, a differences-in-differences estimation strategy. In this case, the treatment group includes defendants arrested for first-degree murder, and the control group includes murder defendants arrested for lesser charges. Because all states that have reinstated the death penalty restrict its application to

Table 6. Summary Statistics, 1988 Cross-Section Data

Variable	Mean	SD
Plea to original charge	.157	.364
Plea to a lesser charge	.438	.496
Plea to any charge	.281	.450
State has death penalty (dummy variable)	.883	.322
First degree (dummy variable)	.832	.374
Death penalty*First degree	.758	.428
Death sentences / homicide arrests	.0160	.0116
Death sentences / homicide arrests*First degree	.0132	.0116
Male (dummy variable)	.884	.320
Black (dummy variable)	.593	.491
Hispanic (dummy variable)	.166	.372
Prior convictions	.940	2.18
White female victim (dummy variable)	.104	.305
Multiple murder (dummy variable)	.045	.208
County population	2,288,513	2,155,316
Black share of county population	.232	.153
County arrest rate	.0673	.019
South (dummy variable)	.365	.482
South*Black	.226	.418
Observations	2,322	

defendants who have been convicted of first-degree murder, those defendants facing second-degree murder or lesser charges serve as a natural control group.[15] Accounting for the effect of states' death penalty policies on this group of defendants would control for any general states' criminal justice system differences that are correlated with their death penalty policies. As Table 6 indicates, approximately one-fifth of the defendants in the data set were arrested on a second-degree murder or a lesser charge.[16]

The differences-in-differences equation that I estimate takes the following form:

$$Pr(\text{Plea}_{iabc}) = \lambda + \theta_1{}^* X_{iabc} + \theta_2{}^* Y_c + \theta_3{}^* \text{Death penalty}_a + \theta_4{}^* \text{First degree}_b$$
$$+ \theta_5{}^* \text{First degree}_b{}^* \text{Death penalty}_a + v_{iabc}, \qquad (3)$$

where i indexes the defendant, a indexes the state, b indexes the charge, and c indexes the county; *Plea* is a dummy variable coded as one if the defendant pleaded guilty, and zero otherwise; X is a vector of defendant characteristics such as sex, race, and prior record; Y is a vector of county fixed effects; *Death Penalty* (defined loosely for now) is a variable that measures each state's use of the death penalty; *First Degree* is a dummy variable coded as one if the defendant was arrested on first-degree murder charges, and as zero otherwise; and *First degree**Death penalty is the interaction term between *First degree* and *Death penalty.*

I use the same three variations on the dependent variable as in Tables 3 and 4: "plead guilty to the original arraignment charge," "plead guilty to a lesser charge," and "plead guilty, regardless of charge." Thus, analysis parallel to that performed on the New York data with respect to charge and sentence bargaining can be carried out here, as well.

I proxy the *Death Penalty* variable in equation (3) with the probability of a death sentence, given arrest for murder, which I approximate by the ratio of death sentences in 1987 to homicide arrests in 1986 per state. I lag the numerator by one year before the year in which the cases were disposed (1988) in order to eliminate possible simultaneity between the dependent

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15. Georgia—where any homicide is potentially a capital offense—is an exception. However, no county in Georgia was included in the *Murder Cases* data set.

16. The *Murder Cases* data set oversamples first-degree murder defendants, which accounts for their large share of the sample.

and explanatory variables. I lag the denominator in this ratio by one additional year because murder cases generally take about one year to dispose (so, a defendant arrested in 1986 would likely be sentenced in 1987). However, all of the results in this section are robust to ignoring either or both of these lags. This ratio varies widely across states, with Maryland sentencing about 0.2% of those arrested for murder to death, and Oklahoma sentencing nearly 6%.[17]

If states in which defendants are frequently sentenced to death also classify more homicides as first-degree murder, then the coefficient on the interaction term will pick up this difference. There does not appear to be a connection between the frequency of death sentences in a state and the first-degree share of murder arrests; the correlation between the 1987-death-sentences-to-1986-murder-arrests ratio and the share of murder arrests that are for first-degree murder is –.0682.[18]

In the first column of Table 7, the coefficient on the interaction term between the death-sentences-to-homicide-arrests ratio and the *First Degree* dummy variable is positive and significant. The point-estimate suggests that, all else equal, a first-degree murder defendant in a state (such as Oklahoma) where the death-sentence-to-homicide ratio is 0.06 is 12.4 percentage points (or 79%, as the baseline probability is .157) more likely to plead guilty to his original charge than is a defendant in a state (such as Michigan) where that ratio is zero. The second column reports that the death penalty has the opposite effect on charge bargaining. The negative and highly significant coefficient on the interaction suggests that first-degree murder defendants in states where the death-sentences-to-homicide-arrests ratio is 0.06 are 9.5

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17. Ideally, I would have liked to use other proxies for state death penalty policy, such as executions per year per state. However, only three of the states in my sample (Texas, Florida, and Louisiana) executed anyone between 1985 and 1988. Similarly, a dummy variable for whether the state had reinstated the death penalty is of limited use, because only three states in my sample (Michigan, Massachusetts, and New York) had not done so by 1988.

18. The exception is New York. Recall that, until 1995, New York had an unusually narrow definition of first-degree murder. Thus, although first-degree murder defendants comprise about 80% of the entire sample, less than 2% of the New York defendants faced first-degree murder charges. Although first-degree murder definitions vary somewhat across states, the statutes of the remaining states in the sample are reasonably comparable. For this reason, I exclude defendants from New York.

Table 7. Differences-in-Differences Results, 1988 Cross-Section Data

Variable	Plead Guilty to Original Arraignment Charge	Plead Guilty to a Lesser Charge	Plead Guilty, Regardless of Charge
First degree	−.248∗∗	.0906∗∗	−.130∗∗
	(.0552)	(.0168)	(.0328)
Death sentences to homicide arrests∗First degree	2.48∗∗	−1.58∗∗	.806
	(1.15)	(.512)	(1.15)
Male	.0560∗∗	−.0557∗∗	.0103
	(.0219)	(.0269)	(.0416)
Black	.0345	.0264	.0639
	(.0214)	(.0362)	(.0398)
Hispanic	.00171	.0386	.0475
	(.0190)	(.0326)	(.0333)
Prior convictions	−.00184	−.000273	−.00339
	(.00421)	(.00472)	(.00630)
White female victim	−.00556	.00823	.00408
	(.0174)	(.0226)	(.0339)
Multiple victim	−.106∗∗	.163	−.0465
	(.00839)	(.127)	(.0992)
South∗Black	−.0200	−.0200	.0384
	(.0415)	(.0415)	(.0497)
Mean of dependent variable	.157	.281	.438
Observations	2,322	2,322	2,322
Pseudo r^2	.145	.0982	.119

Notes: Standard errors are adjusted for clustering on the *First degree*∗*State* level. County-level fixed effects are included in all regressions. Probit results are reported as changes in probability (standard errors in parentheses).
∗Significant at the .1 level.
∗∗Significant at the .05 level.

percentage points (or 34%) *less* likely to plead guilty to a lesser charge than is a similarly situated defendant in a state where that ratio is zero. As should be expected, the third column reports that there is little effect of the death penalty on plea bargaining in general.[19]

The results in this section generally confirm those from the New York State analysis, although the national analysis suggests a stronger effect of the death penalty on charge bargaining. It is difficult to compare the exact

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19. Though not reported here, the results in Table 7 are robust to replacing county fixed effects with county-level death penalty variables, to including a dummy variable coded as one if the state had reinstated the death penalty by 1988 and as zero otherwise, or to excluding states that had not yet reinstated the death penalty.

magnitudes of the point estimates, because the proxies used for death penalty policy are different. But both sets of results indicate that the death penalty makes defendants more likely to plead guilty to their original charge, yet no more likely to plead guilty in general—suggesting that the threat of capital punishment encourages defendants to accept deals that they otherwise would have rejected.

6. Conclusion

The findings here suggest that the threat of the death penalty leads more defendants to plead guilty to their original arraignment charges. The positive effect of the reinstatement of capital punishment on New York murder defendants' propensity to plead guilty to their original charges is robust to several tests and does not appear to be the result of simultaneous changes in the state's criminal code or political climate. Results from a national cross-section of murder defendants generally support this conclusion.

This article also demonstrates the importance of distinguishing between charge bargains and sentence bargains in empirical work on guilty pleas. While the death penalty appears to encourage sentence bargains, it does not encourage charge bargains. In fact, in all regression results reported here, the death penalty has a negative (sometimes significant) effect on charge bargains. The offsetting effects of the death penalty on the two types of plea bargains can explain why I found no significant effect of the death penalty on guilty pleas in general. By separating the two types of plea bargains, this study was able to uncover a positive connection between the death penalty and the DA's bargaining power.

These results are potentially relevant in at least two areas of criminal justice policy. First, since the death penalty affects only the *terms* of the deals defendants make but does not seem to increase defendants' propensity to plea bargain in general, the threat of the death penalty does not seem to reduce the total number of cases that proceed to trial. Thus, the well-documented costs of capital trials do not appear to be offset by reducing total trial costs through plea bargains. Second, while the death penalty does not discourage defendants from going to trial, it does increase the bargaining position of DAs. Opponents of capital punishment might

argue that, based on this finding, the threat of the death penalty is power-ful enough to compel an innocent person to accept a plea bargain.

This work is, to the best of my knowledge, the first to examine the effect of the death penalty on plea bargaining. It remains to be seen whether defendants and DAs react only to particularly dramatic shifts of sentence structure, such as the introduction of capital punishment, or whether shifts in bargaining power result after sentencing reforms for lesser crimes. Addressing this question would be a natural direction for future research. Given that the vast majority of criminal cases are resolved by guilty plea, researchers and policy makers would be wise to consider the effects of sentencing laws on this aspect of the criminal justice system.

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