Online Appendix

The Electoral Connection in Court: How Sentencing Responds to Voter Preferences

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A.1 Dealing with selection: a structural approach

As explained in the main text, our reduced-form analysis abstracts away from two selection issues: First, it only considers cases that resulted in an incarceration conviction. Second, it only addresses the difference between cases that were settled and those that were resolved at trial by incorporating a plea bargain indicator as a control variable in the regression specifications. However, whether a case settles may depend on the severity of the expected trial sentence, creating a potential endogeneity problem.

In this Appendix, we explore a structural approach for dealing with the selection problems described above. Our strategy is based on the techniques proposed by Silveira (2017). It assumes that, for each case, the data generating process involves a defendant and a prosecutor who bargain over the sentence to be assigned. If bargaining is successful, the case is settled. Otherwise, it proceeds to the trial stage, in which the defendant is found guilty with a given probability. Both the potential trial sentence and the probability of conviction at trial are allowed to vary across cases. The bargaining protocol is take-it-or-leave-it: in every case, one of the bargaining parties offers to settle for a sentence. If the other party rejects the offer, the bargaining stage ends and a trial takes place.

As opposed to Silveira (2017), we do not fully specify a structural econometric model. As we argue in the remainder of the section, it is possible to investigate how the passage of Bill 41 affected the sentencing behavior of Superior Court judges by only partially recovering the primitives of the model. As a consequence, we do not need to take a stance on the identity of the proposal-maker at the bargaining stage or on the nature of the asymmetric information in the model. Accordingly, several of the assumptions that we make below are in terms of high-level objects. The structural econometric model presented in Silveira (2017), as well as the assumptions on its primitives discussed there, are fully consistent with the analysis developed here.

Assume that each case i is associated with characteristics Z_i, which are observable by the econometrician. These characteristics may, in principle, include the type of the main charge against the defendant, the defendant's demographics, variables related to the date and place of prosecution, etc. In our application below, Z_i consists of measures of the conservativeness of the judge responsible for the case and an indicator of whether the case was resolved after the passage of Bill 41. To every case correspond a trial sentence T_i. Such a sentence is assigned by the judge in the event that the case reaches trial and results in a conviction. We assume that the trial sentence is known by the prosecutor and the defendant at the plea bargaining stage but, from the econometrician's perspective, it is a random variable with a mixture distribution. Specifically, it may assume value zero with positive probability, which we allow to depend on Z_i. The interpretation for T_i is that, in the event of a conviction at trial, a non-incarceration sentence (such as a sentence to probation or community service) is assigned by the judge. Conditional on being strictly positive, T_i is described by the density function $g(\cdot|Z_i)$ with full support over $[\underline{t}, \bar{t}]$.

In every case i a settlement offer is made. Such an offer is represented by S_i, which, for the econometrician, is a random variable. Assume that there exists a strictly increasing continuous function $\tilde{s}(\cdot,\cdot)$ such that $S_i = \tilde{s}(T_i, Z_i)$. In other words, given realizations z_i and t_i of Z_i and T_i, respectively, the realization s_i of S_i satisfies $s_i = \tilde{s}(t_i, z_i)$. Assume that $\tilde{s}(0, Z_i) = 0$ for every Z_i. Under these assumptions, S_i is equal to zero with positive probability (the same probability that T_i is equal to zero) and, conditional on being strictly positive, S_i is described by a density function $b(\cdot|Z_i)$ with full support over $[\tilde{s}(\underline{t}, z), \tilde{s}(\bar{t}, z)]$.

For each case i the trial sentence T_i is only observed in the event of a conviction at trial. Similarly, the settlement offer S_i is only observed if it is accepted—i.e., the plea bargain is successful. Let Ψ_i denote a random variable indicating the way case i is resolved. Assume $\Psi_i = 1$ when the case is settled and $\Psi_i = 2$ if it results in a conviction at trial. We

can then write the density of trial sentences, conditional on a conviction at trial, as

$$g(t|\Psi = 2, Z = z) = \frac{P[\Psi = 2|T = t, Z = z]g(t|Z = z)}{P[\Psi = 2|Z = z]}. \tag{1}$$

Also, we can write the density of settlement offers, conditional on a plea bargain, as

$$b(s|\Psi = 1, Z = z) = \frac{P[\Psi = 1|S = s, Z = z]b(s|Z = z)}{P[\Psi = 1|Z = z]}. \tag{2}$$

Both $g(\cdot|\Psi = 2, Z = z)$ and $b(\cdot|\Psi = 1, Z = z)$ are observed by the econometrician. Moreover the conditional probabilities $P[\Psi = 2|Z = z]$ and $P[\Psi = 1|Z = z]$ are also observed.

Let z' and z'' be two values of Z_i such that

$$\begin{aligned} & P[\Psi = 2|T = t, Z = z'] = P[\Psi = 2|T = t, Z = z''] \\ \text{and} \quad & P[\Psi = 1|S = s, Z = z'] = P[\Psi = 1|S = s, Z = z''] \end{aligned} \tag{3}$$

for all $t \in [\underline{t}, \bar{t}]$ and $s \in [\tilde{s}(\underline{t}, z), \tilde{s}(\bar{t}, z)]$. Then, the following equations hold:

$$\begin{aligned} & \frac{g(t|\Psi = 2, Z = z')}{g(t|\Psi = 2, Z = z'')} \frac{P[\Psi = 2|Z = z']}{P[\Psi = 2|Z = z'']} = \frac{g(t|Z = z')}{g(t|Z = z'')} \\ \text{and} \quad & \frac{b(s|\Psi = 1, Z = z')}{b(s|\Psi = 1, Z = z'')} \frac{P[\Psi = 1|Z = z']}{P[\Psi = 1|Z = z'']} = \frac{b(s|Z = z')}{b(s|Z = z'')}. \end{aligned} \tag{4}$$

The first equation in 4 shows that, using the observed unconditional probabilities of conviction at trial and the densities of trial sentences, conditional on a conviction at trial, we can recover some information on the unconditional distribution of trial sentences.[1] More precisely, we are able to identify the ratio of unconditional densities of trial sentences for z' and z''. Similarly, the second equation of 4 shows that, using the unconditional probabilities

[1] To be sure, when we refer to unconditional probabilities and densities, we mean to condition these objects on Z.

of successful plea bargain and the conditional densities of settlement offers, we can recover the ratio of densities of settlement offers for z' and z''.

The equations in 4 suggest a method for analyzing how the passage of Bill 41 affected the sentencing behavior of Superior Court judges in a way that accounts for the selection processes determining which cases are settled and which ones result in a conviction at trial. The vector z' can be set to indicate cases that were under the responsibility of a particular judge or group of judges and that were decided before the passage of the bill. Vector z'' can then be set to indicate cases under the same judges that were decided after the bill was approved. The conditional probabilities and densities on the left-hand side of the equations are observed and can be estimated. By examining the ratios of estimates of the conditional densities of trial sentences for z' and z'' (weighted by estimates of the ratios of unconditional probabilities of conviction at trial) we are able to estimate how the passage of Bill 41 affected the unconditional distribution of trial sentences. In the same way, we can estimate how the bill affected the unconditional distribution of settlement offers by recurring to an empirical version of the second equation in 4.[2] Since the trial sentence and the settlement offer of a case are related by the strictly monotonic function $\tilde{s}(\cdot,\cdot)$, the way Bill 41 affected the unconditional distribution of settlement offers is very informative of how it affected the sentencing behavior of judges.

The estimation of the conditional densities of settlement offers and trial sentences can, in principle, be done by kernel. But the supports of the distributions of trial sentences and settlement offers are bounded. Standard kernel density estimation techniques result in inconsistent estimates near the boundaries of the support. To overcome such a problem we employ a boundary correction strategy proposed by Karunamuni and Zhang (2008).[3]

[2] Of course simply employing the weighted ratios of conditional densities only identifies the ratios of unconditional densities of sentences and settlement offers. To independently obtain the unconditional distributions of trial sentences and settlement offers, a full structural estimation procedure, as the one implemented by Silveira (2017), is needed.

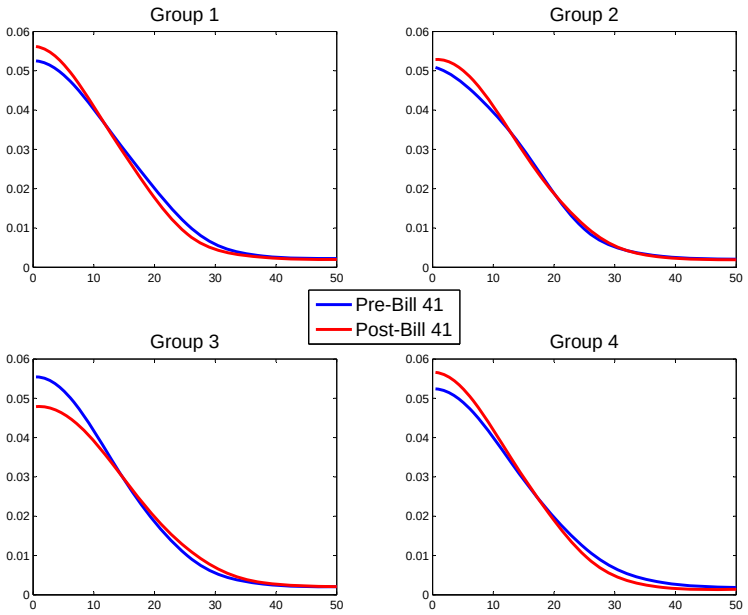
[3] Away from the boundaries, bandwidth selection follows Silverman's "rule-of-thumb" (Silverman, 1986).

Since the vast majority of the cases in the sample are resolved by plea bargain, we focus our analysis on estimating the ratio of densities of accepted settlement offers before and after the passage of Bill 41. Due to the sample size, these densities are much more precisely estimated than those of trial sentence and, as argued above, they are still informative on the sentencing behavior of the Superior Court judges.

Figure 1 depicts the ratios of estimated densities of settlement offers before and after the passage of Bill 41 for four groups of judges. As described earlier, the judges are divided according to the conservativeness of their districts. The groups are numbered from the least to the most conservative, as implied by the Republican vote share in the 2000 Presidential elections. The plots on the top left and top right, which respectively refer to groups one and two, indicate that cases under judges from liberal districts started being settled for more lenient sentences after the passage of the bill. For settlement offers shorter than about ten months, the densities referring to the period after the passage of the bill are above those referring to the period prior to the bill. For settlement offers between ten and about 40 months, the order of the density functions switches. In contrast, the plot on the left bottom of figure 1 indicates that cases under judges from group three, whose districts are moderately conservative, settled for harsher sentences after Bill 41 passed. For settlement offers shorter than about 15 months, the density referring to the period after the bill is below that referring to the post-bill period. The order of the density functions is the inverse for settlement offers between 15 and about 40 months. The plot on the bottom left of the figure depicts cases under judges from group four, whose districts are the most conservative ones. This plot is very similar to the plots on the top of the figure, which refer to judges from the liberal districts. It indicates that cases under judges from extremely conservative districts started being settled for more lenient sentences after the passage of Bill 41.

Near the boundaries, a modified bandwidth is employed. The kernel function is the tri-cube. See Karunamuni and Zhang (2008) for details.

Figure 1: Reaction to Bill 41—Four groups of judges



A simple way of assessing the statistical significance of these results is to recur to two-sample Kolmogorov-Smirnov tests comparing the distribution of settlement offers made before and after the passage of Bill 41 for every group of judges. Table A.1 presents the results of such tests. The null hypothesis is that the sample of pre-Bill 41 cases is drawn from the same distribution as the that of post-Bill 41 cases. The null is strongly rejected for groups one, two and four. For group three, the null is rejected at a confidence level of 3.97%.

The plots in figure 1 confirm the findings from the reduced form analysis. They suggest that, after the passage of Bill 41, judges from liberal and moderately conservative districts adapted their sentencing behavior to suit the preferences of their new electorate. The shock in sentencing patterns resulted in a change in the distribution of settlement offers, as captured by figure 1. Judges from the most conservative districts, however, did not alter their sentencing behavior in a way that was consistent with their voters' will. Instead,

Table A.1: Kolmogorov-Smirnov tests: results per district group

	Group 1	Group 2	Group 3	Group 4
p-value	0.00%	0.00%	3.97%	0.02%

Notes: This table reports the results of Kolmogorov-Smirnof tests of equality of the settlement sentence distributions before and after the passage of Bill 41. The null hypothesis is that the two distributions are the same. The tests are conducted separately for cases decided by judges from district groups one (most liberal) to four (most conservative).

figure 1 suggests that these judges become more lenient after the bill passed. These results, therefore, corroborate the findings from the regression analysis presented in the main text.

A.2 Accounting for Case Severity

Table A.2: Offense Severity in North Carolina Superior Court: 1994-2010

(1) Class	(2) Count	(3) Share	(4) Cumulative
	Misdemeanor		
1	70,927	9.19	9.19
2	32,205	4.17	13.36
3	9,882	1.28	14.64
	Felony		
A	2,619	0.34	14.98
A1	16,230	2.10	17.08
B1	8,715	1.13	18.21
B2	1,394	0.18	18.39
C	22,995	2.98	21.37
D	33,358	4.32	25.69
E	21,885	2.83	28.52
F	31,807	4.12	32.65
G	39,158	5.07	37.72
H	288,959	37.43	75.15
I	191,857	24.85	100.00

A.3 Alternate cutpoint for district-level preferences

In the main text of our manuscript, we operationalize the difference between liberal and conservative districts with a cutpoint at the statewide vote share for then-Gov. Bush, which was 56.47 percent. Those judicial districts above that percentage are conservative and those below are liberal.

From there, we first take a binary approach to liberal and conservative districts when we employ our cumulative distribution functions, which show that judges assigned to conservative districts after Bill 41 sentence more punitively than judges assigned to liberal districts. Second, we take a continuous approach to liberal and conservative districts in our main regression analyses, where the variable liberal represents all those districts below the statewide mean Republican vote share, and the variable conservative represents all those districts above the statewide mean Republican vote share. Even within the variables, we allow for variation, such that some liberal districts are more liberal than others, and so on. The same is true for variation among conservative districts. Whether we employ a dichotomous measure or a continuous measure, we find some evidence for our responsiveness hypothesis.

We believe using the statewide mean vote share for then-Gov. George W. Bush allows for relativity across the state. That is, a district where Bush won 52 percent of the vote is more liberal relative to a district where Bush won 57 percent or 60 percent of the vote. For example—if we momentarily think about North Carolina counties rather than judicial districts—let us compare Wake County (the state's largest and home to the capital, Raleigh) to Union County (the state's eighth largest county, residing in the Charlotte metro area). Bush's two-party vote share in Wake County was 53.58 percent and in Union County was 68.16 percent. A 50 percent cutoff would label both of these counties as conservative because a majority of voters cast their ballots for Bush. But that approach would ignore the relative ideology of particular locations in the state.

We appreciate that an anonymous reviewer suggested taking a different approach to district-level preferences. In Table A.3 below, we implement an alternate cutpoint at 0.50 across judicial districts. Column 1 of Table A.3 replicates our results from the main text of our manuscript, where we utilize liberal districts as those falling below the statewide two-party Republican vote share of 56.47 percent, and conservative districts as those above that vote share. Column 2 of Table A.3 uses 50 percent as the cutpoint between liberal and conservative. Both $conservative * Bill\ 41$ and $liberal * Bill\ 41$ in columns 1 and 2 are continuous. Most importantly, the results across both columns are substantively and statistically similar. In effect, this decreases the number of liberal districts, but we still find evidence of increasingly lenient sentences among those judges who are assigned to those districts. Our results for judges assigned to conservative districts do not change by inflating the number of districts within that category.

Table A.3: Reaction to Bill 41

	(1)	(2)
$conservative * Bill\ 41$	-0.418	-0.168
	(0.292)	(0.218)
$liberal * Bill\ 41$	-0.406***	-0.456***
	(0.131)	(0.164)
$Bill\ 41$	0.0709**	0.0616*
	(0.0305)	(0.0318)
$settled$	-0.519***	-0.519***
	(0.0157)	(0.0157)
age	0.0130***	0.0130***
	(0.00160)	(0.00160)
age^2	-0.000181***	-0.000181***
	(0.0000212)	(0.0000212)
$female$	-0.172***	-0.172***
	(0.0103)	(0.0103)
$black$	0.00759	0.00758
	(0.00699)	(0.00699)
$hispanic$	-0.112***	-0.112***
	(0.0162)	(0.0162)
$attorney: \ private$	-0.0471***	-0.0471***
	(0.00831)	(0.00831)
$attorney: \ public\ defender$	-0.0761***	-0.0761***
	(0.00761)	(0.00761)
$convict\ history\ 2$	0.0242**	0.0243**
	(0.00977)	(0.00977)
$convict\ history\ 3$	0.339***	0.339***
	(0.0115)	(0.0115)
$convict\ history\ 4$	0.594***	0.594***
	(0.0149)	(0.0149)
$convict\ history\ 5$	0.809***	0.809***
	(0.0165)	(0.0165)
$convict\ history\ 6$	1.017***	1.017***
	(0.0188)	(0.0188)
Observations	135481	135481
R^2	0.658	0.658

Notes: OLS estimates. The unit of observation is a case. Standard errors, provided in parentheses, are adjusted for two-way clustering at the judge-period levels, where period refers to pre- and post-Bill 41. Column 1 employs the district-level conservative and liberal calculation discussed in the main text, operationalizing the difference between districts using North Carolina's statewide two-party vote share for the Republican presidential candidate in 2000, which was 56.47 percent. Column 2 uses 50 percent vote share as the cutpoint between conservative and liberal; $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

A.4 Summary statistics before and after Bill 41

Table A.4 presents case-level summary statistics broken down by period, before and after Bill 41. Specifically, column (1) refers to cases decided from January 1995 to August 2, 1996, the date Bill 41 was ratified, while column (2) is based on cases decided in the remainder of our sample period—from August 3 1996 to October 2010. As a subset of cases from column (2), column (3) presents summary statistics for cases resolved from August 3, 1996 to December 31, 1997—that is, the period immediately following Bill 41's ratification. Column (2) represents the shifting demographics of North Carolina in the 15 years that follow Bill 41. In particular, the share of Hispanic defendants increases from 0.48 percent in the pre-Bill 41 period to 2.73 percent in the post-Bill 41 period. This increase in the proportion of Hispanic defendants is not surprising, given the growth of the overall Hispanic population in the state in the same period. To focus the comparison on the period around the ratification of Bill 41—which, as explained in the main text, is the key period for the identification of our coefficients of interest in specifications (2) and (3)—column (3) of Table A.4 shows summary statistics for cases resolved from August 3, 1996 to December 31, 1997. All variables in column (3), including the share of Hispanic defendants, are very similar to the ones in column (1). To conclude, the comparison between case characteristics before and after Bill 41 indicates that changes in the composition of cases are not responsible for the effects we estimate in our analysis.

Table A.4: Descriptive statistics: Before and After Bill 41

	(1)	(2)	(3)
	Pre Bill 41 1995-1996	Post Bill 41 1996-2010	Post Bill 41 1996-1997
% Felony	88.24%	89.52%	89.09%
% Black defendant	63.78%	59.43%	61.06%
% Hispanic defendant	0.48%	2.73%	0.67%
% Female defendant	6.32%	7.57%	7.55%
Average defendant age	29.66	30.89	29.44

Notes: This table, which is based on data form the North Carolina Administrative Office for the Courts, refers to criminal cases decided at the North Carolina Superior Courts. We exclude from the sample all homicide cases, as well as cases with missing information on any of the following: the sentence assigned, the method of disposition, the main charged offense or the defendant's age, gender or race/ethnicity. Column (1) is based on cases resolved from January 1995 to August 2 1996, the date Bill 41 was ratified. Column (2) is based on cases resolved from August 3 1996 to October 2010. Column (3) is based on cases resolved from August 3 1996 to December 31 1997.

References

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