

Directing Retribution: Ex Ante versus Ex Post Constraints on the
Discretion of Trial Court Judges¹

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Abstract

In most states, trial judges' sentencing is constrained by both ex ante constraints, in the form of mandatory and guideline sentences, and ex post review, often by the electorate. Might voters alter their evaluation of judges given the existence of boundaries on judicial discretion? Further, can legislators exploit this response? We present a model of ex ante and ex post control of judges given incomplete information about judicial ideology and defendant culpability. A legislator sets mandatory minimum and maximum sentences for a given crime. Judges sentence subject to these constraints, and voters decide whether to retain the judge given the observed sentence. The model has several significant implications. First, if legislators care about proportionality of punishment, judicial discretion *increases* with legislative punitiveness. Second, whether a voter, having observed a sentence, believes a judge deserves retention depends on the judges discretion. Third, legislators can sometimes manipulate judicial discretion to compel even an ideologically dissimilar voter to filter judges the legislator disagrees with.

1 Introduction

Trial judges in courts of general jurisdiction are fundamental players in the day-to-day operation of the criminal justice system. Voters and their elected representatives delegate responsibility to these judges to make decisions that, at the extreme, contribute to determining whether convicted felons live or die. The exercise of judicial discretion, however, is prone to frequent criticism. Political conservatives allege that judges ignore public preferences about the appropriate punishment of the guilty. Concerns about the leniency of an autonomous judiciary parallel charges of “judicial activism” on the part of justices in higher courts. Liberals, on the other hand, fear that judges may knowingly exceed appropriate punishment in order to appear tough on crime to voters.

Concerns about the behavior of judges are similar to concerns about numerous government officials to whom authority is delegated. Bureaucrats might shirk their responsibilities, by diverging from the desired policy preferences of their principals (Epstein and O’Halloran 1994, 1999), overstating costs to pad their budgets (Niskanen 1971), or engaging in other forms of renegade action (Davis 1969). Concern about shirking by asymmetrically well-informed agents has led both legislators and executives to expend significant resources to identify trustworthy bureaucrats, to formalize boundaries on the range of acceptable actions, and to subject agents to ex post review and the threat of dismissal.

At the same time, both legal scholars and judges have lamented political efforts to control the choices of judges, labeling them encroachments on judicial independence (Dagger 1993; Croley 1995; De Muniz 2002). In his year-end 2003 report on the state of the federal judiciary, William Rehnquist criticized Congress for its passage of the PROTECT Act, which, among other measures, reduces the discretion of judges to “downwardly depart” from federal sentencing guidelines. The Chief Justice wrote, “Judges have . . . an institutional commitment to the independent administration of justice and are able to see the consequences of judicial reform proposals that legislative sponsors may not be in a position to see.” Further, the possibility that an unpopular sentence might garner adverse publicity for an elected judge is a threat judges must constantly evaluate, particularly as reelection approaches (Huber and Gordon 2004).

In this paper, we consider the use of, and interaction between, two broad categories of methods for controlling judicial behavior. The first is ex ante controls on the sentences judges can assign.

These take the form of statutory minimum and maximum sentences associated with particular crimes, or sentencing guidelines that are effectively binding in most instances. The second is the ex post review of judges through elections or reappointment proceedings. We do so by way of a formal model of judicial discretion. Although our model has its origins in previous models of delegation in political science, it differs in two important respects. First, we depart from the standard spatial model by assuming that actors have ideal penalty *schedules* that map culpability into preferred sentences, instead of ideal points in a policy space. Second, we assume that voters and legislators are uninformed as to both the judge's punitiveness (ideology) and defendants' culpability. Thus, except under rare conditions, an observed sentence can never by itself fully reveal the state of the world.

Our framework is a two-stage sentencing game in which the legislature sets discretionary boundaries ex ante, and judges assigns (constrained) ideal sentence in each round of play. Between rounds, a voter has the opportunity to review first-round judicial behavior and decide whether to retain or replace the incumbent judge. Our model reveals a number of insights. First, ceteris paribus, judges will receive *more* discretion when the legislature is conservative (i.e. more punitive) relative to the distribution of judges. At the same time, a conservative legislator that grants discretion optimally will be generically worse off than a liberal legislator delegating optimally. Second, consider a voter who must decide whether to retain or replace a judge on the basis of a single sentence s . The same voter may or may not retain the incumbent upon observing s , depending on the boundaries of the judge's discretion and whether s lies at one or the other end of her discretionary range. Third, a rational legislature who cares sufficiently about the future can manipulate the judge's discretion to exploit this change in the voter's behavior. There is a range of circumstances for which the legislator can induce the voter to work on his behalf, even though the two might differ ideologically.

The relationship between ex ante constraints and ex post review is complex, so we break the full model into its component parts before considering their interaction. First, we derive optimal ex ante guideline minimum and maximum sentences in the absence of ex post review. Next, we consider ex post voter oversight of judges in the absence of binding ex ante constraints. In that situation, even the most punitive voters cannot commit to replacing incumbent judges who impose lenient sentences. Finally, we consider ex ante constraints and ex post review in tandem. We find

that under certain circumstances legislators will find it in their interest to change the boundaries of the judge's discretion to improve the prospect that voters will replace judges who are ideologically unappealing to the *legislator*. That is, guidelines alter both the loss associated with sentencing by individual judges and the filtering behavior of voters.

We conclude by discussing several substantive extensions to our framework, including variation in the distribution of judicial ideologies, and how prosecutors and juries affect the range of defendant culpabilities for which a judge sentences. Additionally, although we focus on the issue of the control of trial judge sentencing behavior, we discuss how this model is of use in other situations in which an actor is a common agent to multiple principals.

2 The Basic Setup of the Model

The model is a variation on standard spatial models of delegation under incomplete information in political science, with two important exceptions. In the traditional spatial delegation setup (e.g. Gilligan and Krehbiel 1987, Epstein and O'Halloran 1994, 2000; Volden 2002), actors have single-peaked preferences over outcomes, which are expressed as the sum of policy and a random shock representing the state of the world (for a discussion of the importance of the additivity assumption, see Bendor and Meirowitz 2004). Actors' ideal point are static, and thus the extent of disagreement among actors over outcomes is also static.

To better capture preferences about punishment, we assume instead that all actors have ideal *schedules* that associate a state of the world, the defendant's culpability, with an appropriate punishment. Culpability refers to the set of circumstances associated with the commission of a given undesired act: criminal history, state of mind, victim characteristics, etc. Note that we take culpability to denote a particular fact pattern revealed at trial (weighted by the quality of evidence), and not the corresponding appropriate level of punishment, about which reasonable people may disagree. Each player adheres to the normative principle of *proportionality* (Beccaria [1764] 1997): Greater culpability requires greater punishment. Likewise, players agree that defendants who are not culpable should not be punished (i.e. the schedule should have zero intercept). However, they disagree about how rapidly punishment should increase as a function of culpability.

Second, existing spatial models of delegation nearly always assume that the relevant actors'

preferences are common knowledge while the underlying state of the world is private information held by an agent. Our model departs from this setup by assuming that both are private information initially known only to the agent. Principals (legislators and voters) have prior beliefs about both, and update those beliefs given the agent’s actions.

There are three players: a legislator L , who sets ex ante constraints on the sentencing behavior of sitting judges, a voter V who, upon observing the behavior of the sitting judge, decides whether to retain the judge or replace her, and the judge J . Although we refer to the judge’s “ex ante principal” as the legislator, the model covers systems in which sentencing commissions have authority to set guidelines from which the judge can only depart in special circumstances.¹ Likewise, although the judge’s ex post principal is labeled the voter, we could apply the model to systems in which the executive, legislature, or independent commission has authority to reappoint sitting judges.²

We assume that all actors’ ideal penalty schedules are linear. Preferences of each player $i \in \{L, J, V\}$ over proportionality can therefore be reflected by a single parameter, $\beta_i \in [0, 1]$. An actor’s ideal punishment given culpability c is $\beta_i c$. We assume throughout that β_V and β_L are common knowledge, but that β_J is the judge’s private information. All actors care only about sentencing, and in the full model there are two opportunities for a judge to sentence. Utilities over sentences are quadratic, and may be expressed as

$$u_i(s_1, s_2) = -(\beta_i c_1 - s_1)^2 - \delta_i(\beta_i c_2 - s_2)^2,$$

where $s_t \in [0, 1]$ and $c_t \in [0, 1]$ reflect, respectively, the sentence and defendant culpability at time t , and $\delta_i \in [0, 1]$ is i ’s discount factor. For simplicity, we assume $\delta_J = 0$.

The full model proceeds in the following steps:

1. Nature chooses a judge with preference parameter $\beta_J \sim U(0, 1)$, which only the judge observes.
2. The Legislator chooses a mandatory minimum sentence, g_ℓ , and a mandatory maximum, g_h .

¹Twenty-two states have sentencing commissions, which vary in the extent of their authority.

²In Connecticut, Maine, and New Jersey, incumbent judges are reappointed by the governor with the consent of the state senate. In South Carolina, Virginia, and Vermont, this responsibility belongs exclusively to the state legislature. In Hawaii, a judicial nominating commission determines whether to reappoint incumbent judges. See Bureau of Justice Statistics 1998.

3. Nature chooses a level of defendant culpability $c_1 \sim U(0, 1)$ for the first period, which the judge observes at trial.
4. The Judge chooses a sentence, $s_1 \in [g_\ell, g_h]$.
5. The Voter observes s_1 and decides whether to retain or replace the Judge. If the incumbent is replaced, nature chooses a new judge with preference parameter $\beta'_J \sim U(0, 1)$.
6. Nature chooses a level of defendant culpability $c_2 \sim U(0, 1)$ for the second period.
7. The Judge (either new or old) chooses a sentence, $s_2 \in [g_\ell, g_h]$.

3 Reduced Forms of the Full Model

To facilitate intuition, we consider two reduced form versions of the game before proceeding to the fuller specification. First, we examine the model in the absence of ex post review. This reduced form is appropriate for the analysis of systems with no reappointment process (the federal courts, Massachusetts, Rhode Island, and New Hampshire). Here we assume that the intractability and sluggishness of the legislative process amounts to a commitment device for legislators across periods of the model that voters lack. At the federal level, the past two decades have seen two major pieces of legislation aimed at constraining the discretion of district court judges. The Sentencing Reform Act of 1984 established the current regime of guidelines, which bind in most circumstances. The PROTECT Act of 2003 reduced the ability of judges to depart from federal guidelines and directed the Justice Department to track individual judges' propensity to "downwardly depart" from guideline sentences.

Second, we analyze the relationship between the judge and the voter in the absence of ex ante constraints. Like the legislator, the voter is uninformed about a particular judge's preferences and an individual defendant's culpability. The voter must make inferences on the basis of the judge's sentencing behavior and decide whether to retain the judge or replace her. Unlike the legislator, the voter lacks the ability to commit ex ante to a decision rule for retaining or discarding a sitting judge based on her observed behavior alone. Because we are most interested in the strategic interaction between legislators and unlike-minded voters, we restrict our attention to the case in which $\delta_J = 0$

– i.e. judges are myopic. (In the absence of voter oversight, this restriction is immaterial.)

3.1 Ex Ante Constraints in the Absence of Ex Post Review

3.1.1 Equilibrium

The first reduced form consists of all of the steps of the full game outlined above except the fifth (in which the voter can discard a sitting judge). We employ subgame perfect Nash equilibrium as a solution concept, which requires that each player behave optimally at each decision node in the game (sequential rationality).

Proposition 1 (Ex Ante Constraints) *The following set of strategies constitutes a subgame perfect Nash equilibrium to the reduced form ex ante constraint game:*

$$s_t^*(c_t) = \left\{ \begin{array}{l} g_\ell \text{ if } \beta_J c_t \leq g_\ell \\ \beta_J c_t \text{ if } g_\ell < \beta_J c_t < g_h \\ g_h \text{ otherwise} \end{array} \right\} \text{ for } t = 1, 2;$$

$$g_\ell^*, g_h^* \text{ solve } \left\{ \begin{array}{l} g_\ell(2\beta_L - 2g_\ell + 2g_\ell \ln(g_\ell) - \beta_L g_\ell) = 0 \\ -2\beta_L g_h + \beta_L - g_h \ln(g_h) + \beta_L g_h^2 + 2g_h^2 - 2g_h = 0 \\ \text{subject to } 0 \leq g_\ell^* \leq g_h^* \leq 1. \end{array} \right.$$

Proof. The judge's decision calculus is identical in both sentencing rounds: She hands down sentences closest to her ideal, $\beta_J c_t$, given the guidelines. For cases in which $\beta_J c_t < g_\ell$, this entails sentencing at g_ℓ , and similarly for cases in which $\beta_J c_t > g_h$, $s_t = g_h$. For intermediate cases, judges can fully exercise their discretion to obtain their ideal sentence.

From the legislator's perspective, there are three types of judges to anticipate when setting constraints on sentencing: First, there are judges for whom $\beta_J \leq g_\ell$. Such judges will always be bound by and will always impose the legislated minimum sentence, because their ideal sentence falls below that value for all levels of culpability. Second, there are judges for whom $g_\ell < \beta_J \leq g_h$. For this intermediate category, there are some values of c for which g_ℓ will be binding ($c < g_\ell/\beta_J$) and others ($c \geq g_\ell/\beta_J$) for which it will not be. Third, the most punitive judges are those for whom both the minimum and the maximum may sometimes bind. For relatively low culpability cases

($c < g_\ell/\beta_J$), they will be bound by g_ℓ , and for relatively high ones ($c > g_h/\beta_J$), they will be bound from above by the maximum sentence. Only in the intermediate range will such judges be able to achieve their ideal.

Knowing these different conditions, the legislator can form expectations about the probability of different combinations of judge types and defendant culpabilities. Given optimal play by the judge, this leads to an induced utility for the legislator of

$$\begin{aligned}
E[u_L(g_\ell, g_h | s_1^*, s_2^*)] &= (1 + \delta_L) \times \left[\int_0^{g_\ell} \int_0^1 -(\beta_L c - g_\ell)^2 dc d\beta_J \right. \\
&\quad + \int_{g_\ell}^{g_h} \int_0^{\frac{g_\ell}{\beta_J}} -(\beta_L c - g_\ell)^2 dc d\beta_J + \int_{g_\ell}^{g_h} \int_{\frac{g_\ell}{\beta_J}}^1 -(\beta_L c - \beta_J c)^2 dc d\beta_J \\
&\quad + \int_{g_h}^1 \int_0^{\frac{g_\ell}{\beta_J}} -(\beta_L c - g_\ell)^2 dc d\beta_J + \int_{g_h}^1 \int_{\frac{g_\ell}{\beta_J}}^{\frac{g_h}{\beta_J}} -(\beta_L c - \beta_J c)^2 dc d\beta_J \\
&\quad \left. + \int_{g_h}^1 \int_{\frac{g_h}{\beta_J}}^1 -(\beta_L c - g_h)^2 dc d\beta_J \right] \\
&= \frac{1 + \delta_L}{9} [6g_\ell^3 \ln(g_\ell) - 6g_h^3 \ln(g_h) + (9g_h + 9g_\ell^2 - 9g_h^2 + 3g_h^3 - 3g_\ell^3)\beta_L \\
&\quad - 3\beta_L^2 + 8(g_h^3 - g_\ell^3) - 9g_h^2]. \tag{1}
\end{aligned}$$

Taking derivatives of this expression leads to the first order conditions in Proposition 1. The solutions to these equations constitute a unique maximum in the interval $[0, 1] \times [g_\ell^*, 1]$.

3.1.2 Comparative Statics: Judicial discretion and the punitiveness of legislators

Although we lack closed-form solutions for g_ℓ^* and g_h^* , they are defined implicitly by the legislator's first order conditions. From these we derive comparative statics of interest. Before proceeding, we present the following useful lemma:

Lemma 1 (Upper Bound on g_h^*) For $\beta_L < 1$, $g_h = \beta_L$ dominates any $g_h > \beta_L$.

When $\beta_L < 1$, there is a positive probability that the judge is more conservative than the legislator *and* that culpability is sufficiently high to make that judge prefer a sentence higher than β_L . We demonstrate in the appendix that the legislator is never hurt by constraining those judges

from above at β_L .

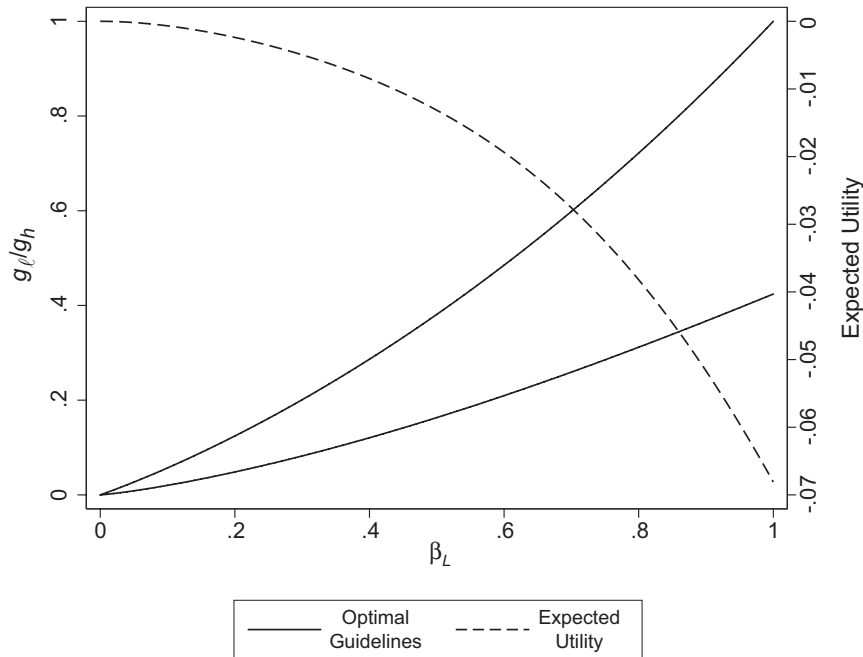
Proposition 2 (Guidelines, Discretion, and Legislative Punitiveness) *In the absence of voter oversight, (A) Both the mandatory minimum and mandatory maximum are increasing in the punitiveness of the legislator for $\beta_L < 1$; (B) The discretion of trial judges, $g_h^* - g_\ell^*$, is increasing in the punitiveness of the legislator for $\beta_L < 1$.*

(For formal proofs, see the appendix.) Recall that even the most punitive actors sometimes recognize the appropriateness of a lenient sentence for low levels of culpability. Part (A) of the proposition simply states that more punitive legislators sacrifice some discretion by raising g_ℓ in order to constrain relatively lenient judges who would otherwise impose mild sentences in the face of high culpability. At the same time, more punitive legislators are more tolerant of high sentences, and so adjust the maximum accordingly.

To establish part (B) of Proposition 2, it is sufficient to demonstrate, first, that as functions of β_L , g_ℓ^* and g_h^* have a common starting point at $\beta_L = 0$; and second, that over the range $\beta_L \in (0, 1)$, g_h^* increases faster than g_ℓ^* . The common starting point ($g_\ell^* = g_h^* = 0$) follows directly from Lemma 1. Our proof in the appendix of the second condition is somewhat more involved. However, because g_ℓ^* and g_h^* are defined implicitly by the first order conditions in (1), we can plot them as a function of β_L . Figure 1 displays optimal minimum and maximum sentences as a function of β_L . The plot confirms visually the results in Proposition 2: Both guidelines and judicial discretion are increasing with the punitiveness of the legislator.

This result stands in contrast to the more symmetric findings in Epstein and O'Halloran (2000). In the canonical spatial account with additive policy shocks, principals with ideal points that are extreme relative to the distribution of agents reign in their discretion; whether the principal's ideal point is at the extreme left or extreme right is immaterial. In contrast, a model that incorporates preferences over proportionality produces the asymmetry evident in the figure. The asymmetry emerges because the most punitive principal values light sentencing for the inculpable more than the most lenient principal values high punishments for the most culpable. The conservative legislator raises the sentencing floor somewhat to account for the possibility that relatively lenient judges will under-sentence, but must moderate this tendency to account for the possibility of a relatively inculpable defendant. The punitive legislator also raises the ceiling to allow punitive judges to

Figure 1: Optimal Ex Ante Constraints on Judges as a Function of Legislator Punitiveness



approximate their preferences across the range of culpability levels. However, except at the boundaries, legislators set $g_h < \beta_L$; in other words, to prevent more punitive judges from oversentencing, they must constrain even a judge who is ideologically identical to them.

Further, a liberal legislator can more easily induce reasonably faithful agency on the part of the judges by effectively decriminalizing the act under consideration. The right axis of figure 1 displays the legislator's expected utility given optimal behavior by themselves and judges. The more conservative the legislator, the more generically unhappy he will be with the results of sentencing; nonetheless, he will be compelled to increase discretion to allow discernment. Finally, note that none of these results require that more punitive legislators are more apt to believe that all criminals are deserving of maximal punishment. The model predicts a higher statutory floor for sentencing *even if* conservative legislators agree with liberal ones about the distribution of culpability in the population of convicted felons and the basic principle of proportionality.

3.2 Ex Post Evaluation of Incumbent Judges

We next consider in isolation the interaction between a policy-minded voter and a myopic judge. The game proceeds as outlined in full except that step 2 (in which the legislature sets guidelines) is omitted. Consequently, the judge operates without any formal ex ante constraint on her discretion. (This is analogous to a hypothetical case in which the legislator assigns $g_\ell = 0$ and $g_h = 1$.) The critical task for the voter is to choose whether or not to retain a judge for the second round after observing the judge's sentence in the first round, s_1 .

3.2.1 Equilibrium

The voter's strategy will be characterized by a response function that maps sentences into election probabilities: $\sigma_V : [0, 1] \rightarrow [0, 1]$. In the equilibrium we describe, the response function will be characterized by two cutpoints, k_ℓ and k_h , such that $0 \leq k_\ell \leq k_h \leq 1$ and $\sigma_V(s_1 | k_\ell \leq s_1 \leq k_h) = 1$ and 0 otherwise. In other words, there will be an intermediate set of sentences that lead to the judge's retention and a complementary set of sentences that lead to replacement.

What distinguishes the voter's equilibrium cutpoints from the legislator's guideline sentences is the fact that the voter cannot commit to a particular set of cutpoints that would be optimal ex ante. Rather, the voter's cutpoints will describe an equilibrium response function that is optimal after the voter has updated her beliefs about the distribution of judges' types upon observing a sentence. Accordingly, we employ perfect Bayesian equilibrium as a solution concept, with $\mu(\beta_J | s_1)$ indicating the posterior probability the judge is of type β_J given a sentence of s_1 .

Proposition 3 (Ex post review of myopic judges.) *The following strategies and beliefs con-*

stitute a perfect Bayesian Nash equilibrium:

$$\begin{aligned} \sigma_V^* &= \left\{ \begin{array}{l} 1 \text{ if } k_\ell^* \leq s_1 \leq k_h^* \\ 0 \text{ otherwise,} \end{array} \right\} \text{ where} \\ k_\ell^* &= 0; \\ k_h^* &= \left\{ \begin{array}{l} 0 \text{ if } \beta_V < \frac{1}{3}, \\ 3\beta_V - 1 \text{ if } \frac{1}{3} \leq \beta_V \leq \frac{2}{3}, \\ 1 \text{ otherwise;} \end{array} \right. \\ s_1^*(c_1) &= \beta_J c_1; \\ s_2^*(c_2) &= \beta_J c_2. \end{aligned}$$

Further,

$$\mu^*(\beta_J | s_1 = s) = \left\{ \begin{array}{l} \frac{1}{1-s} \text{ if } s \leq \beta_J \leq 1 \\ 0 \text{ otherwise.} \end{array} \right\}.$$

In the last phase of the game, a retained judge or her replacement simply assigns her ideal sentence $\beta_J c_2$. Looking forward, the voter's expected utility in the second round for discarding a judge is

$$E[u_V(\text{discard})] = \int_0^1 \int_0^1 -(\beta_V c - \beta_J c)^2 dcd\beta_J,$$

which reduces to $(1/9)(-1 + 3\beta_V - 3\beta_V^2)$ given the uniform distribution of replacement judges.

(Note that we omit the voter's discount rate, since ex post she cares only about the second round.)

The voter's expected utility for retaining a judge into the second round conditional on observing her sentence in the first round is

$$E[u_V(\text{retain}|s_1)] = \int_0^1 \int_0^1 -(\beta_V c - \beta_J c)^2 \mu(\beta_J | s_1 = s) dcd\beta_J.$$

Because no myopic judge with $\beta_J < s$ would ever impose a sentence of s , and for all judges with $\beta_J \geq s$ there is exactly one culpability ($c = s/\beta_J$) corresponding to a sentence of s , μ^* is uniform on the interval $[s, 1]$. The expected utility of retaining given a sentence of s_1 therefore reduces to

$(1/9)(-s_1^2 - s_1 - 1 + 3(s_1 + 1)\beta_V - 3\beta_V^2)$. This quantity never exceeds the expected utility to the voter of discarding when $\beta_V < 1/3$ (so the voter always replaces), always exceeds it when $\beta_V > 1/3$ (so the voter always retains), and for intermediate values of β_V , exceeds it when $0 < s_1 < 3\beta_V - 1$. (When the voter is indifferent, we assume she retains.)

The immediately apparent comparative static is that the most punitive sentence a voter will tolerate from a myopic judge is weakly increasing in the punitiveness of that voter. Note that no voter can credibly commit to any $k_\ell > 0$: In other words, if there exists a sentence $s' > 0$ for which the voter prefers to retain, there is no sentence $0 < s'' < s'$ for which the voter would prefer to replace. As such, the judge's sentencing autonomy may be bounded from above by electoral review, but not from below (unlike in the case of ex ante constraints on discretion). The intuition stems from the fact that the voter infers from a non-zero first-round sentence that the judge is more conservative in expectation than her replacement would be. Liberal voters ($\beta_V < 1/3$) never prefer a judge more conservative than the replacement would likely be, while conservative voters ($\beta_V > 2/3$) always do. Moderates will tolerate judges more conservative (in expectation) than a new draw up to a point. But no voter prefers a judge who is substantially more conservative in expectation than her replacement, while not also preferring one just slightly more so.

4 The Interaction of Ex Ante Constraints and Ex Post Review

In the previous sections, we considered ex ante constraints and ex post review of judges in isolation. Importantly, in the absence of ex post review, discretion is increasing in the punitiveness of the legislator, while in the absence of ex ante constraints, punitive voters cannot commit to discarding judges who assign lenient sentences. The former result emerges because more liberal legislators can easily achieve their policy objectives through effective decriminalization, whereas punitive legislators *who value proportionality* necessarily value discernment as well. The latter result emerges from the model because, *ceteris paribus*, lenient sentences convey less information than stringent ones do.

What might we expect to occur if the judge is bound both by ex ante constraints and ex post review? To begin with, the voter's strategy may change: In the presence of binding constraints, a sentence of s may lead voters to make different inferences about a judge's type than they would in the absence of those constraints. Second, because judges will be constrained in the second round

of play, the voter's expected utility from both a new or retained judge will also be altered. Finally, the legislator may anticipate this, and adjust the guidelines to alter the behavior of both the judge *and* the voter.

4.1 The Voter's decision

We begin by characterizing how the existence of guidelines alters the voter's decision whether to retain or replace an incumbent judge after observing her sentence in the first round. In both rounds of sentencing a myopic judge will simply assign her most preferred sentence, subject to the mandatory minimum g_ℓ and maximum g_h . The voter's posterior belief about the distribution of judges given an observed sentence at the lower guideline g_ℓ , from Bayes' rule, is

$$\mu^*(\beta_J | s_1 = g_\ell) = \begin{cases} \frac{1}{g_\ell - g_\ell \ln(g_\ell)} & \text{if } 0 \leq \beta_J \leq g_\ell; \\ \frac{g_\ell}{\beta_J (g_\ell - g_\ell \ln(g_\ell))} & \text{if } \beta_J > g_\ell. \end{cases}$$

Note that this distribution differs from the voter's posterior in the absence of guidelines because relatively lenient judges ($\beta_J \leq g_\ell$) pool with equal probability at $s_1 = g_\ell$. For more conservative judges ($\beta_J > g_\ell$), the range of culpabilities that will lead them to sentence at g_ℓ decreases with the judge's conservatism; thus the probability that a judge is of a certain type given $\beta_J > g_\ell$ is decreasing from g_ℓ to one.

Given the fact that sentencing guidelines persist into the second round of sentencing, and given this posterior distribution, we can express the voter's expected utility from retaining the judge given an observed sentence of g_ℓ by integrating over μ^* . Simplifying yields

$$\begin{aligned} E[u_V(\text{retain} | s_1 = g_\ell)] &= (3(3g_\ell^2 - g_h^2) + 4(g_h^3 - g_\ell^3) + 6(\beta_V - g_h)g_h \ln(g_h) \\ &\quad - 3\beta_V(g_h + g_\ell) + 2\beta_V^2(1 - \ln(g_\ell)) + \beta_V(g_\ell^3 - g_h^3))/ \\ &\quad (6(\ln(g_\ell) - 1)). \end{aligned}$$

The voter's posterior distribution over β_J given an observed sentence of g_h , is

$$\mu^*(\beta_J | s_1 = g_h) = \begin{cases} \frac{\beta_J - g_h}{\beta_J(1 - g_h + g_h \ln(g_h))} & \text{if } g_h \leq \beta_J \leq 1; \\ 0 & \text{otherwise.} \end{cases}$$

This posterior distribution captures the fact that judges with $\beta_J < g_h$ are never bound by g_h , and given $\beta_J > g_h$, more conservative judges are bound more frequently. Integrating over the posterior, the expected utility to the voter of retaining given an observed sentence of g_h is

$$\begin{aligned} E[u_V(\text{retain} | s_1 = g_h)] &= (g_h - 1)(2\beta_V^2 g_h + 6g_h^3 + 4g_h^4 - 4g_\ell^3 g_h \\ &\quad - \beta_V(6g_h^2 - g_h^3 + g_h^4 + g_\ell^3 - g_\ell^3 g_h)) \\ &\quad - (2g_h \ln(g_h)(\beta_V^2 g_h - 3\beta_V g_h^2 + 5g_h^3 - 2g_\ell^3)) / \\ &\quad (6g_h(1 - g_h + g_h \ln(g_h))). \end{aligned}$$

As above, the posterior distribution of judges given a sentence $s_1 \in (g_\ell, g_h)$ is $1/(1 - s_1)$ for β_J from s_1 to one, and zero otherwise. The expected utility to the voter given an interior sentence is therefore

$$\begin{aligned} E[u_V(\text{retain} | s_1 = s \in (g_\ell, g_h))] &= (6s(g_\ell^3 \ln(s) - g_h^3 \ln(g_h)) + 3\beta_V s(g_h^3 - g_\ell^3 + 3g_h - 3\beta_V + \beta_V s \\ &\quad - s^2 - 3g_h^2) + g_h^2 s(8g_h - 9) + s^4 + 3\beta_V g_\ell^3) / (9s(1 - s)). \end{aligned}$$

Finally, the expected utility to the voter of discarding the judge at the end of the first period must account for the distribution of replacement judges and the conditions under which they would be constrained by the guidelines in the second round of play. This is identical to the expression in (1), replacing β_L with β_V and omitting the δ_L . We will refer to this reservation value as $R(\beta_V)$.

The voter will retain the judge given observed sentence s_1 if $E[u_V(\text{retain} | s_1)] \geq R(\beta_V)$. We solve for the ideology $\tilde{\beta}_V$ corresponding to the voter who is made indifferent between retaining and replacing in each of the three situations just outlined. (These indifference points are presented in the appendix.)

Simulation across the entire parameter space reveals: First, when $\beta_V > \tilde{\beta}_V^{g_h}$ or $\beta_V > \tilde{\beta}_V^{s_1 \in (g_\ell, g_h)}$, the voter strictly prefers retaining an incumbent judge given a sentence at g_h or $s_1 \in (g_\ell, g_h)$. Second, in contrast, when $\beta_V > \tilde{\beta}_V^{g_\ell}$, the voter strictly prefers discarding the incumbent given an observed sentence of g_ℓ . Third, the critical voter $\tilde{\beta}_V$ is increasing in both g_ℓ and g_h , $\frac{\partial \tilde{\beta}_V}{\partial g_\ell}, \frac{\partial \tilde{\beta}_V}{\partial g_h} > 0$, for $\tilde{\beta}_V^{g_\ell}, \tilde{\beta}_V^{g_h}$, and $\tilde{\beta}_V^{s_1 \in (g_\ell, g_h)}$ and is increasing in s_1 , $\frac{\partial \tilde{\beta}_V^{s_1 \in (g_\ell, g_h)}}{\partial s_1} > 0$, for $\tilde{\beta}_V^{s_1 \in (g_\ell, g_h)}$. In other words, raising either guideline or raising the observed sentence between these guidelines has the effect of making the voter who would be indifferent at these points more conservative. Fourth, let $\tilde{\beta}_V^{interior, s_1=s}$ denote $\tilde{\beta}_V^{s_1 \in (g_\ell, g_h)}$ when $s_1 = s$. This is the ideology of the voter who is indifferent given an interior sentence s . We can order the set of critical voters as follows:

$$\tilde{\beta}_V^{interior, s_1=g_\ell} \leq \tilde{\beta}_V^{g_\ell} \leq \tilde{\beta}_V^{interior, s_1=g_h} \leq \tilde{\beta}_V^{g_h}.$$

This ordering implies that a voter will either a) retain only at g_ℓ ; b) retain only at g_ℓ and for a subset of interior sentences on the more lenient end of the spectrum; c) retain over part or all of the interior, but at neither g_ℓ or g_h , or d) retain over the entire interior and at g_h , but not g_ℓ .

It is immediately apparent how the presence of guidelines alters the voter's behavior. Whereas in the game without guidelines (section 3.2) the voter could never commit to discard a judge for assigning a sentence that was too liberal, in this setting the disproportionate pooling of liberal judges at g_ℓ allows voters to make more useful inferences about the judge's type given a sentence at the lower guideline. (There is also pooling at the upper guideline, but while all judges more liberal than the lower guideline [$\beta_V < g_\ell$] are equally likely given a sentence at g_ℓ , the probability a judge is more conservative than g_h is increasing with punitiveness for $\beta_V > g_h$.) This pooling, in combination with the direct effect of guidelines in altering the voter's and legislator's utility associated with sentencing by a given judge, inform the dynamics of the legislator's decision, which we discuss next.

4.2 The Legislator's decision

The legislator is concerned with the sentencing behavior of the judge in both the first and second rounds, the latter weighted by a discount factor δ_L . When $\delta_L = 0$, the legislator's strategy is identical to that in section 3.1. When $\delta_L > 0$, the legislator must also consider that the guidelines

she sets affect the voter's retention decision, which in turn alters the pool of judges sentencing in the second round.

The legislator's expected utility can therefore be broken into two components corresponding to the two rounds of sentencing. The first component is identical to that expressed in equation (1) omitting the δ_L term. The second, corresponding to the legislator's indirect utility from the second round, is substantially more complicated because of the need to incorporate expectations about voter behavior. First, note that the probability any judge would impose a first-round sentence of g_ℓ is

$$F(g_\ell) = 1 - \int_{g_\ell}^1 \int_{\frac{g_\ell}{\beta_J}}^1 1 dcd\beta_J = g_\ell - g_\ell \ln(g_\ell).$$

If the voter retains given $s_1 = g_\ell$, the contribution to the legislator's expected utility in the second round is

$$\begin{aligned} \delta_L(g_\ell - g_\ell \ln(g_\ell))(3(3g_\ell^2 - g_h^2) + 4(g_h^3 - g_\ell^3) + 6(\beta_L - g_h)g_h \ln(g_h) - 3\beta_L(g_h + g_\ell) \\ + 2\beta_L^2(1 - \ln(g_\ell)) + \beta_L(g_\ell^3 - g_h^3))/(6(\ln(g_\ell) - 1)). \end{aligned}$$

If the voter discards at g_ℓ , the contribution (given a new judge is drawn from the prior distribution) is $\delta_L(g_\ell - g_\ell \ln(g_\ell))R(\beta_L)$.

The probability of observing a sentence g_h is $1 - F(g_h) = 1 - g_h + g_h \ln(g_h)$. If the voter retains given a sentence of g_h , the contribution to the legislator's second-round utility is

$$\begin{aligned} \delta_L(1 - g_h + g_h \ln(g_h))((g_h - 1)(2\beta_V^2 g_h + 6g_h^3 + 4g_h^4 - 4g_\ell^3 g_h \\ - \beta_V(6g_h^2 - g_h^3 + g_h^4 + g_\ell^3 - g_\ell^3 g_h)) - (2g_h \ln(g_h)(\beta_V^2 g_h - 3\beta_V g_h^2 + 5g_h^3 - 2g_\ell^3))/ \\ (6g_h(1 - g_h + g_h \ln(g_h)))). \end{aligned}$$

If the voter discards at g_h , the contribution is $\delta_L(1 - g_h + g_h \ln(g_h))R(\beta_L)$.

Finally, consider interior sentences. There are three possibilities: Either the voter never retains in this region, always retains, or retains for some subset $s_1 \in (g_\ell, s')$ with $g_\ell < s' < g_h$ while

discarding for interior sentences above s' . Given a partition of the set of interior sentences into a retain region and a discard region, the posterior distribution of judges given a sentence on the range (g_ℓ, s') is

$$\mu^*(\beta_J | s_1 \in (g_\ell, s')) = \begin{cases} \frac{\beta_J - g_\ell}{\beta_J(s - g_\ell + g_\ell \ln(g_\ell) - s \ln(s))} & \text{if } g_\ell \leq \beta_J < s' \\ \frac{g_h - g_\ell}{\beta_J(s - g_\ell + g_\ell \ln(g_\ell) - s \ln(s))} & \text{if } s' \leq \beta_J \leq 1 \\ 0 & \text{otherwise.} \end{cases}$$

For the interior range of sentences for which the voter would retain, the legislator calculates her payoffs given this posterior distribution of judges and then weights by the probability the sentence is in that range; for the interior range for which the voter discards, the legislator receives her reservation utility and weights by the probability the sentence falls in that range. The resulting contribution to the legislator's expected utility for the interior retention range is

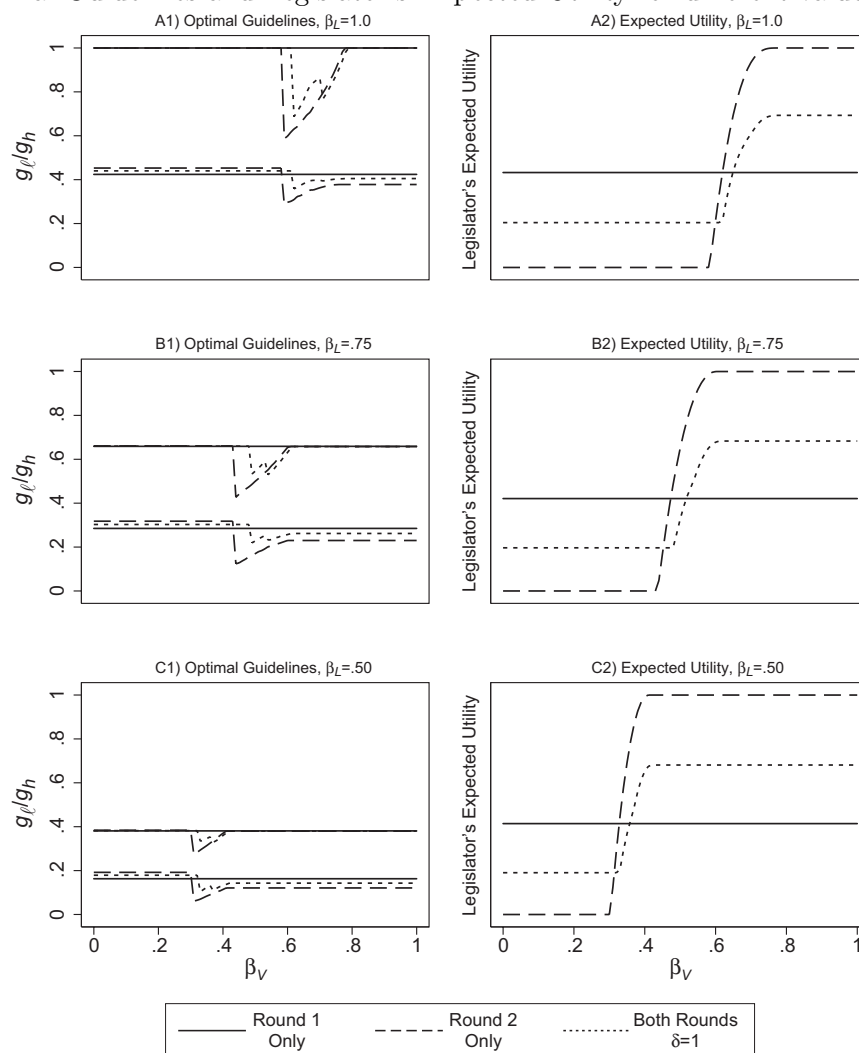
$$\begin{aligned} & \left[\frac{\delta_L}{18s'} (g_\ell^3 s' - 18\beta_L g_\ell g_h s' \ln(g_h) + 3\beta_L g_\ell g_h^3 s' - 9\beta_L g_\ell^2 s' - 6\beta_L^2 g_\ell s' + 9\beta_L g_\ell g_h s' + 3\beta_L g_\ell^3 \right. \\ & \quad + 18\beta_L g_h s'^2 \ln(g_h) + 18g_\ell g_h^2 s' \ln(g_h) + 6\beta_L^2 g_\ell s' \ln(g_\ell) - 9\beta_L g_h s'^2 - 9g_h^2 s'^2 - 3\beta_L g_h^3 s'^2 \\ & \quad + 12g_\ell^4 s' + 6\beta_L^2 s'^2 - 12g_\ell g_h^3 s' + 9g_\ell g_h^2 s' + 6\beta_L s'^3 - 6\beta_L^2 s'^2 \ln(s') + 12g_\ell^3 s' \ln(s') - 12g_\ell^3 s' \ln(g_\ell) \\ & \quad \left. - 18g_h^2 s'^2 \ln(g_h) + 3\beta_L g_\ell^3 s'^2 - 3\beta_L g_\ell^4 s' - 12g_\ell^3 s'^2 - s'^4 + 12g_h^3 s'^2) \right] \\ & \quad + [\delta_L ((g_h - g_h \ln(g_h)) - s' + s' \ln(s')) R(\beta_L)] . \quad (2) \end{aligned}$$

For cases in which the voter always retains given an interior sentence, the contribution to the legislator's expected utility is simply the first part of (2), replacing g_h for s' ; for cases in which the legislator always replaces, it is simply the second, substituting g_ℓ for s' .

4.3 Optimal Guidelines and Voter Behavior

The legislator's objective function consists of all the components detailed above, and is sufficiently complex to render arriving at closed-form expressions for g_ℓ^* and g_h^* impossible. Instead, we simulate across the entire range of feasible guidelines to identify those that maximize the legislator's expected utility in a variety of different settings. The left panels of figure 2 display optimal guidelines for

Figure 2: Optimal Guidelines and Legislator's Expected Utility for different values of β_L and β_V



three legislators with three different levels of punitiveness ($\beta_L = 1.0, 0.75,$ and $0.5,$ respectively).

The solid lines in the graphs correspond to cases in which $\delta_L = 0$. In that circumstance, the legislator cares only about the first round; as such, guidelines do not vary according to voter ideology, which matters to the legislator only in shaping the distribution of judges in the second round. The dashed line corresponds to the case in which $\delta_L \rightarrow +\infty$, i.e. the legislator cares only about the second round and not the first. The dotted line corresponds to the case in which $\delta_L = 1$, where the legislator cares equally about the first and second rounds. In the panels on the right, we display the expected utility for the legislator associated with the corresponding sets of optimal

guidelines.³

Consider panel B1), in which the optimal g_ℓ and g_h are shown for $\beta_L = 0.75$ as a function of β_V . If the legislator only cares about the first round, he sets optimal guidelines at $g_\ell \approx 0.29$ and $g_h \approx 0.66$ irrespective of the voter's ideology. If the legislator only cares about the second round of sentencing, a more interesting pattern emerges. When voters are relatively liberal (β_V less than approximately 0.44), the legislator prefers a discretionary range of [0.32, 0.66]. When voters are relatively conservative (β_V greater than approximately 0.65), the legislator prefers a discretionary range of [0.23, 0.66]. For the intermediate range of voter ideologies, the legislator initially drops both the guideline minimum and maximum to a lowpoint of [0.13, 0.42] for the most lenient voter and then proceeds to gradually raise them toward the level for more conservative voters as the voter becomes more punitive.

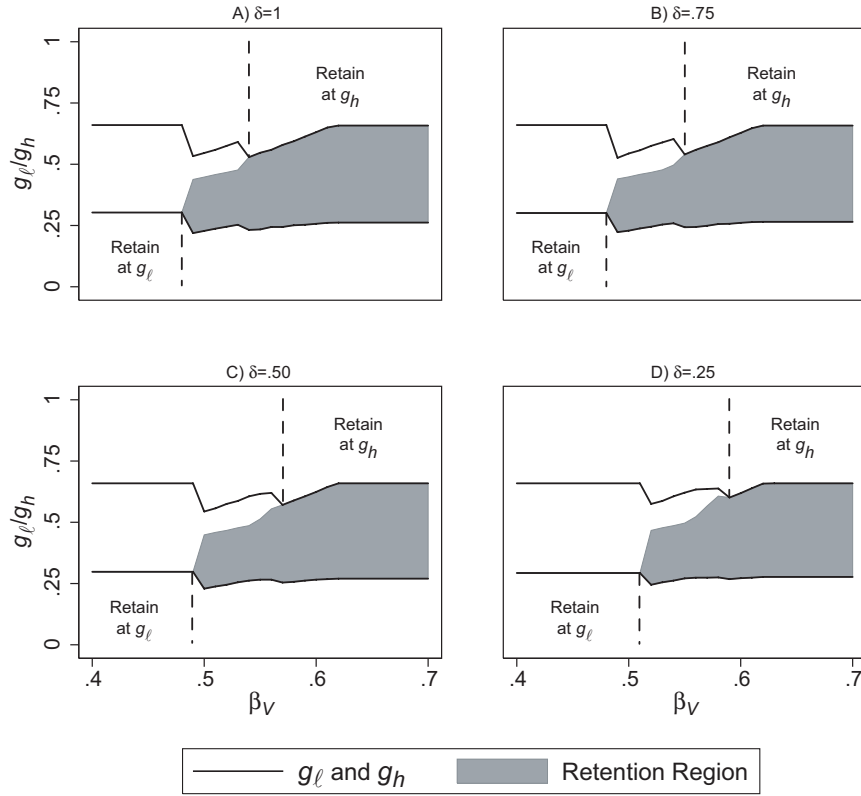
When the legislator cares equally about sentencing in both rounds, the optimal guidelines track roughly between those corresponding to the purely myopic and purely farsighted legislator. Note, however, that the range of voters for which the legislator grants a different discretionary range than for either the most liberal or conservative voter is smaller than when he is purely farsighted. Also, in the intermediate range for which the legislator initially drops both g_ℓ and g_h , neither guideline increases monotonically upward toward its final value for the most conservative voter as β_V increases, unlike when he is purely farsighted.

Panel B2) displays the legislator's expected utility given these optimal guidelines and helps to understand the dynamics that shape these guidelines. When the legislator cares equally about both rounds, his expected utility is flat when β_V is less than approximately 0.49, rises for voters with ideologies between about 0.49 and 0.54, and is flat again for voters with ideologies greater than about 0.54. These three ranges of voters correspond exactly to the three ranges of guidelines discussed above.

What are we to make of these patterns? When the voter is sufficiently liberal, the legislator grants less discretion than if he cared only about the first round by raising g_ℓ . This is because the voter's retention strategy works against the legislator. To better elucidate why this is so, figure 3

³To scale expected utilities for the case in which the legislator cares only about the second round, we set $\delta_L = 1$ and assign zero weight to the first round. When the legislator cares equally about both rounds, we display the average expected utility across both rounds.

Figure 3: Optimal Guidelines and Voter Response for different values of β_L and δ_L



shows both the legislator's optimal guidelines ($\beta_L = 0.75$) for several values of δ_L , and the voter's behavior given these guidelines. In panel A) ($\delta_L = 1$), the scenario is the same as is indicated by the dotted line in the second row of figure 2. Liberal voters retain only after observing a sentence at g_ℓ , thereby throwing out more conservative judges who more closely mirror the legislator's preferences. Because the voter will retain judges who sentence at g_ℓ , the legislator foresees a distribution of judges that is more liberal in the second round than the prior distribution. The legislator therefore raises g_ℓ to diminish the loss associated with a posterior distribution composed disproportionately of lenient judges. The legislator's expected utility, shown in B2), is flat across this range of β_V because all of these voters have identical retention strategies. Under these circumstances, the legislator's expected utility is less than it would be in the absence of voter review.

In contrast, when the voter is sufficiently conservative (β_V greater than approximately 0.65), the legislator allocates greater discretion to the judge by lowering g_ℓ to below what he would choose if he were myopic. This occurs because these voters' retention strategies benefit the legislator: Punitive

voters filter lenient judges to produce (in expectation) a more punitive posterior distribution of judges sentencing in the second round. As is clear from figure 3, conservative voters discard incumbent judges after observing a sentence at g_ℓ and retain after observing a sentence anywhere in the region from g_ℓ to g_h , inclusive of g_h . The legislator does not lower g_ℓ further, however, because doing so would diminish the probability of observing sentences at g_ℓ (thereby weakening the voter's helpful filtering effect) and would increase the loss associated with more liberal judges. Because all of these voters have the same retention strategy (and because the legislator holds g_ℓ and g_h constant) the legislator's expected utility is flat across this region. Note that given ideologically similar voters, the legislator is in expectation better off given ex post review than in its absence.

Finally, we have the intermediate range of voters for which the legislator initially lowers both g_ℓ and g_h when β_V is approximately 0.49 and then, as the voter becomes more conservative, raises both guidelines. When β_V is about 0.53, the legislator again drops both guidelines slightly, and then gradually raises them toward their final levels for the most conservative voter. The legislator lowers the discretionary range in the first instance to entice moderate voters to work on his behalf by filtering liberal judges. As figure 3 shows, this drop corresponds to the point at which voters no longer retain at the minimum sentence. The legislator is still not as well off as he would be with a more conservative voter, however, since he cannot tempt her to retain judges who sentence at g_h . The second drop (when β_V is approximately 0.53) corresponds to the point at which the value of inducing voters to retain at g_h and for all interior sentences exceeds the cost of lower the discretionary range.⁴

Having described the legislator's optimal guidelines (and the voter's behavior given these guidelines), it is useful to think about the tradeoffs the legislator faces in manipulating the guidelines in trying to induce the voter to work on his behalf. Recall that lowering either g_ℓ or g_h has the effect of making the critical voter who is indifferent at each cutpoint, $\tilde{\beta}_V$, more conservative. Now consider the legislator depicted in panel A) of figure 3, who faces a voter with $\beta_V = 0.5$. If the legislator employed the guidelines that were optimal given more liberal voters ($g_\ell^* = 0.30$ and $g_h^* = 0.66$), the moderate voter would retain only at the lower guideline. By lowering both guidelines, the legislator entices this voter to discard judges who sentence at g_ℓ .

⁴If the legislator cares solely about the future, the first time he drops the guidelines, he will do so sufficiently far to induce the voter to retain only at g_h and for all interior sentences.

Why not simply hold g_h constant and lower g_ℓ to a value that would induce voters to discard at the lower guideline? The reason is twofold. First, the legislator would need to lower g_ℓ substantially more to induce the voter to discard. But this would give judges in both rounds discretion to impose sentences the legislator thought were too lenient. Second, because fewer sentences would be observed at the lower-valued g_ℓ , the filtering effects would be mitigated. Likewise, if the legislator kept g_ℓ constant but lowered g_h to induce the legislator to discard at g_ℓ , the filtering benefit would be offset by extreme limits on the sentencing discretion of ideologically similar judges.

A similar logic dictates why the legislator does not lower the guidelines to the levels necessary to induce the most liberal voters to discard at g_ℓ . It is simply too costly, in terms of greater discretion for lenient sentencing by liberal judges and foregone judicial discretion for higher sentences in both sentencing rounds, to entice minimally favorable filtering by the voter. Consequently, the legislator makes do with the restrictions on discretion that anticipate a pool of ideologically distant judges in the second round.

Two final points are worth noting. First, returning to figure 3, one observes that the less the legislator cares about the second round of sentencing relative to the first, the wider the range of voters for which the legislator does not bother to manipulate the guidelines to entice the voter to filter on his behalf. This is because these manipulations come at a (now more important) cost in the first round. Second, we have concentrated our attention on relatively conservative legislators. The reason for this focus goes back to our discussion of ex ante constraints in isolation: A lenient legislator is better able to induce compliance by judges than a punitive one, because the latter has a more difficult tradeoff to make between the desire to inflict harsh punishment on the most culpable offenders and the need to discern low and high culpability. If the lenient legislator can effectively bind the most punitive judges through tight ex ante constraints requiring lenient sentences, the incentive to manipulate sentencing discretion to alter voter behavior is diminished.

5 Discussion

In this section, we consider a number of extensions to the basic model. This paper reflects an initial effort to consider the interaction of ex ante constraints and ex post review of an agent. As we note above, although our substantive application is the political control of trial judges, the logic of a

principal employing boundaries on an agent's discretion in part to manipulate a second principal's authority as an ex post auditor extends beyond the realm of judicial politics. Accordingly, we divide our remarks into those appropriate for the study of judges, and those applicable to the study of similar common agency problems.

5.1 The Control of Trial Judges

For purposes of tractability, we have made a number of simplifying assumptions with respect to the actual operation of the criminal justice system. First, in order to focus on the interaction of the legislator and the voter, we have assumed that judges sentence myopically. Relaxing this assumption is surprisingly thorny. Because judges are policy-motivated, they are concerned with the way that their replacements would sentence. Consequently, some judges will be tempted to moderate their sentences to get reelected. It should be noted, however, that relatively *extreme* judges have a greater incentive than relatively moderate ones to sentence strategically, because a moderate judge has less to fear from her replacement – particularly if sentencing constraints would limit both her and her would-be replacement in the second round.

A very conservative judge might therefore have an incentive to sentence sufficiently leniently to insure retention. However, the fact that extremists are more willing to pander in this regard may lead to the collapse of the pure strategy equilibrium: If the inference a moderate voter draws from a sentence just lenient enough to retain is that the judge may be an extremist, the voter will not want to retain the judge. But if the voter does not want to retain, the extremist judge will have no reason to pander. Incorporating this kind of pandering necessitates the adoption of a mixed voter retention strategy. One inelegant solution to this challenge is to make the judge care about the perquisites of office in the second round instead of the sentencing itself. In that case, moderates will have an incentive to pander, whereas extremists will forego perquisites to get their most preferred sentence in the first round.

Second, we have made assumptions about the distribution of judge ideology and defendant culpability. Changing the shape of these distributions would result in different point predictions, but there is no reason to suspect that the direction of our comparative static results would change. More interesting to us is the lower boundary of the culpability distribution, and what it says about

the trial process. Trial judges in reality are not presented with a random draw of defendants, some of whom have zero culpability. In reality, most cases are settled via plea bargain *subject to the final approval of the presiding judge*, or via jury trial. The process of arriving at guilty verdicts and pleas affords a critical gatekeeping role for the prosecuting attorney (who can decline to prosecute) and the jury (which can acquit). Such gatekeeping implies that the distribution of defendants may be truncated somewhere above zero. (Further, in the shadow of legislative guidelines or an ideologically extreme judge, juries and prosecutors with preferences over sentencing might on occasion prefer dropping a case or acquitting to giving the judge discretion over punishment. Thus, a more comprehensive account could incorporate jury nullification as a possible outcome.) At the very least, however, a truncation of the distribution of culpability to remove the least culpable offenders would mitigate, to some degree, the voter's inability to differentiate leniency from inculpability. As long as some lenient judges would still pool with their more punitive counterparts, however, the basic intuition regarding voter updating would remain.

Third, we assume that an electoral connection exists between the voter and the judge, but not between the voter and the legislator. If we were to model the legislator as an ideologically affine agent of the voter, much of the nuance of the model would disappear: the legislator could count on the voter to filter judges as he would. A more interesting extension would be to consider the interaction of voter review at the district level with legislative constraints on judicial discretion at the state level. Presumably, judicial behavior in one district has externalities for the citizens of other districts. The citizens of a relatively punitive district may prefer ex ante constraints on judicial discretion as a means of controlling the judges and voters of neighboring districts. This dynamic echoes models of federal mandates considered by Crémer and Palfrey (2000, 2002).

5.2 Common Agency with Ex Ante and Ex Post Principals

More generally, this paper has considered a problem of common agency in which one principal controls discretion ex ante while the other controls selection ex post. Other political and economic relationships have a similar structure: In government, political appointees that serve at the pleasure of the President are constrained by the legislature. In the marketplace, the esteem with which publicly owned companies are held by investors depends in part on the government regulations

they may be subjected to. In education, the signaling value of a diploma to a potential employer depends, in part, on the requirements necessary to obtain it.

Our analysis provides insight into the choice of institutions in these common agency relationships. In this particular context, we show that the power to precommit to binding constraints on discretion has important direct consequences for a principal's welfare. Additionally, it alters (and can enhance) the process of ex post review by a second principal. We also show that neither institution dominates. In certain circumstances (great concern about the future or ideologically like-minded voters), the legislator is better off with both ex ante constraints and ex post review. In others, however, simple ex ante constraints are more desirable. In addition to contributing to the positive theory of institutions, our framework helps to shed light on the normative institutional questions that often underlie debates about how and by whom agents should be reviewed.

5.3 Conclusion

These extensions aside, this paper has important implications for understanding the political conflict surrounding institutions for the oversight of judicial behavior and the exercise of judicial discretion. We close with two substantive points that show how our model helps to understand contemporary conflict over these important issues.

First, it is impossible to speak of the politics surrounding judicial behavior without considering ex ante constraints on discretion and ex post review simultaneously. Even without strategic judges, we demonstrate that the inferences one can make about judicial ideology on the basis of even a single assigned sentence are fundamentally different in the presence of ex ante constraints than in their absence. Further, ex ante constraints do more than alter the payoffs associated with the rational sentencing behavior of judges and their potential replacements. They also alter the filtering behavior of strategic voters by changing the pooling of judges at different observed sentences. Perhaps most interestingly, our model suggests that the ability of voters to commit to replacing a judge for being too lenient hinges on whether that judge is constrained ex ante with mandatory or guideline minimum sentences.

Second, conservatives face a much thornier task than liberals in constraining ideologically distant jurists. In light of our model, it is not surprising that conservatives seem to complain about

the abuse of judicial discretion more than liberals do. As we have shown, liberals can constrain conservatives relatively easily by placing binding upper boundaries on sentencing or by discarding judges who assign sentences that are too high in the absence of guidelines. In contrast, conservatives face a double bind: In setting mandatory minima, they face a tradeoff between the desire to punish proportionally and the fear that liberal judges will sentence too leniently. In evaluating judicial behavior ex post, they have a harder time inferring a judge is too lenient than liberals do in deciding a judge is too punitive.

Although the simultaneous presence of ex ante constraints on discretion and review by ideologically like-minded voters mitigates the difficulty of conservatives, the key to this improvement is the existence of relatively high mandatory minimum sentences that bind even conservative judges with some frequency. It is not surprising, therefore, that even judicial conservatives like Rehnquist dislike binding and punitive guidelines. But conservative legislators have a different game in mind. They are worried about sentencing by more liberal judges, not by the Chief Justice. In conservative states with judicial elections, periodic review may winnow out more liberal judges. Still, sentencing guidelines that bind conservatives may still persist, either if legislators fear insufficiently punitive sentencing prior to review, or if they wish to assist similarly conservative voters in doing the winnowing.

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Appendix

Proof of Lemma 1

The proof proceeds by contradiction. Let g'_h be a candidate maximum sentence with $\beta_L < g'_h \leq 1$, and fix $g_\ell < \beta_L$. With probability $1 - \beta_L$, $\beta_J > \beta_L$. A more punitive judge would encounter a culpability level that would impel that judge to impose a sentence greater than β_L with probability $(1 - \beta_L)/\beta_J$. The product of these probabilities, which is strictly positive by assertion, represents the likelihood an unconstrained judge would sentence at a level above β_L . Because g_h is only binding for these cases, we can ignore all others. Since by assertion, $\beta_L < g'_h \leq 1$, this probability is strictly positive. But the legislator would never prefer that any more conservative judge hand such a sentence down. To verify this, we note that the difference between the payoff to constraining a more conservative judge at β_L and allowing that judge to sentence up to g'_h ,

$$\begin{aligned} & E[u_L(s|\beta_J \in (\beta_L, 1]); g_h = \beta_L] - E[u_L(s|\beta_J \in (\beta_L, 1]); g_h = g'_h \in (\beta_L, 1)] \\ = & \int_{\frac{\beta_L}{\beta_J}}^{\frac{g'_h}{\beta_J}} -(\beta_L c - \beta_L)^2 dc - \int_{\frac{\beta_L}{\beta_J}}^{\frac{g'_h}{\beta_J}} -(\beta_L c - \beta_J c)^2 dc \\ = & \frac{3\beta_L^2(g_h'^2 - \beta_J g_h') + 2\beta_L(\beta_J \beta_L^2 - g_h'^3) + (\beta_J g_h'^3 - \beta_L^4)}{3\beta_J^2}, \end{aligned}$$

is always positive for $\beta_L < g'_h \leq 1$. This can be similarly demonstrated for the case in which $\beta_L \leq g_\ell \leq g_h \leq 1$. Thus, she would strictly prefer a cap on the range of feasible sentences at β_L to any alternative cap greater than β_L . \square

Proof of Proposition 2

(A) Solving each of the first order conditions for β_L gives the legislator's punitiveness parameter associated with equilibrium values of g_ℓ and g_h :

$$\begin{aligned}\beta_L^\ell &= \frac{2g_\ell^*(\ln(g_\ell^*) - 1)}{g_\ell^* - 2} \\ \beta_L^h &= \frac{2g_h^*(g_h^* \ln(g_h^*) - g_h^* + 1)}{(g_h^* - 2)^2}.\end{aligned}\tag{3}$$

The derivative of the first equation in (3) is

$$\frac{d\beta_L^\ell}{dg_\ell^*} = \frac{2(g_\ell^* - 2\ln(g_\ell^*))}{(g_\ell^* - 2)^2}.\tag{4}$$

This is always positive, so the inverse of $\beta_L^\ell(g_\ell^*)$ exists; the first derivative of the inverse, $dg_\ell^*/d\beta_L$, is therefore also positive, and given by the reciprocal of the right side of equation (4). From the second solution,

$$\frac{d\beta_L^h}{dg_h^*} = \frac{2(2g_h^* \ln(g_h^*) - g_h^{*2} + 1)}{(1 - g_h^*)^3}.\tag{5}$$

The denominator of this expression is always positive, as lemma 1 bounds g_h below one. The numerator, which is monotonically decreasing, is bounded between two and zero over the domain of β_L . Therefore, $dg_h^*/d\beta_L$ is also positive, and given by the reciprocal of equation (5). \square

(B) As stated in the text, it is sufficient to demonstrate that 1) as functions of β_L , g_ℓ^* and g_h^* have a common starting point at $\beta_L = 0$; and 2) $dg_h^*/d\beta_L > dg_\ell^*/d\beta_L$ for $0 \leq \beta_L < 1$. The first condition can be established by noting that lemma 1 implies that $g_h^*(0) = 0$. Since $0 \leq g_\ell^* \leq g_h^*$ by construction, $g_\ell^*(0) = 0$ as well. As confirmation, note that

$$\lim_{g_\ell^* \rightarrow 0^+} \beta_L^\ell = \lim_{g_h^* \rightarrow 0^+} \beta_L^h = 0.$$

Thus, a legislator who believes no punishment is appropriate for any level of culpability simply decriminalizes the offense. Decriminalization corresponds to zero discretion for the judge. Turning to the second condition,

$$\frac{dg_h^*}{d\beta_L} - \frac{dg_\ell^*}{d\beta_L} = \frac{(1 - g_h)^3(g_\ell - 2 \ln(g_\ell)) - (g_\ell - 2)^2(2g_h \ln(g_h) - g_h^2 + 1)}{2(2g_h \ln(g_h) - g_h^2 + 1)(g_\ell - 2 \ln(g_\ell))}$$

must exceed zero. It follows from (A) that the denominator of this expression is positive. The numerator is positive if

$$\frac{g_\ell^* - 2 \ln(g_\ell^*)}{(g_\ell^* - 2)^2} > \frac{2g_h^* \ln(g_h^*) - g_h^{*2} + 1}{(1 - g_h^*)^3}. \quad (6)$$

Label the left side of (6) $f_\ell(g_\ell^*)$ and the right side $f_h(g_h^*)$. The former has a unique minimum for arguments between zero and one, while the latter declines monotonically from 1 to 1/3. One can demonstrate, using floating point arithmetic, that $f_\ell(g_\ell^*)$ takes its minimum value of approximately 0.827 and $\arg \min_{g_\ell^*} f_\ell(g_\ell^*) \approx 0.604$. Because $g_\ell^* \leq g_h^*$, this g_ℓ^* is potentially compatible with all $g_h^* \in [\arg \min_{g_\ell^*} f_\ell(g_\ell^*), 1)$. Also, because f_h is a decreasing function, when f_ℓ is at its minimum the inequality is at greatest risk of being violated when $g_h^* = g_\ell^* = \arg \min_{g_\ell^*} f_\ell(g_\ell^*)$. The function f_h evaluated at that point is approximately equal to 0.421, which is smaller than 0.827.

Next, as stated above, f_h never exceeds one on the relevant range. By contrast, f_ℓ exceeds one for $g_\ell^* < 0.239$. As such, $f_\ell > f_h \forall g_\ell^* \leq g_h^*, g_h^* \leq 0.239$. On the intermediate interval $(0.239, 0.604)$, both f_ℓ and f_h are decreasing. For a given g_h^* on that interval, the inequality is at greatest risk of being violated when g_ℓ^* is at its highest possible value, i.e. $g_\ell^* = g_h^*$. Because f_ℓ and f_h are decreasing in this range, it is sufficient to insure the inequality holds at the boundaries of the range. We have already demonstrated this to be the case for the right boundary; at the left boundary, $f_h \approx 0.58 < f_\ell = 1$. \square

Indifferent voters in the presence of simultaneous ex ante constraints and ex post review

$$\begin{aligned}
\tilde{\beta}_V^{g_\ell} &= (27g_h^2 + 16g_h^3 \ln(g_\ell) - 28g_h^3 + 12g_\ell^3 \ln(g_\ell)^2 + 18g_h^2 \ln(g_h) - 28g_\ell^3 \ln(g_\ell) \\
&\quad + 12g_h^3 \ln(g_h) + 28g_\ell^3 - 12g_h^3 \ln(g_h) \ln(g_\ell) - 18g_h^2 \ln(g_\ell) - 27g_\ell^2) / \\
&\quad (-18g_h^2 + 9g_h + 18g_h \ln(g_h) + 3g_h^3 - 18g_\ell^2 \ln(g_\ell) \\
&\quad + 6g_\ell^3 \ln(g_\ell) - 6g_h^3 \ln(g_\ell) - 18g_h \ln(g_\ell) + 18g_h^2 \ln(g_\ell) \\
&\quad + 18g_\ell^2 - 9g_\ell - g_\ell^3) \\
\tilde{\beta}_V^{g_h} &= 4g_h(-4g_\ell^3 g_h \ln(g_h) - 3g_\ell^3 g_h \ln(g_\ell) - 3g_\ell^3 \ln(g_h) + 7g_h^4 \ln(g_h) + 7g_\ell^3 g_h \\
&\quad + 3g_\ell^3 \ln(g_\ell) + 3g_\ell^3 g_h \ln(g_\ell) \ln(g_h) - 7g_h^4 - 3g_h^4 \ln(g_h)^2 + 7g_h^3 - 7g_\ell^3) / \\
&\quad (3(6g_h^4 \ln(g_h) - 2g_h^5 \ln(g_h) - 6g_\ell^2 g_h - 6g_\ell^2 g_h^2 \ln(g_h) + 2g_\ell^3 g_h^2 \ln(g_h) \\
&\quad + g_\ell^3 + 6g_\ell^2 g_h^2 - 6g_h^4 + 5g_h^3 - g_\ell^3 g_h^2 + g_h^5)) \\
\tilde{\beta}_V^{s_1 \in (g_\ell, g_h)} &= s(8g_\ell^3 + 6g_\ell^3 \ln(s) + 6g_\ell^3 s \ln(g_\ell) - 6s g_h^3 \ln(g_h) - 6g_\ell^3 \ln(g_\ell) \\
&\quad - 8s g_\ell^3 - 9g_h^2 s + 8g_h^3 s + s^3) / (s(-g_\ell^3 - 3g_\ell^2 s^2 \\
&\quad + g_\ell^3 s^2 - 3g_h s^2 + 3g_h^2 s^2 - g_h^3 s^2 + 3g_\ell^2 s + s^3))
\end{aligned}$$