Permitting Prohibitions

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ABSTRACT

We propose a model in which the probability that courts will enforce a statute is endogenous to the statute. We find, first, that the enactment of legislation prohibiting something might increase the probability that courts will allow related acts that are not expressly forbidden. We call that a permitting prohibition and discuss examples that are consistent with the model. Second, we find that dispersion of courts' decisions might be greater with legislation that commands little deference from courts than with legislation that commands none. Thus, within a certain range, improvement of legislation might trade off with courts' predictability.

1. INTRODUCTION

Legislative activity and common-law developments often complement each other in the same policy space. Consider the problem of restricting the exercise of freedoms—of creating prohibitions, which is our focus in this paper. On the one hand, legislation may impose relevant prohibitions. For instance, it can prohibit charging interest above a certain limit, collecting payments during a pandemic, or disclosing embarrassing private facts about other people. On the other hand, even in the absence of such types of legislation, courts may resort to common-law doctrines and principles to impose the same kinds of prohibitions. For instance, they may deem that charging interest above a certain threshold is unconscio-

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nable, that collecting payments during a pandemic is barred by the doctrines of impracticability or impossibility, or that certain disclosures of private information offend the subjects' right to privacy.

At the same time, courts sometimes compete with, rather than complement, legislators in the given policy space. That happens in particular when courts tussle with the legislation rather than enforce it. For instance, courts can overturn legislation (through judicial review) or interpret it out of existence—but then neutralize it while updating textual meaning, narrowing the interpretation, imposing overly burdensome thresholds, raising restrictive standing rules, deciding it to be merely declaratory, and so on. As can be seen, courts evaluate the legislated rules of the game before applying them to concrete cases, and therefore deference to legislators is not automatic. Thus, legislation is less likely to be enforced when courts strongly disagree with it.

That courts meddle with public policy is well documented; the focal question in law and economics is whether courts do so in light of strictly legal reasons or are motivated by ideology, self-interest, or politics. Across the board, however, the assumption is that in forming their convictions, judges are simply deploying their prior knowledge, which remains intact throughout. Learning—the idea that courts' preferences can be completed or changed—is hardly a part of the conversation. As a result, the prevailing models do not concern themselves with how preferences form and tend to focus on votes for which courts have a preferred outcome prior to the case. (Should schools be desegregated? Do corporations have the right to religious freedom? And so on.)

However, in many cases the boundaries within which a freedom can be exercised are highly subjective, and judges do not have a clearly defined, preferred outcome. For instance, most judges may well believe that charging interest becomes unconscionable at some point, but they have no clearly defined preference for the exact value of that point. When courts do not have clearly defined prior beliefs, how do they arrive at their preferred estimation of the boundary? And what difference does that make?

This paper studies these questions. Our starting point is that judges not only react to but also learn from legislation. This means that each statute contains useful information for courts to decide whether to defer to the legislator. Legislation thus signals to courts something about its own appropriateness. Accordingly, courts learn from the legislation, but the lessons are unclear. Legislation is often crafted by experts and reflects a tolerable balance of powers and views in society. But sometimes leg-

islation crosses certain lines and should not be enforced. To distinguish one situation from the other, judges have to decipher the signal from the statute. Hence, the probability that a statute will be enforced in court is endogenous to the statute. This framework has nontrivial implications for the interaction between written legislation and courts' decisions. This paper proposes a model to study this issue.

In the model, Bayesian adjudicators are imperfectly informed about an issue. The legislation yields a clear implication, but it is not clear to the courts whether it has been appropriately designed.[1] Adjudicators use their knowledge to assess the legislation. Formally, they learn about the type of legislator: legislation from the good legislator should always be followed, but the bad legislator is misinformed. The larger the distance between the legislation and what an adjudicator would expect from a good legislator, the larger is the likelihood that the statute was enacted by a bad legislator and should be rejected. As a result, the weight of the legislation on the adjudicator's decision decreases in the distance between the legislation and the adjudicator's prior beliefs. In equilibrium, the adjudicator will often enforce legislation as intended by the legislator even if it does not reflect the adjudicator's preferred policy choice; occasionally, however, the adjudicator will find the statute unconstitutional, read an exception into the statute, or find an alternative interpretation with the practical effect of bypassing the legislator.[2]

If the average error from bad legislators is sufficiently large, the model yields a nonmonotonic relation between legislated prohibitions and prohibitions effectively imposed by adjudicators. Hence, the enactment of a more restrictive statute might lead adjudicators to uphold a more lenient rule. For instance, the enactment of a statute that prohibits smoking beyond a certain point can make it more likely that adjudicators deem smoking before that same point to be permitted. Similarly, a statute that caps interest rates in private contracts at x percent decreases the odds that courts will find unconscionable contracts bearing interest rates of $x - \varepsilon$ percent. In short, the enactment of a certain cut point by the legislator can in practice have the effect of causing courts to start permitting certain acts that are below the legislated cut point and that were previously

1. We are thus assuming away the problem of statutory ambiguity. On that topic, see Farnsworth, Guzior, and Malani (2010).

2. We realize that courts sometimes speak in terms of deference even when they fail to act so, but we are concerned with the substance rather than the rhetoric of court decisions.

considered illegal by the courts. We call situations of that sort permitting prohibitions, because the permission is implicitly created by the enactment of a prohibition.

To understand the mechanism behind permitting prohibitions, consider the case of statutory interest caps, popularly known as usury laws. Absent usury laws, very high interest rates are not prohibited. But a credit contract bearing interest rates of, say, 1,000 percent will probably be considered unconscionable. In the terminology of our model, the legislated policy that anything goes (which arises in light of the absence of an interest rate ceiling) will be deemed to be that of a bad legislator. In considering certain levels of interest rates as unconscionable, courts will in practice establish the maximum acceptable interest rate. Suppose they do that at the rate of, say, 40 percent, which then becomes the effective cap. Now, contrast that with a scenario in which Congress enacts a usury law setting the cap at 50 percent. If (as we have assumed) originally the court's best judgment is that the appropriate interest rate cap is 40 percent, a legislated cap of 50 percent raises little disagreement. Hence, a court that would impose a 40 percent interest rate ceiling if legislation allowed any interest rate would uphold the legislated 50 percent interest rate cap.

This usury law thus works as a permitting prohibition. In both cases, legislation permits a contract with a 45 percent interest rate (in the first case implicitly because there is no legislated cap and in the second because the cap is set at 50 percent). Yet, with no ceiling, courts invalidate a contract with a 45 percent rate, whereas with a 50 percent ceiling courts validate it. As a result, a contract with a 45 percent interest rate, while legislatively permitted in both scenarios, would be deemed valid only where there is a legislated cap of 50 percent. As can be seen, the existence of a ceiling changes how courts regulate transactions that are not expressly forbidden. This is how the enactment of a statutory prohibition can create permission from a court.

Just like a statutory prohibition can increase the probability that courts permit acts that are not statutorily prohibited (such as contracting with higher interest rates), the enactment of legislation permitting something may increase the probability that judges will prohibit related acts not expressly permitted. To go back to the example, in the presence of a legislated interest rate ceiling of 3 percent (too low), courts will probably look for legal interpretations that allow them to in effect rule against

Table 1. Permitting Prohibition and Prohibiting Permission

	Legislated Ceiling	Prevailing Ceiling
Base interest rate:		
No usury law	None	40
After legislation permitting prohibition	50 (down)	50 (up)
Low interest rate:		
No usury law	3	40
After legislation prohibiting permission	35 (up)	35 (down)

the legislator and apply their best judgment so as to place the threshold again at 40 percent (a related, real-world example can be found in *Marquette National Bank of Minneapolis v. First of Omaha Service Corp.*, 439 U.S. 299 [1978], a Supreme Court decision holding that relatively low state interest caps could not be enforced on national banks based in other states). But suppose the legislature replaces the 3 percent cap with a 35 percent cap, a generous legislative permission. Now the legislated cap causes much less disagreement and is strictly enforced by courts. The interest rates tolerated by courts, however, paradoxically drop from 40 percent to 35 percent. So while the new usury law expressly extends the permission for parties to contract interest rates in the range of 3–35 percent, its actual effect is to prohibit contracts in the range of 35–40 percent. Here, the enactment of a permission in practice creates a prohibition. These effects are shown in Table 1.

The second insight from the model is that the dispersion of court decisions may be greater with legislation that earns little deference from courts than with legislation that earns none. Technically, this means that the relationship between the variance in decisions and some measure of the degree of disagreement of the median judge with the legislation might be nonmonotonic. With greater judicial deference as a proxy for better legislation, the implication is that within a certain range, legislative improvement may trade off with legal certainty. As before, this result requires a potentially large error from bad legislators.

To grasp the intuition, contrast these two situations. First, an interest rate cap is legislated at a completely unreasonable level. For example, it is too low (3 percent) or too high (3,000 percent). In either case, all courts will find legal justifications to deny the practical effects intended by the legislation (the likelihood that the legislation is appropriate will

Table 2. Example of Statutory Improvement Increasing Legal Uncertainty

	Legislated Ceiling	Prevailing Ceiling
Bad legislation:		
Low cap	3	25–250
High cap	3,000	25–250
Better legislation:		
Low cap	15	15–250
High cap	300	25–300

be considered too low). Thus, the ceiling will in effect be ignored (say, a very low ceiling is deemed to be an unconstitutional interference with the freedom of contract; a very high ceiling permits too many unconscionable loans). As a result, courts validate contracts with interest rates above the unreasonably low legislated cap or invalidate contracts with interest rates below the unreasonably high legislated cap. Whether through judicial review or more subtle interpretive processes, the legislator is overruled, and a court-imposed interest rate cap arises as a byproduct of the courts' decisions. By allowing for disagreement between courts, the cap is dispersed (say, between 25 percent and 250 percent).

In the alternative scenario, the cap is legislated at a point deemed unreasonable by the majority of judges, but not by all. For example, the legislated cap is either very low (15 percent) or very high (300 percent), so some courts uphold these caps, but most of them make judgment calls. Crucially, courts that uphold the 15 percent interest rate ceiling are those that would otherwise choose a ceiling close to 25 percent; those that would choose a higher ceiling would consider the 15 percent cap inappropriate.

As a result, compared with a situation with a 3 percent interest rate ceiling, the 15 percent cap increases legal uncertainty because a credit contract with a 20 percent interest rate is subject to legal uncertainty in the latter case (some courts uphold the 15 percent ceiling) but not in the former case (all courts ignore the 3 percent ceiling).[3] These effects are shown in Table 2.

3. Similarly, courts that uphold the 300 percent legislated interest rate ceiling are those that would otherwise choose a ceiling close to 250 percent, as courts that would choose a lower ceiling would reject the null hypothesis that the 300 percent cap is appropriate. As a result, compared with a situation with a 3,000 percent interest rate ceiling,

In general, when legislation is completely within the zone of acceptance, no judge refrains from enforcing it, so the variance in courts' decisions is small. When the legislation is completely outside the zone of acceptance, every judge finds legal grounds to discard it, and the variance is large. And when the legislation is considered acceptable by only a few judges, the variance might be even greater—very large—since some but not all judges enforce it. Hence, one message of this paper is that institutional mechanisms (such as stare decisis) that moderate dispersion and decrease legal uncertainty become more important as courts become more independent from other branches of government.

The rest of this paper is divided as follows. Section 2 presents the literature review. Section 3 describes our model and demonstrates its implication for the enforcement of legislated prohibitions and dispersion of court decisions. Section 4 discusses examples of permitting prohibitions and prohibiting permissions in the real world. Section 5 concludes. Proofs are in the Appendix.

2. RELATED LITERATURE

That courts exercise judgment and some level of discretion has been known for a long time. However, limited evidence exists that in adjudicating cases judges maximize expected monetary (Anderson, Shughart, and Tollison 1989; Toma 1991) or political gains (Cohen 1991; Morriss, Heise, and Sisk 2005; Choi and Gulati 2004), so judicial motivation remains a conundrum for theories that regard judges as strictly self-seeking actors (Epstein 1990; Kornhauser 1992a). To deal with this problem, authors started to embrace richer versions of judicial utility. Posner (2008, p. 36), for example, analogizes judges to nonprofit enterprises, voters, and spectators at theatrical performances to construct judicial utility as a function of leisure, prestige, reputation, self-respect, the intrinsic pleasure of the work, and even "the other satisfactions that people seek in a job" (see also Epstein, Landes, and Posner 2013).

Some authors refine these ideas by distinguishing judicial utility that is derived from cases' dispositions (Badawi and Baker 2015; Cameron, Se-

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a legislated cap of 300 percent increases legal uncertainty because a credit contract with a 280 percent interest rate is subject to legal uncertainty in the latter case (some courts uphold the 300 percent ceiling) but not in the former case (all courts ignore the 3,000 percent ceiling).

gal, and Songer 2000; Cameron and Kornhauser 2006, 2015; Carrubba and Clark 2012; Fischman 2011; Lax 2003; Callander and Clark 2017; Beim, Hirsch, and Kastellec 2014) and policies (Kornhauser 1992a, 1992b, 1995) or by empirically testing or factoring into the model institutional details of courts such as collegial and group decision-making (Kornhauser and Sager 1986, 1993; Stearns 2000) and panel composition effects (Revesz 1997; Cross and Tiller 1998; Sunstein, Schkade, and Ellman 2004). More recently, some studies document the effects of other factors such as the presence of salient facts (Bordalo, Gennaioli, and Shleifer 2015) and the authorship of opinions (Farhang, Kastellec, and Wawro 2015).

Alternatively, authors drawing on the tradition of positive political theory focus on the role of the judiciary in shaping policy rather than on judicial utility (for example, Miller and Moe 1983; McCubbins, Noll, and Weingast 1987, 1989). While most studies focus on the effects of substantive policy preferences based on the judge's ideology (for example, Segal and Cover 1989; Martin and Quinn 2002) and prejudices (Kastellec 2013; Martin and Pyle 2000; Sen 2015), others focus on the interactions between the judiciary and other branches of government (Ferejohn and Shipan 1990; Gely and Spiler 1990, 1992; Eskridge and Ferejohn 1992). In a seminal paper focusing on statutory interpretation, Ferejohn and Weingast (1992) propose that judicial interpretations reflect the strategic setting in which they are announced. In passing legislation, legislatures calculate the risk of invalidation by courts; similarly, courts' decisions reflect the external political reality, for failing to take it into account can always trigger the enactment of new legislation that rebuffs courts' positions.

Our approach is more closely related to that of Baker and Kornhauser (2023). They study whether an appellate court wants to impose its judgment on a trial court that has more factual information, whereas we study whether courts want to impose their judgments on legislators. Both models are essentially about communication and explore the effects of differences in information across players. However, Baker and Kornhauser (forthcoming) are concerned with disagreements over method (agents might give different weights to each piece of evidence), while here the facts are known, and the question is whether the legislation is appropriate. The models' structure and takeaways are thus very different. Our approach also bears similarity to that in Baker and Malani (2015), but in their model judges learn from judges on sister circuits, whereas here judges learn from legislators.

The model developed herein crucially also advances a proposition about the dispersion of courts' decisions. This resonates with a discussion of legal uncertainty that has been regarded as an economic problem for a long time. Famously, Weber (1978) went as far as to attribute the very emergence of capitalism in part to the ability of continental European legal systems to foster calculability through the rational codification of law.

In the modern law and economics literature, however, legal uncertainty has been only a derivative topic. The tradition in the field is to subsume legal uncertainty into the more normative-oriented category of legal error. Indeed, the typical exercise in economic analysis of law is normative in character: an efficient benchmark is proposed, and courts' nonconforming decisions are treated as errors (Schwartz and Beckner 1998). With few exceptions (for example, Rhee 2012; Salama 2012; Ramseyer and Rasmusen 2013), legal uncertainty is then framed as a byproduct of error, and the prospects of more errors in adjudication entail the prospects of greater legal uncertainty.[4] Our contribution in this paper is different, as we are concerned with the interplay between legislation and legal uncertainty.

In sum, economic research on judicial decisions has largely focused on understanding judicial preferences and impacts of institutional constraints on courts. This literature misses that judges not only react to but also learn from legislation, which is the aspect we wish to address.

3. MODEL

The model concerns court cases characterized by an object such as the interest rate in a credit contract, decibels of noise, alcohol consumption by a driver, or incidents even harder to quantify such as intensity of outrage in public speech and so forth.There exists a true maximum admissi-

4. The merger of legal uncertainty and legal error can be visualized, for example, in the discussion of accuracy in adjudication (Kaplow and Shavell 1994, 1996). Take accident law, for example, for which the literature posits that courts are increasingly inaccurate as they depart from incentivizing optimal care. If increasing accuracy in adjudication were costless, courts would always decide cases correctly. But courts can pursue accuracy only up to a point, because more accuracy requires more information, which comes at a cost. Thus, courts make mistakes (that is, decide cases inaccurately). Legal uncertainty arises because in light of the prospects of courts' mistakes, individuals vary in their perception of how much they must invest in compliance to avoid liability. As a result, they may be overdeterred with regard to beneficial activities or underdeterred with regard to harmful activities (Craswell and Calfee 1986; Polinsky and Shavell 1989; Schinkel and Tuinstra 2006).

ble value of that object, denoted $\omega \in \mathbb{R}$, drawn by nature. This may be an interest rate ceiling (to detect unconscionability), maximum permitted noise level (to detect a nuisance), maximum blood alcohol concentration (to detect driving while intoxicated), or even a test for offensive language (to detect intentional infliction of emotional distress), and so on.[5]

There are three agents in the model: a good legislator (G), a bad legislator (B), and an adjudicator (A). They all share the utility function

$$u_i(x, \omega) = -(x - \omega)^2$$

for $i \in \{A, B, G\}$, where x is the maximum value of the variable effectively enforced by courts. Legislators and adjudicators share an objective. They all want the effective threshold x to be as close as possible to the socially desirable threshold ω.

The sequence of events is as follows: First, ω is drawn by nature. The legislator receives a signal about ω. Second, the legislator chooses the legislated cap, denoted $\bar{x}$. The statute does not contain any information about the variance of the legislator's evaluation. Third, the adjudicator receives a signal about ω, observes $\bar{x}$, and chooses the effective cap, denoted x.

Agents have different information about ω. The good legislator knows the socially optimal threshold ω. His signal is $g = \omega$. The bad legislator gets a signal b, where $b \sim N(\omega, \sigma_B^2)$. The variance σ_B^2 is common knowledge, but he does not know ω. Knowing b and σ_B^2, he can infer a distribution for ω. A large σ_B^2 indicates large expected deviations from ω. The adjudicator gets a signal s, where $s \sim N(\omega, \sigma_s^2)$. The variance σ_s^2 is common knowledge, but she does not know ω. Knowing s and σ_s^2, she can infer a distribution of ω. A large σ_s^2 indicates that signal s is not very informative about ω.

A legislator is good with probability π. The good and bad legislators in the model capture, in a simple way, the idea that adjudicators evaluate the legislation using their own information about the problem, trying to infer whether the legislation is guided by good and accurate information. In the model, this is represented by the adjudicator using her signal s and

5. In most practical cases, the set of admissible values for an object is bounded, but nothing changes in the model if ω represents the state of nature, and the variable of interest (say, the interest rate ceiling) is a monotonic function of ω with bounded support (for example, logit or probit transformations of ω).

the legislated cap $\bar{x}$ to infer the type of the legislator. All agents maximize expected utility

$$E[u_i(x, \omega)] = -E[(x - \omega)^2 \mid I_i],$$

where I_i is the information set available to player i.

3.1. The Effective Cap

Proposition 1 establishes how legislators and adjudicators behave in the equilibrium in which we are interested:[6]

Proposition 1. There is a perfect Bayesian equilibrium in which a good legislator chooses $\bar{x} = \omega$, a bad legislator chooses $\bar{x} = b$, and adjudicators follow an effective threshold x given by

$$x(s, \bar{x}) = p\bar{x} + (1 - p)\frac{\bar{x} + Vs}{1 + V}, \tag{1}$$

where

$$p = 1\Big/\left[1 + \frac{1 - \pi}{\pi}\frac{1}{\sqrt{1 + V}}\exp\left\{\frac{(s - \bar{x})^2}{2\sigma_s^2}\frac{V}{1 + V}\right\}\right] \tag{2}$$

and

$$V = \frac{\sigma_B^2}{\sigma_s^2}.$$

The adjudicator selects x to maximize

$$E[u_A(x, \omega)] = -E[(x - \omega)^2 \mid s, \bar{x}],$$

and given the choices of legislators, this leads to

$$E[u_A(x, \omega)] = -pE[(x - \omega)^2 \mid s, g] - (1 - p)E[(x - \omega)^2 \mid s, b],$$

where p is the probability that the legislator is good given her two pieces of information, s and $\bar{x}$. The first term is minimized by $x = E[\omega \mid s, g] =$

6. There are many uninteresting equilibria in this model. For example, suppose legislators always choose random numbers, unrelated to ω or b, and adjudicators always ignore the legislation. This is an equilibrium, nobody has incentives to deviate, but it is not an interesting equilibrium. Alternatively, suppose the good legislator always chooses $\bar{x} = \omega + \kappa$, where κ is a constant, and the bad legislator always chooses $\bar{x} = b + \kappa$. The adjudicator would always subtract κ from $\bar{x}$, and everything would work exactly as in proposition 1, but legislators would be communicating in a rather strange language. Our analysis focuses on the equilibrium characterized in proposition 1.

g: if the legislator is good, his signal reveals ω. The second term is minimized by $x = E[\omega \mid s, b] = (b \mid Vs)/(1 + V)$: if the legislator is bad, a weighted average of $\bar{x}$ and s is the best choice. The weight on the private signal s is given by V, which is the ratio between σ_B^2 and σ_s^2. The ratio V is a measure of the expected amount of error in the legislation relative to the expected amount of noise in the adjudicator's information. If σ_s^2 is relatively large, then the statute is likely to be based on sound knowledge; hence, the weight on the adjudicator's signal is small. This reasoning leads to equation (1).

Crucially, p is not an exogenous parameter: the adjudicator uses Bayes's rule to calculate this probability, given by the expression in equation (2), which is derived in the Appendix. The probability that the legislator is good reaches its maximum value at $s = \bar{x}$ and goes toward 0 as s moves away from $\bar{x}$ (note that as $s - \bar{x}$ increases, the second term in the denominator grows exponentially). This happens because the difference between the signal of the court and the signal received by the bad legislator has variance $\sigma_B^2 + \sigma_s^2$, whereas the difference between the signal received by the court and the proposal enacted by the good lawmaker has variance σ_s^2.[7] Intuitively, the misinformed legislator adds an extra disturbance to $\bar{x}$. Hence, if s and $\bar{x}$ are close to each other, it is more likely that this extra disturbance was not added, that is, it is more likely that the legislator is good. Proposition 1 leads to our main result, summarized in proposition 2.

Proposition 2. If V is sufficiently small, x is always increasing in $\bar{x}$. However, if V is sufficiently large, x is not monotonically increasing in $\bar{x}$. For some values of $\bar{x}$, a stricter legislated cap (smaller $\bar{x}$) leads to a more lenient effective cap (larger x). These are permitting prohibitions. In this case, there are also prohibiting permissions, as a more lenient legislated cap (larger $\bar{x}$) leads to a stricter effective cap (smaller x).

To understand the effects of the legislated cap $\bar{x}$ on the effective cap x, suppose that $\bar{x}$ is larger than s (the reasoning for $\bar{x} < s$ is analogous). An increase in $\bar{x}$ has two effects: it increases the expected value of ω for a given probability that the legislator is good, but it also increases the probability that the legislator is bad and thus decreases the weight at-

7. The variance in the difference between two normally distributed variables equals the sum of their variances; the variance of a variable is unaffected if a constant is subtracted.

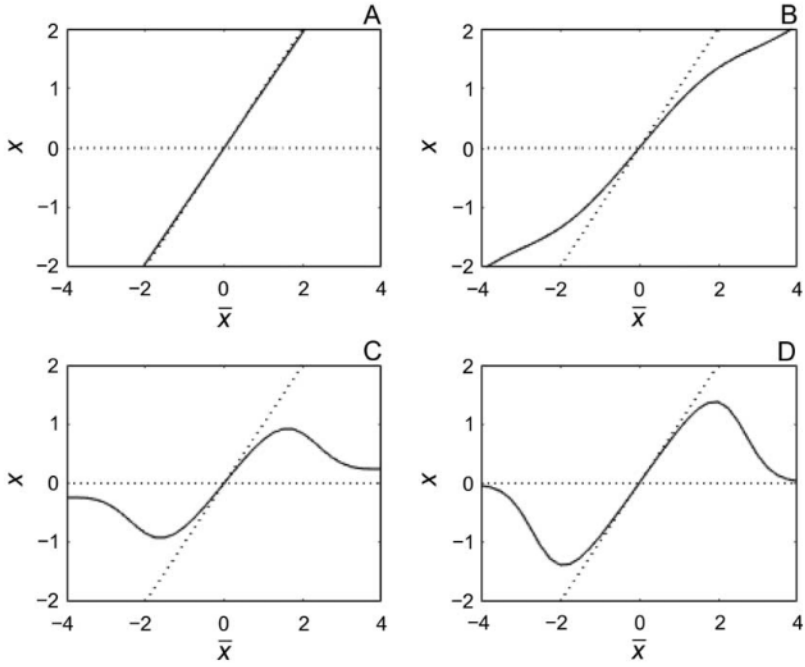

Figure 1. The effective threshold as a function of the legislated threshold. *A*, x for $\sigma_\theta = .25$; *B*, x for $\sigma_\theta = 1$; *C*, x for $\sigma_\theta = 4$; *D*, x for $\sigma_\theta = 16$.

tributed to $\overline{x}$. Permitting prohibitions may occur if the second effect is strong enough.

When V is sufficiently small, there is relatively little potential for error in the statute. Hence, from the adjudicator's point of view, a larger cap $\overline{x}$ is more likely to reflect a larger ω rather than a bad legislator. However, if V is large, as the cap $\overline{x}$ moves away from s, the adjudicator starts to attribute a larger probability to there being a bad legislator. This may lead to permitting prohibitions.

The numerical example in Figure 1 helps to demonstrate the results. The signal s is set to 0, the variance σ_s^2 is normalized to 1, and $\pi = \frac{1}{2}$. The horizontal axis shows legislated caps $\overline{x}$.[8] The dotted lines correspond to $x = 0$ (the legislation is completely ignored) and $x = \overline{x}$ (the adjudicator follows the legislation strictly). The panels consider different values

8. If the legislator is good, the horizontal axis considers signals from −4 to 4 standard deviations from the mean, so a tiny minority (around .01 percent) of signals will be outside this range.

of σ_B and thus reflect different average errors (in absolute value). In this case, $V = \sigma_B^2$.

In Figure 1*A*, σ_B is .25, so legislative errors are usually very small in comparison with σ_s. This captures a situation in which either the adjudicator is not very well informed or the legislator is very well informed. For an adjudicator, a large distance between s and $\bar{x}$ is more likely to have occurred because s happens to be far from ω. A legislative mistake is an unlikely cause of the discrepancy. Since the adjudicator knows less than the legislator about ω, if $\bar{x}$ is far from what the adjudicator expects, it is more likely that her expected value of ω is far from the truth. The implication here is that x closely follows $\bar{x}$. The adjudicator defers to the legislation.

In Figure 1*B*, σ_B is 1, which is equal to σ_s. Differences between s and $\bar{x}$ could be due to a bad legislator or to noise in the adjudicator's signal. The adjudicator is unsure. Hence, the effective threshold x will be somewhere between her signal ($s = 0$) and the legislated threshold $\bar{x}$. In the graph, for a given $\bar{x}$, the value of x will be between the horizontal and inclined dotted lines. Still, x is always increasing in $\bar{x}$.

In Figure 1*C*, σ_B is four times larger than σ_s. For low values of $\bar{x}$, x is close to $\bar{x}$. Intuitively, the bad legislator might be very far off, so an $\bar{x}$ coming from a bad legislator will usually be far from s. Therefore, an $\bar{x}$ close to s indicates that the legislator is probably good. Intuitively, if mistakes are potentially large and the legislation is in line with what the adjudicator would expect, the legislation was likely enacted by a good legislator. Hence, for $\bar{x}$ close to s, the adjudicator will attribute a large weight to the legislation. However, if $\bar{x}$ is, say, 3 standard deviations from s, it is unlikely that the legislator is good. It is much more likely that $\bar{x}$ was picked by a bad legislator. Hence, x gets closer to s.

Permitting prohibitions occur in the regions of the graph where x is decreasing in $\bar{x}$. In Figure 1*C*, as $\bar{x}$ goes from 1.5 to 3, the probability that the legislator is good goes from reasonably large to quite small. In consequence, when $\bar{x} = 1.5$, the adjudicator attributes a relatively large weight to the legislation, but when $\bar{x} = 3$, the weight on the legislation is much smaller, so x is close to the adjudicator's signal, which is 0 in the example.

Finally, Figure 1*D* shows a case in which σ_B is 16 times larger than σ_s. This captures a situation in which the adjudicator is very well informed in comparison with the bad legislator. If the distance between $\bar{x}$ and s is between -1 and 1 standard deviation, the adjudicator is quite sure that the

legislator is good. The legislated threshold $\bar{x}$ is around what she would expect; a bad legislator would likely choose a very different $\bar{x}$. Hence, she ignores her own information and defers to the legislation. However, this changes when the distance between $\bar{x}$ and s gets closer to 2, as the suspicion that the legislator is bad starts to play a role. From then on, increases in $\bar{x}$ only reinforce this suspicion, which leads to lower values of x. When the distance between the legislated cap and the signal is close to 4 standard deviations, the effective cap x is very close to s. In this case, the adjudicator completely ignores the legislation and uses her signal only.

3.2. Discussion

Permitting prohibitions are likely to occur when the adjudicator has better information than the bad legislator but the good legislator has even better information. Intuitively, permitting prohibitions take place when the adjudicator has reasons to follow the legislation when it is deemed good but reasons to ignore it when it is deemed bad.

For the sake of tractability, we have assumed that the good legislator is sure about ω and the bad legislator knows nothing besides b. In reality, bad legislators are likely to have more information about ω, and good legislators might make mistakes as well. Still, as long as bad legislators act differently from good legislators, the main insights from this model should apply to more complicated cases: changes in $\bar{x}$ would affect the probability of the legislator being good (from the point of view of an adjudicator), and this could open the door to permitting prohibitions. Future research might explore the implications of more complicated information structures.

In our model, the legislator moves before the adjudicator and has no information about her preferences. This arguably fits well cases in which future developments might shift opinions in unpredictable ways (so legislators cannot anticipate what adjudicators will think) and situations with dispersed preferences among judges such that the latter cannot infer legislators' strategic reasoning. But in other cases, legislators might have useful information about judges' preferences.

We have assumed that all agents share objectives, but one wonders what would happen in situations in which legislators have incentives to game the legislation to increase the odds that judges will apply it. While a thorough evaluation of this interaction is left for future research, we believe that the key mechanisms emphasized here would still play a role.

A legislator with preferences for a strict prohibition might enact a milder statute on the basis of the understanding that a strict rule would likely be ignored.

In the model, no cost to ignore the legislation is imposed. Instead of assuming imperfect information, one could build a model on the premise that judges have ideal thresholds but face a fixed cost if they ignore the legislature. Importantly, permitting prohibitions will not naturally arise in this environment. Consider an adjudicator with an ideal interest rate cap of 50 percent a year. Say the cost of ignoring the legislation would make her willing to accept interest rate caps up to 80 percent—her effective cap. There is no reason to think that a change in the legislated cap from 80 percent to 100 percent would lead her to decrease her effective cap from 80 percent to, say, 70 percent. Her decision about a contract with interest rates of 75 percent should be the same in both cases, since neither her disutility from allowing the contract nor the cost of ignoring the legislation have been affected.

3.3. Rules and Courts' Predictability

In the absence of any legislation, an adjudicator will have no information other than her signal s. Hence, the cap effectively imposed by the adjudicator x would be equal to s. In consequence, the standard deviation of x would be equal to the standard deviation of s, which is σ_s. Hence, with no legislation, the dispersion of decisions would mirror the dispersion of adjudicators' opinions.

In contrast, if a statute determining a cap $\bar{x}$ is followed by all adjudicators, $x = \bar{x}$ always. The standard deviation of x would be 0. A clear rule that is always followed eliminates legal uncertainty regardless of whether it is a good rule or a bad rule. In the model, this is basically what happens when V is very small.

But what if V is large? How would a rule establishing a cap $\bar{x}$ affect the dispersion of effective thresholds x?

It is perhaps not surprising that if V is large, some dispersion in x will remain, as adjudicators will not simply follow the statute. However, it is possible that the existence of a statute might increase the standard deviation of x: certain rules might increase legal uncertainty. Consider an example with a large V, similar to the case plotted in Figure 1*D*. The variances are $\sigma_s = 1$ and $\sigma_B = 16$, and $\pi = \frac{1}{2}$. The ideal cap ω is normalized to 0. There is a continuum of adjudicators, each with a signal s_i, where as

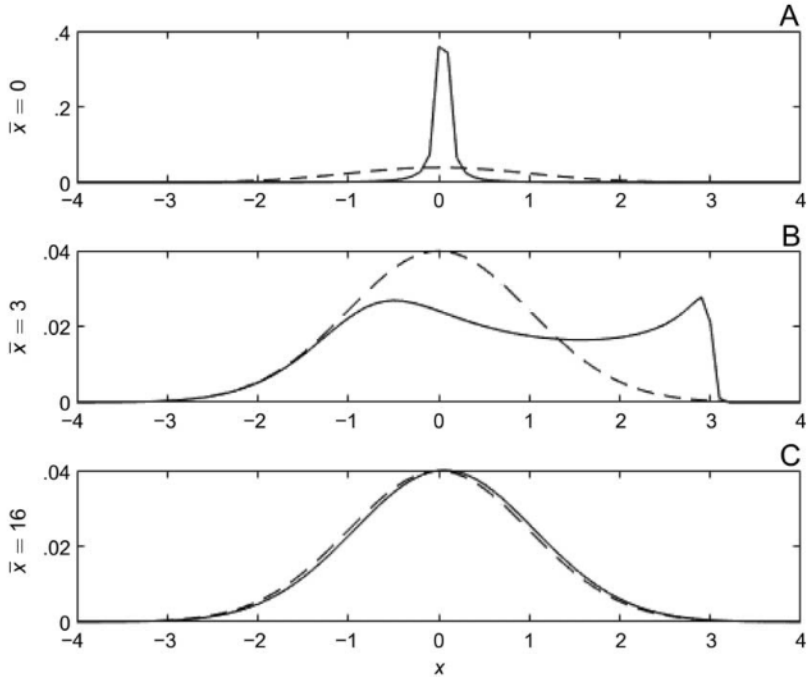

Figure 2. Distribution of the effective cap

before $s_i \sim N(\omega, \sigma_s^2)$. Conditional on ω, the signals are independent from each other. One adjudicator is randomly selected.

Each signal s_i implies a different probability p from equation (2) and hence a different effective cap x from equation (1). Using these expressions, we can compute the probability distribution of x. Figure 2 shows the distribution of the effective cap x for three values of the legislative cap $\bar{x}$.

Figure 2*A* shows the case in which $\bar{x} = \omega = 0$. The legislation is correct, and adjudicators should follow it. The solid curve shows the equilibrium distribution of x, while the dashed curve shows the distribution of s, which would be the distribution of x in the absence of legislation. Although, strictly speaking, adjudicators deviate from the legislation, the deviations are small. Around 93 percent of the adjudicators follow an effective cap x that is in the interval $[-.5, .5]$. In the absence of legislation, fewer than 40 percent of them would follow a cap in this interval. In this case, a good statute induces better decisions and increases courts' predictability.

Figure 2*C* shows the case in which $\bar{x} = 16$. The legislation is very far from adjudicators' signals, which are normally distributed with a mean of 0 and a standard deviation of 1. The dashed curve shows the distribution of s, which would be the distribution of x in the absence of legislation. It is exactly as in Figure 2*A*: the scale of the *Y*-axis is very different. The solid curve shows the equilibrium distribution of x. The curves in Figure 2*C* are almost identical. Adjudicators are convinced that the legislation is bad and are simply ignoring it. As a result, adjudicators behave almost as if there were no legislation.

The situation is more interesting in Figure 2*B*. The statute prescribes $\bar{x} = 3$, which is seen as too large by most adjudicators but not too far off by several of them. Again, the dashed curve shows the distribution of signals, and the solid curve shows the distribution of effective caps. Clearly, the latter exhibits a substantially larger dispersion. The existence of a rule increases legal uncertainty. How can this happen?

When $\bar{x} = 3$, adjudicators with low signals (say, $s_i < -1$) will ignore the legislation, adjudicators with intermediate signals will be somewhat affected by the legislation, and adjudicators with high signals (say, $s_i > 1$) will act according to a threshold x that is very close to 3. Since those who would choose a relatively low x are not affected and those who would choose a relatively high x choose an even larger one, the dispersion in x is larger than it would be in the absence of legislation.

Legislation deemed good by adjudicators leads to a reduction in the dispersion of effective caps, as shown in Figure 2*A*. Legislation that is simply ignored has no effect on the dispersion of caps, as shown in Figure 2*C*. The key insight behind the result in Figure 2*B* is that a somewhat extreme statute will be followed by some adjudicators who would otherwise choose less extreme caps but will be ignored by those on the other side of the distribution.

4. EXAMPLES

The key result of the model is a nonmonotonic relationship between legislated bounds and bounds effectively imposed by courts. We now illustrate how this result can in practice create permitting prohibitions.

Older life insurance policies in the United States habitually contained a suicide exclusion whereby coverage would be denied to the beneficiaries

of a deceased person who voluntarily took her life (*Knickerbocker Life Ins. Co. v. Peters,* 42 Md. 414, 417 [1875]).[9] Yet judges and juries were often uncomfortable with upholding the suicide exclusion, normally out of a concern for protecting a beneficiary from ruin (a nonworking wife with children, for example; *Columbian National Life Ins. Co. v. Wood,* 193 Ky. 395, 397 [1922]; but see *Bigelow v. Berkshire Life Ins. Co.,* 3 Otto 284, 286–87 [1876], which accepts contractual limitation of liability).

To invalidate the suicide exclusion, courts often employed a curious line of reasoning. Under the law, suicide is the intentional act of a person enjoying all her mental faculties. The problem is that those who commit suicide are in principle insane, and the acts of the insane are not valid. As a result, insurance companies could deny recovery only if they could prove that the persons who took their lives were sane in doing so (see *New York Life Ins. Co. v. Dean,* 226 Ky. 597, 11 S.W.2d 417 [1928]; *Ladwig v. National Guardian Life Ins. Co.,* 247 N.W. 312 [Wis. 1933]; *Muzenich v. Grand Carniolian Slovenian Catholic Union,* 154 Kan. 537, 119 P.2d 504 [1941]; but see *Strasberg v. Equitable Life Assurance Soc'y,* 281 App. Div. 9, 13–14 [1952]; *Dent v. Virginia Mut. Benefit Life Ins. Co.,* 226 A.2d 166, 167 [D.C. 1967], which holds a presumption of sanity and ascribes to the plaintiffs the burden of proving the insanity of the deceased). But fulfilling this burden of proof was evidently difficult, not least because the person whose sanity was in question was already dead, so courts could then recharacterize suicides as accidents and maintain the right to recovery under the insurance policy (*Mutual Life Ins. Co. v. Terry,* 15 Wall. 580, 591 [1872]; *Knickerbocker v. Peters,* 42 Md. 421; *Ladwig v. National Guardian,* 247 N.W. 314). Insurance companies tried to deal with this problem by drafting the suicide exclusion so as to encompass "suicide, sane or insane," but incorporating that broader wording was often to no avail, and courts usually still voided the exclusion (see *Equitable Life Assurance Soc'y v. Bailey,* 284 S.W. 403, 404 [1926]; *Christensen v. New England Mut. Life Ins. Co.,* 197 Ga. 807, 809–12 [1944]).

Because of understandable concerns with adverse selection and moral hazard, almost all states passed legislation prohibiting the exclusion when the suicidal person took her life 2 years or more after the policy was issued. This rule is now inscribed in the books in most American

9. Most of the background for this history of life insurance is from Schuman (1993).

states (Tseng 2004).[10] As a result, US courts basically dropped the argument that a suicidal person is in principle insane (at least insofar as the 2-year gap is concerned), and insurance policies are drafted accordingly (see *McKinnon v. Lincoln Benefit Life Co.,* 162 Fed. Appx. 223, 227 [2006]; *Mitchell v. American General Life Ins. Co.,* 2014 U.S. Dist. Lexis 93742, at 5–6, 8 [S.D. Iowa 2014]; *Collins v. Unum Life Ins. Co.,* 2016 U.S. Dist. Lexis 60628, at 31, 34, 37 [N.D. Ohio 2016]). This is precisely a situation in which legislation imposing a prohibition (suicide exclusions are not valid after 2 years) raises the prospects that judges will allow related actions not expressly forbidden by legislation (the suicide exclusion being held valid within 2 years after the policy was issued).

In the language of the model, say that $x = 0$ means that suicide exclusions are strictly forbidden and $x = 100$ means that any suicide exclusion in a contract is valid. The initial legislation can be thought of as, say, $\bar{x} = 90$, with very few constraints on insurance contracts in terms of clauses about suicide. However, courts effectively impose a much lower cap, say $x = 10$, denying coverage only in very special cases. Legislation prohibiting the exclusion when a person takes her life 2 years or more after issuance of the policy is a prohibition, as it lowers $\bar{x}$ to, say, 30. However, this increases the effective cap from $x = 10$ to $x = 30$, so it works as a permission.

The nonmonotonic relation between legislated and court-imposed bounds also generates the opposite phenomenon. Just as a statutory prohibition can cause courts to permit actions that are not statutorily prohibited (such as a suicide exclusion in an insurance policy), the enactment of legislation permitting something may cause courts to prohibit related actions not expressly permitted.

To illustrate, consider the legal battles in Canada over Quebec's legislation on commercial signs. In 1977, the Charter of the French Language defined French as the official language of the provincial government (see 1977 Charter of the French Language, c. C-11, art. 1, also known as Bill 101). That led to a long legal battle (Richez 2014). In 1988, the Supreme Court of Canada ruled that the sections of the charter prohibiting the use of languages other than French on commercial signs violate freedom of expression and are unconstitutional (*Ford v. Quebec* [AG], [1988] 2 S.C.R. 712). In response, the charter was amended, first to permit English inside (Bill 178) and later outside (Bill 86) commercial establishments,

10. In a few states the legislated exception covers only 1 year, and in a few others there is no such legislation.

and only insofar as French remained "markedly predominant" (Richez 2014, p. 209). The new wording of the statute stands as good law.

On the face of it, the amendments to the charter represent a permission: the original statutory policy was to allow no English; the new one allows English if French predominates. However, the fact that the amendments were enacted in response to a Supreme Court decision that struck down the original wording changes their significance. These permissions had the practical effect of creating a prohibition over something that originally had not been expressly permitted, that is, the use of English as the predominant language. The new statute is thus a prohibiting permission.[11]

Examples can also be found in more traditional, classic topics of private law. Consider, for example, the issue of the remedies available to a party who is aggrieved because of a contractual breach. In France, the Napoleonic Civil Code famously ascribed the remedy of damages, not of specific performance (Civil Code 1804, art. 1142; see Rowan [2017] on the evolution of French remedies). Early on, however, courts severely restricted the application of the rule to obligations personal in character (the painting of a portrait, for example; see Szladits [1955]). Thus, and contrary to statutory wording, specific performance was effectively the preferred remedy and was upheld by courts whenever possible.

It took 212 years for this statutory rule to be changed. While explicitly recognizing the central place of specific performance as remedy for contractual breach, the 2016 amendment to the Civil Code also established that a court should not determine specific performance in case of "manifest disproportion between [the cost of specific performance] to the promisor and the benefit to the promisee" (Civil Code, art. 1221). The dynamics created by the latter statutory change resemble a prohibiting permission, because a qualified permission (for courts to determine specific performance of an unfulfilled contractual obligation) ends up restricting courts' ability to do so (because now courts' specific performance is no longer available as a matter of right and can be resisted on grounds of proportionality and reasonableness).

11. In the language of the model, $x = 0$ means that any use of English is strictly forbidden, and $x = 100$ means that there are no restrictions on using English. The initial legislation can be thought of as, say, $\bar{x} = 10$, English is mostly forbidden. But courts disagree and strike down the statute, effectively imposing $x = 90$, with almost no limitation on the use of English. Legislators then enact a permission to use English if French predominates, which we can think of as $\bar{x} = 30$. When courts defer to legislation, they are in practice prohibiting the use of English in the interval that goes from $x = 30$ to $x = 90$.

Thus, what exists is precisely the nonmonotonic relation between legislated and court-imposed restrictions. As a result, the statutory authorization for specific performance is likely to cause courts to enforce specific performance less—and not more—frequently.

In any case, the nonmonotonic relation between legislated rules and rules effectively imposed by courts is not completely new in the empirical literature. Using data from criminal cases in the United Kingdom, Bindler and Hjalmarsson (2018) study the effects of the abolition of capital punishment in the 1800s on the behavior of juries. The abolition of capital punishment is a reduction in the severity of punishment, not a permission as in this paper, but there might be a connection between our theory and their results. With reasoning similar to that in our model, legislation prescribing capital punishment for certain crimes could be deemed excessively tough by courts. If this is the case, a reduction in the severity of punishment could lead to an increase in the chances of conviction. This is exactly what Bindler and Hjalmarsson find.

Similarly, experimental research has shown that the enactment of caps on the amount that juries can establish as damages increases the awards in low-value cases that would otherwise generate smaller awards (Hinsz and Indahl 1995; Robbennolt and Studebaker 1999). This result is attributed to anchoring, the cognitive bias of relying too much on the piece of information that is offered first (such as a statutory damage cap). However, anchoring cannot explain the result found in Robbennolt and Studebaker (1999) that the passage of a legislated cap on punitive damages can increase the variance in courts' decisions. An explanation along the lines in this section cannot be discarded.

5. CONCLUDING REMARKS

We have proposed a model of the choice of enforcement of a statute based on the signal emitted by the statute at hand. The results crucially depend on how well informed courts are and how misguided the legislation is. The model raises several questions beyond those discussed here. A theoretical one has to do with the dynamics of courts and legislatures with regard to prohibitions. We showed that once courts are considered, the enactment of a prohibition can create a permission to contract. However, our model is static, while the examples discussed suggest that there may be a dynamic component in the interplay of courts and legislatures.

Moreover, the idea that statutory prohibitions can generate permissions helps explain an old intuition, namely, that much of the existing regulatory activity aims to enlarge rather than shrink private markets. For instance, in standard economic models, usury laws decrease the amount of loans in the economy, but the models do not take into account the court activism in curbing loans deemed unconscionable. The mechanism of permitting prohibition shows that well-chosen statutory interest rate caps may decrease the probability of successful lawsuits and lead to higher effective interest rate caps—and that might explain the endurance of numerous usury laws worldwide, including in developed countries. These and other applied questions are left for future research.

APPENDIX: PROOFS

A1. Proof of Proposition 1

Since this is a perfect Bayesian equilibrium, we need to prove that players maximize their expected payoffs given the strategies of others and that the adjudicator's beliefs are derived from the equilibrium strategies of the good and bad legislator via Bayes's rule.

A1.1. The Problem of the Adjudicator. We solve the problem of the adjudicator by assuming that the good legislator chooses $\bar{x} = \omega$ and the bad legislator chooses $\bar{x} = b$. We verify these claims below. To minimize her loss function, the adjudicator chooses $x = E(\omega \mid s, \bar{x})$, the expected value of ω considering all of her information. Using Bayes's rule, the adjudicator calculates the probability that the legislator is good given s and $\bar{x}$. Those terms require the probability density of signal s conditional on both types of legislators. If the legislator is good, $\bar{x} = \omega$; hence, the signal $s \sim N(\bar{x}, \sigma_s^2)$, so the probability density of s is given by

$$\phi(s - \bar{x};\ 0,\ \sigma_s^2),$$

where $\phi(a;\ \mu,\ \sigma)$ denotes the probability density of a normally distributed variable with mean μ and standard deviation σ evaluated at a. If the legislator is bad, since $\bar{x} = b$, $\bar{x} - \omega \sim N(0,\ \sigma_B^2)$. Using $s \sim N(\omega,\ \sigma_s^2)$, we obtain $s \sim N(\bar{x},\ \sigma_s^2 + \sigma_B^2)$. Hence, the probability density of s conditional on the legislator being bad is

$$\phi(s - \bar{x};\ 0,\ \sigma_s^2 + \sigma_B^2).$$

Thus, the probability that the adjudicator is good is given by

$$p = \frac{\pi\phi(s-\bar{x};\ 0,\ \sigma_s^2)}{\pi\phi(s-\bar{x};\ 0,\ \sigma_s^2) + (1-\pi)\phi(s-\bar{x};\ 0,\ \sigma_s^2+\sigma_B^2)} = 1\Big/\left[1 + \frac{1-\pi}{\pi}\frac{\phi(s-\bar{x};\ 0,\ \sigma_s^2+\sigma_B^2)}{\phi(s-\bar{x};\ 0,\ \sigma_s^2)}\right].$$

Using the expression for the probability density of the normal distribution, we obtain the expression for p in equation (2).

The adjudicator then calculates the expected value of ω. If the legislator is good, $\omega = \bar{x}$. If the legislator is bad, simple Bayes's rules for normal distributions imply a conditional expected value of ω given by

$$\frac{\sigma_s^2\bar{x} + \sigma_B^2 s}{\sigma_s^2 + \sigma_B^2} = \frac{\bar{x} + Vs}{1+V}.$$

Minimization of the adjudicator's loss function leads to $x = E(\omega \mid s,\ \bar{x})$, which yields the expression in equation (1).

A1.2. The Problem of the Legislators. To prove that the good legislator chooses $\bar{x} = \omega$ and the bad legislator chooses $\bar{x} = b$, we start by noting some features of p and x that play an important role in the proof.

Lemma 1. Let $u = s - \bar{x}$. For any $\bar{x}$, if adjudicators follow the strategy described in proposition 1, the following statements are true:

1) Probability p is an even function of u: $p(u) = p(-u)$.
2) The expression $\partial p/\partial\bar{x}$ is an odd function of u:

$$\frac{\partial p}{\partial x}(u) = -\frac{\partial p}{\partial \bar{x}}(-u).$$

3) Let $v = x - \bar{x}$. Then v is an odd function of u: $v(u) = -v(-u)$ and $v(0) = 0$.
4) The expression $\partial x/\partial\bar{x}$ is an even function of u:

$$\frac{\partial x}{\partial \bar{x}}(u) = \frac{\partial x}{\partial \bar{x}}(-u).$$

Proof. Inspection of equation (2) shows that p is a function of $(s-\bar{x})^2$ only, which proves statement 1. For statement 2, note that

$$\frac{\partial p}{\partial \bar{x}} = p^2\frac{1-\pi}{\pi}\frac{1}{\sqrt{1+V}}\exp\left\{\frac{u^2}{2\sigma_s^2}\frac{V}{1+V}\right\}\frac{V}{1+V}\frac{u}{\sigma_s^2},$$

which leads to statement 2.

For statement 3, equation (1) leads to

$$v = x - \bar{x} = (1 - p)\frac{V}{1 + V}u,$$

and since p is an even function of u, v is an odd function of u. The expression also shows that $v(u) = 0$.

Finally,

$$\frac{\partial x}{\partial \bar{x}} = 1 - (1 - p)\frac{V}{1 + V} - \frac{V}{1 + V}u\frac{\partial p}{\partial \bar{x}}.$$

The first term is an even function of u (since V is a constant and p is an even function). The second term is the product of u and an odd function of u; hence, it is also an even function of u. This yields statement 4.[12] Q.E.D.

Now we solve the problem of the good legislator assuming that the adjudicator follows the threshold in equation (1). The good legislator chooses $\bar{x}$ to minimize $E[(x - \omega)^2 \mid \omega]$; hence, the first-order condition yields

$$E\left[(x - \omega)\frac{\partial x}{\partial \bar{x}} \;\middle|\; \omega\right] = 0.$$

We need to prove that this holds if the legislator chooses $\bar{x} = \omega$. The term of the first-order condition that must be 0 can then be written as

$$\int_{-\infty}^{\infty} (x - \bar{x})\frac{\partial x}{\partial \bar{x}}\phi(s - \bar{x};\ 0,\ \sigma_s^2)ds,$$

and using the definitions $v = x - \bar{x}$ and $u = s - \bar{x}$ from lemma 1, we obtain

$$\int_{-\infty}^{\infty} v\frac{\partial x}{\partial \bar{x}}\phi(u)du.$$

Lemma 1 shows that $\partial x/\partial \bar{x}$ is an even function of u, and since $\bar{x} = \omega$, $\phi(u)$ is an even function as well. Since v is an odd function of u, $v(\partial x/\partial \bar{x})f(u)$ is an odd function of u, and the above integral must be 0.

The proof for the bad legislator is similar. We assume that the adjudi-

12. Formally, define $w(u) = u(\partial p/\partial \bar{x})(u)$. Then $w(-u) = -u(\partial p/\partial \bar{x})(-u) = -u[-(\partial p/\partial \bar{x})(u)] = u(\partial p/\partial \bar{x})(u) = w(u)$.

cator follows the threshold in equation (1); the bad legislator chooses $\bar{x}$ to minimize $E[(x - w)^2 \mid b]$, and thus the first-order condition yields

$$E\left[(x - \omega)\frac{\partial x}{\partial \bar{x}} \;\middle|\; b\right] = 0.$$

We need to prove that this holds if the legislator chooses $\bar{x} = b$. Write $\varepsilon_B = \omega - b$ and $\varepsilon_s = \omega - s$. Then ε_B and ε_s are normally distributed variables with a mean of 0 and variances of σ_B^2 and σ_s^2, respectively. Writing

$$s = \omega - \varepsilon_s = b + \varepsilon_B - \varepsilon_s,$$

we see that s is normally distributed with mean b and variance $\sigma_B^2 + \sigma_s^2$. We can thus write the term of the first-order condition that must be 0 as

$$\int_{-\infty}^{\infty} (x - \bar{x})\frac{\partial x}{\partial \bar{x}}\phi(s - \bar{x};\ 0,\ \sigma_s^2 + \sigma_B^2)ds,$$

and an argument similar to the one for the good legislator implies that this integral is equal to 0, $\bar{x} = b$. It is thus optimal for the bad legislator given the equilibrium choices of the other players.

A2. Proof of Proposition 2

The derivative of p with respect to $\bar{x}$ can also be written as

$$\frac{\partial p}{\partial \bar{x}} = -p(1 - p)\frac{V}{1 + V}\frac{(\bar{x} - s)}{\sigma_s^2}.$$

We can write x as

$$x = \frac{\bar{x} + Vs}{1 + V} + p\frac{V}{1 + V}(\bar{x} - s).$$

Hence,

$$\frac{\partial x}{\partial \bar{x}} = \frac{V}{1 + V}\left\{1 + pV\left[1 - (1 - p)\frac{V}{1 + V}\frac{(\bar{x} - s)^2}{\sigma_s^2}\right]\right\}. \tag{A1}$$

It is easy to see that

$$\lim_{V \to 0}\frac{\partial x}{\partial \bar{x}} = 1.$$

Since this derivative is continuous in V, we obtain the first claim: for sufficiently small V, the derivative of x with respect to $\bar{x}$ is always positive.

For the second claim, write $p(\bar{x} - s)$ as the probability that the legislator is good from equation (2). Note that

$$\lim_{V \to \infty} p(0) = 1$$

and

$$\lim_{\bar{x} - s \to \infty} p(\bar{x} - s) = 0.$$

That is, when V is large, $p(0)$ is close to 1, and as $\bar{x} - s$ goes toward infinity, $p(\bar{x} - s)$ goes to 0. Hence, for large values of V, there will exist some $\bar{x} - s = \Delta$ such that $p(\Delta) = \frac{1}{2}$. Using equation (2) and manipulating yields

$$\Delta = \sqrt{\frac{1+V}{V} 2\sigma_s^2 \left[\log\left(\frac{\pi}{1-\pi}\right) + \log\left(\sqrt{1+V}\right) \right]}.$$

According to the expression in equation (A1), for large V, for $\bar{x} - s = \Delta$ such that $p(\Delta) = \frac{1}{2}$,

$$\frac{\partial x}{\partial \bar{x}} = \frac{1}{1+V} \left(1 + \frac{V}{2} \left\{ 1 - \left[\log\left(\frac{\pi}{1-\pi}\right) + \log\left(\sqrt{1+V}\right) \right] \right\} \right).$$

Taking the limit yields

$$\lim_{V \to \infty} \frac{\partial x}{\partial \bar{x}} = -\infty.$$

Using continuity, for large values of V, $\partial x / \partial \bar{x}$ is negative when $p = \frac{1}{2}$; hence, x is not monotonically increasing in $\bar{x}$.

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