CAREERIST JUDGES[*]

by

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Abstract

In this paper I analyse how careerist judges formulate their decisions using information they uncover during deliberations as well as relevant information from previous decisions. I assume that judges have reputation concerns and try to signal to an evaluator that they can interpret the law correctly. If an appeal is brought, the appellate court's decision reveals whether the judge interpreted the law properly and allows the evaluator to assess the judge's ability. The monitoring possibilities for the evaluator are therefore endogenous, because the probability of an appeal depends on the judge's decision. I find that judges with career concerns tend to contradict previous decisions inefficiently. I also show that judges behave more efficiently when elected by the public than when appointed by fellow superior judges.

Keywords: career concerns; judicial decision-making.
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1 Introduction

Judging by the surge in recent papers counting the number of times a judge's opinion or article is cited (or web-searched), reputation, influence, prestige and career concerns are essential features of the judicial world.[1] This is of course not new; but, as ways of measuring features such as prestige or influence have become more sophisticated, they have generated a renewed interest in judicial reputation. As Posner (2000) writes,

> *"An even more audacious use of citations as a judicial management tool is to grade appellate judges..the ranking is a rough guide to quality, or influence, or reputation - it is not altogether clear which is being measured"*[2]

Judges may care about how others perceive and rank them for two reasons. First, this can influence their career. Although judges who have life tenure positions need not be in fear of losing their job, promotion to a better position in the judicial system may depend on whether others consider them as able. It is a common tradition that appellate judges are trial judges who got promoted and Supreme Court Justices are judges from lower-echelon appellate courts. These higher-echelon positions can increase both the judge's pay and her possibilities of influencing other judges. Thus, trial judges may desire to become appellate judges, and judges of intermediate appellate courts may aspire to become judges of courts of last resort.[3] A second reason for judges to care about what others think about them, may be a human concern for prestige and influence. In this sense, the judicial world is similar to the scholarly academic world.

In this paper, I formalize the effect of reputation seeking behavior on judicial decision making. In particular, I assume that a judge is interested in creating a reputation for high judicial ability, which is the ability to interpret the law correctly. Traditionally, political and legal scholars assume either that judges try to take the right decision, i.e., to interpret the

[1] To name a few examples: The Prestige and Influence of Individual Judges on the US Courts of Appeals, by D. Klein and D. Morrisroe, *JLS 1999*; Determinants of Citations to Articles in Elite Law Reviews, by I. Ayres and F. Vars, *JLS 2000*; The Most Cited Legal Scholars, by F. Shapiro, *JLS 2000*; The Determinants of Judicial Prestige and Influence: Some Empirical Evidence from the High Court of Australia, by M. Bhattaharya and R. Smyth, *JLS 2001.*

[2] Posner, R. (2000), An Economic Analysis of the Use of Citations in the Law, *American Law and Economic Review*, 381-406.

[3] Empirical research finds that the perceived quality of a judge plays a notable part in their promotion. For example, Salzberger and Fenn (1999) find that the promotion probability from the court of appeal to the house of Lords in England is significantly determined by a lower reversal rate of the judge's decision in the house of Lords. They interpret this finding by claiming that the house of Lords believes that a lower reversal rate indicates a better judge who deserves promotion.

law correctly (the 'legal' model), or that judges have ideological preferences and follow them when adjudicating a case (the 'political' model). But some have taken reputation motives more seriously; Landes and Posner (1976) conjecture that judges follow precedents to avoid the disutility of being reversed whereas both Miceli and Cosgel (1994) and Whitman (2000) assume that judges suffer a utility loss when being overturned by others and gain utility when being cited. As opposed to these papers, I derive these motivations as well as aversions endogenously, from fundamental preferences.

In other contexts, several papers model careerist decision makers, such as managers or experts, who try to prove their ability (see for example Holmström (1982), Scharfstein and Stein (1990), Avery and Chevalier (1999) and Levy (2003)). However, as opposed to other types of decision makers, in the judicial system it may never be found out whether the judge's decision is correct or not.[4] This makes the task of assessing and monitoring the ability of the judge difficult. Nevertheless, it may be possible to extract more information about the correct decision, and consequently, about the judge's ability, if an appeal is brought and the case is adjudicated once more. Thus, monitoring the ability of the judge is *endogenous*, because whether an appeal is brought depends on her particular decision. The judge herself can then control the flow of information about the case and incidentally, about her type.[5]

I therefore focus the analysis on judicial systems which allow for appellate review; the judge may be subject to review by an appeals court if the losing litigant believes that her decision is likely to be reversed.[6] An important element of the analysis is that the judge takes into consideration how her decision affects the probability that the case will be brought before a higher court. Secondly, I focus on the availability of previous decisions in similar cases, i.e., non-binding precedent, that can assist the judge in her current decision. As in Daughety and Reinganum (1999), judges in my model may learn some information from decisions of other courts, often termed 'persuasive influence'.[7]

These features are incorporated in the following Bayesian signaling model; a judge receives some private information regarding the application of the law in a particular case. The accuracy of this information depends on her ability; the more able is the judge, the

[4] That is, whether the judge interpreted the law properly.

[5] In the literature about career concerns the assumption is that the correct decision is revealed exogenously.

[6] The court system is often modelled as an hierarchy, for example in Spitzer and Talley (1998), Daughety and Reinganum (2000), and Shavell (1995).

[7] Daughety and Reinganum (1999) assume that judges are interested in taking the right decision whereas in my model judges are careerist. Miceli and Cosgel (1994), Whitman (2000) and Rasmusen (1994) also analyze the use of non binding previous decisions by judges in a repeated game and focus on the evolution of the law. My work focuses on the efficiency of judicial decisions.

more 'accurate' is her interpretation of the law. She then delivers her decision, based both on her private trial information and on past decisions. The losing party appeals the verdict if the probability of reversal is greater than the cost of appeal. If an appeal is brought, an appeals court delivers a reversal or affirmation decision. I assume that the social goal is to attain the correct decision (through efficient aggregation of information) at the minimum cost. A careerist judge, however, is not motivated by social efficiency, but by accumulating reputation for being able.[8] The first task of the paper is to characterize the careerist judge's decisions in equilibrium.

I show that in equilibrium, a careerist judge tends to contradict previous decisions more than an efficient judge would do.[9] Contradicting previous decisions becomes a signal of the judge's ability, since able judges have accurate information of their own about the correct interpretation of the law and do not need to rely on previous decisions. Since this signal increases reputation, other types of judges, and in particular less able types, tend to use it excessively and inefficiently.[10]

However, another equilibrium feature is "reversal aversion", which arises endogenously, because reversal signals that the judge's decision was mistaken and reduces her reputation. Thus, the least able types realize that if they contradict previous decisions they may be 'caught' by the appeals court. Therefore, less able judges cannot fully mimic the behavior of the more able judges. This allows for an informative equilibrium even when monitoring is endogenous and the judge cares only for reputation.

The second goal of the paper is to assess which institutional features can mitigate the distortive behavior of the careerist judge. In particular, I consider the effect of different nomination systems on reputation concerns and as a result on the efficiency of judicial decisions. The procedure of judges' nomination is heavily debated in many countries. In our context, we can ask whether judges should be promoted by superior judges, or elected by the public. Supreme Court Justices may know the correct interpretation of the law, whereas the public or politicians can learn information about it only when appeals are

[8] Since the judge only cares for reputation, her decisions are cheap talk, i.e., there are no costs in her utility function for making one decision or the other (see Crawford and Sobel, (1982)).

[9] An efficient judge maximizes the social utility, that is, attaining the right decision at the minimum costs of appeals. Such a judge is forward looking, and besides attempting to take the right decision, also weighs the probability that each of her decisions would be corrected by the higher court versus the costs of an appeal.

[10] The results of the model differ therefore from those of Daughety and Reinganum (1999) who predict that judges may engage in inefficient herding, that is, they excessively follow previous decisions. The reason is that in their analysis judges are interested in taking the right decision (or, what the Supreme Court perceives as the right decision) whereas in my model judges are careerist and engage in active signaling.

brought. This may affect the incentives of the judge and consequently her equilibrium behavior. I therefore compare the equilibrium of the model when the judge is nominated, as above, by the public, who may know what is the right decision only when an appeal is brought (the case of *endogenous monitoring*) to the equilibrium of the model when the judge is nominated by superior judges, who know the correct interpretation of the law independently of appeals (the case of *exogenous monitoring*).

I find that the judge behaves more efficiently when monitoring is endogenous. The intuition is that an endogenous monitoring system 'punishes' judges who contradict previous decisions by a higher likelihood of an appeal, and therefore a higher likelihood of being proved wrong by the higher court compared to judges who follow previous decisions. This mitigates the incentive of the less able judges to mimic able judges who contradict previous decisions and reduces distortion. This cannot happen with exogenous monitoring because then the correct decision is known independently of the judge's decision. The result implies that the judge is reversed more often when she contradicts previous decisions if she is appointed by fellow judges, compared to being elected by the public.

The rest of the paper is organized as follows. In the next section I lay out the model, a Bayesian signaling game with incomplete and asymmetric information about the state of the world (i.e., the correct interpretation of the law). Section 3 states the main results; I first analyze a benchmark model in which the judge behaves efficiently and then investigate the equilibrium behavior of the careerist judge. A comparison between the two types of judges follows. In Section 4, I analyze the effect of different judicial nomination systems on the equilibrium outcomes and also explore the effect of binding precedent. Section 5 concludes. All proofs that are not in the text are relegated to an appendix.

2 The Model

Players and actions:

The model describes a two-tier hierarchy of a judicial process, formed of a lower-court judge and a higher-court judge.[11] The lower-court judge J must make a dichotomous decision, $d \in \{y, n\}$, i.e., whether to accept the plaintiff's argument ($d = y$) or to reject it ($d = n$).[12]

Given the lower-court's decision, the losing litigant L can advance his case to the higher

[11] Higher-echelon courts are often composed of more than one judge. I depart from collective decision making issues. For analysis of collective reputation problems, see Tirole (1994).

[12] Note that many judicial decisions are dichotomous in nature. Also, each decision may be viewed as a collection of binary decisions, i.e., whether some evidence is valid or not. Thus, the model could be applied to any of these 'mini-decisions'. On the binary nature of judicial decisions, see Kornhauser (1992).

court by bringing an appeal. Thus, $L's$ action is to appeal or not. An appeal is costly; the cost is a random variable c, $c \sim U[0,1]$, where each side has to bear c. For simplicity, I assume that the costs are not known prior to the lower-court judge's decision. The costs are realized by the litigants only after the decision is made.[13]

If L brings an appeal, the higher court H adjudicates the case. H must decide whether to affirm (A) the decision of J or to reverse it (R), i.e., $d^h \in \{A, R\}$.[14] Define the final decision D, as $D = d$ if $d^h = A$ or if no appeal took place, and $D = d'$ for $d' \neq d$, if $d^h = R$. The adjudication process ends if no appeal is brought, or, after the higher court's ruling.

There is one additional player in the game, the evaluator, E, who represents the group that the judge would like to impress. The evaluator observes the judicial process and forms beliefs on the ability of the lower-court judge, as explained below. I analyze a one-shot game, i.e., the adjudication of one legal case.

The information structure:

The underlying state of the world is w, which could be either y or n, with the interpretation that the correct decision in state y is $d = y$ and in state n is $d = n$. The underlying state of the world represents the correct interpretation of the law, about which there is asymmetric information.

Earlier decisions by other courts in similar cases ('persuasive influence') can provide information about w. Assume, without loss of generality, that the body of previous decisions indicates that the correct decision is y and is accurate with probability $q \in (.5, 1)$. The prior belief of the players about the state of the world is therefore that $\Pr(w = y) = q$, where Pr stands for *probability*. The modelling of previous decisions as imperfect information about the current case has several interpretations. First, the current case may be only partially similar to previous cases. The parameter q can measure then the degree of similarity between cases. Second, norms, conventions and other conditions may have changed, and q may reflect the degree of relevance of past decisions to the current case.[15]

[13] The assumption that costs are uncertain implies that the judge views appeals as uncertain. If c is known in advance, it adds another parameter to the model, but the nature of the results would still be maintained.

[14] The lower-court and the higher-court may represent either two appellate courts (intermediate and a court of last resort), or, it may represent a trial court and an appellate court. Daughety and Reinganum (2000) analyze a judicial system in which a trial court is engaged in fact finding whereas the appellate court interprets the law. They reject the idea that a trial court is Bayesian and offer an axiomatic decision making approach.

[15] As explained in the introduction, these previous decisions represent non-binding precedent, that is, either decisions of lower-echelon courts or situations in which the judge has enough discretion to determine whether precedent applies. In the latter interpretation, q may also represent whether the precedent is broad or narrow in its scope.

I assume that the information about earlier decisions is common knowledge.[16] The players may differ however in the amount of additional private information they possess about w.

The information of the judge: while adjudicating the case, the judge receives a private signal $s \in \{y, n\}$ about the correct interpretation of the law. The signal may comprise information that she receives from witnesses and lawyers, as well as some 'hard' evidence. The accuracy of the signal depends on the ability of the judge to interpret the law or to understand the evidence correctly. Let $\Pr(s = w|w) = t$ for $t \in [.5, 1]$. For example, if the judge's ability is $t = .5$, her signal is not informative about the true state of the world. If $t = 1$, her signal is always accurate.

Given the prior q, and her own information (s, t), the judge forms the following posterior beliefs, according to Bayes rule:

$$\Pr(w = y|s, t, q) = \left\{ \begin{array}{ll} \frac{tq}{tq+(1-t)(1-q)} & \text{if } s = y, \\ \frac{(1-t)q}{(1-t)q+t(1-q)} & \text{if } s = n \end{array} \right\} \tag{1}$$

where $\Pr(w = n|s, t, q) = 1 - \Pr(w = y|s, t, q)$.

The litigants' information: the information that the litigants possess when they decide whether to appeal includes the judge's decision (d), the prior (q), and the cost (c).[17]

The information of the higher court: I assume that the higher court H knows the state w, that is, the correct interpretation of the law. Thus, H can make a fully informed reversal or affirmation decision once the case is brought for an appeal.

The information of the evaluator: $E's$ action is to form beliefs about the expected ability of the judge. His prior belief about the ability of the judge is captured by a uniform distribution on $[.5, 1]$ and is common knowledge. E also knows the prior q, and the action d of the judge. Finally, E can glean information from the judicial process. That is, when an appeal is brought, E can observe $d^h \in \{A, R\}$. This implies that $E's$ information about w is endogenous. He can learn w only when an appeal is brought, an event which depends on the judge's and the litigants' behavior.[18] Denote $E's$ posterior beliefs about t by τ.

REMARK 1 Apart from the common prior, the higher court knows 'everything' (about w), the litigants and the evaluator know 'nothing', and the lower-court judge knows 'some-

[16] This is not an important assumption. Similar results would hold if all the players held some beliefs about q or if J only would know q.

[17] For simplicity, the litigants do not have private information about the state of the world (see remark 1).

[18] The evaluator is likely to represent the public or politicians, who elect judges, but do not have an independent knowledge about the interpretation of the law. They can only learn from public opinions published for example by the Supreme Court.

thing' about w. The important assumption is that the lower-court judge has some private information about her type that the evaluator tries to assess. The rest is not important. In particular, the litigants can have some information,[19] and the higher court need not have perfect information. Thus, I make the assumptions which are the simplest to analyze.

Objectives:

The judge J cares about her reputation. She maximizes the expected beliefs about her ability t as perceived by E. Her objective function is therefore $E(\tau)$. Thus, siding with the plaintiff or the defendant is a cheap talk action for the judge, since it has no direct bearing on her utility.

The higher court H maximizes the probability that the right decision is taken (or, in other words, that the law is interpreted correctly). As a result, H simply takes $d^h = A$ if $d = w$ and $d^h = R$ otherwise. The assumption that the higher court is not careerist is for simplicity, in order to focus on the lower-court judge.[20]

Let the litigants value a favorable decision at 1 and an unfavorable decision at 0. The litigants when deciding whether to bring an appeal, evaluate the expected benefits of an appeal, i.e., the probability that the decision d would be reversed, relative to its cost. Denote the probability of $d^h = R$ given a decision d and the information of L by $\Pr(R|d, q)$. Thus, the utility function that the losing litigant perceives is $\max\{0, E(\Pr(R|d, q)) - c\}$.

I do not attribute any utility function to the evaluator. Rather, I assume that E updates his beliefs about the ability of the judge rationally, using Bayes rule.[21]

Finally, for welfare analysis purposes, I define the social utility function. Assume that society values a correct decision at 1 and places a weight 0 on an incorrect decision. Society cares about achieving the correct final decision (D) at the minimum costs. Thus, the social utility function is $E(\Pr(D = w) - 2\theta c)$, where $\theta \geq 0$ is a parameter capturing how much society cares about costs relative to taking the right decision[22] and $2c$ is the cost incurred by both sides.[23] Note that the litigants, who choose whether to appeal, do not necessarily do so according to the social utility but according to their own preferences.[24]

Timing, strategies, and equilibrium:

The structure of the game is as follows:

[19] If the litigants have *perfect* information, then the game becomes a game with exogenous monitoring, i.e., it implies that the evaluator would also have perfect information. This case is analyzed in section 4.1. The main result (Proposition 3) is robust to this assumption as well.

[20] Analogous qualitative results would hold if the higher court would be motivated by reputation concerns.

[21] This can be justified by the evaluator trying to promote the most able judges.

[22] The parameter θ could also represent delay aversion.

[23] There is a slight abuse of notation since the expectation indicator is with respect to both w and c.

[24] This makes the result more general. If $\theta = \frac{1}{2}$, then the litigants behave efficiently.

Stage 1: J chooses $d \in (y, n)$.

Stage 2: L decides whether to appeal or not.

Stage 3: If L appeals, H takes an action $d^h \in \{A, R\}$.

Stage 4: E forms beliefs τ on t.

The strategy of L is a binary decision whether to appeal given q, d, and c. The strategy of H is $d^h : \{d, w\} \to \{A, R\}$. The strategy of E is a belief updating function $\tau : \Omega^E \to [.5, 1]$ where Ω^E represents the information set of E. In particular, it is the prior uniform distribution over t, and either $\{q, d\}$ or $\{q, d, d^h\}$. Finally, $J's$ strategy is a decision function $\delta : (q, s, t) \to \{y, n\}$.

The equilibrium concept is that of a Perfect Bayesian Equilibrium, where beliefs are derived from the players' strategies and the strategies are best responses to these beliefs. I focus on informative equilibria, i.e., equilibria in which the judge's decision is contingent on her information and ignore 'mirror' equilibria, in which the meaning of the actions is reversed.

3 Results

Let us consider first the actions of H and L in equilibrium. The optimal action of H, who is motivated by taking the correct decision, is to affirm the decision of J if $d = w$ and to reverse it otherwise. The losing litigant L knows therefore that the decision d is more likely to be reversed when it is wrong and has to update his beliefs about the state of the world. To do so, he can use the information about q, and his conjecture about the strategy of J in equilibrium.

Let $q_d(\delta)$ denote the posterior probability, updated by L, that the state of the world is indeed d, given a decision d, previous decisions summarized by q, and δ, which is the conjecture of L about the strategy of J. $q_d(\delta)$ is calculated as follows:

$$q_d(\delta) \equiv \Pr(w = d|q, d, \delta) = \frac{\Pr(w = d|q) \cdot \Pr(d|w = d, \delta)}{\Pr(w = d|q) \cdot \Pr(d|w = d, \delta) + \Pr(w = d'|q) \cdot \Pr(d|w = d', \delta)}$$

where $\Pr(w = d|\cdot)$ is a shorthand for the probability with which w and d are the same. Thus, the litigants view the decision d as a signal about w with accuracy $q_d(\delta)$. Since the probability that a decision is reversed is the probability that the judge is wrong, the litigants appeal if

$$1 - q_d(\delta) > c$$

Given any decision d, and the uniform distribution of costs on $[0, 1]$, the probability of an appeal is $1 - q_d(\delta)$, and its expected cost is $E(c|c < 1 - q_d(\delta)) = \frac{1-q_d(\delta)}{2}$. Note that in equilibrium, $q_d(\delta)$ is based on the *correct* conjecture of the judge's strategy.[25]

[25] When no confusion occurs, I write q_d and drop the conjecture δ.

3.1 Benchmark: efficient judge

Before analyzing the equilibrium with a careerist judge, I analyze the behavior of an efficient judge. This can serve as a benchmark for the analysis. An efficient judge adjudicates the case with the goal of maximizing social welfare, i.e., she maximizes $E(\Pr(D = w) - 2\theta c)$.[26] The parameters characterizing the solution for an efficient judge are $\{q, \theta\}$. Note that the evaluator plays no role in such an environment.

As a first step, consider what happens if no appeals are allowed, i.e., the decision of the judge is the final decision. When J takes y, her expected utility is the posterior probability that her decision is correct, i.e., $\Pr(w = y|q, s, t)$. Similarly, if she takes n, her expected utility is $\Pr(w = n|q, s, t)$. Thus, J takes y for all (s, t) such that $\Pr(w = y|q, s, t) \geq \Pr(w = n|q, s, t)$ and otherwise she takes n. By Bayes rule, she takes y whenever $s = y$, or when $s = n$ and $t < q$.[27] This behavior can be summarized by a cutoff point strategy, with a cutoff point (s^e, t^e), so that when $\Pr(w = y|q, s, t) \geq \Pr(w = y|q, s^e, t^e)$ the judge takes y and otherwise she takes n.[28]

It is best to describe such a cutoff strategy in the following figure, which will accompany us throughout the analysis. The right part of the graph describes the judge's decision when $s = n$, for t ranging from .5 to 1. The left part of the graph, describes the judge's decision when $s = y$, and t ranges from .5 (in the middle) to 1 (in the left). Thus, as we go from left to right, $\Pr(w = n|s, t)$ increases, from probability of 0 at $s = y$ and $t = 1$, through probability $\frac{1}{2}$ at $t = \frac{1}{2}$, to probability 1 at $s = n$ and $t = 1$. The cutoff point, (s^e, t^e), is such that for all information (s, t) to the right of it, J takes n, whereas for all information (s, t) to its left, J takes y. Figure 1 describes then an example of a cutoff point strategy for the judge, with $s^e = n$.

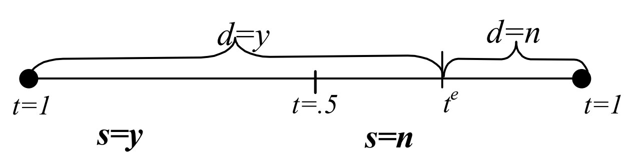

Figure 1: a cutoff point strategy with $s^e = n$

When no appeals are allowed, then $s^e = n$ as in the above figure, and $t^e = q$. What if appeals are allowed, as the model assumes? In this case, the judge is still interested in taking a decision d which she perceives as accurate, i.e., a decision with a higher $\Pr(w = d|q, s, t)$.

[26] The efficient judge does not therefore simply cares for taking the right decision, but understands the structure of the judicial system and the appeals process.

[27] When $s = n$ and $t = q$, $\Pr(w = y|q, s, t) = \Pr(w = y|q, s, t)$, since the judge's private information exactly offsets the prior.

[28] The index e for (s^e, t^e) represents *efficiency*.

But she is also forward looking and has to weigh the costs and benefits of an appeal. If an appeal occurs, the efficient judge knows that the final decision, taken by the higher court, is correct for sure. This induces her to take the decision which is appealed more often, meaning, the decision that is considered *less accurate* by the litigants. But appeals are costly, and the decision that is more often appealed also wastes more resources. The next lemma shows that despite this additional complexity, the behavior of the efficient judge can still be described by a cutoff point strategy:

Lemma 1 *In equilibrium, the efficient judge uses a cutoff point strategy* (s^e, t^e); *she takes* $d = y$ *whenever* $\Pr(w = y|q, s, t) \geq \Pr(w = y|q, s^e, t^e)$ *and otherwise she takes* n.

Proof: Suppose that the judge rules d. Her expected utility can be expressed by:

$$\Pr(w = d|q, s, t) + \Pr(w = d'|q, s, t)(1 - q_d) - \theta(1 - q_d)^2$$

The first expression represents the probability that her decision is correct, and hence the final decision would be correct whether there is an appeal or not. The second expression represents the probability that her decision is wrong but corrected by the higher court, i.e., an appeal is brought. The last expression represents the costs of the decision, i.e., the costs of appeal multiplied by its probability.

Thus, whenever the judge is indifferent between taking y or taking n, the above expression has to be equal for n and for y. Equating them and re-arranging, I get the following condition:

$$\frac{\Pr(w = y|q, s, t)}{\Pr(w = n|q, s, t)} = \frac{q_y - \theta((1 - q_n)^2 - (1 - q_y)^2)}{q_n + \theta((1 - q_n)^2 - (1 - q_y)^2)} \tag{2}$$

When the judge takes her decision, she takes as given the beliefs of the litigants, q_y and q_n. The right-hand-side of (2) does not depend therefore on (s, t) but on the beliefs of the litigants, who have no knowledge of (s, t). The judge perceives it as constant for all (s, t). On the other hand, by Bayesian updating:

$$\frac{\Pr(w = y|q, s, t)}{\Pr(w = n|q, s, t)} = \left\{ \begin{array}{c} \frac{tq}{(1-t)(1-q)} \text{ for } s = y \\ \frac{q(1-t)}{t(1-q)} \text{ for } s = n \end{array} \right\} \tag{3}$$

Hence, any different (s, t) yields a different value of $\frac{\Pr(w=y|q,s,t)}{\Pr(w=n|q,s,t)}$. This implies that there is (at most) a unique (s^e, t^e) that satisfies equation (2). Thus, there is a unique cutoff point (s^e, t^e), such that the judge takes y if and only if $\Pr(w = y|q, s, t) \geq \Pr(w = n|q, s^e, t^e)$.■

Equilibrium means that (2) is satisfied, subject to $0 \leq q_d \leq 1$ for $q_d(\delta) = q_d(s^e, t^e)$, i.e., correct beliefs of the litigants. The first Proposition characterizes the equilibrium in part (i), and presents comparative statics analysis in part (ii):

Proposition 1 *(i) When J maximizes social welfare, there is a unique informative equilibrium, in which* $s^e = n$*. That is, J takes d=y when s=y or when s=n and* $t<t^e(q,\theta)$*. (ii) The cutoff point* $t^e(q,\theta)$ *increases in q and in* θ*,* $t^e(q,\theta)_{q\to\frac{1}{2}} \to \frac{1}{2}$*,* $t^e(q,\theta)_{q\to1} \to 1$*,* $t^e(q,\theta)_{\theta\to0} < q$ *and* $t^e(q,\theta)_{\theta\to\infty} \to \tilde{t}(q)$ *where* $\tilde{t}(q)$ *is a cutoff point that induces an equal probability of appeal for both decisions. For all parameters, an appeal is more likely when the judge contradicts previous decisions.*

To understand the intuition for the equilibrium behavior of the efficient judge, consider again the solution to the judge's problem when no appeals are allowed, i.e., $s^e = n$ and $t^e = q$. Recall that at $t = q$, the judge believes that each decision is equally correct. If the judge were to use this cutoff point when appeals *are* allowed, then, as the appendix shows, $q_y > q_n$; the litigants believe that a decision that follows previous ones is more likely to be correct. This implies that contradicting previous decisions is more expansive (appealed more often), but it is also more likely to be corrected by the higher court. Given that, a judge with $t = q$ would rather contradict previous decisions when θ is low enough. This increases the likelihood that the final decision is correct, since it is often challenged, and she does not care much about the cost. If a judge with $t = q$ preferes $d = n$, the cutoff point has to satisfy $t^e < q$. On the other hand, if costs are important, such a judge opts for the cheaper decision, i.e., takes $d = y$. In this case, $t^e > q$. The cutoff point increases therefore with θ, which implies that the judge follows previous decisions more often. Finally, when $\theta \to \infty$, the judge cares only about costs and hence the cutoff point must be such that both decisions are challenged with the same probability.

3.2 A careerist judge

We are now ready to analyze the behavior of a careerist judge.[29] Recall that the careerist judge would like to impress an evaluator, who assesses the likelihood that she has accurate information. In particular, she is interested in maximizing the posterior beliefs τ of the evaluator, on her expected ability. Let $\tau(d, w, \delta)$ denote the updated belief of E about the expected type t of the judge, if E believes that J uses some strategy δ, the judge's decision is d and E were to know the state of the world w. That is, $\tau(y, y, \delta)$ denotes the beliefs of E when J takes y and she is correct. Similarly, $\tau(y, n, \delta)$ denotes the updated belief of E when $d = y$ but E were to know that $w = n$. And so on.

The evaluator, however, does not observe the state of the world but has to form beliefs about it. Similarly to the litigants, the evaluator knows the decision d, the prior q, and

[29] Note that from the point of view of L and H, the exact motivation of the judge is not important. L just conjectures the strategy of the judge, whereas H simply reverses or affirms the decision given his information about the state of the world.

has a conjecture about the strategy of the judge δ. Thus, when no appeal is brought, the evaluator forms the beliefs $q_d(\delta)$ that the judge is correct. On the other hand, if an appeal is brought, the evaluator can also extract information about w from the decision of the higher court.

The evaluator will therefore attribute the reputation $\tau(d, d, \delta)$ to the judge with the probability with which he thinks that $d = w$, i.e., that the decision and the state of the world are the same. Figure 2 helps to realize when this is indeed the case. The tree in the figure describes the possible 'events' in the game (whether there is an appeal or not, whether the judge is perceived to be correct or not) and identifies the probabilities of each of these events, *as perceived by the judge herself*:

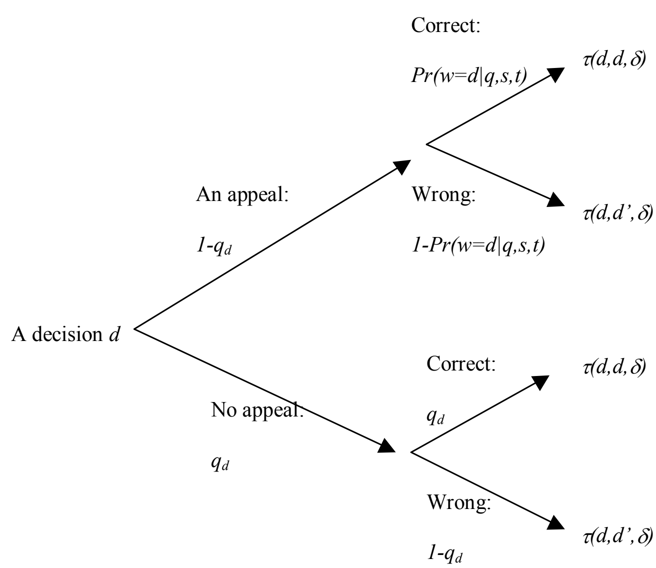

Figure 2: the probabilities with which the judge can receive the reputations $\tau(d, d, \delta)$ for being correct and $\tau(d, d', \delta)$ for being wrong, given a decision d.

For example, the judge believes that she receives the reputation $\tau(d, d, \delta)$ if an appeal is brought and she is found correct, which happens with probability $(1 - q_d)\Pr(w = d|q, s, t)$, or if no appeal is brought, but the evaluator believes that she is correct, which happens with probability q_d^2. We can therefore see how each of the judge's decisions, through the appeal process, induces a different probability distribution over the information about the state of the world that is available to the evaluator. This is why monitoring in this model is *endogenous*, i.e., the judge can control the evaluator's information about the state of the world and consequently about her type.[30]

[30] The judge controls the mean and the higher moments of the distribution over signals about the state of the world that E receives. This feature does not exist in principal-agent models for example, where the agent controls the mean but not the variance of the signals that the principal receives.

Using figure 2 we can express the expected utility of J from a decision d as follows:

$$((1-q_d)\Pr(w=d|q,s,t)+q_d^2)\tau(d,d,\delta)+((1-q_d)\Pr(w=d'|q,s,t)+q_d(1-q_d))\tau(d,d',\delta) \quad (4)$$

As seen in (4), the belief of J that she would be perceived correct by E is increasing in $\Pr(w=d|q,s,t)$. Thus, J believes that her own information is correlated with that of E. The greater the probability she attaches to the event that $w=d$, the greater the probability she attaches to the event that E knows that $w=d$. This feature would discipline the judge to behave informatively, even if E does not know w for sure and moreover, his monitoring possibilities depend on the judge's decision. We can then establish:

Lemma 2 *In an informative equilibrium the careerist judge uses a cutoff point strategy* (s^c,t^c), *that is she takes* y *if and only if* $\Pr(w=y|q,s,t)\geq\Pr(w=y|q,s^c,t^c)$.[31]

The strategy of the careerist judge is similar to that of the efficient judge, who also uses a cutoff strategy. We therefore have to check what cutoff point the reputation incentives of the careerist judge induce her to choose. As a first step, we can impose more structure on the beliefs of the evaluator E whenever he conjectures that J uses some cutoff point strategy $\delta^c=(s^c,t^c)$ and if he were to know w:

Lemma 3 *(i) For any action* d, $\pi(d,d,\delta^c)>\pi(d,d',\delta^c)$, *(ii) If* $s^c=n$, *then* $\pi(n,n,\delta^c)>\pi(y,y,\delta^c)$ *and* $\pi(n,y,\delta^c)>\pi(y,n,\delta^c)$, *(iii) If* $s^c=y$, *then* $\pi(y,y,\delta^c)>\pi(n,n,\delta^c)$ *and* $\pi(y,n,\delta^c)>\pi(n,y,\delta^c)$.

The Lemma follows from Bayesian updating. The first part asserts that the reputation of J is higher if she takes the correct decision; this can arise as a signal on ability since J is more likely to receive the correct signal when she is able, and her cut-off point strategy is responsive to her signal. In addition, the lemma asserts the following; if $s^c=n$, the reputation that E attributes to those who take n, whether they succeed or fail in taking the right decision, is higher than the reputation they receive when they take y. Intuitively, when $s^c=n$, J takes n only if $t>t^c$ (as in Figure 1, which describes an efficient judge). Hence, E knows that if $d=n$, it must be that $t>t^c$, whereas if $d=y$, J may admit a lower type, of $t<t^c$. The opposite happens when $s^c=y$. In this case, higher reputation is attributed to those who take y.

The next lemma helps us to focus our analysis:

Lemma 4 *In equilibrium,* $s^c=n$.

If the evaluator believes that $s^c=y$, higher reputation is attributed to those who follow previous decisions, by Lemma 3. Moreover, types with $s=y$, are more likely to be perceived

[31] The superscript c denotes a *careerist* judge.

as taking the right decision when they follow others. But since taking the right decision also provides a higher reputation, the expected utility from taking y is higher for these types. Hence no such type with $s = y$ can be indifferent and the belief of the evaluator that $s^c = y$ cannot be sustained.

Given that $s^c = n$ in equilibrium, we can now find t^c. At the cutoff point t^c, the expected utility from each decision, as expressed in equation (4), has to be equal. This condition, along with correct conjectures of $J's$ strategy by E and L and rational updating on their behalf, yield the next result; the first part of the Proposition characterizes the equilibrium whereas the second part provides comparative statics results:

Proposition 2 *(i) When J is careerist, there exists a unique informative equilibrium. In the equilibrium, the judge takes* $d = y$ *if* $s = y$ *or if* $s = n$ *and* $t < t^c(q)$. *(ii) The cutoff point* $t^c(q)$ *increases with* q, $t^c(q)_{q \to \frac{1}{2}} \to \frac{1}{2}$ *and* $t^c(q)_{q \to 1} \to \hat{t} < 1$, *that is,* $t^c(q)$ *is bounded away from 1 for all* q. *In equilibrium, an appeal is more likely when the judge contradicts previous decisions.*

Two types of signals emerge in equilibrium. The first signal is proving ability by contradicting previous decisions. This occurs because $s^c = n$ and hence, by Lemma 3, $\tau(n, n, \delta^c) > \tau(y,y, \delta^c)$ and $\tau(n, y, \delta^c) > \tau(y,n, \delta^c)$. The reason is that in equilibrium only those types with sufficient ability allow themselves to contradict previous decisions. The able judges may have private information that outweighs the informativeness of past verdicts. The second signal is proving ability by taking the correct decision. A type which takes the correct decision is more likely to be able. Thus, a judge that is reversed has a lower reputation than a judge whose decision is re-affirmed. At the equilibrium cutoff point, the trade-off between these two signals manifests itself: if this type of judge follows previous decisions, she is more likely to be correct but forgoes the possibility of using the signal of contradicting. If she contradicts, she receives high reputation for doing so but is more likely to err and be reversed.

Note that an informative equilibrium exists, even with endogenous monitoring. The least able judges are not tempted to contradict previous decisions, although this provides high reputation, because in equilibrium such an action induces a higher probability of appeal. A higher probability of appeal is bad news since they may get 'caught' by the higher court. Hence, they would rather follow others and be perceived as correct. The less talented judges would take the risk of taking the wrong decision only if the probability of appeal is believed to be low enough. The more able judges, on the other hand, are encouraged to take decisions which are likely to be appealed, since this will affirm their ability. Thus, although a judge's decision is a signal of her type and there are no exogenous costs in her utility function for ruling in favor of the plaintiff or in favor of the defendant, costs for making the wrong ruling are created in equilibrium.

The Proposition also characterizes the judge's behavior as a function of the parameter q. When q increases, the benefit from following previous decisions, everything else being equal, is higher. This is because the terms of the reputational trade-off change; when one follows previous decisions it becomes more likely to receive the (higher) reputation for taking the correct decision. Hence, more types are inclined to follow previous decisions, that is, the cutoff point t^c increases.

However, a significant portion of types always contradict previous decisions, since the value of $t^c(q)$ is bounded. In particular, I find that t^c is bounded by 0.625.[32] Thus, when $q \to 1$, all types in $(0.625, 1)$ take the wrong decision, consciously and probably inefficiently.[33] To see why t^c is bounded, note that if the evaluator conjectures that t^c is very high, for example $t^c \to 1$, then $\pi(n, \cdot, \delta^c) > \pi(y, \cdot, \delta^c)$. That is, the reputation from contradicting is higher than that from following regardless of the state of the world, since those who contradict previous decisions are only the most able types, with $t \to 1$. In particular, $\pi(n, y, \delta^c) > \pi(y, y, \delta^c)$, i.e., even if the judge goes against her predecessors and is found wrong, her reputation is higher compared to the scenario in which she follows them and is found correct. Thus, if these are the beliefs of the evaluator, any judge would rather contradict previous decisions. This implies that such beliefs for the evaluator cannot be sustained, for any q. Consequently, there is an upper bound on the cutoff point. This feature will allow us to analyze the distortion due to career concerns, which we do next.

3.3 The main result: the distortion due to career concerns

Both the efficient and the careerist judge behave in a relatively similar manner. That is, they both contradict previous decisions only if $s = n$ and t is high enough, in particular for $t > \{t^e(q, \theta), t^c(q)\}$ for the efficient and the careerist judge respectively.[34] I now compare the behavior of the two differently motivated judge. If in equilibrium, $t^c(q) = t^e(q, \theta)$, then it implies that the careerist judge behaves efficiently. If $t^c(q) > t^e(q, \theta)$, it means that the careerist judge takes y more than the efficient judge, which I term by *excessively following previous decisions*. If, on the other hand, the equilibrium value admits $t^c(q) < t^e(q, \theta)$, the careerist judge takes n more than the efficient judge, which I term by *excessively contradicting previous decisions*. The next result establishes that the judge tends to excessively

[32] This number is computed for the uniform prior distribution of the judge's types. The model is general and can be extended to other distributions. In this case, the upper bound would be different.

[33] I discuss the inefficiency of the careerist judge's decisions in the next section.

[34] Moreover, a judge who cares both for efficiency and reputation would use a cutoff point which is in between the respective cutoffs for each type of judge, the efficient and the careerist one.

contradict previous decisions.

Proposition 3 *For any q, there exists $\theta(q)$, such that for all $\theta \geq \theta(q)$, the careerist judge excessively contradicts previous decisions, that is, $t^c(q) < t^e(q, \theta)$. Moreover, there exists $\bar{q}$, such that for all $q \geq \bar{q}$, $\theta(q) = 0$.*

Figure 3 describes the behavior of both judges in equilibrium. Recall that the figure depicts the information of the judge so that as we go from left to right, $\Pr(w = n|s, t)$ increases. The figure shows the area (t^c, t^e) in which the efficient judge takes $d = y$ whereas the careerist judge takes $d = n$:

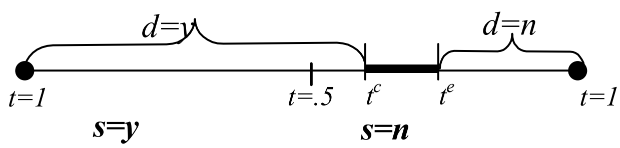

Figure 3: A comparison between the careerist and the efficient judge

The conclusion is that previous decisions, or non-binding precedent, tend to have less effect when the judge has reputation concerns, resulting in an underutilization of readily available information. The intuition is that the careerist judge gains excessive reputation from contradicting previous decisions whereas the efficient judge treats each of these decisions symmetrically. Both judges have induced incentives to take the right decision; the efficient one since she cares about it directly, and the careerist one since she cares about it indirectly, because it provides higher reputation. However, the careerist judge has an additional incentive to contradict previous decisions, since it too provides high reputation in equilibrium.

The result is derived for high enough values of q, *or,* for high enough values of θ. For high values of q, the intuition is that the efficient judge has to follow previous decisions quite often since it is more likely to be the correct decision. On the other hand, the cutoff point of the careerist judge is bounded for any q by some $\hat{t}$, as established in the previous section. Thus, no matter how high q is, a significant portion of types has to contradict previous decisions. For high values of θ, similarly, the efficient judge is inclined to follow previous decisions, since this is the cheaper course of action. The litigants view it as the more accurate decision and as a result challenge it less often. The judge who wishes to save on costs in this case, follows others. For the careerist judge, this consideration is irrelevant. Note that indeed it is reasonable in the context of our model that θ is high enough. Otherwise, if θ is low, deliberation is not costly, and the judicial system should enforce appeals, or target almost all cases to the higher court.[35]

Remark 2 The results reported in Proposition 2 and Proposition 3 yield the following empirical predictions. First, a judge who contradicts previous decisions and is affirmed, is the most likely to be promoted. A judge who follows previous decisions and is reversed, is the least likely to be promoted. Second, a careerist judge tends to contradict previous decisions more than an efficient judge. Thus, if incentives can be identified, stronger career concerns imply that when a judge contradicts previous decisions, she is more likely to be challenged by litigants, and also more likely to be reversed.

In other contexts, several papers analyzed the behavior of careerist experts and showed that experts may behave inefficiently by excessively contradicting prior information.[36] All the papers in this literature assume exogenous monitoring, i.e., that the evaluator knows what is the right decision independently of the decision itself. The contribution of the suggested judicial model to this literature is therefore the analysis of *endogenous monitoring.* It remains to be seen how do endogenous and exogenous monitoring compare, a task we tackle next.

4 Institutional design

It is widely recognized that institutions matter; that is, the design of the judicial system affects the behavior of the judge through the incentives it creates. In this section I analyze the effect of different judicial systems on the behavior of a careerist judge and in particular, I analyze which institutions can increase social utility.

Social utility is defined in the model as the probability that the correct decision is taken, at the minimum costs. The indirect social utility is a function of the careerist judge's behavior, summarized by the cutoff point $t^c(q)$; the equilibrium behavior of the judge and the litigants determines how likely it is that the final decision is correct and how costly is each decision. The next lemma proves useful for the design analysis:

Lemma 5 *When the judge is careerist, then for high enough values of θ, social utility increases when $t^c(q)$ increases.*

The Lemma asserts that indeed, since the judge contradicts previous decisions excessively compared to the efficient judge, social utility is best served when this behavior is mitigated. We can therefore focus on these range of parameters, i.e., high enough θ, and look for instruments that increase the tendency of the judge to follow previous decisions. That is,

[35] Numerical analysis shows that the judge contradicts previous decisions excessively for all other parameters as well, but I cannot prove it analytically.

[36] See for example Levy (2003), Trueman (1994) and Avery and Chevalier (1999). Efficiency, in these papers, usually means taking the right decision. In the judicial decision making context however, as analyzed in this paper, efficiency is more involved since the judge is not the final decision maker.

for methods that increase $t^c(q)$.[37]

4.1 Who should nominate judges?

The procedure of judges' nomination is heavily debated in many countries. The debate centers on whether judges should be appointed (for example by the legal community) or elected (by the public). These different methods are considered to have bearing on how *independent* judges' decisions are. In this paper I consider the effect of different nomination systems on the reputation concerns and as a result on the *efficiency* of judicial decisions.[38]

The model presented in the previous sections analyzes the case of endogenous monitoring. That is, it assumes that the evaluator, who is concerned about whether to promote judges or not, can only glean information about the correct interpretation of the law from decisions of the high court. Thus, the evaluator can be taken to represent the public or a group of politicians, who do not have independent information about the right decision.

On the other hand, Supreme Court Justices or lawyers may know the correct interpretation of the law (i.e., the state of the world) even if they do not adjudicate the case. Thus, when Supreme Court Justices review the judge's file and decide whether to promote her or not, they can determine whether she was right or wrong in each case without the need to wait for an appeal. This can be represented by a model with exogenous monitoring, i.e., a model in which the evaluator knows w independently of the judicial process.

I now compare the equilibrium of the model when the judge is promoted by her superiors, i.e., the evaluator knows the state w independently of the judicial process, and the equilibrium when she is elected by the public, i.e., the evaluator knows the state w only if an appeal is brought (this equilibrium is characterized in Proposition 2). Intuitively, the more information the evaluator possesses, the harder it is for less able judges to mimic the more able judges. The next result however characterizes the equilibrium when the evaluator knows w and shows that it is actually less efficient.

Proposition 4 *(i) When E knows w, the careerist judge takes y when s=y or when s=n*

[37]The reason that we need Lemma 5, is that the litigants behave inefficiently in the model, that is, not according to the social preferences. Thus, given this additional distortion, we cannot use the comparison between the efficient judge and the careerist judge to directly deduce that social utility increases when the careerist judge behaves 'more like' the efficient judge. However, Lemma 5 establishes that this can indeed be the case.

[38]Landes and Posner (2000) show that two different reputation systems are indeed created for judges. Citation by other judges is considered as a measure of reputation attributed by the legal community, whereas search for judges on the web can approximate fame or popular reputation attributed by the public. These different measures create a different list of 'top' judges.

and $t<t^f(q)$.[39] *(ii) The careerist judge follows previous decisions more often when E learns information from appeals than when E has full information, i.e.,* $t^f(q) < t^c(q)$. *Social utility is therefore higher when the evaluator learns information only from appeals.*

Increasing the amount of information available to the evaluator is even worse; it further distorts the decisions of the judge. The implication of the Proposition is that judges should be elected by the public and not by the more knowledgeable legal community.

What is the intuition for this counter-intuitive finding? When the evaluator learns from appeals, an important feature of the equilibrium is that the probability of appeal is lower after a decision that follows previous ones. Following others becomes a 'safe action' in equilibrium; less information about the judge's type is revealed. Contradicting previous decisions, on the other hand, induces a higher probability of appeal in equilibrium and it is therefore a 'risky' action for the less able types, who are likely to be reviewed and found wrong. These types indeed prefer to hide the truth about their ability and hence their incentive to mimic able judges by contradicting previous decision is mitigated. This cannot happen with exogenous monitoring, where the evaluator knows the state of the world irrespective of the state and the judge's decision.[40]

The implication that judges should be nominated by the public should be taken with caution; when considering efficiency, I have concentrated on the social utility from *present* decisions. I have therefore ignored considerations such as electing the more able judges. If the public elects judges, the judge behaves more efficiently at present. But it is not clear if indeed the public elects the better judges, so as to increase the efficiency of *future* decisions. This intertemporal trade-off awaits future research.

REMARK 3 The result of Proposition 4 implies the following empirical predictions. First, conditional on an appeal, a judge appointed by superior judges is more likely to be reversed when she contradicts previous decisions compared to a judge elected by the public. The opposite holds when the judge follows previous decisions. Second, a judge appointed by superior judges is more likely to be challenged by litigants when she contradicts previous decisions, compared to a judge elected by the public.

[39] The superscript f denotes that the evaluator has *full* information.

[40] In his seminal paper about career concerns, Holmström (1982) assumes the existence of a 'safe action'. In his framework, a manager could decide between two actions, invest or not. Investment is risky, in the sense that the state of the world is revealed if it is taken. Not investing is safe, in the sense that the state of the world is not revealed. Here, I derive a 'safe action' and a 'risky action' endogenously.

4.2 Binding precedent

The intuition gained from the pervious analysis is that the judge behaves more efficiently if contradiction of previous decisions is penalized by a higher risk of appeal. This is because it reduces the distortive signaling incentives of the less able judges. If the higher court could commit to a higher rate of reversal when the judge contradicts her predecessors, litigants could indeed be encouraged to bring an appeal more often.

This suggestion, of different legal standards, seems to be in accord with *stare decisis*, the praxis of the Common Law legal system. The concept of binding precedent implies that appeals courts are more likely to reverse a decision that contradicts precedent than one that follows precedent. Accordingly, I model binding precedent in the following way; when the judge follows or contradicts previous decisions and is found wrong, the higher court reverses her decision as before. But, even when the judge contradicts previous decisions and is *correct*, the higher court can commit to overturn this decision with some probability. Thus, implicitly, this modelling implies that higher courts act in order to preserve the strength of previous decisions; a contrarian lower-court judge should be reversed even if she is correct.

If the higher court could use such a strategy, it would indeed increase the incentives of litigants to appeal when a judge contradicts previous decisions, as desired. It is not clear how the higher court can commit to implement such a strategy, which induces it to take a decision which it perceives as wrong. For now, I depart from these considerations, and discuss them later on.

Formally, suppose that we can optimally choose the strategy of the higher court and let $\phi \in [0, 1]$ denote the probability with which the judge is overruled when $d = n$ and $w = n$. When $d = n$ and $w = y$ she is reversed with probability 1. No changes are made when $d = y$, that is, the decision is affirmed if and only if $w = y$. Litigants appeal with a higher probability when $d = n$, because the probability of reversal is now $1 - q_n + q_n\phi$. The exercise is therefore to find what is the optimal ϕ, that is, a value of ϕ that maximizes social utility:

Proposition 5 *When precedents bind, the judge contradicts precedent more often, that is, $t^c(q)$ is lower for any $\phi > 0$ relative to the case in which $\phi = 0$. Thus, $\phi = 0$ maximizes social welfare.*

Surprisingly, binding precedent do not induce the judge to behave more efficiently, and even have the contrary effect. The intuition for this result is as follows. When previous decisions bind, if the judge takes n, she may be perceived as being correct even if she is subsequently reversed: the evaluator knows that the higher court also reverses correct decisions. Hence, judges of low ability are induced to take n and contradict previous decisions, because the loss from being reversed is now lower. Instead of following more often, they do the opposite. This implies, given Lemma 5, that social utility decreases when precedent bind.

Given the inefficiency of the praxis of binding precedent as modelled above, we should not worry about the higher court implementing such a strategy; in other words, even if the higher court could commit to behave in the manner described above, social efficiency considerations would induce it not to use such a praxis.[41]

5 Conclusion

In this paper, I show that judges with career concerns contradict previous decisions more than is efficient. By doing so, they pretend to have a more accurate information than the one supplied by previous judges. Thus, if judges are motivated by proving how able they are in interpreting the law we should observe higher rates of reversal when they contradict previous decisions, compared to judges who are motivated by efficiency and social welfare.

The model analyzes a one-shot game, i.e., the adjudication of one case. The main results should hold also in a dynamic context, in which the judge adjudicates a sequence of cases. When the game is prolonged, more information is revealed about the judge after each of her decisions. This only induces a different prior belief about the judge's type after each stage, and hence the results should be robust to this extension.

Finally, there are many ways to think of reputation motives. In this paper I have used ability as a desired trait for a judge. It is also probable that the judge is trying to prove to her evaluators, be it the public, politicians or higher-court judges, that she shares their preferences regarding the interpretation of the law. The model presented here could be accommodated to explore the implication of such reputation motive.[42]

Appendix

The next lemma is useful for the rest of the analysis:

Lemma 6 When J uses a cutoff point strategy (s^*, t^*), then:

(i) $q_n(n, t^*)$ increases with t^* and $q_n(y, t^*)$ decreases with t^*;

(ii) $q_y(n, t^*)$ decreases with t^* and $q_y(y, t^*)$ increases with t^*;

(iii) $q_n(n, t^*) > q_n(y, t^*)$ and $q_y(n, t^*) < q_y(y, t^*)$;

(iv) $q_y(s^*, t^*) > q$ and $q_n(s^*, t^*) > 1 - q$;

[41] There may be other motivations to use *stare decisis*, such as uniformity and predictability.

[42] The need of experts to accumulate reputation for having the same preferences as their principal is analyzed in Morris (2001).

(v) $q_y(s^*,t^*) > \Pr(w=y|q,s^*,t^*)$ and $q_n(s^*,t^*) > \Pr(w=n|q,s^*,t^*)$;

(vi) $\exists!(\tilde{s},\tilde{t}(q))$ such that $q_y(\tilde{s},\tilde{t}(q)) = q_n(\tilde{s},\tilde{t}(q))$, where $\tilde{s}=n$ and $\tilde{t}(q) > q$.

For the proof, note that when J uses a cutoff point strategy, $\delta^* = (s^*,t^*)$, we can write $q_d(s^*,t^*)$ in the following way, according to the definition in the text:

$$q_y(n,t^*) = \frac{q(\int_{.5}^{1} vf(v)dv + \int_{.5}^{t^*}(1-v)f(v)dv)}{q(\int_{.5}^{1} vf(v)dv + \int_{.5}^{t^*}(1-v)f(v)dv) + (1-q)(\int_{.5}^{1}(1-v)f(v)dv + \int_{.5}^{t^*} vf(v)dv)}$$

$$q_n(n,t^*) = \frac{(1-q)\int_{t^*}^{1} vf(v)dv}{(1-q)\int_{t^*}^{1} vf(v)dv + q\int_{t^*}^{1}(1-v)f(v)dv}.$$

where $f(v)$ is the prior distribution over t. Similar expressions hold when $s^* = y$.

Proof of Lemma 6:

(i) $q_n(n,t^*)$ increases with t^* :

$$\begin{aligned}
\text{sign}\frac{\partial}{\partial t^*}q_n(n,t^*) &= \text{sign}(1-q)qf(t^*)[-t^*\int_{t^*}^{1}(1-v)f(v)dv + (1-t^*)\int_{t^*}^{1} vf(v)dv] \\
&= \text{sign} - t^*\int_{t^*}^{1} f(v)dv + t^*\int_{t^*}^{1} vf(v)dv + \int_{t^*}^{1} vf(v)dv - t^*\int_{t^*}^{1} vf(v)dv \\
&= \text{sign}(1-q)qf(t^*)[-t^*\int_{t^*}^{1} f(v)dv + \int_{t^*}^{1} vf(v)dv] > 0
\end{aligned}$$

Similarly, I will show that $q_n(y,t^*)$ decreases with t^* :

$$\begin{aligned}
&\text{sign}\frac{\partial}{\partial t^*}q_n(s^*=y,t^*) \\
&= \text{sign}(1-t^*)(\int_{.5}^{1}(1-v)f(v)dv + \int_{.5}^{t^*} vf(v)dv) - t^*(\int_{.5}^{1} vf(v)dv + \int_{.5}^{t^*}(1-v)f(v)dv) \\
&= \text{sign}(1-q)qf(t^*)(\int_{.5}^{t^*}(1-2t^*)f(v)dv + \int_{t^*}^{1}(1-t^*-v)f(v)dv) < 0.\square
\end{aligned}$$

(ii) The proof of this is analogous to part (i).□

(iii) Follows from (i) and (ii).□

(iv) By the above claims, it is enough to show that $q_y(n,t^*) > q$, i.e., that:

$$\frac{q(\int_{.5}^{1} vf(v)dv + \int_{.5}^{t^*}(1-v)f(v)dv)}{q(\int_{.5}^{1} vf(v)dv + \int_{.5}^{t^*}(1-v)f(v)dv) + (1-q)(\int_{.5}^{1}(1-v)f(v)dv + \int_{.5}^{t^*} vf(v)dv)} > q$$

which holds if

$$\begin{aligned}
\int_{.5}^{1} vf(v)dv + \int_{.5}^{t^*}(1-v)f(v)dv > \int_{.5}^{1}(1-v)f(v)dv + \int_{.5}^{t^*} vf(v)dv \iff \\
\int_{t^*}^{1} vf(v)dv > \int_{t^*}^{1}(1-v)f(v)dv \iff \int_{t^*}^{1}(2v-1)f(v)dv > 0.
\end{aligned}$$

The second part, i.e., that $q_n(s^*,t^*) > 1-q$, has an analogous proof.□

(v) To show that $q_y(n,t^*) > \Pr(w = y|q,n,t^*)$, we need to show that:

$$q_y(n,t^*) > \frac{q(1-t^*)}{q(1-t^*)+t^*(1-q)}$$

which, after re-arranging, is analogous to:

$$t^*(\int_{.5}^{1} vf(v)dv + \int_{.5}^{t^*}(1-v)f(v)dv) > (1-t^*)(\int_{.5}^{1}(1-v)f(v)dv + \int_{.5}^{t^*} vf(v)dv)$$

where the last inequality is satisfied using the proof in step (iv). To show that $q_y(y,t^*) > \Pr(w = y|q,y,t^*)$, we need to show that:

$$q_y(y,t^*) > \frac{qt^*}{qt^*+(1-t^*)(1-q)} \Longleftrightarrow$$

$$\frac{\int_{t^*}^{1} vf(v)dv}{\int_{t^*}^{1}(1-v)f(v)dv} > \frac{t^*}{1-t^*},$$

but

$$\int_{t^*}^{1} vf(v)dv > t^* \text{ and } \int_{t^*}^{1}(1-v)f(v)dv < 1-t^*,$$

hence the above is satisfied. We can use the analogous proof to show that $q_n(s^*,t^*) > \Pr(w = n|q,s^*,t^*)$.□

(vi) Note that $q_y(y,\frac{1}{2}) > q_n(y,\frac{1}{2})$, and by the above claims this holds for all $t^* > \frac{1}{2}$ and $s^* = y$. On the other hand, $q_y(n,t^* \to 1) \to q$ and $q_n(n,t^* \to 1) \to 1$. Since $q_n(n,t^*)$ increases with t^* and $q_y(n,t^*)$ decreases with t^*, there exists a unique $\tilde{t}(q)$ such that $q_y(n,\tilde{t}(q)) = q_n(n,\tilde{t}(q))$ and for all $t^* < (>)\tilde{t}(q)$, $q_y(n,t^*) > (<)q_n(n,t^*)$. With the uniform distribution, i.e., $f(v) = 2$, then $q_y(n,q) = \frac{2-q}{3-2q} \geq \frac{1+q}{1+2q} = q_n(n,q)$ for all $q \geq .5$ which implies that $\tilde{t}(q) > q$.□

This completes the proof of Lemma 6.■

Proof of Proposition 1. An equilibrium is a solution to equation (2) in the text given true beliefs of L about the strategy of J. Thus, it is a solution to the fixed point equation in s^e, t^e :

$$\frac{\Pr(w = y|q,s^e,t^e)}{\Pr(w = n|q,s^e,t^e)} = \frac{q_y(s^e,t^e) - \theta\beta(s^e,t^e)}{q_n(s^e,t^e) + \theta\beta(s^e,t^e)} \tag{5}$$

where $\beta(s^e,t^e) = (1-q_n(s^e,t^e))^2 - (1-q_y(s^e,t^e))^2$.

Step 1. Existence and characterization.

When $s^e = y$,

$$\frac{\Pr(w = y|q, y, t^e)}{\Pr(w = n|q, y, t^e)} > \frac{q_y(y, t^e)}{q_n(y, t^e)} > \frac{q_y(y, t^e) - \theta\beta(y, t^e)}{q_n(y, t^e) + \theta\beta(y, t^e)}$$

The second inequality follows because $q_y(y, t^e) > q_n(y, t^e)$. The first inequality holds for all t iff:

$$\frac{qt}{(1-q)(1-t)} > \frac{\frac{q(1+t)}{q(1+t)+(1-t)(1-q)}}{\frac{(1-q)(2-t)}{(1-q)(2-t)+qt}}$$

which is satisfied for all $t > \frac{1}{2}$ and $q > \frac{1}{2}$. On the other hand, when $s^e = n$ and $t^e = \tilde{t}(q) > q$,

$$\frac{\Pr(w = y|q, n, \tilde{t}(q))}{\Pr(w = n|q, n, \tilde{t}(q))} < 1 = \frac{q_y(n, \tilde{t}(q)) - \theta\beta(n, \tilde{t}(q)))}{q_n n, \tilde{t}(q)) + \theta\beta(n, \tilde{t}(q)))}.$$

Hence, there exists $s^e = n$ and $t^e \in (.5, \tilde{t}(q))$ that supports an equilibrium.

Step 2. Uniqueness:

I will show that at the equilibrium value of t^e, whenever $\frac{\partial}{\partial t}\frac{q_y(n,t)-\theta\beta(n,t)}{q_n(n,t)+\theta\beta(n,t)} < 0$, then:

$$|\frac{\partial}{\partial t}\frac{\Pr(w = y|q, n, t)}{\Pr(w = n|q, n, t)}| > |\frac{\partial}{\partial t}\frac{q_y(n, t) - \theta\beta(n, t)}{q_n(n, t) + \theta\beta(n, t)}|$$

which is a sufficient condition for uniqueness.[43]

Consider first $\frac{\Pr(w=y|q,n,t)}{\Pr(w=n|q,n,t)} = \frac{q(1-t)}{t(1-q)}$. Then:

$$|\frac{\partial}{\partial t}\frac{\Pr(w = y|q, n, t)}{\Pr(w = n|q, n, t)}| = \frac{q}{(1-q)t^2}$$

Now consider

$$|\frac{\partial}{\partial t}\frac{q_y(n, t) - \theta(\beta(n, t)}{q_n(n, t) + \theta\beta(n, t)}|$$
$$= \frac{1}{q_n + \theta\beta}[\frac{\partial q_y}{\partial t}(-1 + \theta\frac{\partial\beta}{\partial q_y} + \theta\frac{\partial\beta}{\partial q_y}\frac{q_y - \theta\beta}{q_n + \theta\beta}) + \frac{\partial q_n}{\partial t}((1 + \theta\frac{\partial\beta}{\partial q_n})\frac{q_y - \theta\beta}{q_n + \theta\beta} + \theta\frac{\partial\beta}{\partial q_n})]$$

but since

$$\frac{\partial\beta}{\partial q_y} > 0, \frac{\partial\beta}{\partial q_n} < 0\ , \frac{\partial q_n}{\partial t} > 0 \text{ and } \frac{\partial q_y}{\partial t} < 0,$$

it is enough to show that

$$\frac{q}{(1-q)t^2} > \frac{1}{q_n}[-\frac{\partial q_y}{\partial t} + \frac{\partial q_n}{\partial t}\frac{q_y - \theta\beta}{q_n + \theta\beta}]$$

Plugging in the equilibrium condition and the expressions for the derivatives, the right-hand-side becomes:

$$\frac{1}{q_n}[\frac{2q_y(1-q_y)}{(2-t)t} + \frac{q}{(1+t)}\frac{2q_n(1-q_n)}{t(1-q)}]$$

Let $q_x \in \{q_y, q_n\}$ such that $q_x(1-q_x) = \max\{q_y(1-q_y), q_n(1-q_n)\}$. It is therefore sufficient to

[43] Note that $\frac{\partial}{\partial t}\frac{p(w=y|n,t)}{p(w=n|n,t)} < 0$, and that if $\frac{\partial}{\partial t}\frac{q_y(n,t)-\theta\delta(q_y(n,t),q_n(n,t))}{q_n(n,t)+\theta\delta(q_y(n,t),q_n(n,t))} > 0$, uniqueness is assured.

prove that:

$$\frac{q}{t} > \frac{2q_x(1-q_x)}{q_n}[\frac{(1+t)(1-q)+q(2-t)}{(2-t)(1+t)}]$$

But the above equation holds both when $q_x = q_n$ and when $q_x = q_y$.

I will now prove part (ii) of the Proposition. Since the equilibrium is unique, and for all θ there exists an equilibrium with $t^e < \tilde{t}(q)$, for $\tilde{t}(q)$ that satisfies $q_y(s, \tilde{t}(q)) = q_n(s, \tilde{t}(q))$, then in equilibrium, $q_y > q_n$, which implies that the probability of appeal is higher when $d = n$. Moreover, $\frac{\Pr(w=y|q,n,t^e)}{\Pr(w=n|q,n,t^e)}$ is constant for all θ whereas $\frac{q_y(n,t^e)-\theta\beta(n,t^e)}{q_n(n,t^e)+\theta\beta(n,t^e)}$ decreases with θ whenever $\beta > 0$, i.e., for all $t^e(q,\theta) < \tilde{t}(q)$, which along with uniqueness implies that t^e increases with θ. When $\theta = 0$, then the left-hand-side of (5) equals 1 when $t = q$, whereas the right-hand-side is greater than 1, by part (vi) of Lemma 6. Hence, $t_e(q, 0) < q$. Finally, when $\theta \rightarrow \infty$, only costs matter. The judge can be indifferent between the two decisions only if the probability of appeal is equal for both, i.e., if $q_y(n,t^e) = q_n(n,t^e) \rightarrow t^e(q,\theta) \rightarrow \tilde{t}(q)$.

By total differentiation of the equilibrium condition:

$$\frac{dt}{dq}|_{t=t^e} = \frac{\frac{\partial}{\partial q}\frac{q_y(n,t)-\theta\beta(n,t)}{q_n(n,t)+\theta\beta(n,t)} - \frac{\partial}{\partial q}\frac{\Pr(w=y|q,n,t)}{\Pr(w=n|q,n,t)}}{\frac{\partial}{\partial t}\frac{\Pr(w=y|q,n,t)}{\Pr(w=n|q,n,t)} - \frac{\partial}{\partial t}\frac{q_y(n,t)-\theta\beta(n,t)}{q_n(n,t)+\theta\beta(n,t)}}|_{t=t^e}$$

I will show that when $\frac{\Pr(w=y|q,n,t)}{\Pr(w=n|q,n,t)} = \frac{q_y(n,t)-\theta\beta(n,t)}{q_n(n,t)+\theta\beta(n,t)}$,

$$\frac{\partial}{\partial q}\frac{\Pr(w=y|q,n,t)}{\Pr(w=n|q,n,t)} > \frac{\partial}{\partial q}\frac{q_y(n,t)-\theta(n,t)}{q_n(n,t)+\theta(n,t)}$$

which, along with step 2, implies that $\frac{dt}{dq}|_{t=t^e} > 0$. As in step 2, it is enough to show the inequality for $\theta = 0$, i.e., we have to show that:

$$\frac{(1-t)}{t(1-q)^2} > \frac{1}{q_n}[\frac{\partial q_y}{\partial q} - \frac{\partial q_n}{\partial q}\frac{q(1-t)}{t(1-q)}] \Longleftrightarrow$$
$$\frac{(1-t)}{t(1-q)^2} > \frac{1}{q_n}[\frac{q_y(1-q_y)}{q(1-q)} + \frac{q_n(1-q_n)(1-t)}{t(1-q)^2}]$$

but since $q_y > q_n$ in equilibrium, and for all q and t, $q_y > 1 - q_n$, it is sufficient to show that:

$$\frac{(1-t)}{t(1-q)^2} > \frac{q_n(1-q_n)}{q_n}[\frac{1}{q(1-q)} + \frac{(1-t)}{t(1-q)^2}] \Longleftrightarrow$$
$$\frac{q(1-t)}{t(1-q)+q(1-t)} > \frac{q(1-t)}{(1-q)(1+t)+q(1-t)}$$

which holds for all $t, q \in [.5, 1]$. This implies that $\frac{dt}{dq}|_{t=t^e} > 0$. To see that $t^e(q,\theta)_{q\rightarrow\frac{1}{2}} \rightarrow \frac{1}{2}$ and $t^e(q,\theta)_{q\rightarrow 1} \rightarrow 1$ we just need to consider (5) and the result arises.

This completes the proof of Proposition 1.■

Proof of Lemma 2. In an informative equilibrium, some types of J take n whereas some types take y. This implies that there must be at least one type (s,t) who is indifferent between taking n and y. That is, the following condition must hold for some (s,t) :

$$\tilde{p}(y)\tau(y,y,\delta)+(1-\tilde{p}(y))\tau(y,n,\delta)=\tilde{p}(n)\tau(n,n,\delta)+(1-\tilde{p}(n))\tau(n,y,\delta) \tag{6}$$

where

$$\tilde{p}(d)=(1-q_d)\Pr(w=d|q,s,t)+q_d^2 \tag{7}$$

re-arranging (6), and plugging the expressions for $\tilde{p}(n)$ and $\tilde{p}(y)$ from (7), we get:

$$\frac{\Pr(w=y|s,t,q)}{\Pr(w=n|s,t,q)}=\frac{\pi(n,n,\delta)(q_n^2+1-q_n)+\pi(n,y,\delta)(q_n-q_n^2)-\pi(y,y,\delta)q_y^2-\pi(y,n,\delta)(1-q_y^2)}{\pi(y,y,\delta)(q_y^2+1-q_y)+\pi(y,n,\delta)(q_y-q_y^2)-\pi(n,n,\delta)q_n^2-\pi(n,y,\delta)(1-q_n^2)} \tag{8}$$

The right-hand-side of (8) is fixed for all (s,t), since these are the beliefs of the evaluator. The evaluator does not know (s,t) and hence cannot condition his beliefs on this information. The left-hand-side of (8), on the other hand, changes with (s,t), as in the Proof of Lemma 1. Hence, any different (s,t) yields a different value of $\frac{\Pr(w=y|q,s,t)}{\Pr(w=n|q,s,t)}$. This implies that there is (at most) a unique (s^c,t^c) that satisfies equation (8). Thus, there is a unique cutoff point (s^c,t^c), such that if $\Pr(w=y|q,s,t)\geq\Pr(w=y|q,s^c,t^c)$ the judge takes y, and otherwise, she takes n.■

Proof of Lemma 3. $\tau(d,w,\delta^c)$ is an expectation over t, using an updated density function given the observations of d and w, and the knowledge of the cutoff point strategy δ, i.e., $\tau(d,w,\delta^c)=\int_{.5}^1 tf(t|d,w,\delta^c)dt$. To show that

$$\int_{.5}^1 tf(t|d,d,\delta^c)dt>\int_{.5}^1 tf(t|d,d',\delta^c)dt$$

we can use the MLRP property, i.e., show that

$$\frac{f(t|d,d,\delta^c)}{f(t'|d,d,\delta^c)}\geq\frac{f(t|d,d',\delta^c)}{f(t'|d,d',\delta^c)}$$

for $t\geq t'$ with a strict inequality for at least one pair of values t and t'. It is easy to see that the MLRP is satisfied in this case, since whenever J uses a cutoff strategy with $s^c=n$, then:

$$f(t|y,y,\delta^c)=\begin{Bmatrix} t \text{ if } t>t^c \\ 1 \text{ otherwise}\end{Bmatrix},\ f(t|n,n,\delta^c)=\begin{Bmatrix} t \text{ if } t>t^c \\ 0 \text{ otherwise}\end{Bmatrix}$$

and

$$f(t|y,n,\delta^c)=\begin{Bmatrix} 1-t \text{ if } t>t^c \\ 1 \text{ otherwise}\end{Bmatrix},\ f(t|n,y,\delta^c)=\begin{Bmatrix} 1-t \text{ if } t>t^c \\ 0 \text{ otherwise}\end{Bmatrix}$$

implying that

$$\frac{f(t|d,d,\delta^c)}{f(t|d,d',\delta^c)}=\begin{Bmatrix} \frac{t}{1-t} \text{ if } t>t^c \\ 1 \text{ otherwise}\end{Bmatrix}$$

for all d, which increases with t. The analogous analysis holds when $s^c = y$.

(ii) When $s^c = n$, $\tau(y, y, \delta^c) < \tau(n, n, \delta^c)$ and $\tau(y, n, \delta^c) < \tau(n, y, \delta^c)$:

Similarly to part (i), I can show that when $s^c = n$,

$$\int_{.5}^{1} tf(t|n, n, \delta^c)dt > \int_{.5}^{1} tf(t|y, y, \delta^c)dt$$

and that

$$\int_{.5}^{1} tf(t|n, y, \delta^c)dt > \int_{.5}^{1} tf(t|y, n, \delta^c)dt$$

by using the MLRP and in particular showing that $\frac{f(t|n,y,\delta^c)}{f(t|y,n,\delta^c)}$ and $\frac{f(t|n,n,\delta^c)}{f(t|y,y,\delta^c)}$ increase with t. Since

$$\frac{f(t|n, n, \delta^c)}{f(t|y, y, \delta^c)} = \frac{f(t|n, y, \delta^c)}{f(t|y, n, \delta^c)} = \begin{Bmatrix} 1 \text{ if } t > t^c \\ 0 \text{ otherwise} \end{Bmatrix}$$

the result follows. (iii) The results for $s^c = y$ follow from symmetry and part (ii).■

Proof of Lemma 4. Given (7), the expected utility from an action d is

$$\tilde{p}(d)\tau(d, d, \delta^c) + (1 - \tilde{p}(d))\tau(d, d', \delta^c).$$

When $s^c = y$, then $\tau(y, n, \delta^c) > \tau(n, y, \delta^c)$ and $\tau(y, y, \delta^c) > \tau(n, n, \delta^c)$, by Lemma 3. I will now show that when $s^c = y$, for any type $s = y$, also $\tilde{p}(y) > \tilde{p}(n)$. This implies that the expected utility from ruling y is greater than the expected utility from ruling n for all $s = y$ because $\tau(y, y, \delta^c) > \tau(y, n, \delta^c)$ and $\tau(n, n, \delta^c) > \tau(n, y, \delta^c)$, and hence no type with $s = y$ can be indifferent:

$$\begin{aligned} \tilde{p}(y) &= q_y^2 + (1 - q_y) \Pr(w = y|q, y, t) \\ &> q_y q_n + (1 - q_y) \Pr(w = n|q, y, t) \\ &> q_n^2 + (1 - q_n) \Pr(w = n|q, y, t) \\ &= \tilde{p}(n) \end{aligned}$$

The first inequality follows because $q_y(y, t) > q_n(y, t)$ and $\Pr(w = y|q, y, t) > \Pr(w = n|q, y, t)$. The second inequality follows because $q_n > \Pr(w = n|q, y, t)$. This completes the proof.■

Proof of Proposition 2.

Step 1: Existence: If $s^c = n$ and $t^c = \tilde{t}(q)$, then $\tilde{p}(y) < \tilde{p}(n)$ while $\tau(n, n, \delta^c) > \tau(y, y, \delta^c)$ and $\tau(n, y, \delta^c) > \tau(y, n, \delta^c)$. This implies that the utility from ruling n is higher than the utility from ruling y. Hence, along with Lemma 4, this assures existence.

Step 2: $t^c(q) < \hat{t}$ for all q : Let $s^c = n$ and $t = t^c$. I will show that there is a unique $\hat{t} < 1$ satisfying $\tau_{\hat{t}}(y, y, \delta^c) = \tau_{\hat{t}}(n, y, \delta^c)$, and that for all $t > \hat{t}$, $\tau(y, y, \delta^c) < \tau(n, y, \delta^c)$. This implies that an equilibrium with $t > \hat{t}$ cannot exist, since then the expected utility from ruling n, an average over $\tau(n,y,\delta^c)$ and $\tau(n,n,\delta^c)$ where $\tau(n,n,\delta^c) > \tau(n,y,\delta^c)$, is higher than the expected utility from ruling y, an average over $\tau(y,n,\delta^c)$ and $\tau(y,y,\delta^c)$ where $\tau(y,y,\delta^c) > \tau(y,n,\delta^c)$.

The expression for $\tau(y,y,\delta^c)|_{s^c=n}$ is

$$\tau(y,y,\delta^c)|_{s^c=n} = \frac{\int_{.5}^{1} t^2 f(t)dt + \int_{.5}^{t^c} t(1-t)f(t)dt}{\int_{.5}^{1} tf(t)dt + \int_{.5}^{t^c}(1-t)f(t)dt}$$

Taking the derivative of $\tau(y,y,\delta^c)|_{s^c=n}$ w.r.t t^c, it is

$$\frac{d\tau(y,y,\delta^c)}{dt^c}|_{s^c=n} = \frac{(1-t^c)f(t^c)(t^c-\tau(y,y,\delta^c))}{(\int_{.5}^{1} tf(t)dt + \int_{.5}^{t^c}(1-t)f(t)dt)^2}$$

Therefore, $\tau(y,y,\delta^c)$ is a monotonically decreasing function as long as $t^c < \tau(y,y,\delta^c)$ and a monotonically increasing function when $t^c > \tau(y,y,\delta^c)$. When $t^c \to .5$, $t^c < \tau(y,y,\delta^c)$ and when $t^c \to 1$, $\tau(y,y,\delta^c) < t^c$. Therefore, there exists t' such that $t' = \tau_{t'}(y,y,\delta^c)$. Moreover, t' is unique, since when $t^c > \tau(y,y,\delta^c)$, $\frac{d\tau(y,y,\delta^c)}{dt^c} < 1$. Thus, for all $t^c < (>)t'$, $t^c < (>)\tau(y,y,\delta^c)$ and $\frac{d\tau(y,y,\delta^c)}{dt^c} < (>)0$.

On the other hand, $\tau(n,y,\delta^c)$ is an average over t for $t > t^c$ and thus increases with t^c for all $t^c > .5$. Also, since only values of $t > t^c$ are included in the computation of $\tau(n,y,\delta^c)$, then $\tau(n,y,\delta^c) > t^c$ for all t^c. By the above, when $t^c \to 1$, $\tau(n,y,\delta^c) > t^c > \tau(y,y,\delta^c)$. When $t^c = .5$, by Lemma 3, $\tau(y,y,\delta^c) = \tau(n,n,\delta^c) > \tau(n,y,\delta^c)$. Then, there must exist some $\hat{t} \in (.5,1)$ satisfying $\tau_{\hat{t}}(y,y,\delta^c) = \tau_{\hat{t}}(n,y,\delta^c)$. Moreover, it must be that $\hat{t} < t'$ because for all $t^c > t'$, $\tau(n,y,\delta^c) > t^c > \tau(y,y,\delta^c)$. Because $\tau(y,y,\delta^c)$ decreases monotonically for $t^c < \hat{t}$ and $\tau(n,y,\delta^c)$ increases monotonically in t^c, $\hat{t}$ is unique.

Step 3: Uniqueness: First, note that when $s^c = n$, $\tilde{p}(y)$ decreases with t whereas $\tilde{p}(n)$ increases with t and $\tilde{p}(y)$ increases with q whereas $\tilde{p}(n)$ decreases with q. To see this, recall that:

$$\tilde{p}(y) = q_y^2 + (1-q_y)\Pr(w=y|q,s,t),$$

hence:

$$\frac{\partial \tilde{p}(y)}{\partial t}|_{s^c=n} = (2q_y - \Pr(w=y|q,n,t))\frac{\partial q_y}{\partial t} + (1-q_y)\frac{\partial \Pr(w=y|q,n,t)}{\partial t}$$

but when $s^c = n$, $\frac{\partial q_y}{\partial t} < 0$. Also, $\frac{\partial \Pr(w=y|q,n,t)}{\partial t}$ and $2q_y - \Pr(w=y|q,s,t) > 0$ by Lemma 6. Similarly,

$$\frac{\partial \tilde{p}(n)}{\partial t} = (2q_n - \Pr(w=n|q,n,t))\frac{\partial q_n}{\partial t} + (1-q_n)\frac{\partial \Pr(w=n|q,n,t)}{\partial t} > 0.$$

An analogous analysis holds for the derivatives w.r.t. q.

Now, the proof of step 2 (ii) showed that $\tau(n,y,\delta^c)$ is increasing in t, whereas similar analysis holds for $\tau(n,n,\delta^c)$. It also showed that $\tau(y,y,\delta^c)$ is decreasing in the range $[.5,\hat{t}]$, and analogous analysis holds for $\tau(y,n,\delta^c)$. Thus, uniqueness is assured since the expected utility from ruling n is increasing for all t, and the expected utility from ruling y is decreasing for all t.

Step 4: $t^c(q)$ increases with q, $t^c(q)_{q\to\frac{1}{2}} \to \frac{1}{2}$ and $t^c(q)_{q\to 1} \to \hat{t} : \tilde{p}(y)$ increases with q whereas $\tilde{p}(n)$ decreases with q and hence the utility from y increases for all t relative to the utility from ruling n, which implies that in equilibrium the judge has to rule y more often, i.e., $t^c(q)$ increases. The boundary results are trivial using the equilibrium condition specified in Lemma 2.■

Proof of Proposition 3. When the judge is efficient, he uses a cutoff point $t^e(q,\theta) \in [.5, \tilde{t}(q)]$. On the other hand, the careerist judge uses $t^c(q) < \min\{\tilde{t}(q), \hat{t}\}$. Since $t^e(q,\theta)$ is a continuous function which increases with q and θ, there exists $\bar{q}$ for which $t^e(\bar{q}, 0) = \hat{t}$. Hence, for all $q > \bar{q}$, $t^c(q) < t^e(q,\theta)$. For other values of q, since $t^e(q,\theta)$ increases with θ and converges to $\tilde{t}(q)$ when $\theta \to \infty$, and since $t^c(q) < \tilde{t}(q)$ and does not depend on θ, there exists $\theta(q)$ such that for all $\theta \geq \theta(q)$, the result holds.■

Proof of Lemma 5. We first have to define the expression for social utility, denoted by $U(t)$ (for brevity the index c from t^c is omitted):

$$
\begin{aligned}
U(t) = &\\
& q(\int_{.5}^{1} 2v dv + \int_{.5}^{t} 2(1-v)dv + \int_{t}^{1} 2(1-v)dv(1-q_n(n,t))) \\
& +(1-q)(\int_{t}^{1} 2v dv + (\int_{.5}^{1} 2(1-v)dv + \int_{.5}^{t} 2v dv)(1-q_y(n,t)) \\
& -\theta(1-q_y)^2(q(\int_{.5}^{1} 2v dv + \int_{.5}^{t} 2(1-v)dv) + (1-q)(\int_{.5}^{1} 2(1-v)dv + \int_{.5}^{t} 2v dv)) \\
& -\theta(1-q_n)^2(q\int_{t}^{1} 2(1-v)dv + (1-q)(\int_{t}^{1} 2v dv)
\end{aligned}
$$

The first two lines express the social gain from taking the right decision. This happens when the judge takes the correct decision, or when she does not, but an appeal is brought. The remaining expressions measure the social loss from the costs of appeal. This are paid when an appeal is brought.

I will now show that for high enough values of θ, in particular for $\theta > \frac{1}{2}$, $\frac{\partial U(t)}{\partial t} > 0$:

$$
\begin{aligned}
\frac{\partial U(t)}{\partial t} = & \, 2q(1-t)q_n - 2t(1-q)q_y + \theta(2t(1-q) \\
& +2(1-t)q)((1-q_n)^2 - (1-q_y)^2) \\
& +2(2\theta-1)[(1-q)(1-q_n)^2 - q(1-q_y)^2]
\end{aligned}
$$

Note that when $t = t^e$, then the first two elements are 0, whereas for any $t < t^e$, the first two elements are positive (see the proof of Proposition 1). Finally, when $\theta > \frac{1}{2}$, the last element is positive since for any $t < \tilde{t}(q)$,

$$(1-q)(1-q_n)^2 - q(1-q_y)^2 > 0.$$

Hence, for high enough θ, $\frac{\partial U(t)}{\partial t} > 0$.■

Proof of Proposition 4. (i) For the proof of the first part, see Proposition 1 in Levy (2003). (ii) I will now show that $t^f(q) < t^c(q)$. $t^f(q)$ solves:

$$\Pr(w = y|q, n, t^f(q))\Gamma_y = \Pr(w = n|q, n, t^f(q))\Gamma_n + \Gamma \tag{9}$$

where $\Gamma_y = \tau(y, y, \delta^f) - \tau(y, n, \delta^f)$, $\Gamma_n = \tau(n, n, \delta^f) - \tau(n, y, \delta^f)$ and $\Gamma = \tau(n, y, \delta^f) - \tau(y, n, \delta^f)$. We will show that at $t^f(q)$,

$$\tilde{p}(y)\Gamma_y > \tilde{p}(n)\Gamma_n + \Gamma \tag{10}$$

for $\tilde{p}(d) = (1 - q_d)\Pr(w = d|q, n, t^f(q)) + q_d^2$, which implies that at $t^f(q)$, the utility from y is higher than the utility from n if appeals are allowed, meaning that the equilibrium solution $t^c(q)$ must admit $t^c(q) > t^f(q)$.

Plugging (9) into (10), we have to show that:

$$\begin{aligned} q_y(q_y - \Pr(w = y|q, n, t^f(q)))\Gamma_y > q_n(q_n - \Pr(w = n|q, n, t^f(q)))\Gamma_n \Leftrightarrow \\ \frac{\Gamma_y}{\Gamma_n} > \frac{q_n(q_n - \Pr(w = n|q, n, t^f(q)))}{q_y(q_y - \Pr(w = y|q, n, t^f(q)))} \end{aligned}$$

However, for all values of t, $\frac{\Gamma_y}{\Gamma_n} > 1$, whereas for all values of t, $\frac{q_n(q_n - \Pr(w=n|q,n,t^f(q)))}{q_y(q_y - \Pr(w=y|q,n,t^f(q)))} < 1$, which implies the desired result. To see that $\frac{\Gamma_y}{\Gamma_n} > 1$, I calculate the reputations for a cutoff point t from each action and state of the world:

$$\begin{aligned} \Gamma_y &= \tau(y, y, \delta) - \tau(y, n, \delta) \\ &= \frac{\int_{.5}^1 2v^2dv + \int_{.5}^t 2v(1-v)dv}{\int_{.5}^1 2vdv + \int_{.5}^t 2(1-v)dv} - \frac{\int_{.5}^1 2v(1-v)dv + \int_{.5}^t 2v^2dv}{\int_{.5}^1 2(1-v)dv + \int_{.5}^t 2vdv} \\ &= \frac{\frac{1}{2}t - \frac{1}{3}t^3 - \frac{1}{6}}{t^2(2-t)} \end{aligned}$$

but

$$\begin{aligned} \Gamma_n &= \tau(n, n, \delta) - \tau(n, y, \delta) \\ &= \frac{\int_t^1 2v^2dv}{\int_t^1 2vdv} - \frac{\int_t^1 2v(1-v)dv}{\int_t^1 2(1-v)dv} = \frac{-t + t^2 + \frac{1}{3} - \frac{1}{3}t^3}{(1+t)(1-t)^2} \end{aligned}$$

and

$$\Gamma_y > \Gamma_n \Longleftrightarrow \frac{1}{6}\frac{-4t^4 + 4t^3 - t^2 + 2t - 1}{(t+1)\,t^2\,(2-t)} > 0$$

which holds for all $t > \frac{1}{2}$. To see that $\frac{q_n(q_n - \Pr(w=n|q,n,t))}{q_y(q_y - \Pr(w=y|q,n,t))} < 1$ for all t, after simplifying the expressions:

$$\frac{(1-q)\,(1+t)\,(1-t)}{t^2(1-2q)^2 + 1 + 2t(1-2q)} < \frac{q\,(2-t)\,t}{t^2(1-2q)^2 + 4q^2 + 4qt(1-2q)}$$

It is easy to show that if this holds for $t = \frac{1}{2}$, it holds for all t. When $t = \frac{1}{2}$, this expression is:

$$\frac{\frac{3}{4}(1-q)}{\frac{(1-2q)^2}{4} + 2(1-q)} < \frac{\frac{3}{4}q}{\frac{(1-2q)^2}{4} + 4q^2 + 2q\,(1-2q)}$$

which holds for all $q \geq \frac{1}{2}$. This completes the proof.■

Proof of Proposition 5. We will calculate $\tilde{p}(n)$ and show that it increases compared to the case in which $\phi = 0$, whereas $\tilde{p}(y)$ does not change with ϕ. This means that the utility from n is higher for any t, and thus $t^c(q)$ must decrease.

$$\begin{aligned} &\tilde{p}(n)|_{\phi>0} = \\ &(1-q_n+q_n\phi)(\Pr(w=y|q,s,t)+\Pr(w=n|q,s,t)\phi)\frac{q_n\phi}{1-q_n+q_n\phi} + \\ &(1-q_n+q_n\phi)\Pr(w=n|q,s,t)(1-\phi)) + q_n(1-\phi)q_n \end{aligned}$$

The first element is the probability with which the judge is perceived correct, in her eyes, if there is an appeal. Appeal occurs with probability $1 - q_n + q_n\phi$. If the state is y, or if the state is n, and then with probability ϕ, the judge is reversed. In this case, the evaluator believes that the state is actually n with probability $\frac{q_n\phi}{1-q_n+q_n\phi}$, which is the updated probability given the strategy of the higher court. With the remaining probability, the judge is affirmed and the evaluator believes then that she is correct with probability 1. The second element describes the beliefs when no appeal takes place, which are q_n.

We will show that $\tilde{p}(n)|_{\phi>0} > \tilde{p}(n)|_{\phi=0} \rightarrow$

$$\begin{aligned} &(1-q_n+q_n\phi)((\Pr(w=y|q,s,t)+\Pr(w=n|q,s,t)\phi)\frac{q_n\phi}{1-q_n+q_n\phi} + \Pr(w=n|q,s,t)(1-\phi)) \\ &\quad +q_n(1-\phi)q_n > \Pr(w=n|q,s,t)(1-q_n) + q_n^2 \iff \\ &q_n\phi(1-q_n) - \Pr(w=n|q,s,t)\phi(1-q_n) > 0 \end{aligned}$$

which holds by Lemma 6 since $q_n(s,t) > \Pr(w = n|q,s,t)$.■

References

[1] Avery, C.N. and J. Chevalier (1999), "Herding over the career", Economic Letters 63, 327-333.

[2] Crawford, V. and J. Sobel (1982), "Strategic Information Transmission", Econometrica 50, 1431-51.

[3] Daughety, A.F. and J.F. Reinganum (2000), "Appealing judgments", Rand Journal of Economics 31, 505-525.

[4] Daughety, A.F. and J.F. Reinganum (1999), "Stampede to Judgment: Persuasive Influence and Herding Behavior by Courts", American Law and Economics Review 1, 158-189.

[5] Holmström, B. (1982), "Managerial Incentives Problems: A Dynamic Perspective", in Essays in Economics and Management in Honor of Lars Wahlbeck, Helsinki: Swedish School Econ.

[6] Kornhauser, L.A. (1992), "Modelling Collegial Courts I: Path-Dependence", International Review of Law and Economics 12, 169-185.

[7] Landes W. and R. Posner (2000), "Citation, Age, Fame, and the Web", Journal of Legal Studies, 319-344.

[8] Landes W. and R. Posner (1976), "Legal Precedent: A Theoretical and Empirical Analysis", Journal of Law & Economics 249.

[9] Levy, G. (2003), "Anti-herding and Strategic Consultation", forthcoming, European Economic Review.

[10] Miceli, T. and Cosgel M. (1994), "Reputation and Judicial Decision-Making", Journal of Economic Behavior and Organization, 31-51.

[11] Morris, S. (2001), "Political Correctness", Journal of Political Economy 109, 231-265.

[12] Rasmusen, E. (1994), "Judicial Legitimacy as a Repeated Game", Journal of Law, Economics and Organization, vol. 10, 63-83.

[13] Salzberger, E. and P. Fenn (1999), "Judicial Independence: Some Evidence from the English Court of Appeal", Journal of Law and Economics, 831-847.

[14] Scharfstein, D. and J. Stein (1990), "Herd behavior and investment", American Economic Review 80, 465-479.

[15] Shavell, S. (1995), "The Appeals Process as a Means of Error Correction", Journal of Legal Studies 24, 379-426.

[16] Spitzer, M. and E. Talley (1998), "Judicial Auditing", Working Paper no. 98-22, University of Southern California Law School.

[17] Tirole, J. (1999), "A Theory of Collective Reputation" in The economics of corruption and illegal markets, American International Distribution Corporation Williston, Vt.

[18] Trueman, B. (1994), "Analyst forecasts and herding behavior", Review of financial studies 7, 97-124.

[19] Whitman, D.G. (2000), "Evolution of the Common Law and the Emergence of Compromise", Journal of Legal Studies, 753-781.