The Effect of Lawyers' Career Concerns on Litigation '

Rosa Ferrer*

Universitat Pompeu Fabra and Barcelona GSE

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Abstract

This article studies a model with two lawyers opposing each other in a case where the outcome of the trial depends on the lawyers' talents and choices of effort. The trial outcome provides an implicit incentive because it is informative about the lawyers' talents. Regardless of the functional form used to model the binary trial outcome, the implicit incentive can be characterized by three components, namely, the ex-ante uncertainty on the lawyers' talents, the sensitivity of the trial outcome to the lawyers' talents, and the variance of the noise in the trial outcome, which is endogenous. These components interplay with the lawyers' effort levels, affecting the informativeness of the trial outcome on the lawyers' talents. As a consequence, career concerns introduce distortions in litigation decisions. The strategic interactions that arise affect the equilibrium probability of prevailing in court, litigation costs, and consequently, settlement decisions as well as other stages of the litigation process. Furthermore, the merits of the case serve as a multiplier of the implicit incentive when the sensitivity of the trial outcome to the lawyers' talents is increasing in the difficulty of the case.

JEL Classification: D80, K41, L14

Key words: Reputational gain, effort incentives, strategic interactions, settlement, endogenous noise.

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1 Introduction

Legal disputes are frequent in a wide variety of economic activities.[1] In particular, high litigation expenses have been found to distort investments in intellectual property (Lerner, 1995; Gallini, 2002), health care services and costs (Currie and MacLeod, 2008; Roberts and Hock, 2009; Dranove and Watanabe, 2010), and the prices of goods via products liability (Viscusi, et al., 2005). Lawyers' career concerns can influence litigation decisions and, consequently, the costs of litigation. Career concerns appear to be particularly relevant in the legal profession because the variance of lawyers' earnings is large (Rosen, 1992, finds a standard deviation larger than 40 percent of the mean). Such large variance is not fully explained by experience, gender, and working hours. In fact, given that differences in (perceived) talents seem to explain part of the remaining variance, the information about lawyers' skills conveyed in trial outcomes is likely to play an important role in lawyers' future earnings.

Since a lawyer's performance in court provides information about her skills, the choices of lawyers with career concerns might seek to influence this learning process. Specifically, although winning a case might not imply a large amount of direct earnings at the beginning of a lawyer's career, it could have a substantial impact on her future salary. Thus, the prospect of earnings growth upon winning is an incentive that might motivate lawyers to exert more effort in court. Even though there is a large economics literature on litigation, little is known about how lawyers' reputational concerns may affect litigation effort and the decision to settle.[2] In addition, the growing literature on career concerns has not studied in depth the case of agents competing against each other.[3] Career concerns incentives may be affected by specific features of the litigation framework, namely, the tournament element of trials, the nature of lawyers' performance in Court, which is commonly binary (i.e., win or lose), and the potential role of the case merits on trial outcome's informativeness about lawyers' skills.

This article studies how career concerns influence effort levels, litigants' strategic interactions and settlement gains. Because the merits of the case can influence the market's inference on attorneys' talents (e.g., winning a difficult case could lead to a larger reputational gain than winning an intermediate case) the article also pays special attention to the interaction between career-concerns incentives and the case merits. The market's initial belief about the attorney's talent

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[1]Every year nearly 300,000 civil cases are filed in Federal Courts in the United States in areas such as personal injury, intellectual property rights, labor laws, contracts, etc. (Administrative Office of the U.S. Courts, Statistical Tables for the Federal Judiciary, 2007, 2014).

[2]A short section in Dewatripont and Tirole (1999) introduces career concerns to their analysis of evidence provision against a status quo. The goal is to compare a one-agent system (i.e., non-partisan)—where an agent can present (true) evidence in favor of two possible opposite decisions— with a two-agents system (i.e., an advocates' system)— where each agent can only provide (true) evidence in favor of one of the decisions. In contrast with their analysis, I focus on a case with two agents, letting the effort decisions be non-binary and allowing for asymmetries between the attorneys. In this framework, richer interactions arise between the opposing attorneys via the endogenous transmission of information on their talents.

[3]As discussed in the related literature subsection, the closest articles in this direction are Meyer and Vickers (1997) and Miklos-Thal and Ullrich (2015).

is given by the prior distribution about attorneys' capabilities. Once the case is taken to court, the outcome of the trial (i.e., win or lose) provides additional information and leads to an update of the market's initial beliefs, which creates the posterior distribution. The difference between the posteriors on the attorneys' talents in case of winning and in case of losing measures the reputational gain from winning. The larger the reputational gain, the stronger are the attorneys' career-concerns incentives. As shown in the article, the reputational gain is determined by three components, regardless of the specific functional form used to model the binary trial outcome. A first component is the initial uncertainty on the attorney's talent, which determines the scope for the potential reputational gain. If the initial uncertainty is large, then there is more to learn from the trial outcome than if it is small. A second component is related to the noise in the information transmitted by the trial outcome. Intuitively, the noise arises because the trial outcome is not fully determined by effort, talent and the case merits. For instance, it could be affected by an unverifiable bias in the judge or jury's decisions, or, simply, by luck. When the noise variance (hereafter, noisiness) is higher, then there is *ex ante* more uncertainty about the trial outcome and *ex post* a lower degree of informativeness on the attorneys' talents. As a consequence, the potential reputational gain is also lower. Lastly, the third component measures the sensitivity of the trial outcome to the attorneys' talents. The reputational gain from winning in court increases with the sensitivity of the trial outcome to skills. For instance, some legal systems or legal areas can be relatively more sensitive than others to attorneys' talent in court. All of the subsequent results in the article emerge from the analysis of these three components and their interplay with other variables in the model.

For further results, I use similar linearity conditions on the performance outcome as in standard career-concerns models; however, the tournament nature of litigation and the binary outcome lead to a novel feature of this model. While in standard career-concerns models the noise in performance is exogenous, in this model the uncertainty about the trial outcome is necessarily endogenous as it depends on the lawyers effort decisions. In particular, the noisiness is maximal when the two opposing lawyers compete in symmetric conditions. Notice that under symmetric conditions there is more room for randomness (e.g., luck) affecting performance, and therefore more uncertainty on the trial outcome. Consequently, the trial outcome's informativeness and career-concerns incentives are lower.

The results show that career concerns introduce distortions in litigation decisions. First, attorneys with career concerns attempt to influence the market's beliefs by exerting more effort. Even though the market cannot be fooled in equilibrium, the attorney with stronger career-concerns incentives exerts higher effort in equilibrium, holding other incentives equal. Stronger career-concerns incentives arise through three possible channels, namely, a greater variance on the *ex-ante* attorney's talent, a larger weight on the reputational gain relative to other elements in the attorney's payoff function, and a higher sensitivity of the trial outcome to the attorney's talent. Therefore, it is possible to characterize the relative equilibrium effort ratio of the two opposing lawyers as a

function of the net effect of these three possible channels.

Regarding the case merits, they can interact with career concerns through different possible channels. A particularly interesting one for the analysis of career concerns is the potential effect of merits enhancing the transmission of information on attorneys' talents. Facing an unfavorable case can actually increase the sensitivity of the trial outcome to the attorney's talent, for instance when winning a less favorable case can be more informative about her talent than winning an intermediate or an easy case. Unfavorable merits would then act as a multiplier of the career-concerns incentives and increase the attorney's effort incentives. In contrast, favorable merits could weaken them as the trial outcome is likely to be less sensitive to the attorneys' talent when the case is easy. Consequently, even though less favorable merits can increase the marginal cost of effort, they can also lead to a larger reputational gain from winning the case. Therefore, the cost advantage of the attorney that benefits from the merits could be fully offset by higher reputational incentives of the opponent. As a result, the attorney with the merits against might exert higher effort in equilibrium than the attorney with the merits in favor.

An extension of the model studies the implications of career concerns for settlement decisions. Previous results affect the settlement stage because equilibrium effort levels affect the litigants probability of prevailing in court and the litigation costs. Thus, they affect the lowest and highest amounts that the plaintiff and the defendant are willing to accept or pay, respectively. Also, I find that facing an opponent with stronger career-concerns incentives can lead to an increase in the surplus from settlement and, thus, can increase the scope for a settlement agreement. Therefore, by providing incentives to exert higher effort in the trial stage, career concerns increase the gains from reaching a pre-trial agreement. In addition, I find that weaker career concerns than the opponent can lead to a less demanding concession limit. I discuss the implications for settlement bargaining with and without symmetric information. Under symmetric information, it is individually optimal for both parties to settle. I provide the settlement outcome, as a function of the equilibrium effort levels using a random-proposer bargaining game.

I also extend the model to a framework where effort and talent exhibit positive complementarities. Such complementarities arise when the returns from effort are increasing in the attorneys talents. Complementarities between effort and talent can lead to richer learning and career-concerns incentives (Bonatti and Horner, 2014). I find that a higher average talent induces a higher equilibrium effort because due to the complementarity the trial outcome's sensitivity to the attorneys talents is increasing in the effort level. In a framework with two opposing agents, it implies that the equilibrium effort ratio depends as a consequence on the ratio of *ex-ante* average talent.

In addition, the article extends the analysis to alternative compensation schemes. First, it studies the case where the Plaintiff's attorney is compensated via a contingent fee arrangement (i.e., a percentage of the settlement or the award obtained by the plaintiff in court). In a framework without implicit incentives, Polinsky and Rubinfeld (2003) find that contingent fees provide insufficient incentives for the attorney to devote the effort level desired by the plaintiff. However,

4

since career concerns add up to the contingent fee incentive, they can rise the incentives to provide effort. Nevertheless, as shown throughout the paper, the strength of the career-concerns incentives depend on several parameters, such as the characteristics of the opponent's attorney. Second, it studies both clients' willingness to pay for an attorney with high career concerns. Hiring a lawyer with strong career concerns may be beneficial for the client, but the value of such gain is also a function of the strength of the opposing lawyer's career concerns. In fact, both clients may have incentives to hire an attorney with strong career concerns, but they may not benefit from it —or even end up worse off— when both do hire such type of attorney.

Section 2 describes the model set-up and identifies the three key components of attorneys' career-concerns incentives. Section 3 derives the attorneys' equilibrium effort levels in the main framework where the trial outcome is determined by the attorneys' efforts and talents. Section 4 extends the previous framework to let the case merits affect the trial outcome and the information it provides on attorneys' talents. Section 5 studies the implications of the previous sections for the decision to settle. Section 6 contains several extensions. It first studies career-concerns incentives in the presence of positive complementarities between effort and talent. It also extends the setting to examine alternative attorney compensation schemes. Finally, Section 7 studies the implications of the results for social welfare and Section 8 concludes.

1.1   Related literature

This article lies in the intersection between three different literatures, the career concerns literature, the litigation literature, and the tournaments' literature. Combining elements of these three areas, the article provides new insights about effort provision in tournament environments where parties compete for endogenous reputation effects.

The contract theory literature introduced career concerns to study their effects on agency problems. As argued by Fama (1980), career concerns provide incentives for the agent to exert higher effort, to the point that it may solve a moral hazard problem. As pointed out by Holmström (1982, 1999), such career-concerns effect is increasing in the ex-ante uncertainty about the agents' ability. Dewatripont et al. (1999a) extend the results to a more general framework with multiple tasks and where effort may affect the agent's future talent. Posterior literature has built applications adapting this main standard model. Dewatripont et al. (1999b), study the role of career concerns for government agencies' officials focusing on the role of multitasking and fuzzy evaluation of performance. Career concerns tend to increase effort provision, but they can also lead to inefficiencies such as herding and mispricing (Scharfstein and Stein, 1990; Milbourn et al., 2001; and Dasgupta and Prat, 2006, 2008) and anomalies consistent with prospect theory (Harbaugh, 2013).

The analysis in this article differs from the standard career concerns models by studying a model with two opposing agents that compete against each other. Lawyers' performance in court is determined not only by their talent and their effort level, but also by the talent and effort of the opponent's lawyer. Thus, this article relates to career-concerns models where the outcome of

one agent is informative about the outcome of another agent. Most notably, Meyer and Vickers (1997) study career concerns under the richer information arising from comparative performance. They focus on the case where there is correlation in either the talent or the performance's noise of the two agents. Effort incentives can increase when there is positive correlation between the noise shocks of two agents' performances. The positive correlation between noise shocks implies that the performance of one agent becomes more informative about her talent when observing also the other agent's performance. Since there is lower uncertainty about the noise shock, effort incentives increase. In contrast with this model and with the model in Casas-Arce and Asis Martinez-Jerez (2009) that have individual performance outcomes for each agent, two lawyers opposing each other in a case share a common outcome —with perfectly negatively correlated implications for the two of them. This is also the difference with Chalioti (2014), which studies an agent's incentives to collaborate with a teammate when the teammate's performance provides information about the agent's talent. Thus, unlike in these models, in this article there is a common noise shock in the lawyers' observed performance. Furthermore, the noise and, therefore, the informativeness of the trial outcome are endogenous to the lawyers' effort decisions.

Miklos-Thal and Ullrich (2015) study the effort incentives of soccer players under heterogeneous chances to be selected by their national team for an international competition. In their model, players' outcomes are not correlated as in the two previous articles; however, there is interaction between players' strategies because after their independent individual performance is observed, only the player with the highest ex-post perceived ability is selected. The authors focus on the incentives generated by this competition in a framework where the gain from being selected is decreasing in the agents' effort exerted prior to selection (e.g., due to fatigue or risk of injury). In contrast, lawyers' performance in litigation is not independent since it is actually the outcome of competition between the two of them in trial. Thus, this article focuses on how competition affects the information obtained from such common outcome. In addition to litigation, this analysis could also be relevant in some sport frameworks with career-concerned players. Specifically, whenever randomness (e.g., luck) plays a more important role in tighter races or tournaments, and therefore, the inference on players' talents becomes noisier than in less tight races. As shown in the article, changes in the noise have crucial effects on the strength of the resulting career-concerns incentives

Previous authors have applied contest models to litigation (Katz,1988; Farmer and Pecorino, 1999, 2000; Wärneryd, 2000; Hirshleifer and Osborne, 2001; and Baik and Kim, 2007). In particular, this article is related to Wärneryd (2000), and Baik and Kim (2007), which study strategic effects of delegating in lawyers the choice of effort. Nevertheless, these models do not account for career concerns since the reward from winning in court is exogenous. In contrast, this article studies lawyers' effort provision in the presence of endogenous reputational gains. As shown in the article, reputational incentives differ from standard contest incentives. In particular, while asymmetries between the contestants tend to reduce effort provision in contests with exogenous awards (e.g., Schotter and Weigelt, 1992; Franke, 2012a, 2012b), they can induce higher effort levels in the case of

endogenous reputational gains. I find that a less favorable case can actually increase an attorney's effort incentives, since winning a less favorable case can be more informative about her talent than winning an intermediate case.

In addition, the career-concerns model in this article incorporates other features that are specific to litigation models. Legal disputes will not end up in court if litigants settle. Therefore, the model will consider a settlement bargaining process prior to the trial stage, allowing me to study the impact of attorneys' career concerns on settlement decisions. Also, the outcome of the trial might be more or less sensitive to the performance of the attorneys depending on the type of case, court, or legal system. I study how the level of sensitivity affects the results. Finally, a section of the article studies the effect of career concerns when the plaintiff and her lawyer have misaligned interests. I study how career concerns affect the misalignment that arise when the lawyer is compensated through a contingency fee, which consists of a percentage of the settlement or the award obtained by the plaintiff in court.

Previous articles have studied the effect of reputation in the legal profession. Fingleton and Raith (2005) study bargaining outcomes when the parties hire reputation-motivated agents to do the bargaining. They find that, when talent is private information of the bargaining agent, less talented bargainers are more aggressive in open door bargaining (i.e., when their clients can observe the bargaining process). As a consequence, open door bargaining has a higher probability of inefficient disagreements. Levy (2005) adapts the Scharfstein and Stein (1990) herding model of investment to a judicial framework wherein monitoring only takes place when litigants appeal. The author shows that judges with career concerns deviate from the efficient decision by excessively contradicting previous judicial decisions in order to signal ability. Finally, Iossa and Jullien (2012) study the role of judges' career concerns on clients' demand for lawyers under distinctive quality layers.

A number of articles have analyzed the effect of compensation systems for lawyers; however, these models do not incorporate the effect of lawyers' career concerns. If implicit incentives have important effects on the decisions of lawyers, they will also affect the contracts between the lawyers and their clients. In an article that studies the contract choice of a risk averse agent with career concerns, Gibbons and Murphy (1992) show that career concerns incentives play an important role even in the presence of explicit performance-based incentives. Furthermore, since career concerns effects are stronger for younger workers, weaker explicit incentives are optimal in their case, which is consistent with their empirical evidence studying CEO compensation. Regarding the implications for the contract stage, this article contributes to this existing literature by showing that in a litigation environment contract decisions are affected by the potential career-concerns incentives of the opponent's lawyer.

2 The model

2.1 The trial outcome

The plaintiff's attorney (A_P) and the defendant's attorney (A_D) face the decision of how much effort to exert in a case at Court.

Attorney A_i's talent is given by $t_i \in \{\theta_i^l, \theta_i^h\}$ where $0 < \theta_i^l < \theta_i^h \leq 1$ for $i = P, D$. As in the standard career concerns models, there is uncertainty about talent, and the lawyers and the market share common priors on t_P and t_D. In other words, there is imperfect but symmetric information.[4] The unconditional probability of attorney i having high talent is denoted by $\rho_i > 0$, which is common knowledge and where ρ_D may be different from ρ_P. This unconditional probability does not depend on the outcome of this specific dispute although it might reflect information about the attorney's talent based on past trial outcomes. Let (μ_i, σ_i^2) be the *a priori* expectation and variance of attorney i's talent. That is, $\mu_i = \rho_i \theta_i^h + (1 - \rho_i)\theta_i^l$ and $\sigma_i^2 = \rho_i(\theta_i^h)^2 + (1 - \rho_i)(\theta_i^l)^2 - \mu_i^2$.

The trial outcome, denoted by $z \in \{0, 1\}$, is a binary outcome where $z = 1$ is interpreted as A_P *wins* (i.e., A_D *loses*) and $z = 0$ is interpreted as A_P *loses* (i.e., A_D *wins*). The outcome is determined by the attorneys' efforts, denoted as e_i, $i = P, D$, and their talents:

$$z = \begin{cases} 1 & \text{with probability } \Phi(e_P, e_D, t_P, t_D) \\ 0 & \text{with probability } 1 - \Phi(e_P, e_D, t_P, t_D) \end{cases}.$$

where, $\Phi \in (0, 1)$, $\partial\Phi/\partial e_P > 0$, $\partial\Phi/\partial t_P > 0$, $\partial\Phi/\partial e_D < 0$, $\partial\Phi/\partial t_D < 0$. In Section 4 the trial outcome also depends on the case merits.

After the trial takes place, the market updates the prior on the talent of each attorney based on the observed realization of z. A main contribution of the model is to study strategic interactions between these two opposing agents, which arise endogenously depending on how informative is the trial outcome about their talents. There are two main deviations from the standard career-concerns model, both related to the tournament nature of litigation. First, the outcome is binary since only one of the opposing attorneys can win the case.[5] Second, the noise in the outcome is endogenous to the agents' choices of effort. Once the trial ends, the market observes who wins the case (i.e., the realization of z). Therefore, the noise in the market's learning process is implicitly given by the deviations of the observed value of z away from the actual probability $\Phi(e_P, e_D, t_P, t_D)$. Thus, the noise in the trial outcome is a random variable that takes values:

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[4]The standard career concerns model, based on Holmström, (1982, 1999) focuses on distortions due to reputation formation that are unrelated to private information.

[5]Prevailing or not in Court is a binary outcome that transmits information about the attorneys' talents. If the plaintiff prevails, the award obtained could transmit additional non-binary information. A natural question would be whether binary outcomes induce lower or higher effort than continuous outcomes. In a subsection of Dewatripont et al. (1999), the authors discuss the implication of a "pass/fail" outcome in a career concerns framework with one agent. They argue that whether the agent's effort is lower or higher with a binary outcome rather than with a continuous outcome depends on the density function of talent and observables given effort. Thus, if the market can obtain additional information from the Court award, this could potentially lead to higher or lower effort incentives for the attorney relative to the pure binary case.

$$\varepsilon \equiv z - \Phi = \begin{cases} 1 - \Phi & \text{with probability } \Phi \\ -\Phi & \text{with probability } (1 - \Phi) \end{cases}.$$

which implies that the noise's average is $E\{\varepsilon\} = \Phi - \Phi^2 - \Phi + \Phi^2 = 0$ with variance $Var(\varepsilon) = (1 - \Phi)^2 \Phi + (-\Phi)^2 (1 - \Phi) = \Phi(1 - \Phi)$. The variance of the noise coincides with the variance of the trial outcome, $Var(z)$. I refer to this variance as the trial outcome's noisiness. Intuitively, more uncertainty about the trial outcome, z, implies noisier information from the trial outcome about the attorneys' talents.[6]

Intuitively, the noise is larger when the outcome of the trial is determined more from randomness than from the efforts and talents of the two attorneys. For instance, suppose the plaintiff's attorney is considerably more talented and puts more effort than the defendant's attorney, then Φ would be expected to be closer to 1 than in a case with more similar attorneys. Thus, if A_P wins (i.e., $z = 1$), the noise in the learning process would be small since it would be the difference between Φ —fully determined by e_P, e_D, t_P, and t_D— and $z = 1$. In contrast, if A_P loses then the noise in the market learning process would be larger as $z = 0$ would be further away from the value of Φ. Now, consider two attorneys with very similar talent and effort levels, then, everything else equal, Φ would closer to $1/2$ than in the first case. As the case becomes more balanced, the level of uncertainty increases (i.e., the noisiness increases). Notice that if e_P, e_D, t_P, and t_D are such that $\Phi = 1/2$, the highest level of noisiness is reached. Intuitively, when attorneys' effort levels and talents are such that they both have the same chances of winning, then randomness plays an important role in determining the trial outcome; therefore, the outcome is least informative about the attorneys' talents.

In addition to the noise component, the attorneys' talents are another source of uncertainty in the trial outcome, similarly to the standard career-concerns models. Therefore, neither z nor Φ can be anticipated with certainty by the attorneys and the market. As a consequence, the posteriors on the attorneys' talents are not based on the actual Φ but on the expected probability that A_P wins, $\Phi_{Et} \equiv E_t\{\Phi(e_P, e_D, t_P, t_D)\}$, which is the expectation over Φ, taken with respect to both t_P and t_D, given the common priors over them.

The realization of the trial outcome, z, permits to update the priors on the attorneys' talents through Φ_{Et} and Bayes' rule. As discussed above, the trial outcome's informativeness depends on the endogenous noise. As defined above, ε is the noise conditional on the values of effort and talent. Since there is uncertainty about the attorneys' talents, the Bayesian update is based on the unconditional distribution of the noise with respect to t_P and t_D. Therefore, the noisiness level for the market is given by $\Phi_{Et}(1 - \Phi_{Et})$. Let this noisiness level be denoted by $Var(\Phi_{Et}) \epsilon [\underline{\Sigma}, \overline{\Sigma}]$. Since Φ_{Et} is a probability, $\overline{\Sigma} = 1/4$ is the largest level of uncertainty possible. In addition, I assume that $\underline{\Sigma} > 0$, for tractability purposes.

To measure the impact of the trial outcome on the market's opinion about A_P and A_D, let

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[6]For simplicity, I refer to the expression above as the error term but it is the error term of A_P's performance. The error term of A_D's performance is given by $(1 - z) - (1 - \Phi)$. Thus, the two error terms are perfectly and inversely correlated.

$\hat{t}_i(A_P\ wins; e_i, e_j)$ and $\hat{t}_i(A_P\ loses; e_i, e_j)$ denote the posterior expected talent of attorney i for each possible trial outcome, where, based on Bayes' rule, for A_P:

$$\hat{t}_P(A_P\ wins; e_P, e_D) = \theta_P^h \cdot \Pr\{\theta_P^h \mid A_P\ wins\} + \theta_P^l \cdot \Pr\{\theta_P^l \mid A_P\ wins\}, \text{ and}$$
$$\hat{t}_P(A_P\ loses; e_P, e_D) = \theta_P^h \cdot \Pr\{\theta_P^h \mid A_P\ loses\} + \theta_P^l \cdot \Pr\{\theta_P^l \mid A_P\ loses\},$$

and for A_D:

$$\hat{t}_D(A_P\ wins; e_P, e_D) = \theta_D^h \cdot \Pr\{\theta_D^h \mid A_P\ wins\} + \theta_D^l \cdot \Pr\{\theta_D^l \mid A_P\ wins\}, \text{ and}$$
$$\hat{t}_D(A_P\ loses; e_P, e_D) = \theta_D^h \cdot \Pr\{\theta_D^h \mid A_P\ loses\} + \theta_D^l \cdot \Pr\{\theta_D^l \mid A_P\ loses\}.$$

The reputational gain from winning the trial is given by the difference between $\hat{t}_i(A_P\ wins; e_P, e_D)$ and $\hat{t}_i(A_P\ loses; e_P, e_D)$. Naturally, $\hat{t}_P(A_P\ wins; e_P, e_D) > \hat{t}_P(A_P\ loses; e_P, e_D)$ and $\hat{t}_D(A_P\ wins; e_P, e_D) < \hat{t}_D(A_P\ loses; e_P, e_D)$.

As shown in the Appendix, the posterior expected talent can be rewritten as:

$$\hat{t}_P(A_P\ wins; e_P, e_D) = \theta_P^h \cdot \Pr\{\theta_P^h \mid A_P\ wins\} + \theta_P^l \cdot \Pr\{\theta_P^l \mid A_P\ wins\} =$$

$$= \mu_P + \rho_P(1 - \rho_P)(\theta_P^h - \theta_P^l) \cdot \frac{\left(\Phi_{Et} \mid t_P = \theta_P^h\right) - \left(\Phi_{Et} \mid t_P = \theta_P^l\right)}{\Phi_{Et}}. \tag{1}$$

$$\hat{t}_P(A_P\ loses; e_P, e_D) = \theta_P^h \cdot \Pr\{\theta_P^h \mid A_P\ loses\} + \theta_P^l \cdot \Pr\{\theta_P^l \mid A_P\ loses\} =$$

$$= \mu_P - \rho_P(1 - \rho_P)(\theta_P^h - \theta_P^l) \cdot \frac{\left(\Phi_{Et} \mid t_P = \theta_P^h\right) - \left(\Phi_{Et} \mid t_P = \theta_P^l\right)}{(1 - \Phi_{Et})}. \tag{2}$$

Therefore, the difference between the market's inference about t_P in case of A_P winning and in case of A_P losing can be written as follows:

$$\hat{t}_P(A_P\ wins; e_P, e_D) - \hat{t}_P(A_P\ loses; e_P, e_D) =$$

$$= \rho_P(1 - \rho_P)(\theta_P^h - \theta_P^l) \left(\left(\Phi_{Et} \mid t_P = \theta_P^h\right) - \left(\Phi_{Et} \mid t_P = \theta_P^l\right) \right) \left(\frac{1}{\Phi_{Et}} + \frac{1}{1 - \Phi_{Et}} \right) =$$

$$= \rho_P(1 - \rho_P)(\theta_P^h - \theta_P^l) \cdot \frac{\left(\Phi_{Et} \mid t_P = \theta_P^h\right) - \left(\Phi_{Et} \mid t_P = \theta_P^l\right)}{\Phi_{Et}(1 - \Phi_{Et})}. \tag{3}$$

Similarly, for A_D:

$$\hat{t}_D(A_P\ loses; e_P, e_D) - \hat{t}_D(A_P\ wins; e_P, e_D) =$$

10

$$= \rho_D(1-\rho_D)(\theta_D^h - \theta_D^l) \cdot \frac{\left(\Phi_{Et}\,|t_D = \theta_D^l\right) - \left(\Phi_{Et}\,|t_D = \theta_D^h\right)}{\Phi_{Et}(1-\Phi_{Et})}. \tag{4}$$

Intuitively, the reputational gain is greater the larger is the uncertainty about the talent of the attorney, either due to a greater variance of the prior, $\rho_i(1-\rho_i)$, or to a greater spread of the attorney's types, $(\theta_i^h - \theta_i^l)$. The market learns much less from the trial outcome of an attorney with vast experience than in the case of an inexperienced lawyer. Therefore, the reputational gain from winning is larger in the latter case.

In addition, the reputational gain is also increasing in the sensitivity of the trial outcome to the attorneys' talents, $\left(\Phi_{Et}\,|t_P = \theta_P^h\right) - \left(\Phi_{Et}\,|t_P = \theta_P^l\right)$, and $\left(1 - \Phi_{Et}\,|t_D = \theta_D^h\right) - \left(1 - \Phi_{Et}\,|t_D = \theta_D^l\right)$, hereafter denoted as δ_P and δ_D, respectively.[7] Notice that both δ_P, $\delta_D > 0$ since Φ_{Et} is increasing in θ_P but decreasing in θ_D. It is natural that the reputational gain depends on the sensitivity of the trial outcome to the attorneys' talents, δ_P and δ_D. Some types of cases, types of courts, or types of legal systems might be more sensitive than others to attorneys' talents. For instance, previous research has found differences in verdicts from judges and verdicts from juries when facing similar cases.[8] One possibility is that juries are more sensitive to attorneys' ability (e.g., communication skills), while judges might focus more on the merits of the case. Similarly, the outcome of the trial might depend more on attorneys' talents in some legals systems compared to others. Glendon et al. (1982) argues that in civil law countries with an inquisitorial system rather than an adversarial system, "the judge may inject new theories, new legal and factual sides, thus reducing the disadvantage of the party with the less competent lawyer." Thus, if this is the case, the reputational gain from winning the case would be lower in such systems due to the lower sensitivity of the trial outcome to the talent of the attorneys.

Finally, the reputational gain is decreasing in $\Phi_{Et}(1-\Phi_{Et})$, which is the noisiness in the informativeness of the trial outcome. As the noisiness increases, the trial outcome becomes less informative about talent. As a consequence, the gain associated to performing well decreases. The novelty of this framework is that the noise uncertainty is endogenous to the attorneys' choices of effort.

The following proposition summarizes these findings.

Proposition 1 *The reputational gain of attorney i from winning the trial depends:*
i.- Inversely on the trial outcome's noisiness, $\Phi_{Et}(1-\Phi_{Et})$,
ii.- Positively on the sensitivity of the trial outcome to the attorney's talent,
iii.- Positively on the initial uncertainty on the attorney's talent.

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[7]Notice that $\left(1 - \Phi_{Et}\,|t_D = \theta_D^h\right) - \left(1 - \Phi_{Et}\,|t_D = \theta_D^l\right) = \left(\Phi_{Et}\,|t_D = \theta_D^l\right) - \left(\Phi_{Et}\,|t_D = \theta_D^h\right).$

[8]Spier (2007) provides an overview of documented differences between juries and judges decisions. In particular, Clermont and Eisenberg (1992), and Helland and Tabarrok (2000) find differences in trial awards and win rates, once accounting for the part of these differences driven by selection. Their evidence suggests that the differences are more complex than just driven by a general pro-plaintiff jury bias, as considered by conventional wisdom.

2.2 Attorneys' objective functions

The attorneys simultaneously decide how much effort to exert in Court. For simplicity, I assume in most of the article that the attorneys' explicit compensation does not depend on the trial outcome.[9] Therefore, the optimal levels of effort are determined by the tradeoff between the cost of effort and the implicit reputational incentives to win the trial. Attorney i's payoff is increasing in the expected market's inference about their talent, $\hat{t}_i(A_P \ wins)$ and $\hat{t}_i(A_P \ loses)$, which is the implicit incentive to perform well.

Attorney A_P, representing client P, chooses the effort level e_P^* in order to solve the following problem:

$$\max_{e_P \in [0,1]} -\frac{c_P e_P^{\gamma}}{\gamma} + \beta_P \cdot \{\Phi_{Et}(e_i, e_j) \cdot \hat{t}_P(A_P \ wins; e_i^*, e_j^*) + (1 - \Phi_{Et}(e_i, e_j)) \cdot \hat{t}_P(A_P \ loses; e_P^*, e_D^*)\},$$

The first element in the objective function represents A_P's effort costs (e.g., opportunity cost of having to decline other cases or clients), where c_P is a cost parameter and $\gamma > 1$ implies decreasing returns from effort when finding evidence or legal arguments. The second element represents the expected reputational effect of the trial outcome, where $\beta_P > 0$ measures the weight of the reputational gain on the attorney's payoff; that is, it measures the strength of $A_P's$ career concerns.[10] $\hat{t}_i(A_P \ wins; e_P^*, e_D^*)$ and $\hat{t}_i(A_P \ loses; e_P^*, e_D^*)$ are the key elements in modeling the attorney's reputational concerns. They represent the market's inference about A_P's talent conditioned on the outcome of the trial and on the market's conjecture about A_i's and A_j's efforts. Even though the market does not observe the attorneys efforts, as in the standard career-concerns model, the market's inference depend on e_i^* and e_j^*, which are the market's conjecture about A_i and A_j's equilibrium effort levels.

The first-order condition[11] for the interior solution can be written as:

$$-c_P e_P^{*\gamma-1} + \beta_P \frac{\partial \Phi_{Et}}{\partial e_P} \cdot (\hat{t}_P(A_P \ wins; e_P^*, e_D^*) - \hat{t}_P(A_P \ loses; e_P^*, e_D^*)) = 0, \tag{5}$$

where in equilibrium the effort level chosen by A_P has to coincide with the market's conjecture of

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[9] For instance, as argued in Garoupa and Gomez (2008), when attorneys are compensated on an hourly fee basis and the clients cannot observe the attorneys' effort levels, then a regime of hourly fees is equivalent to a regime of flat fees. Section 6 discusses the implications of career concerns for the contract stage between clients and attorneys. The results presented in this section do no change qualitatively.

[10] A_i's payoff depends linearly on the market's inference $\hat{t}_i$. The motivation for this assumption in the standard career-concerns models is that in a competitive market the agent's future compensation is determined by the market's posterior expectation of the agent's outcome. Linear separability between effort and talent, which is commonly assumed in these models, permits the market's posterior expectation to also be linearly separable with respect to the agent's talent.

[11] Note that $\frac{\partial^2 \Phi_{Et}}{\partial^2 e_P} \leq 0$ is a sufficient (not necessary) condition for the objective function to be strictly concave in e_P. Therefore, the first order condition characterizes the interior maximum as long as A_P's trial outcome marginal returns from effort are not strictly increasing. Section 3 provides the necessary parametric condition to rule out corner solutions

her effort, e_P^*. Also, as shown above:

$$\hat{t}_P(A_P \ wins; e_P^*, e_D^*) - \hat{t}_P(A_P \ loses; e_P^*, e_D^*) = \rho_P(1 - \rho_P)(\theta_P^h - \theta_P^l)\frac{\delta_P}{Var(\Phi_{Et}(e_i^*, e_j^*))},$$

where $\rho_P(1 - \rho_P)$ is the variance of the prior on A_P's talent.

Similarly, attorney A_D, representing client D, chooses the effort level e_D^* in order to solve the following problem:

$$\max_{e_D \in [0,1]} -\frac{c_D e_D^\gamma}{\gamma} + \beta_D \cdot \{\Phi_{Et}(e_i, e_j) \cdot \hat{t}_D(A_P \ wins; e_i^*, e_j^*) + (1 - \Phi_{Et}(e_i, e_j)) \cdot \hat{t}_D(A_P \ loses; e_P^*, e_D^*)\},$$

The first-order condition for the interior solution can be written as:[12]

$$-c_D e_D^{*\gamma-1} + \beta_D \frac{\partial \Phi_{Et}}{\partial e_D}(\hat{t}_P(A_P \ loses; e_P^*, e_D^*) - \hat{t}_P(A_P \ wins; e_P^*, e_D^*)) = 0. \qquad (6)$$

where in equilibrium the effort level chosen by A_D has to coincide with the market's conjecture of her effort, e_D^*. Also, as shown above:

$$\hat{t}_D(A_P \ loses; e_P^*, e_D^*) - \hat{t}_D(A_P \ wins; e_P^*, e_D^*) = \rho_D(1 - \rho_D)(\theta_D^h - \theta_D^l)\frac{\delta_D}{Var(\Phi_{Et}(e_i^*, e_j^*))},$$

where $\rho_D(1 - \rho_D)$ is the variance of the prior on A_D's talent.

3 Equilibrium effort in Court

This section studies the role of career-concerns incentives on attorneys' effort decisions. I assume that given the same amount of effort and talent, both attorneys have the same chances of winning the trial. That is, $(\Phi \mid e_P = e_D, t_P = t_D) = 1/2$. Section 4 relaxes this assumption to study the potential role of the merits of the case, which might favor one of the attorneys and, as a consequence, can affect returns from talent and the informativeness of the trial outcome. In equilibrium both attorneys choose effort levels simultaneously. The first order conditions for the equilibrium effort levels (e_P^*, e_D^*) are:

$$c_P e_P^{*\gamma-1} = \beta_P \frac{\partial \Phi_{Et}}{\partial e_P} \cdot \rho_P(1 - \rho_P)(\theta_P^h - \theta_P^l)\frac{\delta_P}{Var(\Phi_{Et}(e_i^*, e_j^*))}, \qquad (7)$$

$$c_D e_D^{*\gamma-1} = \beta_D \frac{\partial \Phi_{Et}}{\partial e_D} \cdot \rho_D(1 - \rho_D)(\theta_D^h - \theta_D^l)\frac{\delta_D}{Var(\Phi_{Et}(e_i^*, e_j^*))}. \qquad (8)$$

In this section, I focus on the case where Φ is linear with respect to effort and talent, in line

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[12]Similarly than for A_P, $\frac{\partial^2 \Phi_{Et}}{\partial^2 e_D} \leq 0$ is a sufficient (not necessary) condition for the objective function to be strictly concave in e_D. Therefore, the first order condition characterizes the interior maximum as long as A_D's trial outcome marginal returns from effort are not strictly increasing.

with Holmström (1999). Also, a direct extension of this assumption for the case of two agents is to let e_P and e_D also be linearly separable with respect to each other. Thus, I will let Φ be linear and separable with respect to e_P, e_D, t_P and t_D. Section 6 discusses the implications of relaxing linear separability of effort and talent.

An advantage of assuming linear separability of e_P and e_D is that all the strategic interactions in the choice of effort arise through the reputational gain rather than through a specific functional form for the trial outcome. Notice that under this assumption, the returns from effort of attorney i do not directly depend on the effort of attorney j (i..e., $\partial\Phi/\partial e_i$ does not depend on e_j), nevertheless it will be shown that attorneys' choose their effort strategically based on how each others' effort levels indirectly affect the trial outcome's informativeness about their talents. I also assume that the returns from effort are assumed to be constant and the same for both attorneys, $\partial\Phi_{Et}/\partial e_P = \partial(1 - \Phi_{Et})/\partial e_D = \xi$. Nevertheless, heterogeneities in the production of effort between the two attorneys can still be captured by differences in the marginal effort costs (i.e., differences in c_P and c_D). To illustrate that an attorney i needs greater effort investment to provide the same amount of evidence (or legal arguments) as attorney j, then we would have that $c_i > c_j$.

Under linearity of Φ with respect to the attorneys' talents, $\delta_P \equiv \tau \cdot (\theta_P^h - \theta_P^l)$, and $\delta_D \equiv \tau \cdot (\theta_D^h - \theta_D^l)$, where $\tau \equiv \partial\Phi/\partial t_P = \partial 1 - \Phi/\partial t_D$.[13] Therefore, it is possible to rewrite the posterior on attorney's i talent as a function of the variance of the prior on attorney A_i's talent, σ_i^2, since:

$$\sigma_i^2 \equiv \rho_i(1 - \rho_i)(\theta_i^h - \theta_i^l)^2.$$

Notice that $\rho_i(1 - \rho_i)(\theta_i^h - \theta_i^l)^2$ can be rewritten[14] as $\rho_i(\theta_i^h)^2 + (1 - \rho_i)(\theta_i^l)^2 - \mu_i^2$. Therefore:

$$\hat{t}_P(A_P \ wins; e_P^*, e_D^*) - \hat{t}_P(A_P \ loses; e_P^*, e_D^*) = \frac{\tau\sigma_P^2}{Var(\Phi_{Et})}$$

$$\hat{t}_D(A_P \ loses; e_P^*, e_D^*) - \hat{t}_D(A_P \ wins; e_P^*, e_D^*) = \frac{\tau\sigma_D^2}{Var(\Phi_{Et})}$$

Figure 1 illustrates how the informativeness of the trial outcome is affected by Φ_{Et}. In particular, both $\hat{t}_P(A_P \ wins; e_P, e_D) - \hat{t}_P(A_P \ loses; e_P, e_D)$ and $\hat{t}_D(A_P \ loses; e_P, e_D) - \hat{t}_D(A_P \ wins; e_P, e_D)$ are minimized when the noisiness is maximal (i.e., when $\Phi_{Et}=1/2$)

Under the assumptions above, the probability that A_P wins the case would be:

$$\Phi = 1/2 + \xi \cdot (e_P - e_D) + \tau \cdot (t_P - t_D), \tag{9}$$

where τ and ξ are parameters small enough to ensure that $\Phi \in [0, 1]$ for any combination of e_P,

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[13] As stated above, in this Section returns from talent are assumed to be the same and constant for both attorneys.
[14] Notice that $\rho_i(1-\rho_i)(\theta_i^h-\theta_i^l)^2 = \rho_i(1-\rho_i)(\theta_i^h)^2+\rho_i(1-\rho_i)(\theta_i^l)^2 -2\rho_i(1-\rho_i)\,\theta_i^l\,\theta_i^h$. Since $\mu_i^2 \equiv (\rho_i\theta_i^h+(1-\rho_i)\theta_i^l)^2 = \rho_i^2(\theta_i^h)^2 + (1-\rho_i)^2(\theta_i^l)^2 + 2\rho_i(1-\rho_i)(\theta_i^h)(\theta_i^l)$, then, replacing $2\rho_i(1-\rho_i)(\theta_i^h)(\theta_i^l)$ as $\mu_i^2 - \rho_i^2(\theta_i^h)^2 - (1-\rho_i)^2(\theta_i^l)^2$ into the initial expression leads to: $\rho_i(1-\rho_i)(\theta_i^h-\theta_i^l)^2 = \rho_i(\theta_i^h)^2 + (1-\rho_i)(\theta_i^l)^2 - \mu_i^2 \equiv \sigma_i^2$.
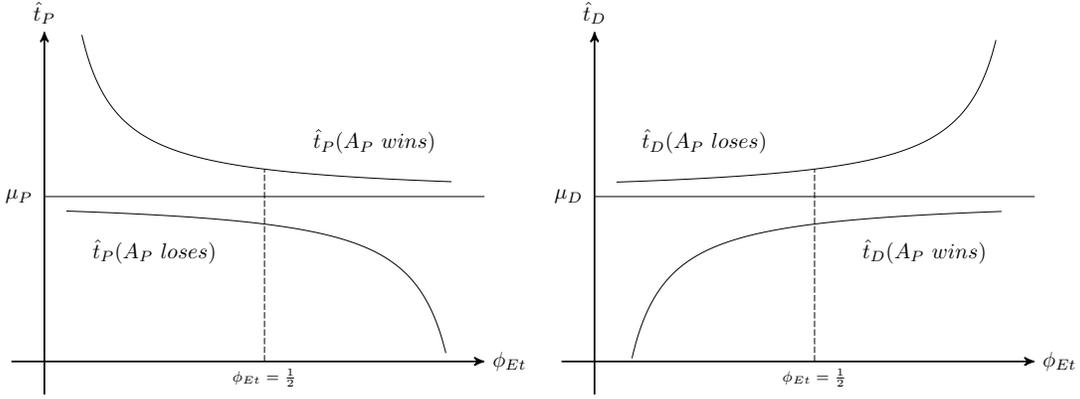
Figure 1: Posterior A_P and A_D's expected talents conditional on the the trial outcome

e_D, t_P and t_D.[15] Since the expectation of a sum is the sum of the expectations, linearity and separability ensure that Φ_{Et} can be expressed as a function of μ_P and μ_D. Under this functional form, the ex-ante expected probability that A_P *wins* is given by:

$$\Phi_{Et} = 1/2 + \xi \cdot (e_P - e_D) + \tau \cdot (\mu_P - \mu_D). \tag{10}$$

Also, given that in this section $(\Phi \mid e_P = e_D, t_P = t_D) = 1/2$, then linearity implies that $(\Phi_{Et} \mid e_P = e_D, \mu_P = \mu_D) = 1/2$. Thus, if the prior expected talent is the same for both attorneys and the effort levels also coincide, then both attorneys have the same expected probability of winning, even though the actual realizations of t_P and t_D may not coincide.

The first-order conditions can be rewritten such that:

$$e_P^{*\,\gamma-1} = \frac{\xi\beta_P\tau\sigma_P^2}{c_P Var(\Phi_{Et})} \tag{11}$$

$$e_D^{*\,\gamma-1} = \frac{\xi\beta_D\tau\sigma_D^2}{c_D Var(\Phi_{Et})} \tag{12}$$

In order to ensure that in equilibrium $e_P^*, e_D^* \in (0,1)$, $c_P > \xi\beta_P\tau\sigma_P^2/\underline{\Sigma}$, and that $c_D > \xi\beta_D\tau\sigma_D^2/\underline{\Sigma}$.

Simplifying these two equations:

$$\frac{c_P e_P^{*\,\gamma-1}}{\beta_P\sigma_P^2} = \frac{c_D e_D^{*\,\gamma-1}}{\beta_D\sigma_D^2} = \frac{\tau\xi}{Var(\Phi_{Et}(e_P^*, e_D^*))}. \tag{13}$$

Therefore, the following result holds.

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[15]This functional form also belongs to the family of "difference-form" success functions that considers the probability of success as a function of the difference in the contestants' performances (Hirshleifer, 1989; Che and Gale, 2000).

Proposition 2 *In equilibrium:*

i.-A higher equilibrium $Var(\Phi_{Et})$ is associated with lower equilibrium effort levels of A_P and A_D.

ii.- A_P/A_D effort ratio can be characterized as:[16]

$$\frac{e_P^*}{e_D^*} = \left(\frac{c_D \beta_P \sigma_P^2}{c_P \beta_D \sigma_D^2} \right)^{1/(\gamma-1)}. \tag{14}$$

Intuitively, a higher equilibrium $Var(\Phi_{Et})$ means the trial outcome is noisier, which reduces the reputational incentives. Also, the equilibrium effort ratio depends on the attorneys' relative career concerns weight, relative effort costs and relative prior uncertainty over talent. To study further implications of this result, the remaining part of the section compares attorneys' asymmetries with respect to these parameters that determine e_P^*/e_D^*. In particular, I use the results of the symmetric case as a baseline to study the effects of career concerns when the attorneys differ in the prior on their talent, in the trial's sensitivity to the attorneys' talent, and in some other characteristics.

3.1 Baseline case: Symmetric attorneys

The symmetric case illustrates how career concerns can lead the attorneys to a rat race. The two attorneys are assumed to be the same ex-ante even though they might differ in the unknown realization of their talents. Therefore, the priors on the talent of the two attorneys coincide, $\mu_P = \mu_D = \mu$ and $\sigma_P = \sigma_D = \sigma$. [17] In addition, attorneys have the same effort cost functions and put the same weight to career concerns, $c_P = c_D = c$, and $\beta_P = \beta_D = \beta$.

Introducing these conditions in Proposition 2, we know that both lawyers have the same incentives to exert effort in Court, $e_P^* = e_D^* = e^*$.

Corollary 1 *In the symmetric case, a symmetric equilibrium is the only solution to the effort optimization problem of the attorneys, with optimal levels of effort:*

$$e^* = e_P^* = e_D^* = \left(\frac{\xi \beta \tau \sigma^2}{c \overline{\Sigma}} \right)^{1/(\gamma-1)}. \tag{15}$$

The equilibrium effort levels are increasing in the career concerns of the attorneys, β, and in the *a priori* uncertainty on the attorneys' talent, σ^2, which is increasing in $\rho(1-\rho)$, and $(\theta^h - \theta^l)$. The greater is the variance of the prior about their talent, the more incentives attorneys have to exert a higher level of effort. Also, the equilibrium effort levels are decreasing in the cost parameter, c. Finally, effort levels cancel each other out in Φ_{Et}. As a consequence, $Var(\Phi_{Et}(e_P, e_D))|_{e_P = e_D}$ does

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[16]It could be that more than one pair (e_P^*, e_D^*) satisfies the equilibrium conditions. Even if potentially there could be multiple equilibria, the model is tractable because the expression above characterizes the equilibrium effort ratio for any possible equilibrium.

[17]Even though the priors on the attorneys' talents coincide, it could be that the actual realizations of the talent are different for the two attorneys. That is, even if the prior expectation of their talents coincides, $\mu_P = \mu_D$, it could be that the actual talents are different $t_i = \theta_i^h > t_j = \theta_j^l$.

not depend on the effort levels and $Var(\Phi_{Et})|_{e_P=e_D} = \overline{\Sigma} = 1/4$. Table 1 below summarizes the effect of increases in the parameters on e^*.

Table 1: Comparative statics effects on the equilibrium effort

	β	σ^2	$\rho(1-\rho)$	$\theta^h - \theta^l$	δ	c
e^*	$+$	$+$	$+$	$+$	$+$	$-$

Let $\Phi^* \equiv \Phi(e_P^*, e_D^*, t_P, t_D)$ be the realized probability that A_P succeeds at trial. Since the attorneys' equilibrium effort levels are equal and $\mu_P = \mu_D = \mu$, then the expected probability that A_P wins the trial is $\Phi_{Et}^* = 1/2$. However, notice that if one attorney has higher talent than the other, then her realized probability of prevailing in Court will also be higher. Only if the realizations of the talents of A_P and A_D were the same then Φ^* would also be $1/2$.

The market anticipates how much effort to expect from the attorneys; hence, the attorney's effort decisions cannot mislead the market's inference; that is, $\Phi_{Et}^* \cdot \hat{t}_P(A_P \ wins; e_P^*, e_D^*) + (1 - \Phi_{Et}^*) \cdot \hat{t}_P(A_P \ loses; e_P^*, e_D^*) = \mu$. However, the attorneys are trapped into providing higher effort the larger their career concerns and the larger the uncertainty about their talent. Therefore, the results are consistent with standard one-agent career concerns models (Holmström, 1982, 1999). Even when there are not explicit incentives, career concerns provide incentives for agents to exert effort. Also, the effect of career concerns is stronger the higher is the uncertainty about the ability of the agents.

A particularity of this framework is that the tournament component —typical of legal disputes— implies that higher equilibrium effort does not necessarily lead to a higher performance, measured by the probability of prevailing in court. Increasing the career-concerns incentives of the two opposing agents, can make both attorneys worse off, since both attorneys would increase the equilibrium effort levels without affecting Φ^*. Therefore, attorneys' expected payoffs decrease because effort costs are larger. As discussed in Section 6 this does not benefit clients either since the expected trial outcome remains unchanged despite the higher equilibrium effort.

Overall, the results show that career concerns can lead to an increase in litigation costs without necessarily improving the litigants' payoffs. As discussed in Section 7, career concerns might still be beneficial in terms of social welfare. In particular, higher equilibrium effort levels might be welfare improving if they lead to more accurate Court decisions or reduce the probability of mistakes. In addition, the following subsections study the potential benefits of having stronger career-concerns incentives than the opponent's attorney.

3.2 Asymmetric priors

The priors on the attorneys' talents (μ_i, σ_i) may be different due, for instance, to differences in the past performance in Court, in the quality of the law school from which they graduated or in the number of years of experience. From Proposition 2, we can anticipate that career-concerns incentives are stronger for the attorney with higher uncertainty on her talent. Corollary 2 compares the equilibrium effort levels when, everything else equal, attorneys' priors are (μ_P, σ_P) and (μ_D, σ_D),

are asymmetric.

Corollary 2 *Asymmetric priors such that $\sigma_j < \sigma_i$ imply that in equilibrium, A_i exerts more effort than A_j in Court. In particular, A_P's and A_D's equilibrium effort levels must satisfy:*

$$\frac{e_P^*}{e_D^*} = \left(\frac{\sigma_P^2}{\sigma_D^2}\right)^{1/(\gamma-1)}. \tag{16}$$

The attorney with a higher prior variance has stronger career-concerns incentives and exerts more effort in Court than her opponent. In contrast, differences in prior expected talents, μ_P and μ_D, do not play any role on effort incentives. This is not the case when effort and talent are not linearly separable. Section 6 shows that μ_P and μ_D may actually affect e_P^*/e_D^* in the presence of complementarities between effort and talent.

A particularly interesting case arises if both attorneys have the same *a priori* expected talent, $\mu_i = \mu_j$ but there is more uncertainty over the talent of one of the attorneys, $\sigma_i > \sigma_j$ (e.g., because of shorter professional experience). For instance, suppose there is more uncertainty on A_P's talent. Then, in equilibrium A_P exerts more effort than A_D, and since $\mu_P = \mu_D$, her expected chances of prevailing in Court are also higher (i.e., $\Phi_{Et} > 1/2$).

Furthermore, it can be shown from Proposition 2 and Corollary 1 that, starting from the baseline case, an increase in σ_i for one of the attorneys increases the level of effort of the other attorney even when her own σ_j remains unchanged. Suppose that σ_P increases while σ_D remains equal to σ, the initial symmetric uncertainty. Let e_P^* and e_D^* denote the new equilibrium effort levels, while e^* denotes the initial symmetric equilibrium effort for the two attorneys. Since $\sigma_P > \sigma_D = \sigma$, it must be that $e_P^* > e_D^*$. Also, since $\Phi_{Et} > 1/2$, then $Var(\Phi_{Et}) < \overline{\Sigma} = 1/4$. As a consequence:

$$e_D^{*\gamma-1} = \frac{\xi\beta\tau\sigma^2}{cVar(\Phi_{Et})} > e^{*\gamma-1} = \frac{\xi\beta\tau\sigma^2}{c\overline{\Sigma}} \tag{17}$$

Therefore, an increase in A_P's career concerns induces A_D to increase her equilibrium effort level. Despite increasing her effort level, A_D's prospects of winning the case are worse than when facing an attorney with the same career-concerns incentives. The analogous result can be shown for an increase in σ_D starting from the baseline case. Figure 2 illustrates these results.

There are two main driving forces in these results. First, winning a case has a larger positive effect for the attorney with a higher prior variance because the market has greater uncertainty over her talent. Similarly, losing a case has a larger negative effect. Thus, her incentives to exert more effort in Court are stronger. In addition, starting from the symmetric equilibrium, if the priors on the attorneys' talents change such that $\sigma = \sigma_j < \sigma_i$, then both attorneys increase their effort because due to $e_j^* < e_i^*$, $Var\{\Phi_{Et}^*\}$ decreases with respect to the symmetric equilibrium. In other words, A_i's effort level is larger because his incentives are twofold ($\sigma_j < \sigma_i$ and $Var\{\Phi_{Et}^*\} < \overline{\Sigma}$). In contrast, A_j exerts higher effort only because the trial outcome becomes less noisy due to $Var\{\Phi_{Et}^*\} < \overline{\Sigma}$.
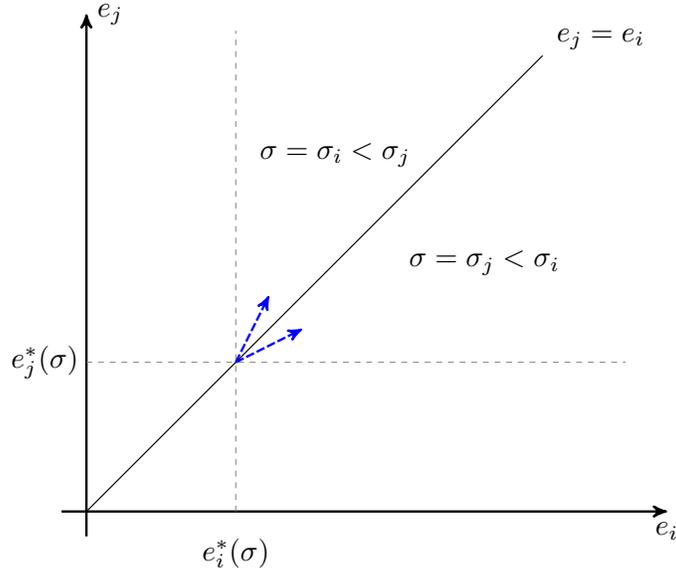
Figure 2: Changes in the equilibrium effort levels when increasing σ_i (or σ_j) while holding σ_j (σ_i) fixed with respect to the baseline

3.3 Other asymmetries

Assume now that A_P and A_D have symmetric priors but asymmetric career concerns, β_i, costs c_i, and τ_i (i.e., $\partial\Phi/\partial t_i$). Then, holding everything else equal, the equilibrium effort levels, e_P^* and e_D^*, must satisfy:

$$\frac{e_P^*}{e_D^*} = \left(\frac{\beta_P \tau_P \; c_D}{\beta_D \tau_D \; c_P}\right)^{1/(\gamma-1)}.$$

Differences in τ_P and τ_D imply differences in the trial outcome's sensitivity to the attorneys' talents since $\delta_i = \tau_i \cdot (\theta^h - \theta^l)$.[18] For instance, it could be that in Torts Law the trial outcome is more sensitive to the skills of the plaintiff's attorney than to the ones of the defendant's attorney. Differences in the sensitivity to the attorneys' talents lead to very similar results as differences in σ_i. A higher δ_i leads to stronger career-concerns incentives, such that holding everything else equal $e_i^* > e_j^*$.

Similarly, differences in the weights put on career concerns, β_P and β_D, play the same role as differences in the uncertainty on the attorneys' talents. Given the same prior and effort cost parameters, if $\beta_i > \beta_j$ it must be that in equilibrium $e_i^* > e_j^*$. Therefore, the attorney with higher career concerns exerts more effort in equilibrium. Furthermore, following the same procedure as with asymmetric priors, it can be shown that a change in β_i affects attorney j's level of effort even when her own costs remain unchanged.

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[18]Notice that since the priors are symmetric, it must be that $\theta_P^h = \theta_D^h$ and $\theta_P^l = \theta_D^l$.

19

The following corollary summarizes these findings.

Corollary 3 *Starting from the baseline, an increase in $\beta_i \tau_i / c_i$ (holding $\beta_j \tau_j / c_j$ fixed) implies that both attorneys increase their effort but Ai increases more than Aj. That is, $e_j^* < e_i^*$.*

4 Career concerns and the merits of the case

The merits of the case also play a role in the trial outcome, frequently favoring one of the litigants (e.g., before the trial begins, it could be common knowledge that the precedents favor one of the litigants). Let $M \in (0,1)$ denote the merits of the case in favor of the plaintiff, such that Φ is increasing in M (i.e., $1 - \Phi$ is decreasing in M). Then, Φ is now a function of M, e_P, e_D, t_P, and t_D, where $(\Phi \mid e_P = e_D, t_P = t_D, M)$ is not necessarily $1/2$, unlike in Section 3. However, by letting $M = 1/2$ represent the case where the merits do not favor any of the litigants, then $(\Phi \mid e_P = e_D, t_P = t_D, M = 1/2) = 1/2$.

The merits of the case can interact with career concerns through three possible channels. First, the merits of the case may affect the attorneys' returns from effort. It is possible to study this channel by making c_P and c_D depend on M, which is equivalent to the asymmetries in marginal costs of effort studied in the previous section.[19] Second, when the trial outcome depends on M, also do the trial outcome's noisiness, $\Phi_{Et}(1 - \Phi_{Et})$ and, as a consequence, the incentives to provide effort in Court. Thus, a change in the value of M can affect career-concerns incentives by making the noisiness, $\Phi_{Et}(1 - \Phi_{Et})$, be closer or farther to the maximal trial outcome's noisiness, which is still reached when $\Phi_{Et} = 1/2$. Third, and particularly interesting for the analysis of career-concerns incentives, the merits may directly affect the trial outcome's informativeness about the attorneys' talents. In particular, winning a difficult case (i.e., a case with merits against the attorney) is likely to be more informative than winning an intermediate or an easy case (i.e., a case with even merits or merits that favor the attorney). As a consequence, a difficult case could lead to larger reputational gain and, therefore, to larger career-concerns incentives.

To introduce the third channel, let the sensitivity of the trial outcome to attorney i's talent, $\delta_i(M)$, depend on M for $i = P, D$. This means that the cross partial derivatives of Φ with respect to talent and merits of the case is non-zero. Specifically, if the trial outcome is more sensitive to A_P's talent when the merits are against then $\partial \Phi / \partial M \partial t_P < 0$. Thus, $\delta_P(M)$ is decreasing in M. For instance, this is the case when only high talented lawyers are able to win difficult cases. Equivalently, $\partial \Phi / \partial M \partial t_D > 0$, implies that the trial outcome is more sensitive to A_D's talent when the merits are in favor of the plaintiff. As a consequence, $\delta_D(M)$ is increasing in M. Thus, for a given $M \neq 1/2$, career-concerns incentives are no longer symmetric for the two attorneys. Since the informativeness is larger whenever the merits of the case are against the attorney, then for A_P, the reputational gain tends to be larger when $M < 1/2$, while for A_D, the reputational gain tends

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[19]Suppose the case merits only affect the cost parameters, then c_P decreasing and c_D increasing in M, (i.e., as the merits become more favorable to attorney i, her cost of effort decreases) , implies that e_P^*/e_D^* is increasing in M.

to be larger when $M > 1/2$. Furthermore, for each attorney, the reputational gain from winning the trial is not symmetric around $M = 1/2$. In particular, for A_P:

$$\hat{t}_P(A_P \ wins; e_P, e_D, M) - \hat{t}_P(A_P \ loses; e_P, e_D, M) = \rho_P(1 - \rho_P)(\theta_P^h - \theta_P^l) \cdot \frac{\delta_P(M)}{\Phi_{Et}(1 - \Phi_{Et})}.$$

Similarly, for A_D:

$$\hat{t}_D(A_P \ loses; e_P, e_D, M) - \hat{t}_D(A_P \ wins; e_P, e_D, M) = \rho_D(1 - \rho_D)(\theta_D^h - \theta_D^l) \cdot \frac{\delta_D(M)}{\Phi_{Et}(1 - \Phi_{Et})}.$$

Maintaining the linearity and separability assumptions as in Section 3, then, we could introduce merits into expressions (9) and (10) by letting the probability that A_P wins the case be:

$$\Phi = M/2 + \xi \cdot (e_P - e_D) + \tau_P(M)t_P - \tau_D(M)t_D, \tag{18}$$

where $\tau_P'(M) < 0$ and $\tau_D'(M) > 0$ to allow the sensitivity to be decreasing (increasing) in M for A_P (A_D). Then, the ex-ante expected probability that A_P *wins* is given by

$$\Phi_{Et} = M/2 + \xi \cdot (e_P - e_D) + \tau_P(M)\mu_P - \tau_D(M)\mu_D. \tag{19}$$

Therefore,

$$\hat{t}_P(A_P \ wins; e_P^*, e_D^*, M) - \hat{t}_P(A_P \ loses; e_P^*, e_D^*, M) = \frac{\tau_P(M)\sigma_P^2}{Var(\Phi_{Et})}$$

$$\hat{t}_D(A_P \ loses; e_P^*, e_D^*, M) - \hat{t}_D(A_P \ wins; e_P^*, e_D^*, M) = \frac{\tau_D(M)\sigma_D^2}{Var(\Phi_{Et})}$$

The solid lines in Figure 3 illustrate the asymmetry that arises in the posteriors for A_P and A_D when the sensitivity depends on the merits of the case as discussed above. The trial outcome's level of informativeness is no longer minimized at $\Phi = 1/2$. For comparison purposes, the dashed lines illustrate a symmetric reputational gain around $M = 1/2$ that would arise if $\Phi = M/2 + \xi \cdot (e_P - e_D) + \tau \cdot (t_P - t_D)$. That is, if M affected Φ, and therefore, $Var(\Phi_{Et})$, through the second channel mentioned above but not through the third channel. The effect through $Var(\Phi_{Et})$ would be symmetric around $M = 1/2$ since the effect on $Var(\Phi_{Et})$ of an increase from $M = 1/2$ to $M = 1/2 + \Delta$ would be equivalent to the effect of a decrease from $M = 1/2$ to $M = 1/2 - \Delta$, for any $\Delta < 1/2$. In contrast, when $\tau_P(M)$ is decreasing in M, the reputational gain from winning relative to losing is larger when $\tau_P(M = 1/2 - \Delta)$ than when $\tau_P(M = 1/2 + \Delta)$. Therefore, career-concerns incentives are larger in the first case. Equivalently for $\tau_D(M)$, the reputational gain from winning relative to losing is smaller when $\tau_P(M = 1/2 - \Delta)$ than when $\tau_P(M = 1/2 + \Delta)$. Therefore, career-concern incentives are smaller in the first case.

Paradoxically, it may happen that less favorable merits for A_P (i.e., a lower M) induce A_P to
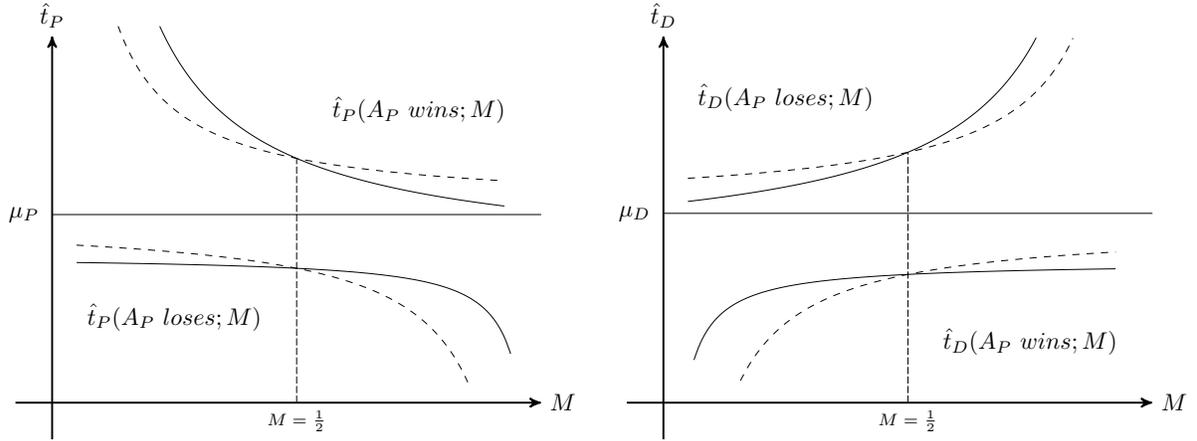
Figure 3: Posterior A_P and A_D's expected talents conditional on the the trial outcome and as a function of the case merits, M

exert more effort than if the merits were more even. Replacing the expression of the reputational gain in the necessary first order conditions permits to aggregate the three potential channels in which the merits of the case can affect the attorneys' effort decisions, as summarized in the following proposition.

Proposition 3 *A less favorable case may increase attorney i's incentives to provide effort (relatively to attorney j's) when less favorable merits are associated to a trial outcome more sensitive to t_i. In particular:* [20]

$$\frac{e_P^*}{e_D^*} = \left(\frac{\beta_P \sigma_P}{\beta_D \sigma_D} \frac{c_D(M)\tau_P(M)}{c_P(M)\tau_D(M)} \right)^{1/(\gamma-1)}.$$

Therefore, e_P^*/e_D^* can be decreasing in M when $\tau_P'(M) < 0$ and $\tau_D'(M) > 0$.

While less favorable merits can increase the marginal cost of effort, they can also increase the attorneys' career-concerns incentives. This is the case when the less favorable merits make the trial outcome more informative, and thus lead to a larger reputational gain from winning the case. Therefore, less favorable merits could actually lead to a positive net effect on the relative equilibrium effort level, as stated in the following corollary.

Corollary 4 *If the merits of the case favor attorney A_i relative to attorney A_j, the resulting possible cost advantage, $c_i(M) < c_j(M)$ could be offset by a resulting lower reputational incentive such that A_j exerts higher effort in equilibrium than A_i. More specifically, $e_j^* < e_i^*$ as long as $\tau_i(M) c_j(M) > \tau_j(M) c_i(M)$.*

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[20]As in Section 3, it could be that more than one pair (e_P^*, e_D^*) satisfies the equilibrium conditions. Even if potentially there could be multiple equilibria, the model is tractable because the expression above characterizes the equilibrium effort ratio for any possible equilibrium.

5 Settlement

Considering the equilibrium effort levels in case of trial, it is possible to study the effects of career concerns on the settlement process. As usual in settlement bargaining models, the lowest (highest) settlement amount that the plaintiff (defendant) is willing to accept (pay) depends on her expected payoff in case of trial. These amounts, designated as the litigants' settlement concession limits, depend on the corresponding litigant's court costs and on the attorneys' anticipated choices of effort. Therefore, the settlement process depends on career-concerns incentives even when settlement agreements *per se* are not informative about the talent of the attorneys.[21,22]

Let W be the award obtained by the plaintiff in case of winning the trial and $\Phi^*_{E_t}$ the anticipated expected probability that A_P *wins*, given anticipated equilibrium effort levels, e^*_P and e^*_D. Then, it is beneficial for the plaintiff's side to accept a settlement compensation, S, as long as it is at least as large as the *ex ante* expected payoff from going to trial. That is, if it satisfies:

$$S \geq W \cdot \Phi^*_{E_t} - \frac{c_P(e^*_P)^\gamma}{\gamma}. \tag{20}$$

The right-hand side of the inequality represents the combined payoff of the plaintiff and her attorney. This condition corresponds to the joint payoff if the client and her attorney decide about settlement jointly, or alternatively, if the choice of whether to settle or not is made by the client but conditional on paying a compensation that satisfies her attorneys' binding participation constraint in case of trial (i.e., in case of trial, the client pays $c_P(e^*_P)^\gamma/\gamma$). For other alternatives regarding the contractual relationship between client and attorneys, see the discussion in Section 6

Similarly, it is beneficial for the defendant's side to accept a settlement compensation, S, as long as it is at most as large as the *ex ante* expected payment to be paid to the plaintiff in case of trial. That is:

$$S \leq W \cdot \Phi^*_{E_t} + \frac{c_D(e^*_D)^\gamma}{\gamma}. \tag{21}$$

As in the case of the plaintiff, this condition corresponds to the joint payoff if the defendant and her attorney decide about settlement jointly, or alternatively, if the choice of whether to settle or

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[21] Settlement may provide information about the attorneys' litigation talent. In particular, reaching a good settlement agreement might reveal that the attorney is talented. However, it could be argued that the kind of talent relevant for bargaining is different (and perhaps even uncorrelated) from the kind of talent relevant in the trial stage. Also, trials appear to be more informative about talent than settlement process because trials are usually complex procedures that test the attorneys' skills to a greater extent, and because many settlement agreements are sealed, in contrast with court judgments that are publicly available in general. This section focuses in these later cases. Nevertheless, settlement negotiations (and other stages of the trial outcome, such as discovery) that are informative about the litigation talent of the attorney, could be considered to be included in $\Phi(e_P, e_D, t_P, t_D)$.

[22] In publicly available settlement agreements, the settlement outcome could be informative about the attorneys' talents and would affect the priors on their talents. As a consequence, career concerns may affect the attorneys' strategies in a similar way as in the litigation stage studied above. Attorneys would decide their settlement strategies considering the resulting effect on the market's inference on their talent. A potential difference could be that settlement agreements are noisier indicators of attorneys' performance since during trials there is more information transmission about the merits of the case. If this is the case, career-concerns incentives would be weaker than with trial outcomes.

not is made by the client only but conditional on paying a compensation that covers her attorneys' participation constraint in case of trial (i.e., in case of trial, the client pays $c_D(e_D^*)^\gamma/\gamma$). Focusing on settlement processes that are not informative about the attorneys' litigation talent,[23] then $\hat{t}_i(settle; e_P^*, e_D^*) = \mu_i$. In addition, since in the case of trial the market cannot be fooled in equilibrium, the *ex ante* expected market's inference of A_i given the possible values for the trial outcome, z, is also the *a priori* expected talent, μ_i (i.e., $E_{t,z}\{\hat{t}_i(trial; e_P^*, e_D^*)\} = \mu_i$). Thus, the attorneys' *ex ante* expected reputational gain in case of trial is zero. Reaching the trial stage does not provide any expected reputational gain or loss relative to choosing settlement.

Therefore, in order to be accepted by both litigants, the settlement amount must belong to the range given by:
$$S \in \left[W \cdot \Phi_{E_t}^* - c_P(e_P^*)^\gamma/\gamma, \quad W \cdot \Phi_{E_t}^* + c_D(e_D^*)^\gamma/\gamma \right].$$

The length of the settlement range is given by $c_P(e_P^*)^\gamma/\gamma + c_D(e_D^*)^\gamma/\gamma$ and measures the surplus from reaching an agreement. Therefore, the surplus is determined endogenously in the litigation stage such that higher equilibrium effort levels result in a larger scope for settlement agreements. While career concerns tend to provide incentives to be more aggressive at the trial stage, they consequently (and somewhat counterintuitively) increase the gains from settlement as well. Continuing with the framework in Section 3, the following proposition states potential effects of career concerns on the settlement surplus.

Proposition 4 *Facing an opponent with stronger career-concerns incentives can lead to an increase in the surplus from settlement. In particular, starting from the baseline case raising A_i's career concerns incentives by raising σ_i such that $\sigma_i > \sigma_j$ —while letting $\mu_i \geq \mu_j$ and holding the remaining parameters— leads to an increase in the attorneys' equilibrium effort levels and, therefore, to an increase in the surplus from settlement.*

From Proposition 2, we can see that an increase in σ_i affects the equilibrium effort ratio such that $e_i^* > e_j^*$. Thus, $\mu_i \geq \mu_j$ is a sufficient (although not necessary) condition for $Var(\Phi_{E_t}^*)$ to decrease. From equations (11) and (12), both an increase in σ_i and a decrease in $Var(\Phi_{E_t}^*)$ lead to higher equilibrium effort levels for both attorneys, e_i^* and e_j^*. Finally, higher equilibrium effort levels imply a larger settlement surplus, $c_P(e_P^*)^\gamma/\gamma + c_D(e_D^*)^\gamma/\gamma$. The equivalent result can be shown for an increase in β_i or τ_i. In words, an increase in attorney i's career concerns leads to an increase in her relative equilibrium effort. If the increase is high enough (i.e., enough to lead to an increase of $\xi(e_i - e_j) + \tau(\mu_i - \mu_j)$) then it introduces an asymmetry that reduces the trial outcome's noisiness and, therefore, it increases the incentives of the opponent's attorney to also increase her equilibrium effort level.

In addition to increasing the gains from settlement, stronger career concerns can weaken the bargaining constraints of the opponent as stated in the following corollary.

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[23]See Footnote 21 above for more discussion.

Corollary 5 *Relatively weaker career-concerns incentives than the opponent's attorney can lead to a less demanding concession limit than when facing an attorney with the same career concerns.*

Continuing with the analysis above, asymmetric priors such that $\mu_i \geq \mu_j$ and $\sigma_i > \sigma_j$, we have that A_i exerts more effort in equilibrium and has a higher expected probability of prevailing in court than A_j. Also, expression (17) shows that A_j's effort level is larger than if $\sigma_i = \sigma_j = \sigma$. Thus, if $j = D$ the defendant's concession limit necessarily increases because when facing an attorney with a larger σ_P, both the probability that A_P wins in Court and the anticipated trial costs increase (i.e., $W \cdot \Phi^*_{E_t} + c_D(e^*_D)^\gamma/\gamma$ increases). On the other hand, the effect for the plaintiff's concession limit is ambiguous since her expected probability of prevailing in Court is larger than in the symmetric but her trial costs also increase (i.e., $\Phi^*_{E_t}$ increases because $e^*_P > e^*_D$, but also does $c_P(e^*_P)^\gamma/\gamma$). Similarly, if if $j = P$ the plaintiff's concession limit necessarily decreases the probability that A_P wins in Court decreases and the anticipated trial costs increase. Therefore, weaker career-concerns incentives can provide a disadvantage during the settlement bargaining process.

5.1 The outcome of bargaining with symmetric information

If litigants have symmetric information then settlement is individually optimal for both. Within the settlement range, the settlement amount resulting from the bargaining stage depends on the bargaining power of the litigants. If the defendant has all the bargaining power, then she makes a take-it-or-leave-it offer, $S^* = W \cdot \Phi^*_{E_t} - c_P(e^*_P)^\gamma/\gamma$, which would be accepted by the plaintiff. If, on the contrary, the plaintiff has all the bargaining power, then she makes a take-it-or-leave-it offer $S^* = W \cdot \Phi^*_{E_t} + c_D(e^*_D)^\gamma/\gamma$, which is accepted by the defendant. Now, suppose the attorney making a take-it-or-leave-it offer is chosen randomly where π represents the probability that A_P is the proposer. Notice that the Nash bargaining outcome (Nash, 1950) coincides with the outcome when both attorneys are equally likely to be the proposer (i.e., when $\pi = 1/2$). Then, the settlement outcome is given by:

$$S^* = W \cdot \Phi^*_{E_t} - (1 - \pi)(c_P(e^*_P)^\gamma/\gamma) + \pi(c_D(e^*_D)^\gamma/\gamma)$$

Therefore, career-concerns incentives are relevant for the settlement bargaining outcome as they determine the equilibrium effort levels and, consequently, the surplus to be split between the litigants in case of settlement.

5.2 The outcome of bargaining with asymmetric information

When litigants are asymmetrically informed, they may fail to reach a settlement agreement that prevents the costly trial . However, it may be possible to transmit some or all of the private information via screening or signaling such that settlement takes place (for a comprehensive survey, see Spier, 2007). As shown in this literature, concession limits and trial costs are key variables for litigants'settlement strategies under asymmetric information. In the presence of career concerns,

these variables would be endogenously determined based on attorneys' career-concerns incentives. Therefore, they can potentially affect the parties' settlement agreement as well as the probability of settlement. The specific implications of career-concerns incentives would depend on the nature and source of the asymmetric information but they could influence the probability of reaching a settlement agreement. For instance, in a signaling model where the plaintiff has private information on the damage suffered (i.e., for the notation used in this article, this would be equivalent to having private information on the award in case of winning, W), Reinganum and Wilde (1986) find that the likelihood of reaching the trial stage depends on the total sum of litigation costs. As a consequence, by increasing litigation costs, stronger career-concerns incentives could decrease the likelihood of trial.

6   Extensions

6.1   Complementarities between effort and talent

Most career-concerns models assume additive separability between effort and talent.[24] However, in certain frameworks effort and talent can exhibit complementarities (e.g., a more talented attorney may have larger returns from effort than a less talented attorney). This subsection focuses on the role of such complementarities on the informativeness of the trial outcome and, therefore, on the career-concerns incentives of the two attorneys.

Letting:

$$\Phi(e_P, e_D, t_P, t_D) = \frac{1}{2} + \frac{e_P t_P - e_D t_D}{N}, \tag{22}$$

where N is a parameter large enough to ensure that $\Phi \in [0, 1]$ for any combination of e_P, e_D, t_P and t_D. Attorney's performance is determined by talent and effort which exhibit complementarities. Given this functional form assumed for Φ:

$$\Phi_{Et}(e_P, e_D, t_P, t_D) = \frac{1}{2} + \frac{\mu_P e_P - \mu_D e_D}{N}; \tag{23}$$

the expectation over Φ is taken with respect to both t_P and t_D, since there is common imperfect information about both attorneys' talents. The cross partial derivative of Φ (respectively, $1 - \Phi$) with respect to e_P and t_P (respectively, e_D and t_D) is positive. Thus, the attorney with higher prior average talent would have larger returns from effort than the attorney with lower prior average talent.

The main implication of this extension is that a higher level of effort increases the informativeness of the trial outcome on the attorneys' talents. This is the case because the sensitivity of the trial

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[24]An exception is Bonatti and Horner (2014), which studies a one agent model with continuous time and coarse information. They find that complementarities between effort and talent lead to strategic substitution effects between effort levels at different career stages of the agent. In contrast, such substitutability does not arise in the model with additively separable effort and talent. Also, Dewatripont et al. (1999a,b) notice that, in a one-agent model with multiple tasks, complementarities between effort ant talent may induce multiple equilibria.

outcome to the attorneys' talents now also depends on the attorneys' effort levels. In particular, $\left(\Phi_{Et}\,|t_P = \theta_P^h\right) - \left(\Phi_{Et}\,|t_P = \theta_P^l\right) = e_P(\theta_P^h - \theta_P^l)/N$ and $\left(1 - \Phi_{Et}\,|t_D = \theta_D^h\right) - \left(1 - \Phi_{Et}\,|t_D = \theta_D^l\right) = e_D(\theta_D^h - \theta_D^l)/N$. Thus, from expressions (1) and (2) we know that the posterior in case of winning (losing) the trial is now increasing (decreasing) in e_i. As a consequence, the attorneys' reputational gain from winning the trial is increasing in their own effort level. For A_P:

$$\hat{t}_P(A_P \ wins; e_P, e_D) - \hat{t}_P(A_P \ loses; e_P, e_D) = \frac{e_P\sigma_P^2/N}{Var(\Phi_{Et})},$$

Similarly for A_D:

$$\hat{t}_D(A_P \ loses; e_P, e_D) - \hat{t}_D(A_P \ wins; e_P, e_D) = \frac{e_D\sigma_D^2/N}{Var(\Phi_{Et})}.$$

Intuitively, attorneys with higher prior average talent have stronger career-concerns incentives because of the complementarities between effort and talent. From the first order conditions in expressions (5) and (6)

$$-c_P e_P^{*\,\gamma-1} + \beta_P\mu_P/N \cdot (\hat{t}_P(A_P \ wins; e_P^*, e_D^*) - \hat{t}_P(A_P \ loses; e_P^*, e_D^*)) = 0,$$

$$-c_D e_D^{*\,\gamma-1} - \beta_D\mu_D/N(\hat{t}_D(A_P \ loses; e_P^*, e_D^*) - \hat{t}_D(A_P \ wins; e_P^*, e_D^*)) = 0.$$

Complementarities imply that $\partial\Phi_{Et}/\partial e_P = \mu_P/N$ and $\partial\Phi_{Et}/\partial e_D = -\mu_D/N$. Replacing the expressions for the reputational gain in the first order conditions:

$$c_P e_P^{*\,\gamma-1} = \frac{\beta_P\mu_P e_P^*\sigma_P^2}{N^2 Var(\Phi_{Et})}, \tag{24}$$

$$c_D e_D^{*\,\gamma-1} = \frac{\beta_D\mu_D e_D^*\sigma_D^2}{N^2 Var(\Phi_{Et})}. \tag{25}$$

Since attorneys' reputational gain is now increasing on their effort levels, the equilibrium effort, e_i appears also on the right hand side of the first order condition of attorney A_i. The following equilibrium result holds.

Proposition 5 *In the presence of complementarities between effort and talent, a higher prior average talent, μ_i, induces a higher effort in equilibrium. In particular:*
i.- A_P/A_D equilibrium effort ratio can be characterized as:[25]

$$\frac{e_P^*}{e_D^*} = \left(\frac{c_D\mu_P\beta_P\sigma_P^2}{c_P\mu_D\beta_D\sigma_D^2}\right)^{1/(\gamma-2)}. \tag{26}$$

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[25] As in the case without complementarities, it could be that more than one pair (e_P^*, e_D^*) satisfies the equilibrium conditions. The model is still tractable because the expression above characterizes the equilibrium effort ratio for any possible equilibrium.

ii.- As in the case without complementarities, a higher equilibrium $Var(\Phi_{Et})$ is associated with lower equilibrium effort levels of A_P and A_D.

6.2 A_P compensated via a contingent fee

In previous sections, attorneys' compensation was either a fixed fee or an hourly fee with unobservable effort levels for the clients.[26] As described in Dana and Spier (1993), "contingent fees are the common form of compensation for plaintiff's attorneys in personal injury and medical malpractice litigation while they are rarely used by defendants." Thus, I adjust the framework to let A_P be compensated only if she wins the trial and A_D's compensation to remain as in previous sections.

Denoting by $\alpha \in (0, 1]$ the fraction of the Court award kept by A_P, then A_P chooses the effort level to solve the following problem:

$$\max_{e_P \in [0,1]} \alpha \cdot W\Phi_{Et}(e_i, e_j) - \frac{c_P e_P^\gamma}{\gamma} + \beta_P \cdot \{\Phi_{Et}(e_i, e_j) \cdot (\hat{t}_P(A_P \ wins; e_i^*, e_j^*) - \hat{t}_P(A_P \ loses; e_P^*, e_D^*))\},$$

Following the same procedure and linearity assumptions as in Section (3) and adjusting expression (11), the interior optimal level of effort, e_P^*, must then satisfy:

$$c_P e_P^{*\gamma-1} - \alpha W\xi = \frac{\xi\beta_P\tau\sigma_P^2}{Var(\Phi_{Et}(e_P^*, e_D^*))} \tag{27}$$

Since A_D's incentives are as in previous sections, then e_D^* satisfies the same condition as in expression (12):

$$c_D e_D^{*\gamma-1} = \frac{\xi\beta_D\tau\sigma_D^2}{Var(\Phi_{Et}(e_P^*, e_D^*))} \tag{28}$$

Simplifying these two equations:

$$\frac{c_P e_P^{*\gamma-1} - \alpha W\xi}{\beta_P\sigma_P^2} = \frac{c_D e_D^{*\gamma-1}}{\beta_D\sigma_D^2} = \frac{\tau\xi}{Var(\Phi_{Et}(e_P^*, e_D^*))}. \tag{29}$$

Proposition 6 *Adjusting the framework in Section 3 to let A_P be compensated via a contingent fee, then in equilibrium, career concerns incentives still induce both attorneys to exert higher effort levels in Court. In particular, A_P and A_D's equilibrium effort must satisfy:*[27]

$$\frac{c_P e_P^{*\gamma-1} - \alpha W\xi}{c_D e_D^{*\gamma-1}} = \frac{\beta_P\sigma_P^2}{\beta_D\sigma_D^2}. \tag{30}$$

equilibrium effort levels of A_P and A_D.

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[26]See footnote 9 for more discussion.

[27]It could be that more than one pair (e_P^*, e_D^*) satisfies the equilibrium conditions.

The contingent fee introduces an additional incentive for A_P to exert effort in Court. For large enough σ_P or β_P, career concerns incentives may have a larger impact than the contingent explicit incentive.

6.3 Alternative contracts between clients and attorneys

In the settlement section, attorneys' compensation in case of trial is determined by their binding participation constraint. This assumption is reasonable if attorneys compete for clients. Alternatively, it could be that attorneys have higher bargaining power during the contract stage; for instance, if the supply of lawyers is scarce or if the number of certified lawyers is given, as in Iossa and Jullien (2012). In these cases, clients' willingness to pay would affect attorneys' compensation. This subsection studies the effect of career-concerns incentives on clients willingness to pay for an attorney.

In models with one agent, stronger career-concerns incentives are potentially beneficial for the principal because they may reduce the moral hazard problem. Also, in a model with one agent, Köszegi and Li (2008) find the conditions under which wages are increasing in an employee's responsiveness to implicit incentives ("drive"). However, when the agents' outcome is determined by a tournament, career concerns might not be beneficial and could potentially have negative implications for clients. Hiring a lawyer with strong career concerns may be beneficial for the client, but the value of such gain is also a function of the strength of the opposing lawyer's career concerns.

As shown in Section 3, a litigant's equilibrium probability of winning the case does not necessarily increase when her attorney's equilibrium effort increases. It depends also on the effect on the equilibrium effort of the opponent. As a consequence, the litigant could be worse off, because her chances of prevailing in Court would not necessarily be higher and the litigation costs would increase. Thus, the results in previous sections indicate that with two opposing agents, clients' willingness to pay is going to be affected by the career concerns of both her attorney and the opponent's attorney.

Suppose both clients choose their attorneys simultaneously. They can both choose among an attorney with high career concerns, $\overline{\sigma}^2$, or an attorney with low career concerns, $\underline{\sigma}^2$. For simplicity, let the ex ante expected talent, μ_i, and other attorneys' characteristics be the same for both attorney types. The equilibrium probability that A_P wins would then be given by $\Phi^{\sigma_P \sigma_D^*}$, such that σ_P and σ_D represent the *ex-ante* talent's variance of the attorneys chosen by the plaintiff and the defendant, respectively. Based on the results in Corollaries 1 and 2 and given $\mu_i = \mu_j$, then:

$$\Phi^{\overline{\sigma}\underline{\sigma}^*} > \Phi^{\overline{\sigma}\overline{\sigma}^*} = \Phi^{\underline{\sigma}\underline{\sigma}^*} > \Phi^{\underline{\sigma}\overline{\sigma}^*}$$

Therefore, if the attorneys' compensation is the same for both types of attorneys, that is $w \equiv w(\overline{\sigma}) = w(\underline{\sigma})$ then clients have incentives to hire the attorney with high career concerns give that

for the plaintiff:
$$W \cdot \Phi^{\overline{\sigma}\underline{\sigma}^*} - w > W\Phi^{\cdot\underline{\sigma}\underline{\sigma}^*} - w$$

$$W \cdot \Phi^{\overline{\sigma}\overline{\sigma}^*} - w > W\Phi^{\cdot\underline{\sigma}\overline{\sigma}^*} - w$$

And for the defendant:
$$-W \cdot \Phi^{\underline{\sigma}\overline{\sigma}^*} - w > -W\Phi^{\cdot\underline{\sigma}\underline{\sigma}^*} - w$$

$$-W \cdot \Phi^{\overline{\sigma}\overline{\sigma}^*} - w > -W\Phi^{\cdot\overline{\sigma}\underline{\sigma}^*} - w$$

Therefore, for both it is a dominant strategy to hire the attorney with high career concerns. This particular case illustrates how litigants might end up in an equilibrium where both hire attorneys with high career concerns even though in equilibrium it does not increase their probability of winning the case relative to the case in which both hire low career concerns attorneys.

7   Implications for social welfare

As in other frameworks, the net effect of career concerns on social welfare is ambiguous. On the one hand, reputational incentives induce attorneys to exert higher effort levels in Court, and thus, can reduce moral hazard problems and could potentially lead to more accurate court decisions —although only whenever the probability of mistakes in court decisions is decreasing in attorneys' effort levels. On the other hand, career concerns can generate rat-race effects leading to long working hours in law firms (Landers et al. 1996), and high litigation expenses, which generate distortions in other markets ((Lerner, 1995; Gallini, 2002; Roberts and Hock, 2009; Dranove and Watanabe, 2010; Viscusi, et al. 2005).

As shown in the previous section, clients might end up in an equilibrium where both hire an attorney with high career concerns even though it does not improve their probability of winning the case. Given that higher career-concerns incentives tend to increase effort provision, this could imply that litigants end up in a prisoners' dilemma situation. Notice that the joint payoff of a client and her attorney decreases if the attorney's equilibrium effort increases but the probability of winning the case does not change. The baseline case clearly illustrates this situation. Therefore, the model extends the result in Ashenfelter et al. (2012) to a framework with attorneys' career concerns. Their article finds that litigants are more successful when they hire expert agents (typically lawyers) to represent them in labor disputes than when they do not. However, they also find that such advantage is fully offset when both litigants hire expert agents. As shown in this article, career concerns can exacerbate this effect.

Beyond the litigants' aggregated payoffs, it might be desirable for overall social welfare to influence attorneys' career-concerns incentives. For countries or areas of law where high litigation expenses are a concern, the article provides ways to reduce such reputational incentives. In particular, litigation procedure rules may affect the sensitivity of the trial outcome to the attorneys' talents, δ_P and δ_D in the model. For instance, the outcome of the trial is likely to depend more on

attorneys' talents in some legal systems compared to others. If as argued by Glendon et al. (1982) in inquisitorial systems the impact of attorneys' talents on the trial outcome is more constrained than in adversarial systems, then the reputational gain from winning the case would be lower in such systems due to the lower sensitivity of the trial outcome to the talent of the attorneys. Similarly, previous research has found differences in verdicts from judges and verdicts from juries when facing similar cases.[28] One possibility is that juries are more sensitive to attorneys' ability (e.g., communication skills), while judges might focus more on the merits of the case. As a consequence, jury trials could potentially lead to higher effort levels and litigation expenses. If high litigation expenses is a concern, policy makers could introduce rules aiming to reduce such sensitivity. For instance, caps on jury awards could achieve this target by introducing a constraint to jury decisions. Nevertheless, a lower sensitivity, could also potentially imply that equilibrium effort levels are not sufficiently high due to the lower career-concerns incentives. Therefore, in some legal frameworks it may enhance social welfare to increase the trial outcome's sensitivity.

8 Conclusion

As shown in this article, career concerns affect lawyers' equilibrium effort levels and generate strategic interactions in their decisions. These strategic interactions depend on how informative is the trial outcome about their talent, which is determined endogenously. A lawyer is then not only affected by her own career concerns, but also by the career concerns of her opponent. In addition, career concerns incentives depend on the sensitivity of the trial outcome to the attorneys' talents. When such sensitivity depends on the merits of the case, then the merits may act as a multiplier of career-concerns incentives on lawyers' effort decisions.

The article contributes to the career concerns literature by studying a model with two opposing agents where performance is determined by a tournament. It shows that when the two opposing agent's performance is determined by a win-or-lose outcome, then there is endogenous noise in the information on talent transmitted by the outcome. As a consequence, the reputational gain from winning depends on the equilibrium effort level of the two agents. At the same time, the article contributes to the contest literature. It shows that the uncertainty on the endogenous noise is maximal when agents compete in symmetric conditions. Therefore, career-concerns incentives weaken relative to situations where the conditions are asymmetric. This result contrasts with usual contest models with exogenous rewards, where asymmetries tend to reduce effort incentives.

As in the standard career-concerns literature, throughout the article attorneys do not have private information about their own talents. Incorporating asymmetric information on talent could imply additional distortions. In line with Spence (1973), attorneys could potentially use the trial

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[28]Spier (2007) provides an overview of documented differences between juries and judges decisions. In particular, Clermont and Eisenberg (1992), and Helland and Tabarrok (2000) find differences in trial awards and win rates, once accounting for the part of these differences driven by selection. Their evidence suggests that the differences are more complex than just driven by a general pro-plaintiff jury bias, as considered by conventional wisdom.

as a signaling device. Lawyers observing a positive private signal about their own talent would have a higher expected reputational gain than those with a negative signal, leading to potential separating equilibria.

Appendix

Derivation of the reputational gain from winning the trial:

This part of the Appendix contains the derivation of the market's inference process. First, to obtain the market's inference about t_P, from Bayes' rule the probability of being a high type conditional on winning:

$$
\begin{aligned}
\Pr\{\theta_P^h \mid A_P \; wins\} &= \frac{\Pr(A_P \; wins \cup \theta_P^h)}{\Phi_{Et}} = \frac{\rho_P \left(\Phi_{Et} \mid t_P = \theta_P^h\right)}{\Phi_{Et}} \\
&= \frac{\rho_P \left(\Phi_{Et} \mid t_P = \theta_P^h\right) + \rho_P \; \Phi_{Et} \; - \rho_P \; \Phi_{Et}}{\Phi_{Et}} = \\
&= \rho_P + \frac{\rho_P \left(\Phi_{Et} \mid t_P = \theta_P^h\right) - \rho_P \cdot \rho_P \left(\Phi_{Et} \mid t_P = \theta_P^h\right) - \rho_P(1 - \rho_P)\left(\Phi_{Et} \mid t_P = \theta_P^l\right)}{\Phi_{Et}} \\
&= \rho_P + \frac{\rho_P(1 - \rho_P)\left(\Phi_{Et} \mid t_P = \theta_P^h\right) - \rho_P(1 - \rho_P)\left(\Phi_{Et} \mid t_P = \theta_P^l\right)}{\Phi_{Et}} \\
&= \rho_P + \rho_P(1 - \rho_P)\frac{\left(\Phi_{Et} \mid t_P = \theta_P^h\right) - \left(\Phi_{Et} \mid t_P = \theta_P^l\right)}{\Phi_{Et}},
\end{aligned}
$$

and the probability of being a low type conditional on winning:

$$
\begin{aligned}
\Pr\{\theta_P^l \mid A_P \; wins\} &= \frac{\Pr(A_P \; wins \cup \theta_P^l)}{\Phi_{Et}} = \frac{(1 - \rho_P)\left(\Phi_{Et} \mid t_P = \theta_P^l\right)}{\Phi_{Et}} \\
&= \frac{(1 - \rho_P)\left(\Phi_{Et} \mid t_P = \theta_P^l\right) + (1 - \rho_P) \; \Phi_{Et} \; - (1 - \rho_P) \; \Phi_{Et}}{\Phi_{Et}} = \\
&= (1 - \rho_P) + \frac{(1 - 1 + \rho_P)(1 - \rho_P)\left(\Phi_{Et} \mid t_P = \theta_P^l\right) - \rho_P(1 - \rho_P)\left(\Phi_{Et} \mid t_P = \theta_P^h\right)}{\Phi_{Et}} = \\
&= (1 - \rho_P) + \frac{\rho_P(1 - \rho_P)\left(\Phi_{Et} \mid t_P = \theta_P^l\right) - \rho_P(1 - \rho_P)\left(\Phi_{Et} \mid t_P = \theta_P^h\right)}{\Phi_{Et}} \\
&= (1 - \rho_P) - \rho_P(1 - \rho_P)\frac{\left(\Phi_{Et} \mid t_P = \theta_P^h\right) - \left(\Phi_{Et} \mid t_P = \theta_P^l\right)}{\Phi_{Et}}.
\end{aligned}
$$

Therefore, the market's inference about t_P when A_P wins can be rewritten as:

$$
\hat{t}_P(A_P \; wins; e_P, e_D) = \theta_P^h \cdot \Pr\{\theta_P^h \mid A_P \; wins\} + \theta_P^l \cdot \Pr\{\theta_P^l \mid A_P \; wins\} =
$$

$$
= \mu_P + \rho_P(1 - \rho_P)(\theta_P^h - \theta_P^l) \cdot \frac{\left(\Phi \mid t_P = \theta_P^h\right) - \left(\Phi \mid t_P = \theta_P^l\right)}{\Phi_{Et}}.
$$

Conversely, when A_P loses, the probability of being a high type conditional on losing is given by:

$$\Pr\{\theta_P^h \mid A_P \; loses\} = \frac{\Pr(A_P \; loses \cup \theta_P^h)}{1 - \Phi_{Et}} = \frac{\rho_P \left(1 - \Phi_{Et} \mid t_P = \theta_P^h\right)}{1 - \Phi_{Et}}$$

$$= \frac{\rho_P \left(1 - \Phi_{Et} \mid t_P = \theta_P^h\right) + \rho_P(1 - \Phi_{Et}) - \rho_P(1 - \Phi_{Et})}{1 - \Phi_{Et}} =$$

$$= \rho_P + \frac{\rho_P \left(1 - \Phi_{Et} \mid t_P = \theta_P^h\right) - \rho_P \cdot \rho_P \left(1 - \Phi_{Et} \mid t_P = \theta_P^h\right) - \rho_P(1 - \rho_P)\left(1 - \Phi_{Et} \mid t_P = \theta_P^l\right)}{1 - \Phi_{Et}}$$

$$= \rho_P + \frac{\rho_P(1 - \rho_P)\left(1 - \Phi_{Et} \mid t_P = \theta_P^h\right) - \rho_P(1 - \rho_P)\left(1 - \Phi_{Et} \mid t_P = \theta_P^l\right)}{1 - \Phi_{Et}} =$$

$$= \rho_P + \rho_P(1 - \rho_P)\frac{\left(1 - \Phi_{Et} \mid t_P = \theta_P^h\right) - \left(1 - \Phi_{Et} \mid t_P = \theta_P^l\right)}{1 - \Phi_{Et}} =$$

$$= \rho_P - \rho_P(1 - \rho_P)\frac{\left(\Phi_{Et} \mid t_P = \theta_P^h\right) - \left(\Phi_{Et} \mid t_P = \theta_P^l\right)}{1 - \Phi_{Et}},$$

and the the probability of being a low type conditional on losing is given by:

$$\Pr\{\theta_P^l \mid A_P \; loses\} = \frac{\Pr(A_P \; loses \cup \theta_P^l)}{1 - \Phi_{Et}} = \frac{(1 - \rho_P)\left(1 - \Phi_{Et} \mid t_P = \theta_P^l\right)}{1 - \Phi_{Et}} =$$

$$= \frac{(1 - \rho_P)\left(1 - \Phi_{Et} \mid t_P = \theta_P^h\right) + (1 - \rho_P)(1 - \Phi_{Et}) - (1 - \rho_P)(1 - \Phi_{Et})}{1 - \Phi_{Et}} =$$

$$= (1 - \rho_P) + \frac{(1 - 1 + \rho_P)(1 - \rho_P)\left(1 - \Phi_{Et} \mid t_P = \theta_P^h\right) - \rho_P(1 - \rho_P)\left(1 - \Phi_{Et} \mid t_P = \theta_P^l\right)}{1 - \Phi_{Et}} =$$

$$= (1 - \rho_P) + \rho_P(1 - \rho_P)\frac{\left(1 - \Phi_{Et} \mid t_P = \theta_P^h\right) - \left(1 - \Phi_{Et} \mid t_P = \theta_P^l\right)}{1 - \Phi_{Et}}.$$

Therefore, the inference in case of winning can be rewritten as:

$$\hat{t}_P(A_P \; lose; e_P, e_D) = \theta_P^h \cdot \Pr\{\theta_P^h \mid A_P \; wins\} + \theta_P^l \cdot \Pr\{\theta_P^l \mid A_P \; wins\} =$$

$$= \mu_P - \rho_P(1 - \rho_P)(\theta_P^h - \theta_P^l) \cdot \frac{\left(\Phi_{Et} \mid t_P = \theta_P^h\right) - \left(\Phi_{Et} \mid t_P = \theta_P^l\right)}{\Phi_{Et}}.$$

Regarding the defendant's attorney, the market's inference about t_D when A_P loses is equivalent to the market's inference about t_P when A_P wins. Similarly, the market's inference about t_D when A_P wins is equivalent to the market's inference about t_P when A_P loses. Therefore:

$$\hat{t}_D(A_P \; loses; e_P, e_D) = \theta_D^h \cdot \Pr\{\theta_D^h \mid A_P \; loses\} + \theta_D^l \cdot \Pr\{\theta_D^l \mid A_P \; loses\} =$$

$$= \mu_D + \rho_D(1 - \rho_D)(\theta_D^h - \theta_D^l) \cdot \frac{\left(\Phi_{Et} \mid t_D = \theta_D^h\right) - \left(\Phi_{Et} \mid t_D = \theta_D^l\right)}{\Phi_{Et}}.$$

$$\hat{t}_D(A_P \ wins; e_P, e_D) = \theta_D^h \cdot \Pr\{\theta_D^h \mid A_P \ wins\} + \theta_D^l \cdot \Pr\{\theta_D^l \mid A_P \ wins\} =$$

$$= \mu_D - \rho_D(1 - \rho_D)(\theta_D^h - \theta_D^l) \cdot \frac{\left(\Phi_{Et} \mid t_D = \theta_D^h\right) - \left(\Phi_{Et} \mid t_D = \theta_D^l\right)}{\Phi_{Et}}.$$

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