On: "A Theory of Legal Presumptions" by Antonio E. Bernado, Eric Talley, and Ivo Welch, JLEO 2000

Stefan Hupfeld[1]

August 11, 2004

Seminar Paper for the
PhD-Course on Economic Analysis of Law
by Prof. Dominique Demougin, PhD
at the University of Konstanz

Abstract: Legal presumptions in litigations influence the winning probabilities of the involved parties. Depending on who is favored by the presumptions, either the plaintiff or the defendant, incentives to shirk before the process, the probability of filing, and the amount of litigation effort alter. In equilibrium, the litigation probability may actually rise when presumptions become more pro-defendant. In this seminar paper, I summarize a model of legal presumptions by Bernado et al. (2000) and provide an assessment and possible extensions.

[1]Department of Economics, University of Konstanz, 78457 Konstanz, Germany, Stefan.Hupfeld@uni-konstanz.de

1 Introduction

In the Journal of Law, Economics & Organization (2000), Bernado et al. published an article on the effect of legal presumptions on the behavior before and during the litigation process of the parties involved. For a specific setting of the model´s parameters, they derive that after a shift of the presumptions that benefits the defendant, in equilibrium *more* litigation will occur. Bernado et al. provide a rationale for this rather counterintuitive result and find the very same to be applicable to different U.S. laws.

Legal presumptions can be understood as the initial probabilistic estimation in the absence of evidence. The probably best known example is the presumption of innocence until found guilty in a criminal process. As Bernado et al. use one parameter to depict these presumptions, the assignment of the burden of proof can be subsumed under the presumptions as well.

Sections 2 to 5 summarize the model, including the setup, equilibria, and some normative implications. In sections 6 and 7, I give some critique and try to provide possible extensions within the presented framework. Section 8 concludes.

2 The Game

2.1 The General Setup

Benardo et al. (2000)[2] present a game theoretic model on the effects of legal presumptions. They introduce two players, an agent and a principal. The principal is the residual claimant on the project surplus, generated by the agent´s effort and a random element, nature. Depending on the outcome and his believes, the principal can sue the agent, and within the litigation process, both players can invest effort in order to increase their chances to win the case.

The legal system does not necessarily have to assign the same weight to both litigation investments; by varying a presumption parameter, the chances to win can shift in favor of one of the two players.

The game is divided in three stages. In the first stage, the agent´s move is his decision on the effort level. After nature has drawn the project outcome (conditioned on the effort), the principal chooses whether to sue or not, and once he decides on filing a case, both players decide on their optimal behavior in the litigation stage.

2.2 The Effort Stage

In the effort stage, the agent has to decide whether to take high or low effort in the project. Let the effort levels be denoted by e_H and e_L, respectively. Once the agent decides to take high effort, this is only possible at the cost of ϕ, whereas the cost of low effort is normalized to zero. After the agent´s choice, nature will choose the outcome of the project, which is discrete, either high or low, and denoted by V_H and V_L. The agent receives a fix wage w, which is not subject to an incentive contract or contingent on the project outcome.[3]

Nature serves as a stochastic element that prevents the principal from a direct observation of the effort; the high outcome does not materialize necessarily when the agent worked hard,

[2] In the following referred to as "the authors".

[3] This is restrictive, but the introduction of an incentive contract of the agent might deviate from the results that are driven by the *legal* setup.

but only with the probability p. With the counter-probability $(1-p)$, the outcome is low, although the agent took high effort. With the same probability p, the principal will observe V_L when the agent shirked, and V_H with $(1-p)$. In order to make the outcome level informative, p is assumed to be strictly greater than one half.

Obviously, it is restrictive to assume that the event that is more likely (given the effort level), occurs with the same probability p. But as far as I interpret this model, this loss off generality does not alter the results qualitatively.

2.3 The Filing Stage

The principal observes the project outcome. Unfortunately, he cannot infer directly on the agent´s effort, and remains in uncertainty. Given this incomplete information, the principal decides on whether to sue his agent or not. Directly attached to the filing are fixed costs F for the principal. We assume that the principal will not enter the litigation stage when he observes V_H.[4] In this case, the payoffs are as follows:

$$\pi_P = V_H - w \tag{1}$$
$$\pi_A^H = w - \phi \tag{2}$$
$$\pi_A^L = w \tag{3}$$

The respective π_A^i are the payoffs for the agent, given he took high $(i = H)$ or low $(i = L)$ effort, whereas π_P denotes the principal´s payoff. If nature reveals V_L to the principal, and he decides not to sue the agent, the principal´s payoff is reduced to $V_L - w$.

2.4 The Litigation Stage

Once the principal enters the litigation stage, both parties can invest a continuous amount of L in order to increase the chance of winning the case. This investment is costly, with constant marginal costs of c_P for the principal, and $c_H < c_L$ for the agent.[5] If the agent really took high effort, his constant marginal costs are strictly lower than those after he took low effort, since it is easier to proof what really has happened. Implicitly, the authors allow for manipulation of evidence, as it is possible to "prove" high effort, although the agent only produced low effort. Let q be the probability of a judicial decision in favor for the principal, then q is given purely mechanical by

$$q(L_A, L_P) = \frac{L_P}{bL_A^i + L_P}, \quad i = H, L. \tag{4}$$

Here, b enters the model as the most important parameter, defining the direction of the legal presumptions. If $b = 1$, there is no advantage for any party, if $0 < b < 1$, the weight of the investment made by the agent is relatively low, and hence q rises in favor of the principal. Any $b > 1$ benefits the agent, as it reduces the probability q that he is found liable. The

[4] Note that this is an assumption the authors impose. See section 6.3 for a discussion.

[5] Note that the marginal costs are constant in litigation effort, which might be interpreted as production of evidence, but not in the production of the winning probability.

presumption is said to be conclusive for $b = 0$ or $b \to \infty$, where $b = 0$ can be interpreted as *strict liability*, as every bad outcome is assigned to the agent, ignoring his effort level. When we call b the presumption parameter,

$$\lim_{L_A, L_P \to 0} q = \frac{1}{b+1}, \tag{5}$$

denotes the presumption itself, hence the *ex ante* probability of winning, given no litigation effort. The marginal productivity of litigation effort is decreasing for both parties.

Once the agent is found liable, he has to pay a damage D, which is passed to the principal. The damage compensation is not fully exogenous, but has to follow certain boundary conditions:

$$D > F \tag{6}$$

$$D > \frac{\phi}{2p-1} \tag{7}$$

Boundary condition 6 guarantees the existence of cases in which the principal will enter the litigation stage with positive probability. Note that if $D = F$, the presumption b has to be zero in order to leave the principal at least indifferent whether to sue or not. Condition 7 ensures that D is sufficiently large, so that the agent can at least in principal be deterred from shirking. If condition 7 does not hold, the agent will always shirk, regardless of the presumptions. Within these bounds, we may introduce D as additional policy parameter to stimulate filing activity and effort into the efficient direction. Interestingly, the collectable damage was also subject to the U.S. Federal Securities Litigation Reform[6] in 1995. It was reduced, in order to weaken the incentives to sue.

3 Noncooperative Equilibria

3.1 Solving the Game

In order to solve the game, the authors use the sequential equilibrium concept, as introduced by Kreps and Wilson (1982) and described by Gibbons (1992). Let α denote the principal´s believe of the probability that the agent decided on high effort, given that nature unveils V_L. Then, the principal solves the following maximization problem:

$$\max_{L_P \geq 0} \left[\alpha \left(\frac{L_P}{bL_A^H + L_P} \right) + (1-\alpha) \left(\frac{L_P}{bL_A^L + L_P} \right) \right] D - c_P L_P \tag{8}$$

The first-order condition yields $L_P^* \geq 0$. The case of $L_P^* = 0$ is disturbing at first sight; why would the principal choose to produce no litigation effort, when he could have avoided the litigation itself in the first place? First, it is necessary that D is large enough. Then, consider b to be 0. The winning probability finally is $\lim_{L_P \to 0} \frac{L_P}{0 \cdot L_A + L_P} = 1$, so the principal wins the case without producing litigation effort.

[6] See section 5.

Given the exerted effort e_i with $i = H, L$, the agent maximizes his payoff from the litigation and solves the following problem:

$$\max_{L_A^i \geq 0} \left[\frac{L_P}{bL_A^i + L_P} \right] (-D) - c_A^i L_A^i \tag{9}$$

The respective first order condition yields L_A^{i*}, which can be zero for a sufficiently low b.[7] The second order condition holds for every interior solution. Comparative statics show that

$$\frac{\partial L_P^*}{\partial D} > 0 \quad \text{and} \quad \frac{\partial L_A^{i*}}{\partial D} > 0, \tag{10}$$

which can be interpreted as higher aggressiveness induced by a larger potential gain or loss, respectively.

Given the optimal levels of litigation effort, we can compute the principal´s payoff when filing or not. The net payoff of filing is given by

$$R_P \equiv (\alpha q_H^* + (1-\alpha) q_L^*) D - c_P L_P^* - F. \tag{11}$$

Here, q_i^* is the winning probability as defined in equation 4, now dependent on the optimal levels of litigation effort. The principal will decide to enter the litigation stage, if $R_P > 0$.

Now that the optimal behavior of the principal is given, the agent decides on whether working hard or not. Let $\gamma = \Pr(S|V_L)$ denote the probability that the principal sues the agent, conditional on observing V_L. Then we can compute the net payoff of exerting high effort by

$$R_A \equiv \gamma \left(p(q_L^* D + c_A^L L_A^{L*}) - (1-p)(q_H^* D + c_A^H L_A^{H*}) \right) - \phi. \tag{12}$$

The agent will always take high effort, when $R_A > 0$. Let the probability of that event be denoted by β.

3.2 Equilibria

We can identify two regions of distinct presumptions. For the presumptions to be strongly pro-defendant, b has to be larger than a certain $\overline{b}$, and if $b < \underline{b}$, the presumptions are defined to be strongly pro-plaintiff. If we now assume that F and ϕ are sufficiently small[8], the agent will always take high effort if $b < \underline{b}$, as he anticipates that the principal will win any suit.

Reversely, if $b > \overline{b}$, the agent will always shirk, as he anticipates that the principal will loose every suit and will therefore never decide to enter the litigation stage. Both cases define unique sequential equilibria.

If $b \in [\underline{b}, \overline{b}]$, the sequential equilibrium is unique in mixed strategies. We find that the

[7] Note that the agent cannot choose whether to enter the litigation stage or not (which he nevertheless would not choose in equilibrium), so $L_A^{i*} = 0$ may serve as an imperfect substitute.

[8] In order to keep the fix costs of filing or of high effort, respectively, non-prohibitive.

probability of high effort increases when the presumptions become more pro-plaintiff. More interestingly and counterintuitive at first sight is the following (with γ as the probability of filing, conditional on V_L):

$$\frac{\gamma^*}{b} > 0 \tag{13}$$

The rate of filings actually *rises* as the presumptions shift toward the defendant! The authors give the following intuitions: While the presumptions are in favor of the agent, he will shirk with a higher probability. Once the bad outcome V_L occurs, it is now more likely to depend on the low effort than on nature.

This is indeed the key result, and further research might test its robustness against extensions and generalizations.

4 The Optimal Choice of Legal Presumptions

The legislation or the court[9] may want to maximize social welfare by deciding on optimal presumptions. It faces a trade-off between two sources of social waste, first, the inefficiency due to moral hazard of the agent, and second, the costs associated with any litigation.

Suppose that either F or ϕ are relatively high, compared to the potential efficiency gain $V_H - V_L$. Then society may want to prevent the principal from litigation, and the agent from taking effort, respectively. To induce this behavior, b has to be larger than $\overline{b}$, so that the agent will win any case, and the principal will never file a suit, anticipating his defeat. This situation can be referred to as *immunity* of the agent. Once F or ϕ are sufficiently low, $b = 0$ will minimize social waste, as the principal will always win, and the agent will therefore always take high effort, facing the threat of $q = 1$. These two cases constitute *corner* equilibria.

For specific and rather moderate parameter values, we can identify $b = \underline{b}$ to be the optimal value. In this case, the deterrence is high enough to induce high effort, but the principal does not litigate in every case (i.e., he plays a mixed strategy), so the litigation costs are reduced.

Unfortunately, the authors cannot provide such unique results in general. For some parameter ranges, it appears to be optimal to decide on a strictly interior b, such that both parties play mixed strategies, the agent sometimes shirks, and the principal sometimes decides to enter litigation stage.

5 Application: U.S. Federal Securities Legislation

Before the U.S. Federal Securities Legislation Reform from 1995[10], investors often filed against companies for securities fraud, based on forward looking corporate statements only. Together with clear incentives for lawyers that encouraged such "abusive" filings, U.S. legislation (and,

[9] Presumably, the court itself might not want to maximize social welfare, but some other standard instead. The authors draw a distinction between possible aims of the legislation and the court, where the latter might rather focus on uncovering the truth than on efficiency. This distinction may play only a minor role once legislation is able restrict courts to merely *applying* the law than advancing it, which is predominantly the case in continental Europe.

[10] First vetoed by President Clinton, but the veto was overrode by Congress.

indeed, also the President) felt pressure to give incentives for the reduction of such behavior. The Reform Act complicated this kind of filings in several ways.

The securities´ issuer could afterwards not be sued based on forward looking statements. The standard of proof for the fraudulent intent of the defendant was heightened. Overall, this and several other elements can all be summed up in stronger pro-defendant presumptions.

As a first reaction subsequent to the reform, filings dropped. But after a short time, the number of filings actually rose again and exceeded the former number and frequency. The authors control their results for market effects in the sense that in bear markets investors file more often, but their result is robust. The presented model framework may provide a reasonable explanation, when it is more likely now that specific losses can be attributed to fraudulent behavior of the defendant.

The authors apply their model to additional real-world phenomena, namely the Business Judgement Rules and Fiduciary Duties and Financial Distress. I omit to present them here.

6 Assessment and Suggestions for Extensions

6.1 Remarks on the Efficiency of Presumptions

The principal and the agent can produce evidence in the litigation stage in order to support their case. This includes the manipulation of evidence as well. Although the parties will refrain from producing false evidence in equilibrium once we assign certain values to the model´s parameters[11], in some rather intermediate cases they will not do so. Once we focus on social efficiency, the production of false evidence and therefore of potentially "false" winning probabilities may lead to unnecessary waste *in principle*. Of course, this depends crucially on the naive behavior of the court that takes every evidence as given. The quasi-standard of proof implicitly modelled in $q(L_P, L_A)$ does not include a threshold amount of evidence from that on the court is convinced of the truth; what is important is not the absolute, but the *relative* amount of evidence. Once (different) budget constraints are introduced, the court´s decision might either deviate even further from the socially desirable one, as the decision is not based on factual truth, but on economic capacity, or it might lead to an inefficiently high amount of evidence produced by both parties. See for example Dewatripont and Tirole (1999) and Palumbo (2000a and 2000b) and related literature for a comparison and assessment of the adversarial and inquisitorial system of the production of evidence, especially under the possibility of manipulation.

The naive attitude of the court also prevents adaptive behavior of the agent. Suppose in an intermediate optimum we have a separating equilibrium, where the agent sometimes exerts high effort. If he decides to be the high effort type, he will produce some positive amount of evidence, and if he is the low effort type, he will produce a strictly lower amount or refrain from producing any evidence at all. Then the court could directly infer on the type of agent and therefore find him liable or not. The authors recognize this latter caveat of their model, but they do not present a strategic version of the court instead.

[11] The cases were identified as those where the presumption parameter is set to *immunity* or *strict liability*.

6.2 Direct Costs of Judicial Error

The authors claim that an introduction of error costs would not render their model useless. Without explicitly naming it, they already incorporate such errors: While the simpler, but explicit alternative would impose exogenous costs of error, the authors´ proposal at least partly endogenizes them. Hence, what a model with judicial errors has to consider are deviations or changes in the degree of moral hazard and of the litigation frequency as a reaction on errors. The agent internalizes that the court will be mistaken sometimes in his behavior. So does the principal when deciding on his litigation activities. Consider the case of presumptions that are sufficiently pro-defendant. Indeed, they can be so high as to induce a sure defeat for the plaintiff. This decision is being anticipated by the principal; he will refrain from losing money in a futile undertaking such as a litigation. Finally, the unoffended agent will shirk. The court will *always* err, because he will never find the defendant liable.

So we observe the following indirect costs of judicial error: The loss of efficiency due to shirking, and the fixed and variable costs associated with the litigation process. But a social planner exactly minimizes this (probability-weighted) sum[12], and therefore the indirect costs of judicial error! What is not aimed at is the minimization of the error *frequency* alone; but in the economic analysis of legal presumptions the absolute minimization of errors might come at costs beyond any justification on the grounds of efficiency.

If we assign additional direct costs to the errors, the social welfare maximization problem will change. Let k_1 denote the costs associated with a false positive[13], which occurs with the frequency $\lambda_1(b)$, and k_2 the costs of a false negative[14], occurring with frequency $\lambda_2(b)$. The direct costs are exogenous, whereas the error frequencies are endogenous.

The social planner then maximizes

$$\left\{ \begin{array}{l} -\underbrace{(1-\beta)[(2p-1)(V_H - V_L) - \phi]}_{\text{costs of suboptimal effort}} \\ -\underbrace{\gamma[\beta(1-p) + (1-\beta)p][\alpha c_A^H L_A^H + (1-\alpha)c_A^L L_A^L + c_P L_P + F]}_{\text{costs of litigation}} \\ -\underbrace{[\lambda_1(b)k_1 + \lambda_2(b)k_2]}_{\text{direct error costs}} \end{array} \right\} \tag{14}$$

over the choice of b. Note that optimal behavior of the two parties is already assumed. The error frequencies are simply denoted to be a function of b, but they are derived as a result from this optimal behavior. It is not possible to drive both frequencies down to zero: Under *immunity*, no false positive will occur. But when the agent produces low effort, he will never be found liable, so the probability of a false negative is 1, vice versa under *strict liability*, and

[12] In other words: The social planner in Bernado et al. (2000) minimizes the inefficiencies resulting from potential errors. If the court were able to observe e_H or e_L directly, it would never be mistaken, we could assign 1 and 0 to q_L and q_H, and it would be unnecessary to spend litigation effort. The agent would only exert low effort if $\phi > D$, and the principal would only file if $F < D$. Suppose $D = V_H - V_L$. The agent would rather pay D to the principal if $\phi > D$ than spending effort, which would be socially efficient as well. And the principal will only file if $F < D$, which again is the efficient solution.

[13] An agent the after having produced high effort is nevertheless found liable for the low state of nature.

[14] Vice versa.

some interior values will emerge under moderate presumptions.

Proposition 1. *For sufficiently*[15] *small F and ϕ, and $\underline{b} < b < \overline{b}$, the following holds: The frequency of a false positive decreases with a marginal shift of presumptions towards the defendant.*

Proof. The probability (or frequency) of a false positive is given by the principal´s winning probability, given the agent exerted high effort. So λ_1 is simply given by q_H. Bernado et al. (2000) exemplary show that for the given range of presumptions, $\partial q_H/\partial b < 0$ holds. □

Proposition 2. *For sufficiently small F and ϕ, and $\underline{b} < b < \overline{b}$, the following holds: The frequency of a false negative increases with a marginal shift of presumptions towards the defendant.*

Proof. The probability of a false negative is $\lambda_2 = 1 - q_L$. In the given range of b, $\partial q_L/\partial b < 0$ holds as strict inequality, so $\partial \lambda_2/\partial b > 0$. □

The *generalized* proof for propositions 1 and 2 remains open. From propositions 1 and 2, the direction of the change of b^* after the introduction of direct error costs is not uniquely positive or negative. In order to reduce error costs, proposition 1 suggests a rise of b, whereas proposition 2 suggests a reduction. It is left to future research, under which conditions a unique result can be derived, hence if the introduction of direct error costs shifts the optimal presumptions towards the plaintiff or the defendant.

6.3 Litigation under High Project Outcomes

Assume the absence of the restriction of no litigation under V_H. Let δ denote the principal´s believe of $\Pr(e_H|V_H)$, then the maximization problem under V_H becomes

$$\max_{L_P \geq 0} \left[\delta \left(\frac{L_P}{bL_A^H + L_P} \right) + (1-\delta) \left(\frac{L_P}{bL_A^L + L_P} \right) \right] D - c_P L_P. \tag{15}$$

The agent will choose his optimal amount of litigation effort, and in the filing stage the principal decides on entering the litigation, based on the sign of his net payoff. In equilibrium, an objective perception of the filing probability will emerge:

$$\eta \equiv \Pr(S|V_H)$$

For a given η, the agent decides on his effort level. The decision criterion is the sign of the net gain of high effort,

$$\begin{aligned} R_A \quad &\equiv \quad \gamma \left(p(q_L^* D + c_A^L L_A^{L*}) - (1-p)(q_H^* D + c_A^H L_A^{H*}) \right) \\ &+ \quad \eta \left((1-p)(q_L^* D + c_A^L L_A^{L*}) - p(q_H^* D + c_A^H L_A^{H*}) \right) - \phi. \end{aligned} \tag{16}$$

[15] Compare with Assumptions 1 and 2 in Bernado et al. (2000), p. 17.

Whenever R_A is positive, the agent will take high effort. With application of Bayes´ rule, the total and unconditional probability of filing $\Pr(S)$ is given by

$$\begin{aligned} \Pr(S) &= \frac{\Pr(S|V_H)\Pr(V_H)}{\Pr(V_H|S)} + \frac{\Pr(S|V_L)\Pr(V_L)}{\Pr(V_L|S)} && (17) \\ &= \frac{\eta[\beta p + (1-\beta)(1-p)]}{\frac{\eta}{\eta+\gamma}} + \frac{\gamma[\beta(1-p) + (1-\beta)p]}{\frac{\gamma}{\eta+\gamma}} && (18) \\ &= \eta + \gamma. && (19) \end{aligned}$$

Proposition 3. *Within a specific range of parameters, the total and unconditional probability of filing increases when the presumptions marginally shift towards the defendant.*

Proof. The derivative of 19 with respect to b depends on $\partial\gamma/\partial b$ and $\partial\eta/\partial b$. Bernado et al. (2000) show that there are regions where the first term is positive. It remains open whether there are specifications for that the second term can be positive as well, and whether the whole effect is potentially positive. (Please note that this merely the *idea* of a proof). □

There is potential to prove the main finding of Bernado et al. (2000) to be valid once we assume that litigation is possible, even after the observation of a high project outcome; the completion of the proof has to be left for future research.

6.4 Multiple Agents

Suppose that there are two (or in general, n) agents. Applications for this can be found in class action suits. The outcome of the project now depends on the cumulative effort. The principal observes three different levels of outcome, denoted by $V_H > V_M > V_L$, but he can neither infer which agent has shirked, nor whether an agent has shirked at all. Nature will overlay the cumulative effort in the way she did in section 2.2.

The game can be set up in two different fashions: First, agent 1 exerts effort, and agent 2 acts subsequently, after having observed the decision of agent 1. Second, both agents act simultaneously (i.e., agent two makes his decision without knowing the decision of agent 1). The principal observes the outcome and faces four options: He can sue agent 1, agent 2, both agents at the same time, or no agent at all.[16] The presumption parameter could vary across the two agents, and not only across the agent and the principal. The interesting question is whether the results of the original model are robust in the two-agent case, such that the principal with sue the agent favored by the presumptions. Extended to the n-agent case, the question arises if the principal will *in general* sue the agent with the most favorable presumptions on his side, given the presumptions are neither set to immunity, nor to strict liability.

7 Further Possibilities for Extensions

Other extensions are possible, but cannot be accounted for in detail. Just as the game can be extended to n-agents, it could be played more than once, either a finite or an infinite number of times. This extension probably should then include some refinements, such as the introduction

[16] A fifth possibility might contain the option to file a second suit, conditional on the result of the first litigation.

of incentive payments instead of exogenous wages, or the possibility to terminate the joint project. The authors themselves already propose the introduction of a pre-trial settlement. After the principal has sued the agent, one of the parties could offer a settlement to the counter-party. If there is disagreement upon the settlement, the litigation starts, which is necessary in order to pose a credible threat. Within such a settlement, both parties can share the variable costs of litigation ($c_P L_P + c_A^i L_A^i$), e.g. by Nash bargaining. The bargaining power depends on the expected winning probabilities.

An almost natural extension to the game is the introduction of continuous effort $e \in [\underline{e}, \overline{e}]$. One can think of constant or even increasing marginal costs $\phi(e)$ of effort for the agent. The outcome V is than a continuous mapping[17] $f(e)$, plus an error term with zero mean:

$$V = f(e) + \epsilon, \quad \epsilon \sim F, \quad f'(e) > 0 \tag{20}$$

The principal then has the option to file a suit against the agent, whereas the litigation stage could be set up as in the original paper. Depending on the parameter values, I consider the following cases to be plausible (see figure 1 for a comparison):

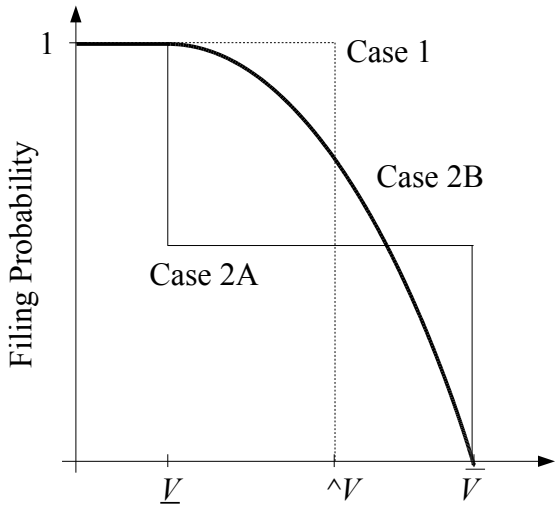

Figure 1: Filing Probabilities under Continuous Project Outcomes

1. In equilibrium, $\hat{V}$ will emerge, such that below $\hat{V}$ the principal will enter the litigation stage, and above he will refrain from doing so.

2. There emerges $\underline{V}$, such that for any $V < \underline{V}$ the principal will sue the agent with probability 1. Observing a V above an endogenous $\overline{V}$, the principal will refrain from filing. For any $V \in (\underline{V}, \overline{V})$, the principal will play a mixed strategy, i.e. he sues the agent with a positive probability smaller than 1. It is left for further calculations whether this interior probability is constant (case 2A) between $\underline{V}$ and $\overline{V}$, or whether it is decreasing (case 2B).

[17] For reasons of simplicity, this might just be the identity function.

8 Conclusion

With the theory of legal presumptions, the authors provide an insight to the field of law and economics. They are able to support their most important result with empirical (though anecdotal) evidence. Even in the basic setup of the model, the results differ significantly across various parameter specifications; nevertheless, it is left to future research whether the increasing filing probability under increasing pro-defendant presumptions is still an (at least potential) equilibrium when some assumptions are generalized.

Unfortunately, it is hard to think of an empirical assessment of their findings beyond anecdotal evidence. Since the results heavily depend on parameter specifications, it will remain uncertain if any finding can really be used for corroboration or falsification of the model. Yet, the results are plausible, so legislation might want to take this point of view in order to predict possible consequences of new or reformed laws. As the assignment of the burden of proof is element of the legal presumptions in this setting, Bernado et al. (2000) might give rise to to refinements in this branch of law and economics as well.

References

1. BERNADO, ANTONIO E., ERIC TALLEY and IVO WELCH (2000), A Theory of Legal Presumptions, Journal of Law, Economics & Organization, Vol. 16, No. 1, pp. 1-49.

2. DEWATRIPONT, MATHIAS and JEAN TIROLE (1999), Advocates, The Journal of Political Economy, Vol. 7, No. 101, pp. 1-39.

3. GIBBONS, ROBERT (1992), A Primer in Game Theory, Prentice Hall, New York.

4. KREPS, DAVID and ROBERT WILSON (1982), Sequential Equilibria, Econometrica, Vol. 50, No. 4, pp. 863-894.

5. PALUMBO, GULIANA (2000a), Decision Rules and Optimal Delegation of Information Acquisition, Centre for Studies in Economics and Finance (CSEF), Working Paper No. 42.

6. PALUMBO, GULIANA (2000b), Trial Procedures and Optimal Limits on Proof-Taking, International Review of Law and Economics, Vol. 21, No. 3, pp. 309-27.