When Should Judges Appoint Experts?: A Law and Economics Perspective

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Jonathan T. Tomlin and David Cooper
LECG LLC[*]
2049 Century Park East, Suite 2300
Los Angeles, CA 90067
Phone: 310-556-0709
Email: jonathantomlin@netscape.net, dcooper@lecg.com

ABSTRACT

The Supreme Court's decision in *Daubert v. Merrell Dow Pharmaceuticals* placed federal judges in the role of "gatekeepers" empowered to evaluate the reliability of often complex expert testimony. Many judges, commentators, and legal scholars have argued that court-appointed experts can assist judges in appropriately carrying out their gatekeeping role. However, previous literature has not evaluated the role of court-appointed experts in a rigorous framework that considers the complex interaction of the incentives of expert witnesses, the impact of expert witnesses on the decision-making of the fact finder, and the knowledge of the judge. In this article, we provide such a framework for assessing the appropriate use of court-appointed experts. We demonstrate that the option to appoint court experts in the role of technical advisors helps lead to appropriate judicial outcomes. Further, we provide guidance on the circumstances in which judges should appoint experts and the frequency with which such appointments should occur.

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[*] The opinions expressed in this article do not necessarily represent those of LECG.

INTRODUCTION

The Supreme Court's decision in *Daubert v. Merrell Dow Pharmaceuticals*[1] placed federal judges in the role of "gatekeepers" empowered to assess the reliability of often complex expert testimony in a wide variety of disciplines. Many legal commentators (including several judges) have suggested that court-appointed experts can assist judges in this role and mitigate the effects of potential expert witness bias when it occurs.[2] However, the prior literature has provided differing prescriptions for the use of court-appointed experts in terms of the conditions under which court-appointed experts should be used and the role they should play in litigation. Undoubtedly, a substantial portion of these disagreements arises from the difficulty of determining the ultimate effects of court-appointed experts on judicial outcomes. Whether, and how, court-appointed experts affect judicial outcomes depends on the complex interaction of the incentives of expert witnesses, the impact of expert witnesses on the decision-making of the fact finder, and the knowledge of the judge.

In this article, we employ simple game-theoretic tools to provide a framework for assessing the complex interactions between the experts of the parties, judges and juries, and court-appointed experts. We demonstrate that court-appointed experts acting as technical advisors can lead to proper judicial outcomes in situations when some experts might otherwise be inclined to provide biased testimony, and inaccurate damages awards might otherwise tend to result.[3] Thus, the guidance from the First Circuit that the appointment of technical advisors necessarily should be "hen's teeth rare" does not lead

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[1] Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993).

[2] *See, e.g.*, Sofia Adrogue & Alan Ratliff, *The Independent Expert Evolution: From the "Path of Least Resistance to the "Road Less Traveled?,"* 34 Tex. Tech L. Rev. 843, (2003); G. Michael Fenner, *The Daubert Handbook: The Case, Its Essential Dilemma, and its Progeny*, 29 Creighton L Rev. 939 (1996); Timothy Hillman, *Using Court-Appointed Experts*, New England Law Review, Vol. 36:3, 587, 2002; Lewis A. Kaplan, *2005 Milton Handler Antitrust Review: Experts in the Courthouse: Problems and Opportunities*, Colum. Bus. L. Rev. 247 (2006); Joseph Sanders, *From Science to Evidence: The Testimony on Causation in the Bendectin Cases*, 46 Stan. L. Rev. 1 (1993); Brian Huseman, Note, *Taylor v. State, Rule 709, and the DNA Database: Future Directions in DNA Evidence*, 22 Okla. City U.L. Rev. 397 (1997); Jay Lazo, Comment, *True or False: Expert Testimony or Refused Memory*, 28 Loy. L.A. L. Rev. 1345 (1995); Michael C. Polentz, Comment, *Post-Daubert Confusion with Expert Testimony*, 36 Santa Clara L. Rev. 1187 (1996); Developments in the Law, *Confronting the New Challenges of Scientific Evidence*, Harv. L. Rev. 1481 (1995); Note, *Improving Judicial Gatekeeping: Technical Advisors and Scientific Evidence,* 110 Harv. L. Rev. 941 (1997).

[3] Experts should certainly strive to provide unbiased testimony. However, there has long been a perception that some expert witnesses present testimony that is biased in favor of their attorney clients. *See, e.g.*, John H. Langbein, The *German Advantage in Civil Procedure*, University of Chicago Law Review, 52 U. Chi. L. Rev. 823, (1985).

to accurate jury decisions.[4] Further, we show that it is not necessary for judges to appoint technical advisors in every case or even a majority of cases in order to promote proper judicial outcomes. It is only necessary that judges establish a reputation for appointing technical advisors in the appropriate circumstances. Finally, we provide guidance on the circumstances in which judges should appoint experts.

In Section I, we summarize the gatekeeping role of the courts and the roles that court-appointed experts can play in litigation. In Section II, we discuss how expert testimony can impact the decisions of the finder of fact. Because of its importance in judicial outcomes, we focus particularly on testimony on economic damages although our results are more widely applicable. In Section III, we develop a simple game-theoretic model which shows the impact of court-appointed experts on the average level of awarded damages. As the model demonstrates, when the parties perceive a high probability that the judge will appoint an expert, the probability that experts will present biased testimony decreases. Accurate damages awards are more likely to result. In Section IV, we assess the results of our model in terms of prior policy recommendations. We explain that judges should not be reluctant to appoint technical advisors but that it is not necessary to appoint technical advisors in many cases. We also explain the circumstances in which judges should be more inclined to appoint experts. In Section V, we summarize our conclusions.

I. THE GATEKEEPING ROLE OF THE COURT AND THE ROLES OF COURT-APPOINTED EXPERTS

A. *Judges as "Gatekeepers"*

Expert witness testimony in a federal case must meet the requirements of Rule 702 of the Federal Rules of Evidence.[5] Rule 702 was revised following the Supreme Court's decisions in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*[6] and *Kumho Tire Co.*

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[4] Reilly v. United States, 863 F. 2d 149, 157 (1st Cir. 1988).
[5] *See* Fed. R. Evid. 702. *See also* CHARLES W. GERDTS III & CAROL E. DIXIT, *The Federal Law Governing Expert Witness Testimony*, in the LITIGATION SERVICES HANDBOOK Chapter 2 (2000),; Robert G. Badal & Edward J. Slizewski, *Economic Testimony Under Fire*, ABA Journal, November 2001; Peter Bronsteen & Asim Varma, *Daubert Rules for Economists*, Antitrust (Summer 2001); Christopher B. Hockett, Geraldine M. Alexis, & Christina M. Wheeler, *Revisiting the Admissibility of Expert Testimony in Antitrust Cases*, Antitrust (Summer 2001).
[6] *Daubert* 509 U.S. 579 (1993).

v. Charmichael,[7]and it attempts to clarify the standards developed in these decisions.[8]
Daubert listed a four-part, non-exclusive set of factors to be considered by federal judges in evaluating the admissibility of expert testimony: 1) whether the theory can be (and has been) tested, 2) whether the theory or technique has been subject to peer review or publication, 3) the theory's potential rate of error, and 4) the theory's general acceptance.[9] *Daubert* factors are non-exclusive, and Rule 702 appeals to a more general standard that expert opinion be "reliable."[10] In *Kumho Tire*, the Supreme Court clarified its decision in *Daubert* by explaining that *Daubert* is not limited to scientific testimony but includes testimony based on "technical" and "other specialized" knowledge.[11] Many states have adopted standards for assessing expert evidence that are similar to the federal standards although the approach varies between states.[12]

In an empirical study of *Daubert* decisions in federal court, Dixon and Gill concluded that "over time ... as judges gained experience in evaluating reliability and appellate court opinions clarified their authority, they appear to have felt less compelled to address each *Daubert* factor and to have paid increasing attention to more general issues important to addressing reliability."[13] They also found that for their sample of cases in which the reliability of expert evidence was challenged, the challenges failed in approximately 90% of the cases in which the court felt that the expert's analysis met a standard of "general acceptance." Thus, "general acceptance" appears to be an important criterion for judges in evaluating expert testimony.

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[7] Kumho Tire Co. v. Carmichael, 526 U.S. 237 (1999).
[8] *See* GLICK, REYMANN, & HOFFMAN *supra* note 45 at 27; Joseph A. Keierleber & Thomas Bohan, *Ten Years After Daubert: The Status of the States*, J. Forensic Sci., Vol. 50, No. 5 (2005).
[9] *Daubert* 509 U.S. 579 (1993). *See also* Quiet Tech. DC-8, Inc. v. Hurel-Dubois UK Ltd., 326 F.3d 1333, 1341 (11th Cir. 2003). The Committee Note accompanying Rule 702 of the Federal Rules of Evidence added five additional factors for consideration: 1) whether the expert's testimony grows out of research he or she has done independently of the litigation, or whether it was created just for the litigation, 2) whether the expert has "unjustifiably extrapolated from an accepted premise to an unfounded conclusion," 3) whether "obvious alternative explanations" have been accounted for, 4) whether the experts has used as much care as he or she would have in their work outside of litigation, and 5) whether the field of expertise claimed by the expert is known to reach reliable results for the topic the expert is opining on. *See*, Amended Fed. R. Evid. 702 Committee Note, May 1, 1999 Committee Report.
[10] Fed. R. Evid. 702.
[11] *Kumho Tire Co., 527 U.S.* at 149.
[12] *See* Joseph A. Keierleber & Thomas Bohan, *supra* note 8.
[13] Lloyd Dixon & Brian Gill, *Changes in the Standards for Admitting Expert Evidence in Federal Civil Trials Since the Daubert Decision*, (Rand Institute for Civil Justice) at 62.

The decision in *Daubert* placed federal judges in the role of "gatekeepers" empowered to screen out expert evidence that is unreliable. In addition, "a district court may properly consider whether the expert's methodology has been contrived to reach a particular result."[14] Thus, *Daubert* placed federal judges in positions of assessing expert testimony in a wide range of disciplines, some of which may be highly technical and in areas unfamiliar to them. Gatowski *et al.* found that 48% of state court judges felt that they had not been adequately prepared to handle the range of scientific evidence presented in their courtrooms.[15]

B.   *Court-appointed Experts*

Because *Daubert* placed federal judges in the role of "gatekeepers" assessing the reliability of complex testimony, it is natural to query whether court-appointed experts might facilitate the proper functioning of that role. Indeed, in its decision in *Daubert*, the Supreme Court noted that judges "should also be mindful" of their authority to appoint an expert under Rule 706 of the Federal Rules of Evidence.[16] It is useful to consider the different ways in which courts may appoint experts along with the propensity of judges to exercise their authority to appoint an expert.

A district court judge has the ability to appoint a "special master" under Federal Rules of Civil Procedure 53,[17] a testifying expert under Rule 706 of the Federal Rules of Evidence[18] or a technical advisor under the court's inherent powers.[19] Courts often utilize local attorneys as special masters to help expedite cases.[20] Special masters "gather evidence, make formal findings, give testimony and are subject to discovery and cross-examination."[21] Rule 706 authorizes district judges to appoint experts who may testify in

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[14] Rink v. Cheminova, Inc. 400 F.3d 1286, 1293 n.7 (11th Cir. 2005).

[15] Sophia I. Gatowski, Shirley A. Dobbin, James T. Richardson, Gerald P. Ginsburg, Mara L. Merlino, and Veronica Dahir, *Asking Gatekeepers: A National Survey of Judges on Judging Expert Evidence in a Post-Daubert World*, Law and Human Behavior, Vol. 25 (5) 2001.

[16] *Daubert* 509 U.S. 579 (1993).

[17] Fed. R. Civ. P. 53.

[18] Fed. R. Evid. 706. *See, also,* Adrogue & Ratliff *supra* note 2; Joe S. Cecil and Thomas E. Willging, Accepting Daubert's Invitation: Defining a Role for Court-Appointed Experts in Assessing Scientific Validity, 43 Emory L.J. 995 Summer (1994);; Kaplan *supra* note 2 .

[19] Ex Parte Peterson 253 U.S. 300 (1920); *See, also*, Cecil & Willging, *Id*.

[20] *See, e.g.*, Ryan M. Seidemann, James G. Wilkins, and Mindy Heidel, *Closing the Gate on Questionable Expert Testimony: A Proposal to Institute Expert Review Panels*, 33 S.U.L. 29 Fall (2005) at 50.

[21] Adrogue & Ratliff *supra* note 2 at 885.

court or present written findings and are subject to cross-examination.[22] Technical
advisors provide "advice and guidance to help steer the judge away from the pressures of
the adversarial process"[23] and have a less formal role in that it is not anticipated that they
will be testifying experts subject to cross examination. Because of the potential for
confusion between the appointment of technical advisors and experts under Rule 706, it
has been proposed that Rule 706 be revised to explicitly incorporate the role of technical
advisors.[24]

There is considerable dispute between judges and legal scholars over whether
court-appointed experts should testify and be subject to cross examination or serve as less
formal technical advisors focused on advising the judge directly. Some have argued that
court-appointed technical advisors not subject to cross examination "usurp the judicial
function."[25] The First Circuit has also stated that the appointment of a technical advisor
should be "if not a last, a near-to-last resort to be engaged in only where the trial court is
faced with problems of unusual difficulty, sophistication, and complexity, involving
something well beyond the regular questions of fact and law with which judges must
routinely grapple."[26] However, others have argued that technical advisors can often be
superior to Rule 706 experts because Rule 706 experts do not allow for "the sort of
ongoing, interactive guidance that would be helpful to judges in many cases."[27]

In addition to the question of the proper role of the court-appointed expert, the
circumstances under which experts should be appointed by the courts and the frequency
of these appointments have been areas of contention. Some have argued that the
appointment should be quite rare.[28] Many judges have been reluctant to appoint experts
out of a concern that doing so will interfere with the adversarial process.[29] Others have
felt that they discovered the need for an expert when it was too late to appoint one.[30] The
Fifth Circuit has stated that experts should only be appointed when there is an extreme

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[22] Fed. R. Evid. 706; Kaplan *supra* note 2 at 254.
[23] Kaplan *supra* note 2 at 254.
[24] *See*, Sophia Cope, Ripe for Revision: *A Critique of Federal Rules of Evidence 706 and the Use of Court-Appointed Experts*, 39 Gonz. L. Rev. 163 (2003/2004).
[25] Adrogue & Ratliff *supra* note 2 at 886.
[26] Reilly v. United States, 863 F. 2d 149, 157 (1st Cir. 1988).
[27] Kaplan *supra* note 2 at 254.
[28] *Reilly*, 863 F. 2d at 157.
[29] *See*, Cecil & Willging *supra* note 18 at 1018.
[30] *Id*. at 1020.

divergence between the opinions of the experts retained by the litigants.[31] Others, however, have advocated greater use of court-appointed experts.[32] There is also a perception that greater use of court-appointed experts is "coming, and it's going to happen sooner rather than later."[33]

II.   EXPERT TESTIMONY AND ITS INFLUENCE ON THE FINDER OF FACT

A.   *Expert Testimony on Damages*

Expert witness testimony on damages is a critical avenue through which experts can influence legal outcomes. In their survey of judges, Krafka *et al.* found that the "existence, nature, or extent of injury or damages" was the issue most frequently addressed by experts at trial and that 44% of the trials in their survey involved testimony on the extent of damages.[34] We focus on expert witness testimony on damages although, as explained below, our results are more widely applicable.

There are a large number of available methods for calculating damages which can lead to vastly different estimates. For example, consider the issue of applying prejudgment interest and a discount rate to damages. Multiple methods exist for calculating both. With regard to prejudgment interest, some economists have advocated the use of a "risk-free" rate[35] while others have advocated the use of the defendant's debt rate.[36] Advocated methods for calculating discount rates include the "CAPM" method, the weighted average cost of capital ("WACC"), and the "build-up" approach.[37]

Discount rates and prejudgment interest can vary substantially based on the amount of risk assumed and, given the importance of compounding, differences in these rates can yield very large differences in calculated damages. As an example, assume a harmful act that will cause lost profits to the plaintiff of equal amounts for each of the

[31] Eastern Air Lines, Inc. v. McDonnell Douglas Corp., 532 F.2d 957, 999-1000 (5th Cir. 1976).

[32] *See, e.g.*, Adrogue & Ratliff *supra* note 2; Kaplan *supra* note 2.

[33] Hillman *supra* note 2 at 587.

[34] Carol Krafka, Meghan A. Dunn, Molly Treadway Johnson, Joe S. Cecil & Dean Miletich, *Judge and Attorney Experiences, Practices, and Concerns Regarding Expert Testimony in Federal Civil Trials*, Psychology, Public Policy, and Law 2002, vol. 8, no. 3, pages 309-332.

[35] *See, e.g.,* Franklin M. Fisher and R. Craig Romaine, *Janis Joplin's Yearbook and the Theory of Damages*, Journal of Accounting, Auditing, and Finance (Winter 1990).

[36] *See, e.g.*, James M. Patell, Roman L. Weil, and Mark A. Wolfson, *Accumulating Damages in Litigation: The Roles of Uncertainty and Interest Rates*, Journal of Legal Studies, vol. XI (June 1982).

[37] *See* GLICK, REYMANN & HOFFMAN *supra* note 45 at pages 109-112,

next twenty years. Experts retained by both sides calculate the same lost profits. However, the plaintiff's expert uses a discount rate of 5% while the defendant's expert uses a higher risk discount rate of 15%. Under these assumptions, the plaintiff's expert will calculate damages that are approximately double those of the defendant's expert. Thus, differences in the choice of the discount rate alone may cause a wide range of proffered damages.[38]

Considering the other possible methodological differences that can arise between experts, the number of avenues through which it is possible to generate a large range of damages estimates using methods that many might deem "accepted" becomes quite large. Consider lost profits to a plaintiff's business whose operations have ceased because of the harmful act or acts of the defendant. Methods for calculating lost profits that have been discussed in the published literature include the "before and after" method and the "yardstick" method.[39] The "before and after" method entails using the financial performance of the plaintiff in the time period before the harmful act in order to project the profits during the damages period that the plaintiff would have obtained "but for" this act. However, there are many ways to implement such a method. Many different time periods may be used for the "before period." Should two years be used? Five years? Ten years? In addition, there are many different ways of using the "before period" to project profits for the damages period. Tomlin and Merrell demonstrate that misapplications of the "before and after" approach yield "lost" revenues that exceed actual revenues by 20% for approximately half of a sample of 5,000 firms even when damages do not exist.[40]

Beyond the area of business losses, there are often many avenues for an expert to generate a wide range of damages estimates. For example, for a wrongful termination or wrongful death suit, experts may differ in calculating lost earnings by using different work life expectancies, different personal consumption rates, different discount rates, or

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[38] In the well known article "Janis Joplin's Yearbook and The Theory of Damages," Fisher and McGowan argue that in the case in which the "Janis Joplin" idea was first introduced, the expert retained on behalf of the opposing litigant erred in the calculation of damages by 100% through misapplication of the discount rate alone. *See* Fisher & McGowan, *supra* note 35.

[39] *See, e.g.*, Jonathan T. Tomlin & David Merrell, *The Accuracy and Manipulability of Lost Profits Damages Calculations: Should the Trier of Fact be "Reasonably Certain"?*, Transactions: The Tennessee Journal of Business Law, Issue 7: Volume 2, Spring 2006.

[40] *Id.*

some combination of these.[41] In securities fraud cases, experts can differ in the method used to calculate the impact of market movements on a stock price.[42] In antitrust cases, numerous different methods, capable of generating vastly different results, have been used to calculate the price effects of an anticompetitive act.[43]

Courts typically afford testifying experts a degree of uncertainty in the damages calculations they are allowed to present to the fact finder.[44] In determining the admissibility of expert testimony on damages, courts often apply a threshold of "reasonable certainty."[45] The Third Circuit has defined "reasonable certainty" with regard to damages as "a rough calculation that is not 'too speculative, vague or contingent' upon some unknown factor."[46] The law on the admissibility of expert evidence, along with studies of judicial decision-making summarized above, indicates that although expert witness testimony on damages may be excluded if found "unreliable," courts permit some uncertainty in damages calculations, and some judges may be reluctant to exclude expert testimony. As a result, there is ample room for expert witnesses to reach differing conclusions regarding damages in many cases.

B.   *Does Expert Testimony Impact the Decisions of the Fact Finder?*

If judges and juries are able to detect bias in expert testimony and discern the true damages suffered by a plaintiff, then expert witness bias should have no impact on judicial outcomes. Thus, an important issue is how judges and juries assess expert witness evidence.

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[41] *See* Robert Thornton and John Ward, *The Economist in Tort Litigation*, Journal of Economic Perspectives, Volume 13, Number 2, (Spring 1999) at 106.

[42] *See, e.g.,* Philip H. Dybvig, Ning Gong, and Rachel Schwartz, *Bias of Damage Awards and Free Options in Securities Litigation*, Journal of Financial Intermediation, 9 (2), (April 2000).

[43] *See, generally*, Jonathan T. Tomlin, *Distinguishing the Illegal from the Legal in Antitrust Damages Calculations: Lessons from Netscape v. Microsoft*, Journal of Forensic Economics, volume XVII, Number 2 (Spring/Summer 2004).

[44] "(i)f the damage is certain the fact that its extent is uncertain does not prevent a recovery." Story Parchment Co. v. Patterson Parchment Paper Co., 282 U.S. 557 (1931).

[45] *See, e.g.,* ATACS Corp. v. Trans World Communications, Inc. 155 F.3d 659 (3d Cir. 1998); Rambola v. Cosindas, 220 N.E.2d 919, 922 (1966); City of Greenville v. W.R. Grace & Co., 640 F. Supp. 559 (D.S.C. 1986); Restatement (Second) of Contracts §352 (1979); U.C.C. §1-106 comment 1; MARK A. GLICK, LARA A. REYMANN, & RICHARD HOFFMAN, INTELLECTUAL PROPERTY DAMAGES: GUIDELINES AND ANALYSIS 35 (2003).

[46] ATACS Corp. v. Trans World Communications, Inc. 155 F.3d 659, 669 (3d Cir. 1998), quoting Sprang&Co. v. U.S. Steel Corp., 545 A.2d 861, 866 (Pa. 1988).

Several studies have evaluated the impact of expert testimony on jury decisions. Some legal commentators have criticized the jury system, citing studies indicating that some jurors evaluate expert testimony based on the appearance of an expert, or her presentation style, or both.[47] Vidmar and Diamond, however, conclude that juries evaluate the content of expert testimony in making their decisions.[48] Juries are often aware of the adversarial environment in which parties introduce expert witness testimony and can be skeptical of experts as possible "hired guns."[49] Some studies have found that juries can have difficulty comprehending complex expert testimony in some cases.[50] Other studies have found the same result for judges.[51]

At least two studies demonstrate that expert witness testimony impacts jury damages awards. In a study of mock trials, Raitz *et al.* concluded that expert witness testimony had a substantial impact on jury decisions on damages and that about half of mock jurors reached a verdict on damages that was exactly equal to the amount provided by one of the experts.[52] In another study of mock jury trials involving damages, Greene *et al.* found that juries awarded higher damages when only the plaintiff presented an economic expert witness compared to the scenarios in which both sides presented an economic expert or neither side presented an expert witness.[53] They also found the mean juror award to be equal to the midpoint of the amounts proffered by the opposing experts.[54]

C.   *Are Court-Appointed Experts Necessary?*

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[47] *See, e.g.*, Daniel W. Shuman, Anthony Champagne, & Elizabeth Walker, *Juror Assessments of the Believability of Expert Witnesses: A Literature Review*, 36 Jurimetrics J. 371, Summer 1996.

[48] Neil Vidmar & Shari Seidman Diamond, *Juries and Expert Evidence*, 66 Brooklyn L. Rev. 1121 (Summer 2001).

[49] *See, e.g., Id.*, Sanja Kutnjak Ivkovic and Valerie Hans, *Jurors' Evaluations of Expert Testimony: Judging the Messenger and the Message.* 28 Law & Soc. Inquiry 441.

[50] *See, e.g.*, Joel Cooper, Elizabeth A. Bennet, and Holly L. Sukel, Complex *Scientific Testimony: How Do Jurors Make Decisions*? Law and Human Behavior, 20:379-94 (1996).

[51] *See, e.g.,* Gatowski et al. *supra* note 15 at 442.

[52] Allan Raitz, Edith Greene, Jane Goodman, & Elizabeth F. Loftus, *Determining Damages: The Influence of Expert Testimony on Jurors' Decision Making*, Law and Human Behavior, 14, 385-395, 1990.

[53] Edith Greene, Cheryl Downey, Jane Goodman-Delahunty, *Juror Decisions About Damages in Employment Discrimination Cases*, Behav. Sci. Law 17: 107-121 (1999). The authors' results should be interpreted with caution because they did not have a large enough data set to generate a statistically significant result.

[54] *Id.* at 116.

If judges and juries reach accurate decisions when presented with inaccurate expert testimony, then there is no need for court-appointed experts. For example, in theory, expert witness biases may simply "cancel out," and judges and juries may ultimately reach accurate decisions despite biased, inaccurate expert testimony. Thus, before considering the impact of court-appointed experts, it is worthwhile to consider whether expert witness biases might simply cancel each other out in a "battle of the experts."

Experts should attempt to carefully and properly apply the methodologies in their field and provide unbiased and independent testimony. Unbiased expert testimony leads to unbiased judicial outcomes. Providing unbiased testimony will also often be in the financial interest of the expert witness.[55] Expert witnesses who provide poor work product in a particular case may cause harm to their reputation that substantially reduces their expected future earnings as experts. Moreover, as noted by Fisher, the expert who presents unbiased opinions to her attorney client assists that attorney in litigating her case.[56]

Unfortunately, expert witness bias sometimes occurs. When one of the litigating parties retains a witness presenting unbiased testimony but the other litigant retains a witness presenting biased testimony, inaccurate damages awards will result if the trier of fact adopts the damages testimony of the biased witness or "splits the difference" between opposing witnesses. However, when both experts present biased testimony, the expected result is unclear. Will the biases tend to offset each other, or will an inaccurate damages award tend to result?

As an example of how expert witness biases may offset each other, assume that true damages are equal to $100,000. Experts retained by the litigants present damages numbers that are symmetrically biased. The plaintiff's expert presents a damages estimate of $150,000, and the defendant's expert presents a damage estimate of $50,000. In this case, a "split the difference" decision will lead to the correct level of damages - $100,000 – on average, although the variance of expected damages may increase.

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[55] *See, e.g.*, Richard A. Posner, *The Law and Economics of the Economic Expert Witness*, Journal of Economic Perspectives, Spring 1999, Volume 13, Number 2.
[56] *See*, Franklin M. Fisher, *Statisticians, Econometricians, and Adversary Proceedings*, Journal of the American Statistical Association, Vol. 81, No. 394 (June, 1986), 277, 285.

Consistent with this reasoning, Froeb and Kobayashi developed a model in which the plaintiff and the defendant report only information that is favorable to their particular side to a naive decision maker (i.e., a judge or jury).[57] They assume that the judge or jury uses a "split the difference" rule and that the probability distribution around mean damages is symmetric. Under their model, the judge or jury reaches an unbiased decision regarding damages as both sides present biased estimates of damages that are equidistant from the true damages. This result leads the authors to be optimistic about the presentation of biased damages numbers by litigants. If one accepts their findings, then there would presumably be little or no need for court-appointed experts.[58]

The conclusion that judges and juries will ultimately reach an unbiased decision regarding damages even in the face of biased expert witness testimony relies on the crucial assumption that the bias presented to the judge or jury is symmetric. In reality, however, when expert witnesses present biased testimony the biases may not be symmetric. An asymmetry in the extent of bias nullifies the conclusion that judges and juries will reach unbiased decisions. One such asymmetry exists in that damages are necessarily truncated at zero (because there are no negative damages).

Consider once again the example in which actual damages are equal to $100,000 but assume that the plaintiff's expert presents calculated damages of $250,000 (a greater bias than that presented above). Because damages must be non-negative, the maximum allowable bias for the defendant's expert is to opine that there are no damages. In this case, biased testimony and a "split the difference" rule result in damages of $125,000 -- $25,000 above the true level. One can see from this example that the prohibition on negative damages can lead to average damages that are excessive. In other contexts, previous authors have also concluded that a truncation of damages at zero may lead to damages that are too high. Dybvig, *et al.* argue that the impossibility of negative damages leads to excessive damages awards in securities fraud cases.[59] Patell, Weil, and

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[57] Luke Froeb & Bruce H. Kobayashi, *Evidence Production in Adversarial vs. Inquisitorial Regimes,* Economics Letters, 70 (2), (2001), 267-272.
[58] At least one commentator has argued that all experts are necessarily biased and, therefore, that the attempt to appoint an expert that will be "neutral" is in vain. *See, e.g.*, Thomas M. Crowley, *Help Me Mr. Wizard! Can We Really Have "Neutral" Rule 706 Experts?,* 1998 Det. C.L. Rev. 927 (Winter, 1998).
[59] Dybvig et al. *supra* note 42.

Wolfson[60] and Fisher and Romaine[61] also show that damages can be excessive due to a restriction against negative damages in the context of using "ex-post" information in calculating damages.

A truncation of damages at zero is not the only asymmetry that will lead damages awards to deviate from the true damages sustained by a plaintiff when expert witness testimony is biased. Thus, based on the simple logic presented above, there is a need for court-appointed experts in at least some circumstances. Below, we develop a simple model which yields insights into the circumstances in which the use of, or the option to use, court-appointed experts helps lead to proper judicial outcomes. Our model also demonstrates the impact of court-appointed experts on damages awards and provides guidance on the types of experts that should be appointed.

III. A SIMPLE GAME-THEORETIC MODEL OF COURT-APPOINTED EXPERTS

A. *Overview of the Model*

Below, we present a simple game-theoretic model that provides a more rigorous approach than previously presented in the literature for addressing the circumstances in which the courts should appoint experts. We believe that most of the key implications of our model are quite intuitive. Thus, readers uncomfortable with the mathematics presented can follow the key insights of the model by skipping the mathematics and reviewing the text.

Our model focuses on expert testimony related to the calculation of damages. However, our results apply more broadly to any context in which an expert opinion is not binary, but can range across a continuum capable of impacting damages. For example, a medical expert may opine on the number of patients impacted by malpractice or an environmental expert may opine on the geographic areas affected by a toxic spill. Our model addresses the situation in which each of the litigants retains an expert, and the judge contemplates appointing an additional expert to advise her. In developing our

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[60] Patell et al. *supra* note 36.
[61] Fisher & Romaine *supra* note 35.

model of the effects of court-appointed experts on judicial outcomes, we make the following assumptions:

1)   Judges allow the experts of the litigants to present testimony that damages differ from their true level, but exclude this testimony under *Daubert* (or similar state law) if the proffered damages differ too far from actual damages.[62] This assumption is consistent with the law on the admissibility of expert witness testimony and the surveys of judicial decision-making discussed above.

2)   The experts of the litigants are uncertain about the level of damages testimony they can offer without facing exclusion. There is a probability that a judge will appoint an expert, become "well informed" in evaluating damages testimony, and will not allow proffered damages to differ substantially from the true level.[63] There is also a probability that a judge will not appoint an expert and will remain "less informed" in evaluating damages testimony.

3)   Except for a truncation of damages at zero, the courts tolerance for deviation from true damages is equal for both side's experts.

4)   Litigants and experts are "risk neutral."

5)   On average, juries award damages that are equal to the midpoint of the damages proffered by the plaintiff's expert and the defendant's expert. We refer to this outcome as "splitting the difference" although it does not necessarily result from a jury choosing the midpoint of proffered damages in any particular case. Damages will also be equal to the midpoint of proffered damages, on average, if the jury chooses the number presented by each of the experts with equal probability. An assumption of average damages awards equal to the midpoint of proffered damages is consistent with the mock trial results of Raitz *et al.*[64] and Greene *et al.* described above.[65]

6)   If the plaintiff's expert is excluded, no damages are awarded, regardless of the testimony presented by the defendant's expert. This is consistent with many of the

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[62] We explain "too far" below.

[63] The focus of this article is on when courts should appoint experts. We do not mean to diminish the importance of judges becoming "more informed" through educating themselves on expert issues. Such education can help promote proper judicial outcomes as well. *See, e.g.*, Robert M. Lloyd, *Proving Lost Profits After Daubert: Five Questions Every Court Should Ask Before Admitting Expert Testimony*, (2006), forthcoming, Richmond Law Review.

[64] Raitz et al. *supra* note 52.

[65] Greene et al. *supra* note 53.

Daubert decisions resulting in exclusion of expert damages testimony in which summary judgment was granted.[66]

7)	For purposes of the model, we assume that both expert witnesses present testimony that leads to the best expected outcome for the party retaining them. As explained below, this does not imply that their ultimate testimony will be biased and outside of the bounds within which reasonable disagreements can arise between experts. As shown in the model, unbiased testimony will often lead to the best expected outcome for the litigants.

8) Consistent with Rule 26 of the Federal Rules of Civil Procedure,[67] we model this interaction as a sequential game, with the following sequence of events:[68]

- (i)	Plaintiff's expert reveals damages opinion.
- (ii)	Defendant's expert reveals damages opinion.
- (iii)	Court chooses whether or not to appoint a Court Expert based on a pre-determined set of rules (as explained below).
- (iv)	Court decides on admission or exclusion of experts.
- (v)	Damages are awarded.

We employ the following notation:

Let,

- T = True damages
- R = range of damages acceptable to the court, as a multiple of T. In other words, the court will allow damages up to $T+R*T$ without excluding testimony, but expert testimony that damages are greater than this will lead to exclusion. The lower bound for acceptable damages is therefore equal to Max $\{T*(1-R), 0\}$ due to the

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[66] *See, e.g.*, Zenith Elecs. Corp. v. WH-TV Broad. Corp., 395 F.3d 416 (7th Cir.), *cert. denied*, 125 S. Ct. 2978 (2005); Storage Tech. Corp. v. Cisco Sys., Inc., 395 F.3d 921 (8th Cir. 2005); Group Health Plan, Inc. v. Philip Morris USA, Inc., 344 F.3d (8th Cir. 2003); Lifewise Master Funding v. Telebank, 374 F.3d 917 (10th Cir. 2004); Lantec, Inc. v. Novell, Inc., 306 F.3d 1003 (10th Cir. 2004). Exclusion of the plaintiff's damages expert will not necessarily result in no damages for the plaintiff, however, if the court concludes that that jury has sufficient evidence to determine damages from other sources and allows the case to proceed to trial. *See, e.g.*, Children's Broad. Corp. v. Walt Disney Co., 245 F.3d 1008 (8th Cir. 2001).
[67] Fed. R. Civ. P. 26.
[68] We have also solved the model under the alternative assumption that the experts of both of the parties submit their estimates of damages at the same time. This assumption did not alter the main findings. The results are on file with the authors.

impossibility of negative damages, and the upper bound for acceptable damages is equal to T*(1+R).

- R can take on two values, High (H) and Low (L). In particular, when the judge appoints a Court Expert, the range of damages that is acceptable to the court is reduced, thus R = L. If a Court Expert is not appointed, the range of acceptable damages is greater, thus, R=H. For simplicity, we assume L < 1 < H.

- If either of the experts presents a damages opinion outside of the range bounded by L, a Court Expert will be appointed with a pre-determined probability equal to π. In this event, we have R = L with probability π, and R = H with probability 1-π.

There can be uncertainty in calculating damages, and "L" can reasonably be thought of as establishing a range within which calculated damages may fall due to this uncertainty. Differing damages calculations within the range (T+L, T-L) may result from reasonable differences in choice or use of methodology or assumptions and not from any intent to bias results. For purposes of the model, we label testimony that damages fall within this range as "unbiased." In the model, damages differing from the true level by more than "L" result from the inappropriate choice or use of methodology or assumptions. For purposes of the model, we label such testimony as "biased." Judges that are "well informed" will exclude such biased testimony (i.e., "R" is equal to "L" for these judges). Judges that are "less informed" will admit a wider bound of accepted damages testimony; R takes on the higher value of "H" for these judges. Proffered testimony that damages deviate from the true level by more than H*T are assumed to be clearly unreliable and, thus, excluded with certainty by all judges.[69]

B.   *Outcomes of the Model*

A game-theoretic model necessarily involves "players," "strategies," and "payoffs."[70] In this model, the players are the experts. The strategy choice is defined by the damages opinion presented by the expert. The payoff is the damages awarded by the jury. This is a "zero-sum" game, in which the sum of the payoffs of the players is equal to

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[69] We assume that a judge will not appoint an expert if both experts opine that damages are within "L" of true damages. When this occurs, both experts will likely offer opinions that are quite close to each other and the judge will not find a need for a Court Expert.

[70] *See, e.g.*, ERIC RASMUSSEN, GAMES AND INFORMATION, (1989) at 22.

zero. In a game-theoretic model it is also important to specify an equilibrium condition. The equilibrium condition we use is the commonly employed "Nash equilibrium" in which a strategy pair by the plaintiff's expert and the defendant's expert is an equilibrium if neither has an incentive to deviate from her strategy given the other expert's strategy.

In the model, the plaintiff's expert will choose to opine that damages are "high" and equal to T+H*T (the maximum amount to which the expert can testify without resulting in certain exclusion) or that damages are relatively "low" and equal to T+L*T (the maximum amount that can be testified to and remain certain that testimony will not be excluded).[71] Testifying to any other amounts would not maximize expected damages and will not be chosen. Testifying that damages are lower than T+L*T is not optimal because the plaintiff's expert can opine that damages are greater than this without risking exclusion. Testifying that damages are greater than T+L*T will result in exclusion if it turns out that the judge is more informed in evaluating expert testimony but will not result in exclusion if the judge is less informed. If the judge is less informed, however, testifying that damages are less than T+H*T is not optimal because the expert can testify that damages are equal to the greater amount of T+H*T without facing exclusion. Finally, testifying that damages are greater than T+H*T will result in automatic exclusion, since it is beyond the range of acceptable damages even if the judge is "less informed."

Thus, the only optimal choices for the plaintiff's expert are to "play it safe" and opine that damages are equal to the maximum amount falling within the range in which there is no risk of exclusion or "play it risky" and opine that damages are equal to the maximum amount that a "less informed" judge will allow before excluding testimony. By similar reasoning the defendant's expert will chose to either "play it risky" and opine that there are no damages or to "play it safe" and opine that damages are equal to the smallest amount to which the expert can testify without facing possible exclusion (T-L*T in the model).

There are four potential combinations of expert testimony in the model:

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[71] Note that damages testified to by the plaintiff's expert are only "low" compared to the alternative higher amounts which the expert may proffer. "Low" damages are above the true damages.

Outcome #1   Both experts "play it risky" - the plaintiff's expert opines that damages are

high, and the defendant's expert opines that there are no damages:

$$(1)\ D_P = T(1+H)\ ;\ \ D_D = 0$$

Outcome#2   The plaintiff's expert "plays it risky" while the defendant's expert "plays

it safe":

$$(2)\ D_P = T(1+H)\ ;\ \ D_D = T(1-L)$$

Outcome #3   The plaintiff's expert "plays it safe" while the defendant's expert "plays it

risky" and opines that there are no damages:

$$(3)\ D_P = T(1+L)\ ;\ \ D_D = 0$$

Outcome #4   Both experts "play it safe" and offer biased testimony only up to the level

where they are certain they will not risk exclusion:

$$(4)\ D_P = T(1+L)\ ;\ \ D_D = T(1-L)$$

Based on the strategies chosen by both experts and on whether a Court Expert is appointed, one of the following three outcomes will result: a) Plaintiff's expert is excluded. In this case, damages will equal zero; b) Neither expert is excluded. In this case, expected damages will equal the average of the damages claimed by the two experts (i.e., the "split the difference" rule); c) Defendant's expert is excluded while the plaintiff's expert is admitted. In this case, damages will equal the amount calculated by the plaintiff's expert. The following "payoff" matrix shows the expected damages ("E(D)") under each of the four possible outcomes described above in (1) through (4).[72] The outcomes are numbered on the corners of the matrix.

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[72] In each strategy combination, expected damages are calculated as the sum of the products of the probabilities of the possible "events" multiplied by the damages under each "event." In our model, the possible "events" are the high or low acceptable ranges for damages. Thus, expected damages can be expressed as: $(5)\ E(D) = \pi*(\text{damages if } R=L) + (1-\pi)*(\text{damages if } R=H)$.

Table 1:

<div align="center">DEFENDANT</div>

PLAINTIFF		$D_D = 0$	$D_D = T(1-L)$
	$D_P = T(1+H)$	$E(D) = \dfrac{1-\pi}{2}T(1+H)$	$E(D) = \dfrac{1-\pi}{2}T(2+H-L)$
	$D_P = T(1+L)$	$E(D) = (\dfrac{1+\pi}{2})T(1+L)$	$E(D) = T$

We solve this as a non-cooperative game in which each player selects the best response to the potential actions of the opposing player. Solving each player's maximization problem as a function of the opposing player's strategy choice results in the non-cooperative (Nash) equilibrium. In the model, the defendant's expert, who moves second, chooses her optimal strategy based on the strategy chosen by the plaintiff's expert. The plaintiff's expert, in turn, chooses her optimal strategy knowing that the defendant's expert will react in this way. Appropriately solving a sequential game such as this involves the method of "backward induction," where we first solve the maximization problem of the *second* player, in this case the defendant's expert, in order to determine the optimal choice of the first player, the plaintiff's expert. Details of the solution to this problem are provided in the Appendix. Table 2 below shows the expected outcomes under the various possible scenarios.

Table 2:

If (Condition 1) Holds	And (Condition 2) Holds	Then Plaintiff's Expert Strategy is: $D_P =$	Followed by Defendant's Expert Strategy $D_D =$	Equilibrium Outcome #	Expected Damages
$\pi > \dfrac{1-L}{1+L}$	$\pi < \dfrac{H-1}{H+1}$	T(1+H) ("risky")	0 ("risky")	1 Both experts "play it risky"	$\dfrac{(1-\pi)}{2}T(1+H) > T$ (Above True Damages)
$\pi > \dfrac{1-L}{1+L}$	$\pi > \dfrac{H-1}{H+1}$	T(1+L) ("safe")	T(1-L) ("safe")	4 Both experts "play it safe"	True Damages
$\pi < \dfrac{1-L}{1+L}$	$\pi < \dfrac{H-L}{2+H+L}$	T(1+H) ("risky")	0 ("risky")	1 Both experts "play it risky"	$\dfrac{(1-\pi)}{2}T(1+H) > T$ (Above True Damages)
$\pi < \dfrac{1-L}{1+L}$	$\pi > \dfrac{H-L}{2+H+L}$	T(1+L) ("safe")	0 ("risky")	3 Plaintiff expert "plays it safe"; Defendant's expert "plays it risky"	$\dfrac{(1+\pi)}{2}T(1+L)$ (Below True Damages)

C.   *Interpretation of Results*

As shown in Table 2 above, the model produces a non-cooperative ("Nash")
equilibrium outcome in which expected damages are equal to true damages **only** when
both players "play it safe" or, in other words, when both experts present unbiased
testimony. In order for this to occur, we have identified two necessary conditions defined

by the parameters of the model. They are $\pi > \dfrac{1-L}{1+L}$ and $\pi > \dfrac{H-1}{H+1}$ (5)

Let's examine these conditions. First, note that both are essentially minimum
thresholds for π. In other words, the probability of appointing a Court Expert must
exceed a minimum level in order to induce the experts to present unbiased testimony.
When experts believe it is highly likely for a Court Expert to be appointed, they
understand that presenting aggressive damages testimony is much more likely to result in

exclusion by the court. Thus, they are more inclined to "play it safe" by presenting unbiased testimony. This leads to awarded damages equaling true damages on average.

Now let's examine each condition individually. The first condition is more likely to hold for higher levels of "L," which establishes the range in which judges who appoint their own expert will allow testimony. In particular, as L approaches 1, this condition is satisfied for all levels of π (i.e., there is no need for a Court Expert). The intuition for this is quite simple. As L approaches 1, it implies that the defendant's expert can testify that damages are close to zero without any risk of being excluded by the court. Thus, there is little or no potential gain associated with testifying to damages outside the range acceptable to a "well informed" judge who has appointed an expert. Thus, only a small probability that the judge will appoint an Court Expert will ensure unbiased testimony.
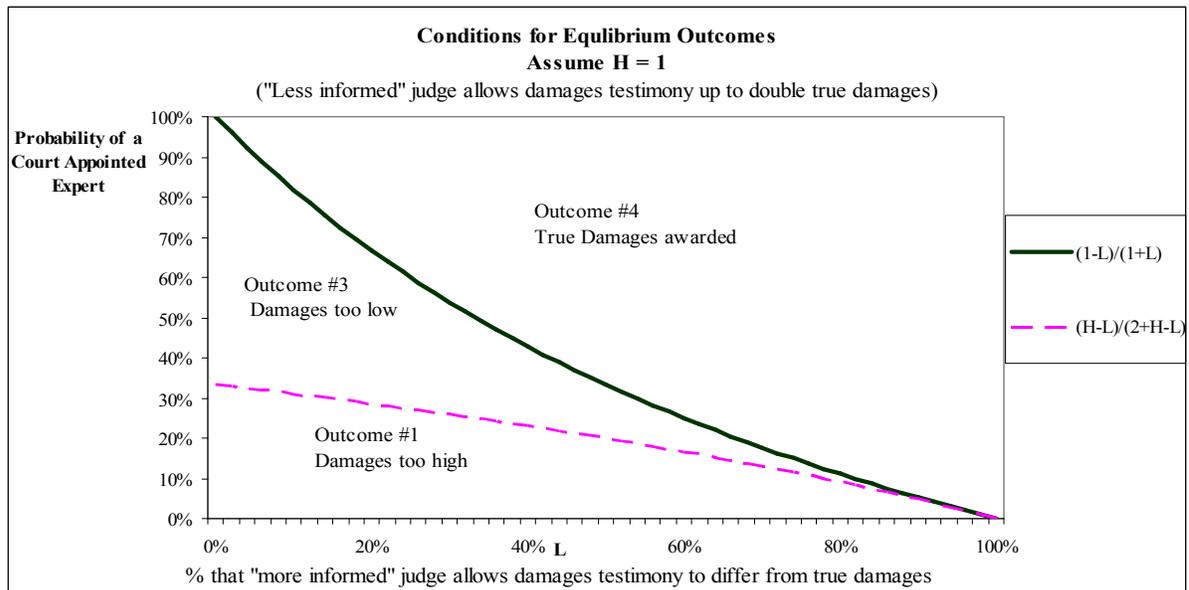
The second condition holds more easily for lower levels of "H," which establishes the range within which "less informed" judges will allow testimony. In particular, as H approaches 1, this condition is satisfied for all levels of π (i.e., there is no need to appoint a Court Expert). The intuition is very similar to the previous condition. For lower levels of H, there is very little potential gain to the experts by testifying to damages which fall outside of the range which is acceptable to a well informed judge. Alternatively, when H is high, experts in the model will have a greater tendency to present aggressive damages opinions and risk exclusion by the court, thus requiring a higher probability that the court will appoint a Court Expert in order to prevent this behavior.

Importantly, if the perceived probability of appointing a Court Expert is lower than the required conditions defined in (5), true damages will **not** be awarded on average, since at least one expert will present biased testimony. Outcome #1 results in excessive expected damages (i.e $E(D) > T$) and Outcome #3 results in damages that are too low (i.e. $E(D) < T$).

The following graphs illustrate equilibrium outcomes and expected damages relative to true damages ("T"), over the range of possible values for π and L. Graph 1 shows the results under the assumption that the judge is relatively well informed without appointing a Court Expert and thus will not allow testimony that damages exceed true damages by more than 100%, i.e. H=1. We observe that in scenarios such as these,
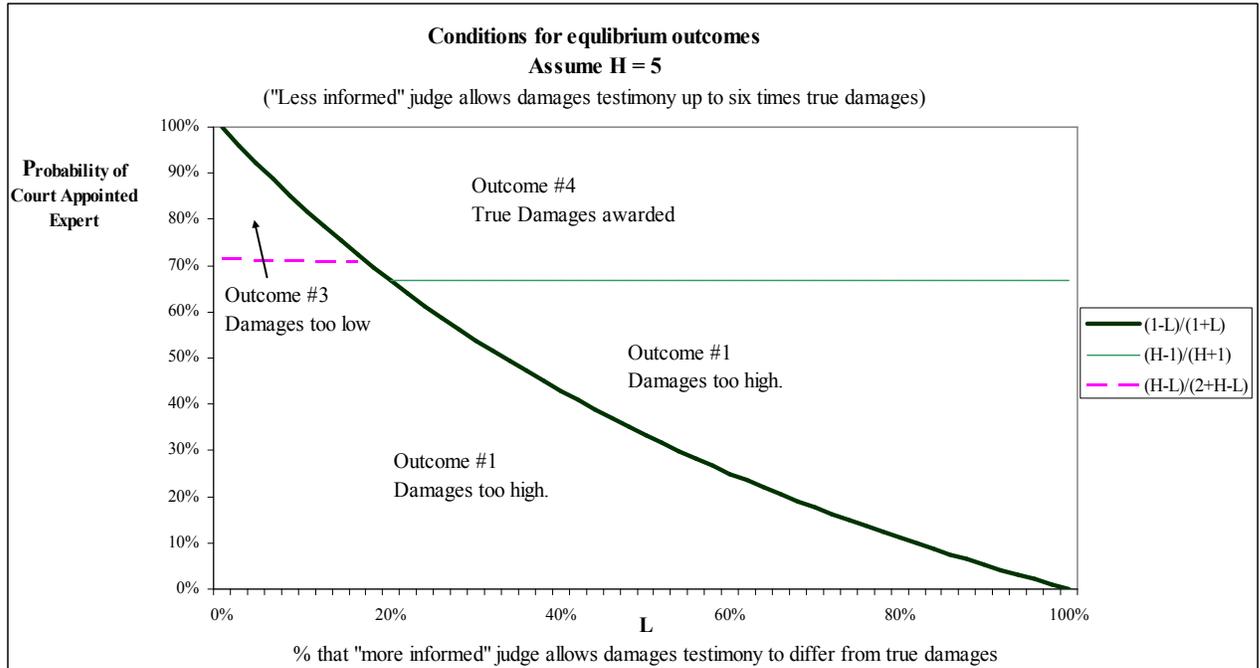
21

where "H" (the maximum amount of bias that a less informed judge is expected to allow) is relatively small, an accurate damages award can be ensured by a judge associated with only a small probability of appointing a Court Expert. In other words, when judges can put a fairly narrow band on allowable damages testimony without the use of a court-appointed expert, the experts in the model only need to perceive a small chance that the court will appoint a Court Expert for accurate damages to result.
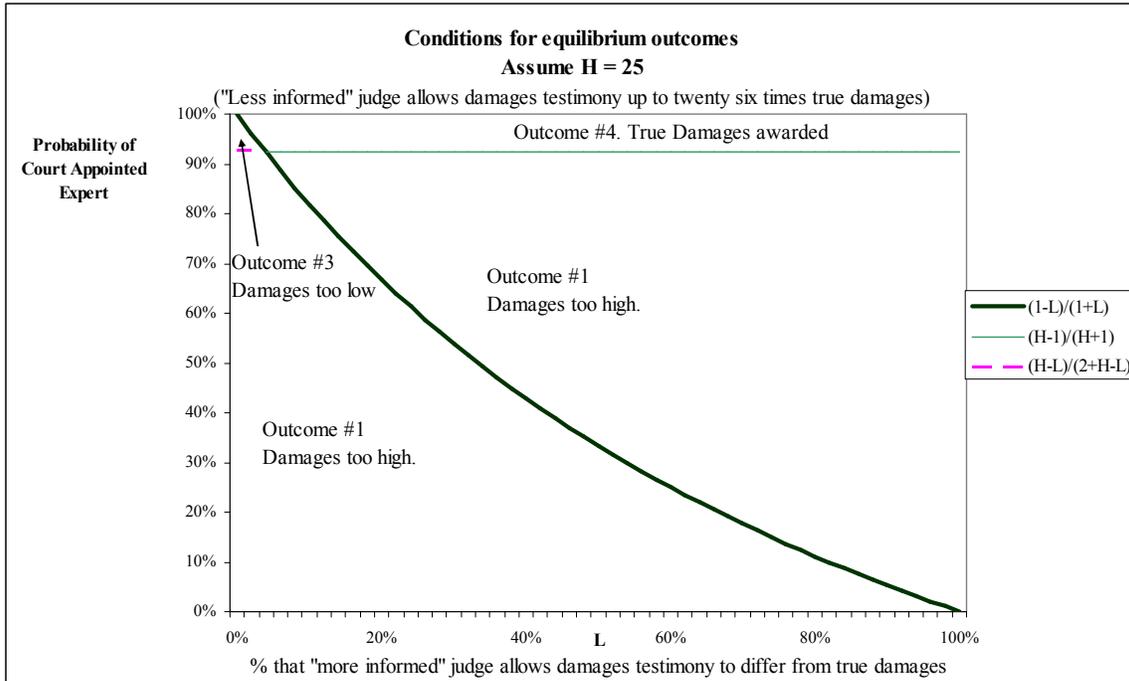
Graph 1:

Conditions for Equlibrium Outcomes
Assume H = 1
("Less informed" judge allows damages testimony up to double true damages)

Probability of a Court Appointed Expert

Outcome #4
True Damages awarded

Outcome #3
Damages too low

Outcome #1
Damages too high

(1-L)/(1+L)

(H-L)/(2+H-L)

% that "more informed" judge allows damages testimony to differ from true damages

Alternatively, when a "less informed" judge allows testimony that deviates substantially from true damages ("H" is high), it is more likely that inaccurate damages awards will result. Thus, a higher probability that the judge will appoint an expert is needed to ensure accurate damages awards. Graph 2 below shows the equilibrium outcomes when "H" is equal to 5 and a less informed judge will therefore allow a plaintiff's expert to testify that damages are six times their true level. As shown, expected damages are excessive throughout a large range of L and π, and damages that are too small rarely prevail.

Graph 2:

Conditions for equilibrium outcomes
Assume H = 5
("Less informed" judge allows damages testimony up to six times true damages)

Probability of Court Appointed Expert

Outcome #4
True Damages awarded

Outcome #3
Damages too low

Outcome #1
Damages too high.

Outcome #1
Damages too high.

(1-L)/(1+L)
(H-1)/(H+1)
(H-L)/(2+H-L)

L

% that "more informed" judge allows damages testimony to differ from true damages

Finally, consider the scenario in which a less informed judge will allow testimony that damages are more than twenty-five times their true value. This possibility is not implausible for a complex case. As shown in Graph 3 below, the outcome in which damages are too low all but disappears; true damages result only when there is a very high probability that the judge will appoint an expert.

Graph 3:

Conditions for equilibrium outcomes
Assume H = 25
("Less informed" judge allows damages testimony up to twenty six times true damages)

Probability of Court Appointed Expert (vertical axis)

Outcome #4. True Damages awarded

Outcome #3 Damages too low

Outcome #1 Damages too high.

Outcome #1 Damages too high.

Legend:
- (1-L)/(1+L)
- (H-1)/(H+1)
- (H-L)/(2+H-L)

L
% that "more informed" judge allows damages testimony to differ from true damages

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D.   *When do the Benefits of Appointing an Expert Exceed the Costs?*

As demonstrated above, when the probability of appointing a Court Expert is high enough (i.e. the conditions in equation (5) are met), experts are not willing to undertake the risk of exclusion by the court. They will present unbiased testimony and this will lead to true damages being awarded on average.   Thus, the *threat* of appointing a Court Expert is in itself sufficient to prevent biased testimony. An important question to ask, therefore, is when do the benefits of following through and executing this threat exceed the cost of appointing a Court Expert?

A reasonable way of measuring the "benefit" of a Court Expert is by the benefit provided to the litigant who would otherwise expect a disadvantageous decision on damages that differed from true damages.[73] If we measure the benefit as the absolute value of the difference between true damages and expected damages in the absence of the

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[73] Under Rule 706(b) "the compensation shall be paid by the parties in such proportion and at such time as the court directs, and thereafter charged in like manner as other costs." With regard to technical advisors, in some cases the parties have agreed to share the cost of the expert. Although it may currently "prove difficult" to appoint technical advisors in some cases. *See,* Cecil & Willging supra note 18 at 1053.

Court Expert, we have a cost-benefit analysis that can be applied by the court.[74] Let's explore a simple numerical example:

Consider the following model parameters:

- True damages = $10,000
- H = 3, i.e., a "less informed" judge will allow testimony that damages are up to four times their true level (T + 3T = 4T).
- L = 0.5, i.e., a "more informed" judge receiving the benefit of a Court Appointed expert will only allow testimony that damages deviate by fifty percent or less from true damages.

This example implies that $\dfrac{1-L}{1+L} = \dfrac{1}{3}$, $\dfrac{H-1}{H+1} = \dfrac{1}{2}$, and $\dfrac{H-L}{2+H+L} = \dfrac{5}{11}$

Based on the results described in Table 2, we state the following:

- If $\dfrac{1}{2} < \pi$ (a judge appoints a Court Expert more than half of the time in these circumstances) both players will "play it safe," resulting in true damages (T=$10,000) being awarded on average.

- If the court chooses to relinquish the option of appointing its own expert, (i.e. $\pi = 0$), both players "play risky", resulting in expected damages of $\dfrac{T(1+H)}{2} = 2T =$ $20,000, or double true damages on average.

Thus, in this example, the benefit provided by the Court Expert to the defendant is equal to 2T-T=T=$10,000. In the absence of a threat by the judge to appoint a Court Expert, the expected damages liability of the defendant is $10,000 above the damages that he actually caused to the plaintiff. This is the amount by which the defendant's damages liability is diminished by the appointment of a Court Expert. We therefore conclude that such an expert should be appointed when the cost of his services does not exceed $10,000. More generally, the maximum cost the court should be willing to pay

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[74] We assume that the cost of the Court Expert is borne by the parties to the litigation.

for its own expert under this decision rule is $\dfrac{T(1+H)}{2} - T = \dfrac{T(H-1)}{2}$. This amount

increases with the amount of true damages and the range in which a "less informed" judge will allow damages testimony.

III.   IMPLICATIONS FOR THE APPROPRIATE APPOINTMENT OF EXPERTS

There is substantial disagreement among legal commentators as to what role, if any, court-appointed experts should have. Are Rule 706 testifying experts or technical advisors superior? In addition, there is disagreement over the circumstances in which and the frequency with which they should be appointed. Should the courts appoint experts only in extremely rare circumstances? Alternatively, are court-appointed experts needed on a consistent basis in order to assist the finder of fact in assessing the highly complex and technical issues that often appear in litigation? The model we develop provides guidance on these issues.

As explained above, our results are applicable to situations in which expert opinions are not just binary (i.e., "yes" or "no" to a particular question) but can range across a continuum capable of impacting awarded damages. The expert opinion at issue may be on the quantification of damages. It may also be in other areas that can impact the ultimate damages award such as a medical expert opining on the number of patients affected by a wrongful act, or an environmental expert opining on the geographic areas impacted by toxic waste. In discussing policy implications, we assume that both parties maintain the ability to retain their own experts and that the court has an ability to appoint a third expert (as opposed to a hypothetical situation where the court may appoint an expert in lieu of experts retained by the parties). We do not consider situations in which judges may become "more informed" by educating themselves on the topics on which the experts opine. This is another avenue through which accurate damages awards can be facilitated.

With regard to the issue of whether the courts should appoint technical advisors or Rule 706 testifying experts, our results show that court-appointed experts can lead to accurate damages awards without testifying or providing guidance to a jury. In our

model, a court-appointed expert facilitates accurate damages awards by making a judge well informed for her decision as to whether or not to exclude expert testimony. From the model, when the experts retained by the parties perceive a substantial probability that a judge will appoint an expert, they are more likely to provide testimony that will lead the jury to select an accurate damages award. Thus, the courts should make greater use of technical advisors.[75]

Our results also demonstrate the circumstances in which judges should choose to appoint experts. The Fifth Circuit has indicated that "extreme variation" among the parties is the most important circumstance in which the court should appoint an expert.[76] However, "extreme variation" between the parties is a necessary but not a sufficient condition for appropriately appointing an expert. For example, suppose that a plaintiff's expert opines that damages in a particular case are $1.8 million while the defendant's expert opines that damages are only $200,000. It is reasonable to conclude that this discrepancy constitutes an "extreme variation" in opinions. If, however, the true damages are equal to $1 million, and a jury either "splits the difference" or chooses the estimates given by each expert with equal probability, then an accurate damages award will result on average (the average of the proffered damages amounts is $1 million) and it will be unnecessary for the court to appoint an expert to ensure that an accurate damages award will result. On the other hand, if true damages are much closer to $300,000, for example, then the average estimated damages of $1 million is too high and an accurate damages award cannot be expected in the absence of a court-appointed expert.

It is not necessary for a judge to know the value of true damages or the values of "H" or "L" in order for our model to provide guidance on the proper circumstances for judges to appoint experts. Our results indicate that judges should be more inclined to appoint an expert when they perceive that either or both of the experts retained by the litigants is presenting testimony that damages deviate substantially from the true damages. One signal of this is when the defendant's expert opines that damages are zero or *de minimus*.

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[75] As noted above, there have been alternative proposals as to the rules that should govern the appointment of experts. We do not suggest that any particular system of appointing experts is preferable over another, only that judges should not be reluctant to appoint experts in a role in which they act solely as advisors to the judge and not as testifying witnesses. *See, e.g.,* Cope *supra* note 24.
[76] Eastern Air Lines, Inc. v. McDonnell Douglas Corp., 532 F.2d 957, 999-1000 (5th Cir. 1976).

Judges should be more inclined to appoint an expert when they are incapable of determining a reasonably narrow range within which true damages are expected to fall and believe that a court-appointed expert is likely to help them narrow the range of expected damages. If judges do not appoint experts in these circumstances, then inaccurate damages awards are likely to result. Court-appointed experts are more likely to help judges narrow the bounds within which reasonable damages calculations may fall when a substantial source of disagreement between the experts retained by the parties is over the application of a damages methodology, as opposed to the assumption used.

As an example, assume that in an antitrust matter involving price-fixing allegations, the plaintiff's expert opines that collusive behavior has resulted in substantial price "overcharges" and uses an econometric model to estimate substantial damages. The defendant's expert opines that the plaintiff's expert has made a fundamental econometric error by not correcting for "serial correlation." The defendant's expert further opines that once this error is corrected, the plaintiff's model shows that there is no "overcharge" and no damages. A judge in this case who is not trained in econometrics will unlikely be able to determine the merits of the defendant's critique and, therefore, without additional assistance, will unlikely place a narrow range around true damages. A court-appointed econometrician, however, should be able to reduce substantially the bounds of acceptable testimony by opining whether the defendant's expert's critique is valid. The circumstances are ripe for the judge to appoint an expert. If she does not appoint an expert in these circumstances, inaccurate damages awards will often result.

A point of contention in the literature on court-appointed experts is the frequency with which courts should appoint experts.[77] It is unfortunate that many judges have been reluctant to appoint experts. Cecil and Willging found that 50 of the 81 judges in their survey of federal judges viewed an appointment of an expert as an "extraordinary action."[78] Many of these judges cited "respect for the adversarial system" as the explanation for their reluctance.[79] As we demonstrate, the use of court-appointed experts helps lead to accurate damages awards and, therefore, judges should not be reluctant to appoint experts in the appropriate circumstances.

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[77] See, e.g., supra note
[78] Cecil & Willging, *supra* note 18 at 1015.
[79] Cecil & Willging, *supra* note 18 at 1017.

As our model shows, a judge's reputation for appointing experts is paramount in obtaining accurate damages awards. The actual appointment of an expert in a case under the appropriate circumstances is important in that it establishes this reputation. Judges need not appoint an expert in all cases in order for accurate damages awards to result. The experts retained by the parties need only to anticipate a substantial probability that the judge will appoint an expert in the appropriate circumstances. If they perceive a substantial probability of such an appointment, they are likely to provide unbiased testimony and accurate damages awards will be expected to result, on average.

Some judges have appropriately noted the fact that the "threat" of a court-appointed expert alone may lead to accurate expert testimony.[80] As one of the judges surveyed by Cecil and Willging noted, "the threat is effective because the authority exists and the judge is known as one who will use it; he need not mention it each time."[81] Judge Lewis Kaplan of the Southern District of New York states "[i]t is possible that a judge's mere threat to appoint an expert advisor 'exerts a sobering effect' on party experts deterring them from espousing extreme views."[82] Judge Hillman of the Massachusetts Superior Court writes "the ever-present possibility that the judge may appoint an expert in a given case must inevitably exert a sobering effect on the expert witness of a party and upon the person utilizing his services."[83] The Advisory Notes of Rule 706 express a similar hope that "the availability of the procedure in itself [would] decrease...the need for resorting to it."[84]

Thus, judges should not be reluctant to appoint experts when experts can lead to more accurate damages awards. Judges should appoint such experts as early as possible in their judicial careers to develop a reputation for appointing experts. Once such a reputation is established, experts retained by the parties in future cases will be apt to offer accurate damages testimony, and the judge will likely find that she will not need to appoint experts in a large number of her future cases.

B.   *Alternative Proposed Policy Solutions*

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[80] *See, e.g.*, Cecil & Willging *supra* note 18, Hillman *supra* note 2, Kaplan *supra* note 2 .
[81] Cecil & Willging 1994 at 1014
[82] Kaplan *supra* note 2 at 257.
[83] Hillman *supra* note 2 at 591.
[84] Fed. R. Evid. 706 advisory committee's note.

Because of a long persisting perception that expert witnesses may present biased testimony and that juries may consequently err in their damages awards, there have been multiple proposals to address the perceived problem. Several proposals do not involve the use of court-appointed experts. These proposals include: 1) greater use of judges in deciding damages awards,[85] 2) damages guidelines or damages caps,[86] 3) discovery rule changes, [87]and 4) imposing penalties on experts.[88] We briefly assess the prospects for these proposals to ameliorate the tendency for expert witness bias to lead to inaccurate damages. We do not believe any of these proposals remove the need for court-appointed experts.

Greater use of judges in deciding damages awards will not resolve the problem of expert witness bias. Witnesses who testify at trial have already passed the *Daubert* screen, and two very well qualified experts can present very different damages estimates. Understanding the nuts and bolts of the differing damages calculations in some cases can be very difficult for any individual not well trained in economics or statistics, including judges. As noted above, survey data indicate that judges often feel they have difficulty evaluating the complexity that they face in their courtrooms.

Caps on damages awards also cannot fully resolve the problem of expert witness bias. As shown above, in some instances, an inaccurate damages award results because the defendant's expert presents biased testimony. Because a damages cap can limit bias only by the plaintiff's expert, it would do nothing to resolve the problem of potential defense expert witness bias. Moreover, at least one study has shown that jurors may tend to use a damage cap as an "anchor" toward which they reach their verdict.[89] If a jury uses a cap in this way, it may exacerbate the problem of inaccurate damages awards.

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[85] *See, e.g.*, MARCIA ANGELL, SCIENCE ON TRIAL: THE CLASH OF MEDICAL EVIDENCE AND THE LAW IN THE BREAST IMPLANT CASE 204 (1996).
[86] *See, e.g.*, Albert W. Alschuler, *Mediation with a Mugger: The Shortage of Adjudicative Services and the Need for a Two-Tier Trial System in Civil Cases*, 99 Harv. L. Rev. 1808, June 1986.
[87] *See, e.g.*, Richard A. Posner, *The Law and Economics of the Economic Expert Witness*, Journal of Economic Perspectives, Spring 1999, Volume 13, Number 2, See Stephen D. Easton, *Ammunition for the Shoot-Out with the Hired Gun's Hired Gun: A Proposal for Full Witness Disclosure*, 32 Ariz. St. L.J. 465,520 (2000).
[88] *See, e.g*, Jeffrey L. Harrison, *Reconceptualizing the Expert Witness: Social Costs, Current Controls and Proposed Responses*, 18 Yale J. on Reg. 253, Summer, 2001.
[89] V. Hinsz, & K. Indhal, *Assimilation to Anchors for Damage Awards in a Mock Civil Trial*. Journal of Applied Social Psychology, 25, (1995): 991-1026.

Some legal commentators have proposed changes in discovery rules. Easton proposes "widening reporting requirements to include full disclosure of attorney influences on experts and all information considered by experts. . ."[90] In his opinion, attorneys often heavily influence expert opinions through their communications with experts and through the information they provide, but this information is often hidden from the jury. He argues that requiring disclosure of this information will help mitigate expert witness bias. Posner proposes a requirement that "lawyers who call an economic expert as a witness should be required to disclose the name of all economists whom they have contacted as possible witnesses."[91]

These changes in discovery rules are likely to have little impact on the potential for expert witness bias to lead to inaccurate damages awards. These proposals overlook that lawyers inclined to utilize biased expert witness testimony will simply adapt their behavior in the face of new discovery rules. For example, a requirement that attorneys provide a list of all experts they have contacted will lead some attorneys to attempt to determine whether experts are inclined to favor their client's position through means other than contacting the expert. For example, they can review the expert's prior published articles, examine prior testifying roles, and consult other attorneys who have previously worked with the expert. The existence of these alternatives means that the ability to "witness shop" without disclosing this fact to the jury may remain for some attorneys despite the imposition of any requirement to disclose the experts they have contacted. All that will result is the social cost of additional time spent by attorneys in performing their witness search.

Fourth, it has been argued that experts should be subject to increased penalties for providing inaccurate and biased testimony.[92] Harrison lists four primary ways of disciplining experts: "The first is the adversarial process itself, embodied by opposing counsel. The second is judicial action by means of public exposure or exclusion of questionable testimony. The third is common law liability to the 'friendly' or to the adverse party. A fourth possibility is the use of professional disciplinary procedures. .

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[90] *See* Easton *supra* note 87
[91] Posner *supra* note 87 at 98.
[92] *See* Harrison *supra* note 88.

."[93] He argues that none of these provides the best method for improving expert testimony and that there should be increased liability for experts under a contract theory.[94]

Increased penalties on experts certainly have the potential for promoting accurate expert testimony. However, as demonstrated above, in many cases, no penalty other than exclusion is necessary to lead to expert testimony that results in accurate judicial decisions. This is particularly true when the parties perceive a substantial probability that the judge in their case will appoint an expert.

V.   CONCLUSION

In their role as "gatekeepers" judges are often faced with the problem of evaluating the reliability of expert testimony that can be quite complex. Expert witnesses should present unbiased, accurate, and independent expert testimony. However, biased expert testimony sometimes occurs. When it occurs, it presents a hurdle to achieving proper judicial outcomes. Many commentators have advocated the use of court-appointed experts to aid judges in their gatekeeping role in determining the reliability of expert testimony and whether or not to exclude it. Unfortunately, the literature to date has not evaluated the proper use of court-appointed experts in a rigorous framework which considers the knowledge and incentives of experts, the influence of experts on the finder of fact, and the knowledge of judges. As a result, there is substantial disagreement over the proper role of court-appointed experts and the frequency with which and circumstances in which judges should appoint them.

In this article we provide law and economics perspective on the issue of court-appointed experts and develop a game-theoretic framework for assessing the proper role of court-appointed experts and the circumstances in which judges should appoint them. As we demonstrate, court-appointed experts in the role of "technical advisors" are capable of facilitating accurate jury awards. We show that judges should be more inclined to appoint an expert when the experts retained by the parties do not enable the judge to establish a narrow range within which true damages fall and the judge

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[93] *Id*. at 273.
[94] *Id*. at 314.

anticipates that a court-appointed expert can substantially narrow the range. Judges need not appoint experts in a large number of cases. They should, however, develop a reputation for appointing experts in the appropriate circumstances. Once a judge has developed such a reputation, she will find that she will not need to appoint experts in the majority of cases in order to solicit expert testimony leading to accurate jury awards.

APPENDIX

Solving the defendant expert's maximization problem:

The defendant's expert observes the damages opinion of the plaintiff's expert prior to presenting her own opinion. As explained above, the plaintiff's expert will testify to one of two possible damages opinions: $D_P = T*(1+L)$, or $D_P = T*(1+H)$. The defendant's expert, in turn, must also select between two possible damages opinions: $D_D = T*(1-L)$, or $D_D = 0$. Her decision process can be broken down as follows:

- If the defendant's expert observes that $D_P = T*(1+L)$ (i.e., the plaintiff's "plays it safe"), testifying to damages of $D_D = T*(1-L)$ (i.e. "playing it safe") will lead to Outcome #4 described above, resulting in an expected damages award of

$$E(D_4) = \frac{1}{2}[T(1+L) + T(1-L)] = T$$

Alternatively, if the defendant's expert testifies to damages of $D_D = 0$ (i.e., "playing it risky"), this will lead to Outcome #3 described above, resulting in an expected damages award of

$$E(D_3) = \pi T(1+L) + (1-\pi)\frac{1}{2}T(1+L) = \frac{(1+\pi)}{2}T(1+L)$$

Thus, if the plaintiff's expert "plays is safe", the defendant's expert essentially chooses between Outcomes #3 and #4 described above. She will testify to damages leading to Outcome #4 if $E(D_4) < E(D_3) \Leftrightarrow T < \frac{(1+\pi)}{2}T(1+L) \Leftrightarrow \pi > \frac{1-L}{1+L}$

(5)

We conclude that when the plaintiff's expert "plays it safe," the defendant's expert will also "play it safe" provided that $\pi > \frac{1-L}{1+L}$; she will "play it risky" otherwise.

- Similarly, if the plaintiff's expert "plays it risky," the defendant's expert must choose between outcomes #1 and #2 described above. She will choose outcome #1 ("play it risky") if

$$E(D_1) < E(D_2) \Leftrightarrow \frac{(1-\pi)}{2}T(1+H) < \frac{(1-\pi)}{2}T(2+H-L) \Leftrightarrow L < 1 \qquad (6)$$

Since L is always smaller than 1 by definition, it follows that the defendant's expert will always "play it risky" in response to a plaintiff's expert who also "plays it risky."

The following table summarizes the defendant expert's optimal strategy plan in response to the possible damages opinions of the plaintiff's expert:

Table 3:

If $D_P =$	And (Condition)	Then $D_D =$	Outcome#	Expected Damages
T(1+L)	$\pi > \dfrac{1-L}{1+L}$	T(1-L)	4	True Damages
T(1+L)	$\pi < \dfrac{1-L}{1+L}$	0	3	$\dfrac{(1+\pi)}{2}T(1+L)$ (Below True Damages)
T(1+H)	None	0	1	$\dfrac{(1-\pi)}{2}T(1+H) > T$ (Above True Damages)

Solving the plaintiff expert's maximization problem:

Since this is a game of complete information, the plaintiff's expert can rationally arrive at the results depicted in the above table. Thus, he is aware of the defendant expert's optimal response to any damages opinion he presents. For example, he knows that if he "plays it safe", defendant expert will also "play it safe", leading to Outcome #4 and expected damages of T, if the condition of $\pi > \dfrac{1-L}{1+L}$ is met. On the other hand, if he "plays it risky", he is assured that the defendant expert will as well, leading to Outcome #1 and expected damages of $\dfrac{(1-\pi)}{2}T(1+H)$.

Thus, as the first mover in this game, the plaintiff's expert responds to conditions rather than to the opposing player's move. His decision process is as follows:

- If the condition $\pi > \dfrac{1-L}{1+L}$ is met, plaintiff's expert is essentially choosing between

  Outcomes #1 and #4. In this scenario, he will "play it safe" if

$$E(D_4) > E(D_1) \Leftrightarrow \frac{(1-\pi)}{2}T(1+H) > T \Leftrightarrow \pi < \frac{H-1}{H+1} \tag{7}$$

  ; he will play it risky otherwise.

- If $\pi < \dfrac{1-L}{1+L}$, the plaintiff's expert is essentially choosing between outcomes #1 and

  #3. In this scenario, he will "play it safe" if

$$E(D_3) > E(D_1) \Leftrightarrow \frac{(1+\pi)}{2}T(1+L) > \frac{(1-\pi)}{2}T(1+H) \Leftrightarrow \pi < \frac{H-L}{2+H+L} \tag{8}$$

  ; he will "play it risky" otherwise.