The Accuracy and Manipulability of Lost Profits Damages Calculations: Should the Trier of Fact be "Reasonably Certain"?

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ABSTRACT

The accuracy and manipulability of calculations for lost profits damages are critical determinants of the ability of harmed parties to receive just compensation in a wide range of cases including antitrust, fraud, false advertising, intellectual property infringement, and breach of contract. They are also important determinants of the deterrent effects of the law. Using a sample of over 5,000 U.S. firms, we show that simple damages methods are capable of being substantially inaccurate. We also show that damages methods in general are highly susceptible to manipulation. In the absence of reasonable justifications for why particular data sets and methods were chosen for calculating damages, there can be little certainty that proffered damages are accurate and free of manipulation and, therefore, little certainty that goals such as just compensation and optimal deterrence are being properly promoted.

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INTRODUCTION

Lost profits damages are commonly an essential form of relief sought in commercial litigation. Many courts have allowed a degree of uncertainty in the calculation of damages and have articulated a standard that damages need to be calculated only with "reasonable certainty."[1] Intersecting with this standard is a commonly held perception that simple methods of calculating damages are often more understandable and persuasive to a judge or jury than more complex methods. When presented with the results of such simple methods, should the trier of fact be "reasonably certain" that the results are accurate? Moreover, should there be a concern that the lost profits damages presented have been manipulated to provide a favorable result? In this article, we bring empirical evidence to bear on these highly important issues. The accuracy and manipulability of damages calculations is an important determinant of whether the law will result in the attainment of such goals as just compensation, optimal deterrence of harmful acts, and efficient breach of contract.

We evaluate several versions of the well established and often used "before and after" approach to calculating damages. We assess these by applying these methods to a large sample of *undamaged* U.S. firms. For the firms in our sample, we simply assume a fictional damaging event and damage date. Thus, unlike an actual litigation environment in which the damages are unknown and typically in dispute, for our sample the damages are known with certainty. They are equal to zero. The certain nature of the actual

[1] *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) at 35.

damages of our sample allows us to compare the damages generated by a particular method with actual damages and thereby assess the accuracy of the calculated damages. Any calculated damages are "phantom" damages and a result of an inaccurate calculation.

As we show below, damages methods that have been previously used and accepted by the courts can be highly capable of producing substantial "phantom" damages and highly capable of manipulation. For example, considering only the three methods we employ, for about half the firms in our sample there exists at least one method that yields non-existent "lost" revenues that exceed 20% of actual revenues. These results indicate that many damages methods should require additional evidence on their appropriateness, and inquires should be made as to why particular methods were chosen. Without such additional information, the trier of fact should have little certainty that the damages presented are accurate and have not been manipulated.

Section I below provides an overview of the law and economics of lost profits calculations. As explained, various implementations of the "before and after" approach to calculating damages have been commonly used and commonly accepted by the courts. Section II explains the theoretical sources of uncertainty that arise from the use of simple damages methodologies. This uncertainty can arise from the failure of a particular method to yield accurate damages calculations. It can also arise from manipulation in applying the method or choosing data. Section III explains the data sample and the results obtained. As shown, the methods we employ often yield substantial damages when they do not exist. They are also highly susceptible to manipulation. Section IV assesses the prospects for courts to exclude simple damages calculations when they are

unreliable and explains factors that courts should look for in evaluating damages methods. Section V provides concluding remarks.

I. Background on the Calculation of Lost Profits: The Law and Economics

A. Economics of Lost Profits Calculations

A plaintiff may incur lost profits damages due to a variety of harmful acts leading to lawsuits such as fraud, false advertising, antitrust violations, intellectual property infringement, and breach of contract. The lost profits of a plaintiff are equal to the difference between the profits that plaintiff would have received "but-for" the harmful act or acts at issue and the actual profits received by the plaintiff, appropriately adjusted to present value.[2] For example, if a plaintiff would have earned $100 in profits had a harmful act not occurred (the "but-for" scenario) but it actually earned only $75 (the "real world") then lost profits are equal to $25 ($100 minus $75 is equal to the profits the plaintiff lost as a result of the harmful act). Approaches to calculating damages include the "before and after" approach, the "yardstick" or "control group" approach, and other approaches based on the economics of the hypothetical "but-for" scenario.[3]

The "before and after" approach entails a comparison of the plaintiff's financial performance during the time period in which it was presumably impacted by the harmful

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[2] *See, e.g.,* AMERICAN BAR ASSOCIATION, ANTITRUST LAW DEVELOPMENTS (1996); GLICK, REYMANN, & & HOFFMAN, *supra* note 1; ROBERT HALL & VICTORIA LAZEAR, *Reference Guide on Estimation of Losses in Economic Damages Awards*, in the REFERENCE MANUAL ON SCIENTIFIC EVIDENCE (2000); VICTORIA A. LAZEAR, *Estimating Lost Profits and Economic Losses*, in the LITIGATION SERVICES HANDBOOK, THE ROLE OF FINANCIAL EXPERT, Chapter 5, (2001); Jonathan T. Tomlin, *Distinguishing the Legal from the Illegal in Antitrust Damages Calculations: Lessons from* Netscape v. Microsoft, 17(2) Journal of Forensic Economics (2004).

[3] *See generally*, Conwood Co. v. United States Tobacco Co., 290 F.3d 792-793 (6th Cir. 2002), cert. denied, 123 S. Ct. 876 (2003); ROBERT DUNN, RECOVERY OF DAMAGES FOR LOST PROFITS, (5th ed., 1998, supplement March 2005); PATRICK GAUGHAN, MEASURING BUSINESS INTERRUPTION LOSSES AND OTHER COMMERCIAL DAMAGES (2004), Tomlin, *Id.*

act or acts of the defendant with another time period in which it was presumably not impacted. The hypothetical "but-for" scenario is one in which the plaintiff would have performed in accordance with the benchmark time period chosen. The "yardstick" or "control group" approach entails comparing the performance of the plaintiff with a financial benchmark based on an alternative geographic area, product line, distribution channel, industry or firm. For example, an application of the "yardstick" approach can be to create a hypothetical "but-for" scenario in which it is assumed that the plaintiff would have obtained profits consistent with other firms in the same industry. In applying the "yardstick" approach or the "before and after" approach, additional factors that may have impacted the plaintiff's performance may also be taken into account. In addition to the before and after approach and the yardstick approach other approaches are available and can include calculating any costs incurred by a plaintiff as a result of the harmful behavior at issue.

Methods for calculating damages range from the simple to the sophisticated. As explained further below, simple methods used in litigation include simply comparing the average revenues or profits of a plaintiff before the harmful act at issue with its revenues or profits following the harmful act. More sophisticated techniques include the use of multiple regression techniques to analyze lost profits by controlling for other factors, outside of any harmful behavior by the defendant, that may have impacted the profits of the plaintiff. The use of multiple regression techniques has become quite common in litigation.[4]

[4] *See, e.g.,* DANIEL RUBINFELD, *Reference Guide on Multiple Regression*, in the REFERENCE MANUAL OF SCIENTIFIC EVIDENCE, (2000); Michael O. Finkelstein & Hans Levenbach, *Regression Estimates of Damages in Price-Fixing Cases*, 46 Law & Contemporary Probs. 145, 1983; Franklin M. Fisher, *Multiple*

As observed by many commentators on the presentation of damages calculations, simple methods of calculating damages may often prove appealing to a party attempting to persuade the trier of fact. As Rubinfeld and Steiner note, "a simple graph with a firmly asserted conclusion, even if spurious, can be quickly grasped and readily accepted."[5] Gaughan writes "because the methods used must be explained to a judge or jury, who most likely do not have a background in statistical analysis, simple methods have certain advantages. Only if it can be demonstrated that the sophisticated methods are significantly more accurate should they be contemplated."[6] Davis and Laguzza write "jurors, like most other humans, are cognitive misers who prefer to avoid complexity, so they tend to accept arguments that relieve them of the duty to investigate and understand unfamiliar information."[7]

Because of a perceived lack of sophistication on the part of judges and juries and the corresponding perception that simple damages models will be persuasive, simple damage models that do not account for other factors potentially impacting the plaintiff firm are often presented. Thus, a highly important question is the reliability of such simple models.

B. The Law

The courts generally allow a plaintiff a degree of uncertainty in calculating damages and place a lower threshold on the plaintiff in quantifying damages than that placed on it to prove the fact of damage. As the Supreme Court has stated "(i)f the

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Regression in Legal Proceedings, Columbia Law Review, (1980); Daniel L. Rubinfeld, *Econometrics in the Courtroom*, Columbia Law Review, Volume 85, No.5 (June, 1985).

[5] Daniel L. Rubinfeld & Peter O. Steiner, *Quantitative Methods in Antitrust Litigation*, Law and Contemporary Problems, Vol. 46, No. 4 (Autumn 1983) at 140.

[6] GAUGHAN (2004) *supra* note 3 at 144.

[7] DAVID SCOTT DAVIS & ROSS LAGUZZA, *Communicating with a Jury*, in the LITIGATION SERVICES HANDBOOK, (3rd Edition,), 2001, at §15.3.

damage is certain the fact that its extent is uncertain does not prevent a recovery."[8] A threshold of "reasonable certainty" is often applied.[9] As the Third Circuit has explained it, "reasonable certainty embraces a rough calculation that is not 'too speculative, vague or contingent' upon some unknown factor."[10]

The damages testimony of lay persons or expert witnesses can be excluded if it does not meet the standards of proper case law (such as "reasonable certainty" for computing damages). If damages testimony in a federal case is presented through an expert witness, it must meet the requirements of Rule 702 of the Federal Rules of Evidence.[11] Rule 702 was revised following the Supreme Court's decisions in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*[12] and *Kumho Tire Co. v. Charmichael*[13]and it attempts to clarify the standards developed in these decisions.[14] *Daubert* listed a non-exclusive four-part test to be used by federal judges in evaluating the admissibility of expert testimony. In *Kumho Tire*, the Supreme Court clarified its decision in *Daubert* by explaining that *Daubert* applied not only to scientific testimony but also testimony based on "technical" and "other specialized" knowledge.[15] Many states have adopted standards

[8] Story Parchment Co. v. Patterson Parchment Paper Co., 282 U.S. 557 (1931).
[9] *See supra* note 1.
[10] 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).
[11] *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), GLICK, REYMANN & HOFFMAN *supra* note 1 Chapter 2; 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).
[12] Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993).
[13] Kumho Tire Co. v. Carmichael*,* 526 U.S. 237 (1999).
[14] GLICK, REYMANN & HOFFMAN *supra* note 1 at 27; Joseph A. Keierleber & Thomas Bohan, *Ten Years After Daubert: The Status of the States*, J. Forensic Sci., Vol. 50, No. 5 (2005).
[15] *Kumho Tire Co., 527 U.S.* at 149.

for assessing expert evidence that are similar to the federal standards although the approach varies between states.[16]

As explained below, in this paper we focus on assessing the reliability and manipulability of simple implementations of the "before and after" method to calculating damages. Federal and state courts across the country have utilized and accepted various implementations of the "before and after" approach.[17] Often, the period before an alleged harmful act at issue is used as a benchmark to measure the damages to a plaintiff during a period in which the harmful act was expected to impact the plaintiff.[18] Other times, however, the subsequent experience of the plaintiff is used as the benchmark.[19] Courts have had to evaluate the reliability of utilizing a "before" period of as little as one week as a benchmark for damages.[20] In many cases, courts have found time periods as short as a few years or less to be a reliable basis for calculating the "after" performance of the plaintiffs.[21]

Nearly eighty years ago, the Supreme Court addressed the reliability of a simple application of the before and after approach in *Eastman Kodak Co. of New York v. Southern Photo Materials Co*.[22] In that antitrust case, the plaintiff, Southern Photo Materials, alleged that, as a result of anticompetitive acts of the defendant (Eastman

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[16] *See* Joseph A. Keierleber & Thomas Bohan, *supra* note 14.
[17] *See, e.g.,* Eastman Kodak Co. v. Southern Photo Materials Co., 273 U.S. 359 (1927). DUNN *supra* note 3 and the references therein.
[18] *Id.*
[19] *See*, *e.g.,* Milgard Tempering, Inc. v. Selas Corp., 902 F.2d 703 (9th Cir. 1990); *See also* DUNN *supra* note 3 and the references listed therein.
[20] *See* UST Corp. v. General Road Trucking Corp.*,* 783 A.2d 931 (R.I. 2001).
[21] *See, e.g.,* Eastman Kodak Co. 273 U.S. 359 (1927) (four year "before" period used to calculate damages for a four year damage period); Tingley Systems, Inc. v. Norse Systems, Inc. 49 F.3d 93 (2d Cir. 1995) (one and a half year before period used to calculate damages for a three year damage period); Kevin Swierczynski v. Arnold Foods Company, 265 F. Supp. 2d 802 (4 year "before" period used to calculate damages for 20 year damages period); Shade Foods, Inc. v. Innovative Products Sales & Marketing Inc., 78 Ca. App. 4th 847, 93 Ca. Rptr. 2d 364 (2000) (3 month "before" period used to calculate damages for 3 year damages period).
[22] *Eastman Kodak Co.*, 273 U.S. 359.

Kodak), it was unable to obtain goods from the defendant important to its business for a four year period. The plaintiff calculated its damages as the gross profits on its sale of the defendant's goods for the four years preceding the suit (after subtracting out some additional expenses that would have been incurred in selling these goods). Thus, the damages methodology simply assumed that during the period of presumed harm gross profits would have been equal to those in prior years in the "but-for" scenario and made no other adjustments. In addressing the defendant's claim that the "plaintiff's damages were purely speculative," the Court opined that "plaintiff's evidence as to the amount of damages, while mainly circumstantial, was competent, and that it sufficiently showed the extent of the damages, as a matter of just and reasonable inference, to warrant the submission of this question to the jury."[23]

Since *Eastman Kodak*, simple implementations of the "before and after" method have been employed numerous times and have continued to be employed after *Daubert.*[24] In *Tingley Systems Inc. v. Norse Systems, Inc*.,[25] for example, Norse brought counterclaims against Tingley alleging, *inter alia*, tortious interference with its business relations. Norse calculated its lost profits for a three year period as the difference between its profits during this period and average profits (projected over three years) for an eighteenth month period preceding the damage period. Thus, the "before" benchmark was simply the average profits for the eighteen month prior period, and the method assumed that the proper "but-for" scenario was one in which Norse would have earned the same profits as it did during this period had the allegedly harmful conduct by Tingley

[23] *Id.* at 379.
[24] *See, e.g., Tingley Systems, Inc*. 49 F.3d 93 (2d Cir. 1995), *Swierczynski*, 265 F. Supp. 2d 802; *Shade Foods, Inc.* 78 Ca. App. 4th 847, 93 Ca. Rptr. 2d 364 (2000).
[25] *Tingley Systems, Inc.* 49 F.3d 93 (2d Cir. 1995).

not occurred. In reviewing Tingley's claim that the method failed to prove a connection between its actions and lost profits, the Second Circuit concluded that the jury "could have reasonably accepted Norse's calculations of the profits it lost due to Tingley's interference..."[26]

C. Overview of Our Approach

When presented with a calculation of lost profits damages, when should the trier of fact be "reasonably certain" of its accuracy?[27] For example, if the sales for a particular business decline, say, 20% during the period of harmful behavior, is this unusual and therefore solid evidence of the fact and amount of lost profits? On the other hand, are such fluctuations in sales quite typical and, therefore, of little or no useful guidance on the issue? In addition to the possibility of the method leading to uncertain results is the possibility that the data or the model have been "cherry picked" and therefore were subject to manipulation by the presenter.

We focus on the "before and after" model in addressing these questions for four reasons. First, simple methods are often employed in litigation, and there is a conventional wisdom that simple models can be more persuasive to the trier of fact. Second, the courts have accepted the "before and after" method on numerous occasions. Third, the "before and after" approach allows us to apply the same method to a large sample of firms. Other methods, such as the yardstick approach, typically involve the use of data that is specific to a particular case. Fourth, and finally, we believe that the results

[26] *Id*. at 98.

[27] Some commentators have discussed whether a standard of "reasonable certainty" is a desirable standard. *See, e.g*., Doug Carleton, *Note: Averting the New Business' Battle to Prove Lost Profits: A Reintroduction of the Traditional Reasonable Certainty Rule as a Penalty Default*, 67 S. Cal. L. Rev. 1573 (1994). This issue is beyond the scope of this paper as we focus not on whether the standard is appropriate but, rather, on the ability of damages models to meet this standard.

from our application of simple damages methods are more widely applicable to other methods.

II. Sources of Uncertainty in Lost Profits Calculations

Inaccuracies in proffered lost profits calculations can result from inaccuracies inherent in the method and data employed. They can also result from manipulation of the method or inappropriate use of the method or both.

A. Inaccuracies Inherent in the Method

Proper calculation of lost profits entails determining the profits that the plaintiff would have earned in a hypothetical scenario in which the harmful act or acts of the defendant did not occur. At the most basic level, the profits of a firm are determined by the demand factors and the supply conditions for that firm. In the economic model of perfect competition, a firm can sell an unlimited amount of products and services at the perfectly competitive market price. It cannot sell any goods or services above this price and it has no hopes of changing this price. However, few industries in the real world correspond to the perfectly competitive model.[28] Thus, the relevant demand for a firm is usually the demand that is specific to that firm (the "firm specific" demand) and not simply a demand curve in which the firm can sell all it wants to at the market price but nothing above this price. Supply factors refer to the cost conditions faced by the firm.

Accuracy in calculating profits in the "but-for" scenario results from accurately projecting the firm specific demand and cost conditions that the plaintiff would have been faced had the harmful act or acts at issue not occurred. On the demand side, a harmful act may eliminate demand entirely (in the case in which the harmful act puts the plaintiff

[28] *See* Benjamin Klein, *Market Power in Antitrust: Economic Analysis After* Kodak, 3 S. Ct. Econ. Rev. 43 (1993).

out of business) or it may shift demand. In the case of a shift in demand, demand may shift for a variety of reasons, including changed perceptions on the part of consumers (e.g. false advertising), changes in the products offered by competitors (e.g. intellectual property infringement), or the loss of a particular customer (e.g., breach of contract or tortious interference). On the supply side, costs may change due to changes in input costs (e.g., antitrust allegations of price fixing or price discrimination) or changes in the way inputs are processed (e.g., breach of contract causing the loss of a key employee).

Thus, a harmful act may impact firm specific demand and cost conditions in multiple ways (and can shift the demand curve or change the responsiveness of demand to price changes (the "elasticity" of demand)[29]). Damages methods accurately measure damages if they accurately capture these changes. Whether a simple damages method can adequately perform this task depends on the circumstances.

B. Manipulation of the Method or the Data

In addition to questions of reliability resulting from potential inadequacies of the damages method itself, the possibility of manipulation of the data or method used is a source of uncertainty.[30] In the circumstance in which the presenter of damages is an employee of the company, the incentives to present a biased estimate are quite clear. A large damage award increases the profits of the firm. Such incentives can exist for financial experts testifying on damages as well. Financial experts may perceive that they will obtain increased business from the party that has retained them if they provide a

[29] *See, e.g.,* WALTER NICHOLSON, MICROECONOMIC THEORY, Chapter 7 (1992).
[30] Of course, errors can result from errors in implementation (such as a mathematical error) but such errors will often be discovered in the litigation environment. Thus, we focus on manipulation of the data and methods used.

result that is favorable to their client.[31] In addition, such a bias can result from the "slippery slope" as attorney clients may prove persuasive and therefore bias the analysis.[32] A persuasive witness, in turn, may be able to prevail with "shoddy data or methods."[33]

The possible sources for inaccurate and misleading calculations of damages include the choice of the data set to use, the choice of variables to include in the damages model (i.e., the factors for which to adjust in assessing the "but-for" scenario), and the choice of "functional form" of the model (i.e., how the model is set up).[34] Because we address simple damages methods, our focus is on the potential for manipulation from data choice and model choice.

The choice of data used to forecast revenues or profits in the "but-for" scenario is capable of heavily influencing the results obtained. A firm that experiences high variability in its sales and profits may show very different results if its profits in the "before" period are averaged over, say, a three year period instead of a four year period. A three year period may show substantial profits while the inclusion of a fourth very unprofitable year may reduce profits to zero (and therefore reduce calculated damages to zero).

In *Eastman Kodak*, as explained above, the plaintiff used profits over a four year period to calculate profits in the "before" period that were used as the benchmark comparison for the damages period. As the defendant pointed out, however, using only

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[31] *See generally* Richard A. Posner, *The Law and Economics of the Economic Expert Witness*, Journal of Economic Perspectives, Spring 1999, Volume 13, Number 2; Deanne M. Short & Edward L. Sattler, *The Market for Expert Witnesses*, Journal of Economics, 22 (1996); Robert Thornton & John Ward, *The Economist in Tort Litigation*, Journal of Economic Perspectives, Spring 1999, Volume 13, Number 2.
[32] *See* Michael Mandel, *Going for Gold: Economists as Expert Witnesses*, Journal of Economic Perspectives, Spring 1999, Volume 13, Number 2.
[33] Rubinfeld & Steiner *supra* note 5 at 140.
[34] *See* Rubinfeld (2000) *supra* note 4.

the two most recent years for comparison yielded a loss for the plaintiff (and presumably no damages). In *Tingley*, discussed above, the plaintiff used an eighteen month "before period" to calculate its average revenues as a benchmark for calculating damages. However, when it came to calculating costs, the plaintiff used only a six month period and explained that its revenues needed to be calculated over a longer period as they came "in chunks."[35] It is natural to wonder whether calculated average revenues would have been substantially lower if only a six month period were used.

Another potential source of manipulation in lost profits calculations is in the choice of the method itself. For example, a firm may not have obtained any profits averaged over a well defined "before period." However, if one were to look at the growth rate of the firm's revenues and assumed that costs would not increase substantially, a method might well be developed that yielded damages. Various econometric models might also yield different damages calculations and therefore more opportunities to "find" a method that generates damages.

Ex-post model selection in an attempt to find favorable results obviously biases damages calculations in favor of the party presenting them. The process also renders standard statistical tests used to assess the reliability of statistical models invalid.[36] In the realm of academic research, it has long been recognized that researchers have an incentive to find results that are more likely to generate publishable research and that they may engage in "ex-post model selection" to generate such results.[37] Because of this,

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[35] *Tingley Systems, Inc.* 49 F.3d 93, 98 (2d Cir. 1995).
[36] *See* DAVID H. KAYE & DAVID A. FREEMAN, *Reference Guide on Statistics*, in the REFERENCE MANUAL ON SCIENTIFIC EVIDENCE (2000).
[37] *See* Edward E. Leamer, *False Models and Post Data Model Construction*, Journal of the American Statistical Association (1974); Edward E. Leamer & Herman B. Leonard, *Reporting the Fragility of Regression Estimates*, 65 Rev. Econ & Statistics 306 (1983).

academics often report the results from various specifications of the models they considered. The concern that a researcher has generated biased results through ex-post model selection in academia should exist in the litigation context as well.[38]

III. Assessing the Accuracy and Manipulability of Methods for Calculating Lost Profits

The damages sustained by a plaintiff are typically a matter of dispute in litigation. Thus, finding a sample of firms that can used to compare the actual damages sustained with the damages calculated by a particular method (and therefore assessing the accuracy of the damages measured by that method) would seem to be a difficult task. However, there is at least one group of firms in which the amount of damages may be calculated with certainty. For those firms not suffering any damages, damages are known with certainty to be equal to zero. We create such a sample of firms by assuming a fictional harmful event and date at which this fictional event allegedly occurred. Any damages calculated for our sample are therefore "phantom" damages and a result of inaccuracies resulting from the method or inappropriate data choice or both.[39] This sample allows us to assess both the accuracy and the manipulability of lost profits methods. We focus on several implementations of the "before and after" approach.

[38] *See* Richard Lempert, *Symposium on Law and Economics: Statistics in the Courtroom, Building on Rubinfeld*, 85 Columbia Law Review 1098 (1985).

[39] Economic damages are equal to lost revenues minus the incremental costs that would have been incurred to produce the goods or services necessary to generate the lost revenues. As long as profit margins are positive, lost revenues equate to lost profits damages. We focus solely on lost revenues and do not take the subsequent step of subtracting out incremental costs as the calculation of incremental costs is likely to be firm specific and it is unnecessary to address the issues of concern in this article.

A. The Data Used

We obtained annual (fiscal year) revenue data for the period 1995-2004 for all U.S. firms contained in Standard and Poor's Compustat North America database. Compustat compiles detailed financial information for publicly traded companies. We attempted to screen out firms which experienced highly unusual changes in revenues in a single year. Accordingly, we deleted all firms which experienced an increase of over ten times prior year revenues in any single year.[40] As explained below, we applied several different damages methodologies to the firms in our sample. To be included in the analysis of a particular method, a firm was required to have complete annual revenue data throughout the period being considered. The final number of firms in our sample ranged from 3,739 to 5,544, depending on the date range and method considered.

Because we only include firms with data throughout the periods we consider, firms that performed so poorly that they ceased business operations are necessarily excluded. Thus, there may be a "survivorship bias" that biases the dataset in the direction of including more successful firms. Any such survivorship bias, however, should tend to make the finding of non-existent damages less likely (and therefore makes a finding of such damages even stronger).

B. Results from Using Simple Averages to Forecast "Lost" Sales

In order to apply the damages methodologies we examine, we will create a fictional lawsuit for each firm in our sample that specifies a non-existent harmful event to that firm allegedly occurring in the year 2000. Our fictional lawsuit seeks lost profits damages for the year 2000 for this non-existent harmful act. In actuality, we have not

[40] We also deleted the firm "Pittsburgh and West Virginia Railroad" as it showed extremely small revenues and no change in revenues for numerous quarters.

examined actual events occurring in the year 2000 for any of the firms in our sample and have no *apriori* reason to believe there was any particular damaging event occurring in 2000 for any firm considered. The year 2000 is chosen as it allows us to average over several years of data both before and after our hypothetical damage year. It is also chosen so as to avoid the year 2001 which was a recessionary year according to the dating conventions used by the National Bureau of Economic Research. Because our harmful event is non-existent, any damages we calculate using a method we examine are non-existent as well and represent an inaccurate calculation of damages. True damages are equal to zero.[41]

An obvious way to forecast the sales that a defendant firm would have received in a "but-for" scenario in which the harmful act at issue did not occur is simply to suppose that the plaintiff would have received the same revenues during the period of harm as it did on average over some benchmark period. Under this approach, lost revenues are calculated as the difference between the average revenues over the benchmark period and the actual revenues during the period of perceived harm. As noted above, this simple approach has been used in litigation and accepted by the courts on several occasions.[42] It has also been advanced as a potentially acceptable approach by at least one practitioner text on the calculation of lost profits.[43]

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[41] It is certainly possible that some of the firms in our sample experienced an event in 2000 that caused their profits to decline in this year (and perhaps to decline substantially). However, these lost profits would not be attributable to the fictional harmful event that we assume. Any calculated damages resulting from this event would still be inaccurate as they would be attributed to our fictional event (and not to the actual event causing the lost profits).

[42] *See, e.g.,* Eastman Kodak Co. v. Southern Photo Materials Co., 273 U.S. 359; Tingley Systems, Inc. v. Norse Systems, Inc. 49 F.3d 93 (2d Cir. 1995).

[43] "When the plaintiff has experienced both positive and negative growth, the expert needs to apply judgment in selecting the appropriate base. One possible alternative is the use of average revenues computed over prior years, such as the past three years." GAUGHAN, supra note 3, at 145.

"Lost" revenues for the year 2000 are calculated as a percentage of actual revenues that year. It is natural to wonder whether any particular level of phantom "lost" revenues constitutes a substantial inaccuracy as opposed to an inconsequential amount that should be of little concern in litigation. This amounts to a consideration of what can be labeled the "practical significance" of our results as opposed to any statistical significance found. For example, in theory, a damages method could yield a statistically significant result that damages were equal to $1. However, the $1 in damages could hardly be considered practically significant.

Unfortunately, as Rubinfeld notes, there is no particular threshold for "practical significance" as opposed to statistical significance and, thus, no particular threshold to guide us in examining "lost" revenue percentages in this instance.[44] Because of this, we present the percentage of firms for which the simple use of average revenues to forecast "but-for" revenues exceeds certain thresholds. As Table 1 below shows, for over 20% of the firms in our sample this method generates "lost" revenues that do not exist for each of four different "before" periods (ranging from two years to five years).[45] For approximately 10% of the firms, these phantom "lost" revenues exceed 30% of year 2000 revenues.

[44] RUBINFELD (2000) *supra* note 4, at 14.
[45] Using 2001 as the hypothetical damage year led to larger phantom "lost" profits and shows the particular pitfalls that may be present in overlooking important economic factors (in this case a recession). The number of firms with calculated "lost" revenues exceeding each threshold level were higher for 2001 than for 2000.

Table 1:

Percentage of Firms for Which Calculated "Lost" Revenues Exceed Given Thresholds For a Fictional Year 2000 Damage Date Based on Average "Before" Period Revenues

	Percentage of Firms Exceeding Selected Thresholds						
	>0%	>10%	>20%	>30%	>40%	>50%	Sample Size
Before Period:							
1995 - 1999	22%	16%	13%	10%	9%	8%	3,739
1996 - 1999	22%	16%	12%	10%	8%	7%	4,077
1997 - 1999	23%	16%	12%	10%	8%	7%	4,344
1998 - 1999	24%	16%	12%	9%	8%	6%	4,719
Mean	23%	16%	12%	10%	8%	7%	4,220

Notes: Annual revenue data obtained for publicly traded firms from Compustat. "Lost" revenues are calculated as (average revenue over the applicable before period - year 2000 revenue)/year 2000 revenue.

Table 2 below shows the results using the five year period over 2000-2004 to calculate lost revenues. As shown, the phantom damages calculated are just as persistent over the longer time period. Of course, because the damages period is longer, the total calculated "lost" revenues (and therefore the total amount by which damages were inaccurately calculated) would be commensurately larger.

Table 2:

Percentage of Firms for Which Calculated "Lost" Revenues Exceed Given Thresholds For a Fictional 2000-2004 Damage Period Based on Average "Before" Period Revenues

	Percentage of Firms Exceeding Selected Thresholds						
	>0%	>10%	>20%	>30%	>40%	>50%	Sample Size
Before Period:							
1995 - 1999	23%	18%	14%	12%	10%	9%	3,423
1996 - 1999	24%	19%	15%	12%	10%	9%	3,725
1997 - 1999	25%	20%	15%	12%	10%	9%	3,950
1998 - 1999	26%	20%	15%	13%	10%	9%	4,260
Mean	25%	19%	15%	12%	10%	9%	3,840

Notes: Annual revenue data obtained for publicly traded firms from Compustat. "Lost" revenues are calculated as (average revenue over the applicable before period multiplied by five - total revenues 2000-2004)/total revenues 2000-2004.

Another potential "benchmark" period for consideration is the use of the period after the period in which the harmful act allegedly occurred. This approach has been used in litigation and accepted by the courts in numerous cases.[46] A plaintiff may use such an approach where there is no prior operating history before the harmful event at issue. A plaintiff may also use this approach with the justification that the period after the harmful event better reflects the market conditions in the "but-for" scenario than that in the period preceding the event. Table 3 below shows the percentage of firms exceeding particular "lost" revenue thresholds when the average revenues for various periods after 2000 are used to forecast revenues during the fictional damage year of 2000.

[46] *See, e.g.,* Milgard Tempering, Inc. v. Selas Corp., 902 F.2d 703 (9th Cir. 1990); DUNN *supra* note 3 at §5.8. The approach has been rejected in some circumstances, however. *See*, DUNN *supra* note 3 at §5.9.

Table 3:

Percentage of Firms for Which Calculated "Lost" Revenues Exceed Given Thresholds for a Fictional Damage Date Of 2000 Based on Average Revenues Subsequent to Damage Date

	Percentage of Firms Exceeding Selected Thresholds						
	>0%	>10%	>20%	>30%	>40%	>50%	Sample Size
Subsequent Period:							
2001-2004	61%	50%	39%	32%	26%	22%	4,954
2001-2003	60%	48%	38%	31%	26%	21%	5,155
2001-2002	57%	46%	37%	30%	25%	21%	5,544
Mean	60%	49%	38%	31%	26%	22%	5,218

Notes: Annual revenue data obtained for publicly traded firms from Compustat. "Lost" revenues are calculated as (average revenue over the applicable subsequent period - year 2000 revenue)/year 2000 revenue.

As shown, for more than half of the firms in our sample, this method yields "lost" revenues that do not exist as a result of our fictional harmful act. This should be expected as the method uses the simple average revenues following our fictional damage date, and, on average, one would expect that firm revenues would increase for our sample. Of more interest is the frequency with which substantial phantom "lost" revenues are generated. For about one quarter of the firms, these phantom "lost" revenues exceed 40% of actual revenues. Thus, for our sample, the method of using simple averages following the damage period yields non-existent damages with even greater frequency and at a higher level than the method of using "before" period averages.

C. Results from Applying Past Growth in Revenues to Project Sales

The analysis above applied a quite simple approach used in prior litigation in which revenues of the plaintiff "but-for" the harmful act of the defendant were calculated under the assumption that they would have been equal to the average revenues obtained

by the plaintiff during some benchmark period. Damages are also commonly calculated in litigation by assuming that the revenues of the plaintiff would have grown over time during the period in which it was harmed.[47]

One way of projecting the growth of revenues of the plaintiff firm is through regression analysis. Regression analysis is a statistical method for estimating the relationship between a "dependent" variable that one seeks to explain (in this case revenues) and one or more "independent" variables (in this case time) presumed to help explain changes in the dependent variable. Estimating a "linear trend" through regression analysis is one simple way of projecting the growth of a firm by estimating how revenues change over time.[48] Calculating a growth rate through a linear trend has been illustrated in the texts on damages[49] and utilized in litigation.[50]

Under *Daubert*, one of the standards for evaluating a theory used by an expert is that theory's "general acceptance." In academic research using regression analysis, the typical level at which a result is considered "statistically significant" is at a five percent level.[51] Using regression analysis properly, statistical significance at a five percent threshold means that there is less than a five percent probability that the result obtained was simply due to random chance. Because a five percent threshold is commonly applied (and might be labeled "generally accepted"), we also performed calculations that limited

[47] *See, e.g.*, Kevin Swierczynski v. Arnold Foods Company, 265 F. Supp. 2d 802; E.J. McKernan Co. v. Gregory, 252 Ill. App. 3d 514, 623 N.E.2d 981 (1993); DUNN *supra* note 3; GAUGHAN *supra* note 3; GLICK, REYMANN, AND HOFFMAN *supra* note 1.
[48] *See, e.g.*, ROBERT S. PINDYCK AND DANIEL L. RUBINFELD, ECONOMETRIC MODELS AND ECONOMIC FORECASTS, (1998) at 469.
[49] *See, e.g.*, GAUGHAN *supra* note 3 at 150.
[50] *See, e.g., E.J. McKernan Co. v. Gregory*, 252 Ill. App. 3d 514, 623 N.E.2d 981 (1993).
[51] *See* G.S. MADDALA, INTRODUCTION TO ECONOMETRICS (1988) at 47. Some econometricians have argued that the five percent threshold is arbitrary, overemphasized, and may be inappropriate in some circumstances. *See, e.g.,* EDWARD LEAMER, SPECIFICATION SEARCHES: AD HOC INFERENCE WITH NON-EXPERIMENTAL DATA (New York: Wiley, 1978); D.V. Lindley, *A Statistical Paradox*, Biometrika, 1957. In addition, whether a five percent threshold is appropriate for the litigation context has been debated. *See* Lempert *supra* note 38.

calculating "lost" revenues to those instances in which there was a statistically significant coefficient (at five percent) on the time trend variable. Thus, an expert who utilized one of the models we employ would be able to appeal not only to the use of the well established "before and after" approach but also to the statistical significance of his or her results.

Table 4 below shows the percentages of firms for which calculated "lost" revenues exceed the indicated thresholds using a linear trend analysis for our sample of firms.[52] As shown, the linear trend model is very capable of generating damages when they do not exist. The frequency and magnitude of these phantom "lost" revenues calculated using the linear trend model is greater than that obtained using the average revenues before the year 2000 but less than that obtained using average revenues after 2000. Limiting the use of the model to statistically significant results improves matters but is hardly a cure-all. With this limitation, the method still results in calculated "lost" revenues exceeding 10% of actual revenues for about one quarter of the undamaged firms in our sample. These results should caution the courts to avoid placing excessive weight on the importance of statistical significance.

[52] The simple linear trend model we use is specified as $R_t = \alpha + \beta t$ where R_t represents the revenues of the firm at year t and t is a counter that starts at 1 in 1995 and increases by one for each subsequent year. Appropriate use of regression techniques should consider *apriori* the appropriate model choice and why it is being used. *See generally supra* note 4. In addition, proper use of regression techniques entails diagnotics checking for potential problems such as serial correlation and potential correcting for any problems. However, because our goal is only to assess the accuracy and manipulability of models employed (whether or not they were properly employed) we have not examined these issues for the linear trends we estimated.

Table 4:

Percentage of Firms for Which Calculated "Lost" Revenues Exceed Given Thresholds for a Fictional Damage Date Of 2000 Based on a Linear Trend Growth Model

	Percentage of Firms Exceeding Selected Thresholds						
	>0%	>10%	>20%	>30%	>40%	>50%	No. of Firms
All firms	51%	42%	35%	28%	23%	19%	3739
Firms with a statistically significant "t" statistic	31%	25%	20%	16%	13%	10%	3739

Notes: Linear trend model in which revenues for the year 2000 are projected based on a regression of annual sales on a constant and a yearly time trend using data from 1995-1999. "Lost" Revenues calculated as (projected revenues for 2000 - actual revenues in 2000)/actual revenues in 2000. Statistically significant sample restricts "lost" damages to those firms for which there was a statistically significant coefficient on the time trend variable used to project revenues.

D. Manipulability

In addition to the issue of the accuracy of the simple implementations of the before and after approach considered here, another issue of keen interest is the manipulability of these models. As explained above, two sources of potential manipulation are the choice of the data set and the choice of the method. Above we considered three different methods. The "before" method considered four different before period datasets, the method using subsequent period data considered three different datasets, and the linear trend growth model used one dataset. This leaves eight different avenues for an ethically challenged witness to "find" lost revenues even when they don't exist.

To address this issue, we examined the potential for finding at least one damage model and data set combination that yielded "lost" revenues at each selected threshold. Calculated lost revenues for the linear trend model are limited to those in which there was

a statistically significant coefficient on the time trend variable. To be sure, there are numerous other methods (e.g., implementations of a yardstick approach) and datasets that could have been used. Thus, the number of avenues for manipulation is much larger than the eight scenarios we consider. This makes a finding of easy manipulability even stronger.

Table 5 below shows the percentage of firms for which at least one of the eight dataset/method combinations yields "lost" revenues exceeding a given threshold. As shown, for over 70% of the firms in our sample at least one of the damages methodologies we employ yields phantom "lost" revenues. For nearly half of the firms in our sample, there is at least one method that yields phantom "lost" revenues exceeding 20% of actual revenues.

Table 5:

Percentage of Firms for Which at Least One Damages Method Yields Calculated "Lost" Revenues Exceeding Given Thresholds for a Fictional Year 2000 Damage Date

	>0%	>10%	>20%	>30%	>40%	>50%
Percentage of Firms Exceeding Selected Thresholds	70%	61%	48%	39%	32%	26%

Notes: Annual revenue data obtained for 5541 publicly traded firms from Compustat. "Lost" revenues are calculated as (Projected revenue for year 2000 - year 2000 revenue)/year 2000 revenue. Three methods used for forecasting: 1) average revenues before 2000 (date ranges of 1995-1999, 1996-1999,1997-1999, 1998-1999, 2) average revenues after 2000 (date ranges of 2001-2004, 2001-2003, 2001-2002), 3) Linear trend model (only when statistically significant trend) - date range of 1995-1999.

IV. Implications for the Trier of Fact

A. On the Accuracy and Manipulability of Damages Calculations

As shown above, the simple models that we employ are very capable of generating substantial "lost" revenues when they do not exist. The sample of firms that

we studied was close to a random sample. When one considers the non-random nature of suits selected for litigation, however, the potential for inaccurate damages calculations (including those in which the expert offering the damage calculations can appeal to the statistical significance of his or her results) increases further (and perhaps much further).[53]

Firms whose financial performance generates claims for lost profits that are particularly large are more likely to bring lawsuits.[54] Thus, unlike our sample, which includes firms who both performed relatively well during our damage year (relative to other years) and those who performed relatively poorly, the trier of fact may be viewing a sample of firms that is more likely to have been selected from the group of firms performing relatively poorly. For this more limited sample, the probability of the linear trend model generating "lost" revenues exceeding 10% (for example) may be much greater than the calculated probability of 25% that we have found. For example, in our sample there are well over 300 publicly traded undamaged firms in the U.S. for which a linear trend model with a statistically significant "t" statistic generates lost revenues for the year 2000 that exceed 50% of actual revenues. Firms in this group may be much more likely to bring a lawsuit, and lawyers looking for potentially lucrative lawsuits may also be more inclined to focus on this group.

With regard to the issue of manipulability, as shown above, damages methods can be highly manipulable. Thus, the courts should be very alert to the possibility that datasets or damages methods have been selected to generate a "favorable" result. For the vast majority of publicly traded firms, it is possible to "find" damages (and often

[53] *See generally* Rubinfeld (2000) *supra* note 4.
[54] *See generally*, George L. Priest and Benjamin Klein, *The Selection of Disputes for Litigation*, The Journal of Legal Studies, Volume XIII (1) (1984).

substantial damages) where they simply do not exist. Use of a more sophisticated method solves the problem only if it has been used properly. Improper use of more sophisticated methods only provide an additional potential avenue for manipulation. A requirement of statistical significance does not resolve the concerns for inaccuracy and manipulability. For a substantial number of firms in our sample, an expert would have been able to appeal to a statistically significant result in presenting a calculation for non-existent lost revenues.

In actual litigation, of course, it is likely that a defendant faced with a claim for damages resulting from one of the models we use would point out the failure of the method to account for factors impacting the plaintiff's financial performance.[55] The defendant or an expert retained on behalf of the defendant would also likely question the appropriateness of the method chosen and the date range used. For our sample of undamaged firms, these critiques have merit. However, this does not mean that they would necessarily be successful. The plaintiff could attempt to support the data set choice by arguing that during the benchmark time period used, market conditions were very similar to those during the damage period. It might appeal to company documents or company testimony to support this. In addition, the plaintiff or the expert retained on behalf of the plaintiff may argue that demand factors or supply factors were not substantially different during the damage period and therefore did not have to be taken into account.

The models we employ do not explicitly account for demand factors or supply factors unrelated to any harmful act at issue (in our case a fictional harmful act) that have

[55] As would a plaintiff faced with an inaccurate calculation from the defendant. Of course, damages methods can be misused by both plaintiffs and defendants. For ease of exposition, we have focused on the possibility of inaccurate calculations by a plaintiff throughout.

caused firm revenues to change during the year 2000. It is the failure to account for these demand and supply factors that leads to a calculation of phantom "lost" revenues. Nevertheless, we believe that our results have applicability beyond the simple methods that we examine. If one of the simple methods we employ is capable of generating substantial non-existent damages for a particular firm, there is a large range of alternative damages models available that could purport to adjust for factors outside of the behavior of the defendant while leaving a large claim for damages intact.

B. The Gatekeeping Role of the Courts

What are the prospects for the courts to perform a "gatekeeping" role and exclude highly inaccurate damages calculations and those that have been subject to manipulation? Before the Supreme Court's decision in *Daubert*, the typical standards for evaluating the admissibility of expert evidence in federal courts were based on "relevance" and "general acceptance."[56] The Supreme Court's decision in *Daubert* placed federal judges in the role of "gatekeepers" empowered to screen out unreliable expert evidence. Many state courts now also follow standards that are similar to federal standards although the standards differ between states.[57] Several studies have found that courts have been more likely to exclude expert testimony following *Daubert*.[58]

It is natural to inquire whether courts have the inclination and the ability to identify and exclude expert testimony on damages where the calculated damages are highly inaccurate or subject to manipulation. *Daubert* listed a four-part non-exclusive set

[56] *See*, Frye v. United States, 293 F. 1013 (D.C. Cir. 1923); Paul C. Giannelli, *Daubert: Interpreting the Federal Rules of Evidence*, Cardozo Law Review, Vol. 15, 1994.
[57] *See* Keierleber & Bohan, *supra* note 16.
[58] *See* Molly Treadway Johnson, Carol Kafka, & Joe S. Cecil, *Expert Testimony in Federal Civil Trials: A Preliminary Analysis*, Federal Judicial Center, Washington, DC, 2000; Lloyd Dixon and Brian Gill, *Changes in the Standards for Admitting Expert Evidence in Federal Civil Cases Since the Daubert Decision*, (Rand Institute for Civil Justice) (2002).

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.[59] On their face, these factors would seem to provide little assurance that inaccurate damages claims or manipulated damages claims or both will be consistently excluded.

Consider the linear trend model used above, which was limited to a statistically significant coefficient on the time trend variable, and each of the four articulated *Daubert* factors. A plaintiff could certainly argue that: 1) testing was done (there was a test for statistical significance); 2) that the theory was subject to peer review and publication (it used the "before and after" method and regression analysis and both have been used many times in published articles); 3) that the potential rate of error was known (a five percent significance threshold was used), and 4) that the theory was generally accepted (the "before and after" approach and regression analysis has been accepted in published articles on many occasions). Yet, this approach yielded non-existent damages for over 30% of our sample of firms.

The *Daubert* factors are non-exclusive and Rule 702 appeals to a more general standard that expert opinion be "reliable."[60] Moreover, as noted above, the commentary to Rule 702 added additional criteria for consideration. In an empirical study of *Daubert*

[59] *Daubert* 509 U.S. 579 (1993). 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.
[60] Fed. R. Evid. 702.

decisions in federal court, Dixon and Gill concluded that "over time, however, 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."[61]

Using the more general approach of assessing "reliability," what are the prospects for the courts to consistently exclude highly inaccurate damages calculations and manipulated damages calculations? With regard to simple methods, the likelihood that the courts will exclude methods that do not properly account for other factors impacting sales and profits is unclear. In *CDM Mfg. Co. v. Complete Sales Representation, Inc.*,[62]for example, the plaintiff's expert relied on "mathematical extrapolation, straight line linear progression, and averaging to arrive at his figures" for calculating lost profits. The methods would appear to be similar to the methods we examine. The district court did not exclude the expert's testimony and the Ninth Circuit affirmed the district court's opinion. However, in *Craftsmen Limousine, Inc. v. Ford Motor Co*[63], the expert retained on behalf of the plaintiff calculated the plaintiff's average annual growth in revenues from 1991 through 1994; applied this growth rate to the plaintiff's past sales to project "but-for" sales; and subtracted out actual sales to arrive at lost sales. The plaintiff's expert apparently assumed that all of the difference between his projection and actual sales was due to the defendant's behavior and did not account for other factors such as "general economic conditions or increased competition." The district court excluded the expert's

[61] Dixit and Gill, *supra* note 58 at 62.
[62] CDM Mfg. Co v. Complete Sales Representation, Inc., No. 01-56138 (9th Cir. Oct. 29, 2002) (unpublished).
[63] Craftsmen Limousine, Inc. v. Ford Motor Co., 360 F.3d 865 (8th Cir. 2004).

testimony. After listing the four *Daubert factors*, the Eight Circuit affirmed the district court's decision reasoning that an analysis of other factors potentially affecting sales was required.

Even if a court is diligent in requiring that an expert consider other factors that may have impacted the plaintiff's performance, our results indicate that there is still ample opportunity for an expert to present a damages estimate that purportedly accounts for multiple factors. First, as noted above, improperly applied multiple regression analysis can purport to account for other factors when it has not sufficiently done so. Second, the availability of large phantom "lost" revenues leave ample room for an expert to purportedly account for other factors and subtract out their impact while yielding room for a substantial remaining damage claim. For example, our sample contains over 300 firms for which a simple linear trend analysis yields damages exceeding 50% of revenues in 2000. An expert could purportedly account for multiple other factors that caused, say, 30% of the "lost" revenues and present a damage calculation for the remainder that would leave the plaintiff with a large claim for damages that did not exist.

The evidence on actual judicial decision making should also lead one to question whether the courts will consistently exclude inaccurate and manipulated damages calculations. Gatowski, Dobbin, Richardson, Ginsburg, Merlino, and Dahir 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.[64] Dixon and Gill found that when the reliability of expert evidence was challenged, in only 10% of the cases in their sample did a court find expert evidence unreliable if the court reflected favorably on

[64] *See* 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.

whether the expert's analysis met a standard of "general acceptance." As noted, a plaintiff expert using a linear trend model for our sample could potentially appeal to both the "general acceptance" of the before and after method and regression analysis.

In order to properly address the accuracy of a damages study and whether or not it has been subject to manipulation, several inquires are very important.[65] As shown, the choice of data used is important. A good rationale should be provided on why a particular date range was chosen. In addition, due to the potentially severe problem of "ex-post" model selection, an explanation should be provided for why a particular method was chosen over other methods. Because damage methods can generate damages in many instances when they do not exist, an economic explanation of the mechanism through which a harmful act impacted the sales and profits of a plaintiff should also be provided. In the absence of this information, there can be little certainty that proffered damages are accurate and free of manipulation.

V. Conclusion

Our results indicate that simple methods for calculating lost profits that do not take into account demand factors and supply factors are capable of being highly inaccurate. In addition, we have shown that damages methodologies in general are highly manipulable. To the extent that accurate damages awards for plaintiff firms promote such goals as just compensation, optimal deterrence, or efficient breach, these goals will not be well served if damages received are highly inaccurate and subject to

[65] Some commentators have opined that a court appointed neutral expert should be used to assess the reliability of proffered damages calculations. *See, e.g.*, Rubinfeld (1985) *supra* note 4 . We do not address the implications of such a choice in this article. Rather we provide empirical evidence on the extent to which damages models are manipulable and subject to inaccuracy.

manipulation. Moreover, as we have explained, we are not optimistic about likelihood that the courts will consistently screen out such damages calculations. In assessing damages methods, it is highly important that the trier of fact be convinced that an adequate explanation has been provided regarding the economics of how a harmful act caused damages, why the particular data set chosen was used, and why the particular method chosen was used.