

# Risk Analysis:

## A General Approach to Evaluating Settlement Offers

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We use litigants' assessments about the likelihood of success and the likely duration of litigation in a probabilistic model to determine how today's settlement offer compares with tomorrow's uncertain award. The model evaluates acceptability of settlement offers under a wide range of values for the perceived likelihood of success and the expected duration of the litigation process.

### 1. Introduction

Litigation is a risky proposition. When disputants go to trial, control passes from the parties to the hands of the judge and jury. A jury may have difficulty understanding the complexities of the case, the award may be vastly different from the amount anticipated and litigation can consume considerable time and resources. With clogged judicial dockets and soaring legal expenses, it is not surprising that most civil cases settle out of court. Indeed, litigants often are reminded about the risks they face:

In assessing the fairness, reasonableness and adequacy of a proposed settlement, the Court should 'compare the terms of the compromise with the likely rewards of litigation'...the Court should consider the vagaries of litigation and compare the significance of immediate recovery by way of compromise to the mere possibility of relief in the future,

after protracted and expensive litigation. In this respect, 'It has been held proper 'to take the bird in the hand instead of a prospective flock in the bush' (citations omitted, *Oppenlander et al. v. Standard Oil Company (Indiana)*, C-3414, U.S. Dist. Court of Colorado, Feb. 22, 1974).

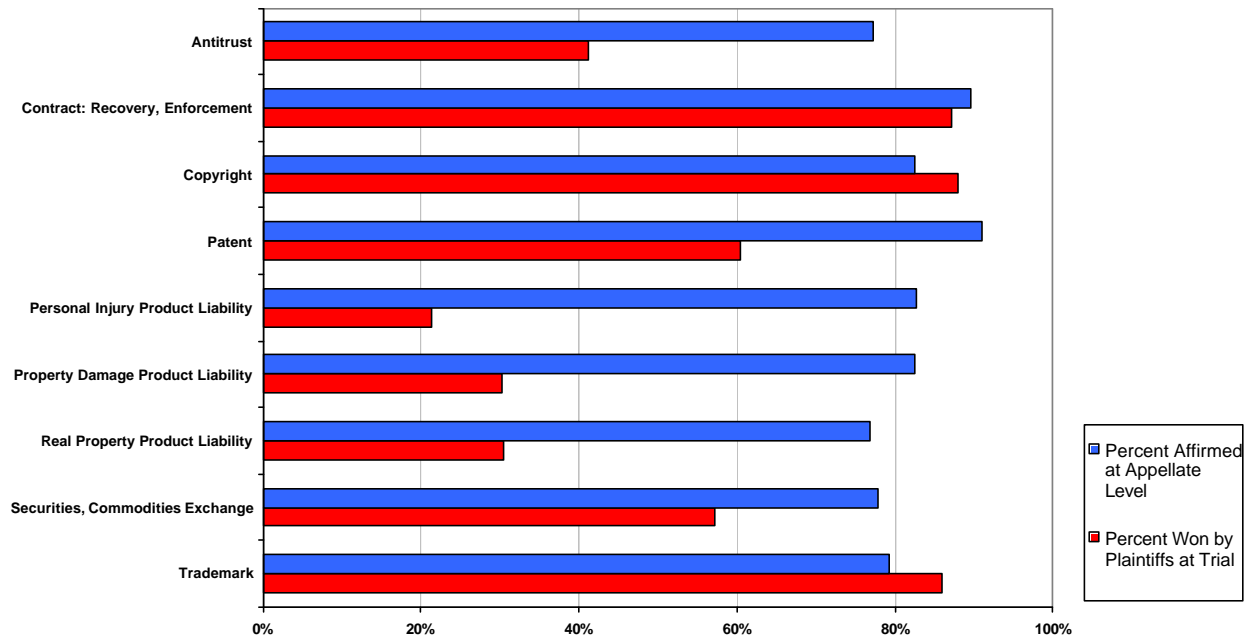
Litigants consider several factors when faced with the choice of proposing or accepting a settlement offer versus the prospect of proceeding with litigation. Important among such factors are the likelihood of success at trial, the likely duration of the trial, the expected size of an award, the likelihood of an appeal, and expected litigation costs. This paper demonstrates how today's settlement offer compares with tomorrow's uncertain award when these factors are explicitly recognized.

In undertaking this analysis, we begin with the premise that each case is unique. In each case, litigants have their own

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<sup>1</sup> Research assistance from Etan Markowitz and Yonni Fushman is gratefully acknowledged. We are also thankful to Andrea Roundfield for her desktop publishing assistance.

**Figure 1: Percentage Of Cases Won by Plaintiffs at Trial & Percentage of Cases Affirmed at the Appellate Level**



subjective assessments about the likelihood of success and the likely duration of the litigation process. Our paper combines these subjective evaluations with an objective probabilistic model to evaluate the acceptability of settlement offers under a wide range of values for the perceived likelihood of success and the expected duration of the litigation process. We first present a simplified model of trial without appeal and then extend the model by considering the possibility of appeal.

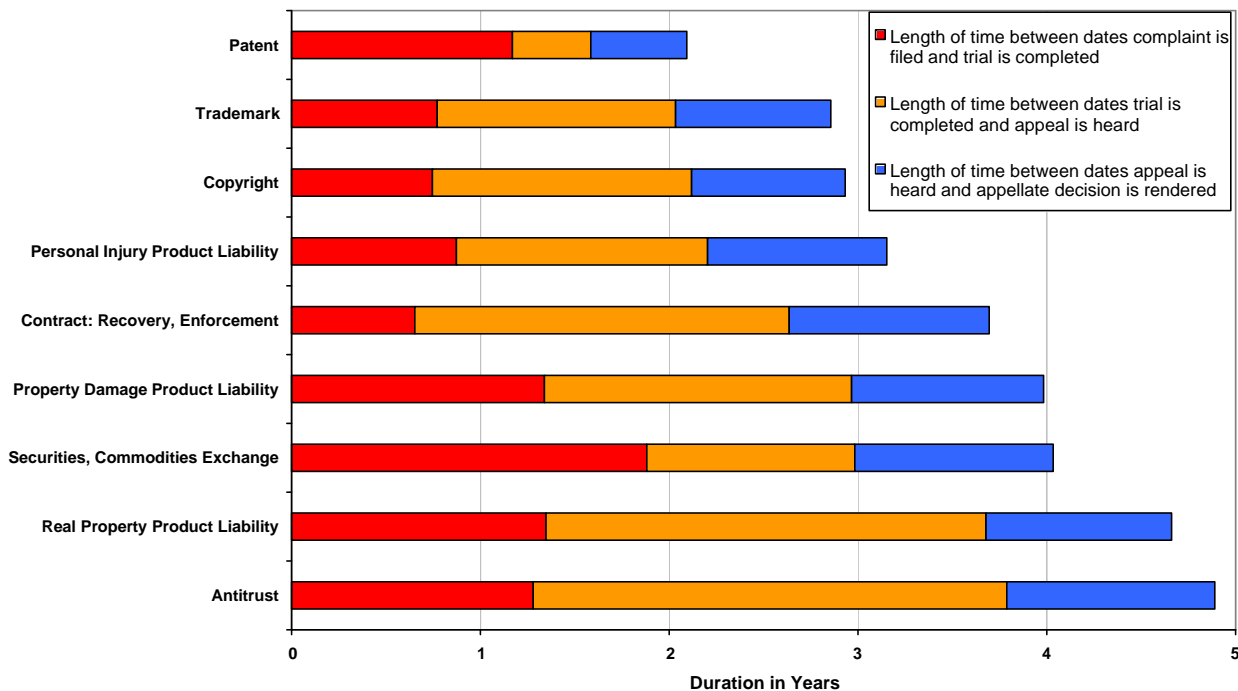
## 2. What Do Data On Trials and Appeals Reveal?

We begin our analysis by considering summary statistics on trial outcomes and appellate decisions from the Federal Court Cases Integrated Database for 1993 through 1995. We consider nine areas of civil law covering product liability, intellectual property, antitrust, securities, and contract issues. These case types represent 55,388 cases in the trial database and 4,197 appeal cases.

Our review of trial judgment statistics indicates that most cases are dismissed or transferred (about 78 percent); only about 17 percent result in an unambiguous judgment. For those cases brought to verdict, 64 percent produce findings at trial on behalf of the plaintiff. However, as can be seen from Figure 1, this percentage varies markedly by type of dispute. For example, in copyright and trademark disputes, about 87 percent of cases went in favor of the plaintiffs; for personal injury product liability cases, the figure was less than 22 percent.

At the appellate level, less than half the cases appealed produce a conclusive result in the form of affirmation or reversal of the lower court judgment. Among these cases, 80 percent affirmed the findings of the lower court. Interestingly, the affirmation percentage varies little across areas of law, ranging from a low of 77 percent to a high of 91 percent. Thus, the

**Figure 2: Average Duration by Type of Case**



data suggest that regardless of the type of case, a lower court ruling is considerably more likely to be affirmed than reversed at the appellate level.

The data presented at Figure 1 suggest that defendants in cases involving trademark, copyright or contract disputes face a double hurdle: most cases go in favor of plaintiffs at trial, and when such rulings are appealed, the lower court verdict is affirmed almost 80 percent of the time. The opposite, however, is true in all three product liability case categories (personal injury, property damage and real property). Here, considerable hurdles face plaintiffs at both the lower court and appellate levels. In antitrust and securities law the picture is more balanced, with approximately half the cases going in favor of the plaintiffs.

Figure 2 presents data on the duration of trial and appeal. The average length of time from the initial filing of a case to its initial outcome, by judgment or other means, is one year. The average duration between the filing of an

appeal and the start of the appeal hearing is one and a half years; and, on average, appeals take about a year between the date the appeal is heard and the date of the appellate decision. Once again, there exists considerable variability across case types. Average trial length varies from six months (contract disputes) to almost two years (securities and commodity exchange cases). The time from trial termination to hearing of the appeal ranges from 5 months (patent disputes) to two and a half years (antitrust cases). Interestingly, the duration of the appeal shows remarkable consistency across most areas of law: with the exception of patent disputes, most cases take about a year at the appellate level.

In addition to case type, the district in which a case is tried influences the length of the trial and appellate process. Supplemental information in this connection is available from Micronomics. Further details on the disposition and

**Figure 3: Acceptable Settlement Offer as a Percentage of Plaintiff's Demand (Trial Only)**

Duration of Trial Years	Perceived Likelihood of Success at Trial									
	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1. 0.5	0 %	4 %	16 %	27 %	39 %	51 %	62 %	74 %	85 %	97 %
2. 1	0	4	15	26	38	49	60	72	83	94
3. 2	0	4	14	25	36	46	57	68	78	89
4. 3	0	3	13	24	34	44	54	64	74	84
5. 4	0	3	13	22	32	41	51	60	70	79
6. 5	0	3	12	21	30	39	48	57	66	75
7. 10	0	2	9	16	22	29	36	42	49	56
8. 15	0	2	7	12	17	22	27	32	37	42

duration of cases are presented in the Appendix.

The data presented in Figures 1 and 2 provide litigants with information that may be refined using supplemental statistics on duration by district. It will be seen in the next two sections that the information on duration and verdict presented here plays an important role in an assessment of the acceptability of a settlement offer.

### 3. A Simplified Model of Settlement Offer Evaluation

In its most simplified form, a trial has two possible outcomes: a “win” or a “loss”. The probability of winning may be assessed on the basis of an evaluation of the merits of the case, prior experience with the type of case, and other factors.

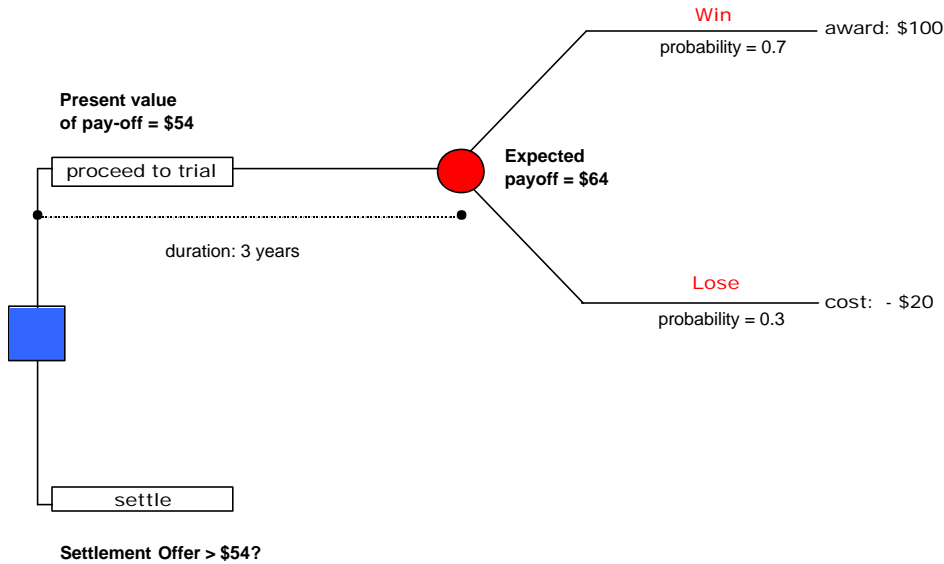
In order to provide a framework for evaluating settlement offers, we consider the following assumptions:

- (1) each party’s costs are equivalent to 10 percent of the award amount; the losing party pays its own and the winning party’s legal costs;
- (2) the award and costs are discounted at an annual rate of 6 percent;
- (3) the award, if the plaintiff wins, equals 100 percent of the demand.

Data on jury awards show that they vary considerably, with the number of cases where the award is less than the plaintiff’s demand about equal to the number of cases in which the award exceeds plaintiff’s demand. In light of this evidence, it seems appropriate to assume that the jury award will neither exceed nor fall short of the plaintiff’s demand. However, our calculations can be made under alternative assumptions regarding the magnitude of the jury award relative to the plaintiff demand.

Figure 3 presents mathematically accurate acceptable settlement offers as a percentage of plaintiff’s demand given these assumptions and plaintiff’s

Figure 4: Simplified Model of Settlement Offer Estimation



assessment regarding the likelihood of prevailing and the duration of the trial. Columns (2) through (11) of this table correspond to the plaintiff's assessment of the strength of the case; lines (1) to (8) correspond to estimates of trial duration. For example, if the plaintiff believes that the likelihood of winning is 70 percent (Column 8) and the trial is likely to last three years (row 4), then the defendant's settlement offer should be at least 54 percent of plaintiff's demand for it to be acceptable.

The working of our model is depicted at Figure 4. This figure has been drawn under the assumption that the plaintiff assesses the likelihood of winning its demand of \$100 to be 70 percent; if it loses, plaintiff bears its own legal costs (\$10) plus those of the defendant (\$10); thus, the total cost in the event of a loss is \$20. Since there is a 70 percent chance of winning \$100 and a 30 percent chance of losing \$20, the expected payoff at the conclusion of the trial is  $0.7 \times \$100 + 0.3 \times (-\$20) = \$64$ . Assuming the trial will last 3 years and the discount rate is 6 percent, the present discounted value of this amount is  $\$64 / (1.06)^3 = \$54$ . This result

suggests that if the settlement offer is greater than 54 percent of the plaintiff's demand, then settling the case, rather than proceeding to trial, should be the preferred choice.

It is important to note that even when plaintiffs believe that there is a one hundred percent likelihood of success at trial, an acceptable settlement offer is less than one hundred percent of the demand. For example, when the plaintiff is absolutely sure of winning the case, a settlement offer worth only 75 percent of the demand is acceptable if the trial is expected to last 5 years (see column (11) of Figure 3). This figure is explained purely by the time value of money: with an interest rate of 6 percent, \$100 received five years from now is worth only \$75 today.

At the other extreme is the situation where the likelihood of success at trial is perceived to be very low. Column (2) of Figure 3 shows that when the plaintiff assesses the success probability to be 10 percent or less, any settlement offer is

better than proceeding to trial. This result is explained by the perceived high likelihood of losing at trial and incurring legal expenses equaling 20 percent of the award.

#### **4. Model with Trial and Appeal**

The model presented in the preceding section is applicable only in those situations where the possibility of an appeal does not exist, such as in certain arbitration situations. However, in most cases, litigants have the option of appealing an unsatisfactory trial verdict. Consequently, to compare the expected payoff from proceeding with litigation with the value of a proposed settlement offer, it is not sufficient to calculate just the expected payoff at the conclusion of the trial. The likelihood of an appeal and, if an appeal is filed, the payoff at the appellate level, also must be considered.

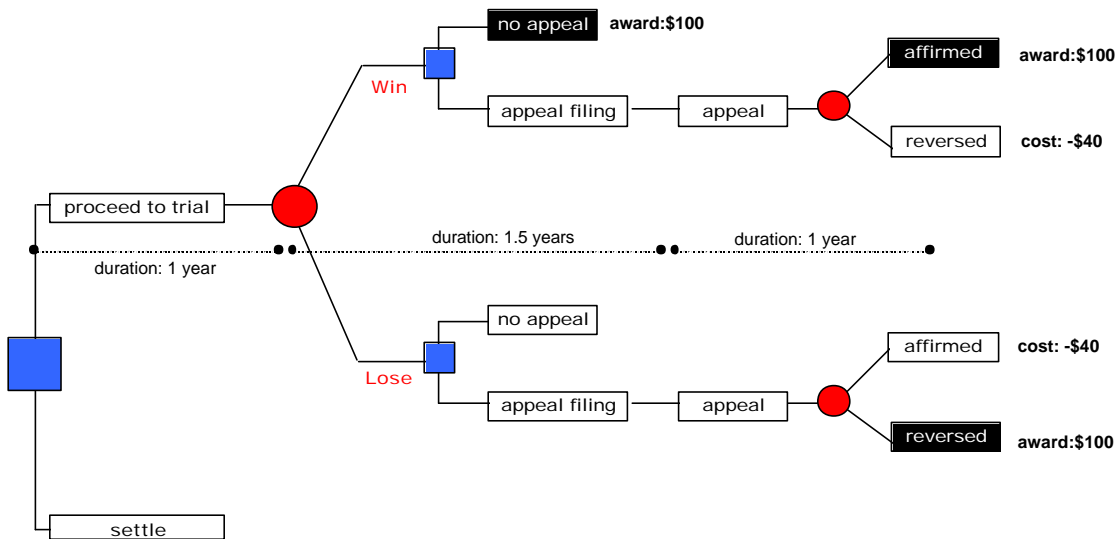
Figure 5 presents possible outcomes associated with a trial and appeal. As before, the trial has two possible outcomes, a win or a loss. But now a win at trial does not necessarily translate into an award. The opposing party may appeal the verdict; as a result, the award is realized only if the appellate court upholds the lower court's decision. Conversely, a loss in the lower court may be appealed and reversed at the appellate level. The three possible ways a "win" can occur are highlighted in Figure 5 by the black boxes: (a) a favorable judgment at the lower court without the verdict being appealed, (b) a favorable lower court verdict that is upheld at the appellate level and (c) an unfavorable lower court verdict that is appealed and reversed.

With an unfavorable verdict, the litigant must decide whether or not to appeal. From a purely financial standpoint, an unfavorable trial verdict should be appealed if the expected payoff from appealing exceeds the cost of

accepting the verdict. The expected payoff from appealing a verdict will depend on the likelihood of reversal of the lower court's decision by the appellate court and the amount of the award. As was seen in Figure 1, appellate courts are more likely to affirm than reverse lower court decisions. Furthermore, the duration of the appeals process, including the time between the filing of an appeal and it being heard, can be several years. Both factors — a low likelihood of reversal at the appellate court level and the duration of the appeals process — tend to favor the decision of accepting an unfavorable lower court ruling over filing an appeal, unless the litigant believes that there are exceptionally strong grounds for continuing. Our analysis of the litigation data confirms this observation: we found that most cases tried to a verdict do not proceed to the appellate level.

Issues addressed in the foregoing discussion on litigants' decisions on whether or not to appeal have direct relevance for determination of the expected payoff from proceeding with a litigation. In fact, to calculate this expected payoff, one has to consider each party's optimal decision about whether to appeal. Once the question is resolved, this information can be incorporated into the decision tree of Figure 5. For example, suppose the decision tree is viewed from the perspective of a plaintiff. If the plaintiff loses at trial (depicted by the lower branch), it faces two choices: 'appeal' and 'no appeal'. The decision will be based on the relative magnitude of the expected payoffs under the two alternatives. In contrast, in the event the plaintiff wins at trial (depicted by the upper branch), the decision of whether or not to appeal is made by the defendant, based on its assessment of the relative

Figure 5: Extended Model of Settlement Offer Estimation



magnitude of payoffs with or without an appeal. Therefore, to be able to evaluate the plaintiff's payoff if it wins at trial, one must first determine whether or not the defendant will appeal.

Figure 6 expresses acceptable settlement offers as a percentage of plaintiff's demand in view of alternative prior probabilities of success at trial and thereafter. In all cases, the length of the appeal process, including the time between trial and termination of an appeal, is assumed to be two and a half years. Column (2) of Figure 6 denotes the duration of the litigation from initial filing of the case to appeal termination. Litigation costs have been assumed to be double that of the trial-only phase, i.e., each party's costs are assumed to be 20 percent of the award and both parties' costs are borne by the losing party. Assumptions (2) and (3) of the simplified model presented in the preceding section are maintained here.

In computing the acceptable settlement offer as a percentage of plaintiff's demand in Figure 6, we had to consider the expected payoff, not only at trial, but also at the appellate level. As

was seen in the simplified model depicted in Figure 4, the expected payoff at either level depends on the probability of a favorable or an unfavorable outcome and the financial implications of each outcome. However, when the appeal process is considered, the expected payoff calculations are considerably more complicated than those encountered in Figure 4. This complication arises primarily because the probabilities at the two stages — the probability of a favorable decision at the lower court and the probability that the outcome will be affirmed — are interdependent. In other words, the outcome at the appellate level is not independent of the outcome in the lower court. The technical details and the mathematical model used in calculating the percentages in Figure 6 are presented in the Appendix.

Figure 6 is meant to provide a general guideline about the acceptability of a settlement award. The usefulness of the information contained in this figure depends on the accuracy of the litigants' assessments about the likelihood of success and the likely duration of the

**Figure 6: Acceptable Settlement Offer as a Percentage of Plaintiff Demand (Trial and Appeal)**

	Time to Trial	Time to Appeal	Prior Probability of Success								
	Termination	Termination	10%	20%	30%	40%	50%	60%	70%	80%	90%
	Years	Years	Percent								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.	<b>0.5</b>	<b>3</b>	0 %	0 %	3 %	13 %	25 %	37 %	49 %	60 %	72 %
2.	<b>1</b>	<b>3.5</b>	0	0	3	13	24	36	47	59	70
3.	<b>2</b>	<b>4.5</b>	0	0	3	12	23	34	45	55	66
4.	<b>3</b>	<b>5.5</b>	0	0	3	12	22	32	42	52	62
5.	<b>4</b>	<b>6.5</b>	0	0	3	11	21	30	40	49	59
6.	<b>5</b>	<b>7.5</b>	0	0	3	10	19	28	37	47	56
7.	<b>10</b>	<b>12.5</b>	0	0	2	8	14	21	28	35	42
8.	<b>15</b>	<b>17.5</b>	0	0	1	6	11	16	21	26	31

litigation. In forming these assessments, litigants’ own perceptions about the case will be crucial; however, the information presented at Figures 1 and 2 regarding plaintiffs’ success rates and trial duration across various areas of law also should be considered.

## 5. Summary

Evaluation of a pre-trial settlement offer must include not only the likelihood of success at trial and the magnitude of the award if successful, but also an assessment of the likelihood of an appeal, the expected duration of the trial and appeal, the costs that may be incurred if the suit is unsuccessful, and the interest rate appropriate for discounting future economic values into present day dollars. We propose reliance on the litigants’ own assessments about the likelihood of success and the likely duration of litigation in a probabilistic model of litigation risk to determine how today’s settlement offer compares with tomorrow’s uncertain award. This model evaluates acceptability of settlement offers under a wide range of values for the perceived likelihood of success and the expected duration of the litigation process.

Several extensions of the paper may be of interest. First, it is possible to augment the model to consider the possibility of countersuits. When such a possibility is introduced, the economics of acceptability of settlement offers change significantly. A second extension of the model considers the possibility of a mock trial. Our litigation risk model can be used to decide whether or not to have a mock trial and how the results of the mock trial can be used to “revise” the acceptability of settlement offers. A third version of the model exclusively examines the issue of whether or not to appeal a trial verdict. That is, it examines the economics of the two alternatives *after* a trial verdict becomes known: determining whether it is most advantageous to accept the loss associated with the negative verdict versus proceeding to the appellate court. The model can also be tailored to address other litigant risk-related questions. These extensions of the basic model are available from Micronomics.

