TechnoLawyer.com: Hocus Pocus: Using Crystal Ball to Bring Litigation Into Focus

By: Ellis R. Mirsky

This article originated in The TechnoLawyer Community, a free online community in which legal professionals share information about business and technology issues, products, and services, often developing valuable business relationships in the process. To join The TechnoLawyer Community, fill out the form at the following Web site: www.technolawyer.com.

In corporate America, litigation has become an accepted consequence of doing business. As a result, corporations regularly rely on their counsel to help them manage litigation in such a way as to minimize its impact on the underlying business. In this article, Ellis Mirsky explains how he uses Microsoft Excel and Crystal Ball (an Excel add-on) in conjunction with the Monte Carlo technique (a statistical simulation of real-life events) to help him identify strategies that minimize the overall costs of litigation for his corporate clients. If you represent corporate clients in complex litigation, this article will give you a birds-eye view of litigation management in the next century — as if you were looking into a crystal ball at the future. This article won the MasterPost, a writing contest in The TechnoLawyer Community.

Introduction

Ambrose Bierce defined "litigation" as "[a] machine which you go into as a pig and come out a sausage" and a "litigant" as "[a] person about to give up his skin for the hope of retaining his bones." Ambrose Bierce, The Devil's Dictionary (1911). Though written in jest, these famous musings serve as a constant reminder that litigation can exact an excruciating toll not only on a company's bottom line, but also on the productivity, health, and well-being of its employees (especially those who are witnesses). A company sapped of its spirit and creativity is not much of a company.

Although most lawyers take human and pecuniary factors of litigation into account when developing litigation strategy and tactics, most do not employ computers in their analysis. Instead, they rely largely on their intuition and experience — usually pretty good. In my legal practice, I add a quantitative element to the usual qualitative approach. I develop financial models to simulate litigation scenarios so that corporate managers can understand and evaluate the impact of various tactical or strategic decisions on litigation outcomes. In short, I employ the PC to transform the relative vagueness of traditional litigation approaches into comprehensible and measurable business problems that can be analyzed and even tweaked for optimal results. As Justice Felix Frankfurter wrote in one of his opinions, "[l]itigation is the pursuit of practical ends, not a game of chess." Actually, litigation may indeed be a game of chess, but quantitative analysis makes it susceptible to measurement and optimization — just what corporate litigation managers crave.

This article provides a glimpse into my litigation modeling and simulation methodology, which I believe will become increasingly popular in the coming years. My litigation methodology involves the use a statistical approach known as "Monte Carlo" and a statistical software program called "Crystal Ball." In addition to discussing these components and how I've used them to help corporate counsel manage litigation, I've also included an outline to help you get started in the brave new world of litigation modeling and strategic planning.

Monte Carlo — One Cornerstone Of Litigation Modeling And Strategic Planning

Many wealthy people live in Monte Carlo to avoid paying taxes. I use a statistical technique known as "Monte Carlo" to help my clients avoid making costly litigation mistakes (such as spending limited resources in non-optimal pursuits). The Monte Carlo technique involves the conversion of facts and assumptions into numerical information that can be placed into mathematical formulas designed to describe real-life events and predict future outcomes. The Monte Carlo technique gets it name from its similarity to rolling dice. The method, in essence, "rolls the dice" thousands of times for each of many independent and dependent variables driving a modeled scenario. Independent variables are those factors that drive a litigation scenario and over which litigants might have some control. In a litigation model, these factors are not so much independent as they are controllable (e.g., amount paid in settlement of a particular class of case). Dependent variables are those factors that litigants ultimately would like to control. Dependent variables stem from the facts of a case and the values of the independent variables (e.g., total costs of litigation). Thanks to the power of today's personal computers, mere mortals can perform these calculations (i.e., the rolling of the dice) quickly and produce a usable frequency distribution for the dependent variables with each new set of values for each of the independent variables.

After "rolling the dice" a sufficient number of times, the dependent variables assume characteristic frequency distributions of their own that tend to stabilize and converge to a "solution." The resulting solution can be examined to see how much of those distributions fall above or below a value of interest (e.g., if 90% of the values fall below "x," that means the dependent variable will not exceed "x" 90% of the time). In a litigation scenario, x could represent the out-of-pocket cash needed to pay for the total costs of a litigation. That value can help an insurance company set a reserve, arrive at a settlement figure, or project the total payout of a set of insurance polices covering a given kind of loss (e.g., cigarette claims).

As you may have already guessed, I use the Monte Carlo technique to help insurance companies and corporate insureds project policy buyout values, appropriately set reserves, and evaluate the most cost effective way of handling litigation associated with their policies. The financial models I create for my Monte Carlo calculations contain a wide array of independent and dependent variables. I design a model for each litigation scenario because no two are identical (e.g., some involve government subsidies, insurance pools, reinsurance, aggregate limits, stop losses, retrospectively-rated insurance policies (SIR), self-insured limits and layers, reserves,

deductibles, supplemental and limit-consuming defense coverages in insurance policies, and so on).

Monte Carlo models of "litigation inventories" can assist in producing sensitivity analyses that enable companies to determine where best to allocate their limited resources (e.g., money and executive and attorney time) for optimum results (e.g., maximizing the use of external funding, such as insurance, indemnities and subsidies, while minimizing the use of company cash). In other words, it enables clients to identify and preferentially allocate limited resources to control those independent variables that will have the biggest impact on the dependent variables of most concern. In addition, these sensitivity analyses enable managers to establish a suitable litigation reserves with confidence levels that will satisfy auditors.

The ways in which people can use the Monte Carlo technique are without end. An investor can use it to identify the most lucrative allocation of capital among competing investment opportunities (stocks, bonds, etc.) within given risk comfort levels. A sales executive can use it to choose the form of advertising that will maximize sales. And litigators can use it to better serve their clients by identifying the strategies that will minimize the overall costs of litigation and bring about a favorable outcome.

Excel & Crystal Ball — The Other Two Cornerstones

If I used a pen and paper to calculate Monte Carlo outcomes, I wouldn't have any clients because the cost savings associated with using Monte Carlo simulations to manage litigation would evaporate given the time it would take me to carry out the calculations. As a result, I use Microsoft Excel <http://www.microsoft.com> and Crystal Ball <http://www.decisioneering.com/> (an Excel add-on developed and sold by Decisioneering, Inc.) to crunch all the numbers.

More to the point, I use Excel to relate the independent variables to the dependent variables using a financial model. My models reflect the many intermediate relationships standing between and relating the independent variables to the dependent variables. Excel doesn't really do anything other than provide the platform upon which I build the financial litigation model. And, of course, Excel performs the calculations involved in the Monte Carlo "play" — it calculates the values of the dependent variables each time the independent variables change.

Microsoft's wizards, sophisticated though they may be, cannot yet create a litigation forecasting model for the purposes of running a Monte Carlo simulation. That's where my judgment, experience, and understanding of the litigation scenarios of my clients come into play. To transform my understanding of the litigation scenarios at issue into useful numerical information using the Monte Carlo technique, I use Crystal Ball. To use an analogy, I am a painter and Excel is the canvas on which I paint a litigation scenario. The financial model is the paint that I brush onto the canvas and the brush I use in the painting process is Crystal Ball. Thus, Microsoft Excel serves as the platform on which Crystal Ball runs — much like your Web browser serves as the platform on which Java applets run.

Crystal Ball contains a gallery of built-in and customizable discrete and continuous frequency distributions that allow users to jump-start their Monte Carlo simulations rather than having to start from scratch. It also features a built-in random number generator (within a user-specified range and frequency distribution) that selects values for the independent variables (again, within a user-specified range) with which to compute resultant values for the dependent variables (i.e., outcome predictions). Crystal Ball enables users to graphically slide the end points of the frequency distribution of the resulting dependent variables to easily determine the portion of the distribution falling above, below, or within certain limits of interest. It also provides users with a built-in sensitivity chart that produces graphical representations of the relative influence of a model's independent variables on the dependent variables of interest. These charts serve as a useful tool to determine priorities in managing litigation because they help to identify those variables that, with change, could have the largest impact on the dependent variables of interest. My clients love these charts!

Crystal Ball is not difficult to learn, but it does require some familiarity with Excel. Using Crystal Ball for modeling litigation scenarios requires only that one have a background in litigation as well as the substantive and procedural legal areas (e.g., insurance coverage, personal injury, securities litigation, arbitration, etc.) that will come into play. It does not require a degree in statistics, but a statistics course wouldn't hurt. The manuals that accompany Crystal Ball are well-written and thorough.

Real-Life Examples of Crystal Ball and Monte Carlo in Action

I have used Monte Carlo simulations to model mass tort litigation involving thousands of cases pending in many different jurisdictions against various classes of defendants in different industries, some of which were members of a complex mutual insurance pool and some not. Some of the complexities I've encountered in these insurance defense cases include insurance coverages involving per claim deductibles, retrospectively rated premiums, and reinsurance subject to limits.

My use of Monte Carlo simulations in mass tort insurance coverage cases has enabled my clients to create a litigation fund sufficient to encompass 90% of all outcomes given the possibility of new law developing in several different directions related to certain determinative insurance coverage issues. One client used my analysis to set up a bulletproof litigation reserve. It hired a Big Six accounting firm to review the reserve against the backdrop of the litigation. Thanks to my Monte Carlo reports, the accounting firm found the reserve adequate and permitted my client to cease making annual additions to the reserve.

On another project, I used the Monte Carlo technique to determine the total payout (and present value) of a series of insurance policies responding to a series of long-term lawsuits in which the insured had a declining share of the projected liability and the insurance policies provided for the payment of

defense expenses in addition to liability limits. In that litigation scenario, the defense expense liability of the insurer would last as long as any of the liability limits of the policies remained untapped. My Monte Carlo analysis enabled the insurer to determine a break-even point or dollar amount at which buyout by the insurer of its policy obligations would cost the same as paying out defense and liability coverages over time pursuant to the terms of the policies. The Monte Carlo technique thus gave the insurer information with which to determine a fair buyout price for its policies.

Conclusion

My use of Crystal Ball to generate Monte Carlo simulations makes lawyering a lot more fun — and it saves my clients considerable time, money, and aggravation. It gives them a basis upon which to make litigation decisions, such as how much to pay in settlement, whether to focus on the defense of one class of cases over another, whether to spend more money in defense or more money in settlement, and so forth. Numbers have a way of removing emotion from litigation decision-making and reducing the process instead to that of any other business problem. My methods would probably not suit disciplines such as family law, but one need not work in the insurance defense area to make use of them. Virtually any litigation involving the representation of a corporate client can benefit from a well-founded analytical approach. To help you get started, I've placed a Monte Carlo outline below that you can use as a springboard for your own Monte Carlo simulations.

Addendum — Mirsky's Monte Carlo Method For Strategic Planning in Litigation

A. Introduction

1. Litigation: A business problem requiring business solutions.
2. Legal Approach: Defend all claims vigorously; press heavily on all fronts.
3.Business Approach: Invest selectively to achieve best result with smallest investment.

B. To Choose Wisely, You Need a Selection of Choices:

1. Identify the Factors Driving your Problem:
a. Number of Cases
b. Types of Cases
c. Venues
d. Plaintiff Types
e. Plaintiff Attorneys

2. Describe those Factors:
a. Actual Data
b. Trends
c. Likely Future Course

C. To Make Decisions, Identify Your Concerns:

1. Identify the Factors in which You Are Interested
a. Total Cost of Problem
b. Insurance Consumed
c. Net Cost after Insurance
d. Other Pockets (e.g., subsidies, contributions from codefendants)

D. Relate the Driving Factors to the Goals (A Model):

1. Insurance (e.g., limits, deductibles, SIRs)
2. Subrogation
3.Subsidies
4. Claims against Codefendants

E. Simple Model:

1. Three Severity Levels of Case (e.g., not so bad, bad, very bad)
2. Number of Cases at Each Level (model range and frequency distribution)
3. Mean Value of Cases at Each Level Varies (e.g., $10K, $40K, $100K)
4. One Dependent Variable — Total Cost

F. Independent Variables:

1. Define Range and Distribution (values and how those values distribute over the range):
a. Equal Likelihood of Any Value Within a Range (Flat)
b. Normally Distributed Likelihood of a Value With The Range (Bell Curve)
c. Custom Distribution (Any Shape You Want)
d. Discrete Values or Continuous Values

G. Dependent Variables

1. Calculate Range/Distribution of Dependent Variables by running thousands of cases or what-ifs with values for the independent variables within the range and according to the frequency distributions selected above.
2. Produce Sensitivity Charts to Show the Most Outcome-Determinative Independent Variables (i.e., those in which to invest limited resources of money and attention).
3. Identify the dependent variables of greatest concern

H. Select and Focus Your Limited Resources on Independent Variables with Greatest Impact on Dependent Variables of Greatest Concern.

I. Conclusions

1. Not An Exact Science — One of Many Approaches
2. An Effective Way to Quantify Strategic Options for Litigation Management.
3. Use in Conjunction with Other Approaches
a. Advice of Counsel
b. Management Comfort
c. Other Priorities

J. My Prediction:

1. Your clients can save money by applying Monte Carlo simulation to their lawsuits.

Ellis Mirsky practices law at Mirsky & Block in Tarrytown, NY. You can contact him by telephone (914-332-4700) or e-mail (emirsky@mirskyblock.com).