

# From the Witness Stand

Insights and observations from the area's leading financial and valuation experts.

**Offering a world  
of opportunity...**

**POTTER & COMPANY, LLP** is the exclusive local member of the National Litigation Support Services Association (NLSSA), a national association of CPA firms dedicated to the delivery of superior quality services to trial lawyers. We enthusiastically subscribe to that philosophy and the NLSSA mission statement.

*NLSSA serves as a network for the exchange of information about case preparation and emerging issues in forensic accounting. We help our members stay informed on current developments in litigation support. In addition to support in multi-state cases, NLSSA, through its members, provides trial lawyers with a broader, deeper knowledge of a wide range of industry and functional disciplines.*

#### **Give Us Your Opinion -**

If you have an issue or a question that you feel should be addressed in a future edition, please contact our office.

## Pitfalls in Using Time Series Analysis

Financial experts, both accountants and economists, frequently utilize regression analysis to project future events – often some measure of damages. Simply put, *regression analysis* is the study of the historical relationship between two (“simple” regression) or more (“multiple” regression) factors (generally described as “variables”).

The hypothesis for undertaking a regression analysis is that one of the variables (the “dependent”) will be influenced by the other(s) (the “independent”). The strength of the relationship can be measured mathematically, and defined by a mathematical equation. If the strength is “strong enough”, a mathematical testing done during the course of the analysis but beyond the scope of this article (but definitely an area of interest to the litigator cross-examining an expert utilizing this technique), this formula can then be utilized to project the future results of the dependent variable (generally, the damages measurement) based on known or hypothesized independent variable(s).

*Time series* analysis is a type of simple regression where time, i.e., the passage of a given time element (hours, days, weeks, etc.) is the independent variable.

A *time series*, by definition, is a “set of observations taken at specific times, usually at equal intervals”. The datum (earnings, sales, units of production, etc.) being observed are plotted along the y-axis, and the time periods are plotted along the x-axis. When reviewing historical earnings

for the preparation of a business valuation, damages assessment, or other impairment of economic value, the analyst is looking at a *time series* – financial results over time.

Many, if not most, analysts will at least consider the implication of these historical earnings in attempting to evaluate the impact of the event (i.e., the act giving rise to the need for the analysis) on *future* earnings. Often the consideration takes the form of using regression analysis to develop a *trend* from the historical data that can be projected to the future. However, in all regression analysis, the resulting equation can only be applied to projections within the *relevant range* of the independent variable tested. In other words, if the independent variable of the historical data tested ranged between, say, 10 and 1,000; a projection of the dependent variable based on an independent variable value of 2,000 will not be reliable. Also, the statistical reliability of the historical data relates *only* to the historical data – it does not impute similar reliability to a forecast of the future *from* the historical data.

Unfortunately, many analysts (utilizing Excel®, Lotus®, or some other proprietary financial tool) simply plot the historical data into a bar graph, ask the program to perform linear regression, extend the line to the future period, and “project” the estimated future earnings (or sales, units of production, or whatever the dependent variable may be).

One significant problem of this approach is



that it implies that growth would continue unabated as time marches on. This notion is absurd, and has been the frequent downfall of many analysts. However, *if* utilizing this method, this discrepancy may possibly be overcome by keeping projections within the relevant range (the relevant range is defined by the number of historical data points available), giving proper consideration to the product life cycle phenomenon, and/or *capping the projection for the target's productive capacity*.

Another problem, and the focus of this article, is the nature of time series. In general, forecasting or projecting into the future based on time series is an *extrapolative* method (there are three common forecasting models – judgmental, *extrapolative*, and causal). Under the extrapolative method, there are five increasingly sophisticated approaches available to the analyst – trend curves, decomposition, exponential smoothing, Box Jenkins, and Bayesian. The discussion that follows describes decomposition, probably the minimum level of analysis that should be undertaken when dealing with time series.

It is tempting, and a common mistake, to think of a time-series graph as one that describes the dependent variable as something *moving*, or being carried along, by the independent variable, *the passage of time*. It is much more likely that the dependent variable is moving in relation to one or more (most likely more) economic, political, sociological, psychological, or even meteorological forces. Every effort should be made to identify and understand these more likely suspects.

However, most time series share common characteristics. And, it should seem apparent, if there are *common* characteristics; those must be identified and eliminated if the time-series in question is utilized as the basis for the analyst's ultimate opinion of damages or diminution of value.

These characteristics may be defined as: long-term, seasonal, cyclical, and random. Our dependent variable,  $y$ , is therefore a product of these factors and can be mathematically represented as  $Y = L \times S \times C \times R$ . To properly understand the data being analyzed, the trend line developed from the data set must undergo a process known as *decomposition*, and these four elements and their impact on  $y$  identified.

While seemingly very technical,  $L, S, C \& R$  are the foundation of the cross-examination when faced with an expert utilizing a time series to project future damages.

In general, the first step is to identify the *long-term trend (L)* present in the data. This involves utilization of the mathematical method of *least squares* to find the curve that best fits the data. Another approach and one computationally more straightforward, is to simply smooth the data by utilizing a moving average of the appropriate order (this reduces the number of data points by the order chosen and smoothes out sharp fluctuations in the data).

The next step is to remove *seasonality (S)* if it appears to be present (this is a qualitative judgment, and will either be apparent in the data or common to the target or its industry). There are a number of computation methods that may be applied, but the desired result is to derive a *seasonal index* of the data. From

the index a factor can be derived that when applied to the results of any specific time period remove the seasonal impact from that time period's data.

If *cyclicality (C)* is present, it can be removed by dividing the deseasonalized data by the identified trend. *Cyclic indices* can also be developed in a manner similar to the seasonal index in order to remove the effects of cyclicality from any given period.

Since the formula is known, and three of the variables have been identified ( $L, S, \text{ and } C$ ), the analyst can solve for any remaining *random factors (R)*. However, in practice, it has been found that random variations by their nature generally occur in a normal distribution and have minimal effect.

Also the more historical data points available for analysis, the better (i.e., a trend evident over a long period of time can more logically be assumed to be more representative of the future than one over only a shorter period of time). Additionally, current events/activities may be more indicative of the future than more "ancient" ones – consider the analogy of projecting tomorrow's weather conditions: are they more likely to be like yesterday's, or those of the same date 1, 5, or 10 years ago? This phenomenon strongly supports utilizing a weighted average of the data in developing the projection with the heaviest weight given to the most recent events/activities unless contra-indicated by the cycle analysis above or by the normal business cycle.

Sometimes, though, time series information will be all the analyst has to work with. In those instances, with caution, projections may still be made. However, the analyst should carefully consider the implications of the approach and include appropriate limiting statements within his or her report. As discussed above, the analyst should give consideration to the product life cycle curve, productive capacity, external factors (economics, fiscal policy, availability of raw materials, etc.) and, above all, the possibility that other curves may fit the data better than the linear relationship (implying the presence of one or more of the element  $(L, S, C, \text{ or } R)$ ).

Mathematical analysis does not always, if ever, provide all the answers, but if properly applied may produce the *most reliable* answers. The responsible analyst will also carefully utilize common sense, logical judgment, experience, and knowledge of the target and its industry when arriving at his/her conclusion.

This article has just briefly touched on the technical issues involved in the analysis of time series. For a thorough understanding and additional knowledge, the interested reader should consult appropriate advanced materials on mathematics and statistics. In addition to the reference cited, other resources include *Statistics*, Eighth Edition, McClave and Sincich, and, of particular value for self study: *Teach Yourself Statistics*, Alan Graham; *Data Analysis with Microsoft Excel*, Berk and Carey; and *Learning Business Statistics with Microsoft Excel 2000*, John Neufeld.

<sup>11</sup> *Schaum's Outline of Theory and Problems of Statistics*, Third Edition, 1999, McGraw Hill

## Calculating Intellectual Property Infringement Damages

There is in this country, as well as abroad, growing awareness that the corporate balance sheets of the world are vastly understated because of accounting convention regarding

intellectual property. Generally accepted accounting principles require that research and development costs be *expensed*, thus only the cost (not necessarily the value) of

*acquired* intellectual property determined in accordance with FASB 141 and 142 will appear on the balance sheet. The value of intellectual property developed and retained in-house is invisible.

There is no doubt that this value exists. One has only to look at the growing amount of revenue enjoyed by companies from royalties, copyright payments, and other licensing arrangements *for which their balance sheets show no underlying productive asset* (because the development of those assets was expensed). Capitalize that earnings stream at something north of a risk free rate, and you arrive at a huge amount of unstated value.

In a monologue published by USA for Innovation, Robert J. Shapiro and Kevin A. Hassett<sup>1</sup> estimate “that U.S. intellectual property is worth between \$5 trillion and \$5.5 trillion, **equivalent to about 45 percent of U.S. GDP.....**” [emphasis added]. They go on to report that the Organization for Economic Development estimates that “as much as \$638 billion a year” is lost due to “pirated or counterfeit patented or copyrighted technologies and products.”

Damages from infringement of corporate assets with no apparent balance sheet value can be huge. Calculation of these damages requires insight, special knowledge, and careful analysis.

CPA experts engaged to calculate damages resulting from the infringement of intellectual property must be intimately familiar with two seminal cases, *Panduit Corp. v. Stablin Bros. Fibre Works, Inc.* and *Georgia Pacific v. U.S. Plywood Corp.*, aware of other significant case law relative to intellectual property, applicable micro- and macroeconomic theory, and familiar with market analysis. Additionally, professional literature has begun to appear in recent years addressing intellectual property damages, and these include: *Trademark Valuation*, Gordon Smith; *The Handbook of Business Valuation and Intellectual Property Analysis*, Reilly & Schweih; *Essentials of Trademarks and Unfair Competition*, Shilling; *Intellectual Property Damages: Guidelines and Analysis*, Glick, Reymann, & Hoffman; and *Valuation of Intellectual Property and Intangible Assets*, Smith and Parr.

In 2006 the AICPA released AICPA Practice Aid 06-1, “*Calculating Intellectual Property Infringement Damages*.” This publication provides guidance that the CPA may *wish, but is not required*, to consider, and is therefore considered to be non-authoritative. It supersedes a former Practice Aid 99-2, *Valuing Intellectual Property and Calculating Infringement Damages* (except for sections 7.01 and 8.09

and 10.01 to 11.46 of the former) released in 1999 which was also non-authoritative.

The Practice Aid discusses the traditional forms of intellectual property, and devotes roughly equal attention to patents, trademarks, and copyrights. It provides a brief overview of the concepts of the determination of compensatory damages based on the *market value* and *lost opportunity* measures, and discusses the two, primary types of measures of damages – *lost profits* and *reasonable royalties*.

The different *types* of lost profits are identified, and their availability to different types of infringement discussed. Following this, the *measurement* techniques are reviewed. A large number of these intellectual property claims require a solid grounding in macroeconomics and familiarity with such elements as “price elasticity” or conducting a “market analysis of [an] infringing product.” Depending on the complexity of the matter, the experienced CPA may team with an economist to thoroughly address these elements of the claim.

The Aid then moves on to a discussion of reasonable royalty. Generally, even beginning practitioners (at least those who have undertaken to develop at least a fundamental understanding of the subject) are aware that when the measure of damages is to be determined by the application of a reasonable royalty, the royalty rate to be used to measure damages can be derived from either an *established royalty* or through the development of a rate via the mechanism of a *hypothetical negotiation*. The experienced practitioner earns his fee in recognizing the difference, knowing where to find the former, and how to calculate the latter.

The final several pages of the Aid touch on other interesting topics such as stacked royalties and statutory damages for counterfeit trademarks and for copyrights. These additional areas for claim are not frequently encountered. However, awareness of these subjects is important so that they may be recognized, and pursued, when appropriate.

Practice Aid 06-1 provides excellent guidance to the expert conducting a lost profits analysis with respect to intellectual property. While the Practice Aid is nonauthoritative, we are aware of one recent case where a CPA’s testimony was disallowed when it was revealed during cross-examination that not only had he *not* considered its guidance, but also that he was unaware of its very existence. Of course, subtracting further weight from his testimony was his lack of knowledge of *Panduit* and *Georgia Pacific*.

<sup>1</sup> “The Economic Value of Intellectual Property,” October 2005, [www.usaforinnovation.org/news/ip\\_master.pdf](http://www.usaforinnovation.org/news/ip_master.pdf)

## “DUM-DE-DUM-DUM”

The stalwart holder of Badge No. 714 of the LAPD, Sergeant Joe Friday, made immortal the phrase, “**Just the facts, M’am, just the facts!**”<sup>1</sup> Expert witnesses, effective ones, embrace Sergeant Friday’s guidance.

An expert may also find all, or part, of his/her expert testimony disallowed or stricken if he/she offers opinions or conclusions not relevant to the matter at hand, not within the scope of the expert’s area of expertise, and/or not of sufficient probative value (violation of either or both of the first two may result in violation of the third).

In the matter of *TCE Systems, Inc. v. Thomas & Betts Corp.*,

USDC, E. D. Michigan, 19 Southern Division, No. 00-72628, Nov. 21, 2005<sup>2</sup>, a breach of contract issue surrounding an alleged trade secrets infringement, Defendant moved to strike the testimony of Plaintiff’s CPA damages expert. Defendant’s motion was predicated on “[t]he expert report and testimony of [the CPA expert] should be excluded, in whole or in part, because it (sic): (i) raises a new theory of damages sufficiently debatable to have required its disclosure during discovery, (ii) discusses and relies upon claims and issues specifically excluded by prior rulings of this Court, and (iii) is replete with conclusions and opinions which are beyond the author’s expertise.”

While the expert opened his report with the statement, “[t]he purpose of my retention is to analyze and quantify damages due [to] TCE as a result of the alleged actions and conduct of T. & B.”, the Court found that the section of his report entitled “Unjust Enrichment” strayed from his stated purpose. Further, the Court concluded that it “found very little within [this expert’s] report which purportedly ‘analyze(s) and quantif(ies) damages.’”

Unfortunately, he also offered opinion and interpretation regarding “the conduct of the parties” and the “factual events which surround this dispute.” The Court also noted that the “Background” section of his report was devoted to a discussion of his “belief” of the facts of the matter. In keeping with Federal Rule of Evidence 703<sup>3</sup>, the Court stated “.....[the expert’s] education and experience do not qualify him to interpret the conduct of the parties in this matter or to opine about the factual events which surround this dispute. The determination of these matters rests properly with the jury.”

It should not come as a surprise that the ultimate conclusion of the Court, in keeping with Federal Rule of Evidence 403<sup>4</sup>, was “..... [the] probative value of admitting the [this expert] report and any testimony relating thereto ‘is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury.’”

Defendant’s motion was granted, and Plaintiff found itself with no testimony to support their claim for damages.

Lessons to be learned from this case:

- Litigators need to review their expert’s preliminary report to insure that it stays within the confines of the rules of the court,
- experts need to be aware of the specific issue(s) that they have been retained to address and limit their testimony to their factual analysis and the results thereof, and
- if issues of law, or the position of the litigator’s client, need to be addressed in the expert’s testimony, the expert and litigator should discuss it and the litigator provide the expert with an instruction(s). The expert’s report and testimony may then include a statement such as, “I have been instructed by counsel to assume [whatever needs to be addressed by the expert that is outside of his personal ability to address]”.

As Sergeant Friday so ably noted, **“Just the facts, M’am, just the facts!”**

<sup>1</sup> NBC radio and TV series starring Jack Webb. Radio – 1949-1957, TV – 1951-1959 and 1967-1970

<sup>2</sup> Not reported in F. Supp. 2d, 2005 WL 3132207 (E. D. Mich.)

<sup>3</sup> Federal Rule of Evidence 703, in part “...a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion....”

<sup>4</sup> Federal Rule of Evidence 403, in part “...evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury....”

*This publication is distributed with the understanding that the author publisher and distributor are not rendering legal, accounting or other professional advice or opinions on specific facts or matters, and accordingly, assume no liability whatsoever in connection with its use. © 2007*



500 West Jefferson St., Suite 1600  
Louisville, KY 40202  
(502) 584 - 1101

301 East Main St., Suite 1100  
Lexington, KY 40507  
(859) 253 - 1100

<http://www.mspotter.com>  
e-mail: [info@mspotter.com](mailto:info@mspotter.com)

PRSR STD  
U.S. Postage  
PAID  
United Mail