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NOTES

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HEALTH LIFE EXPECTANCY

by

Kurt V. Krueger*

I. Introduction

An individual's health status may affect his or her earnings capacity, performance of services, or utilization of leisure. In forensic economics, the accounting for the effects of health status on earnings capacity and ability to perform household services is often ambiguously contained within other non-health-status-specific variables or not considered at all. This paper presents ways that the forensic economist can directly include health status within their calculations.

The paper begins with a discussion of the indicators of health status. Next, a presentation of the concept of "healthy life expectancy" is given along with the process of adjusting standard life expectancy tables to healthy life expectancy tables. The paper concludes with examples of forensic economic applications using health status as a determinant in calculating economic loss.

II. Quantifying Health Status

Health status is a part of individual productivity. Forecasting future earnings considering changes in productivity involves a prediction of future health status. Implicitly, when projecting earnings forensic economists make a quantification of health status with the utilization of labor force participation rates and age-earnings profiles. However, when projecting the value of lost services, many forensic economic calculations do not include an accounting for the effects of anticipated declining health on pre-injury ability to perform services.

As age increases, health status deteriorates and the number of persons not in the labor force due to disability increases. The proportion of the civilian non-institutional population that is not in the labor force due to disability is shown in Figure 1. As age increases, the percentage of the population not in the labor force increases. After age 60, the proportion of persons reporting that they are disabled and unable to work declines. These observations are not because a declining rate of disability incidence with age, but because persons with disability after age 60 begin to categorize themselves as being retired as opposed to being prevented from being able to work due to a disability. By including labor force participation rates into their projections, forensic economists partially include deterioration in health leading to exit from the labor force.[1]

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[1] Forensic economists using the LPE expected earnings model use participation rates based on all persons not in the labor force. When evaluating earnings capacity, forensic economists sometimes use the LAPE model where AP stands for "Able to Participate" defined as one minus the percentage of persons not in the labor force due to disability.

Age-earnings profiles used in forensic economics also partially include health status considerations. As age advances, several events affecting earnings may take place. Examples include:

(1) wages increase due to special age or job-tenure related productivity growth;

(2) wages decrease due to declining health status causing lower productivity and wages;

(3) wages decrease due to voluntary considerations (want to work less); and,

(4) wages decrease due to involuntary considerations (discrimination).

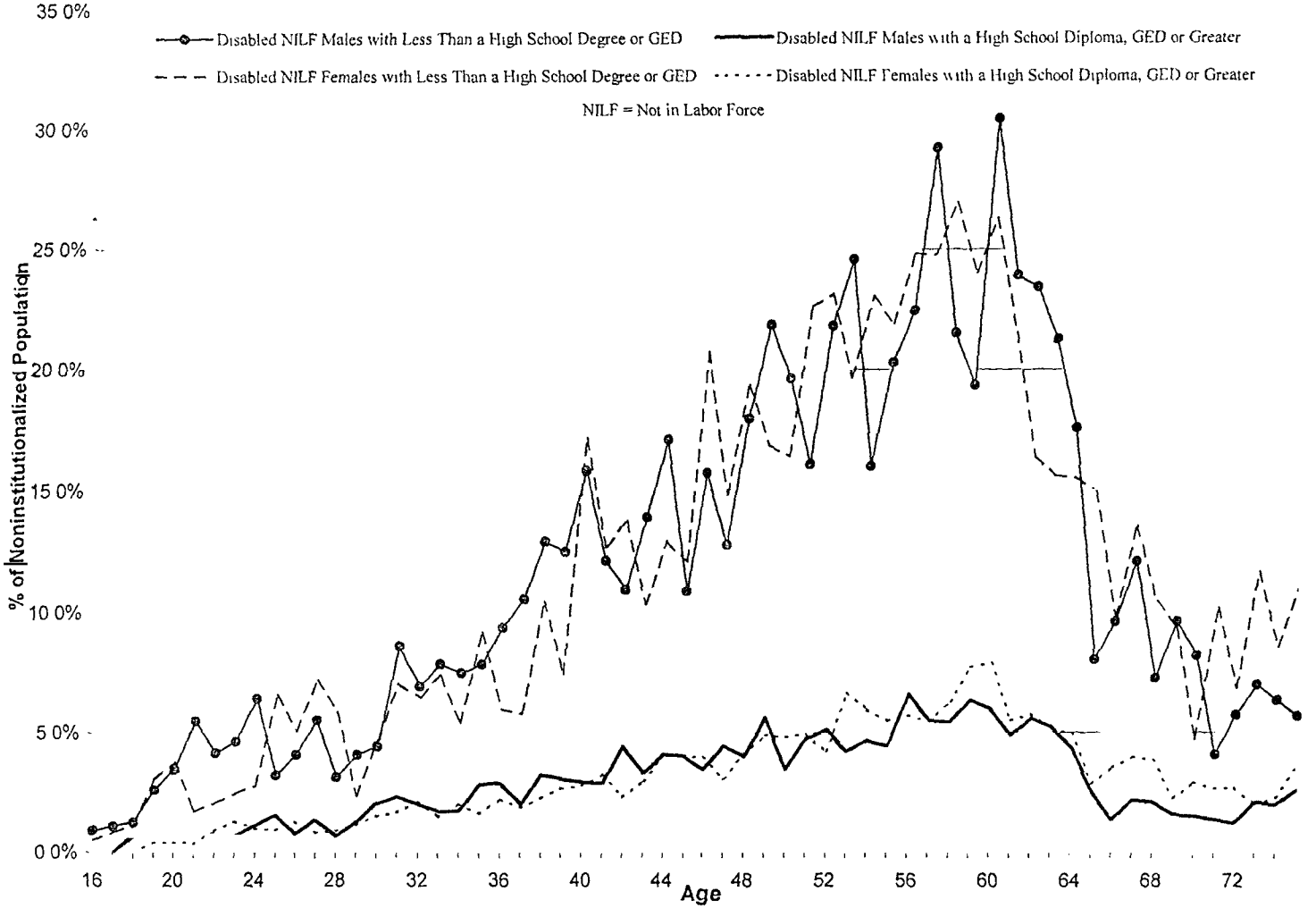
In many circumstances, forensic economists might expect that any one of the above factors shaping the age-earnings profile might dominate the others. Isolating any one factor becomes impossible using the traditional methods of calculating age-earnings profiles. Examples of the differences in the average annual earnings of persons by perceived health status are shown in Tables 1 and 2. Persons ages 55 to 64 that work full-time and live in households without any children under the age of 18 were chosen as a representative group that has large counts of persons by health status classification. From Table 1, the differences in the earnings level by perceived health status is dramatic. In order to isolate the effects of income and health status, average earnings are presented in Table 2 by level of completed education. Both of these tables show consistent reductions in average earnings with decreasing health status. When using traditional age-earnings profiles, the reduction in earnings associated with reduction in health status is impossible to identify. For example, in 1996, the earnings of all college graduates and persons with a 9th grade education or less that are employed full-time steadily increase from age 18 to age 65[2], while data from Table 2 shows that earnings fall substantially for these education groups.

[2] Data from the Current Population Survey, March 1997 Supplement was accessed from the U.S. Census Internet site at:

http://ferret.bls.census.gov/macro/031997/perinc/06A_001.htm

on October 5, 1998. This data source, Current Population Report P-60, is often used by forensic economists to calculate age-earnings profiles.

Figure 1. Incidence of Disability that Prevents Work:
Eight Panels of Current Population Survey Data (February and June 1998)



Source: U.S. Bureau of the Census

Table 1. Average Annual Wages and Salaries of Persons in 1996, Ages 55 to 64, Working Full-time, and Residing in Households Without Any Children Under the Age of 18

		Perceived Health Status					
		Excellent	Very Good	Good	Fair	Poor	ALL
Males	Married, Spouse Present	$61,346	$49,300	$44,780	$38,404	$32,724	$50,221
	All Other Households	55,887	42,564	26,621	17,223	21,790	38,915
	ALL Households	60,257	48,133	41,151	34,002	29,713	48,046
Females	Married, Spouse Present	31,270	26,702	22,556	23,562	17,821	26,084
	All Other Households	30,696	29,198	25,609	19,824	22,266	27,308
	ALL Households	31,052	27,693	23,843	21,978	19,719	26,579
Both	Married, Spouse Present	51,134	41,532	36,187	32,864	26,343	41,551
Sexes	All Other Households	41,820	34,251	25,965	18,850	22,073	31,780
	ALL Households	48,604	39,590	33,088	28,589	24,852	38,779

Source: Current Population Survey, March 1997 Supplement, U.S. Census Bureau.

Table 2. Average Annual Wages and Salaries of Persons in 1996, Ages 55 to 64, Working Full-time and Residing in Households Without Any Children Under the Age of 18, by Education Level and Health Status

		Perceived Health Status			
		Excellent or Very Good	Good	Fair or Poor	ALL
Less than a High School Diploma					
Males	Married, Spouse Present	$30,598	$27,703	$26,033	$28,910
	All Other Households	22,449	15,324	13,221	17,796
	ALL Households	28,714	24,343	21,308	25,957
Females	Married, Spouse Present	20,897	16,186	18,969	18,287
	All Other Households	16,890	14,958	17,580	16,380
	ALL Households	18,724	15,703	18,270	17,385
Both Sexes	Married, Spouse Present	28,351	23,791	22,992	25,669
	All Other Households	19,430	15,151	15,696	17,058
	ALL Households	25,355	21,044	19,819	22,704
High School Graduates					
Males	Married, Spouse Present	$40,680	$37,704	$31,273	$38,637
	All Other Households	41,647	31,714	14,282	35,933
	ALL Households	40,856	36,709	28,739	38,169
Females	Married, Spouse Present	21,859	18,219	20,434	20,515
	All Other Households	23,540	22,954	19,791	22,849
	ALL Households	22,415	20,128	20,180	21,363
Both Sexes	Married, Spouse Present	33,010	30,045	26,975	31,361
	All Other Households	30,717	25,694	18,197	27,479
	ALL Households	32,437	28,832	24,626	30,346
Some College or Associates Degree					
Males	Married, Spouse Present	$52,196	$50,615	$45,726	$51,173
	All Other Households	47,123	29,069	17,421	38,676
	ALL Households	51,172	46,255	39,216	48,619
Females	Married, Spouse Present	28,319	26,373	18,321	26,765
	All Other Households	26,312	25,600	17,602	25,500
	ALL Households	27,398	26,029	18,049	26,199
Both Sexes	Married, Spouse Present	43,453	40,571	34,787	41,777
	All Other Households	33,398	26,674	17,525	29,930
	ALL Households	40,235	36,065	29,660	37,991
Bachelor's Degree or Greater					
Males	Married, Spouse Present	$73,689	$70,027	$53,187	$71,785
	All Other Households	68,180	32,408	35,400	58,916
	ALL Households	72,783	62,999	50,068	69,607
Females	Married, Spouse Present	39,632	32,378	43,436	38,041
	All Other Households	46,087	37,375	30,247	42,405
	ALL Households	41,985	34,631	37,727	39,751
Both Sexes	Married, Spouse Present	63,698	55,608	50,540	61,327
	All Other Households	56,088	35,832	32,451	49,229
	ALL Households	61,909	49,413	45,731	58,256

Source Current Population Survey, March 1997 Supplement, U S Census Bureau.

A plaintiff might lose a specific number of hours of household work from a pre-injury performance level. For some household services, the forensic economist could expect that the pre-injury performance level would naturally decline with advancing age and deterioration of health status. However, it is difficult for the forensic economist to make predictions as to the expected decline in ability to perform services or the age to which losses should be projected.

Quantifying or classifying health status is a formidable task. There are many components to health and well being beyond the response to the simple question, "How is your health, excellent, very good, good, fair or poor?" Health assessment includes analysis of physical and social functioning, physical and psychological sensations, social opportunity, and health perception. "Combining measures of different concepts of health into a single number requires a conceptual model that considers health as a continuum ranging from perfect health to death (or worse). Between these two points are a number of different health states. These states are defined in terms of one or more concepts of health-related quality of life."[3]

Quantifying health status involves combining indicators of 'perceived health' and 'activity limitation'. Perceived health status is most often recorded as the response to the simple question "How is your health, excellent, very good, good, fair or poor?" Limitations occur within the following activities:

1. major life activities, i.e. working, keeping house, going to school, retired, etc;
2. activities of daily living, i.e. preparing meals, shopping, handling money, housework, moving outside of home;
3. independent activity of daily living, i.e. bathing, dressing, eating, using the toilet, getting up and down, moving around home.

Limitations can be:

1. sensory, i.e. seeing, hearing, smelling, tasting, touching;
2. cognitive, i.e. communicating, learning, understanding, responding, concentrating, coping;
3. functional, i.e. lifting, walking, standing, bending, reaching, climbing.

The U.S. Department of Health and Human Services (DHHS) monitors the health status of the United States population. According to the DHHS:

> "Historically, health has been measured primarily in terms of mortality and morbidity. On the one hand, measures of mortality may understate the public health importance of conditions that result in proportionately more morbidity and disability. On the other hand, commonly used morbidity measures tend to focus on physical function and thus may understate social and mental dysfunction as well as satisfaction with health. A single measure that incorporates health-

[3] "Years of Healthy Life," page 2.

> related quality of life and life expectancy gives a more comprehensive picture of the population's health. *Years of healthy life* can be sensitive to changes in health among the well and the ill".[4]

The DHHS recognizes that health and well being can be defined and measured in many ways. In its presentation of measuring healthy life, the DHHS uses responses from the National Health Interview Survey to categorize health status. The National Health Interview Survey is an on-going large-sample survey sponsored by the DHHS. The DHHS numerically scored the overall functioning of individuals[5] for a specific period based on responses to survey questions dealing with health status indicators. The numerical scoring ranges from 1.0, excellent health with no limitations, to 0.1 poor health with severe limitations in the activities of daily living. The resulting score represents the estimated health state in a period. For example, a health state that has a value of 0.75 represents 75 percent of full function over the time interval, such as one year.

Two types of information from the National Health Interview Survey, activity limitation and perceived health are used by the DHHS to form an operational, quantifiable definition of health-related quality of life. Activity limitation captures a person's ability to perform the social role or major activity that is usually associated with his or her particular age group—for example, working, keeping house, or utilizing retirement leisure. Each person is classified into one of the following six categories based on age and ability to perform a major activity:

- not limited; not limited in any way
- limited-other; not limited in major activity, but limited in other activities
- limited-major; limited in major activity
- unable-major; unable to perform major activity
- limited in IADL; unable to perform instrumental activities of daily living (IADL) without the help of other persons
- limited in ADL; unable to perform self-care activities of daily living (ADL) without the help of other persons

Each National Health Interview Survey respondent is asked to rate their health as excellent, very good, good, fair, or poor. The response to the question on perceived health status is used to form a matrix with the six categories of activity limitation listed above. The matrix creates a definition of health-related quality of life consisting of 30 possible states, ranging from the optimal level of not limited in activity and in excellent health to the lowest health state of needing help to perform self-care activities of daily

[4] "Years of Healthy Life," page 1.

[5] Alternatively, a group of individuals.

living and being in poor health.

In order to assign values to each of the 30 cells in the matrix by perceived health and role limitation, the DHHS uses a technique called multiattribute utility scaling.[6] Values range from 1.00 for persons who have no role limitation and are in excellent health to 0.10 for persons who are limited in ADL and are in poor health. According to these values, if a person lives one year in excellent health and has no limitation in activity, then he or she has one full year of healthy life. Other health states result in less than a full year of healthy life. The DHHS' average health-related quality of life of persons by age interval in 1990 is reported in Table 3.

Table 3. Average Health-related Quality of Life of All Persons by Age: United States, 1990

Age	Average Health-related Quality of Life of Persons in the Age Interval
0-5 years	0 94
5-10 years	0.93
10-15 years	0 93
15-20 years	0.92
20-25 years	0.91
25-30 years	0.91
30-35 years	0.90
35-40 years	0.89
40-45 years	0.88
45-50 years	0.86
50-55 years	0.83
55-60 years	0.81
60-65 years	0.77
65-70 years	0.76
70-75 years	0 74
75-80 years	0.70
80-85 years	0 63
85 years and over	0 51

Source: U.S. Department of Health and Human Services

One unique feature of the DHHS' presentation of health-related quality of life is that it incorporates perceived health status. Thus, the health status of people with

[6] For a complete description of the scaling technique, see "Years of Healthy Life" pages 10-13.

disabilities, who might score low on activity limitation scales, can be compensated by their perception of their own health. For example, the health of persons with leg amputations that also run regularly with the assistance of special prostheses may be more accurately represented by a set of health states that include perceived health. For many persons with disabilities who feel they are healthier than their physical limitations may suggest, a health-related quality-of-life measure that includes perceived health will be more representative of their overall health-related quality of life than a measure that is based on activity limitation alone. The data used by forensic economists pertaining to the disabled is most often confined only to activity limitations

III. Computation of Healthy Life Expectancy

The DHHS publishes life tables on a decennial basis along with yearly-abridged editions.[7] Life tables are standardized and presented in two components: (1) the expectation of life at single years of age and (2) the number of survivors at single years of age out of 100,000 born alive. Using standard life tables and the average health-related quality of life statistics, it is straightforward to construct a years of remaining health life table.[8]

The first step in the calculation of the healthy life table is to obtain the stationary population in the age interval.[9] Stationary population is simply the number living at the beginning of an age interval of 100,000 born alive less 50% of the number dying between age intervals (i.e. the average number of persons alive in the time interval). For example, if at the age of 35 there are 96,322 survivors and at the age of 36 there are 96,150 survivors, the stationary population is 96,322 – (96,322 – 96,150) * 50% = 96,236. Stationary population is calculated for each age interval.

The second step in the healthy life table calculation is to multiply the stationary population by the average health-related quality of life of persons in the age interval. This statistic is called the quality-adjusted stationary population. The third step is to calculate the quality-adjusted stationary population in the age interval and all subsequent age intervals by summing up the quality-adjusted stationary population figures from the bottom to the top of the table. When using an abridged life table, the last age's subsequent year stationary population is the life expectancy for that age multiplied by the number of persons alive at the beginning of the age interval. An example is as follows. The life table being used for conversion to a healthy life expectancy table is abridged at age 85; the life expectancy at age 85 is 6.2 years; and, the number of persons at the beginning of age 85 is 33,205. The stationary population in the 85 to 86 age

[7] The DHHS also publishes life table information for state and local areas. Various bodies such as insurance boards and actuary companies publish other life tables.

[8] For a thorough example of calculation with numbers, see "Years of Healthy Life," page 7.

[9] Some life tables include this information and others leave it for the researcher to calculate.

interval and all subsequent age intervals is 6.2 * 33,205 or 205,871. Normal life expectancy is the stationary population in the age interval and all subsequent age intervals divided by number of all persons alive at the beginning of the age interval. Years of healthy life is the quality-adjusted stationary population in the age interval and all subsequent age intervals divided by number of all persons alive at the beginning of the age interval.

IV. Healthy Life Expectancy Table

The years of remaining healthy life at single year of age by race and sex for the United States in 1993 are presented in Table 4. The data used to calculate the table are from the DHHS' 1990 health-related quality of life data and 1993 abridged life expectancy tables. For all races and both sexes, years of remaining healthy life is 85% of life expectancy at birth, an average of 75% of life expectancies in each year from birth to age 85, and 69% of life expectancy at age 65. Based on data provided by the DHHS, the ratio of healthy life to life expectancy is similar for individual races and sexes.

Table 4. Expectation of Remaining Years of Life and Healthy Life at Single Years of Age, All Persons, United States, 1993

Age	Life Expectancy	Healthy Life Expectancy	Ratio	Age	Life Expectancy	Healthy Life Expectancy	Ratio
0	75.5	64 2	85.0%	43	35 4	27 2	76 8%
1	75 2	63 8	84 8%	44	34 5	26.4	76 5%
2	74 2	62.9	84 8%	45	33 6	25 6	76 2%
3	73 3	62 0	84 6%	46	32 7	24 8	75.8%
4	72 3	61 1	84 5%	47	31 8	24 0	75.5%
5	71 3	60 1	84 3%	48	30 9	23 3	75 4%
6	70 3	59 2	84 2%	49	30 0	22 5	75 0%
7	69 3	58 3	84 1%	50	29 2	21 7	74 3%
8	68 4	57 4	83 9%	51	28 3	21 0	74 2%
9	67 4	56 5	83 8%	52	27 4	20.3	74 1%
10	66 4	55 6	83 7%	53	26 6	19 6	73 7%
11	65 4	54 6	83 5%	54	25.7	18 9	73 5%
12	64 4	53 7	83 4%	55	24 9	18 1	72 7%
13	63 4	52 8	83 3%	56	24 1	17 5	72 6%
14	62 4	51 9	83 2%	57	23 3	16 8	72 1%
15	61 5	51 0	82 9%	58	22 5	16 1	71 6%
16	60 5	50 1	82 8%	59	21 7	15 5	71 4%
17	59.5	49 2	82 7%	60	20 9	14 8	70 8%
18	58 6	48 3	82 4%	61	20 2	14 2	70 3%
19	57 7	47 5	82 3%	62	19 5	13 6	69 7%
20	56 7	46 6	82 2%	63	18 7	13 1	70 1%
21	55 8	45 7	81 9%	64	18 0	12 5	69 4%
22	54 8	44 9	81.9%	65	17 3	11 9	68 8%
23	53 9	44 0	81 6%	66	16 6	11 4	68 7%
24	52 9	43 1	81 5%	67	15 9	10.8	67 9%
25	52 0	42 3	81 3%	68	15 3	10.3	67 3%
26	51 1	41 4	81 0%	69	14 6	9 8	67 1%
27	50 1	40 5	80 8%	70	14 0	9 3	66 4%
28	49 2	39 7	80 7%	71	13 3	8 8	66 2%
29	48 3	38 8	80 3%	72	12 7	8 3	65.4%
30	47 3	38 0	80 3%	73	12 1	7 8	64.5%
31	46 4	37 1	80 0%	74	11 5	7 3	63 5%
32	45 5	36 3	79 8%	75	10 9	6 8	62 4%
33	44 5	35 4	79 6%	76	10 4	6 4	61.5%
34	43 6	34 6	79 4%	77	9 8	6 0	61 2%
35	42.7	33 8	79 2%	78	9 3	5 6	60 2%
36	41 8	32 9	78 7%	79	8 8	5 1	58 0%
37	40 8	32.1	78 7%	80	8.3	4 7	56 6%
38	39 9	31 3	78 4%	81	7 8	4 4	56 4%
39	39 0	30 5	78 2%	82	7 3	4 0	54 8%
40	38 1	29 6	77 7%	83	6 8	3 7	54 4%
41	37 2	28 8	77 4%	84	6 4	3 4	53 1%
42	36 3	28 0	77 1%	85	6 0	3 1	51 7%

Source *Years of Healthy Life* and *Vital Statistics of the United States*, 1993, *Life Tables*, U S Department of Health and Human Services

V. Using Healthy Life in Forensic Economic

In some situations, the combination of labor force participation rates and age-earnings profiles do not capture the effects of health on expected earnings. In these cases, the forensic economist can use average health states in particular age groups to provide indication of the anticipated loss in full-function with advancing age. The anticipated loss in function might affect earnings capability.

When projecting household services or the utilization of leisure far into the future based upon current performance levels, some forensic economists truncate the calculation at some arbitrary age before life expectancy. They argue that, at some age in the future, the plaintiff's service production level is anticipated to naturally fall or that he or she would have become dependent on others. The remaining years of healthy life could be used to eliminate the arbitrary nature of the truncation before life expectancy. The forensic economist could devise several approaches to the productivity reduction theory. One method might be to project a level of production to healthy life expectancy and a lower level thereafter to life expectancy. Another might be to use a weighting system determined by the ratio of years of healthy life remaining to life expectancy. The economist could also split hours into various categories—lost hours, reduced productivity hours, and extra hours—with separate projections over years of healthy life remaining and life expectancy.

When projecting future life care costs, the economist might consider the pre-injury probability the plaintiff would have needed those costs between the time period of the end of years of healthy life and life expectancy. For example, if the life care plan includes residential care, there may have been a pre-injury probability that the plaintiff would have become dependent on residential care at some time in the future. The forensic economist may want to include this probability from the end of remaining healthy life to life expectancy.

A plaintiff might be employed at an advanced age and express that he or she would have worked indefinitely. The forensic economist may feel that many of the labor force statistics available on elderly workers are not reliable or applicable to the plaintiff. The years of remaining healthy life can be used to present the number of remaining years of full function and possible ability to continue working.

The uses of healthy life expectancy figures are not applicable to all plaintiffs or to all forensic economic work. However, the years of remaining healthy life do provide scientific information in some situations that provides insight to future expectations or allow arbitrary calculations to be avoided.

References

Erickson, Pennifer and Wilson, Ronald and Shannon, Ildy, "Years of Healthy Life", *Health People 2000 Statistical Notes*, Number 7, April 1995. Center for Disease Control and Prevention, National Center for Health Statistics. As of October 5, 1998, this report could be accessed at: http://www.cdc.gov/nchswww/data/statnt_7.pdf on the Internet.

Vital Statistics of the United States, 1993, Life Tables, Volume II, "Mortality", Part A, Section 6. Center for Disease Control and Prevention, National Center for Health Statistics As of October 5, 1998, this report could be accessed at http://www.cdc.gov/nchswww/data/lifetb93.pdf on the Internet.

Simulation Modeling in Forensic Economics: The Example of Reasonable Royalty Negotiations

by

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I. Introduction

Economists are often called upon to provide expert testimony on damages in patent infringement litigation. Such damages typically consist of a combination of lost profits and lost royalty payments caused by the sales of an infringing competitor If the courts find that patent infringement has occurred the economist, usually in the role of expert witness, analyzes the amount of infringement and estimates the amount of monetary damages assessed against the infringing party.

A body of case law references has developed that defines patent infringement, and provides instruction on acceptable techniques for damage computation. However, one concept of damage, the reasonable royalty to which the infringed party is entitled, remains elusive in practice, if not in theory.

The purpose of this paper is to demonstrate the application of computer simulation modeling to the estimation of a reasonable royalty rate arrived at between a patent holder and potential licensee or infringer. This method requires the integration of two diverse subjects: (1) current professional practice in estimating reasonable royalty rates; and, (2) management science techniques. The practical example used in this paper is estimating a reasonable royalty rate in a patent infringement case. However, there are other situations of interest to forensic economists for which this kind of approach appears useful, such as negotiating settlements for personal injury or employment cases, business valuations and life-time-care cost estimation. All of these situations contain degrees of uncertainty and are subject to bargaining or negotiation.

This paper may also serve to introduce the reader to the new generation of desktop simulation modeling programs which are now on the market and available at reasonable prices. These programs will enable the aggressive novice to build sophisticated simulation models without expending enormous resources of time, energy and money.

The first section of this paper presents an overview of the applicable literature on patent licensing practices. The second section is an introductory discussion of simulation modeling and its relevance to royalty negotiations. The third section develops the background and context for model development and serves as a bridge for the synthesis of the two topics. The fourth section develops the reasonable royalty simulation model. The fifth section executes the model and presents the results. The sixth section reports the conclusions and evaluates the model's utility for practical situations In addition, an Appendix provides information on model building software, including names and addresses of software providers.

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II. Review of the Current State of the Art in Estimating Reasonable Royalties

Computation of lost profits from patent infringement is reasonably well founded from a methodological perspective (Frank et al 1995, and Parr 1993). However, determining the reasonable royalty that should be awarded to the infringed party presents some severe practical problems, even for experienced forensic economists (McGavock 1992, Smith 1994). Review of the literature on patent infringement fails to reveal any consensus on what constitutes a reasonable royalty rate (Goldscheider 1984). Royalty rates vary by industry, product lines, firm size, and stage in the product development cycle (Degnan 1997). Royalty rates may also differ by risk taking postures of licensors and licensees (Parr 1995).

Since firms are under no obligation to report details of their licensing arrangements, and tend not to provide information to third parties voluntarily, little data are available. Although some researchers have periodically attempted to compile licensing rates for specific products and industries, the results have been sparse, and not of much practical use (Degnan 1997).

III. Simulation Modeling

Modern simulation modeling is an outgrowth of game theory, which is that branch of the social sciences that studies strategic decision-making (Von Neuman and Morgenstern 1944). A game in this context has been described in management science literature as a situation of strategic interdependence where the outcome of one person's choices (strategies) depends upon the choices of another person or persons acting purposively (Dixit et al 1991). The interests of the players involved in the game may be in strict conflict, when one person's gain is another's loss – the zero sum game.

However, in business and life's other games, participants discover largely through trial and error, that there are zones of commonality of interest in spite of conflict. In fact, there are often combinations of mutually gainful or mutually harmful strategies (Bierman et al 1992). It is possible for an equilibrium situation to arise where each player's action is the best response to the circumstances in which they find themselves. Locating this equilibrium, whether by trial and error, or a mathematical model, can be the key to successful negotiation (Dixit et al 1991).

In the context of quantitative analysis, simulation has come to mean experimentation based on a mathematical model. The basic idea of simulation is to build an experimental device (simulator) that acts like (simulates) the system of interest in certain important aspects in a quick and cost-efficient manner (Eppen et al 1995). The simulation modeling process generally involves collecting information that describes inputs and operational factors, and defines the interrelationships among the factors (variables), inputs and other components of the problem being studied. Exercising the model allows the characteristics of the problem to be explored (Davis et al 1986). Consider the problem faced when management can choose between several alternatives, but is unsure of the payoffs for each course of action where only one alternative can actually be selected. Which alternative is best? In this case simulation modeling of the situation enables management to evaluate several alternatives without actually having to expend resources on any of them.

In the past, simulation modeling was the province of those with enormous programming skills and computational aids, which hindered the development of practical negotiation models.

However, with the advent of the personal computer and a new vintage of desktop modeling programs, it is possible to simulate the reasonable royalty negotiating process, and other bid and ask situations, both economically and efficiently.

IV. Simulating the Reasonable Royalty Negotiation Process

Courts have held that a patentee (licensor) is entitled to lost profits, or a reasonable royalty, from an infringer (Pincus 1991). However, there are many practical problems encountered in estimating the value for a reasonable royalty *ex post*. After all, had the basis and opportunity for a reasonable royalty negotiation existed prior to infringement, there would probably be no litigation in the matter. It is the lack of effective negotiation that has landed the parties in court.

Courts have defined a reasonable royalty as:

> The amount that a licensor (such as the patentee) and a licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement: that is, the amount which a prudent licensee – who desired, as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention – would have been willing to pay as a royalty and yet be able to make a reasonable profit and which amount would have been acceptable by a prudent patentee who was willing to grant a license.[1]

Reconstructing the bargaining process between two parties over reasonable royalty as defined by the courts is a quite complicated process. An expert placed in the middle of litigation, and asked to determine how two parties would have negotiated in a hypothetical situation, faces a daunting task. Traditionally experts used in such litigation have attempted to simulate the hypothetical patent negotiation process by reviewing accounting records and other documents from both sides and reconstructing what might have been, if negotiations had actually occurred. Based on such document review an expert would opine on the rate that may have prevailed had such negotiations actually occurred (Goldscheider 1984).

Historical precedent is an important part of such reconstruction. However, historical precedent will not take the expert very far unless that expert has experienced a similar situation in that industry for comparable products. This would be the best solution, especially in a litigation context. Unfortunately, even the expert will not always find cogent information since patent and licensing data are furtive.

Availability and quality of the data may influence how the model is specified. For example, it would not be effective to devise a model which required data inputs which were unavailable or from unreliable sources. The expert will have to work with available data that can be independently verified, such as audited financial statements, or accounting records

[1] Georgia Pacific Corp. v. United States Plywood Corp., supra, p. 1120. This case describes some important factors to consider in determining a royalty rate.

with can be reconciled with the audited financial statements. The expert will usually have adequate data from one side. Through discovery it may be possible to obtain adequate data from the opposing side.

An alternative to using historical case studies, as advocated in this paper, is the use of a simulation model. Computer modeling represents an improvement and step forward over traditional methods used by experts in attempting to reconstruct *ex post*, or simulate the hypothetical negotiations of reasonable royalty rates. From a management science perspective modeling the reasonable royalty negotiation process has all the attributes of a game. There are two parties acting purposively. Each party's actions elicit responses form the other. A zero-sum solution dooms the outcome, whereas a win-win situation may lead to successful negotiations. Simulation modeling allows the game to be played in a cost efficient manner to evaluate whether or not there are winners or losers.

V. Modeling the Negotiation Process

The first step in the modeling process is development of the logical flow of activities, shown as the block diagram in Exhibit 1. Development of the flow diagram is a useful first step since it allows the model builder an opportunity to visualize the component parts of the process. In Exhibit 1, the negotiation process is divided into four discrete steps, taking the participants from their initial concerns and self-interest to a zone of commonality of interests. If the two parties can reach the zone of commonality of interests they will be a position to reach a mutually acceptable reasonable royalty rate. If, on the other hand, their demands are irreconcilable, or the constraints insuperable, negotiations may falter for lack of common ground.

A. Step 1 Determining the Willingness to Pay a Reasonable Royalty.

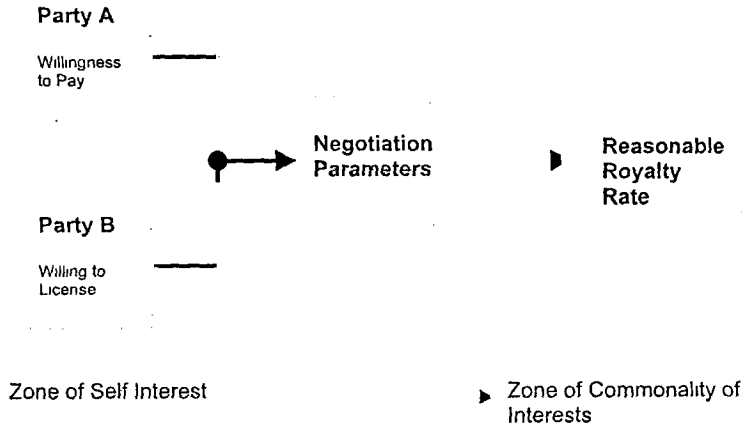
The negotiation process begins with the assumption that Party A wants to use the invention and is willing to pay an amount equivalent to a reasonable portion of its gross margin on sales for access to the product. The specific percentage of gross margin that Party A is willing to spend has yet to be determined. The benefit of paying a royalty is that it will enable Party A to enter an additional market and have a new source of revenue. As a potential licensee, Party A considers its own manufacturing and sales costs, additional investment that may be required, and the price of the license.

Party A enters the negotiating game with the following decision rule: It is willing to pay a royalty rate if that rate, expressed as some reasonable portion of its gross margin on sales, is low enough so that a normal or reasonable profit can be made from sale of the product after all other expenses are paid.

B. Step 2. Determining the Willingness to Accept a Royalty Payment for the Invention

As the patentee (licensor), Party B faces a different set of choices from Party A.

Exhibit 1
Flow Diagram for Reasonable Royalty Negotiation Model



Party B owns the patent and may be willing to license the invention to other firms for some as yet undetermined fee. Patent protection provides the patent holder with an exploitable monopoly for the product. Although selling a license provides additional income to patentee, it may also cost the patentee in terms of lost sales. However, if selling a license expands the total market for the product, the overall increase in product sales may ameliorate any

potential harm to the patentee from lost sales. Therefore, Party B is willing to play the negotiating game, but with the following decision rules on its behalf:

1. Party B is willing to sell a license for the product only if it does not reduce its own profits from competition from a rival seller;

2. Party B wants to receive a license fee large enough to provide a "sufficient" return on its investment incurred in developing the invention; and

3. Party B also wants any license fee to be large enough to compensate it for any lost profits on cannibalized sales of its own customer base.

C. Step 3. Evaluating the Parameters of the Bargaining Process

The negotiations between the two parties do not begin with a *tabula rasa.* Rather, opportunities and constraints on both sides involving existing customers, amounts invested in development the patent, the possibility of lost sales and the profitability of both firms, circumscribe the process.

The most contentious issue is whether or not Party A will actually expand the market and create new sales opportunities, or will merely cannibalize Party B's existing base. Party A has two potential sources of customers: (1) new customers who are currently not purchasing the product; and, (2) existing customers who are currently purchasing the product from Party B. The mix of new and existing customers and sales, as yet to be determined, will figure prominently in the negotiations.

If Party A expands the market and sells exclusively to new customers, then Party B is better off by selling the license to Party A, since every dollar Party B receives in royalties is a net new dollar -- which is the classic win-win situation. However, to the extent that Party A's sales come from Party B's existing customers, then Party B may be worse off by selling the license. This is the classic zero sum game where one party's gain is the other's loss.

If Party B fears that its own sales will suffer it will be reluctant to sell a license. However, if in spite of these misgivings, Party B does sell the license it would seek a royalty rate high enough to compensate it for the lost sales. This is not necessarily the best strategy, since Party B would then be trading its incremental profit on sale for a royalty payment. Typically, the gross margin on sale is higher than a royalty payment. But this is certainly something to consider during negotiations between the two parties.

D. Step 4. Reaching a Zone of Commonality

In order for the negotiations between Parties A and B to succeed, a zone of commonality must be found. This is the win-win situation, leaving both parties better off. However, if the negotiations fail to uncover any substantial commonality of interests, the zero sum syndrome will doom the negotiations. By adjusting the expectations of both parties, it may be possible for them to reach a zone of commonality wherein they both can achieve some, or all, of their individual goals through good faith bargaining.

There are two other possible impediments in the negotiating game. (1) the

availability of information; and, (2) the willingness to accept risks. Even when both parties are totally sincere and bargain in good faith, lack of information may lead one or both parties to a bad decision. If on the other hand, there is asymmetric information (one party knows something the other doesn't), one party may accept a bad bargain without knowing it. Risk is another factor in such negotiations. Asymmetric risk tolerance between the two parties may skew the results of bargaining in an unknown manner.

VI. Making the Simulation Model Operational

Making the model operational requires converting the articulated opportunities and constraints, as discussed in the previous section, into a mathematical form, within a comprehensive model structure, in order to obtain a quantitative solution. This is the essence of model building. The special strengths of the new vintage of desktop modeling programs are that they can provide a model structure, a computational framework, and a system to guide the user through the model development process.

For this example of the simulation of the royalty rate negotiation process a model was developed using Decision Pro software.[2] This particular program constructs models in a specific kind of decision tree format. Other comparable modeling programs on the market may use other techniques that may be just as effective. However, decision tree format is appropriate in this case since the activities in this game are sequential, with a chain of thinking that can be studied by drawing a game tree. Exhibits 2, 3 and 4 are graphic depictions of the operational model of the reasonable royalty negotiation process in decision tree format.

Each node in the decision tree depicts input, output, or intermediate products calculated by the formulas introduced into the model by the user. In Exhibit 2, the input nodes have pointed ends for easy identification. The diagram itself contains the formulas used to compute the outputs and/or intermediate products. In building the model the user introduces arithmetic operations that convert the decision rules into formulas and then convert the inputs into outputs.

Each party in this negotiation has a set of criteria (decision rules), which it uses to determine its acceptable bid or asking prices. The top part of the diagrams in Exhibits 2, 3 and 4 show the position of the infringer (licensee) and is used to calculate its "willingness to pay" a reasonable royalty. The bottom half of the diagram calculates the patent holder's "willingness to accept" a reasonable royalty. The first node in the model is the "decision node", since the purpose of the exercise is to calculate the number that appears in that node.

The reasonable royalty negotiation model has the following inputs:

1. Existing Sales A: the anticipated revenue expected by Party A from sales from customers currently buying the item from Party B.

2. Existing Sales B: The sales that Party B anticipates losing to Party A if a license is sold.

3. Gross Margin A: the gross margin on sales of Party A (revenue – cost of

[2] Vanguard Software Corporation, Decision Pro

goods).

4 Incremental Profit: the profit margin without regard to fixed costs (sales – variable costs/sales)

5. New Sales A: the sales of Party A to entirely new customers who are not currently purchasing the item form Party B.

6. ROI Patent: An amount that Party B requires as a return on its investment in research and development for the patent.

7. Rule A: The percentage of the gross margin that could be spent to purchase a license for the product.

8. ASP: average selling price for the product at issue

The model produces four outputs.

1. Difference: the primary root node of the model, which is the primary object calculated by exercising the model. This figure is the difference (in dollars) between the royalty rate Party A is willing to pay, and the royalty rate Party B is willing to accept.

2. Royalty A: the royalty rate Party A is willing to pay based on its expected sales of the item, expressed as an acceptable percentage of it gross margin.

3. Royalty B: the amount of royalty payment Party B is willing to accept in order to sell the license for the product. It is based on the value party B regards as an acceptable return on its investment in developing the product plus an allowance for possible lost profits on sales lost to Party A.

4. Lost Profit: the amount of profit Party B expects to lose from competitive sales by Party A to Party B's existing customers.

A. Scenarios of the Negotiating Process

Three scenarios for the negotiations were developed and analyzed.

1. Scenario 1, shown as Exhibit 2, is the initial bargaining positions of the two parties. The execution of this scenario shows how far apart the two parties are initially when they first begin negotiations.

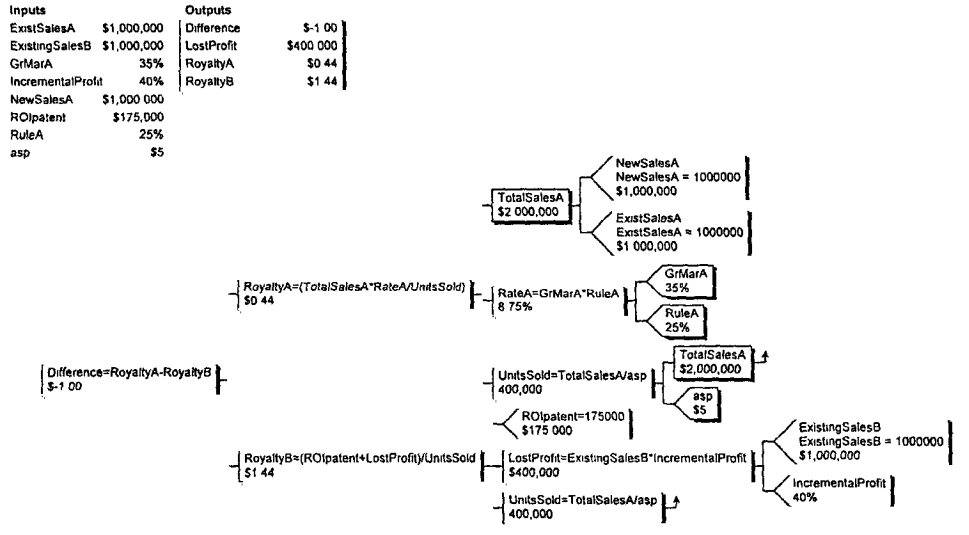
2. Scenario 2, shown as Exhibit 3, represents the final position reached by the two parties after bargaining, introduction of new information and compromising on initial positions.

3. Scenario 3, shown as Exhibit 4, represents the final position reached by the two parties using Monte Carlo simulation.

B. Scenario 1 Results

Scenario 1, shown as Exhibit 2, is the starting point in the negotiating position of the two parties. The top part of the diagram shows the position of the Infringer (licensee) and calculates its "willingness to pay" a reasonable royalty. The bottom half of the diagram calculates the patent holder's "willingness to accept" a reasonable royalty.

Exhibit 2 -- Scenario 1 Initial Negotiating Positions



The model, as executed in Scenario 1, shows that Party A is willing to pay a royalty rate of $0.44 per unit sold. This amount was determined within the model as follows:

1. Party A anticipates sales of 400,000 units at $5.00 per unit.

2. Half the sales will come from entirely new customers and half from Party B's existing customers.

3. Party A will pay 25 percent of its gross margin (estimated at 35 percent) as a royalty rate.

Party B, on the other hand, has determined that it requires a royalty rate of $1.44 per

unit. This amount was determined within the model as follows:

1. Party B wants a return of $175,000 for the investment in its patent.

2. Party B anticipates losing sales to Party A from its existing customers in the amount of $1.0 million, and wants to recoup the lost profits on those units. Party B estimates that its incremental profit rate is 40 percent, thus its loss is $400,000.

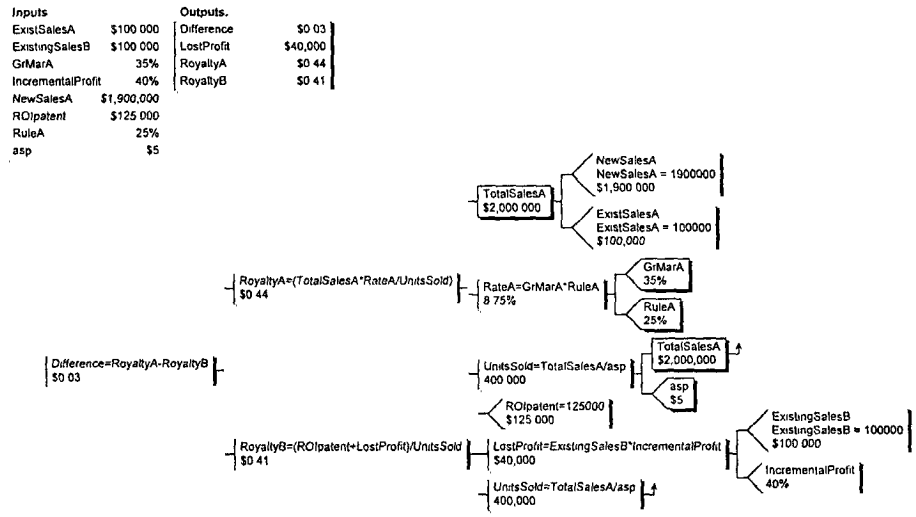
The two parties are far apart since Party A is willing pay $0.44, however Party B wants to receive $1.44 per unit. If the two parties remain at this position they are unlikely to ever reach a voluntary agreement.

C. Scenario 2 Results

In order to reach a mutually acceptable agreement the parameters have to change with the result being a decrease in the difference between bid and ask prices for the license. Any one, or combination of variables can be the agent of change during subsequent negotiations between Parties A and B. For example, Party A could change its expected sales figures for total sales, new sales, and the expected amount of cannibalization of Party B's sales. One or both parties could change the amount of gross margin they would consider appropriate for a license fee. In fact, both parities are free to discuss and negotiate over any of the model's inputs.

In Scenario 2 (Exhibit 3) the difference in bid and ask prices has virtually disappeared by changing some key assumptions. For this second scenario, shown in Exhibit 3, Party A has reviewed its estimate of new and existing sales, and has revised its marketing program to target only new customers, for example by concentrating on international, rather than domestic sales. Now most of Party A's anticipated sales are allocated to entirely new customers. Therefore, in light of this new information, Party B has revised its own estimate of its expected loses from its existing base of customer in line with Party A's new forecast. Party B has also lowered its required return on its investment in patent development from $175,000 to $125,000. These two modifications have narrowed the difference between the bid and ask positions of the two firms. Thus it is quite likely that with these modifications from their initial positions they will reach an agreement on a license rate of about $0.45 per unit, or nine percent of the selling price. By negotiating and introducing new information the parties have gone from irreconcilable differences to a zone of commonality of interests.

Exhibit 3-- Scenario 2 Revised Negotiating Positions

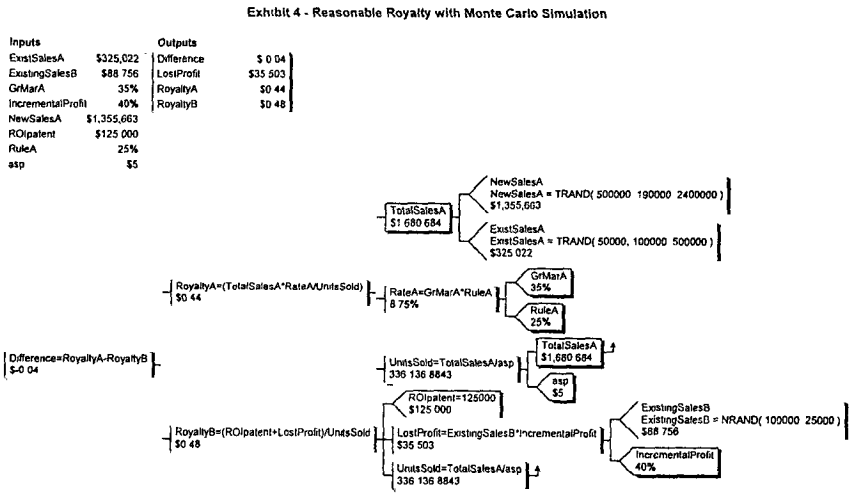


D. Sensitivity Analysis

Once the model is complete and operational, the user can subject it to a variety of analyses to determine how sensitive the results are to input assumptions. Simulation allows a variety of sensitivity analyses wherein one or more variables can be altered, one at a time or severally, and the results analyzed. The extent of sensitivity analysis is at the user's discretion.

E. Monte Carlo Simulation

The new breed of simulation modeling programs has features that allow the use of Monte Carlo simulation in the model and enable the user to introduce uncertainty and probability into the process. Monte Carlo simulation permits the user to replace uncertain quantities in the model with ranges or "fuzzy" numbers, then evaluate how that uncertainty affects the results. Monte Carlo simulation also provides information about the range of possible outcomes, such as best or worst cases and most likely. Royalty negotiations entail many unknowns; such as forecasting how many units will be sold and to which sets of customers. Also the acceptable percentage of gross margin a firm may be willing to expend may be expressed as a range rather than an exact number.



F. Scenario 3 Results

Exhibit 4 shows the same model with the same decision rules, but with inputs for new and existing sales expressed as probability distributions rather than discrete numbers. For example, in Scenario 3 (Exhibit 4) Party A has determined that its best estimate of new sales to exclusively new customers would be within a range with a triangular distribution with a low of $500,000, high of $2,400,0000 and $1,900,000 as most likely. Party A has also estimated that sales to existing customers would also be a range with a triangular distribution with a low of $50,000, a high of $500,000 and $100,000 as most likely.

In Scenario 3 Party B has done its own independent estimate of sales by Party A to its existing customers and determined that the most likely range is a normal distribution with mean of $100,000 with standard deviation of $25,000. The model is then executed using the estimated ranges of vales from both parties as inputs. In this case the simulation is conducted 500 times, and the results shown as probable values. The difference (in bid and ask rates) is calculated at 4¢ in this scenario, well within the zone of commonality of interests. Other variables expressed as ranges and distributions will produce other outcomes. The amounts shown in the input nodes of the Monte Carlo diagram for the new and existing sales variables are the most likely values for these variables given the ranges and distributions involved.

G. Simulation as Opposed to Speculation

It is possible that opposing counsel will object to the use of computer simulation on the grounds that it is speculative This argument may have some grain of truth since the simulation process is being used to make statements about what might have been. However, there are two rebuttals to this objection; one general, and one specific to this issue.

The general rebuttal is that computer simulation is an accepted component of modern management science, and is in wide use in scientific experimentation, military applications

and business planning. Computer simulation is used to test drugs, medications and treatments for a variety of conditions and diseases. Computer simulation is used to test and evaluate weapons. Businesses use computer simulations in securities trading, product design, and market research. Even though computer simulation is not the "real thing" it is widely used because it is often the best way to analyze or evaluate a proposed product, process or idea. Therefore, it is only logical that this important analytical tool may have some applicability to litigation. There is no *a priori* reason that computer simulation should not be considered along with any other relevant evidence.

A more specific refutation of the speculative objection is the fact that computer simulation is consistent with the spirit of *Georgia Pacific*, which requires "speculation" on how the two sides might bargain with each other to determine a reasonable royalty. The court requires that the parties contemplate (speculate upon) what they might have done for something that they obviously failed to do in real life. In fact, the use of computer simulation provides more structure and rigor in re-creating hypothetical negotiations than thinly substantiated expert testimony. In addition, the simulation process, if properly applied, will provide both sides with an understanding of the conditions under which good faith negotiations might have occurred, and the range of the differences between them. It can elucidate the problems and opportunities facing each party.

VII. Conclusions

Evaluating what two parties in a litigation situation might have done in hypothetical negotiations is obviously speculative. It is impossible to say with absolute certainty what the parties would have agreed to as a reasonable royalty rate if they had actually negotiated. However, in this kind of litigation the courts require an answer, and the expert must use professional judgment.

This paper has demonstrated how reasonable royalty negotiations can be treated as a game, subject to computer simulation, using a desktop-modeling program. The opportunities and constraints involved in the negotiation process were converted into decision rules with enough specificity to be modeled. The model was executed and refined in a manner to elucidate the conditions under which negotiations are or are not feasible. Modeling was used to develop a zone of commonality of interests wherein a mutually acceptable royalty rate could be evaluated.

The simulation model was used to reconstruct and discuss a hypothetical situation in the absence of empirical data. Fortunately, the model provides a structure to make such speculations plausible. This technique appears to be effective in situations that call for speculation on what might have happened had the parties bargained in good faith.

However, a caveat is in order. As with any model this simulation of the reasonable negotiation is only as good as the quality of its inputs. Where the inputs are insightful and based on accurate historical data and good forecasts, the result should be reasonable. However, when the inputs are substandard, the GIGO problem presents itself.

A. Postscript

When an attorney or judge in court asks the expert that prepared this simulation, "Sir, what in your expert opinion is a reasonable royalty in this case, and on what do you base

your opinion?" Our expert can say with confidence, "Nine percent, Your Honor, based on my computer simulation." And our expert may just be right.

References

Bierman, Harold Jr., Charles P. Bonini and Warren H. Hausman, Quantitative Analysis for Business Decisions, Irwin (Homewood, IL 1992).

Davis, Roscoe K., Patrick G. McKeown and Terry R. Rakes, Management Science: An Introduction, (Kent Publishing Company, Boston, MA, 1986.

Degnan, Stephen and Corwin Holton, "A Survey of Licensed Royalties," *Les Nouvelles, Journal of the Licensing Executives Society,* Volume XXXII, No. 2, June 1997, pp. 23-40.

Dixit, Avinash K. and Barry J. Nalebuff, Thinking Strategically: the Competitive Edge in Business, Politics and Everyday Life, 1991, W.W. Norton & Company (New York, NY).

Eppen, G.D, and F. J. Gould and C.P. Schmidt, Introductory Management Science, Fourth Edition (Englewood Cliffs, NJ 1995).

Frank, Peter B. and Michael J. Wagner, "Patent infringement Damages," in Roman L. Weil, et al, *Litigation Services Handbook The Role of the Accountant as Expert*, (John Wiley and sons, New York, NY, 1995) pp. 17-1 to 17-20.

Goldscheider, Robert, "The Art of Licensing Out." Les Nouvelles - Journal of the Licensing Executives v19.2, June 1, 1984, PP 84-89.

McGavock, Daniel M., David A. Haas and Michael P. Patin, "Factors Affecting Royalty Rates," *Les Nouvelles Journal of the Licensing Executives*, June 1992, pp. 46-54.

Parr, Russell L., Intellectual Property Infringement Damages: A Litigation Support Handbook, John Wiley & Sons, 1993.

Parr, "Russell L, Investment Risk and Royalty Rates", *Licensing Economics Review*, January 1995, pp. 23-31.

Pincus, Laura B., "The Computation of Damages in Patent Infringement Actions", *Harvard Journal of Law and Technology*, Volume 5, Fall Issue, 1991, pp. 95-143.

Smith, Gordon V., "Licensing Economics", *The Licensing Journal*, October 1994, pp.1-3.

Von Neuman, J. and O. Morgenstern, Theory of Games and Economic Behavior, (Princeton University Press, 1944).

Appendix

Several desktop modeling programs are available in the market. The following is a list of some of the products and companies distributing desktop modeling programs. These companies will send a free evaluation edition of their software upon request.

Program name -- Decision Pro
Vanguard Software
Chapel Hill, North Carolina
800-538-8173

Program name --I Think
High Performance Systems, Inc.,
45 Lyme Road - Suite 300
Hanover, NH 03755
800-332-1202
Fax 603-643-9502

Program name -- Analytica Visual Modeling Tool
Lumina
59 N. Santa Cruz Avenue – Suite O
Los Gatos, CA 95030
Tel 408-354-1841
Fax 408-354-9563

Program name -- Extend Performance Modeling
Imagine That, Inc.
6830 Via Del Oro, Suite 230
San Jose, CA 95119-1353
408-365-0305
Fax 408-629-1251

THE ECONOMICS OF OWNERSHIP RIGHTS IN VALUING MINORITY INTERESTS

by

Tyler J. Bowles and W. Cris Lewis*

I. Introduction

An area of increasing tax litigation involves the use of limited partnerships (LPS) and similar entities[1] to achieve discounts (i.e., minority interest discounts) from the value of ownership interests gifted or bequested. According to the IRS, "14 percent of gift and estate tax returns under examination involved family limited partnership issues" (*The Wall Street Journal*, p. A-1, Sept.16, 1998). A significant number of these returns are being challenged on the valuation issue. Consequently, economists and other financial professionals who calculate minority interest discounts are likely to have to support their valuation in an adverse atmosphere.

Unfortunately, economists have not developed a rigorous economic model for valuing minority interests.[2] It is certain however, that any approach or methodology for valuing minority interests should focus on ownership rights of minority interest holders. The purpose of this paper is to delineate important ownership rights and explain the degree to which a limited partner or a member of a limited liability company may possess a particular right. Furthermore, a tax case that focuses on ownership rights is analyzed. Taking the point of view of the Tax Court, this case illustrates the importance of ownership rights in determining an appropriate minority interest discount.

The paper is structured as follows: Section II provides background on the minority interest discount issue and outlines two general approaches in valuing minority interests. Section III identifies important ownership rights and the degree to which a limited partner or member of a limited liability company may possess a particular right under the *Revised Uniform Limited Partnership Act* and the proposed *Uniform Limited Liability Company Act*. Section IV provides a case study and, a short summary is presented in Section V.

II. The Value of a Minority Interest

The courts have long recognized that minority or noncontrolling shareholders are in an inferior position, and, consequently, the value of their ownership interest may be less than a pro rata share of the total value of the company. (See, for example, *Estate of Hoover v. Commissioner*). For estate and gift tax purposes, therefore, taxpayers have available a

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[1] Limited liability companies (LLC) are similar entities and are growing in popularity.

[2] We are indebted to an anonymous referee for noting that there is ". . . the lack of a compelling economic model that tells us how to value even an *idealized* firm with minority interest holders."

minority interest discount (i.e., a discount from a pro rata share) when the transferee of the property receives a minority interest. *Rev. Rul 93-12* makes it clear that such discounts are available even for transfers between family members.

Two methods are suggested for valuing minority interests: (1) a comparative company approach, and (2) the discounted cash flow (DCF) approach. The IRS apparently prefers the former (see *Rev. Ruling 59-60*), although in many instances it may be difficult to apply the approach for lack of comparative company information.[3] A DCF approach has strong theoretical support but also may prove difficult to apply when valuing the unique ownership interests being conveyed in limited partnerships and limited liability companies. A focus on ownership rights should be part of either approach.

A. Comparative Company Approach

The comparative company approach is applied by identifying a comparative company, calculating selected ratios from the comparative company's historical financial statements and trading prices (e.g., price per partnership unit/net asset value of partnership), applying these ratios to the company being valued, and determining the amount, if any, of other possible discounts. For example, assume a publicly traded limited partnership engaged in hog production that has net assets of $100,000,000 and has 10,000 limited partnership units. Moreover, assume that each partnership unit is trading in the market for $7,500. This may indicate that for an LP engaged in hog farming with net assets of $10,000,000, each one percent limited partnership ownership interest is worth $75,000, without giving any consideration to discounts for lack of marketability.[4]

B. A Discounted Cash Flow Approach

The DCF approach is based on the principle that the value of an ownership interest in a firm equals the discounted value of cash flows paid out by the firm to the holder of that ownership interest. Cash flows paid out by an LP or LLC will come in the form of profit distributions, liquidating distributions, and/or proceeds from the sale of the ownership interest. In valuing a minority interest, careful consideration must be given to the control

[3] In *Jung v. Commissioner*, the Tax Court rejected valuations based on the comparative company method. Mrs. Jung held a minority interest in a closely held corporation engaged in the manufacture and marketing of elastic textile goods. Financial information from comparably sized companies in the elastic textile industry was used in the valuation of Jung Corporation. The Court rejected this approach because the "comparable company" did "not have the same product mix."

[4] It is possible that the partnership agreements and associated ownership rights of the two limited partnerships are so different that the fact that they are both engaged in a similar activity (i.e., hog farming) is of minimal value in assessing the value of a minority interest.

(or lack of control) that the minority interest holder has over these cash flows.[5] Lack of control over cash flows is the fundamental support for a minority interest discount claim. The degree of control over cash flows held by a particular minority holder will depend both upon the type of entity (e.g., LP or LLC) and the details in the operating agreements.

When valuing a minority interest in an LP or an LLC using either the comparative company approach or the DCF approach, the appraiser should evaluate the ownership rights held by the minority owner. A credible minority interest discount report should include a discussion of the ownership rights being conveyed, perhaps with a comparison to the ownership rights conveyed in a minority interest discount already accepted by the court or to the ownership rights held by the owners of the publicly traded partnership if the comparative company approach is being utilized.[6]

III. Ownership Rights

For LPS and LLCs, state law provides the general nature of ownership rights. Specific partnership agreements, articles of organization, and/or operating agreements provide the rest of the details. However, to limit the use of achieving large minority interest discounts through operating agreements that severely limit the rights of limited interest holders, the IRS has provided additional guidance in sections 2703 and 2704 of the code. For example, Sec. 2704 limits the use of agreements concerning liquidation rights that are more restrictive than governing state law. Sec. 2703 limits the use of buy/sell agreements that do not have a bonafide business purpose, are devices to transfer ownership interests to family members for less than fair market value, and are not comparable to those entered into through arms' length transactions.[7]

[5] A discount for lack of marketability is closely associated with, but conceptually distinct from, the discount for owning a noncontrolling interest. Restrictions on the ability of an owner to convert an ownership interest to cash (i.e., sale of ownership interest) are more closely related to the concept of a discount for lack of marketability. However, to avoid the subtleties involved in distinguishing between these two overlapping discounts, herein we use the term minority interest discount to mean the discount from a *pro rata* share of the value of the net assets of an entity necessary to reflect the inability of a minority interest portion or member to influence cash flows either as a return to his ownership interest or liquidation or sale of his ownership interest.

[6] Partnership Profiles, Inc. (1997) publishes a bimonthly report that tracks sales of publicly traded partnership interests and provides financial statements and related information

[7] The appraiser faces a dilemma if the partnership agreement, or buy/sell agreements of the partnership being valued, contains provisions that would be questionable under Sections 2703 or 2704. If the appraisal is for tax purposes, the appraiser should obtain a legal opinion on questionable partnership agreement or buy/sell provisions. Provisions that do not meet the Section 2703 or 2704 test, should be ignored.

The ownership rights deemed to be more closely associated with the ability to control cash flows include the right to (1) participate in day-to-day management, (2) determine the timing and amount of interim distributions, (3) dissolve the entity, (4) transfer ownership interest, and (5) withdraw from the entity. The following section reviews the degree to which a limited partner or member of a limited liability company has these rights.

A. Ownership Rights of a Limited Partner

Except for Louisiana, all states have adopted with some modification the *Uniform Limited Partnership Act* (*ULPA*), or the Revised *ULPA*. As a general rule, a limited partner may not participate in the *control of the partnership* without losing his limited partnership status. In *Ahrline v. Daines*, the court noted that a limited partner does not have "the power to interfere in the conduct of the partnership business or to surreptitiously devise a scheme to direct the assets from the partnership so as to deprive the general partners of their interest."

A limited partner has a right to a share of profits (see Revised *ULPA* §305). The details concerning each partner's share and timing of distributions are left to the partnership agreement. Hence, the partnership agreement and history of distributions should be carefully reviewed. In general, given the general partner's operating control of the partnership, limited partners are likely to have little control over the amount and timing of profit distributions.

Under the *ULPA*, a limited partner's withdrawal does not cause a dissolution unless there is only one limited partner and generally provides that a limited partner has the right to dissolve the entity only through a court order (§10(1)c). Hence, a limited partner is severely limited in his access to cash flows or other property distributions as a result of dissolution.

A limited partner has the right to assign his interest in the partnership. The assignee receives the right to the assignor's share of partnership profits (*ULPA* §19(1)). Generally, the assignee does not become a limited partner without the consent of all partners, although the partnership agreement may specify otherwise. This ownership right provides some control over cash flows—the revenue from selling (assigning) the partnership interest.

The *ULPA* does not define the right of a limited partner to withdraw, but the Revised *ULPA* gives a limited partner the right to withdraw upon six months notice (Revised *ULPA* §603). The withdrawing partner has the right to receive his contribution to the partnership only if the partnership has sufficient assets to pay all partnership creditors (*ULPA* §16(1)(a). "Partner's contribution" refers to the amounts contributed to the partnership, not the balance in the partner's capital account that would include the cumulative effect of losses and undistributed profits. The right to withdrawal and the associated amount of contributions provides some information regarding the value of a particular partnership interest. An analysis of the amounts and timing of contributions should be included in a minority interest discount report.

B. Limited Liability Companies

All fifty states have adopted legislation providing for limited liability companies (LLC). There currently is no uniform limited liability company act, although one has been proposed. For a detailed analysis of the rights of a member of an LLC, we use the proposed

Uniform Limited Liability Company Act (*ULLCA*).

Two alternatives are available for managing an LLC-member managed or manager managed. In a member-managed firm, ". . .each member has equal rights in the management and conduct of the company's business"(*ULLCA* §404(a)(1)). This is fundamentally different than in a limited partnership. In a manager-managed entity, ". . .the managers have the exclusive authority to manage and conduct the company's business" (*ULLCA* §404(b)(1)). The managers, however, must be appointed by the consent of the majority of the members (*ULLCA* §404(b)(3)(I)).

The *ULLCA* §404(c)(6) requires that all members must consent to an interim distribution. However, this provision is likely to vary from one LLC to another. Hence, the LLC articles of organization, operating agreement, and historical actions should be considered carefully when determining the ability of a particular member to influence interim distributions.

The limited liability company acts in many states and the operating agreements associated therewith have been drafted to ensure that the entity so organized fails the corporate attributes of "free transferability of interest" and "continuity of life." Utah law, for example, provides that an LLC can be dissolved upon agreement by members entitled to receive a majority of the profits. (The *ULLCA* has a similar provision.) A provision of this kind generally gives a member of an LLC greater ability to dissolve an LLC than is true of the ability of a limited partner to dissolve an LP through obtaining a court order.

Under Utah law, the assignee of an LLC interest can become a member only with the consent of the nontransferring members entitled to receive a majority of the nontransferred profit (*Utah Code* §48-26-131). Recall that the default rule under the Revised *ULPA* is that for an assignee to become a limited partner, all partners must consent (Revised *ULPA* §§301(2) and 704). In practice, however, the partnership agreement may allow substitute limited partners without the consent of other partners and, hence, limited partners may come and go rather freely. Given the flexibility allowed by both types of entities regarding ownership transfer, it is difficult to provide a general rule on which type of entity is more restrictive on this ownership right. Careful attention must be given to the state law under which the entity was created and especially to the specific operating (partnership) agreement.

In general, the right to withdrawal from an LLC will be similar to that right held by a limited partner. Also, as a general rule, either will be able to withdraw and receive back their contributions if the financial position of the entity so provides.

Table 1 provides a summary of the ownership rights of a limited partner compared to those for a member of an LLC. In general, limited partners will have less control over cash flows than members of limited liability companies. Hence, larger minority interest discounts should be available through the use of a limited partnership rather than a limited liability company.

Table 1 Ownership Rights of Limited Partners Versus Limited Liability Company Members

Ownership Rights	Limited Partner	LLC Member
1. Participate in day-to-day management	no	Yes, if member-managed No, if manager-managed *
2. Determine timing and amount of interim distributions	Partial	Partial **
3. Dissolve entity	Partial	Partial (but generally greater than limited partners)
4. Transfer ownership interest	Partial	Partial
5. Withdrawal from entity	Partial	Partial

* A member may be appointed manager in a manager-managed firm.

** LLC members generally would have greater control over distributions in a member-managed LLC than limited partners in a limited partnership.

IV. Case Study

The facts and analysis contained in *Moore v. Commissioner* provide a useful guide to the ownership issues involved in determining an appropriate minority interest discount. The Moores operated a family partnership engaged in farming in Colorado. They, and the IRS, agreed that the net asset value of the partnership was $7,386,000. The parents made gifts of less than a 1 percent interest in the partnership to children, and claimed a 40 percent discount from the pro rata share value of each partnership interest given. The IRS responded that a 10 percent discount was more appropriate. The Court ruled that 35 percent was the correct discount.

The partnership's expert focused on an exhaustive list of ownership rights and the degree to which minority partners lacked a specific right. He also provided empirical evidence on minority discounts given to buyers of publicly held corporations and real estate partnerships. Finally, he considered the previous sale of a minority interest in the Moore partnership back to the partnership.

The report of the expert for the IRS looked almost exclusively at the withdrawal provision of the Moore partnership agreement. The Court was critical of the narrow focus of the IRS expert's analysis and, hence, the discount allowed was much closer to that requested by the partnership.

In arriving at its decision, the Court paid close attention to the partnership agreement and underlying state law. Regarding the first ownership right listed in Table 1, the Court noted that although the minority partners had a vote in selecting the managing partner and other management issues proportionate to their partnership interests, minority partners did not have ". . .much of a voice in management."

It is worth noting that the Moore partnership was a general partnership and, hence,

minority partners would have greater access to management control than typical limited partners. Regardless of this fact, the Court found a 35 percent discount reasonable—due in part to lack of control over day-to-day management.

Now consider ownership right number two from Table 1. In the Moore partnership, each partner could, at his own discretion, take a draw from the partnership. Draws, of course, were deducted from the partner's capital account, which had to have a positive balance in order to take such a draw. Limited partners would not have this degree of control over cash distributions.

Concerning ownership right number three, the Moore partnership agreement provided that it would have taken a majority of partnership interests so electing to dissolve the entity. Thus, minority partners at least had a vote on dissolution. Limited partners probably would not have such a vote.

Regarding ownership rights number four and five from Table 1, the Court noted that the Moore partnership agreement stated that a partner could assign his interest or withdraw from the partnership only with the prior written consent of all remaining partners. The Court went on to note that whether or not these provisions of the partnership agreement were enforceable under Colorado law, ". . .a hypothetical buyer would pay less for the partnership interests either because he felt that the provisions in the agreement limited his ability to transfer his interests or because even if the limitations were not binding, he might have to litigate the issue."

V. Summary

Limited partnerships, limited liability companies and the associated concept of minority interest discounts are topical in the estate tax and business valuation arena. Unfortunately, however, there is not a rigorous, generally accepted economic model available for use in valuing minority interests. This paper contends that any approach to valuing minority interests should focus on ownership rights as outlined in Table 1.

Analysis of a tax case in which the court concentrated on ownership interest was provided. In the Moore case, the minority partners had more control over cash flows than would a limited partner or a typical member of an LLC. Nevertheless, the court granted a 35 percent discount. Experts involved in this interesting area of litigation should make an analysis of ownership rights the keystone of their valuation report.

References

Articles

Tax Report, *Wall Street Journal*, September 16, 1998, p. A-1.

Court Cases, Tax Code, and Administrative Pronouncements

Rev. Rul. 93-12, 1993-1 C.B.
Rev. Rul. 59-60, 1959-1 C.B.
Ahrline v Daines, 567 P. 2d 1120, 1124 (Utah 1977)
Estate of Hoover v. Commissioner, 69 F. 3d 1004 (10th Cir. 1995).
Jung v Commissioner 412 T.C. 412, 433 (1993).
Internal Revenue Code of 1986.
Moore v. Commissioner 61 T.C.M. (CCH) 546 (1991).
Uniform Limited Partnership Act, National Conference of Commissioners on Uniform State Laws.
Revised *Uniform Limited Partnership Act*, National Conference of Commissioners on Uniform State Laws (1994).
Uniform Limited Liability Company Act, National Conference of Commissioners on Uniform State Laws (1995).
Utah Code, *Utah Limited Company Act*.

Reference Materials

Partnership Profiles, Inc., *Partnership Spectrum*, Dallas, Texas, (bimonthly); and *Special Addendum Covering Real Estate Partnerships Included in the 1997 Partnership Re-Sale Discount Study Published by Partnership Profiles, Inc.*, 1997.

Working Together: Some Practical Advice for Lawyers and Forensic Economists

by

Dr. Kent Gilbreath and Robert B. Gilbreath, J. D.*

The process of assessing and estimating damages in cases involving economic loss is under intense scrutiny in American society today. There is a heightened sensitivity among lawyers to focusing on "reasonable probability" when testimony is presented concerning damages. The "go-for-the gold" approach in presenting testimony for claims of economic loss is giving way to a much more careful assessment of damages and a clear and understandable presentation of the legitimacy of damage claims.

Careful selection of an economics expert who can help identify damages and prepare well-supported, believable reports on the measurement of damages has never been more important. The days of shopping for an expert who will say whatever a lawyer wants him to say is increasingly becoming the approach that is sure to backfire on a lawyer, perhaps resulting in the lawyer's winning the liability but losing the damages. While there are economic bonanzas like the McDonald's spilled-coffee case, more and more of the bread and butter liability cases of plaintiffs' attorneys are being presented to jurors who are skeptical about claims of large economic losses and who demand more proof of the legitimacy of economic damages.

I. Selecting an Economics Expert Witness

Envision a trial wherein a lawyer has completed the presentation of his arguments concerning the liability in the case. He did a good job; the jury's body language suggests sympathy for the client and empathy with the lawyer. The last witness is called to take the stand. A distinguished looking person approaches the witness stand, stands upright, swears to tell the truth, and takes his seat with a look of seriousness and respect for the process that is about to begin. It is evident that the testimony of this witness may have a crucial impact on the jury's deliberations and the outcome of this case.

In this context, the expression "courtroom drama" is not inappropriate. Hollywood and television may have made the players in the drama appear to be more beautiful or handsome and appear to be leading more complex personal lives than the real-life "actors" in the courtroom; still, no one who has participated in a trial where lives have been damaged or destroyed and millions of dollars are at stake can deny the intensity of the emotions in the courtroom and the seriousness with which the majority of the participants approach the process.

When the distinguished economics expert who has taken the stand to give

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testimony that the damages being sought by the plaintiff are unquestionably justified or, if testifying for the defense, that the damages sought are exaggerated and in no way reflect the economic losses suffered by the plaintiff, the wisdom of the lawyer who has employed the economics expert will be apparent to everyone in the courtroom. In other words, in addition to the obvious requirement of finding expertise in a complicated field, the lawyer must also be something of a theatrical casting director, a psychologist, and an excellent judge of character when he selects an economics expert to bring closure to the goal of almost every civil action--proving the legitimacy or illegitimacy of the damages sought in the case.

A. Professional Qualifications

When selecting an economics expert, look first at the professional qualifications of the witness: a) what is his educational background--what degrees does he hold; b) what is the witness' publication record; c) what honors has the witness received; d) what positions has he held both in terms of employment and public trust; and e) what are the witness' lifetime accomplishments in general?

Do not assume that the same academic credentials, which give prestige to the economist among his peers, will be equally impressive to juries in your region. In fact, degrees from prestigious but remote universities may not be as well received as degrees from state or regional universities with which the jury is more familiar and for which they are likely to have more trust and respect than more distant academically prestigious universities.

Generally, a Ph.D. in economics will provide a sufficient education in economic theory, statistics, and the other analytical tools necessary for doing forensic economics analyses. However, experience in business consulting and, of course, previous trial experience are invaluable in important cases. A highly skilled economist does not always make a good expert witness. Educational background provides only an initial guide to finding a competent forensic economist.

In addition to being a skilled economist, the economics expert must exude confidence, be empathetic, sincere, and convincing. He must be able to explain difficult economic concepts in simple, concise, ordinary English and, most importantly, present a creditable report backed by reasonable economic assumptions.

B. References

How does an attorney find this perfect witness--this embodiment of intellect, charisma, virtue, and honesty? It's not easy. When selecting an economics expert, the attorney should always ask the economist for names of other attorneys he has worked for in the past, and then take the time to call these attorneys and ask about the quality of the economics expert's work. The inquiring attorney should ask his colleagues whether or not the expert was a believable and persuasive witness, whether he alerted the attorney to weaknesses in the economic report, pointed out potential cross examination questions for which redirect questions would be needed, and, finally, whether the attorney would hire the economics expert again. (Nagin, 37)

C. Oral Presentation Skills

Ideally, an economics expert would never be employed unless the attorney has had a face-to-face meeting with the expert. The single most important element that gives every economic appraisal its value in court and its influence on the judge and jury is the clarity and believability of the expert witness. In interviewing the economics expert, listen to determine if he speaks clearly and audibly. In dealing with juries, oral impressions are of great importance. If the economist speaks too rapidly, has a strong non-regional accent, or is prone to extensively use professional jargon, he may not be a suitable witness despite having a good knowledge of the subject matter.

Less easy to explain, but no less important, is the need to determine if the economist's spoken thought patterns are easy to follow. Perhaps the easiest way to understand this skill is for the attorney to recall the differences between professors who were effective in teaching graduate level classes compared to those professors who were more effective in teaching undergraduate classes. The economist will be explaining complex issues to a group of men and women who, more than likely, have never had a course in economics. For this reason, the forensic economist who is accustomed to teaching undergraduates or speaking before the general public may be a more effective communicator on the witness stand than the economist who is accustomed to teaching graduate level economic theory classes or conducting seminars for professional investment managers.

As you visit with the economist, listen to see if his conclusions about issues are plausible, logically explained and supported with clear, persuasive reasoning. Also, raise some questions that touch on ethical issues and test whether or not the expert seems to have a "flexible conscience". If his conscience seems to be flexible, his ethical standards unclear, and if he is willing to say whatever you want said, this person is not the witness you need.

D. Personal Appearance

Appearance is important. In describing the perfect profile of expert witnesses, one lawyer said that "they should be middle-aged, wear glasses, dress in a dark suit, and carry a briefcase." However, what constitutes an effective appearance for an expert witness will vary from region to region in the country. In some jurisdictions, an economist who shows up wearing a dark pin-striped suit and looking like the banker who just repossessed one of the juror's cars may doom your case! An experienced economics expert will be sensitive to the dress that is appropriate for your community, and, if smart, they will dress that way when they come to an interview with you.

Effective appearance, however, goes beyond simply the attire of the witness. Here is a tip: when you interview the economics expert, provide him with a rocking, swivel chair and observe whether he swings and rocks in the chair while talking to you. Many witness chairs are rocking swivel chairs, and a witness who is "in motion" while giving testimony will distract the jury from what is being said. Also, notice if the witness has any other distracting personal habits such as: drumming on the table with his fingers, lecturing "to the ceiling" or speaking "to his feet," or frequently using "verbal pauses," e g., "you know," "like," "uh," or other similar verbal injections which disrupt

the flow and clarity of his testimony. Finally, evaluate the expert's posture, his facial expressions, and his effective use of eye contact with you and others in the room. All of these personal characteristics are critical in determining the witness' effectiveness in delivering testimony to jurors.

E. Credibility

Of all the factors that are important in determining the effectiveness of an economics expert's testimony, without doubt, the most important is the witness' credibility. Does the witness have the educational background and experience as a forensic economist to meet the test of expertise required by the court and expected by the jury At a minimum, economics experts should hold a Ph.D. Certainly, there are effective witnesses giving economic testimony who have not received a Ph.D. in economics; however, since there is an abundance of doctoral level economics experts who are also effective witnesses and highly experienced, why should an attorney settle for less and open the door for challenges to the credentials of his expert?

A second factor crucial to credibility is the substance and accuracy of the written report. It is inevitable that economists will occasionally make errors in their reports. The errors may be minor, and possibly irrelevant, but they will be discovered by the opposing attorneys and used to impeach the witness' testimony or to make the witness appear incompetent. Most competent economics experts will prepare preliminary reports with accompanying statements that any errors discovered will be corrected prior to giving testimony in court and that the report will be modified to reflect any new or additional information that the economist receives. Usually, working with an economist on several cases will give the attorney increased confidence in the substance and accuracy of the economist's reports. However, in every case, the attorney should review the report looking for potentially damaging errors.

Demeanor and style of presentation will also influence the economics expert's credibility with the jury. A degree of humility and honest sincerity is easily perceived by a jury. The jury does not expect the expert to know the answer to every question he may be asked. The expert should also not appear to be an unquestioning advocate for the attorney's client or case. The only advocacy that is proper for an economics expert is to be an advocate for his opinion.

During cross-examination, an economist's credibility will be strengthened by direct answers to questions and by maintaining the same tone and demeanor that was used in answering questions during direct examination. It is not necessary for the economist to be mild or meek in dealing with the cross-examining attorney; however, credibility will be enhanced if the economics expert can clearly and effectively answer with composure, questions that have been asked in a hostile manner.

Finally, the ultimate credibility of the witness depends upon the soundness and believability of the testimony he has given. If the economics expert's estimate of damages is supported by weak and highly questionable assumptions his report will not be credible, regardless of how professional the economist looks, how clearly he speaks, what degrees he has earned, or what universities he has attended.

II. Other Factors in Selecting an Economics Expert

A. Confronting the Unexpected

An effective expert witness must be able to confront the unexpected and deal with hostile questions in a concise, articulate, and professional manner while under great psychological and emotional pressure on the witness stand. It is equally important, therefore, that the attorney hiring the economics expert carefully assesses his ability to deal with uncertainty and ability to respond calmly and intelligently when confronted with the possibility of error or earlier contradictory testimony.

B. Durability and Stamina

Because cases can last several months or even years, it is important that an economics expert have the ability to resurrect a long-dormant case and revise or update his report quickly and accurately. The existence of a lengthy case means that an attorney must consider the economics expert's stamina, attention span and ability to stay focused on a case during its long gestation. Also, it is important that the attorney be confident that the economics expert will remain in business for the duration of a long litigation process.

It is equally important that the economist understand that committing to work on a case is a commitment to work until the case is finished. In the context of lengthy litigation, it is only fair that the attorney and the economist have an understanding from the beginning that if the case continues for more than a year, the fees charged by the economics expert may change.

III. When to Employ an Economics Expert

In cases involving economic loss, it is important to bring an economics expert into the litigation process as early as possible. In many cases, it may even make sense to bring the economics expert into the process well before the suit is filed. An early examination of the economic merit and potential of a case may clarify the damages issues and enhance the probability of a pre-trial settlement or the decision of the attorney to accept the case.

In cases where the liability is reasonably clear, it is especially important for an attorney to hire an economics expert as soon as possible. When hired early as a consultant, the economist can give an early estimate of the extent of damages, help identify economic materials that are necessary for the case, help select those materials which are most useful for introducing into evidence, suggest a sequence for introducing the economic evidence by relevant witnesses, help prepare questions for the direct examination of these witnesses, and help prepare direct examination questions for his own testimony should testifying become necessary.

In using this well-organized approach to evaluating damages, the economics expert is helping to make potential mountains of data and endless streams of numbers come alive as a clear and understandable depiction of the losses suffered by the client. (O'Hara, 33) The flip side of this coin, however, is that when working for a plaintiff's

attorney, the economist may also show that the damages are minimal and not sufficient to justify an extensive investment by the attorney in developing the case.

The main deterrent to the early and extensive use of an economics expert is often the costs involved. There probably is not a plaintiff's attorney alive who does not hope that he can simply file a lawsuit, make claims for damages, and then secure an early and favorable settlement of a case without any substantial investment of time or resources in developing the case. How often does this happen? Almost never. Thus, if a case is a potentially valuable one and the attorney is confident about the liability, he should not wait to hire an economics expert. The early hiring of an economics expert may be the most cost saving investment an attorney can make in preparing a case.

IV. Problems with Economics Experts

Knowing your experts is almost as important as knowing your client. There are pitfalls to watch out for in retaining and using economics expert witnesses. Being aware of these pitfalls can help avoid pre-trial surprises, courtroom catastrophes, and the accompanying sleepless nights.

Obviously, errors in reports, bias in theoretical frameworks, and client advocacy in economic testimony are always problems to be avoided by expert witnesses. Experts need to be accurate, impartial, trustworthy, and objective. Beyond these considerations, however, there are other factors an attorney must consider when hiring an economics expert.

A. Examine Past Testimony

Contradictory testimony given by an economics expert in earlier cases is one of the favorite targets of opposing attorneys. Economics experts may have stated contrary opinions in other cases or in their scholarly writings and public presentations. The past writings and testimony of potential economics expert witnesses must be carefully reviewed to see if they are consistent with the theory of damages and methodology that he is presenting in the present case.

One can be certain that the opposing attorneys will have thoroughly investigated previous testimony by the expert and will be well aware of any inconsistencies with the present report or testimony. In almost every deposition, the opposing attorneys will have copies of reports prepared by the expert for earlier cases and will explore in depth any differences that exist.

Thus, attorneys need to find economics experts who are able to effectively explain past testimony in the context of the current trial. If an economics expert does not wish to have his work scrutinized with a fine-toothed comb by opposing attorneys, he should never take the witness stand. If economics experts thought the oral examination for their doctoral dissertation was tough and challenging, just wait until they are in a deposition or on the witness stand and are confronted by a hostile, well-informed team of attorneys!

B. Changes in Testimony

In assessing economic damages, an economics expert may change methodologies and some basic assumptions over time. It is perfectly legitimate for any expert witness to adjust his approach or methodology in assessing damages when new evidence and information make that necessary.

Forensic economics is a relatively new field of expert witnessing. Every year, the forensic economics journals are full of new ideas, more sophisticated data, and improved theories and methodologies. This is true not only in the field of economics but also in medicine, engineering, and almost every other professional field. If there were never any changes in methodologies and procedures used by expert witnesses, it would imply that knowledge does not advance and that better information never becomes available. An expert witness in forensic economics, or in any other field, who never modifies his approach, is an expert who obviously is not keeping up with developments in the field.

C. Underestimating the Opposition's Economics Expert

There is a temptation sometimes for attorneys, especially those who do not have business or economics backgrounds, to underestimate the potential impact of an opposing attorney's economics expert. Nothing can be more devastating in the courtroom than the skillful eloquence of a competent expert. If the other side employs an economics expert, always take his deposition, if for no other reason than to assess his effectiveness as a witness.

D. Defense Attorneys and the Economics Expert

Historically, defense attorneys have often been reluctant to retain economics experts on behalf of their clients. I am often asked in depositions why I think this happens. The answer is simple. If a defense attorney hires an economics expert and uses that expert's testimony in court, any number that his economics expert gives concerning damages puts a bottom line on the potential award by the jury. The defense's preference, of course, is that the minimal award that the jury consider be zero. Putting their own economics expert on the stand will raise the measure of damages, in most cases, well above zero.

In an advocacy legal system such as ours, this defense strategy may make legal sense However, I find more and more defense attorneys retaining the services of forensic economists--not as expert witnesses, but rather as an economics consultant. Specifically, defense attorneys are increasingly asking economics experts to assess the legitimacy and accuracy of other economics experts' reports Did the opposition's expert use sound methodologies and accurate and appropriate data in measuring damages? Every economic report concerning damages is challengeable, and the person best able to identify weaknesses in economic reports is another economics expert.

Increased concern about legal malpractice may also be influencing defense counsels' inclination to employ their own economics experts both as consultants and as witnesses. Failures to see errors in opponents' economics reports and to point out these

errors in trial is a growing concern to defense attorneys.

V. Working with the Economics Expert

Testimony in trial is generally the last task an economist will undertake, and it is often only the tip of the iceberg of services rendered by an economics expert. The most valuable contributions of an economics expert may be as a consultant and advisor. While all attorneys are interested in the "bottom line" or total damages that the economics expert calculates, some attorneys show little interest in the methodology and theory of damages that the economist is using. This is asking for trouble, especially if the economics expert is an inexperienced witness or if this is the first time the attorney has worked with him.

A. Documentation

In working with the economics expert, an attorney should always advise the economist that any paperwork he generates and accumulates is discoverable. This should be kept in mind in dealing with sensitive materials and in preparing any speculative analyses that may not have been requested by the attorney. Periodically the attorney should review with the economist his inventory of materials and documents and carefully assess those materials which are relevant and necessary for the economics expert to do his work.

B. Too Much Information

In this context, one of the problems I have encountered in dealing with attorneys is the tendency to provide too much information--information that is not relevant to my work and is not needed to prepare an economic analysis.

One of the services that an economics expert can provide an attorney is to specifically identify those materials which are necessary and to encourage the attorney not to provide reams of materials and stacks of data that are not necessary yet become discoverable if the economist is asked to keep them in his file Also, as an expert witness, I assume the attorney wants me to be familiar with any materials that are given to me. This may mean unnecessary hours of work becoming familiar with materials I do not need but over which I can be questioned.

C. Data and Information Gathering

Economics experts have numerous data sources reflecting historical information and economic trends. However, they may also need to place the individuals or businesses they are studying in statistical cohorts. To do this, they depend on lawyers to provide them with case-specific data reflecting the unique economic characteristics of the individuals or businesses.

If the attorney gathers data concerning his client's damages before soliciting the aid of an economist, the attorney is likely to either gather more data than is necessary or fail to gather all of the relevant data, thereby increasing costs to the client unnecessarily.

If data is gathered without the assistance of an economics expert, the attorney should remember to: 1) gather data for periods of time several years prior to the incident; 2) gather specific data, e.g , income levels at the time of the incident; 3) and gather any economic data that is available subsequent to the incident and prior to the time of trial. The economist will need all of this data and can help the attorney identify and find the relevant information. Because time is necessary to prepare exhibits for trial as well as to calculate damages and to prepare testimony, waiting to bring in an economics expert in order to save money can easily be a false economy.

In order to assist the attorney in gathering the necessary information, most experienced economics experts will have prepared an information form to give attorneys which indicates the types of data they need to prepare a report. These data request forms vary in complexity. (A sample form is attached below.)

D. Keep It Simple

In all cases, from measuring the loss of a weekly wage earner's income to highly complex attempts to measure lost profits of a business, different degrees of complexity can be used in preparing the reports prepared for presentation at trial. Some economics experts prefer to use highly complex models in measuring economic losses. In some cases, complex models may be justified. Generally speaking, however, the simpler the presentation of damages in court, the more likely the presentations are to be understood by the jury. The key to being a helpful and successful witness is to be able to explain complex damages issues in a simple-to-understand manner. It is often more effective to explain losses in an uncomplicated manner during direct examination and leave the introduction of complexity to the cross-examination.

E. Precision in the Measurement of Damages

Knowing that opposing attorneys will attempt to convince the jury that the economist's testimony is speculative, imprecise, and totally hypothetical, the economist should point out during direct testimony that economic damages <u>are</u> speculative and that he do is not claiming unquestionable precision. However, he should also point out that he is there to assist the court and the jury in considering appropriate methods for measuring losses, and that he understands the jury may adjust his estimates to reflect information presented during the trial which they believe would cause the damages to be greater than or less than those shown in his report.

Admitting an inability to know precisely and without question what the future will bring can only humanize the economist's presentation. Any economics expert who would defend to the last dollar the estimate of losses in his report is an economics expert attorneys should avoid.

F. Hearsay Evidence

While a lay witness is allowed to testify only to those things which he has personally seen or experienced, an economics expert is permitted to give opinions based on evidence that might ordinarily be considered "hearsay". The ability of the expert to

use hearsay evidence is very important. Most of the data used in preparing a report is not gathered by the economics expert. He may use life expectancy tables, worklife expectancy tables, inflation rates, interest rates, and other data not personally gathered; however, this "hearsay" data may be presented in court in most cases by an expert witness.

The rules concerning the presentation of evidence are always evolving. However, Rule 703 of the Federal Rules of Evidence permits an expert to base his opinions on facts or data prepared by third parties as long as the material is generally used by other experts in the field and is compiled by reliable sources. What the economics expert does that is unique is to blend case-specific data with statistical cohort data found in widely accepted publications by government agencies and scholarly journals.

It is absolutely necessary that the economics expert be able to testify that statistical data used in his report is data that is reasonably relied on by other economics experts and is data that is generally available in the field of economics. For this reason, I prefer whenever possible, to rely on data prepared by federal government agencies, e.g., data found in the Statistical Abstract, and publications by the Department of Commerce and the Department of Labor.

Attorneys should always ask their economics expert if the approach he is using is one that is customarily used by others in the profession. Since the answer is likely to be "yes," the economist should be asked to identify professional journals which provide evidence that the methodology used in this case is widely used. If nothing else, this allows the attorney to see if the expert is familiar with the leading journals in forensic economics.

G. Assessing Strengths and Weaknesses of the Economics Expert's Reports

After the report on damages is completed and before the taking of depositions and testimony at trial, the attorney should sit down with the economics expert and ask him to point out the strengths and weaknesses of the damages report. Among other things, having knowledge of strengths and weaknesses will help the attorney assess settlement offers before the trial--both the making of settlement offers and the accepting of such offers.

While the economics expert should always be an advocate of the work he has done in measuring damages, I have never seen a case wherein certain aspects of the measurement of damages could not be challenged. Being aware of weaknesses can lead to more realistic evaluations of the potential of a case, encourage compromise, and help generate realistic settlements that can be in the interest of all parties.

In addition to assisting in settlement, knowing the strengths and weaknesses of a case will help the attorney and the economics expert prepare responses to potentially effective attacks on the damages report during cross examination.

VI. The Economics Expert in the Courtroom

As observers of courtroom proceedings know all too well, it is not uncommon for the victory in a case to go to the side making the clearest, most understandable presentation. Style without substance is usually not sufficient for success, but if there is equal substance on both sides, the victory may go to the side with the best communications skills.

A. Establishing the Witness' Expertise

In presenting the economics expert's testimony at trial, the first thing the attorney must do is establish the professional credentials of the expert. Here, the attorney must walk a fine line. In establishing the credentials of the expert, there are two temptations that the attorney should avoid. One is to skip quickly over the qualifications of the expert and move summarily to have him declared an acceptable witness in the case. Doing this may please the opposing attorney who does not want the jury to be aware of the high qualifications of the distinguished expert. A second procedure that should be avoided in establishing the expert's credentials is a dry reading of qualifications from the expert's resume followed by perfunctory questions certifying that what has been read is accurate.

Juries and even judges can develop confidence in a witness by hearing the expert's qualifications. The key is not to overstate or understate these qualifications. Generally speaking, it is not a good idea for the attorney to ask the expert to simply state his qualifications. The expert may leave out important aspects of his background due to forgetfulness or a natural modesty. It is generally best for the attorney to identify the highlights of the expert's career that he wants the judge and jury to know about, and then to lead the expert through those qualifications making sure to identify important career and educational achievements.

It is equally important not to overstate the qualifications of the expert and alienate the jury by portraying the expert as a "big shot". In establishing the economist's credibility, focus as much on the "witness" part of his title as on the "expert" part. It is always important to try to generate a good first impression of your witness, and to clearly establish his credibility in a manner that does not alienate the jury.

B. The Expert and the Jury

It is helpful to the economics expert to know something about the profile of the jury before whom he will be testifying. The attorney will have information concerning the background of the jury and should inform the economist about any jury members' special competencies or difficulties in understanding the economics expert's testimony.

In the majority of cases in which I have testified, the lawyers have provided little or no information to me concerning the jury. This is not a particular handicap given my style of testifying, which is to try to explain complex economic issues as simply as possible without "talking down" to the jury.

Occasionally, I will have an attorney tell me that there are individuals on the jury who have a particularly astute understanding of economic and financial issues.

Such knowledge gives the economics expert a bit more freedom to go more deeply into complex matters such as real interest rates, discounting and present value, or the probability of receiving benefits. However, since the majority of jurors are not likely to have a working knowledge of these concepts, the expert still has to be careful not to assume too much understanding of complex financial issues on the part of the jury.

One of the things that I particularly try to avoid is having an attorney tell me which members of the jury possess special competencies. I do not wish to know that information because I want to avoid the temptation of looking at and speaking to any particular member of the jury in a disproportionate manner during my testimony.

The attorney should remind the economics expert before giving testimony that he will be speaking to a group of average men and women who are likely to have many things on their mind besides the trial. Some may be upset about having to serve on a jury; some may be bored with the case and the economist's testimony in particular; some may be irritated by the economist's accent or by the color of his tie; and some may dislike the personality and presentation of the attorney who has employed the witness. (Wang, 30)

In other words, to be effective, an economics expert will have to win the jury's attention and somehow convince them that what he is talking about is fascinating stuff. Winning and holding the jury's attention is the art of expert witnessing.

C. Jurors' Expectations of the Expert Witness

Contrary to what might seem probable, I have found most juries to be quite interested in the subjects of income growth, benefits, the value of household services, and similar economics topics; these are matters to which they can relate personally. In any economic testimony, however, because numbers and calculations are involved, the jury can quickly lose interest. That is why it is important to present the salient parts of the damages testimony in a brief and tightly focused manner.

The importance of empathy between the witness and the jury cannot be overstated. Appropriate humor, reasonable modesty, and patience throughout the process, on the part of the witness, will help establish rapport with the jury making it more receptive to the expert's opinions. There is a fine line, however, between seeking to identify with the jury and attempting to retain a degree of formality and professional demeanor. Juries do not expect an expert to be "a good old boy." They expect the expert to be competent and clear in his presentation, while simultaneously being helpful to them as they seek to deliver justice in the case. Jurors feel a kinship with the judge and with the legal process. They see themselves as collaborators in a process of seeing that justice is done.

The economics expert, therefore, needs to keep in mind that the underlying theme crucial to success in the courtroom is that the entire process is about the quest for justice. While it is perfectly legitimate for the defense and plaintiff's attorneys to be advocates for their clients, it is equally important for the economics expert not to be seen as an advocate but rather as a contributor to the development of information that will lead to a just and fair result in the case.

It is only natural that the attorneys who have employed the economics expert will want him to be an advocate for their client. However, by becoming an advocate for

a client, the economics expert may diminish the jury's perception of his fairness and objectivity and actually hurt the case of the attorney who has retained his services.

After the trial, the attorney can determine the jury's perception of the objectivity of the expert witness by interviewing jury members. Inevitably, the expert who has rendered what is perceived to be an unbiased, objective opinion will be seen as more "believable" than an expert witness who appears to be an advocate for the attorney's client. Jurors are remarkably observant, and attorneys should always solicit their opinions about witnesses after the trial. This will help the attorney to determine whether or not he wants to use the expert witness in the future.

D. Direct Examination

The courtroom procedure for eliciting an economics expert's testimony is simple and straightforward:

- The Person

  Establish the economist's personal and educational background, current employment, and specific qualifications to serve as a forensic economist. Do not forget to elicit some personal background. If the expert is married, has children, lives in the local or a nearby community, participates in community life, and is generally familiar with the values and culture of the community, it is important for the jury to know this. Juries like to know whom the person is they are listening to.

- The Task

  Ask the economics expert what you have asked him to do in this case. This gives the economist a chance to tell the jury what he is about to explain to them and why he has examined the various topics included in his report.

- The Data

  Ask the economist what data or information he has used in preparing the report. Make sure the court record shows that the data and methodology used by the economist are materials that are customarily used by others in his profession in developing similar reports for litigation purposes.

- The Opinion

  Ask the economist to state his ultimate opinion in the case concerning the total amount of losses experienced by your client. In some manner, illustrate this total loss visually for the jury.

- The Explanation

Ask the economist to explain the process by which he derived the total losses depicted in the previous question.

E. Methods of Presenting Testimony

The method chosen to present the details of the economist's report is a matter of strategy, court requirements, and tradition within the jurisdiction. There are three basic approaches that are typically used:

- Question and Answer

  The first approach involves a question and answer process by which the attorney asks a lengthy series of questions about each stage of the report, how these stages were developed, what data was used, and how the calculations were made. This is probably the worst possible method of presenting the economist's report to the jury. It can be tedious, boring, confusing, and is just generally ineffective.

- Narrative

  The second method of presenting the report to the jury is to simply ask the economist to explain his report to the jury. In this approach, the economist may leave the witness stand and discuss a series of charts or slides showing how each conclusion was derived.

- Combination Approach

  A third method of presentation is a hybrid of the first two. In this approach, the attorney asks general questions that allow the economist to narrate the report. This is the methodology that I have found to be the most effective, because the questions establish a dialog that can make it easier for the jury to understand the economist's presentation. This method also allows the lawyer to clarify and emphasize important issues and conclusions.

In first and third above methods, where questions are asked in order to guide the direction of the economist's presentation, it may be helpful for the economics expert to write questions for the attorney to ask. There was, at one time, an expectation that all opinion evidence rendered by economics expert witnesses would be elicited by way of hypothetical questions. This requirement now seems to have been relaxed, and experts are frequently allowed to use narrative methods in presenting their reports.

Occasionally, opposing attorneys object to a narrative form of presentation. Judges sometimes sustain their objection and instruct the attorney eliciting the direct examination to ask the expert questions. Questions are typically asked for a brief period of time, and then the expert is allowed to lapse into a narrative presentation again, because both attorneys, the judge, and the jury seem to find it the least objectionable method of presentation and the most efficient and quickest way to have the content of

the report presented to the jury.

F. Asking Questions

If the attorney is forced to use questions in eliciting the economics expert's opinion evidence and the economist has prepared a list of questions for the attorney to ask, it is important that the questions be brief and that the attorney not recite them verbatim. The reading of questions does not allow the free flow of witness responses. The key to good questioning is spontaneity and interaction. Written questions should only be used as guidelines and as a method of remembering important matters that should be brought to the jury's attention.

In asking questions of the economics expert, a lawyer should ask them as clearly and simply as possible. The use of complex, compound questions full of legalisms and hypotheticals, will frustrate the jury, confuse the witness, and be generally ineffective. For example, consider the following passages, which are asking the same question:

- "With respect to the plaintiff's earning capacity pre- and post-injury, do you have an opinion with regard to the comparison of the respective incomes?"

- "How does the defendant's income before the accident compare to his income after the accident?"

There is no substitute for experience in learning to ask effective questions and no substitute for experience in giving understandable, clear responses on the part of the witness

G. Order of Presentation of the Economics Expert

Ordinarily, the economics expert will be the last, or one of the last, witnesses appearing in direct testimony by a plaintiff's attorney. There are several reasons for this. First, the economist's testimony is, in many ways, a summary of the financial impact of the liability testimony that has been previously presented. Second, the economist's testimony will be opinion testimony that is predicated somewhat on the evidence that has previously been presented in the trial. Using the economics expert as a lead off or early witness dramatically diminishes the impact of his testimony. A plaintiff's attorney usually wants the last thing the jury hears to be the dollar value of losses suffered by his client.

H. Concluding the Direct Testimony

The attorney must remember to offer into evidence all reports, charts, and other exhibits used by the economics expert. It is extremely valuable for the jury to have the reports and charts in the jury room with them so that they can refer to them during their deliberations.

- Distributing Reports to the Jury

  I have found it preferable to take twelve copies of my report to the courtroom and have my attorney seek to have them distributed to the jury. This allows the jury to follow my presentation of numbers--numbers that in some courtrooms may not be easily seen when displayed at a distance. Often, the view from certain seats in the jury box is not good for seeing charts and slides. Also, some members of the jury may have 1) forgotten their glasses, 2) taken their contact lenses out, or 3) simply prefer not to wear glasses in public.

  Problems as simple as these can substantially diminish the visual impact of the economics expert's report. Thus, placing a copy of the report in the jury's hands allows them to be better informed and to more attentively follow the presentation of the economist.

- Total Damages

  At the end of his direct testimony, the economist should be asked if his report contains an estimate of all of the damages that have been experienced by the client. The answer is no.

  Economists are not likely to testify about the value of damages related to physical pain, mental anguish, lost love and affection, and other intangible losses. The jury will have to wrestle on their own with determining the value of any intangible losses.

- Reasonableness of the Report

  On more than one occasion, but especially toward the end of the expert's testimony, the attorney should ask the economist if his work is based on reasonable assumptions, and reflects "reasonable economic probability." The expert should be asked to explain why he feels comfortable in labeling his report as reasonable. This question gives the economist an opportunity to strengthen his testimony by giving examples of unrealistic alternative assumptions.

- Final Questions in Direct Testimony

  In concluding the economics expert's testimony, the attorney should ask the economist if his opinion of the amount of damages would have been any different if he had been hired by the other attorney in the case. The economist should be able to honestly answer; "No."

  Finally, because the opposing attorney will ask this question, the attorney retaining the economics expert should ask him if he has been paid for his work on this case. I have found it effective to have the attorney ask if I "have been

paid for my testimony." The answer to this question is "No." My testimony is not for sale. I have been paid for my time and my expertise.

- Objections and Cross Examinations

I do not recall ever testifying in a case wherein the opposing attorney did not object at some point during my testimony. It almost seems as if attorneys have beeper alarms that go off after so many minutes reminding them to stand and object to something the witness has said or the opposing attorney has done!

It is, of course, entirely appropriate for attorneys to offer objections in court. When this occurs, the proper response for the economics expert is simply to sit back, remain quiet and assume the role of observer as the judge and attorneys sort out legal issues. In all circumstances, the economics expert should maintain a dignified demeanor, a reasonable tone of voice, and never display anger or frustration during direct or cross-examination.

During cross-examination, the economics expert also has a responsibility to make sure that questions he is answering are not compound, complex, vague questions which cannot be answered in a useful and effective manner. The economist should break complex questions down into their component parts and answer each part of the question separately. The economics expert should also attempt to explain his answers if the cross-examining attorney seeks simple yes or no answers which would be misleading.

- Redirect Testimony

Finally, before the trial, it is important for the expert witness and the attorney to discuss the importance of redirect examination. An alert attorney and an experienced economics expert can communicate nonverbally in a very effective manner when the economist wants his attorney to follow up on redirect any "misleading" questions that may have been asked during cross examination.

VII. Conclusion

As the global economy emerges and economic issues become increasingly complex, forecasting lost income, lost profits, and other economic damages will become equally complex. The field of forensic economics is a rapidly evolving discipline. In the future, both plaintiff and defense attorneys will increasingly use economics expertise in trials. The risks of not using an economics expert are too great. Attorneys who hope to successfully represent their clients in civil suits will, of necessity, have to become familiar with the field of forensic economics and develop proficiencies in the use of economics experts.

References[1]

Cohen, Martin D., "Effective Tax Procedures," *The Journal of Taxation*, January, 1972.

Colella, Francis J., Johnson, Walter D., Tinari, Frank D., "Attorney Perspectives On The Use Of Economic Experts: Survey Results," *Journal of Forensic Economics*, Vol. 8:13-23, 1995.

Depperschmidt, Thomas O., "Ethics in Forensic Economics: Evidence and Remedy Issues," *Journal of Forensic Economics*, Vol. 7:159-169, 1994.

England, Len, "The Expert Witness In Court," *Journal of The Market Research Society*, 27(3): 199-203, July, 1985.

Foerster, David W, "The Expert Witness and the Hearsay Rule," *The Appraisal Journal*, April, 1985.

Gage, Hilda R., "View From the Bench," *Journal of Products Liability*, Vol. 7 (343-351), 1984.

Kirby, Frederick, "Tort Actions and the Economic Expert," *Journal of the Missouri Bar*, Jan-Feb, 1975.

Kornblum, Guy O., "The Expert as Witness and Consultant," *The Practical Lawyer*, March, 1974.

Lindahl, George M., "Defense Economist Testimony," *For The Defense*, February, 1983.

Maher, John, "Estimating Future Earnings Loss: Misinterpretation and Faulty Logic," *Trial*, February, 1979.

Mandel, James P., "Pfeiffer and Culver II: Calculations, Issues and Tactics," *Texas Bar Journal*, November, 1984.

Marquis, Linda M., Moore, Virginia M., "Attorneys and Expert Financial Witnesses," *Mid-South Business Journal*, January, 1984 (p.15-17).

McConnell, James-Mason, Edwin, "Lost Earnings and Income Tax: Cross-Examination of Plaintiff's Economist," *American Journal of Trail Advocacy*, Vol. 4:289, 1980.

Moskowitz, Harvey S., "How to Use Experts Effectively in Land Regulation Proceedings," *Real Estate Law Journal*, Vol. 3:330.

Nagin, Stephen E., "Economic Experts in Antitrust Cases," *Litigation*, 8(2): 36-39, Winter, 1982.

O'Connor, Leo M.-Miller, Robert E., "The Economist-Statistician: A Source of Expert Guidance in Determining Damages," *The Economist-Statistician*, Vol. 48:354.

O'Hara, Michael J., "The Economic Expert in the Antitrust Arena," *Antitrust Law and Economics Review*, 12(2): 17-40, Spring, 1980.

Oleinick, Arthur-Sikora, Paul, "Expert Witnesses Under Rule 702," *Environmental Law*, Vol.8, 1978.

Riley, Stephen T., "The Economic Consultant in Forensic Economics," *Journal of Forensic Economics*, Vol. 2:1-17, 1989.

Schieren, George A., "The Economic Framework Of Personal Injury/Wrongful Death Damages," *Journal of Forensic Economics*, Vol. 11:33-46, 1998.

Simmons, Ray C., "Some Common Fallacies in Economist Testimony," *For The*

[1] This list contains both sources for reference notes in the article's text and suggested sources for further reading and research.

Defense, May, 1983.

Simmons, Ray C., "Update: Economic Fallacies," *For The Defense,* August, 1983.

Slesinger, Robert E., "How Economists Can Help in Litigation," *Journal of Forensic Economics,* Vol. 1:61-70, 1987.

Stufflebean, Debra Guiou, "The Expert Witness: Knowledge and Communication (The Deadly or Dynamic Duo)," *Journal of Forensic Economics,* Vol. 4:317-327, 1991.

Tinari, Frank D., "Competition for Forensic Economists and Their Ethical Behavior," *Journal of Forensic Economics,* Vol. 6:263-269, 1993.

Wang, Charleston C.K., "You Can Be An Effective Expert Witness," *Professional Safety,* 31(2): 28-30, February, 1986.