

Cumulative Supplement to
ECONOMIC/HEDONIC DAMAGES

Supplement Prepared by

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1 INTRODUCTION

1.1 Purpose

While we originally thought that attorneys would constitute our principal readership, it is apparent from a review of citations in journal articles that many research economists in the field frequently refer to this text as an authority in the area of forensic economics. The principal journal deliberating issues relevant to the assessment of damages in a litigation setting is the *Journal of Forensic Economics*, published by the National Association of Forensic Economics in Kansas City, Mo. The bound volume is also being used as the principal text in a course in forensic economics at the undergraduate level and also in a law school course on advanced remedies.

As a result of this broadened interest, we are undertaking to deepen our commitment in the supplements to keep readers abreast of important work recently published in the field, while avoiding the technical detail of a typical research paper. In this manner we hope to meet the needs of practicing trial attorneys, practicing forensic economists and law students.

While a few of the chapters have only modest changes in the supplement, the great majority of the chapters have been supplemented extensively. In conjunction with the expansion of topics in the supplements, technical improvements and enhancements are being made to the companion software, and these will accompany the update of the database used by the software.

1.3 Forensic Economics

The bound volume reports the results of a Spring 1989 survey of members of the National Association of Forensic Economists (NAFE).¹ In Spring 1990, another survey of NAFE members was conducted, and the results were reported at the annual NAFE meetings in December.² Some of the results on prevailing methods and data sources are discussed later in this supplement.

Taken together, the two surveys indicate convergence by responding forensic economists on methods and data sources in some areas, but divergence in others.

¹ Michael Brookshire, Frank Slesnick, and Robert Lessne, *The Emerging Industry of Forensic Economics: A Survey of NAFE Members*, JOURNAL OF FORENSIC ECONOMICS, Vol. 3, No. 2, 1990, pp. 15-29.

² Michael Brookshire and Frank Slesnick, "A 1990 Survey Study of Forensic Economists," paper presented at the American Economic Association meetings, Washington, D. C., December 29, 1990.

For example, consensus is notable in the areas of real wage growth forecasts, fringe benefits, price inflation, and personal consumption deductions in death cases. Greater divergence of opinion prevails over such topics as appropriate discount rates, methods of estimating the economic loss of household services, and methods of calculating the lost enjoyment of life.

One segment of the 1990 survey focused upon the "forensic" side of forensic economics. Much useful information was obtained for both trial attorneys and forensic economists. For example, the average (median) time of direct examination of a forensic economist in a personal injury or wrongful death case was 45 minutes, and the cross examination consumed an average of 30 minutes.³

A final segment of the 1990 survey solicited information relevant to the NAFE membership as a whole and to the NAFE organization. Member forensic economists clearly indicated that they did not wish the NAFE organization to become a certifying body for forensic economists.⁴ It should be noted that anyone can join NAFE, without any review of background or qualifications. The same is true for the American Economic Association and its regional groups.

Members of NAFE were also asked to rank their future research priorities in forensic economics. Their priority ranking of 12 categories is as follows,⁵ #1 being the highest priority and #12 the lowest:

1. Personal consumption
2. Household services
3. Fringe benefits
4. Hedonic damages
5. Medical costs
6. Income tax effects
7. Earnings growth
8. Worklife expectancy
9. Discounting
10. Commercial, antitrust, pension, divorce, or others
11. Earnings base
12. Testimony techniques

Two comments should be made as the survey results are considered. First, these priorities are influenced by the relative number of NAFE respondents in specific sub-specialties. Thus, the #10 ranking of commercial, antitrust, pension, divorce, and other categories partially reflects the relatively low proportion of NAFE members who specialize in commercial damages compared to personal injury and wrongful death damages. Yet much research is needed by, and for the benefit of, those who estimate economic damages in commercial and antitrust cases.⁶

Secondly, rankings are likely affected by the economic specialties of respondents; we tend to focus upon research in those areas where we have background

³ Ibid.

⁴ Ibid.

⁵ Ibid.

⁶ Michael L. Brookshire, *An Agenda for Future Research in Forensic Economics*, JOURNAL OF FORENSIC ECONOMICS 4(3), 1991, pp. 287-296.

and training. Thus, it should be expected that finance-oriented economists would emphasize interest (discount) rates; antitrust economists would emphasize research in commercial and antitrust damages; and labor economists would focus upon the earnings base, earnings growth, and worklife expectancy.

1.4 Emerging Trends

Forensic economists interact and communicate with each other, and with related experts, more frequently than only a few years ago. The creation and growth of the National Association of Forensic Economists have been important to this process. The national association sponsors professional sessions at meetings of the American Economic Association and its regional groups, publishes the *Journal of Forensic Economics*, and spawns other research and publications by members.

The improved climate for research is fortunate. Trends involving labor force participation, employment, and compensation patterns must be addressed, as forecasts and estimates of economic damages are made in the future. Some examples of these trends are as follows:

1. The relationship between permanent and contingent jobs in the U. S. economy is changing. One definition of contingent work is "any job in which an individual does not have an explicit or implicit contract for long-term employment or one in which the minimum number of hours can vary in a random manner."⁷ In the 1980s, the proportion of contingent jobs to permanent jobs increased dramatically. Contingent work has significant implications for wages, fringe benefits, and worklife expectancy.
 2. The incidence of self-employed workers, temporary help workers, and multiple job holders is increasing.
 3. Two-tier compensation systems, in which new hires are paid lower wages and fringe benefits than existing employees, are becoming more common.
 4. Employers and employer groups wish to place 25-30 percent of employee wages "at risk;" this portion of compensation varies with company, employee, and work group performance in a given time period. Also, one-time bonuses and other lump sum payments are increasingly common, and such payments do not remain in the earnings base.
 5. Employer fringe benefit payments as a percentage of payroll slightly declined in the late eighties. Moreover, employers are attempting to shift some of their fringe benefit payments from guaranteed payments, such as defined contribution pension plans, to "at risk" payments, such as profit sharing plans, that may be defined but are not guaranteed.
 6. Future changes in labor force participation rates of females and of older age males are difficult to predict. Hours of future work are also difficult to forecast, and government-induced, employer-oriented, and employee-oriented reasons exist to expect further departures from a 40-hour historical norm or from the current average hours by the sector of the economy.
- It should be noted that these examples relate to only three of the research

⁷ Anne E. Polivka and Thomas Nordone, *On the Definition of "Contingent Work"*, MONTHLY LABOR REVIEW (December, 1989), pp. 9-16.

categories mentioned above: the earnings base, worklife expectancy, and fringe benefits. Two of these categories are not even listed in the upper half of the research priorities by forensic economists. The examples are not meant to suggest that current economic loss estimates are of poor quality. Rather, they indicate future opportunities for continuing refinements in data sources and methods.

Another emerging trend in forensic economics is the incipient debate about ethics in the profession. Every witness has experienced, at one time or another, a witness on the other side whose behavior was "unethical," i.e., using methodologies known to be incorrect. Further, psychologists, vocational rehabilitation counselors and other consultants who have no serious economic training have begun to offer "economic" loss assessments. NAFE recently developed a Statement of Ethical Principles. (See Appendix I to this chapter.) Consideration is being given to a certification process. Typically, economists dislike barriers to entry in any arena since they serve to augment the income of those admitted and reduce overall market efficiency. Thus only 21% of members of NAFE expressed a desire for a certification process. Other solutions proposed include the education of defense attorneys on the value of using economic experts at trial, and not just as consultants, and the bifurcation of liability and damages portions of trials.⁸ Encouragement of defense attorneys to use economists at trial (a form of peer review) may lead to increased competition of ideas in the courtroom, which can only be healthy. If a defendant has been found liable, a bifurcated trial may encourage more defense use of economists.

Any certification proposal must be debated in the context of work by Nobel economists Stigler, Buchanan, Friedman, and Coase, who showed the general inefficiency of regulation. Frequently, the costs of regulation and market intervention outweigh the intended and sometimes elusive benefits. "Reforms" once instituted are difficult to modify. Some imperfections in the system may be preferable to the distortions caused by the "solutions."

1.5 Emerging Trends in Litigation

Trends in litigation are important because they impact the use of forensic economics, but contrary to popular belief, the trends are not obvious. First, while there has been an increase in the amount of litigation in the United States, new studies by the National Center for State Courts examining state court caseloads, punitive damage verdicts, actual payment and business litigation found that tort filings were increasing at a more modest rate in 1989 than earlier in the decade, and that tort filings constituted less than one half of 1% of all cases.⁹ Other studies indicate that the greatest growth in case filing was not in tort cases but in corporate litigation: contract cases, intellectual property cases and bankruptcy.¹⁰ Again, there is little support for the commonly held belief that verdicts are in general increasing.¹¹ Nonetheless, tort

⁸ Pauline Fox, *The Economic Expert in Wrongful Death/Personal Injury Cases: Workable Competition or Monopoly Power?* JOURNAL OF FORENSIC ECONOMICS 4(3), 1991, pp. 253-254.

⁹ Roxanne Barton Conlin, *Litigation Explosion Disputed*, THE NATIONAL LAW JOURNAL, July 29, 1991, pp. 26-27.

¹⁰ *Ibid.*

¹¹ Andrew Blum, *Verdict Trends Remain Elusive*, THE NATIONAL LAW JOURNAL, January 29, 1990, p. S2.

costs, which include jury verdicts and settlements as well as legal and administrative expenses, are growing. From 1980 to 1987, they increased at a rate of 10.6% per year after inflation.¹²

In response to public perception that the increase in litigation reduces this country's competitiveness in international markets, Vice President Dan Quayle chaired a working group on Federal Civil Justice Reform which recommended certain reforms designed to reduce litigation. Among the proposals are the increased use of Alternative Dispute Resolution (ADR), reform of punitive damage rules, and limitations on expert testimony and discovery.¹³ An increase in litigation *per se* is not necessarily bad—it may well indicate continued and efficient access to justice. Moreover, the percentage of cases that settle appears to be increasing. However, an increase in the backlog of cases means the system for processing cases is antiquated and could use the help which ADR might provide.

APPENDIX I

NATIONAL ASSOCIATION OF FORENSIC ECONOMICS STATEMENT OF ETHICAL PRINCIPLES

As a practicing forensic economist and a member of the National Association of Forensic Economics, I pledge to provide fair and accurate economic analysis associated with any litigation in which I am involved, to strive to improve the science of forensic economics, and to protect the integrity of the profession through adherence to the following tenets of ethical behavior:

1) *Employment*

While it is the right of the forensic economist to accept, at his* discretion, employment relating to any case or proceeding for which his expertise qualifies him, he should decline involvement in any litigation where he is asked to take or support a predetermined position where he has reservations about the ethical standards to which he is being asked to adhere.

2) *Honesty, Candor and Fairness*

The forensic economist shall be accurate, equitable and fair in his analysis and shall refrain from placing before either the hiring or opposing attorney or the court, any information, through commission or omission, that he knows to be false. He shall exert due diligence and, at all times, attempt to use competent judgment to avoid the entrance of false or fictitious information.

3) *Neutrality*

The forensic economist shall attempt to operate, at all times, from a position of neutrality with respect to his calculations and analysis. Whether he is engaged by the plaintiff or the defense, his approach, methodology and conclusions should, in the end, be essentially the same.

¹² Gene Koretz, *Litigation's Cost is Rocketing—Its Efficiency Isn't*, BUSINESS WEEK, November 6, 1989, p. 34.

¹³ *Less Litigation, More Justice*, Editorial, THE WALL STREET JOURNAL, August 14, 1991, p. A8.

*The use of "his," "he," or "him" within the code is for convenience only. It is meant to be gender neutral.

4) *Knowledge*

The forensic economist shall attempt, at all times, to maintain a current knowledge base of his discipline and shall provide his employing attorney with the full benefit of this knowledge regardless of how it may affect the outcome of the case.

5) *Responsibility*

The forensic economist shall, at all times, strive to not only present the analysis of the case within the boundaries of honesty and fairness, but also within those of his profession. To this end, he must assume the responsibility of holding his colleagues in the profession accountable to the ethical standards promulgated herein.

2 ISSUES PRELIMINARY TO A WRITTEN ANALYSIS OF ECONOMIC LOSS

2.1 Is An Expert On Economic Damages Necessary?

As the bound volume was being prepared in the 1988-1990 period, some attorneys, jurists, and economists were predicting a slowdown in the rapid growth of demand for forensic economists. Total offset, or other rules were to lessen the need for economic testimony. Some believed that defense attorneys were obtaining sufficient expertise that they would need expert help for cross examination only in new and unusual cases.

By 1991-92, surveys of forensic economists,¹ the sustained growth of the National Association of Forensic Economists (NAFE) membership, and our own networking with forensic colleagues have indicated strong growth in the number of cases involving forensic economists each year. Indeed, plaintiffs' attorneys in large cases may have several experts on damages, including two economists. The most common example is one economist for lost earning capacity damages and another for lost enjoyment of life (hedonic) damages. In class action cases, as another example, it may be impossible for a very experienced economist, with academic and other time demands, to accomplish all of the research and calculation tasks alone.

The growth in demand for forensic economists on the defense side of cases may be even more dramatic. Ironically, our own reviews of plaintiff reports indicate that the range of economic conclusions, in cases with similar facts, has not been reduced. Forensic economics has rapidly developed as a subspecialty, with many books, journal articles, related publications, and papers to improve the state of the art. Yet, forensic economists now have more alternatives than before in data sources, methods of calculation, and applications. Economists who only handle a few cases per year find increased difficulty in staying abreast with the state of the art, and the same is certainly true for experienced trial attorneys facing the various categories of economic damages.

Thus, the defense attorney has a greater need for help and advice in preparing for settlement discussions and/or cross examinations than even a few years before. The experienced forensic economist knows what to attack, what not to attack, and

¹ Michael Brookshire, Frank Slesnick, and Robert Lessne, *The Emerging Industry of Forensic Economics: A Survey of NAFE Members*, JOURNAL OF FORENSIC ECONOMICS (Spring/Summer 1990), Vol. 3, No. 2, pp. 15-29.

how to explain deficiencies or mistakes by the plaintiff's economist in common sense terms.

It is still true that defense economists are more likely to help in cross examination than to provide their own loss estimates in testimony. The danger is that the defense estimate will be considered a minimum estimate. However, defense attorneys face a tradeoff when their own economist does not testify. In closing arguments, the plaintiff's attorney will discuss the missing, or "invisible," economist, who did not appear for the defense. If the plaintiff's economist had been other than conservative, then surely the defense would have used its own forensic economist to show why estimates were too high. This may help explain why testimony by a defense economist, while not typical, is less rare. Such testimony is likely to occur when the defense estimate is substantially below that of the plaintiff's economist.

2.2 Choosing the Expert on Damages

Forensic economics has become increasingly specialized. Thus, experienced economists can now be found with sub-specialities in permanent injury cases, hedonic damages, costs of medical and institutional care, and household services, as examples. The hiring attorney can identify such persons more readily than before. This is true primarily because of increased research and publications in forensic economics. The tendency still exists to hire and pay the well-recognized versus the less-recognized economist, but a further issue is now involved. Perhaps depending upon how damages seem to fall among damages categories, the hiring attorney may choose a sub-specialist (with possible weaknesses in some categories) versus a forensic economist with some "spread" of his/her expertise among the many categories of variables and damages that may apply to a particular case. Many forensic economists do, indeed, keep current with the breadth of issues and research results, and this requires significant amounts of work time each year.

The choice of an expert to testify regarding the lost enjoyment of life (hedonic damages) has become particularly important. The willingness-to-pay literature and government whole life values for setting regulatory standards may not have been studied or understood by those with years of experience in estimating lost earning capacity. Even (and perhaps especially) on the defense side, silly and superficial arguments will no longer work. The theoretical and empirical foundations for testimony in this area have been established. Cross examination can be effective, and a forensic economist must now have a thoughtful and academically credible position on the value of the enjoyment of life, whatever that position might be.

2.3 Relationships Among Experts on Damages

The most common relationship in testimony on damages is between the vocational/rehabilitation expert and the forensic economist in serious, permanent injury cases. Chapter 8 of the bound volume describes the possibility of a 5-factor loss report resulting from the combined work of vocational experts and forensic economists. Obviously, the hiring attorney must ascertain how opinions of a vocational expert can "fit" into the format of input needed by the economist. We still see, for example, vocational experts whose only conclusions relate to the percen-

tage of labor market jobs foreclosed by the injury. Such a conclusion, taken alone, is useless to the forensic economist and the trier of fact, and it does not even provide the first factor—lowered wage levels after injury—of five possible factors affecting economic loss.

A major reason for this problem is the traditional lack of interdisciplinary coordination among different experts on economic damages. The need for an interdisciplinary research institute on economic damages, associated with a major research university, is apparent to those involved in interdisciplinary “networking.” Moreover, some of the most needed future research must involve vocational experts with forensic economists, psychologists with economists in hedonic damages, and accountants with economists in commercial damages cases.

A related issue is that the 1990 bound volume emphasizes the necessary “connections” between disciplines but leaves great latitude in how related disciplines develop their own input to the forensic economist. Research by noted vocational experts, who use and improve existing models, is always welcome,² but it must ultimately “fit” into the format of five (or more) damage factors that result from a particular injury. Similarly, forensic economists and psychologists must give more attention to coordinating their work and their research regarding hedonic damages calculations in permanent injury and death cases. The discipline of psychology must provide conclusions on the diminution of the capacity to enjoy life, resulting from a specific physical and/or psychological injury. Forensic psychologists have, and are improving, their own technology in this area. Their conclusions must be in a format that can be applied by the economist to benchmark values.³

While common, it is an increasingly bad idea to hire related experts on damages without consulting the economist, who must bring testimony on damages to a “bottom line.” The economist cannot dictate the theory, model, or conclusions of a related expert, but conclusions that cannot be appropriately quantified are not useful to the economist.

Because of the increased competition in the forensic expert field mentioned above, another reason exists to consult with the forensic economist before hiring related experts on damages. A recurring example from our experience may be helpful. There are vocational experts and psychologists who go beyond conclusions from their own expertise, assume the role of a forensic economist, and reach economic conclusions on a “bottom line” economic loss. If the economist then receives the vocational report, this report may or may not have vocational conclusions in a format which can be used. In any case, the economic “bottom line” will differ, perhaps dramatically, from that produced by the vocational expert. The alert defense attorney will delight in “whipsawing” the two experts on damages against each other. An experienced forensic economist, when consulted early, can render advice which will avoid the problems created by related experts working outside of their expertise.

² See, for example, Timothy F. Field, *LABOR MARKET ACCESS: RESEARCH AND RATIONALE* (Athens, Georgia: Elliott and Fitzpatrick, Inc. 1988).

³ See Edward P. Berla, Michael L. Brookshire, and Stan V. Smith, *Hedonic Damages and Personal Injury: A Conceptual Approach*, *JOURNAL OF FORENSIC ECONOMICS* (December 1989), Vol. 3, No. 1, pp. 1-8.

2.4 Timing

The increased tendency for defense attorneys to hire their own forensic economist has been mentioned. In our experience, it is common that the defense attorney hires his or her own economist after a plaintiff's economist has rendered a report, after interrogatories have been sent to the plaintiff's attorney, and even after the plaintiff's economist has been through a discovery deposition. Perhaps this is because both plaintiffs' and defense attorneys focus upon liability issues before damage issues. Defense attorneys must change this practice. A major advantage of having an economist on the defense team is to use his or her expertise in preparation for interrogatories and discovery depositions of opposing experts. The importance of retaining a defense economist early is multiplied in class action and mass disaster cases.

2.5 The Costs of Using Experts on Damages

The 1990 bound volume reported a wide range in the fee schedules of forensic economists, as of the late 1980s. This wide range still exists, even within the same geographic region. Per diem fees range from around \$800 to over \$2,000. Flat fees for various types of economic reports—earning capacity, household services, medical costs, lost enjoyment of life, and commercial damages—also vary significantly.

One ramification is that the attorney can significantly affect the costs of a case by "shopping around." Of course, the range in costs may primarily result from a range in quality and experience of experts. Another ramification is that defense attorneys will likely point out very high charges by economic experts, but they must be mindful of the fees of their own experts. Interestingly, experienced economists do not feel that the quantity of their services demanded is very sensitive to fees charged.⁴ Quality and experience seem to be more important factors than price in the choice of economists.

2.6 Elements of Loss

An important issue is the role of a forensic economist in working with his or her attorney to determine the elements, or categories, of loss for damages calculations. One view is that the plaintiff's economist should simply take the categories requested by the employing attorney, without comment. An opposing view is that the economist has a responsibility to carefully talk through the categories of damages which *may* be applicable to the facts of a particular case. Indeed, the forensic economist may have more knowledge and experience than the attorney regarding the application of particular elements of damages in particular jurisdictions.

2.7 Legal Parameters Affecting the Expert

As suggested above, the forensic economist and attorney may be able to help each other in clarifying legal parameters affecting the economist. Even experienced

⁴ Michael L. Brookshire, Frank Slesnick, and Robert Lessne, *The Emerging Industry of Forensic Economics: A Survey of NAFE Members*, JOURNAL OF FORENSIC ECONOMICS (Spring/Summer 1990), Vol. 3, No. 2, p. 19.

economists must not overlook the possibility that relevant parameters have changed. Some examples from our recent experience include the application of the collateral source rule; the nature of estimating the "reverse tax effect" in railroad cases; the use of expected consumption versus maintenance consumption in wrongful death cases; and variations in permissible testimony on the lost enjoyment of life between personal injury and wrongful death cases.

2.8 Is A Written Report Desirable?

A recent survey of forensic economists indicated that a written report was produced in 95 percent of the cases in which a forensic economist was employed.⁵ Since economists working for the defense were represented in the survey sample, it is somewhat surprising that this percentage was so high. From our experience on the defense side, an economic report is requested in less than half of the cases. This may mean that when the defense economist testifies about problems with the plaintiff's calculations, the plaintiff's attorney must ask about *all* calculations performed by the defense economist.

Another aspect of written reports, whether for the plaintiff or defense, is that they vary greatly in their level of detail. Many simply state assumptions and conclusions, with little or no calculations shown. The opposing attorney may effectively inquire about college professors who don't "show their work."

2.9 Collection of Data For Economic Loss Estimates

It should be noted that Appendix 2 is based upon the premise that the best information is specific to the particular plaintiff, and not broadly based upon statistical groups of persons. An unstated assumption is that the attorneys (and clients) who complete these questionnaires are not made aware of "average" values for household services hours or personal consumption expenditures, for example. We worry about the bias that such information in a Guide Sheet can produce. Our best judgment has been to check specific responses against broader survey data and probe where individual results vary from broader averages. Sometimes good reasons exist for such variance, but sometimes they do not.

2.10 Additional Data Used by Economists

Testimony on the lost enjoyment of life (hedonic damages) has significantly increased the "general" data base that must be maintained by the practicing forensic economist. He or she must understand significant results from willingness-to-pay models of the value of life, the models themselves, and the pros and cons of particular studies. Changing whole life values used by safety regulatory agencies, whether explicit or implicit, must also be tracked. Those economists who ignore this area are out of touch. Those few who advertise the same hedonic conclusions for all plaintiffs have little credibility.

⁵ Michael Brookshire and Frank Slesnick, *A 1990 Survey Study of Forensic Economists*, JOURNAL OF FORENSIC ECONOMICS (Summer 1991), Vol. 4, No. 2, pp. 125-149.

3 THE BASICS OF ESTIMATING WAGE OR SALARY LOSS

3.3 Projecting Lost Wage or Salary Earnings

A. Establishing Base-Level Earnings

Establishing an appropriate wage base for projecting lost earning capacity is the first and most fundamental task of a forensic economist. Yet, this topic receives little research attention among forensic economists, and plaintiff and defense attorneys do not give this fundamental determination the attention that it deserves. The wage base decision requires good data on historical work patterns and earnings, forces a forensic economist to make an informed judgment, and requires a theoretical and practical knowledge of labor markets and the changing nature of work in this country.

For example, the proportion of “contingent” jobs in the U. S. economy, relative to “permanent” jobs, is rapidly growing. Contingent jobs are those which provide no permanent attachment to or security with the employer and often exhibit random variation in the minimum hours of work. The proportions of workers in various sectors of the economy continue to shift; the relative importance of self-employed workers and multiple job holders is increasing; employers are moving to compensation systems wherein a larger proportion of pay is based upon company, work unit, or individual performance that can vary from year to year; and compensation levels are more likely to include bonus or other one-time payments which do not remain in the base.¹

The forensic economist cannot ignore these trends in attempting to arrive at a wage base for projecting earnings into labor markets of the future. Indeed, we may be moving toward projections of multiple bases through time, reflecting different employment statuses and scenarios. The forensic economist may focus judgment primarily upon the appropriate probability weightings for different scenarios, and simulation analyses and other tools may be required.

In our experience, successful attacks by defense attorneys and economists often focus upon the plaintiff’s economist’s judgment regarding the wage base. The plaintiff’s economist is likely to be vulnerable here, may have little knowledge about labor markets, and is substantially wounded if the trier of fact doubts the credibility

¹ Michael L. Brookshire, *An Agenda for Future Research in Forensic Economics*, JOURNAL OF FORENSIC ECONOMICS, 1991, Vol. 4, No. 3, pp. 288-289.

of the base. All issues discussed later in this chapter represent computations built upon the wage base decision, and any computations relating to a questionable base produce questionable results. For these reasons, the defense needs documentation on many years of employment and earnings history at least as much as the plaintiff needs this history. Preferably, a defense economist can scrutinize these data in relationship to a plaintiff's report of economic loss and provide input to the defense attorney before the discovery deposition of a plaintiff's economist.

B. Growth Rates in Wage/Salary Earnings

In a Spring 1990 survey of forensic economists, 39.3 percent of respondents used a geometric mean from historical wage increases to project future earnings capacity, while 33.3 percent continued to use an arithmetic mean.² Preference for a geometric mean is also seen in current research.³

In a Spring 1989 survey of forensic economists, the average growth in real wages then in use by respondents was 1.54 percent per year.⁴ An approximately 20-year period for projecting future wage growth also receives support in recent studies,⁵ and we now use the 1971-1991 period for 20 years of historical wage growth data. The resulting rate of real wage growth, calculated as a geometric mean in Appendix 1 of this supplement, is 0.64 percent annually. It should also be noted that forensic economists are increasingly focused on potential problems with fixed growth rates, especially when age/earnings effects are not considered.⁶ These effects are discussed below.

3.3.1 Projecting Lost Wage or Salary Earnings Using Age-Earnings Profiles

A. Introduction

Most workers in the United States find their earnings increasing over the years as they age and gain experience and seniority. Age-earnings profiles describe the average expected change in earnings which occur in step with a worker's age. This is in addition to any increases caused by productivity gains throughout the economy or by inflation. Typical profiles begin as young workers in their early 20s are hired for entrance positions at entry level wage rates. Average earnings by age generally increase rapidly until about age 30, after which they grow at a slower rate, level in real terms, and then fall around the mid-fifties.

Age-related wage increases may arise from promotions, seniority increments, or even job hopping. In general, they reflect a young worker's transition from low experience and low marginal output, to greater levels of experience, skill and respon-

² Michael Brookshire and Frank Slesnick, *A 1990 Survey Study of Forensic Economists*, JOURNAL OF FORENSIC ECONOMICS, 1991, Vol. 4, No. 2, p. 132.

³ See Rolando F. Pelaez, *Valuation of Earnings Using Historical Growth-Discount Rates*, JOURNAL OF FORENSIC ECONOMICS, 1991, Vol. 5, No. 1, pp. 27-44.

⁴ Michael Brookshire, Frank Slesnick, and Robert Lessne, *The Emerging Industry of Forensic Economics: A Survey of NAFE Members*, JOURNAL OF FORENSIC ECONOMICS, 1990, Vol. 3, No. 2, p. 21.

⁵ See, for example, Pelaez, *op. cit.*, and David S. Saurman and T. S. Means, *Estimating Earning Capacity With Constant Earnings Growth Rates*, JOURNAL OF FORENSIC ECONOMICS, 1990, Vol. 3, No. 1, pp. 51-60.

⁶ Saurman and Means, *op. cit.*, and Edward B. Bell and Allan J. Taub, *More on Alternative Measures of Earnings Growth*, JOURNAL OF FORENSIC ECONOMICS, 1991, Vol. 4, No. 3, pp. 329-332.

sibility, for which employers pay a higher wage rate. Because lifetime earnings embody these age-related changes as well as productivity gains and inflation, the lump sum or present value of lost earnings for a disabled or deceased worker can be understated if they are not taken into account.

Earnings estimates for younger workers in particular can be understated if age-earnings adjustments are not included along with general wage growth. As a rule, the younger the worker, the greater can be the understatement of loss without an age-earnings adjustment, though there are numerous exceptions. For workers age 50 and over, an age-earnings adjustment changes the lump sum by a small amount, either upward or downward. Workers in their 30s and 40s may have moderate lump sum increases when the adjustment is performed.

There are also situations in which incorporating age-earnings adjustments in damage calculations can overstate lost earnings; and there are data sources which already embody age factors that would be double counted if adjusted further. In the discussion which follows, it is presumed that when there is a need for age-related earnings adjustments, they can be incorporated directly by methods suggested herein or indirectly in an alternative procedure; there is no single procedure which is appropriate in every case.

Age-earnings adjustments are based upon age-earnings profiles and are not without controversy among economists. Profiles have been difficult to measure using readily available labor statistics, and, if done improperly, may overlap with the LPEH (Life, Participation, Employment, and Hours) adjustments described in Section 3.6.

It may be useful to define a few terms:

Age-Earnings Profile: the average earnings of workers year-by-year according to their age as they progress over their careers. The effects of general productivity gains and inflation are removed.

Age-Earnings Longitudinal Survey: a multiple-year survey of the average earnings of workers as they age. The same or similar workers are surveyed, year after year.

Age-Earnings Cross Section Survey: a single year survey of the average earnings by age of workers at one point in time.

Most estimates of age-earnings profiles are derived from cross sectional surveys, which are used as proxies for longitudinal ones. The approach has both advantages and disadvantages.⁷

The advantages of cross sectional studies over longitudinal ones include the following:

1. The data are more readily available and can be updated periodically.
2. The business cycle distortions are reduced.
3. Inflation biases are reduced.
4. Because they are more recent, they may be more valid to project into the future.
5. The shifts in the composition of the labor force have less impact.

⁷ Julia Lane and Dennis Glennon, *The Estimation of Age/Earnings Profiles in Wrongful Death and Injury Cases*, JOURNAL OF RISK AND INSURANCE (December 1985), p. 687.

6. The impact of employment shifts among occupations and industries is reduced.

The disadvantages of cross sectional studies compared to longitudinal ones include the following:

1. They are proxies, not actual age-earnings patterns for specific individuals.
2. They contain statistical anomalies that may alter the shape of a profile.⁸

Recent studies in forensic economics make clear the problems which may arise when a constant growth rate in earnings is projected beyond an earnings base and age-earnings effects are not considered.⁹ It should also be noted that researchers and forensic economists utilizing age-earnings adjustments have focused upon a U. S. government data source entitled *Money Income of Households, Families, and Persons in the United States*.¹⁰

B. One Method for Incorporating Age-Earnings Effects

A major improvement in U. S. government data, utilized by forensic economists, occurred with the 1990 edition of this *Money Income* source.¹¹ Average full-time earnings were disaggregated for American workers by race, sex, and education level for 10-year age increments. Moreover, the same (unpublished) disaggregations can now be obtained from the U. S. Bureau of Labor Statistics in 5-year age increments. This means that we know the average full-time earnings of, for example, white female high school graduates who are age 25-29, 30-34, 35-39, 40-44, etc.

These 5-year increments of average earnings data allow a simple interpolation to determine year-by-year percentage changes in earnings as the white female high school graduate would have aged and (usually) increased earnings in the absence of injury or death. Age-earnings adjustments, derived from these cross sectional results in a recent year, are independent of wage growth due to price inflation and general productivity improvements. They also assume that current cross section data applied to a deceased white female of age 26 are a good predictor of the age-earnings improvements that would have accrued to the particular female as she would have aged into the future.

C. Other Considerations

The decrease in earnings in cross section surveys after about age 50, discussed earlier, is primarily due to a problem of measurement. Several economists have called the decrease an aberration, for various reasons.¹² Actually, it most probably

⁸ James J. Heckman, *A Life-Cycle Model of Earnings, Learnings and Consumption*, JOURNAL OF POLITICAL ECONOMY (1976), p. 512.

⁹ See Saurman and Means, *op. cit.*; Bell and Taub, *op. cit.*; and Matthew J. Mullette, *et al*, *Alternative Measures of Earnings Growth*, JOURNAL OF FORENSIC ECONOMICS, 1990, Vol. 3, No. 1, pp. 29-50.

¹⁰ U. S. Bureau of the Census, Current Population Reports, Series P-60, MONEY INCOME OF HOUSEHOLDS, FAMILIES, AND PERSONS IN THE UNITED STATES, 1990, pp. 128-155.

¹¹ *Ibid*. In fact, the 1989 and 1990 editions carried this improvement but were published only a few months apart.

¹² For example, see W. Cris Lewis, *On the Relationship Between Age, Earnings, and the Net Discount Rate*, JOURNAL OF FORENSIC ECONOMICS (August 1989), pp. 69-77. This discussion wrongly identifies the decline in earnings after age 50 as a mathematical consequence of using cross-sectional

stems from an error of measurement in cross section surveys caused by changes in the composition of workers being surveyed and averaged at various age levels.¹³ The effect comes from the tendency of higher paid workers, who also have more substantial pension benefits, to retire earlier than less well paid workers. Thus, at each succeeding age above 50, earnings are averaged for those who remain employed and are naturally lower. The problem comes in interpreting this drop as a reduction in earnings for those who remain employed. A leveling, rather than a decline, is also demonstrated by cross sections of wage rates, which do not decline with age.¹⁴

In fact, a similar but unnoticed cross section error exists for workers who are in their 20s. While some work force entrants begin at age 20, others begin at ages 22, 23, 24 or higher. When the earnings of workers at each educational level and age are averaged, the figures include some workers who are already several years of experience ahead of workers who are just beginning. This makes the average pay at each age level in the cross section lower than the average of workers who begin at the same time and have reached the same degree of increased skill, experience and higher pay.

The true wage profile is thus understated by cross section surveys for both low and high age workers. The differences tend to understate the lump sum value of loss earnings somewhat even after an age-earnings adjustment, but produce more accurate figures than if no age-earnings adjustment had been made.

A *Money Income*-based adjustment for age-earnings effects may also contain a small overlap with worklife expectancy (see Section 3.6) adjustments that incorporate likely hours of work. Full-time work is defined and measured by the U. S. government as 35 or more hours of work per week. Therefore, average full-time earnings in the *Money Income* source are not earnings for 40 hours per week. If a worklife adjustment predicts variations in future working hours around a 40-hour standard, then a small measurement problem may occur. On the other hand, age-earnings adjustments are generally independent of worklife expectancy adjustments, and the initiation of age-earnings adjustments by forensic economists should not diminish the importance of accurate reductions for worklife expectancy variables.

As suggested earlier, age-earnings adjustments for younger workers may substantially increase the lump sum value of their lost earnings. For workers in their mid-40s and older, the increase becomes much less significant. An adjustment may be unnecessary for workers above age 45. Also, there are a number of special situations in which specific age-earnings profiles are inappropriate or require further adjustment. One case is young workers who have already reached high earnings. If it is likely that a worker has already achieved increments in earnings growth which others receive at higher ages, an age-earnings adjustment may not be appropriate.

The average age-earnings profile for women understates earnings for those who are pursuing full-time careers and have been consistently employed. The profiles for women may continue upward toward the profiles for men. Until then the

studies. The author's result is entirely due to rounding errors in his calculations compounded by the misinterpretation of historical earnings data to fit the mathematical result.

¹³ Charles W. de Seve, *The Relationship Between Age, Earnings, and the Net Discount Rate Revisited*, JOURNAL OF FORENSIC ECONOMICS, 1991, Vol. 5, No. 1, pp. 67-70.

¹⁴ Heckman, *op. cit.*, p. 512.

economist may need to make formal or informal adjustments for continuously participating females.

A similar caveat applies to full-time minority workers for which cross sections are available. Because cross sections may average earnings for workers who are life-long career workers and those who often enter and leave the work force, age-earnings profiles for similar whites may need to be considered in a formal or informal adjustment.

In summary, data sources are now available for reasonable age-earnings adjustments in estimates of lost earning capacity, and research in this important area is likely to continue. While these new adjustments will increase the accuracy of economic loss estimates, they involve more than the simple application of new statistics. The forensic economist has a large responsibility to apply his or her judgment and experience to the proper application of age-earnings effects in each case.

3.5 The Teeter-Totter: Alternative Approaches in Selecting Wage Growth Rates vs. Discount Rates

The bound volume discusses the net difference between wage growth rates (that make loss estimates higher) and discount rates (that make loss estimates lower). Forensic economists label this difference the "net discount rate." The net discount rate will be positive if wage growth exceeds the discount rate, but is usually negative in current forecasts because discount rates have exceeded growth rates of earnings. Thus, forecasted losses into the future move downward each year in present value. The greater the net discount rate, the lower is the lump sum loss of earning capacity. This wage growth rate versus discount rate relationship has always been a major research focus of forensic economists.

Appendix I shows the 20-year (1971-1991) relationship between U. S. wage growth and interest (discount) rates on 91-day Treasury Bills. The real wage growth rate is 0.64 percent, the real discount rate is 1.79 percent, and the net discount rate is the (compounding *downward*) 1.15 percent difference between the two. The higher this net discount rate, the lower is the present value estimate of loss, *ceteris paribus*.

Only one survey study has attempted to capture the average values of these important forecast values that are used by forensic economists. A Spring 1989 survey was conducted among members of the National Association of Forensic Economists (NAFE). Among respondents to this questionnaire, the average real wage growth rate was 1.54 percent; the real discount rate was 2.55 percent; and the average net discount rate then in use was 1.01 percent. In our opinion, the forensic economist cannot simply take a consensus, or any other, net discount rate and make a loss forecast without being able to explain why he chose the particular forecast values that resulted in his net discount rate.

In our own case, we must be prepared to defend a 0.64 percent real wage growth rate, which might be used when adequate data on a specific plaintiff was unavailable. We must explain, for example, why we think current U. S. government forecasts of real wage growth are too optimistic. Similarly, we must defend the 1.79 percent real discount rate based upon the shortest maturity of U. S. government securities. As seen in the bound volume, the injured party, in order to be made

whole, should not be forced to run any risks of default or of unanticipated price inflation.

Some have argued that, especially because of high real discount rates in the 1980s, no set of historical data provide good predictors of net discount rates in the future.¹⁵ We agree only in the sense that the forensic economist must defend any historical data set which he or she believes to be the best predictor of the future. The common sense of the issue, however, is that most of us believe that the past *is* the best predictor of the future. Forecasts without roots in the past bear a heavy burden.

Others argue that total offset projections, whereby the net discount rate is zero, are both simple and provide reasonable forecasts.¹⁶ We disagree. The use of a total offset method is supported neither by historical data (particularly in the 1980s) nor by the recent literature.¹⁷ It results in loss estimates which are too high, and the inaccuracy may be significant for younger persons.

We remain convinced that, at the present time, a stable and relatively small net discount rate is appropriate for projecting losses in the future. When a forensic economist utilizes a net discount rate below 1 percent or above 2 percent, the opposing economist and attorney should probe deeply.

3.6 Work-Life Expectancy

A major improvement has occurred in U. S. government data sources that underlie the Life-Participation-Employment (LPE) approach to adjustments for work-life expectancy. Heretofore, U. S. Bureau of Labor Statistics (BLS) data on participation and employment probabilities were disaggregated by age, race, and sex, or by age, sex and educational level. By 1991, unpublished data could be obtained from the BLS (and the Current Population Survey) on Participation and Employment probabilities by age, race, sex, and educational level.¹⁸

This change in the available disaggregation of data, which had been sought for years by forensic economists, allows a greater degree of precision in LPE adjustments. Interestingly, in a 1990 survey of forensic economists, only 11.4 percent of respondents used the LPE approach for work-life adjustments. A clear majority (71.6 percent) of respondents used U. S. government work-life tables in their traditional format, while 17 percent of respondents used other approaches.¹⁹ Those who continue to use traditional (increment-decrement) tables for work-life adjustments cannot directly utilize the improvement in the disaggregation of U. S. government source data. Their technique, in our opinion, continues to suffer disadvantages relative

¹⁵ See, for example, W. Cris Lewis, *On the Relative Stability and Predictability of the Interest Rate and Earnings Growth Rate*, JOURNAL OF FORENSIC ECONOMICS, 1991, Vol. 5, No. 1, pp. 9-25.

¹⁶ See Rolando F. Pelaez, *The Total Offset Method*, JOURNAL OF FORENSIC ECONOMICS, 1989, Vol. 2, No. 1, pp. 45-60.

¹⁷ See Melville Z. Wolfson, *Comment: Discount Rates*, JOURNAL OF FORENSIC ECONOMICS, 1989, Vol. 2, No. 3, p. 115; Allan M. Feldman, *Comment: Discounting in Forensic Economics*, JOURNAL OF FORENSIC ECONOMICS, 1990, Vol. 3, No. 2, pp. 65-71, and Bell and Taub, *op. cit.*

¹⁸ See U. S. Department of Labor, Bureau of Labor Statistics, unpublished tabulations from the Current Population Survey, 1991 annual averages, pp. 1-28.

¹⁹ Brookshire and Slesnick, *op. cit.*, p. 135.

to the LPE technique; these are discussed in the bound volume. Chapter 8 also points to a major advantage of an LPE approach—it allows for Factor #2 loss calculations in a straightforward format.

The new disaggregations of PE data also neatly fit with the disaggregations of age-earnings adjustments that can be obtained from U. S. government sources. The future need to forecast hours (H) of work has also been discussed in the bound volume and elsewhere.²⁰ These changes and possibilities imply changes in the calculation methods, software systems, and testimony protocols of forensic economists.

Finally, it should be mentioned that lost earning capacity must at least be projected through life expectancy when LPE reductions in loss values are made age-by-age. This results, however, in making adjustments twice for the “L” probability and the death probability. Technically, it is more precise either to make PE reductions through life expectancy or to extend LPE-adjusted projections to age 80 and beyond, when reasonable interpolations of life probabilities at advanced ages can be made.

3.7 Personal Consumption Reductions

As explained in the bound volume, in wrongful death cases a deduction for the personal consumption of the deceased wage earner prevents overcompensation for lost earnings to survivors. Briefly, the death of Jack Doe not only eliminates his earnings, but also eliminates his consumption from the family budget. To award survivors his lost income without reduction could leave them more to spend on themselves than had Jack lived.

Though the concept is simple, there are cases in which its correct application is unclear. One example is where the capacity to choose to spend has a value beyond the spending itself. Reducing the award by the deceased’s recorded personal consumption would leave the family without the option previously available to shift that spending to other areas. At any time Jack Doe could have spent less on himself and more for his children’s education, for emergencies, for other family members, or any purpose at any time. That contingent potential has value and could be recognized in the damage award.

An emergency situation may be the easiest to conceptualize. By cutting back on clothing, eating out, or a sports car purchase, Jack could have shifted spending to pay for his daughter’s kidney transplant (not covered by health insurance). The lost capacity to exercise that choice each year is worth to Jack’s family at least the annual value of the insurance premiums necessary to extend health coverage for organ transplants. (Actually it was worth more because the insurance rider would be limited, while Jack could shift his personal spending to any other emergency or, indeed, any other purpose to benefit his family. An insurance premium to cover all possible household contingencies and choices would be more costly, and perhaps not available in the insurance market.)

The insurance benefits from such a policy would equal the portion of Jack’s personal consumption available to be shifted to other uses, i.e., all of Jack’s per-

²⁰ Brookshire, *op. cit.*, pp. 289-291.

sonal consumption except that necessary for personal maintenance (see Section 3.7 C.). Under standard insurance practice, the required insurance premium would equal the benefits adjusted by the probability of having to pay the benefits (leaving aside administrative expenses, etc.). The difficulty is in assessing the probability of paying benefits. An actuarial approach suggests that spending data from large statistical groups would give the probability for Jack's personal consumption to be diverted to other family purposes; which is to say that the average choices made by average families would substitute for the specific personal consumption record of Jack Doe. Just as life tables based upon large statistical groups give the probability of death for Jack, similar personal consumption tables could give the probability of Jack's personal consumption changing in each future year. Until such tables are constructed, there is an argument to be made that their results are better approximated by using personal consumption figures derived from either the Cheit study or the Revised Equivalency Scale (see Section 3.7 B. in the bound volume) than by using the specific consumption record of the deceased.

To continue the theme, consider two traditional families, each with a deceased wage earner of similar age and income. The first family values present consumption over future consumption, saving none of its annual income, while the second saves heavily. Using family checkbooks to attribute specific consumption to each wage earner would give the first a higher personal consumption percentage and thus lower net earnings to replace. But is this result truly equitable? Savings defer consumption to future years when the family composition may change. Because household size typically decreases over the years, the eventual personal consumption of the decedent in the high-saving family may be greater than that of the decedent in the high-consuming family. Too little would be deducted from the high saver's award based upon current spending patterns. The use of statistical averages rather than client-specific spending would mitigate this likelihood.

In other situations, though the use of specific personal consumption figures for Jack Doe may be preferred in the courts, they may be unavailable or inappropriate, requiring the use of group averages. One example is when spending patterns for Jack may change over future years. This can occur when children mature and leave home, a nearly universal experience that alters consumption patterns among family members. There are many other examples which run the gamut of supporting elderly parents to a job change for the spouse. Any of these can cause the consumption percentages of family members to change. Thus, Jack's consumption percentage may need to be modified by average spending data derived from large statistical groups in order to project his future personal consumption along with future income.

The typical year's record of Jack Doe's personal consumption may be correctly projected for his remaining life if there are no substantial family changes expected nor a strong likelihood of other spending choices to be made. However, if changing circumstances will likely alter the spending pattern, it may be necessary to use statistical averages adapted to reflect any unusual aspects of Jack's own consumption.

New techniques for using U. S. government data in improving the precision of personal consumption deductions continue to be discussed in the literature. Harju

and Adams suggest an approach that involves detailed disaggregations and re-combinations of U. S. government data; suggest how personal consumption percentages vary by decedent and survivor income levels; and discuss the effects of single- versus multiple-earner households.²¹ Gilbert contrasts another approach by Patton and Nelson²² with the early Cheit study and the RES method; Gilbert also contrasts a “family income approach” and the “welfare” approach to personal consumption deductions. An important conclusion reached by Gilbert is that consumption deductions under newer approaches do not significantly differ from the percentage-of-income deductions suggested by the earlier Cheit study.²³ It should be remembered that the Cheit percentages represent consumption by one adult out of *total family income*. Adjustments to these percentages have always been necessary in cases of two-earner households to isolate the percentage deduction for consumption out of the *deceased’s* projected earnings.

In a 1990 survey of forensic economists, NAFE members were asked about their percentage consumption deduction for a deceased adult in a two-adult household with no children. The average deduction made by respondents was 30 percent of income, which is the exact reduction suggested in the 1961 Cheit study.²⁴ The Cheit study was the most commonly-cited data source for consumption deductions. The average percentage deduction made by forensic economists in the death of single persons was 77 percent.²⁵

3.8 The Impact of Income Taxes

The bound volume discusses the two effects of considering income taxes in lost earning capacity calculations—the “downward” effect of taxes on earnings and the “upward” effect of taxes on interest earnings. This second effect is less easily explained, and it has sometimes been labeled the “reverse tax effect.” The bound volume then contrasts a complex approach for considering both effects with a more straightforward approach involving the use of discount rates on tax-free bonds. The accuracy of both approaches has been discussed by Franz.²⁶ Under the second approach, we have calculated a real after-tax discount rate slightly above zero. This has often been combined with a zero real wage growth rate for certain railroad workers, for example, so that that *net* discount rate in tax-adjusted cases is also slightly above zero. In a recent article, Schwartz and Thornton argue that the appropriate net discount rate is slightly above zero.²⁷ Forensic economists must be able

²¹ Melvin W. Harju and Clarence H. Adams, *Estimating Personal Expenditure Deductions in Multi-Income Families in Cases of Wrongful Death*, JOURNAL OF FORENSIC ECONOMICS, 1990, Vol. 4, No. 1, pp. 65-81.

²² Robert T. Patton and David M. Nelson, *Estimating Personal Consumption Costs in Wrongful Death Cases*, JOURNAL OF FORENSIC ECONOMICS, 1991, Vol. 4, No. 2, pp. 233-240.

²³ Roy F. Gilbert, *Estimating Personal Consumption of a Deceased Family Member*, JOURNAL OF FORENSIC ECONOMICS, 1991, Vol. 4, No. 2, pp. 175-185.

²⁴ See Earl F. Cheit, *INJURY AND RECOVERY IN THE COURSE OF EMPLOYMENT* (New York: John Wiley & Sons, Inc., 1961).

²⁵ Brookshire and Slesnick, *op. cit.*, pp. 125-128.

²⁶ Wolfgang W. Franz, *The Effect of Recent Income Tax Reforms on the Calculation of Lost Earnings*, JOURNAL OF FORENSIC ECONOMICS, 1989, Vol. 2, No. 2, pp. 15-27.

²⁷ Eli Schwartz and Robert Thornton, *The Effects of Taxes and Inflation on the Real Interest Rate*, JOURNAL OF FORENSIC ECONOMICS, 1991, Vol. 5, No. 1, pp. 71-73.

to explain their approach to calculating income tax effects in FELA cases and in the few jurisdictions that require these calculations. The number of jurisdictions requiring these difficult-to-explain adjustments is not increasing.

APPENDIX 1

WAGE GROWTH, INTEREST RATES, AND INFLATION RATES IN THE UNITED STATES, 1971-1991

Year	U.S. Wage Index	Wage Increase	Treasury Bill Interest Rates	Interest Index	CPI	Percent Increase	Real Wage Growth	Real Interest Rates
1971	39.00	—	—	1.0000	40.70	—	—	—
1972	41.50	6.41	4.18	1.0418	42.10	3.44	2.97	.74
1973	45.10	8.67	7.27	1.1175	44.70	6.18	2.50	1.09
1974	49.50	9.76	8.16	1.2087	49.60	10.96	-1.21	-2.80
1975	54.50	10.10	6.01	1.2814	54.10	9.07	1.03	-3.06
1976	59.40	8.99	5.14	1.3472	57.20	5.73	3.26	-.59
1977	64.20	8.08	5.41	1.4201	60.90	6.47	1.61	-1.06
1978	69.90	8.88	7.46	1.5261	65.60	7.72	1.16	-.26
1979	76.70	9.73	10.45	1.6855	73.10	11.43	-1.70	-.98
1980	85.00	10.82	12.05	1.8886	82.90	13.41	-2.58	-1.36
1981	93.00	9.41	14.75	2.1672	91.40	10.25	.84	4.50
1982	100.00	7.53	11.14	2.4086	96.90	6.02	1.51	5.12
1983	103.70	3.70	8.94	2.6240	99.80	2.99	.71	5.95
1984	108.10	4.24	9.98	2.8859	103.30	3.51	.74	6.47
1985	113.00	4.53	7.73	3.1089	106.90	3.48	1.05	4.25
1986	118.60	4.96	6.16	3.3004	108.60	1.59	3.37	4.57
1987	122.70	3.46	5.99	3.4981	112.50	3.59	-.13	2.40
1988	128.00	4.32	6.90	3.7395	117.00	4.00	.32	2.90
1989	132.50	3.52	8.41	4.0540	122.60	4.79	-1.27	3.62
1990	139.60	5.36	7.76	4.3686	129.00	5.22	.14	2.54
1991	145.10	3.94	5.57	4.6119	134.30	4.11	-.17	1.46
AVG.	6.79		7.94		6.15		.64	1.79

SOURCES:

Interest Rates: Bond Yields and Interest Rates, 1929-91, ECONOMIC REPORT OF THE PRESIDENT, 1992, pg. 378.

Hourly Compensation: *Industry Analytical Ratios for the Business Sector—All Persons*, Bureau of Labor Statistics, February 5, 1992.

CPI: Consumer Price Index, Urban Wage Earners and Clerical Workers (CPI-W), Bureau of Labor Statistics, February 19, 1992.

APPENDIX 2
THE "TEETER-TOTTER"
REAL WAGE GROWTH VERSUS REAL INTEREST (DISCOUNT) RATE
FOR ALL U.S. WORKERS, 1952-1990

Year	All U.S. Wage Index		Interest (Discount Rate)		Consumer Price Index		Real Wage Percent Change	Real Interest (Discount) Percent
	Index	Percent Change	Rate	Index	Index	Percent Change		
1952	22.4	—	—	1.0000	79.5	—	—	—
1953	24.0	7.14	1.97	1.0197	80.1	0.75	6.34	1.21
1954	24.7	2.92	0.97	1.0296	80.5	0.50	2.41	0.47
1955	25.4	2.83	1.79	1.0480	80.2	-0.37	3.21	2.17
1956	27.1	6.69	2.72	1.0765	81.4	1.50	5.12	1.21
1957	28.8	6.27	3.34	1.1125	84.3	3.56	2.61	-0.21
1958	30.2	4.86	1.87	1.1333	86.6	2.73	2.08	-0.84
1959	31.5	4.30	3.48	1.1727	87.3	0.81	3.46	2.65
1960	32.9	4.44	3.00	1.2079	88.7	1.60	2.79	1.37
1961	34.1	3.65	2.43	1.2373	89.6	1.01	2.61	1.40
1962	35.7	4.69	2.84	1.2724	90.6	1.12	3.53	1.70
1963	37.1	3.92	3.23	1.3135	91.7	1.21	2.67	1.99
1964	39.0	5.12	3.64	1.3613	92.9	1.31	3.76	2.30
1965	40.6	4.10	4.05	1.4164	94.5	1.72	2.34	2.29
1966	43.4	6.90	5.01	1.4874	97.2	2.86	3.93	2.09
1967	45.9	5.76	4.43	1.5533	100.0	2.88	2.80	1.51
1968	49.6	8.06	5.50	1.6387	104.2	4.20	3.70	1.25
1969	53.2	7.26	6.89	1.7516	109.8	5.37	1.79	1.44
1970	57.2	7.52	6.66	1.8683	116.3	5.92	1.51	0.70
1971	60.9	6.47	4.46	1.9516	121.3	4.30	2.08	0.15
1972	64.7	6.24	4.18	2.0332	125.3	3.30	2.85	0.85
1973	70.3	8.66	7.27	2.1810	133.1	6.23	2.29	0.98
1974	77.3	9.96	8.16	2.3590	147.7	10.97	-0.91	-2.53
1975	84.9	9.83	6.01	2.5008	161.2	9.14	0.63	-2.87
1976	92.6	9.07	5.14	2.6293	170.5	5.77	3.12	-0.59
1977	100.0	7.99	5.41	2.7715	181.5	6.45	1.45	-0.98
1978	108.6	8.60	7.46	2.9783	195.3	7.60	0.93	-0.13
1979	119.3	9.85	10.45	3.2895	217.7	11.47	-1.45	-0.91
1980	131.8	10.48	12.05	3.6859	247.0	13.46	-2.63	-1.24
1981	144.1	9.33	14.75	4.2295	272.3	10.24	-0.83	4.09
1982	154.9	7.49	11.14	4.7004	288.6	5.99	1.42	4.86
1983	160.8	3.81	8.94	5.1209	297.4	3.05	0.74	5.72
1984	167.4	4.10	9.95	5.6306	307.6	3.43	0.65	6.31
1985	174.8	4.42	7.73	6.0659	318.5	3.54	0.85	4.04
1986	183.8	5.15	6.16	6.4393	323.4	1.54	3.56	4.55
1987	191.0	3.92	5.99	6.8249	335.0	3.59	0.32	2.32
1988	200.2	4.82	6.90	7.2958	348.4	4.00	0.79	2.79
1989	206.1	2.95	8.41	7.9091	365.2	4.82	-1.79	3.42
1990	213.5	3.59	7.76	8.5229	384.4	5.26	-1.58	2.38
AVG.	6.11%		5.90%		4.23%		1.80%	1.60%

4 FRINGE BENEFITS

4.1 Introduction

As was pointed out in the bound volume, employer contributions to fringe benefits, as a percentage of direct wage payments (payroll), dramatically increased from the end of WWII through the late 1980s. The annual fringe benefit survey of the U. S. Chamber of Commerce was cited as the leading source of average contributions to fringe benefits.

The 1990 survey, published by the U. S. Chamber of Commerce in 1991, shows employer contributions to fringe benefits, as a percentage of payroll, at 37.4 percent. This is important, because the percentage had declined for two successive years prior to 1989. The percentage was 38.6 percent in the 1986 survey, 38.0 percent in the 1987 survey, down again to 36.2 percent in the 1988 survey, but up to 36.7 percent in 1989 and 37.4 percent in 1990.¹ For the 1986-1990 period, the percentage has slightly fallen, but there is no demonstrable "trend," either upward or downward, in this percentage benchmark.

It remains a reasonable assumption that a fringe-to-payroll percentage established for a current year can be held the same for forecasts of fringe benefit earning capacity in future years. This is true if the "base" relationship can be discerned for an established relationship between a (plaintiff) employee and a specific employer, association, or union. It is also true when national statistics, such as the U. S. Chamber of Commerce study, are used. Nevertheless, forensic economists and labor economists may have reasons for forecasting a future which differs from the past, and such possibilities as national health insurance mean that forecasts of fringe benefit losses could change in the future because of changing public policy. It may be expected that such changes will be seen primarily in the distribution of economic losses between wages and fringe benefits, rather than as changes in total (lost) compensation itself. For example, a large increase in employer-required fringe benefits may be expected to be associated with a lowered rate of wage increase, *ceteris paribus*.

Finally, it should be noted that a shift continues toward economic sectors with lower fringe benefits.² This is one among many trends to be monitored and also has ramifications to fringe benefit losses in permanent injury cases, when injured

¹ U. S. Chamber of Commerce, EMPLOYEE BENEFITS 1987, 1988, 1989, 1990 AND 1991 (Washington, D.C.: 1987, 1988, 1989, 1990, and 1991.)

² Thomas P. Burke and John D. Morton, *How firm size and industry affect employee benefits*, MONTHLY LABOR REVIEW (December 1990), pp. 35-43.

persons have been restricted to jobs in “low-fringe” occupations, industries and/or economic sectors.

4.2 Why Include Fringe Benefits in Loss Estimates?

The bound volume discusses the rationale for treating the loss of employer contributions to fringe benefits the same as the direct wage or salary component of lost earning capacity. The “Market Theory” of valuing fringe benefits losses was singled out as the most common basis for such estimates—that the value of employer contributions to a fringe benefit category, as the amount necessary to obtain and keep the employee in the particular firm or labor market, is the best measure of lost earning capacity of the (plaintiff) employee. In a 1990 survey of forensic economists, the median value used for (lost) employer contributions to fringe benefits was 20 percent of wage earning capacity, and the most commonly used data source was the annual U. S. Chamber of Commerce study.³ The results imply that a current consensus favors use of a market theory approach and fringe benefit losses as the value of employer contributions per time period; the Chamber of Commerce percentages, less the value of pay for time not worked, remain in the 20-26 percent range, depending upon several smaller benefit categories that may or may not be considered.

Important and useful professional papers and articles are emerging, which deal with specific issues in the calculation of specific types of fringe benefits.⁴ This itself is a recognition that fringe benefit losses have always been an important part of lost earning capacity and overall economic losses.

Some have argued that contributions to a benefit category may bear little relationship to benefits actually received. A typical example is employer contributions to Social Security and/or to a defined-benefit pension plan for an employee a few years away from retirement. It must be remembered that the forensic economist must be guided by the *measure* of damages in a particular jurisdiction. If the measure is lost earning “capacity” or “power to earn,” then the economist must focus upon the value of employer contributions at each point in time; the issue of relating contributions per (lost) working period to benefits upon retirement, for example, is moot. This is not true when the legal standard is “pecuniary loss” or economic loss to the injured person or to survivors.

A troublesome question remains when the replacement cost of a fringe benefit, such as an individual health insurance plan, exceeds the market-based value of

³ Michael Brookshire and Frank Slesnick, *A 1990 Survey Study of Forensic Economists*, JOURNAL OF FORENSIC ECONOMICS (Spring/Summer 1991), Vol. IV, No. 2, pp. 125-149. The 20 percent is also consistent with the current figure quoted in the ECONOMIC REPORT OF THE PRESIDENT, which does not disaggregate or analyze fringe benefit data.

⁴ See Robert Roserman, *Restricted Fringe Benefits and Their Economic Value in Personal Injury and Wrongful Death Settlements*, JOURNAL OF FORENSIC ECONOMICS (Spring/Summer 1991), Vol. IV, No. 2, pp. 215-223; Ralph R. Frasca, *The Valuation of Fringe Benefits: A Comparative Analysis*, paper presented at Washington, D.C. meeting of the National Association of Forensic Economists, December 1990; Wolfgang W. Franz and Scott T. Ashby, *Valuing Future Fringe Benefits*, paper presented at San Diego meeting of the National Association of Forensic Economics, June 29-July 3, 1990; and Wolfgang W. Franz and Scott T. Ashby, *Calculating Fringe Benefits in Personal Injury and Wrongful Death Cases*, JOURNAL OF FORENSIC ECONOMICS (Spring/Summer 1991), Vol. 4, No. 2, pp. 245-246.

employer contributions for employees (under a pre-injury group plan). In such cases, absent legal guidelines, replacement costs are certainly more consistent with making the injured party "whole."

As will be seen, trends in employer-provided fringe benefits are more consistent, theoretically and practically, with a market-based, value-of-contribution-per-time-period approach to valuing fringe benefits losses. Cafeteria-style benefits and employee reimbursement accounts are leading current examples.

4.3 General Approaches To Estimating Fringe Benefits

A second important source of fringe benefits data, which may be considered along with the U. S. Chamber of Commerce studies for benchmark values, is the annually-published study of fringe benefits by the U. S. Bureau of Labor Statistics. Both studies provide useful disaggregations of average fringe benefits by category and by industry, occupation, and union membership, for example. These disaggregations, in turn, form the potential bases for projecting and differentiating future earning capacity by the likely nature of work.

The U. S. government series that had been discontinued for several years in the 1980s provides a more prompt report of survey data. The lag time is longer for reporting U. S. Chamber of Commerce data after an annual survey. It is important to note that the U. S. government reporting format provides average employer contributions to fringe benefit categories as a percentage of total compensation. These fringe benefit contributions must be converted to a percentage of payroll when compared with U. S. Chamber of Commerce survey conclusions.

When such a conversion is accomplished, results from the two surveys are very similar and reinforce each other. The latest comparison of U. S. Chamber of Commerce and government results is from the 1990 survey year. According to the U. S. Chamber of Commerce survey for 1990, employers paid U. S. workers an average of 26.25 percent in fringe benefits as a percentage of payroll, when fringe benefits that double count with wage estimates are excluded. The comparable percentage-of-payroll figure from the U. S. government was 24.82 percent. In the 1991 survey year, the percentage from the U. S. government survey rose from 24.82 percent to 25.41 percent. Again, past data support the assumption that future fringe-benefit-to-payroll percentages will likely be at the percentage established for the current time or the time of injury or death.

The Employment Cost Index (ECI) of the U. S. government may also be useful in tracking compensation and fringe benefit trends, although a hazard is that the value of leave time is calculated in fringe benefit compensation.⁵ The ECI is the only measure of labor costs that consistently treats wages, salaries, and total compensation costs by occupation and industry. Its existence embodies the idea that employers value *all* labor costs in comparison to the value of benefits derived from

⁵ See *Chapter 8. Employment Cost Index*, BLS HANDBOOK OF METHODS (Washington, D.C.: U. S. Government Printing Office, 1988), Bulletin 2285, pp. 53-62; Bureau of Labor Statistics. *EMPLOYMENT COST INDEXES AND LEVELS, 1975-89* (Washington, D.C.: U. S. Government Printing Office, 1989), Bulletin 2339; and subsequent issues of Bureau of Labor Statistics NEWS and other reports relating to the ECI.

using that labor; these values are produced by the operation of both labor and product markets.

4.4 Issues Within Major Fringe Benefit Categories

The changing nature of U. S. work may make forecasts of lost earning capacity in fringe benefits increasingly complex. For example, contingent jobs grew at a much faster rate than permanent jobs in the U. S. economy during the 1980s; contingent jobs do not provide job security, and hours of work may vary randomly.⁶ Such a trend, if continued, is important because much lower employer payments to fringe benefits are made to contingent workers than to permanent workers. This is especially true in regard to medical insurance and pension payments.

Future fringe benefit payments to workers will also be affected by the speed and magnitude of shifts from higher wage and fringe benefit jobs in the manufacturing sector of the economy toward certain service sector jobs that pay lower wages and fringe benefits. Changes in the relative importance of part-time jobs, multiple job holders, and self-employed persons will also be important in future forecasts. One possibility might be to forecast the probabilities that a deceased or injured worker would be in a certain type of job or employment status. The probabilities could be used to weight alternative fringe benefit conclusions that are attached to different occupational types or employment statuses. On the other hand, a multiyear track record of fringe benefits for a specific injured or deceased person must still be the preferred foundation for fringe benefit projections under normal circumstances.

More specific comments on fringe benefit categories must begin with an issue, mentioned above, that deals with valuing retirement and other elements of the Social Security system. Especially if the measure of damages is lost earning capacity, losses are valued as employer contributions per time period under a market theory. Additional measurement issues may arise when the legal standard is net economic loss to a specific person or survivors.

An equally important issue is forecasting the required employer contributions to the Social Security system of the future, and the maximum earning bases to which payroll tax percentages will be applied. Such forecasts involve both politics and economics, and assumptions may need to be made about such important policy issues as national health insurance.

Projecting both public and private sector health care contributions is, indeed, an important issue, and the dramatic rise in health care costs has received much attention.⁷ Some would separate medical care costs from other fringe benefit estimates, recognizing the higher-than-average increases in these costs over recent decades.⁸ Certainly, a method that holds medical cost growth to average earnings or average fringe benefits growth rates is conservative, unless, for example, one assumes such changes as continuing cost shifting from employers to employees.

⁶ See Michael L. Brookshire, *An Agenda For Future Research in Forensic Economics*, JOURNAL OF FORENSIC ECONOMICS (Fall 1991), Vol. 4, No. 3, pp. 287-296.

⁷ See Thomas P. Burke and Rita S. Jain, *Trends in employer-provided health care benefits*, MONTHLY LABOR REVIEW (February 1991), pp. 24-30.

⁸ Franz and Ashby, *op. cit.*

Other trends in employer-provided fringe benefits must be tracked by forensic economists. For example, employer-sponsored prescription drug benefits were the second-fastest category of medical cost growth; from 1979 through 1989, these costs grew 151 percent.⁹ Also within the health cost arena, health maintenance organizations (HMOs) have continued to grow as a means of managing health care. The participation rate of those offering HMO arrangements continued to grow in all regions of the nation in the eighties.¹⁰ Such arrangements are another example of employer costs per time period as an accurate measure of employee earning capacity in fringe benefits.

Moving to private pensions, the trend is away from defined benefit plans,¹¹ which are the most likely to cause difficulties in valuations based upon a market theory compared to a pecuniary loss theory. Employers and employer groups are likely to prefer defined contribution pension plans, which limit employer risk, worry, and responsibility. These plans are directly measured as a percentage of salary under a market-based approach, and defined contribution percentages from national studies have often been used as proxies for the market value of defined benefit plans.

Employers prefer, even more strongly, a shift in the distribution of their employee benefit dollars toward profit sharing plans, where benefits may be defined but are not guaranteed unless profit performance exceeds a certain benchmark. Slightly less than 20 percent of full-time employees now participate in such plans.¹² The forensic economist may be forced to treat this element of a fringe benefit package separately. As with bonuses and other one-time payments, the economist must deal with the probability in each future year that such a payment, in a particular amount, will be received. Averages of past payments, if available, clearly help as a foundation. In the extreme, the economist must revert to a model for commercial forecasts, predict profits, and thereby predict profit-sharing payments.

Other types of fringe benefits continue to emerge and grow. For example, 5 percent of full-time employees had employer-assisted child care in 1989, 3 percent had paid maternity leave, 1 percent had paid paternity leave, and 3 percent had some form of elder-care.¹³ While trends in leave practices do not directly affect fringe benefit projections, they do have an indirect effect on wage growth and the value of other fringe benefits, as employers weigh all employee costs.

A notable trend, with a significant impact upon fringe benefit loss estimates, is the continued growth of flexible benefit plans and individual employee reimbursement accounts. Employers make their dollars spent for each employee's benefits productive when the employee is provided dollars in a reimbursement account

⁹ Cathy Baker and Natalie Kramer, *Employer-sponsored prescription drug benefits*, MONTHLY LABOR REVIEW (February 1991), pp. 31-35.

¹⁰ Michael Bucci, *Health maintenance organizations: plan offerings and enrollments*, MONTHLY LABOR REVIEW (April 1991), pp. 11-18.

¹¹ See Edward J. Emering, *Defined Benefits Are In Jeopardy*, PERSONNEL JOURNAL (April 1991), pp. 104-109.

¹² Edward M. Cooter, III, *Profit sharing today: plans and provisions*, MONTHLY LABOR REVIEW (April 1991), pp. 19-25.

¹³ Stephanie L. Heyland, *Helping employees with family care*, MONTHLY LABOR REVIEW (September 1990), pp. 22-26.

that can be tailored to the needs of that individual employee. From 1986 through 1988 alone, private sector employees eligible for such plans grew from 5 to 13 percent,¹⁴ and many employers were just moving toward such plans by the late eighties. The growth of such plans adds further weight to the arguments that employer contributions to fringe benefits are best estimated as the value of each benefit category at each point in working time.

4.5 Necessary Adjustments To Fringe Benefits

The bound volume makes clear that personal consumption must be deducted from fringe benefits when applicable law requires such a deduction from lost earning capacity in wages. Survivors do not lose what the deceased would have consumed exclusively on himself—in either wages or fringe benefits. This is most apparent in the need to deduct a consumption percentage from public (Old Age Insurance of Social Security) and private retirement benefits. Even when these benefits are valued as contributions per time period, the loss value must be reduced because some portion of the retirement benefit would have been spent by the deceased, exclusively for himself or herself. The difficulty is that this logic does not apply to all categories of fringe benefits. A conservative approach is to apply a personal consumption deduction to the overall percentage of fringe-benefits-to-wages.

4.6 Testimony Regarding Fringe Benefit Loss

Both the measurement of employer contributions to fringe benefits and the forecast of fringe benefit payments far into the future are becoming more complex. The forensic economist must consider these complexities, without a significant increase in the presentation time or complexity of testimony. Communication must become more efficient.

The defense has many lines of potential inquiry. The decline in the fringe benefit percentage reported by the U. S. Chamber of Commerce for two of the last three years might be noted. Broad fringe benefit averages might be contrasted with averages for more specific types of work, sectors of work, and employment statuses that might relate to a specific deceased or injured person. Employer preferences to substitute “at risk” fringe benefit payments, such as profit sharing, for defined contribution or defined benefit pension plans, might be discussed, as well as the relative shifting of health care costs from employers to employees and/or to the government.

¹⁴ Joseph R. Meisenheimer, II and William J. Wiatrowski, *Flexible benefit plans: employees who have a choice*, MONTHLY LABOR REVIEW (December 1989), pp. 17-23.

5 HOUSEHOLD SERVICES

5.1 Introduction

The value of household services can be an important component of recovery in a personal injury, wrongful death or divorce case. Economists recognize that household production is an important component of the country's total value of production,¹ estimated to be perhaps as much as 25 percent or more of Gross National Product. Because of disparities in measurement of such services, the value of household production is not included in U. S. government national product statistics. However, many economists have argued for its formal inclusion in the measure of individual and national income because, by its omission, measures of the welfare changes in families may be misleading.

5.2 General Issues and Approaches

Estimating the replacement cost of these services is the most widely accepted method of estimating the value of household services. This is traditionally done by estimating both the number of hours of services lost and the cost of these services in the market. To estimate the cost, the services can be disaggregated into specific functions, and the appropriate market wage can be estimated for each type of service.² Alternatively, a market wage can be estimated by using an overall average wage, such as for housekeepers, for all hours. (The *Economic/Hedonic Software System* companion to this book allows for both these approaches.) The replacement cost method is also referred to as the specialist-cost or market-alternative approach.

As discussed in the book, other lesser preferred approaches involving replacement costs for valuing household hours exist. Valuing the service hours at the market opportunity wage of the provider is rarely done since it is usually viewed as a distinct overestimate; household service occupations are generally low paying jobs; the fact that the provider may earn more in the market does not mean that the services are worth more. Further, this method would value the household services of a highly paid executive more than the identical services provided by a laborer of low skill, a conclusion with which most economists would generally

¹ For a comprehensive bibliography of literature relevant to the valuation of household services, see *JOURNAL OF FORENSIC ECONOMICS*, Vol. 4, No. 3, 1991, pp. 339-353.

² Michael Brookshire and Frank Slesnick, *A 1990 Survey Study of Forensic Economists*, *JOURNAL OF FORENSIC ECONOMICS*, Vol. 4, No. 2, 1991, Question 13, p. 136. This method was used by 48.8 percent of the respondents to the survey.

disagree. However, using the wage of a housekeeper as an estimate of the average wage for all hours can lead to an underestimate of the value provided, since some of the more sophisticated services that are performed in households, such as nutritional planning or nursing care during late night hours, are expensive and are rarely performed by housekeepers. Still, such an approach, while very conservative, is common.

Several conceptual issues that bear on the measurement process are worth future research.³ The distinction between a household service and a leisure activity or social role such as maintaining a formal garden may be blurry. Furthermore, multiple services, such as gardening and child supervision, may be performed simultaneously. Importantly, the quality of services and skill level of the provider can vary; for example, some skilled gardeners raise rare hybrid orchids while others may grow only common varieties of petunias.

5.3 Methods of Estimation

Often the amount and type of services that might have been performed in the future by an injured or deceased person is difficult to forecast, even if the amount of services in the past has been carefully recorded. Thus economists frequently rely upon statistical data sources for general estimates of the number of hours and types of services. Several reliable data sources are available for estimating household services for the statistically average person. Perhaps the most well known and widely used in forensic economic work is the Gauger and Walker study at Cornell University, summarized on page 93 of the book. While the Gauger and Walker estimates, based on the oldest data, show the highest figures, all data sources underestimate the total value of a household production by omitting certain categories of work such as shopping. A second frequently used data source is from the Institute for Social Research (ISR) (at the University of Michigan) Survey for household services, as well as ISR data developed by the Panel Study of Income Dynamics (PSID), which examines only housework, not all of household services. Peskin⁴ developed estimates of household time using non-PSID data; Kiker and Heath⁵ used the PSID data to develop estimates. The Gauger and Walker study is generally easier to use since it is in the form of a table; Peskin and Kiker and Heath studies are in the form of equations.

In an excellent study, Douglass, Kenney and Miller⁶ undertake a comparison of Gauger and Walker, Kiker and Heath, and Peskin, adjusting appropriately for comparability. Using an assessment of nine different illustrative family structures, this study shows the average variation between these sources to be under 8 per-

³ See Thomas R. Ireland and John O. Ward, *Replacement Cost Valuation of Production by Homemakers*, JOURNAL OF FORENSIC ECONOMICS, Vol. 4, No. 3, 1991, pp. 297-305.

⁴ Janice Peskin, *The Value of Household Work in the 1980s*, 1983 PROCEEDINGS OF THE SOCIAL STATISTICS SECTION, American Statistical Association, Washington, D.C. (1984).

⁵ B. F. Kiker and Julia A. Heath, *Evaluating Household Services: Additional Evidence*, JOURNAL OF FORENSIC ECONOMICS, Vol. 1, No. 1, (Sept. 1987), pp. 19-25.

⁶ John B. Douglass, Genevieve M. Kenney, and Ted R. Miller, *Which Estimates of Household Production are Best?* JOURNAL OF FORENSIC ECONOMICS (Dec. 1990), Vol. 4, No. 1.

cent. The alternative estimates appear quite comparable despite the significant difference in the time between the studies.

5.4 Other Refinements

Single adult households are becoming increasingly common, but some problems arise in estimating the value of household services for such households. The total number of family households with children under the age of 18 increased by 4.2 percent in the 1980s, but those with no spouse present increased by 25 percent.⁷ Such single spouse households now constitute more than one family household in five (23.4 percent) with children under the age of 18. The Gauger and Walker study does not provide guidelines for single parent households; a user must extrapolate from the study. Peskin shows that the effect of being married increases the number of hours spent; Peskin estimates about 6.5 more hours per week for women, but no statistically significant effect of being married for men. The studies may somewhat underestimate the number of household hours performed by husbands with working wives.⁸ The percentage of such households increased substantially during the 1970s and 1980s. It may be that there has been a significant shift in the traditional roles whose impact has yet to be fully measured. Further research in these areas would be helpful.

A second issue arises in measuring the services rendered by people in their senior years. It seems logical that the number of hours devoted to household services eventually declines at some point in the senior years prior to the end of life expectancy, due to illness, incapacity or reduced need. However, no researcher reports any decline in either a man's or a woman's household contribution in the years just prior to the end of life expectancy. Perhaps no one has sought to test for this as yet. To be conservative, an economist might terminate household services during the last year or so of life expectancy. On the other hand, the measure of household services excludes shopping and some child supervision. These two effects may offset each other, depending upon the age of the deceased or injured spouse.

A further complication arises when an unemployed housewife with preschool children dies or is injured. The husband must replace her for all the hours he is away from the home, not just for the several hours she spent on specific household tasks. Upon the death of a spouse, adjusting for the hours and activities not included in the accepted studies may more than offset the decline resulting from fewer needs and reduced ability and incapacity in old age.

5.6 Testimony

Plaintiff's attorneys will want to make sure that the assumptions used in determining the value of household services appear reasonable, without stretching. So long as conservative assumptions are used, it is usually not productive for the defense

⁷ Table No. 62, STATISTICAL ABSTRACT OF THE UNITED STATES: 1991 (111th Edition), Washington, D.C., 1991, p. 48, based on U. S. Bureau of the Census, CURRENT POPULATION REPORTS, Series P-20, No. 447 and earlier reports and unpublished data.

⁸ Harvey Paul, *The Role of the Husband/Father in Household Output*, JOURNAL OF FORENSIC ECONOMICS, Vol. 4, No. 2, 1991, pp. 203-209.

to challenge an economist in front of a jury regarding minor variations and alternatives regarding this calculation. At times, we have heard economists for the defense argue that a deceased housewife had worked in the household as a hobby, and therefore there truly is no value at all to the service since she chose to forego a career and not take a job. At other times, we have seen economists give no household services value for women with full-time jobs. We caution against these tactics. Not only do they fail to value a real service, but the defense can seem heartless, and this may backfire.

We have sometimes seen a plaintiff's economist estimate the value of an unemployed housewife's services by using the wages plus room and board costs of a full-time, live-in housekeeper. Similarly, we have seen defense economists give no credit to the household services of a woman working full-time outside the home. Both these extreme positions represent a major distortion without foundation and should be subject to (successful) challenge.

While Gauger and Walker show a small value of the service contribution by minor children, there is likely a net savings through a reduction of services performed by the adults. There are special instances, however, such as on a farm or in a business in the home, or in a single adult family, where the services of a child may be substantial and therefore should be claimed, taking the offset into consideration.

Defense attorneys sometimes argue for a deduction from the service value for the amount required because of the absence of the deceased in the household. This may seem reasonable to a jury. Economists generally believe that the services are performed for the family unit as a whole, but it is possible that future research may show a "personal consumption effect." A plaintiff's economist might argue that any such effect would be more than offset by several factors: first, anyone hired to perform the lost services will probably require more time to perform them since they will not be as familiar with running the household as the decedent and will require management; second, they may not have the same incentive as the decedent (or injured party) to perform these services with the same degree of quality provided by the family member. And as stated previously, many published estimates of average hours spent omit certain activities, and this makes them somewhat conservative.

6 MEDICAL AND INSTITUTIONAL CARE COSTS

6.1 Introduction

After earnings and household services losses, future medical costs are perhaps the most frequently estimated element of damages that economists are asked to calculate. When a plaintiff is seriously injured, significant costs may arise in the future for care and treatment by medical specialists. There may also arise expenditures for drugs, equipment and supplies. Future care needs may include a variety of treatments and remedies, including lengthy hospital stays, surgery, home care, occupational therapy, modifications to the home, specialized furniture and equipment, etc. The list includes all reasonable medical costs related to the tort and generally accepted by the medical profession.

Future medical costs are commonly detailed by specialists in medical care, including physicians, physiatrists, nurses and life care plan specialists. It is increasingly common, however, for defense attorneys to ask the economist to expand his traditional role beyond that of merely calculating the present value, and to request that he scrutinize such plans for possible redundancy, double counting, and reasonableness of costs.

The general approach used by economists to project future medical related losses is described in the bound volume. A significant increase in the level of sophistication of this process has been suggested recently by Slesnick,¹ based on work by Englehart.² Slesnick argues that such expense estimates should be modified by the year-by-year probabilities of loss, replacing the current practice of assuming an all or nothing loss for various periods of the plaintiff's future years.

This method is similar to the LPE calculation, described in Chapter Three in the bound volume, for wage losses, which assigns the combined probabilities of living, participating in the workforce and being employed, to each year of future earnings. The loss of potential earnings is limited by the LPE to the simultaneous probability of being alive and participating and employed. Similarly, each year's

¹ Slesnick, Frank, *Forecasting Medical Costs in Tort Cases: The Role of the Economist*, JOURNAL OF FORENSIC ECONOMICS (Winter 1990), pp. 83-99. This article develops a framework for a more comprehensive calculation of future medical costs and points in the direction the economics profession will most likely take. It is drawn upon liberally in this supplement.

² Englehart, Kenneth, *Proof of Future Events: In Support of the "Simple Probability" Burden of Proof*, ADVOCATES QUARTERLY, Vol. 8, 1987, pp. 163-184.

medical costs would be limited by the combined probability of being alive and requiring the medical costs.

Implementing this approach is complex and can require data not yet readily available. For example, how does the type and severity of each illness or physical disability alter the life span of patients? How certain are the future medical costs for a patient? Does the illness in question create a probability of other derivative illness or symptoms which will increase costs? Conversely, what is the probability that the patient will be cured? In what period? With what chance of recurrence? With what chance of complications? What is the cost to treat the complications? Economists are beginning to develop a cost database, but as yet only for certain specific injuries.³

Generally, life tables which are affected by certain illnesses or conditions are not readily available. Insurance companies have developed these, using private actuarial data, for their own proprietary use. With the recent publication of *Medical Risks: Trends in Mortality by Age and Time Elapsed*,⁴ a significant step has been taken in making some of the data more accessible to the public. This reference details the impact of many risks, including lifestyle hazards (such as smoking and alcoholism), cardiovascular diseases, neurological, psychiatric, respiratory and other diseases, on life expectancy. It can be used to assess pre-injury life expectancy for individuals suffering from preexisting medical conditions or exposed to occupational hazards, among other circumstances. It is of limited use in modifying post-injury life expectancy because it is geared toward diseases rather than specific injuries, although injuries such as cerebral concussion, skull fracture, and spinal cord injuries resulting in paraplegia and quadriplegia are assessed.

The probabilities of requiring treatment in the future, conditional upon differing future circumstances, are complex. Ideally, actuarial and medical probability tables will be constructed from the histories of illnesses and injuries for use parallel to LPE calculations in earnings projections.

One alternative method of estimating these total costs, when total institutional care is required, is to obtain a quote for the total future life care from an institution willing to provide this for a given lump sum. This is, in effect, an annuity consisting of the required care over time. There exists, however, the probability of default in delivery, which could be factored in by separately insuring for that contingency. Such performance bonds are not uncommon in the construction industry and should be available. The total estimate would include the cost of the care and of the performance bond or guarantee.

6.2 Estimating Medical, Therapy and Similar Costs

A. Possible Categories of Costs/Losses

The reasonableness of future costs has several dimensions. One dimension is the

³ Miller, Ted, Nancy Pindus, and Shelli Rossman, *Long Term Costs and Consequences of Injury*, Working Paper, The Urban Institute, Washington, D.C. 1990.

⁴ Lew, Edward A., and Jerzy Gajewski, eds., *MEDICAL RISKS: TRENDS IN MORTALITY BY AGE AND TIME ELAPSED*, Sponsored by the Association of Life Insurance Medical Directors of America and the Society of Actuaries, 2 Vols. Praeger, 1990.

reasonableness to the medical community regarding standard of care. Another is the reasonableness as a standard of quality of life in our society. A third dimension is the reasonableness of expectation that the expenditure will be necessary in the future.

The standard of care for severely injured people can vary tremendously. Institutional costs can differ by a factor of two or more. For example, it may be unreasonable to use the most expensive hospital in a metropolitan area as the basis for institutional care. The difference, in present value terms, between maximum quality and average care may be in seven figures for certain injuries, particularly in serious brain injury cases. There is almost no practical upper limit to the amount that could be spent in some instances, although at some point the marginal benefit may be questionable. When restoration to the pre-injury status is not possible, at what point should the defendant cease to bear responsibility for marginally beneficial therapies or equipment expenditures?

The quality of care can extend the lives of some patients. This can raise the present value of future medical costs by increasing the total number of years over which care is expected to be provided. Is this justifiable when there is permanent brain damage and no cognitive awareness of any prolonged life expectancy? To what extent does society wish to impose such care costs? Conversely, can higher quality care for certain illnesses shorten the recovery period and reduce future costs? Unfortunately, these questions cannot be answered generally with available data. This reinforces the need for the economist to approach each case individually and to rely upon medical and rehabilitation experts to determine which outlays are required and which are reasonable. Differences among medical experts are almost certain to arise and should be expected.

Certain future expenses may be required only under particular conditions. The probability of complications and contingencies must be included. While any of ten future complications all may be reasonably certain to occur in a given patient, the probability that all ten will occur may be small. This test of reasonableness can vastly complicate a present value analysis and may require data that are not now available.

Even if the data are available to estimate the expected cost of a possible future treatment, a moral problem can arise. Assume an instance where the defendant has stipulated to liability and seeks to pay a fair estimate of future medical costs. If medical experts expect that the plaintiff may require a certain heart operation, with 10 percent probability in, say, 5 years, what amount should be paid? How equitable is it to award the plaintiff 10 percent of the cost of this treatment knowing that if the treatment is required, the monies to pay for it will not be available, and that without the treatment death will occur with certainty? How fair is it for the plaintiff to keep the 10 percent estimate after 5 years if no operation is required?

B. Establishing the Basis for Necessary Costs

Once a particular medical condition has been specified by medical experts, it would be ideal if economists could rely upon some actuarial basis for the probabilities of future care and the cost calculations, by specifying plaintiff's age, race, gender, and type and severity of injury. In the extreme, this would permit the economist

to project medical costs independently, without the need for the plaintiff's attorney to hire medical and rehabilitation experts to establish a foundation for costs.

It may be some time before expert systems programs will replace medical experts, life care planners and vocational rehabilitation experts. The development of diagnostic systems and artificial intelligence programs is proceeding at such a rapid rate that this eventuality within a decade or so is likely. Such systems are already available for the military to use in emergency battlefield conditions in the treatment of trauma. At present, however, there are simply too many elements which affect the prognosis of each plaintiff and which must be evaluated by the appropriate expert. There are, however, unique aspects of each case which may forever continue to trouble expert systems and humans alike.

Thus economists must be realistic in their use of such actuarial data as it develops. A danger may arise when a professional expands his claimed expertise beyond the borders of his training and competency. It may require specialized training to apply results of actuarial studies of survival of certain injuries to a particular plaintiff. If anything, there will be a greater need for interdisciplinary work in which economists and other experts work more closely to increase the quality of the assessments.

Certain medical conditions have more abundant and useful data on the probability, timing and cost of necessary medical services. Slesnick uses the example of spinal cord injuries, which have been widely studied. He breaks these costs into first year costs such as hospitalization, unique second year costs such as home remodeling, and annual follow-on costs such as attendant care. Using work by Geisler⁵ and by Webb,⁶ a study done by the Bureau of Economic Research,⁷ and other information, the economist can come closer to estimating the lifetime cost of caring for an average injury.

An economist must scrutinize the costs to avoid double counting and redundancy, or the life care plan loss figure may be unnecessarily high. Medical specialists often are unaware of the concept of marginal or incremental costs when estimating future costs. According to Slesnick, spinal cord patients may average 42 days per year in the hospital. Their incremental cost, however, is only for the number of days above the average annual future hospital stays of the uninjured cohorts of similar age and other characteristics. The loss is properly limited to the incremental cost because the plaintiff would be expected to incur the cost of the average stay absent the tort which caused the spinal injury.

Double counting can arise in calculating personal consumption for institutionalized patients. Food, housing, home modifications, clothing and other personal outlays which the plaintiff would have borne in any event should be used to reduce the cost of care that eliminates, reduces or offsets those expenses. Some life care plans include, for example, routine dental examinations that should be part of a general personal consumption pattern, and not an incremental expense of the injury.

⁵ Geisler, W.O., et al, *Survival in Traumatic Spinal Cord Injury*, PARAPLEGIA, Vol. 21, 1983, pp. 364-373.

⁶ Webb, Samuel, *First Year Hospitalization Costs for the Spinal Cord Injured Patient*, PARAPLEGIA, Vol. 15, 1978, pp. 311-318.

⁷ ECONOMIC CONSEQUENCES OF SPINAL CORD INJURY, New Brunswick, N.J.: Bureau of Economic Research, 1985.

D. Estimating Economic Loss

In the bound volume we provided expenditure detail in the Medical Care Index on page 104, Table I: "Medical Care Price Increases Compared to Increases in the Consumer Price Index, 1970-1988." Below is a table showing 1981 through 1991 real growth in prices for Medical Care Price Index All Items, and expenditure detail in four categories: Medical Care Commodities, Medical Care Services, Physician's Services and Hospital Rooms.⁸ Real growth rates reflect subtracting 3.9% inflation (CPI-U) for the 1981-1991 period and 6.4% for the 1970-1988 period.

EXPENDITURE DETAIL CONSUMER PRICE SERIES	DEC. 1991 CPI-U INDEX	1981-1991 REAL GROWTH RATE	v.	1970-1988 REAL GROWTH RATE
Medical Care All Items	182.6	3.8%	v.	1.7
Medical Care Commodities	181.7	3.7	v.	0.0
Medical Care Services	182.8	3.8	v.	2.1
Physician's Services	174.4	3.1	v.	1.8
Hospital Rooms	198.3	5.0	v.	4.3

Every category shown above has a higher growth rate in real terms over the past decade than in the 18-year period from 1970 through 1988. The real growth rate of overall medical care is more than double, 3.8% versus 1.7%; for 1991, the real growth rate for Medical Care All Items is even greater than the past 10-year average: 4.8% versus 3.8%. This recent national experience in medical care price growth significantly above the rate of general inflation continues to raise a national alarm.

6.6 Other Issues and Refinements

Institutional care cost indices are currently not available. Because long term institutional care is frequently indicated in severe injury cases, it would be useful if the government consumer price index included an expenditure detail on nursing home costs. These vary significantly by region. Commonly, an economist estimates these by conducting a (non-scientific) survey of several facilities, but national data would be extremely helpful.

Changes in the life expectancy of an injured victim who is still employable can significantly affect lost earnings estimates. Changes in the probability of survival due to certain injuries will shorten the worklife and hence the wages that are calculated as a setoff against pre-injury wages. The shortened life expectancy can also reduce the setoff of household services if the victim is still able to provide some of these.

This country is in the throes of a national debate about health care costs, catastrophic insurance coverage and national health coverage. How we as a society resolve these issues will significantly affect the price and allocation of health care in the near future. It will be important to monitor changes in costs over the next few years because of the complex effects of the recent recession, government medical cost containment strategies and changes in both the supply of and demand for physicians and total medical services.

⁸ CPI DETAILED REPORT, U. S. Department of Labor, Bureau of Labor Statistics, Washington, D.C., December 1991.

7 SPECIAL CASES

7.1 Introduction

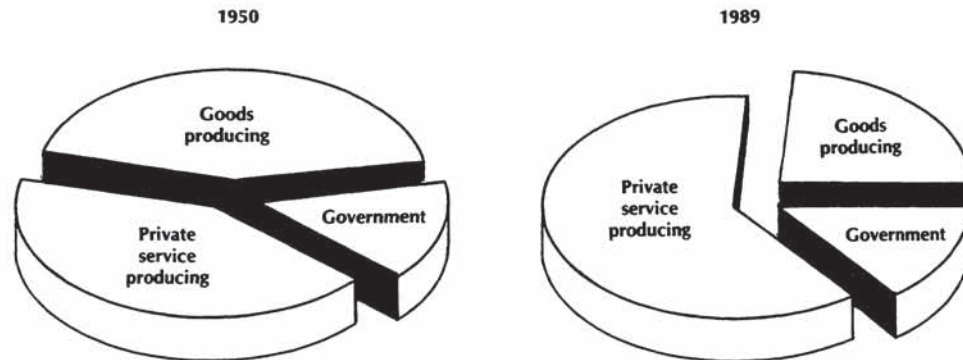
The “special” cases described in this chapter of the bound volume are increasingly normal and typical for the trial attorney and the forensic economist. At the same time, the case of a white male household head, employed full-time in a permanent job, is becoming less the norm.

Changes in labor force composition and the nature of American work may stimulate significant changes in loss projection techniques and in the computer software for economic loss projections. Consider the case of an unmarried male or female in his or her early twenties; further assume that this deceased or seriously injured person was in some type of training or education program and was working part-time in a service sector firm. We may be moving toward forecasts of alternative scenarios for a future of permanent or contingent employment, with related earnings, worklife expectancy, fringe benefit, and consumption characteristics. Alternative scenarios may also be created for differing sectors of employment, full-time or part-time work, labor force attachment, etc. The exercise of judgment might involve primarily the probability weighting of the alternative scenarios (or vectors of economic loss extending far into the future).

Forensic economists already consider alternative scenarios, sometimes in formal reports and more often, implicitly and informally, in testimony. It is the changing nature of American work that may force a more formal and explicit approach. Chart 1 demonstrates only one of such changes: the shifting of work among major economic sectors that is expected to continue.

Forensic economists need more interdisciplinary research and improved communication with U. S. government and other entities that produce basic data to move further in this direction. Even then, a fundamental problem to be addressed is how the increased complexity of economic analyses can be effectively and efficiently communicated to triers of fact.

Chart 1
Employment by Major Industry Sector, 1950 Versus 1989



SOURCE: Lois M. Plunkert, *The 1980's: a decade of job growth and industry shifts*, MONTHLY LABOR REVIEW (September 1990), p. 5.

7.2 Females

When employment rates are updated through 1991 for females, average employment rates rose very slightly over the 1988 data from Table 1 in the bound volume. This was true for both black and white females, with 1989-1991 data added for a 20-year average of employment rate changes; this was despite the onset of recession. The key variable for analysis and prediction remains the future participation rates of both black and white females.

The 1991 data updating 1988 data from Table 1 of the bound volume show white female participation rates rising slightly from 1988-1991 and black female rates falling slightly. Table 2 of the bound volume clearly shows the rapid rise in overall labor force participation rates of females through 1988. The participation rate of females age 20 and over rose from 33.3 percent in 1950 to 37.6 percent in 1960 to 43.3 percent in 1970 to 51.3 percent in 1980. This participation rate continued to steadily increase through the eighties, reaching 56.8 percent in 1988. The participation rate rose to 57.7 percent in 1989, rose slightly to 57.9 percent in 1990, and fell to 57.8 percent in 1991.¹

Forecasting future participation rates for females of different ages is among the most difficult tasks of labor economists and forensic economists. Some note the rapid rise in the participation rate of females since World War II and envision that economic and social factors will cause this trend to continue.² A few forensic economists already go to the extreme of setting future participation rates of females

¹ Bureau of Labor Statistics, U. S. Department of Labor, MONTHLY LABOR REVIEW (January 1992), p. 85. The 1991 participation rate is an average of monthly rates for January-November, 1991.

² See, for example, Janet L. Norwood, *Working Women: Where Have We Been? Where Are We Going?* (Washington, D.C.: U. S. Government Printing Office, April 1990), U. S. Bureau of Labor Statistics Report 785, pp. 1-2.

equal to those of males. This becomes more acceptable when the participation rate of a particular female resembles the male participation rate more closely than the female participation rate, at past ages before injury or death.

Others note that the rate of increase in participation growth by females has slowed and may be leveling. A declining trend in female participation rates for the age 55-64 group would negate or significantly undermine the Bureau of Labor Statistics' forecasts of higher participation rates for females by the year 2000.³ Clearly, the latest participation rates published for females should be used, rather than any historical averages that result in participation rates for average females that are too low. We do not yet see the scientific foundation for routinely equating female and male participation rates into loss estimates for average females. In individual cases, where the injured female has a history of participation, the forensic economist should deal with such possibilities either formally in a written analysis or less formally in testimony.

An increasingly important variable in worklife assessments is the likely hours of work, in terms of full-time and part-time work schedules. Almost 20 percent of women working full-time in one year do not do so the next year, and 38 percent of women working part-time in one year either move to full-time work or leave the labor force by the next year.⁴ A recently published study noted that a decline in the male-female earnings gap from 1979-1987 resulted from both hours-of-work changes and changes in earning levels.⁵ In 1979, 66.0 percent of men with work experience versus 44.3 percent of women with work experience were working year-round full-time schedules. By 1987, 68.4 percent of men and 51.5 percent of women were on year-round, full-time work schedules.⁶

Chart 2 provides a comparison of average weekly hours for men and women, in 1979 and 1989, with the prime working age range and older age groupings. While average working hours for men have remained stable, the hours of work for average females have clearly been on the rise. The difference in hours of work by gender remains significant. As with female participation rates, some argue that average working hours for females will continue to rise; others point to trends toward part-time, flexible, and stay-at-home jobs, which may retard the future growth in hours of work for average participating females.⁷ As hours projections become more explicit, in earnings base and/or worklife expectancy calculations, forensic economists will be increasingly required to make explicit their assumptions about future working hours of both women and men. The history of working hours by particular females is still the foremost foundation for future projections.

³ WORKFORCE 2000, WORK AND WORKERS FOR THE 21st CENTURY (Indianapolis: Hudson Institute, Inc., 1987), p. 87.

⁴ Rebecca M. Blank, *The Role of Part-Time Work in Women's Labor Market Choice Over Time*, AEA PAPERS AND PROCEEDINGS (May 1989), pp. 295-299.

⁵ Michael W. Horrigan and James P. Markey, *Recent gains in women's earnings: better pay or longer hours*, MONTHLY LABOR REVIEW (July 1990), pp. 11-17.

⁶ *Ibid.*, p. 12.

⁷ Norwood, *op. cit.*, p. 2; and WORKFORCE 2000, *op. cit.*, p. 88.

Chart 2
Per Capita Weekly Hours For
Men and Women, 1979 Versus 1989,
Selected Age Ranges

Age Range	1979	1989	1979	1989
	Men	Men	Women	Women
35-44	39.5	39.4	20.1	25.4
55-59	32.1	31.1	15.5	17.8
60-64	22.9	20.1	10.2	10.8
65 and over	5.5	4.7	2.0	2.0

SOURCE: Unpublished data from the U. S. Department of Labor, Bureau of Labor Statistics.

Focusing only upon year-round, full-time workers, female earnings were 60.2 percent of male earnings in 1979; female earnings increased to 65.0 percent of male earnings by 1987.⁸ By 1989, median earnings of women were 70 percent of the median earnings of men, compared to 63 percent of median male earnings a decade earlier. Since the gap in earnings is smaller for younger women than younger men, it may be expected that the relative percentage will continue to increase as these younger cohorts move through working life.⁹ The data do not exist, on the other hand, to forecast the elimination of a female-versus-male earnings differential.

As suggested in the bound volume, a significant factor affecting this wage gap in the future is the extent to which women qualify for, and move into, higher-paying occupations, industries, and sectors of work. The 1990 data on occupational distribution, to update Table 3 of the bound volume, do not show significant changes. The most notable was an increase in the share of women in "managerial and professional specialty jobs," from 25.2 percent of working women in 1988 to 26.3 percent two years later.¹⁰ However, the effects of shifts in the occupational mix can be complex. Women who were employed as executives, administrators, and managers, working full-time, had median earnings 60.5 percent of those for men in 1987, which is less than the 65 percent overall relationship of female to male earnings reported above for the same year.¹¹

7.3 Minorities

Comparing data through 1991 with the data through 1988 in Table 1 of the bound volume, participation rates for black males slightly decreased and employment rates slightly increased or decreased, depending upon the age category. In contrast, par-

⁸ Horrigan and Markey, *op. cit.*, p. 13.

⁹ Norwood, *op. cit.*

¹⁰ U. S. Bureau of Labor Statistics, *EMPLOYMENT AND EARNINGS* (October 1990), p. 30.

¹¹ U. S. Department of Labor, *Fillers From The U. S. Labor Department*, October 1990.

ticipation rates for white males were stable, and employment rates slightly decreased. The national recession, which began in the second half of 1990, certainly affected participation and employment rates in the short run, and these adverse effects have had a disproportionate impact upon blacks in the past.

Black median income compared to that of whites was shown through 1987 in the bound volume, when black income was 56 percent of white income and had fallen from a high of 61 percent in 1970. By 1989, median household income was \$18,083, which was 59.5 percent of the \$30,406 income for whites.¹² Thus, the decline in relative incomes ceased, and the income relationship improved, over these two years.

As with females compared to males, one significant factor is the differing occupational mix of blacks and whites. The 1990 data which update 1988 data in Table 5 of the bound volume show a positive movement in the occupational mix of blacks, toward the highest-paying occupational sets. The percentage of blacks in "managerial and professional specialty" occupations rose from 15.4 percent in 1988 to 16.0 percent by 1990; the proportion of blacks in "technical, sales, and administrative support jobs" rose from 27.8 percent to 28.2 percent in the same period.¹³ In considering future earnings projections, the economist must also keep in mind such variables as the deployment of blacks by industry and trends in the education and training of blacks compared to whites for various occupations and careers. For example, are blacks disproportionately represented in declining manufacturing industries, with likely shifts toward lower-paying work?¹⁴ What will be the impact of reverse discrimination litigation on black enrollment in professional schools?¹⁵

New data to update Table 6 of the bound volume do not show significant changes in important labor force characteristics of Hispanics. The overall participation rate fell from 67.4 percent in 1988 to 67.0 percent in 1990. The participation rate for male Hispanics was 85.0 percent in 1989 and fell to 84.1 percent in 1990; the participation rate for female Hispanics rose from 54.2 percent in 1988 to 54.6 percent in 1990.¹⁶ Key worklife variables continue to vary significantly by Hispanic sub-groups.

Median income of Hispanics was shown and compared to other groups in Table 7 of the bound volume. By 1989, median income of Hispanics was \$21,921, compared to \$18,083 for blacks and \$30,406 for whites.¹⁷ Hispanic income had risen to 72.1 percent of white income, compared to 70.4 percent in 1987. The occupational mix of Hispanics, like females and blacks, is an important variable, and data

¹² U. S. Bureau of the Census, *STATISTICAL ABSTRACT OF THE UNITED STATES 1991* (Washington, D.C.: U. S. Government Printing Office, 1991), p. 449.

¹³ U. S. Bureau of Labor Statistics, *EMPLOYMENT AND EARNINGS* (January 1991), p. 184.

¹⁴ Linda Stearns and Charlotte Coleman, *Industrial and Labor Market Structures and Black Male Employment in the Manufacturing Sector*, *SOCIAL SCIENCE QUARTERLY* (June 1990), Vol. 71, No. 2, pp. 285-298.

¹⁵ John Gruhl and Susan Welch, *The Impact of the Bakke Decision on Black and Hispanic Enrollment in Medical and Law Schools*, *SOCIAL SCIENCE QUARTERLY* (September 1990), Vol. 71, No. 3, pp. 458-473.

¹⁶ U. S. Department of Labor, *EMPLOYMENT AND EARNINGS* (January 1991), p. 209.

¹⁷ U. S. Bureau of the Census, *op. cit.*

updating Table 8 through 1991 show that the percentage of both male and female Hispanic workers in the two highest-earnings categories fell slightly between 1987 and 1991.¹⁸ Again, trends in industry deployment, education, and training are important to forecasts for Hispanics without work histories.¹⁹

7.4 Minor Children

The primary source for many forensic economists in estimating the likely earning capacity of a minor child is the latest edition of *Money Income of Families and Persons in the United States*.²⁰ This provides average income by age, race, sex, and education level. A problem with past publications is that mean and median income were reported for all white males, for example, aged 18-24 and age 25 and over. Thus, the economist had to explain a large jump in projected income and earnings at age 25. It might be explained that the age 25+ average would be higher than expected at ages immediately after age 25 but lower than expected after some point in the age 30s when earnings plateaus are reached by average workers. A worrisome truth was that the early years, when earnings and income would be below the age 25+ average, are weighted more heavily because they are discounted to present value less heavily.

The 1990 edition of this publication brought a significant change in the disaggregation of these data. For the first time, average income by race, sex, and educational level were reported by age range—25-34, 35-44, 45-54, etc. Thus, projections based upon likely educational attainment now make more common sense to juries, with movements through an age-earnings profile readily seen in 10-year increments. (The U. S. government can also now provide these data in five-year age ranges.) Some problems of age-earnings projections (discussed in Chapter 3) remain, such as the limitations of cross section studies by age and potential overlaps with work-life adjustments. The economist must also deal with differences in income versus earned income, and this 1990 government source now specifically reports *earned* income averages.

Research continues on both the appropriate theoretical model and methods for estimating economic loss in the death of a minor child. Some have analyzed and debated an investment approach, in terms of the benefits and costs of parental investment in a minor child, had the wrongful death not occurred. The model is an application of the "human capital" model originally developed by Professor Gary Becker, and it may be contrasted with a product valuation approach, a hedonic valuation approach, and an earning-capacity-less-consumption approach.²¹

¹⁸ Unpublished data from the Bureau of Labor Statistics, U. S. Department of Labor.

¹⁹ Desdemona Cordoza, *College Attendance and Persistence Among Hispanic Women: An Examination of Some Contributing Factors*, *SEX ROLES* (1991), Vol. 24, Nov. 3 and 4, pp. 133-147.

²⁰ See Bureau of the Census, U. S. Department of Commerce, *Money Income of Families and Persons in the United States, 1990* (Washington, D.C.: U. S. Government Printing Office, 1990), CPS Series P-60.

²¹ See John O. Ward, *Estimating Economic Loss in the Case of a Death of a Child*, *JOURNAL OF FORENSIC ECONOMICS* (August 1989); the commentary on this article by Thomas R. Ireland, *Loss in the Death of a Child: An Extension of the Ward Analysis*, *JOURNAL OF FORENSIC ECONOMICS* (Spring/Summer 1990), pp. 73-77, Thomas R. Ireland and John O. Ward, *Valuing the Life of a Child: A Unified*

It is the latter approach, however, which most states impose upon the forensic economist. The present value of likely earning capacity by the particular minor child must be estimated. Depending upon the jurisdiction, a deduction must be made for the likely consumption of the child had the death not occurred or for the minimum maintenance consumption of the child necessary to sustain the projected earning capacity in future years. This results in an amount which may have been *available* to survivors. Furthermore, a few states prohibit any type of personal consumption deduction. In these states, the present value of lost earning capacity *is* the measure of damages in the wrongful death of a minor child. As is always true, the debate on an appropriate model and methods will only be meaningful when related to applicable legal parameters that prescribe the nature of calculations. Moreover, estimates of the lost enjoyment of life to parents and/or siblings can be made separately from lost earning capacity estimates, and such hedonic damages estimates are being made across the country.

It is in cases of minor children, whether killed or seriously injured, that projections far into the future must be made. Projections of earning capacity in such cases are more likely to require alternative assumptions and scenarios. In one way or another, the forensic economist must use his or her knowledge of labor force trends and variables to weight these scenarios and/or to effectively explain how current and historical data should be considered by the trier of fact.

The bound volume discusses the importance of a "true consumption" versus a "maintenance" deduction from projected earning capacity in the death of a minor child or other single person. In a recent survey of forensic economists, the median reduction for "true consumption" of a single person was 77 percent.²² Not only does the nature of the deduction relate to the applicable law, it also may relate to whether lost enjoyment of life calculations are allowed. Deductions from earning capacity beyond the maintenance expenditure level do, indeed, represent expenditures on the material enjoyments of life.

New 1989 data are available to supplement Table 9 of the bound volume regarding annual child rearing expenses and, as expected, show increases. At the middle \$28,300-\$46,900 family income level, annual costs are \$6,020-\$7,330 in the urban West; \$5,950-\$7,280 in the urban East; \$5,950-\$7,230 in the urban South, and \$5,790-\$7,040 in the urban midwest.²³ Such expenditures by parents, as well as average expenditures on college education, have a variety of applications, but they must be considered in the context of legal parameters and the specifics of each case.

Finally, estimates of lost earning capacity for minor children of other groups,

Theory of Measurement, paper presented at the annual meeting of the National Association of Forensic Economists, January 1992, New Orleans; Charles M. Gray, *Wrongful Death of a Child: The Timing of Parental Returns*, paper presented at the Midwest Economics Association, April 1991, St. Louis; and Gary S. Becker, *A TREATISE ON THE FAMILY* (Cambridge, Massachusetts: Harvard University Press, 1981).

²² Michael Brookshire and Frank Slesnick, *A 1990 Survey of Forensic Economists*, *JOURNAL OF FORENSIC ECONOMICS* (Summer 1991), Vol. IV, No. 2, pp. 125-149.

²³ Mark Leno, *Expenditures On A Child By Husband-Wife Families*, *FAMILY ECONOMICS REVIEW* (1990), Vol. 3, No. 3, p. 10.

such as Asian-Americans, would clearly improve if the U. S. government reported such disaggregations of average earnings by age range and educational level. As with other groups, trends in education and training are important for future predictions of earning capacity.²⁴

7.5 Single Persons

The bound volume discusses how the nature of the consumption deduction is a critical factor in the wrongful death of a single adult, as well as in the case of a single child. If personal maintenance deductions are required, earning capacity is usually reduced by 20-50 percent depending upon the earnings level forecasted. If deductions for likely consumption out of income are made, deductions often exceed 80 percent of projected income. Chapter 3 explains why, if the same person were married, only around 30 percent would be deducted.

We have actually seen plaintiff's economists assume that a marriage would have occurred and drop the likely consumption deduction to the 30 percent range. Such a method is speculative and logically implies that the economist should also deal with divorce rates, the timing of changes in future marital status, etc. Moreover, the economic and legal logic of deducting estimated consumption by the deceased to determine net loss (or earning capacity available to survivors) breaks down when mythical survivors are assumed by the economist.

7.6 Retirement-Age Persons

Perhaps the most notable change in economic loss calculations for retirement-age persons has been the development of methods and testimony regarding dollar values of the lost enjoyment of life (hedonic damages). Worklife expectancy forecasts directly affect lost earning capacity calculations, but only life expectancy is directly relevant to annual losses of the normal enjoyments of living. This is true whether the individual has been wrongfully killed or has suffered substantial injuries.

Many trends and variables must be considered in lost earning capacity calculations for retirement-age persons. On the one hand, evidence clearly exists that job opportunities decline at older ages.²⁵ On the other hand, the relative increase in part-time and service sector jobs may mean that job opportunities for certain types of jobs may expand. This would affect participation and employment rates, but earnings from such jobs, on average, would be low. A specific work history after retirement from a "primary" career path, of course, would still be the foundation for a specific estimate if such a history existed.

All worklife variables, especially hours of work, are critical in earning capacity forecasts for such persons. Per capita weekly hours of work, shown in Table 10 of the bound volume, increased from 1986 to 1989. Per capita weekly hours increased for age 55-59 males from 30.3 hours in 1986 to 31.1 hours by 1989; for age 60-64 males from 19.9 to 20.1 hours in 1989; and for age 65 and over males from 4.4

²⁴ See, for example, Paul R. Brandon, *Gender Differences in Young Asian Americans' Educational Attainments*, *SEX ROLES* (1991), Vol. 25, Nos. 1-2, pp. 45-88.

²⁵ Robert M. Hutchens, *Do Job Opportunities Decline With Age?* *INDUSTRIAL AND LABOR RELATIONS REVIEW* (October 1988), Vol. 42, No. 1, pp. 89-99.

to 4.7 hours in 1989. Per capita weekly hours increased for age 55-59 females from 16.4 hours in 1986 to 17.8 hours by 1989; for age 60-64 females from 9.9 to 10.8 hours in 1989; and for age 65 and over females from 1.8 to 2.0 hours in 1989.²⁶

Fringe benefits of retiring workers of the future may not be easily predicted from historical data. This is true for public benefits, such as social security, and for such private benefits as pensions, health insurance, and life insurance.²⁷ Changes in the amount and nature of retiree fringe benefits may affect calculations of the value of employer contributions during working life or the value of fringe benefits after an expected date of retirement.

7.7 Professionals, Executives, and Entrepreneurs

In addition to U. S. Department of Labor surveys and data, professional and industry groups may compile excellent earnings and related data for specific professionals. Experienced forensic economists are likely to discover and utilize such data sources as they work in a wide range of cases.

For example, consider the death or serious injury of a physician, early in his or her internship, residency, or practice. A projection based upon the physician's specific earnings history is not possible. However, the Socioeconomic Monitoring System of the American Medical Association publishes data on average net income before tax by physician specialty, geographic region, type and nature of practice, and physician age range.

For entrepreneurs, it should be noted that the forensic economist may need experience in calculating the lost earning capacity of individuals and in calculating commercial (lost profits) damages. Whether in a wrongful death or personal injury case, the lost earning capacity projection proceeds from a "track record" of profits and/or losses in past years. The earning capacity of an entrepreneur is less likely to have moved steadily upward than is the earning capacity of a wage earner. Regression-based estimates may be more likely and, even then, the economist must deal with prospects for a particular entrepreneur in a particular market. The economist must deal with flows of both revenues and costs; he or she is more likely to work with a certified public accountant. The analysis is likely to require more time and be more complex than with other income earners, and the need for a forensic economist with significant experience in testimony may be greater.

7.8 Other "Special" Occupations

Lost earning capacity estimates involving persons who are on active military duty cannot be made without consideration of coming military cutbacks. The probability that any such person with less than 20 years of service will actually reach the 20-year pension has been reduced.

It may also be more likely that a person reaching 20 years of service in the future will retire and enter civilian employment; a declining active duty pool obvi-

²⁶ Bureau of Labor Statistics, U. S. Department of Labor, unpublished data on per capita weekly working hours, by sex and age, 1989.

²⁷ See, for example, Margaret Simons and Cynthia Thompson, *Life Insurance Benefits For Retired Workers*, MONTHLY LABOR REVIEW (September 1990), pp. 17-21.

ously means declining probabilities for future promotions. Projecting civilian earning capacity beyond military retirement, or beyond retirement from a police or firefighting career, has always involved special issues. This is one area where a vocational expert may help the forensic economist with an appropriate basis for projecting lost earning capacity in civilian work. Both vocational testing by this related expert and analyses of military occupational specialities and training may help both the vocational expert, and ultimately the forensic economist, with the most accurate and reasonable loss estimate that is possible.

8 ECONOMIC LOSSES IN PERSONAL INJURY CASES INVOLVING PARTIAL DISABILITY

8.2 Major Approaches To Partial Disability Losses

Our book emphasizes the desirability of joint work by vocational/rehabilitation experts and forensic economists to scientifically determine economic losses in serious, permanent injury cases. The state of the art in both forensic disciplines is rapidly advancing. Vocational models that focus upon residual earning capacity often contemplate at least the two loss factors of a lowered wage level and lowered worklife expectancy due to specific injuries.¹

Yet, practitioners in the two disciplines rarely engage in joint research or communicate about the interconnections of their data sources and methods. The danger still exists that the two sets of professionals will compete, rather than cooperate, and some vocational experts, who have no serious training in economics, do promote themselves as economists. Ironically, new U. S. government data sources make it easier for forensic economists to deal directly with residual earning capacity in some cases. The most notable new source on labor force characteristics of the disabled was issued by the Bureau of the Census in July 1989.²

For example, forensic and labor economists know important statistics about the labor force characteristics of persons with disabilities. In 1987, the average earnings of males with a work disability were 64 percent of the average earnings of males without a work disability. The labor force participation rate was 39.7 percent for males with a work disability, compared to an 88.9 percent participation rate for males without a work disability.³ Similar data are available for Canada and other countries.⁴

The forensic economist may not be able to apply professional judgment to determine how such important variables relate to the post-injury scenario for a

¹ See Michael L. Brookshire, *ECONOMIC DAMAGES* (Cincinnati: Anderson Publishing Company, 1987), pp. 121-123; Timothy F. Field and Thomas B. Hamilton, *Estimating Disability and Lost Employment*, TRIAL (March 1987), pp. 39-43; and Timothy J. Field, *LABOR MARKET ACCESS, RESEARCH AND RATIONALE* (Athens, Georgia: Elliott and Fitzpatrick, Inc., 1990).

² Robert L. Bennefield and John M. McNeil, *LABOR FORCE STATUS AND OTHER CHARACTERISTICS OF PERSONS WITH A WORK DISABILITY: 1981 TO 1988* (Washington, D.C.: U. S. Government Printing Office, July 1989), Current Population Reports Special Studies, Series P-23, No. 160.

³ *Ibid.*, p. 4.

⁴ Peter Ross, *The Impact of Disability on Earnings*, London, Canada, Associated Economic Consultants, Ltd., May 9, 1991.

plaintiff with specific injuries. On the other hand, vocational experts have little background to go beyond conclusions about how specific permanent injuries affect the ability to work in specific occupations, industries, and/or major sectors of the economy. They are not experts in wage growth, interest (discount) rates, price inflation, and fringe benefits, and they are not qualified to assess economic losses in present value dollars. The problem of experts attempting to work outside of their expertise is sufficiently worrisome that NAFE, for example, is considering standards for qualifying economic experts on damages.

8.3 The Vocational Analysis

The bound volume discusses and illustrates the shortcoming of one-factor reports by vocational experts, in which conclusions are provided only on the likely average wage level in jobs to which the injured plaintiff now has access. It should be mentioned that many vocational experts across the nation still provide reports which do not even provide conclusions for a one-factor report by the forensic economist. Rather, they either discuss percentages of loss to the body, which cannot be translated into economic losses, or conclusions, perhaps in percentage terms, of the lost access to labor market jobs, to which access could have been made except for the injury.⁵ These labor market access conclusions, taken alone, are also of little use to the forensic economist.

Herein is the linkage between the vocational expert and the forensic economist, which is often weak and should be more fully explored by plaintiff and defense attorneys. This linkage problem exists partly because some in the two separate professions are unsure about competition versus cooperation. Another factor is that professionals in the two areas rarely interact on substantive issues interlinking their work and seldom engage in interdisciplinary research and writing. The fundamental example is the difference between labor market access in a post-injury scenario and the probable post-injury wage rates and labor force patterns which the forensic economist must estimate. A vocational conclusion that an injured person has access to 25 percent of the jobs in a particular labor market is only the transition to conclusions in a format that the forensic economist needs. The economist must know how the 25 percent access translates into a likely average wage level which can be obtained by the injured plaintiff. Then, the economist must be told the likelihoods of labor market participation and employment in those jobs to which the injured plaintiff has access.

8.4 Use of Vocational Report by Economist—Sample Case

In addition to the appendices in the bound volume, a more simple illustration in Figure 1 may help to illustrate the significance of a two-factor approach versus a one-factor approach. Assume that the injured worker held a \$10/hour earnings base before the injury. A vocational expert provides only a one-factor conclusion that

⁵ See Timothy Field, *op. cit.*; and a useful background for medical and vocational analyses is contained in GUIDES TO THE EVALUATION OF PERMANENT IMPAIRMENT (Milwaukee: American Medical Association, 1990), 3rd edition.

the likely wage level in post-injury jobs is \$8/hour. In this simplified example, the forensic economist only has the foundation for a \$2/hour loss in wage levels.

Alternatively, the forensic economist already knows the average participation and employment probabilities. For example, assume 90 percent probabilities for a male over the relevant period. Assume that the vocational expert now provides a two-factor report, adding the analysis and conclusion that post-injury probabilities of participation and employment have fallen to 45 percent over the relevant period. Likely earnings are now \$9.00/hour in the pre-injury scenario and \$3.60/hour in the post-injury scenario. Economic loss is now \$5.40/hour in the simple example. This is 170 percent different from, and higher than, the economic loss conclusion based upon differences in wage levels alone.

FIGURE 1
A SIMPLE EXAMPLE OF
DIFFERENCES IN A ONE-FACTOR
VERSUS A TWO-FACTOR APPROACH

One Factor: Differences in Wage Levels Only

Pre-Injury Wage Level	\$10
Post-Injury Wage Level	<u>– 8</u>
ECONOMIC LOSS	\$ 2

Two Factor: Differences in Wage Levels and Worklife Probabilities

	Wage Level	×	Participation and Employment Probability	=	Likely Earnings
Pre-Injury	\$10.00	×	90%		\$ 9.00
Post-Injury	\$ 8.00	×	45%		<u>– 3.60</u>
			ECONOMIC LOSS		\$ 5.40

8.5 Other Issues in Calculating Partial Disability Economic Losses

Five factors which may differentiate a pre-injury scenario of expected earning capacity and household services from a post-injury (residual) scenario were discussed in the bound volume. Conclusions on each of these five factors affect the amount of economic loss, and the five factors are summarized as follows:

Factor #1 The difference between pre- and post-injury expected wage or salary levels through time. (Differences in age-earnings effects on wage levels through time may soon be considered here or as a separate factor.)

Factor #2 The difference between worklife expectancy factors, including likely hours of work, through time.⁶

⁶ See Michael L. Brookshire, *An Agenda for Future Research in Forensic Economics*, JOURNAL OF FORENSIC ECONOMICS (Fall 1991), Vol. IV, No. 3, pp. 287-296.

Factor #3 The difference in expected annual growth rates of earnings beyond the pre-injury versus the post-injury wage or salary bases.

Factor #4 The difference between expected employer contributions to fringe benefits through time.

Factor #5 The difference in the amount and value of household services through time.

The elaboration of these factors provides a framework for coordinated and reinforcing testimony between vocational experts and forensic economists. As stated, interdisciplinary work is needed to improve effectiveness and efficiency in using this framework as calculations are made, conclusions are reached, and testimony occurs. (A sixth factor may be differences in the enjoyment of life, which often requires that economists work with forensic psychologists as described in Chapter 9.)

A persistent difficulty is that even two-factor vocational and economic reports center on how participation rates, and other worklife expectancy variables, are lower than average for the injured male plaintiff, for example. Economic loss is calculated by comparing this post-injury judgment to a pre-injury scenario utilizing participation rates for average males. This use of statistical averages for the pre-injury scenario must, itself, become a focus for more precise measurements—in both personal injury and wrongful death cases.

Forensic economists, perhaps in conjunction with vocational experts and forensic psychologists, must develop scales, or other weighting systems, to scientifically exercise judgment regarding a person *before* an injury or death, based upon the characteristics and history of that unique person. Let us use a Factor #2 (above) example, regarding expected participation rates in the future (and absent the injury). We might set the average participation rate of this plaintiff's statistical class (by age, race, sex, education, and/or marital status) at the 50th percentile on a 100-point scale. Perfect labor force participation for a certain year and age would equal "perfect," or the 100th percentile on the scale; no participation would equal a zero percentile rating.

Thus, a pre-injury judgment would not necessarily equal the average statistic for a relevant statistical class. A more specific estimate, based upon past characteristics and other variables, would be made for the plaintiff as reconstructed before the date of injury or death. The post-injury judgment, by a vocational expert and forensic economist, would then be made on the same variable—expected participation rates in this example. Specific judgments on the pre-injury scenario versus the post-injury (residual) scenario would generate the economic loss estimate. The amount of economic loss, due to such an increase in precision, might be either greater or less than that calculated under existing techniques.

Another issue may relate to each of the five factors. Who is more qualified to make the pre-injury and post-injury judgments—the vocational/rehabilitation expert or the forensic economist? Conflict and contradiction between the two experts need not exist but have been problems in our experience. Plaintiff's attorneys need to be concerned with interconnections among experts as these experts are being chosen, and defense attorneys often don't exploit their opportunities when the interconnec-

tions between these related experts are poorly defined or contradictory.

The forensic economist, for example, would logically take the lead in judgments regarding Factor #3, covering differing rates of wage growth. If a vocational expert renders quantifiable judgments on likely occupations, sectors, and types of work in a post-injury scenario, these judgments may greatly affect the forensic economist in forecasting a wage growth rate in the post-injury scenario. The currently used assumption (often implicit) is that wage growth will not differ between a pre-injury and a post-injury scenario. Neither logic nor data to support such an assumption is apparent. Moreover, disaggregations of wage growth data, and software systems to facilitate the use of discretion, are increasingly available for estimating likely differences in wage growth.

Good data also exist to allow the Factor #4 separation of likely employer contributions to fringe benefits in a post-injury scenario. Both the annual U. S. government and U. S. Chamber of Commerce studies provide useful disaggregations of likely fringe benefits by economic sector, for example. Vocational/rehabilitation experts often have little background or experience in the complexities of modern fringe benefits. The same is true for many forensic economists with scarce experience in this area because of their particular economic subspecialty. Again, vocational experts can provide important input relating to the likelihood of post-injury work in particular occupations or sectors of the economy. This input, if in the proper format, allows the differentiation of fringe benefits (as a percent of wages) in a post-injury projection versus a pre-injury projection. Average employer contributions to fringe benefits certainly differ by economic sector.

Concerning Factor #5 differences in expected household services, either a qualified vocational expert or a forensic economist can judge and establish a pre-injury number of service hours. We need more rigor in judging how a post-injury number of hours at future ages and with future family statuses will differ because of the injury. The burden of valuing lost hours and discounting shifts to the economist.

Finally, Chapter 9 discusses the calculation of the lost enjoyment of life (hedonic damages) in personal injury cases. These calculations involve the joint work of forensic psychologists and forensic economists described above. A few experts around the nation are qualified as both vocational experts and forensic psychologists. In one report, they can provide the foundation for economic losses affecting several of the 5 factors described above and for tailoring the enjoyment-of-life benchmark values as discussed in Chapter 9.

8.6 Testimony

Since the initiation of the two-factor technique in the mid-eighties, the defense bar has seemed slow to respond with attacks based on an understanding of the interdisciplinary work involved. The original technique⁷ forced the vocational expert to begin by establishing a joint probability of participation and employment (essentially Factor #2) for an average disabled person in the relevant area. The vocational expert was then given a scale, and professional discretion, to establish a post-injury

⁷ Michael L. Brookshire, et al, *Assessing Damages in Cases of Partial Disability Through Use of a Vocational/Economic Assessment of Work-Life Expectancy*, TRIAL (March 1987), pp. 44-48.

worklife value between this low, "all disabled" average and an average for white females as a class, for example. Some vocational experts seemed to ignore their responsibility for a judgment and assigned most individual plaintiffs to the all disabled average. This results, all other things being equal, in very low post-injury earning capacity and high economic loss that overstates the plaintiff's loss.

Other lines of inquiry are often useful in attacking two-factor interdisciplinary conclusions. For example, recovery rates and retraining possibilities should not be ignored in post-injury assumptions and conclusions. Pre-existing injuries may affect how the pre-injury scenario might have been below average for the relevant statistical class, anyway. Finally, data representing multi-disease categories may be inappropriately applied to a specific plaintiff and his or her earning capacity projections.⁸

⁸ See Michael L. Brookshire and Paul R. Lees-Haley, *Addressing Plaintiff's Use of the Two-Factor Approach for Estimating Personal Injury Damages*, JOURNAL OF PRIVATE SECTOR REHABILITATION (April 1990), Vol. 5, No. 1, pp. 11-18.

9 HEDONIC DAMAGES

9.1 Introduction

The admissibility and the nature of hedonic damages testimony continue to receive much attention from the courts, trial attorneys, and forensic economists. Trial and appellate court rulings regarding admissibility continue at a steady pace, jurisdiction by jurisdiction.¹ Table 2 of Chapter 12 in the bound volume is a review of legal parameters affecting lost enjoyment of life (hedonic) testimony, and updated summaries and analyses are available.² The nature of legal parameters affecting hedonic damages clearly varies by jurisdiction, as do the allowable measures of damages, and they also vary between wrongful death cases and personal injury cases. Moreover, early estimates and testimonies of the lost enjoyment of life in wrongful death cases were often from the perspective of the deceased person. Interdisciplinary work is now allowing lost-enjoyment-of-life estimates from the perspective of a specific survivor.

It is also notable that the Civil Rights Act of 1991 specifies the “loss of the enjoyment of life” as an element of compensatory damages.³ Early in 1992, a unanimous U. S. Supreme Court ruled that damages for “loss of the enjoyment of life” were an allowable element of compensatory damages under the Federal Tort Claims Act.⁴ This measure of damages, of course, has existed in one form or another in many jurisdictions for many years. The focus is heightened because this element of damages can be measured and is being measured across the nation.

The forensic economist and attorney must share an understanding of applicable legal parameters in the particular jurisdiction, if such parameters exist and are

¹ See, for example, *TERRY v. C. M. I., ET AL.* 89-C-238, Mason County, West Virginia Circuit Court (July 25, 1990); and *SOUTHLAKE LIMOUSINE AND COACH, INC. v. BROCK*, 578 N. E. 2nd 677 (Ind. App. 1991).

² Michael L. Brookshire and James C. Peterson, *Hedonic Damages—Calculating and Proving Lost Enjoyment of Life Damages*, *TRIAL* (June 1992), and a jurisdiction-by-jurisdiction appendix is also available; Thomas O. Depperschmidt, *Hedonic Damages: A Contrary View*, paper presented at November 1991 meetings of the Southern Economic Association, Nashville. Also, see Gretchen L. Valentine, *Hedonic Damages: Emerging Issue in Personal Injury and Wrongful Death Claims*, *NORTHERN ILLINOIS UNIVERSITY LAW REVIEW*, Vol. 10, No. 3, 1990, pp. 543-577; and Gary A. Magnarini and Stan V. Smith, *Hedonic Damages: Recoverability, proof, and valuation in personal injury, survival, and wrongful death actions*, *WISCONSIN LAWYER* (February 1991), pp. 17-58.

³ Civil Rights Act of 1991, Senate Bill 1745 amending Civil Rights Act of 1964, *CONGRESSIONAL RECORD-HOUSE* (Washington, D.C.: U. S. Government Printing Office, 1991), Vol. 137, No. 164, pp. 9517-9534.

⁴ *SHIRLEY M. MOLZOF v. UNITED STATES* (1992), ___ U. S. ___, ___ S.Ct. ___, 113 L.Ed.2d 239.

clear. An example, mentioned above, is whether lost enjoyment estimates are from the perspective of the deceased person or from the perspective of survivors. Another is whether the lost enjoyment of life is a separate element of damages or part of more generalized pain and suffering damages. Another is whether cognitive awareness is a prerequisite for recovery.

The economist will then proceed based upon a fundamental judgment. Does the economist regard hedonic damages testimony to be speculative and as likely to mislead as to inform a trier of fact? Or, does the forensic economist believe that his or her testimony on "benchmark" lost enjoyment of life values can be based on the scientific literature, can be fairly presented to a trier of fact, and will have probative value to the trier of fact in reaching a decision on the prescribed measure(s) of damages. We believe the latter is true.

A useful analogy may be made between the state of the art in hedonic damages and the current literature and debate on wrongful death damages in the case of a minor child. Economists have been testifying for decades about benchmark values of the likely earning capacity of a deceased minor child. Yet, basic disagreements still exist over the appropriate model for valuing these damages; these are discussed in Chapter 7 of this supplement. Moreover, major criticisms of willingness-to-pay-based estimates could just as easily be focused upon the theoretical and empirical underpinnings of the lost earning capacity models, which have also been used by labor economists and forensic economists for many years.

9.3 How to Value a Life

Table 1 of the bound volume was a 1989 summary of conclusions about life value from the willingness-to-pay literature. This literature serves as the foundation for credible hedonic loss estimates. The most current review of willingness-to-pay research was published by Ted Miller of the Urban Institute in 1990.⁵ Miller analyzed 67 willingness-to-pay studies with value-of-life conclusions, and he based his attempt to find a central tendency on an analysis of 47 of these studies. Miller adjusted "raw" conclusions from these studies to accommodate various biases and measurement problems discussed in his article. Table 1 reproduces Miller's conclusions, based on thirty of the 47 studies. (The remainder were consumer behavior and contingent valuation studies, showing similar results.) Miller's average value-of-life conclusion from this literature was \$2.2 million in 1988 after tax dollars; the majority of the values were in the \$1.5-\$3.0 million range. Miller estimates a \$55,000 annual value of the enjoyment of life.⁶

The forensic economist calculating hedonic damages must be prepared to explain his or her position on a number of issues, which will now be elaborated step-by-step. These steps are both a generalized guide to direct examination and a road map for systematic exploration by the defense.

First, what economic model (and what economic literature based upon this model) serves as the scientific foundation for lost-enjoyment-of-life conclusions?

⁵ See Ted R. Miller, *The Plausible Range for the Value of Life—Red Herrings Among the Mackerel*, JOURNAL OF FORENSIC ECONOMICS (Fall 1990), Vol. 3, No. 3, pp. 17-39.

⁶ *Ibid.*, pp. 32-33.

The clear consensus is that the willingness-to-pay model, whereby benchmark American life values are based upon what Americans are willing to pay in order to preserve a life, is the model which must lead to hedonic analyses. This model is the target of academic critics. Ironically, one of the critics of willingness-to-pay-based conclusions presents another model as more precise, based on estimated leisure time valued at the minimum wage.⁷ An obvious and compelling flaw with this alternative, of course, is that it equates our enjoyment of life with the time which we might specifically identify as "leisure." It precludes the net enjoyments of life from all other time. Does one's enjoyment of his life's work, his family, and his community activities not count, unless it is somehow placed in a leisure time slot? In the extreme, do we only value and enjoy life when we are entertained?

Most economists who testify focus upon the willingness-to-pay model and empirical results of life value based upon this model. The next issue is how the range of life values from willingness-to-pay studies is translated into a best estimate, or range of estimates, for the value of a statistically average American life. Here, the depth of knowledge of the economist becomes important, as several bases exist for a conclusion on an appropriate value of life benchmark.

One basis is the set of wage-versus-risk studies, which measure what workers are willing to give up in wages for employment in safer jobs and industries. More of these studies exist than any other category of willingness-to-pay studies, and the average value-of-life conclusions from the thirty of these studies reported by Miller is \$2.15 million in 1988 after tax dollars.⁸ Heavy reliance on wage-risk studies published since 1980 may also result in higher life values, and higher lost-enjoyment-of-life values, if all other factors remain the same.

Consumer behavior studies are based upon what consumers are willing to pay for safety products that reduce the risk of death or serious injury. This is a second possible basis for a value-of-life conclusion. As with wage-versus-risk studies, these studies generate conclusions on our value of life based upon what Americans are observed to do, not upon what they say in response to hypothetical questions, for example. The average of such studies that Miller analyzed and adjusted is \$2.15 million in 1988 after tax dollars.⁹

Contingency valuation studies are a third possible basis, and these willingness-to-pay conclusions are based upon what persons say they are willing to pay to avoid risks that are posed to them in focus groups or questionnaire studies, as examples. The average life value conclusion from six of these studies analyzed by Miller was \$2.5 million in 1988 after tax dollars.¹⁰

⁷ See Jerome Staller, *Placing a Value on the Enjoyment of Life*, FOR THE DEFENSE (June 1989), pp. 8-11.

⁸ Michael J. Moore and W. Kip Viscusi, *Doubling The Estimated Value of Life: Results Using New Occupational Fatality Data*, JOURNAL OF POLICY ANALYSIS AND MANAGEMENT 7 (3), 1988, pp. 476-490; W. Kip Viscusi and Michael J. Moore, *Workers' Compensation: Wage Effects, Benefit Inadequacies, and the Value of Health Losses*, THE REVIEW OF ECONOMICS AND STATISTICS 69, 1987, pp. 249-261; W. Kip Viscusi and Michael J. Moore, *The Quality-Adjusted Value of Life*, ECONOMIC INQUIRY 26, 1988, pp. 369-388; W. Kip Viscusi and Michael J. Moore, *COMPENSATION MECHANISMS FOR JOB RISKS: WAGES, WORKERS' COMPENSATION, AND PRODUCT LIABILITY*, Princeton University Press, Princeton, NJ, 1990.

⁹ Ted Miller, *op. cit.*, pp. 25-29.

¹⁰ *Ibid.*, pp. 30-31.

A fourth basis is the set of life values reported and used by various federal regulatory agencies. These values are politically generated, but they do represent what the government is willing to force corporations to spend in order to save American lives. Because of executive actions during the Carter presidency and another executive order issued early in the Reagan presidency, such values are now reported,¹¹ and they average slightly more than the life value average calculated by Miller.

A fifth basis is studies which analyze, adjust, and/or calculate central tendencies of the many empirical studies that are the foundation of the willingness-to-pay literature. The leading example is the Miller study itself.¹² Miller's conclusion on the central tendency of life value is \$2.2 million in 1988 dollars, which is closer to \$3.0 million in 1992 dollars if also adjusted to a before-tax conclusion.

Assume that the forensic economist reaches a conclusion on a benchmark life value of a statistically average American. A third major issue is whether this life value is the conclusion of the economist or, alternatively, only forms the basis for further calculations to produce lost-enjoyment-of-life benchmarks. Stated differently, is a life value (sometimes labeled a whole life value) benchmark the same as a lost-enjoyment-of-life benchmark? Several forensic economists do not move beyond whole life conclusions in their calculations, and they treat whole life values as hedonic benchmark values.¹³

We do not believe that whole life values are the same as enjoyment-of-life values. Important deductions must be made from life values to account for the fact that we consider our value as an "economic machine" in the workplace and at home when we make labor market and consumer decisions regarding safer work and safety products. If whole life values are derived for statistically average Americans, then deductions must be made for the earning capacity and household services of statistically average Americans. A residual lost-enjoyment-of-life benchmark value is thereby derived for a statistically average American. Those who ignore such a deduction produce higher hedonic benchmarks, if all other factors are the same. They also are combining lost earning capacity and household services estimates tailored to a specific injured or deceased person with hedonic benchmarks that have not had earnings and services benchmarks for statistically average Americans removed.

Indeed, one conclusion running from early wage-risk studies through more recent studies is that our desire for income protection (and, by implication, household services protection) represents less than half, but still a sizable portion, of our willingness to pay in order to avoid death or serious injury.¹⁴ Our own calculations

¹¹ See Federal Register, *Executive Order 12291* (February 19, 1981): 13193-13198; and specific citations in Ted R. Miller, *Willingness To Pay Comes Of Age: Will the System Survive?* NORTHWESTERN UNIVERSITY LAW REVIEW (Summer 1989), Vol. 83, No. 4, pp. 876-907.

¹² Miller, *JOURNAL OF FORENSIC ECONOMICS* (Fall 1990), *op. cit.*

¹³ See, for example, Richard A. Paflin and Brent B. Danninger, *HEDONIC DAMAGES, PROVING DAMAGES FOR LOST ENJOYMENT OF LIVING* (Charlottesville: The Michie Company, 1990).

¹⁴ See, for example, Stuart A. Low and Lee R. McPheters, *Wage Differentials, and Risk of Death: An Empirical Analysis*, *ECONOMIC INQUIRY* (April 1983), Vol. XXI, pp. 271-279; W. Kip Viscusi and Michael J. Moore, *Workers' Compensation: Wage Effects, Benefit Inadequacies, And The Value of Health Losses*, *THE REVIEW OF ECONOMICS AND STATISTICS*, *op. cit.*; Ted Miller, *JOURNAL OF FORENSIC ECONOMICS* (Fall 1990), *op. cit.*, p. 33; and W. Kip Viscusi, *The Value of Life: Has Voodoo Economics Come To The Courts?* *JOURNAL OF FORENSIC ECONOMICS* (Fall 1990), Vol. 3, No. 3, p. 13.

of earning capacity and household services reductions for statistically average Americans reinforce this conclusion. Lost-enjoyment-of-life benchmark values are significantly less than whole life values taken directly from the willingness-to-pay literature.

A fourth issue is how the benchmark lost-enjoyment-of-life value for a statistically average American is converted to an annual benchmark value and then projected through the life expectancy of a specific person.¹⁵ The simplest calculation, which abstracts from time preference or the possibility of changing life values with age, is to determine the remaining life expectancy of Americans at an average age. The nature of this calculation may significantly affect conclusions. The average age of working Americans is in the late thirties, but the average age of Americans is in the early thirties. Life expectancy from the late thirties, which is logically related to an emphasis upon wage-versus-risk studies, is less than from the early thirties. Thus, a calculation based upon working Americans divides the lost-enjoyment-of-life benchmark by fewer years and results in a higher annual benchmark value for the enjoyment of life by an average American. Whatever the annual value, some economists assume that future benchmark values will rise with real wages, while others keep the hedonic loss benchmark constant in real terms. The same economic logic for discounting any future losses to a present value also applies to estimates of future hedonic losses.

A final issue involves how lost-enjoyment-of-life benchmark values in annual amounts are tailored to an injured plaintiff or to a specific decedent or survivor. As suggested above, the obvious tailoring to a specific case is to project annual benchmark values through a specific life expectancy and discount to a present value. In our opinion, further tailoring of benchmark values may occur through interdisciplinary work with a forensic psychologist.¹⁶ A member of this or a related profession can estimate the degree of impact on the normal enjoyments of life of a specific person after a specific injury or death. The economist then applies degree-of-loss percentages to benchmark conclusions on the enjoyment of life for statistically average Americans.

It should be noted that tailoring a benchmark value for the degree of lost enjoyment still produces a benchmark value. The trier of fact must weigh this particular benchmark, along with other facts and judgments relevant to the lost enjoyment of life by a specific person. Returning to a previous analogy, economists have long testified about benchmark earning capacity for a deceased minor child, who might have been a high school graduate, or a college graduate. The issue of the probative value of hedonic benchmarks does not differ from that of earning capacity benchmarks for those without a specific earnings history. Does a scientifically-based, competent, and fair elaboration of either type of benchmark significantly help a jury in reaching a sound (and more predictable) conclusion regarding a specific measure of damages? We believe so.

¹⁵ Again, some economists do not make any adjustments to whole life values in testimony regarding hedonic losses. Others do make adjustments to whole life values but recommend other approaches to necessary adjustments. See, for example, Thomas L. Wyrick, *Valuing Life and Liberty*, JOURNAL OF MISSOURI BAR (September 1991), pp. 492-498.

¹⁶ See Ed Berla, Michael Brookshire, and Stan Smith, *Hedonic Damages and Personal Injury: A Conceptual Approach*, JOURNAL OF FORENSIC ECONOMICS (December 1989), Vol. 3, No. 1, pp. 1-8.

Chapter 11 in this supplement provides illustrative questions for direct examination on lost-enjoyment-of-life damages, and Appendix 1 of Chapter 11 provides excerpts from a sample hedonic testimony in a personal injury case. It will be noted that the testimony moves through the major calculation issues as described above. Because such testimony can be complex, adherence to major principles of adult learning—incrementalism, repetition, and the use of common sense examples and analogies are especially important.

Let us now turn to major criticisms of lost-enjoyment-of-life estimates and testimony that are based upon the willingness-to-pay literature. First, it is sometimes argued that authors of willingness-to-pay studies never intended for their conclusions to be applied by forensic economists in loss estimation.¹⁷ This argument is silly. The value of life conclusions from willingness-to-pay studies are what the authors say they are: values of a statistically average American life based upon what we are willing to pay to preserve a life. Authors of empirical studies in economics rarely contemplate all of the applications of their conclusions. This criticism is only one example of holding the willingness-to-pay bases of hedonic loss estimates to a different standard than the marginal productivity theory of wage determination (and/or human capital theory) that forms the theoretical basis for earning capacity, replacement household services, and certain cost-of-care estimates.

A second set of criticisms focuses upon the nature and quality of the willingness-to-pay studies themselves.¹⁸ For example, the wide range of life value conclusions from these studies is noted, and the reliability of results thereby questioned. On the other hand, Miller considers and adjusts for certain biases in original empirical studies, and the range of conclusions narrows significantly. A central tendency of American life value in the \$2 million-\$3 million range appears in his analyses of three categories of willingness-to-pay studies; life values reported by federal regulatory agencies support the same range; and an emerging willingness-to-pay literature in other Western countries also buttresses this benchmark range found for Americans.¹⁹

The assumptions behind willingness-to-pay studies are also criticized: the assumption that workers have perfect information on death and serious injury risks and the assumption that workers are perfectly mobile to respond to risk differences.²⁰

¹⁷ See, for example, Lauraine G. Chestnut and Daniel M. Violette, *The Relevance of Willingness-To-Pay Estimates of the Value of a Statistical Life in Determining Wrongful Death Awards*, JOURNAL OF FORENSIC ECONOMICS (Fall 1990), Vol. 3, No. 3, pp. 75-89. A related argument is sometimes made against conclusions based on how persons respond to small differences in risk. Also see William T. Dickens, *Assuming the Can Opener: Hedonic Wage Estimates and the Value of Life*, JOURNAL OF FORENSIC ECONOMICS (Fall 1990), Vol. 3, No. 3, pp. 52-53; and W. Kip Viscusi, *op. cit.*, p. 10.

¹⁸ See Dickens, *op. cit.*; pp. 55-56.

¹⁹ Miller, JOURNAL OF FORENSIC ECONOMICS (Fall 1990), *op. cit.*; Miller, NORTHWESTERN UNIVERSITY LAW REVIEW (Summer 1989), *op. cit.*; Alan Marin and George Psacharopoulos, *The Reward for Risk in the Labor Market: Evidence from the United Kingdom and a Reconciliation with Other Studies*, JOURNAL OF POLITICAL ECONOMY (1982), Vol. 90, No. 4, pp. 827-853; and Ted Miller and Tagadish Guria, *The Value of Statistical Life in New Zealand: Market Research on Road Safety*, Land Transport Division, Ministry of Transport, May 1991, especially pp. 36 on 13 studies from seven countries other than the United States.

²⁰ See, for example, W. Kip Viscusi, *The Economic Basis for Estimates of the Value of Life*, JOURNAL OF FORENSIC ECONOMICS (Fall 1990), Vol. 3, No. 3, pp. 61-69; and Jerome Staller and Brian Sullivan, *On the Accuracy and Usefulness of Hedonic Loss Estimates*, JOURNAL OF FORENSIC ECONOMICS (1991), pp. 75-79.

A generation of labor economists has seen the same academic focus on assumptions behind the marginal productivity theory of wage determination and the large set of empirical studies on wage differentials and wage patterns, for example. The state of the art in labor economics has nevertheless formed the basis for earnings forecasts and loss estimates.

It has been argued that wage-versus-risk relationships, which form the basis for life value conclusions, do not pass .05 or .10 tests of statistical significance in some studies. It is also pointed out that the wage-versus-risk equations "explain" less than half of observed wage differentials. These critics downplay or ignore the many studies where the coefficient of the risk variable *is* statistically significant, producing life values that have exceeded the \$2-\$3 million range in recent studies.²¹ Those economists who focus upon wage differentials also know that the variables affecting wage differentials are many and are complex, which is why regression studies attempt to isolate, and test the significance of, the relationship between wage differences and differing risks of death or serious injury. Again, the same academic criticisms may also be focused upon the theoretical model(s) and empirical studies which lie behind economic estimates covering other categories of economic losses.

A final set of criticisms is that lost-enjoyment-of-life testimony is speculative, or misleading, or invades the province of the jury. Another generalized argument is that human life cannot be valued by a mortal man or woman—even an economist. We are among those aiming such criticisms at alleged "experts" who do not understand the willingness-to-pay conclusions and how they may be reasonably translated into lost-enjoyment-of-life benchmark values. Criticisms should be leveled at those who simply provide the jury with a wide range of life values, or only use high values from the range of conclusions, or misrepresent the relationship of value-of-life conclusions with lost-enjoyment-of-life values that are tailored for a specific person to the extent possible. It is our opinion, however, that competent and knowledgeable economists can provide the trier of fact with benchmark values that are of significant help when this measure of damages is to be addressed.

Again, it is useful to consider the analogy to testimony regarding benchmark values of future economic losses in the death or permanent injury of a minor child. Triers of fact find such benchmark values, when properly and fairly explained, to be very useful in reaching a specific decision after hearing all of the relevant facts. Would the jury make a more informed decision about the lump sum equivalent of (lost) earning capacity in the absence of economic testimony?

Moreover, it is our opinion as forensic economists that the literature and state of the art in hedonic calculations clearly meet the admissibility standards of the *Frye* and *Downing* cases, for example.²² The existence of criticism in the economic literature certainly does not mean that hedonic loss testimony by *any* economist is inadmissible. If criticism automatically leads to inadmissibility, economists should

²¹ Moore and Viscusi, *JOURNAL OF POLICY ANALYSIS AND MANAGEMENT* 7 (3), 1988, *op. cit.*; Viscusi and Moore, *THE REVIEW OF ECONOMICS AND STATISTICS* 69, 1987, *op. cit.*; Viscusi and Moore, *ECONOMIC INQUIRY* 26, 1988, *op. cit.*; Viscusi and Moore, *COMPENSATION MECHANISMS FOR JOB RISKS: WAGES, WORKERS' COMPENSATION, AND PRODUCT LIABILITY*, 1990, *op. cit.*

²² *FRYE v. U. S.*, 293 F. 1013 (D.C. Cir. 1923); *U. S. v. DOWNING*, 753 F.2d 1224 (3rd Cir. 1985); and see Federal Rules of Evidence 702 and 703.

not be testifying in the courts regarding anything. The trier of fact will not have greater difficulty in judging the credibility of such testimony, after cross examination and the possibility of a defense economist, than in judging the credibility of economic testimony in other areas.

9.3.1 The Loss of Enjoyment of Life in Injury

The application of the value-of-life literature to the measurement of the loss of enjoyment of life in injury cases is important. This process measures the decrease in the value or enjoyment of life that one would ordinarily look forward to experiencing. It is separate and apart from palpable pain and the consequent suffering accompanying the injury (such as fear, worry, mental disturbances, humiliation). Some courts define pain and suffering in such a way as to specifically include the loss of enjoyment of life, and some courts require cognitive awareness in order that the compensation not be punitive.

The reduction in the ability to experience the value of life can be measured using an interdisciplinary process that is based on the total value of the life and a psychologist's (or psychiatrist's or other mental health professional's) evaluation measuring the percentage reduction in the capacity to function as a whole individual. The evaluation examines the claimant's reduced capacity to function in all areas of life by examining the impact on occupational functioning, social and leisure activities, daily practical living, and the internal emotional state, as examples. This impact can vary from the time of the incident to the end of life expectancy. It may be more severe at the time of injury; it may decline as the injured person recovers and adapts; and it may worsen as the medical consequences are aggravated by the physical deterioration as one ages.

Table 2 suggests some standards for rating the percentage of functional disability. The assessments are examples and are not intended to limit the possibilities; different injuries will affect people differently. Moreover, there are other possible assessment protocols. Ultimately, the percentage loss figure, however derived, is the psychologist's best estimate of the loss of the quality or enjoyment of life, based on his or her training, background, experience and judgement. The percentage figure preceding the description indicates the percentage loss of enjoyment or value of life.

The conclusions of a forensic psychologist on the *degree* of the lost enjoyment of life, by age, is most usefully provided in percentage form, so that it can be applied by the economist to the benchmark enjoyment of life value that represents the total loss from a death or comatose condition. This is also discussed in Chapter 11 of this supplement and the sample testimony in Appendix 1 of Chapter 11.

9.6 Additional Considerations

The forensic economist who calculates the lost enjoyment of life must be prepared to differentiate "no tax" and "income-tax-adjusted" benchmark values. This assumes that in FELA cases and state jurisdictions that require income tax adjustments, the requirement extends to hedonic loss calculations. If so, after-tax conclusions regarding life value can be directly used, the calculation of earning capacity deductions must

involve income tax considerations, and the "reverse tax effect" on interest earnings must also be considered.

9.7 Testimony

This chapter supplement has systematically outlined the issues which should be addressed in a direct examination on lost-enjoyment-of-life damages. Plaintiffs' attorneys may enhance their understanding by combining this information with the sample questions and sample hedonic testimony in Chapter 11. The plaintiff's attorney should also understand major criticisms herein described, as these may be discussed in direct examination, cross examination, and redirect examination.

An attempt has also been made to provide defense attorneys with major lines of criticism that have appeared in the literature and in cross examinations of economists across the country. Some lines of attack are better than others, some make more common sense to juries than others, and one set of criticisms cannot be simply transplanted from one economist's methods to those of another economist. Further, the defense may not succeed in countering hedonic testimony with an economist who has not specialized in forensic economics. The defense economist should be very familiar with loss estimation principles applying to other categories of economic damages, with the willingness-to-pay literature, and with the literature regarding the application of whole life values to the lost enjoyment of life for specific persons.

TABLE 1
JUDGMENTALLY BEST ESTIMATES OF THE VALUE OF LIFE
IN SOUND WAGE-RISK STUDIES
 (Thousands of 1988 After-Tax Dollars)

Study	Wage Data Year	Risk Level	Value Range	Best Est	Risk-Adj. After-Tax
Arnould & Nichols (1983)	1970	11. SOA	784	784	1431 ^a
Brown (1980)	1966-71	2.3 SOA	1516	1516	2638 ^{ab}
Butler (1983)	1940-69	.5 SC	901-914	908	1121 ^c
Cousineau et al (1988)	1979	.8 Canada union	3162-3260	3162	2850
		non-union	2964-3181		
Dickens (1984)	1977	? BLS union	1087-1324		
		non-union	2420-2838	2629	2411
Dillingham et al (1984)	1979	.6-1.2 BLS union	0	2876	3416
		non-union	0-5277	2638	
Dillingham (1985)	1970	1.4-1.6	2067-4162	3114	1624
	1977	BLS/NY	1415-2068	1742	2342
Dillingham et al (1990)	1977	1.4-1.6	2240-2878	2559	2926
Dorsey & Walzer (1983)	1978	.5-.6 BLS	2367-3872	3188	2926
Garen (1988)	1981-82	? BLS	8368	8368	2696 ^d
Gegax et al (1985)	1983	8-10 Survey union	5200	5200	1617 ^d
		non-union	1768-2121	1944	1394 ^e
			0		
Leigh & Folsom (1984)	1974	1.4 BLS	6921-8387	6921	2205 ^d
	1977	1.3 BLS	7688-9098	7688	2350 ^d

Leigh (1987)	1977 QES	? BLS	9031-9500	9365	2863 ^d
	1977 CPS	? BLS	5607-10551	5614	1716 ^d
Marin et al (1982)	1975	2.3 UK	2940	2940	2432
Melinek (1974)		? UK	1413	1413	1419
Moore & Viscusi (1988)	1981	.8 NTOF	5646-7111	5995	2662 ^{c,d}
Olson (1981)	1973	1.0 BLS	8516-8782	8699	2763 ^d
R. Smith (1974)	1967	1-1.5 BLS	9188-16172	9188	2941 ^d
R. Smith (1976)	1973	1-1.5 BLS	3945-4215	3991	1271 ^d
V. Smith (1983)	1978	3.0 BLS	2483-7434	4288 ^f	1902 ^f
V. Smith et al (1984)	1978	3.0 BLS	6344-7476	6569 ^f	1837 ^f
Thaler & Rosen (1976)	1967	11. SOA	497-921	709	1473 ^a
Viscusi (1978)	1969-70	1.2 BLS	1789-5366	1938-3823	2199 ^e
Viscusi (1980)	1969-70	1.2 BLS			
		union	3798-10424	3798	2799 ^e
		non-union	0		
Viscusi (1981)	1976	1.0 BLS	5111-9082	5801	1822 ^d
Viscusi & Moore (1988)	1976	.6 BLS	1300-1600	1300	1606 ^c
Viscusi & Moore (1989)	1981	.8 NTOF	7200-15650	7200	2841 ^d

^aMultiplied times 2.2 to remove bias in risk variable definition.

^bAdjusted from an expected remaining lifespan of 54 years to 39 years by multiplying times .84, the ratio of years remaining at a 2.5% discount rate.

^cRegression was run in after-tax dollars.

^dDivided by 3 to remove bias in risk variable definition.

^ePublished estimate adjusted for risk perception.

^fFatal and nonfatal risk. Adjusted value is fatal only.

Risks are in units of annual deaths per 10,000 workers.

Numbers in all tables should be treated as significant to the nearest \$100,000.

All values were inflated to 1988 dollars using the U. S. Consumer Price Index.

Values from other countries generally were converted to U. S. dollars, then inflated.

SOURCE: Ted R. Miller, *The Plausible Range for the Value of Life—Red Herrings Among the Mackerel*, JOURNAL OF FORENSIC ECONOMICS (Fall 1990), Vol. 3, No. 3, p. 26.

TABLE 2

LOSS OF ENJOYMENT OF LIFE — FUNCTIONAL ASSESSMENT

% LVL	Examples of Functional Impairment
0-5%	Matter of little consequence; may require some change in order of activity or create a slight reduction in the number of times the activity can be performed, but no cessation.
6-10%	Good functioning, socially effective, but tends to focus on concerns. May openly express a concern in social, occupational, or daily functioning.
11-20%	Noted concern. Patient may identify a loss in activity. Will endorse concern as a mild problem versus a concern.
21-30%	Clear symptoms or problems presented. Problems will be significant enough that patient will see problem as being present on a regular basis and will even quantify the loss in either time spent or responsibility given up. (For example: Remains in club, but quits as President.)
31-40%	Moderate difficulty in social, occupational, or daily functioning; loss of friends; conflicts with co-workers and family members.

- 41-50% Serious symptoms, endorses loss in all areas. No friends, unable to keep job, but can work and is still interested in finding a job; discusses depression and/or other psychological losses; will identify elevated scale on MMPI.
- 51-60% Major impairment in enjoyment of life; will not be able to hold jobs due to impairment; will have few outside the home contacts and will openly speak about feeling useless, worthless, but will, in all likelihood, make occasional trips, i.e., going shopping and occasionally going out to dinner.
- 61-70% Severe losses noted by patient; endorses all areas of loss: daily functioning; psychological; social; and occupational. Patient's condition may be so severe that he or she may be confined; work unavailable; social contacts limited and arranged by family members.
- 71-80% Persistent vegetation; no social contact; psychological condition considered to be grave; communication and ability to relate to others is either missing or has to be done by others; will require guidance and support with rehabilitation.
- 81-90% Loss of pleasure or enjoyment in all areas; patient not bedridden, but confined to the house; cannot see a way out; appears hopeless.
- 91-100% Catastrophic; bedridden; no independent functioning.

SOURCE: Dr. George Parsons, Associates for Psychological Resources, Cincinnati, Ohio.

10 PRE-TRIAL TASKS AND ISSUES

10.2 General Considerations on the Plaintiff's Side

It is not unusual for the defense to name an economist only after the plaintiff's economist's deposition has been taken. But when the defense economist is named earlier, it is a good idea to review any available work product of the defense economist prior to the plaintiff's economist's deposition. Experienced plaintiff's economists may have depositions or reports by the defense economist from other cases that can be reviewed for their relevance to the issues in the case at hand. Once the plaintiff's economist has produced a report, and perhaps also given a deposition, it is time to give consideration to the probabilities of different outcomes at trial, as well as to settlement negotiation strategies.

10.3 General Considerations on the Defense Side

A meaningful pretrial settlement offer could result in significant savings over an unfavorable verdict. A review of the ten largest awards in personal injury lawsuits in 1989, totalling over \$475 million, showed that in most instances only trivial pretrial settlement offers were made.¹ An economist can assist in providing an outcome matrix in which possible trial results and their probabilities are listed along with the "expected" or average loss. The defense can then examine the possibilities and decide on any realistic settlement offers.

In severe injury cases, defense attorneys should explore the cost of a structured settlement using a rated-age annuity. If the plaintiff's injury is severe, the life expectancy may be reduced significantly. The cost of an annuity based on this "rated age" basis may well make a settlement offer appear to be a bargain for the defense while at the same time attractive to the plaintiff. The claimed losses by the plaintiff will look much larger in present value terms than perhaps an age-rated annuity will cost the defense. A victim of a severe injury such as paraplegia, stroke, or brain damage will certainly be considered as a substandard mortality risk by life insurance companies. The injury, coupled with any prior circumstances such as diabetes, obesity or heavy smoking may open an opportunity for negotiating a cost-effective settlement.² Of course the plaintiff may discover the cost advantage,³ but

¹ Laurence Bodine, *Avoiding Multimillion-Dollar Verdicts*, VIEWPOINT—MARSH & MCLENNAN QUARTERLY (Fall 1990), pp. 17-20.

² William L. Winslow and Nancy K. Esterly, *Using Rated-Age Annuities in Reduced Life Expectancy Cases*, FOR THE DEFENSE (January 1989), pp. 7-8.

even some sharing of this advantage with the plaintiff can nevertheless be a satisfactory result for all.

If one or more of the defendants have settled prior to trial using a "Mary Carter" sliding scale agreement, courts now allow the value of this agreement to be subtracted from the post-trial liability of the non-settling defendants. Calculating these values should be done in advance of trial so that meaningful settlement negotiations can be entered into during trial if appropriate, and so that the court may reduce any final award by this value. Calculating this value involves some complex mathematical modeling,⁴ but does not represent an intractable problem for most economists.

10.4 Economic Report in Settlement Proposals

The plaintiff's economic report may serve as an important basis for a settlement package presented to the defense. While the contents of the report and the credentials of the economist are important factors, so is the presentation itself. Many attorneys produce a settlement video in which the plaintiff's economist tenders a three to five minute summary of his opinions. The advantage to the plaintiff, assuming that the economist is an effective presenter, is that the defense can evaluate the prospective jury impact of the presentation, not only of the content, but of the form as well. In general, the more both sides know about the actual effects at trial, the greater the likelihood of settlement.

10.5 Structured Settlements and Settlement Negotiations

Most cases never reach trial, and the percentage of cases that do is steadily declining.⁵ Negotiating a settlement means neither side loses, but reaching agreement is an art.⁶ However, the prospect of losing at trial is so unpalatable that settlements are usually reached. There are times, however, when opposing sides are so far apart that a trial seems inevitable. In such instances, it still may be possible to enter into an arrangement whereby the trial outcome is used in a pre-trial settlement formula so that neither side "loses" at trial. An agreement can be structured which can "hedge" the positions of both defense and plaintiffs so that the worst case does not obtain. Business and individuals commonly use hedging techniques which give rise to the options and futures markets used to transfer risk.

Here is how this process might work. Let us assume that the defense is afraid of a runaway verdict (say in excess of \$3,000,000) in a particular case, but would be willing to offer \$750,000 to settle. Assume further that the plaintiff would expect to obtain \$2,000,000 from a favorable trial verdict but would settle pre-trial for \$1,000,000. There are possible arrangements that could assist both sides but which require a trial to implement. For example, an agreement might be reached whereby

³ Mary B. Jerue, et al, *Deflating Defendant's Settlement Advantages*, LAWYER'S WEEKLY PUBLICATIONS, Boston, MA.

⁴ Jules H. Kamin, *Valuation of a Mary Carter Agreement*, JOURNAL OF FORENSIC ECONOMICS, Vol. 2, No. 1 (December 1988), pp. 101-104.

⁵ Ellen Joan Pollock and Edward Felsenthal, *Federal Civil Cases Rarely Reach a Trial*, THE WALL STREET JOURNAL (June 27, 1990), p. B6, Col. 1.

⁶ James A. Erisman, *The Art of Negotiating a Settlement*, TRIAL (Sept. 1989), pp. 26-35.

the defense will pay the plaintiff 50 percent of any trial award, but with a payment minimum, win, lose or draw, of \$500,000 and a payment maximum (or ceiling) of \$1,500,000. This arrangement satisfies the defense in that it precludes a runaway award in excess of \$1,500,000 and may result in a lower payment than the pre-trial settlement offer of \$750,000; it satisfies the plaintiff that a minimum payment \$500,000 will be forthcoming in exchange for capping the outcome at \$1,500,000 and giving up the potential of a runaway award. An infinite number of arrangements could be reached. By using an economist in suggesting and calculating several outcome matrices, such arrangements might be reached which are more satisfying to both sides than the possible trial outcomes when simple lump sum or structured settlement agreements cannot be reached. Such arrangements may require the agreement of the judge in advance. We are aware of clients who have used these hedging agreements, but they appear to be very infrequent.

In drafting any settlement agreement, hedged or not, care must be taken to minimize taxes.⁷ Structured settlements, where payments are made over time and which offer favorable tax advantages to both sides, are one reason why case settlements are increasing. Moreover, these tax advantages also accrue to the plaintiff's attorney if he defers his fee and takes a percentage of the future cash flows. Legal magazines abound with advice regarding structured settlements.⁸ Sometimes a court will grant the defendant the right to pay a lump sum award in periodic installments. An economist must then convert the award into a flow. The easiest and fairest way to do this is to obtain a quote from a life insurance company for an annuity with a cost equal to the award. Absent a quote, equivalent period payment streams may be calculated using either real or nominal rates of growth and discounting.⁹

A recent area of concern regarding structured settlements is the degree of financial security of the insurance company responsible for paying the settlements. Insurance companies have come under extraordinary financial pressure over the past several years. Three dozen life insurers went under in 1989, compared with an average of five per year during the preceding two decades.¹⁰ Moreover, the traditional rating systems are suspect. The best known rating company, A. M. Best, does not conduct its own formal audit of the insurance companies; it relies upon public financial statements, as do all rating companies. Accounting standards allow assets to be listed at cost even though the market value might only be a fraction of cost. An insurance company may have invested in an asset, say a commercial real estate project, which has become worth much less than its original investment, but its full cost could be carried on the balance sheet. New assessments of insurance company financial strength are beginning to emerge.¹¹ Besides assuring that the

⁷ James R. Kahn, *Ensure Tax Advantages in Case Settlements*, TRIAL (June 1990), pp. 62-67.

⁸ Richard G. Mandel, *Structured Settlements—An Ounce of Prevention: Some Dos and Don'ts*, TRIAL (Dec. 1988), pp. 32-40; William L. Winslow, *Structured Settlements—Drafting for Reliability and Favorable Tax Treatment*, TRIAL (Dec. 1988), pp. 21-29; and Abraham Fuchsberg, *Pitfalls in Structured Settlements*, TRIAL (Sept. 1989), pp. 42-49.

⁹ Peter Formuzis and Joyce Pickersgill, *Converting Present Value Awards Into Periodic Payments*, JOURNAL OF FORENSIC ECONOMICS, Vol. 2, No. 3, (August 1989) pp. 89-94.

¹⁰ *Checking up on Life Insurers*, U.S. NEWS AND WORLD REPORT (May 28, 1990), p. 64.

¹¹ One such rating service is Weiss Research of West Palm Beach, 800-289-9222, which provides comprehensive reports for rather nominal fees. Other services include: Standard & Poors, New York, New York; A. M. Best, Oldwick, New Jersey; and Moody's, New York, New York.

issuing company is financially healthy, a settlement could require that the policy itself be insured by another company; the likelihood of two financially strong companies getting into trouble is much more remote. However, the problem can become a shell game because an insurance company issuing the policy in which you have confidence might transfer (sell) the policy to another company which does not have the financial strength of the first. This too can be protected against by drafting the agreement so that any transfer requires approval of the policyholder, who would be bound not to consent without the consent of the beneficiary. Tax and insurance specialists should be consulted prior to drafting any settlement agreement, structured or otherwise.

Frequently, economists provide estimates of future losses in real terms whereby the effects of inflation have been omitted. In negotiating a settlement with future payments, the economist should recalculate the loss tables using a reasonable inflation assumption so that the estimated future losses including inflation effects can be used as a basis of comparison with the structured settlements payment proposal.

One of the benefits of a structured settlement, which is frequently overlooked, is that the insurance company assumes any risk resulting from the beneficiary outliving the life expectancy tables. If a plaintiff invests a lump sum settlement, he or she will receive payments equal to the losses over time. But the present value of the losses is calculated in such a way as to deplete the investment fund at the end of life expectancy. Fifty percent of the time, plaintiffs will outlive the life expectancy tables. If a plaintiff were to draw down funds assuming he would live only to life expectancy, a proper assumption for the economist to make, there would be nothing left at the end of life expectancy, when the plaintiff may be quite hearty and hale, but broke. Structured settlements generally provide for payments through the end of life, no matter how long a plaintiff lives. Life insurance companies can balance losses from a plaintiff's unanticipated longevity in one policy against gains from premature deaths in other policies; individual plaintiffs cannot.

The actual cost of a structured settlement is the basis for determining the attorney's fee. While an economist can estimate the present value of a structured settlement for negotiating purposes, it is imperative to know the cost in order to calculate the fee. The cost may be much less than the present value, for several reasons. The insurer may have rated the life of the beneficiary, reducing the cost. Secondly, the insurer can generally spread risks and invest in riskier securities so that the discount rate is greater than that of riskless securities. If an economist renders an opinion as to the present value which is higher than cost, and if the attorney bases his fee on this value, both could be liable, since the amount charged the plaintiff will be higher than a fee based on the cost. Ultimately, the plaintiff's attorney should seek to know the cost, or should have the structure price quoted by another issuer, to avoid liability.

In the bound volume, we stress the correctness of using mortality tables which show the probability of survival through the age of 100 in order to calculate the value of payments which are promised through life expectancy. The Life Tables published by the U. S. Department of Health and Human Services provide mortality statistics only until the age of 85. Using reasonable assumptions, one can extend the U. S. Life Tables beyond age 85 by using an exponential function assuming

life expectancy cannot realistically exceed 116 years. This is the last year for which the National Association of Insurance Commissioners shows a positive remaining life expectancy. Once determined, the probability of survival to each future year can be determined by dividing the number of survivors in the future year by the number of survivors in the present year. We caution that some reference texts show the extended life tables, but do not indicate that the extensions are based on the author's assumptions.

10.6 Discovery Depositions

The increase in interdisciplinary work between economists and other specialists such as psychologists, psychiatrists, life-care planners, etc., calls for increasing attention to assure adequate linkage in the deposition and trial testimony of all experts. The overall conclusions of the other experts must flow properly into the assumptions used by the economist, who usually testifies last. Without proper attention to the linkages between experts, there may be logical gaps in the assumptions and conclusions which can preclude proper foundation for an opinion. Worse, the possibility for contradictory assumptions would throw any conclusion into doubt.

Prior to the deposition of a related expert, an economist might review the assumptions that could be affected by, or be inconsistent with, the opinions of other experts. By going over these carefully, the attorney can ensure that these are properly conveyed to other experts so that the possibility of contradiction can be minimized. For example, in some severe injury cases a rehabilitation expert determines that the plaintiff has been injured to the extent that he or she will never return to work. Further, let us assume that a psychiatrist recommends that the victim be placed in an institution for a number of years. Unless the economist understands the degree of injury, he might assume that personal consumption may continue as before the injury, although this is not likely for the period of institutionalization. It might be appropriate to offset wage losses by some reduction in personal consumption. By reviewing these assumptions with the attorney, the possible double counting might be eliminated. One way to ensure consistency is to provide the reports of other experts to the economist as soon as they are available. And after the depositions of other experts have been taken, these might also be provided to the economist for his review to make sure that his assumptions are consistent with what has been said in earlier depositions. Any lack of flow or possible inconsistencies should be resolved prior to trial so that the jury can be presented with a logical and congruent testimony. It may not be possible to eliminate all inconsistencies; experts may not always agree on complementary assumptions. But an overall review can help to provide the clearest possible presentation to a jury with a minimum of conflicts.

10.7 Preparation for Trial: Plaintiff

As noted in the bound volume regarding testimony at trial, the "best" question the defense can ask is to have the plaintiff's economist show how the present value that he has estimated will earn more in interest each year than the estimated losses, while preserving the principal forever. The question, discussed in detail in Chapter 11,

basically ignores the effects of inflation. To prepare for this at trial, not only should the plaintiff's economist handle this question on direct, but it can be useful to have an amortization table showing the investment of a present value award accumulating interest in nominal (inflationary) terms, while withdrawing the annual losses, in order to show that at the end of the loss period there will be nothing left in the fund. This chart can help convince a jury that the present value calculations are fair and not inflated as the defense may attempt to portray.

Properly prepared exhibits can be valuable to the plaintiff at trial. While economic testimony is generally thought of as one technical piece of a puzzle, damages exhibits can be reviewed throughout the trial, including during the defense presentation, and can continue to assist and educate the jury well after the economic expert has concluded the testimony.¹² There are no hard and fast rules regarding demonstrative evidence. The exhibits should illustrate the key points of the testimony and be likely to interest a jury.

10.8 Preparation for Trial: Defense

At times plaintiff's attorneys have used a so-called "vocational economist," mathematician, or CPA to calculate lost earnings over a worklife, attempting to save money by avoiding the use of a real economic expert. Vocational counselors, experts, and others without an advanced degree in economics, and no work experience in the field, are simply not qualified to estimate the present value of losses.¹³ A few vocational experts are well-trained in economics, have significant work experience, and have earned advanced degrees in the field. But the great majority have little or no serious training or work experience in economics. A late-in-life "post-graduate" course or two does not constitute serious, advanced, academic study, much less training, in economics. Most of them recognize this and do not pretend to be economists.

But a few will attempt to offer economic testimony. In the absence of using an economist, the defense attorney will want to prepare for the cross examination. First he should review the resume of the vocational expert so that he can question him regarding any credible credentials (or lack thereof) in economics. A vocational expert, mathematician, or CPA, whose economic experience consists solely of being occasionally lucky enough to have a judge admit his testimony in court, is not trained in economics.

Some vocational experts rely upon proprietary worklife tables which have never been verified or authenticated by the economics profession. These are claimed to be "based on" government tables and are marketed through software systems and licensing arrangements with accompanying "present value" software, but they have absolutely no reliability and are no substitute for, unadulterated and authoritative government data. The defense will want to obtain copies of texts that support the use of the government worklife tables.

If the expert has used a "total offset" method, a common practice among

¹² Norris L. Weese, *Employing Financial Expertise*, THE NATIONAL LAW JOURNAL, Litigation Section (March 18, 1991), pp. 19-22.

¹³ Stephen M. Renas, *Challenging Plaintiff's Vocational Expert in Disability Cases*, FOR THE DEFENSE (March 1991), pp. 30-32.

vocational experts since it precludes selection of growth and discount rates, chapters in texts on economic damages can help attest to how this leads to a plaintiff bias. If the expert does use a growth rate and discount rate, his training (or lack thereof) in selecting an appropriate rate (rather than using a "recipe" borrowed from another economist) should be explored.

The defense may not use an economist at trial, yet a consulting economist may help prepare sensitivity tests that will enable the defense attorney to ask "what if" questions of the plaintiff's economist, knowing the answers in advance. For example, the defense may inquire as to the bottom line change by adding one percentage point to the discount rate. While the plaintiff's economist cannot quickly calculate this at trial, the defense may be able to artfully inquire: "Is it likely that the loss you estimated would fall by approximately 22%?" Such pretrial calculations can help the defense attorney use the plaintiff's economist as his own at trial if a consulting economist has informed him in advance of the answers to the proposed questions he would want to ask at trial.

11 ECONOMIC DAMAGES AT TRIAL

11.1 Introduction

During the direct examination of the economist at trial, jurors may be presented with a mass of mathematical facts, but generally they have little or no training in economics or mathematics. The goal, therefore, is to present the information in the most comprehensible and interesting manner. It may be that not all of the jurors will fully understand all the testimony. It is possible, however, to present the key concepts and conclusions of the testimony in such a way that they are effectively understood and retained by the jurors.

The ability of an economist to communicate effectively to a jury can be enhanced by experience in the courtroom. Courtroom experience can also prepare an expert to respond to misleading cross-examination questions in a manner in which the question's faulty premise or underlying partial truth can be illuminated and the misleading implication can be defused. Experienced expert witnesses can also help fill in testimony when the direct examination has omitted inadvertently to cover important ground. The experienced expert has a basic story to tell. That story should come through clearly, despite possible omissions in direct examination and attempts to mislead and confuse the jury during cross examination. Moreover, an experienced expert may be able to improve jury understanding during cross examination, adding supporting details that may have not been brought forth during the direct examination.

This supplement contains two samples from direct examinations of a forensic economist. Appendix 1 provides a sample lost-enjoyment-of-life (hedonic) testimony in a permanent injury case. The case is discussed in Chapter 9 of this supplement. Appendix 2 provides a sample testimony in a lost profits (commercial) case. This case is discussed in Chapter 13 of this supplement.

11.3 Opening Statements

It is not common, but increasingly occurs, that both a plaintiff's and a defense economist will testify and a "battle of experts" will ensue. In such a case, either attorney may wish to briefly allude to the (superior) qualifications of his or her economist in the field of forensic economics. Beyond the qualification issues discussed in Chapter 2, the relative work of the economist on the plaintiff's versus the defense side of cases may be worth noting early. A plaintiff's attorney, for example, may mention that the plaintiff's economist has balanced work for plaintiffs

and defendants, performing analyses in the same way for both sides. The defense economist might be labeled as a person who almost always works on the defense side. Obviously, the defense attorney may reverse this scenario in opening statements against an “all-plaintiff” economist.

Either a plaintiff’s or defense attorney may also allude to errors, poor assumptions, or faulty methods of the opposing economist. Danger exists in anything other than generalizations in this regard. First, the attorney may not accurately state the problems with the report of the opposing economist. Second, his or her economist should have the skill to lay the necessary framework, in language that makes common sense, for professional attacks on shortcomings from experts on the other side. Third, time is a problem, and it may be counterproductive to mention a criticism which the jury cannot understand without background testimony.

11.4 Direct Examination of Economic Expert

The bound volume contains a checklist of a general order of questions to be used in direct examination of a forensic economist. The expanded Checklist 1 which follows provides a more detailed set of illustrative questions for lost enjoyment of life (hedonic) testimony. Appendix 1 follows this outline for a permanent injury case, and Chapter 9 comments further on developments in hedonic testimony.

CHECKLIST 1

ILLUSTRATIVE QUESTIONS FOR DIRECT EXAMINATION IN LOST ENJOYMENT OF LIFE (HEDONIC) CASES

- 1.) Dr. Economist, have you estimated damages other than those which result from the functioning of Mr. Terry as an “economic machine” in the workplace or at home?
- 2.) In general, how is this done?
- 3.) How long have economists studied the value of a human life?
- 4.) Have you published books, articles, or given economic papers on this element of economic damages?
- 5.) What is your conclusion on the overall value of life for a statistically average American—based upon wage studies, consumer and other studies, life values from regulatory agencies, and summary studies by other economists?
- 6.) Could you discuss in more detail how studies of differing wage rates versus different risks of death generate values of life from the actual decisions of workers?
- 7.) Could you discuss in more detail how consumer and related studies of what consumers pay for safer products generates values of an American life?
- 8.) What studies by and about federal government regulatory agencies did you rely upon in reaching your conclusions?
- 9.) What critiques of these studies did you consider?
- 10.) What is your best estimate of total life value?
- 11.) How do you translate this total life value for an unknown American into estimates of the net enjoyment of life for unknown Americans per year?

- 12.) Why is this the "net" enjoyment of life? Do you assume that we enjoy everything that happens to us?
- 13.) How is this value per year individualized to Mr. Terry in this case?
- 14.) What lump sum would restore the value of the lost enjoyment of life for Mr. Terry if his per-year value was the average for unknown Americans?
- 15.) How are the conclusions of Dr. Psychologist used in developing the estimate of the lost enjoyment of life for Mr. Terry?
- 16.) What other benchmark values have you considered, which relate to how we value the net enjoyment of life?
- 17.) How do your estimates of the lost enjoyment of life relate to earning capacity or other categories of losses?
- 18.) Is there any double-counting?
- 19.) Is your conclusion a final answer for the jury, or a guideline?

Concerning testimony techniques, a 1990 survey of forensic economists provides useful insight for both attorneys and economists on effective testimony.¹ All important principles of adult learning also apply to effective testimony. Three of these may be described as follows:

1.) *Incrementalism*: The jury should be introduced to key concepts one at a time, and the economist should not spend a large amount of time on any single concept, e.g., the wage base, wage growth, discounting, fringe benefits, etc. The testimony must move along crisply.

2.) *Repetition*: This concept relates to incrementalism. The trier of fact is more likely to remember the LPE technique, for example, if it is discussed three times briefly than if it is discussed only one time for 10 minutes. The former can occur by alluding to LPE adjustments in the talk-through of major facts and assumptions, in the overview of conclusions on a summary chart, and in the discussion of one calculation chart which shows LPE adjustments.

3.) *Use of Common Sense Analogies and Examples*: The economist may talk about teeter-totter effects versus net discount rates. He or she may discuss wage differentials between top floor and ground floor window washers on skyscrapers in presenting wage versus risk studies leading to estimates of hedonic damages.

Moreover, the economist may use at least three rules, or combinations of these rules, for organizing the communication process of direct examination:

1.) Proceed from the general to the specific. For example, the economist may overview facts, assumptions, and conclusions before proceeding to a brief discussion of specific calculations.

2.) Proceed from the known to the less well known. For example, earning capacity losses may be completely discussed before proceeding to hedonic damages.

3.) Proceed from the simple to the complex. For example, the nature of before-tax calculations may be fully explained and then followed by a quick discussion of necessary tax adjustments in FELA cases.

¹ See Michael L. Brookshire and Frank Slesnick, *A 1990 Survey of Forensic Economists*, JOURNAL OF FORENSIC ECONOMICS (Summer 1991), Vol. 4, No. 2, pp. 125-149.

Finally, the “best defense” question is discussed in the bound volume. It goes something like this: “Isn’t it true that if you invested your present value estimate in a safe government treasury bond, the interest alone would exceed the losses you have shown for each and every year, without ever having to invade the principal?” The purpose of the question is to imply that the economist’s present value analysis overstates the losses. This is the impression given when the defense attorney shows how much actual interest the present value figure would generate in each year: an amount generally in excess of the annual losses estimated in the early years, and perhaps for all years. By using an example, the expert may be able to assist the jury in understanding that such thinking is tempting, but illogical. The problem arises because economists generally portray losses in real (minus inflation) terms. Thus the future losses are shown without the effects of inflationary growth; only “real growth” is considered. However, the interest rates that the defense discusses are actual and include the earnings to compensate for inflation. There are a number of ways to correct this attempt to mislead.

An economist could illustrate, for example, the rule of 72. This mathematical shortcut quickly shows the number of years in which prices will double: divide the number 72 by the assumed rate of inflation. At 7.2% inflation, for example, prices double in 10 years. In 30 years prices will double three times, or go up by a factor of $2 \times 2 \times 2 = 8$. The rule of 72 quickly illustrates the power of compounding rates.

Another way to illustrate the powerful effects of inflation on prices far into the future might be to take an example from the past. Thirty years ago, a basic Chevrolet sold for about \$1,500. Such a car today can cost \$15,000. It may be easier for the jury to believe that cars could cost \$150,000 in 30 or so more years, by showing them the ten-fold price increase for the past 30 years.

Thus jurors can understand that an invested lump sum must generate an amount of interest greater than the loss in the early years. This excess interest must be reinvested and not used until later years, to compensate for the prospective effects of inflation. Table 2 in the text illustrates mathematically how the present value just provides coverage for the loss in real terms. Either using the rule of 72 or an example, such as the car, that can make sense to jurors of all backgrounds can help them understand the powerful effects of the interest growth. This might require several different illustrations until the jurors fully understand the issue, but it can be well worth the trouble to educate them.

Analogous to the illustration of how much interest could be earned, the defense may sometimes present the testimony of an annuitant to illustrate the cost of providing an annuity to cover constant annual losses. Of course, most losses increase annually due to inflation, whereas most annuities provide for constant payments, without growth. The testimony showing the logic of the present value analysis can be handled in the same manner as the best defense question. Using the rule of 72, the economist could show that without increasing the payments, in only 10 years at 7.2 percent, the payments will be worth one half their current purchasing power. In some states, such as Illinois, the annuity testimony is deemed to be so misleading to a jury that it has been frequently barred.

11.5 Cross Examination of the Economic Expert

The opposing side may wish to call into question the ability of an economist generally to predict the future by inquiring as to the track record of economists in predicting short term inflation, recession, nominal interest rates, etc., especially during periods of economic uncertainty such as existed during 1990 and 1991. Short term macro-economic factors are much more difficult to predict than longer term factors generally needed in an economic loss analysis, such as the real wage growth rate and the real rate of interest. There is greater accuracy in predicting the average winter daytime temperature in Chicago for the next 10 years than the temperature on February 17, 1993, for example. But a skillful attorney can help create the impression in the mind of the jury that all people who make forecasts are just gazing into crystal balls, even those with advanced degrees and econometric skills. The skillful economist can point out that forecast errors occur even in the hard sciences. Most people may recall the hoopla with which Halley's comet was anticipated, but it turned out to be an optical disappointment; this doesn't mean we stop relying upon astronomers. No forecast can be expected to be perfect. A forecast can be expected to be fair, neutral and reasonable.

Another way in which the opposing side may make an economist feel discomfort is to inquire, if he or she is not from the local area, whether competent economists exist in the local area. The implication is that the out-of-town expert is a hired gun who will say things that the local economist would not. Further, if the expert's rates are discussed, this can deepen the impression. Some of the more experienced experts charge from \$150 to \$250 and more per hour to testify. Even the more modest fee schedules of some experts will seem like premium pay to the average juror, whose hourly pay may be from \$10 to \$20 per hour. An economist can counter such questions by pointing out that he testifies frequently in his own local area and that travel for an expert with a national reputation is quite common. Further, he can point out that expert rates in the \$150 to \$250 and more per hour range are not uncommon in economics, medicine, or other areas, and must cover research time, secretarial costs, rent, computers, etc.

As noted, Appendices 1 and 2 provide sample direct examinations in hedonic injury cases and lost profits cases, respectively. However, the material provides a useful basis for contemplating cross examination in such cases. This is also true because Chapters 9 and 13 of this supplement discuss both cases and incorporate areas of criticism and attack.

APPENDIX 1
EXCERPTS FROM
A SAMPLE LOST ENJOYMENT OF LIFE
TESTIMONY IN A PERMANENT INJURY CASE

- Q. Now, Dr. Economist, have you estimated damages other than those resulting from the function of Mr. Terry as what I would call an economic machine, simply producing money to live on?
- A. Yes, sir. I have estimated an entirely different category of damages.

Q. This is both in the workplace and the home?

A. This is his loss of enjoyment of life separate from loss of earning capacity.

Q. In general how is this done?

A. In general let me talk you through three sources of those data. By the 1980s, particularly, we had a wealth of wage differential studies that showed us what workers were willing to give up in wages to work in safer jobs: jobs that would reduce their probability of death on the job. Assume we use the example of top floor window washers on the 50th floor versus first floor window washers. Assume also that we found out from research that each first floor washer was willing to accept \$300 less in annual wages on average, and that first floor window washers had a one in ten thousand less probability of death on the job, because if they fall off they don't fall anywhere. Then, we know what ten thousand of those first floor workers will give up in wages. They are willing to give up \$300 each, or \$3 million in total, so that one of them will not lose his life. They value life, those ten thousand workers collectively, at \$3 million, or \$300 each times 10,000 workers.

Well, I have studied those wage differential studies to come up with a total value of life, including all the components, of about \$2.5 million. There are also a number of consumer studies in which we find out what consumers are willing to spend for safety devices, such as a car air bag system or smoke alarm systems in homes. From those studies, assume we know, for example, that consumers are willing to spend \$500 for an air bag system in a car. If, because of air bags, one in ten thousand of those people will not die in a wreck who otherwise would have died, then ten thousand people spending \$500 each have valued the life of an unknown American at \$5 million. They don't know which one is going to be saved, but collectively they valued it at \$5 million. We have a range of those studies.

Finally, in the 1980s we found out what Federal Government agencies were using as standards for the value of life when they set safety regulations, and those values average above \$2.5 million. So, I've got three categories of sources that lead me to the conclusion that a conservative estimate of the total life value of a statistically average American—based on what Americans actually do, the wage decisions they make, the consumer decisions they make, and what government agencies use as value of life standards—that a conservative standard of total life value is just over \$2.5 million in today's dollars.

From that I have to subtract the economic machine part of that \$2.5 million; not for Thomas Terry, but for an unknown average American, and I weight that by the percentage of working Americans who are women versus men. I calculate and deduct from the \$2.5 million "whole life" value, the economic machine components for average wage and fringe benefit earnings and the average value of household services. When I do all that and apply it to the life expectancy of Mr. Terry, we get a lost enjoyment of life value based on what Americans do. We don't ask them, "What would you do to avoid being killed?" We look at what they actually do, what they're actually willing to give up to preserve an unknown American life. They don't know if it's theirs, but we know the

risk and probabilities of death—in those riskier jobs or without the safety devices.

Based on all that—I know that’s an overview—I calculate loss of enjoyment of life at a little over \$50,000 a year based upon the willingness-to-pay literature in economics. That’s the loss as if it were all lost, as if Mr. Terry died. That’s what Dr. Psychologist gives me. The percentages that, in his opinion, are the percentages of that \$50,000 that this man has lost because of what happened to him. Otherwise the numbers would be much higher.

Q. This value of human life concept, this is a new concept that you’ve just developed?

A. It’s as old as the first economics book. Adam Smith in 1776 wrote a book called *Inquiry Into the Nature and Causes of Wealth of Nations*, which is the first “modern” economics book. He talked about what are called compensating wage differentials, and when I teach labor economics classes, we talk about the same thing. They are now sometimes called hedonic wage differentials, but what Adam Smith says is that workers must be paid more to induce them to work in riskier jobs. He didn’t have skyscrapers at the time, but if you’re going to make them wash windows on the 50th floor, you must pay them a higher wage rate and that differential may exist forever because there’s a whole bunch of people who aren’t going to work on the 50th floor. Again, Adam Smith may have been thinking of coal miners, but it was the same principle. So, the concept is as old as the first economics book. It was not until the 1980s, however, that we had enough studies, modern studies, of wage and consumer behavior to enable people like me to put that in terms we can use in courtrooms.

Q. Have any articles or publications or pamphlets been written specifically dealing with this concept?

A. Yes.

Q. And can you give us a few of those?

A. One book that deals with that specifically is called *Economic/Hedonic Damages, The Practice Book for Plaintiff and Defense Attorneys*. That’s the book I suppose you’re holding. In the *Journal of Forensic Economics*, there is an article entitled, “Hedonic Damages and Personal Injury: A Conceptual Approach.” It’s the approach we’re following in this case. There have been a number of other papers and articles given at professional meetings on these very concepts and it’s what many forensic economists are spending research time on now, as a matter of fact.

Q. So, is your conclusion as to the overall value of life of this unknown American we talked about, this \$2.5 million?

A. That’s the total life value I used.

Q. Can you discuss in a little more detail the types of studies about differing wage rates versus different risks of life, how they generate values of life from the actual decisions of workers in the work place?

A. Yes, sir, and I can really repeat what I just said, quickly. We have studies, particularly in the 1980s, and most were actually performed for purposes other than courtroom testimony, that match wage differentials for jobs of varying risks with the statistics that, by the 1980s, we had on deaths on the job, by industry and by occupation. Those studies and databases, by the 1980s, allowed us to see that, for example, those first floor window washers would earn \$300 less a year. I’m using that number as an example, but this is how the studies were per-

formed. Risk statistics would show those top floor people had a one in ten thousand greater probability of death. So if ten thousand first floor people will spend \$300 each—by spend I mean give up in wages, to be safer—if ten thousand of them spend \$300, they're valuing an American life at \$3 million.

Now I'm using \$2.5 million. But I'm looking at those studies from the 1980s that actually average above \$5 million.

- Q. Are there other consumer studies that relate to this particular problem we're presenting to the jury?
- A. Consumer-based studies would first examine the cost of a safety device. Assume it was \$200 for a smoke detector system in a home, and we, again by the 1980s, had the probabilities on accidental deaths with or without smoke alarms. Well, if ten thousand consumers spent \$200 each for the system, they're spending \$2 million in total to save one in ten thousand persons. They don't know which one of them would have died, but they're collectively valuing life at \$2 million. So, these studies were the second foundation for my opinion.
- Q. I think you mentioned earlier some federal studies in this area. What studies of the federal regulatory agencies or bodies, if any, did you rely upon in reaching your conclusion about the \$2.5 million figure?
- A. I'm going to read you the most current information on what federal regulatory agencies use as their value of life standards when they set safety standards. The value of life standard used by the Nuclear Regulatory Commission is the highest, and that is \$5 million—remember I used \$2.5 million. The Occupational Safety and Health Administration standard is exactly \$2 million. The Consumer Product Safety Administration for unknown adults uses a standard of \$1.7 million; for an unknown child, \$1.95 million. The Federal Highway Administration standard is one-and-a-half million. It wasn't until the late 1980s that these values came out in published articles. If one averages all of those regulatory standards, the average is 2.7 million. Let me try to explain what that means. If the Occupational Safety and Health Administration standard is \$2 million, which it is, that means that if they could order a company to install a safety device or make its 10,000 workers use a safety device (a guard on a machine or a respirator system or maybe specially designed goggles), they would do so if that piece of safety equipment costs \$200 a worker and reduces the risk of death by one in ten thousand. If that device had cost \$201 for each of 10,000 workers, OSHA wouldn't have made them do it. They would not force a \$2.1 million expenditure; that exceeds their \$2 million standard.
- Q. In any field of endeavor people criticize the work of other people and I'm sure in your profession as an expert you have been criticized; you have maybe criticized other people. What criticism of this loss of enjoyment of life approach have you considered in evaluating your approach to what this value is?
- A. To my knowledge I have read all of the articles and all of the books published to date that have anything to do with this area and again, by the way, the original applications for these studies were in regulatory economics, not the courtroom connection. Many criticisms involve technical details; for example, in looking at different risks of death, how good are the data? What are the best sources? The best single review of these studies was done by economist Dr.

Ted Miller, who works for the Urban Institute in Washington. He attempted to adjust the studies that had been published—these wage studies and consumer studies—based on some of the criticisms. His conclusion from all of the studies was an average whole life value of \$2.2 million in 1988 dollars, which is just over \$2.5 million in 1991 after adjustment for inflation. Indeed, a major criticism of some other economists working in this area comes from me. Whole life values are *not* hedonic loss values. The “economic machine” component of life value must be subtracted.

- Q. How do you translate this whole life value which we’ve talked about for an unknown American into estimates of the net enjoyment of life for unknown Americans per year?
- A. When these workers are deciding to work on the first floor and give up \$300 a year, they’re worried about the risk that they would die if they worked on the top floor. Now, I’m assuming that they know that if they were that one person in ten thousand who died, their family, and themselves for that matter, wouldn’t earn the wages that they would make if they had lived, wouldn’t earn the fringe benefits, and would not provide a value in household services. We know the present value of these values for average-aged Americans. I deduct, then, about \$700,000 from the \$2.5 million and divide by the remaining life expectancy of an average American. Such a person, in his or her early 30s, has a life expectancy of approximately 45 more years. So, the loss of enjoyment of life value for an average American divided by the life expectancy for an average American gives us a lost pleasure of living benchmark of just over \$50,000 a year. This is what I did project out into the future, but I applied Dr. Psychologist’s percentages to the annual benchmark loss values each year. If Dr. Psychologist concludes that at a given age, Mr. Terry would lose half of the normal enjoyments of life, then I’m taking 50 percent of the benchmark value for that year.
- Q. Is what you’ve just described, then, the net bottom line of enjoyment of life?
- A. That’s the bottom line after we apply Dr. Psychologist’s percentages.
- Q. And that’s for the unknown American?
- A. That’s an “unknown American” benchmark tailored to the specifics of Mr. Terry’s situation by Dr. Psychologist.
- Q. Does that assume everything in life is enjoyable?
- A. This is the *net* enjoyment of life. Those workers, and those consumers making decisions, are making decisions to preserve their life. They know that the life they’re preserving has its ups and downs, but in net it must be positive. It must have value or those first floor workers would go ahead and work on the top floor without a much higher wage to cover risk. We wouldn’t buy air bags if we didn’t think life had a net positive value to preserve.
- Q. So, again, how do we apply this net value to Mr. Terry in this case?
- A. In two ways. Number one, we apply it to Mr. Terry’s own life expectancy. Remember we obtained the annual benchmark for the average unknown American. But we know Mr. Terry’s life expectancy, so we’re going to use that figure through his life expectancy as an average white male. Second, we use the percentages from Dr. Psychologist to reduce the annual benchmark for a total loss of enjoyment of life down to partial losses due to Mr. Terry’s specific injuries.

- Q. And you utilized the percentages that are contained in this chart from Dr. Psychologist.
- A. That is correct, that is the chart I used.
- Q. What lump sum of money, given today, would restore the lost enjoyment of life to Mr. Terry if he values his life as do other Americans?
- A. \$734,218. This is the lump sum that, given today, could be invested and earn compound interest. All of the lump sum and all of the interest earnings would exactly be used up in restoring the projected loss for each year, so that not a nickel would remain at the end of Mr. Terry's life expectancy.

APPENDIX 2
EXCERPTS FROM A SAMPLE
COMMERCIAL DAMAGES TESTIMONY

- Q. And have you been qualified previously as an expert witness on economic loss or commercial damages in the state of Oz?
- A. Many times.
- Q. I've used the terms economic loss and commercial damages. Would you please explain what each is and how they relate to one another?
- A. Economic loss, or one could say economic damages, is a more general term than commercial damages. And let me try to explain it this way.

When somebody like me calculates economic loss, we are preparing to talk to the jury about a lump sum value that will make the injured party exactly whole, that is, put them in the place financially that they would have been in had not the bad thing happened to them.

So, for example, in a personal injury case, if someone has been badly injured, economic loss would be—we would project—what their earning capacity would have been had this injury not occurred. And we would usually use their track record in the past to project what they would have earned in the future. We will then usually work with a vocational expert. If the injured person couldn't do what they were doing before, but they can still do something, we will project that out, and we'll call that the post-injury amount. That is what their earning capacity is after the injury. Economic loss in that kind of case is simply the gap, it's the difference in any year between what they would have made had that injury not occurred and what they now are expected to make because they can't do the same thing they did before. They can still earn something, but not as much. So economic loss there is the difference between what their earning capacity would have been pre-injury, and what their earning capacity will be post-injury. It's the absolute gap.

If it were a wrongful death case, we would project out their earning capacity, and of course there is no post-injury earning capacity, since they are deceased. They will earn nothing now. So economic loss is the difference between what their earning capacity would have been, and zero, because there is nothing to subtract.

In a commercial damage case, which is just another subset of economic

loss, we're going to project out profits as they would have been had not the bad thing happened, whatever the bad thing is that we're talking about. And we will then look at what the profits or losses have been or will be because of the injury. And again, the economic loss will be the gap or the difference between what would have happened in profits and what, in fact, has happened and is expected to happen because of the bad event. In this case, it is the carcinogenic spill.

Q. All right. Now, will you tell us what you were asked to do for River City Terminals?

A. I was asked to determine a sum of money, a lump sum, what we call the present value, that will make River City Terminals, the corporation, exactly whole. So that when that amount is invested, for example, and when it earns compound interest in future years—through 1996 in this case—all of the principal lump sum and all of the earned interest will be exactly used up by the end of 1996 in matching the amounts of economic loss. Our present value loss in dollars of July 1, 1992, considers such adjustments so that the lump sum—if paid on July 1, 1992—will exactly restore economic loss.

Since some of the damages extend into the future, we're going to do something called discounting to present value. Some of you on the jury probably know what that means, some of you probably don't. I'll try to explain it in detail later. But it basically means we've got to lower those annual loss numbers back to what we call the present value, so that we know that when that lump sum is awarded, and when it earns compound interest, then we replicate the loss year by year by year in the past, and year by year by year in the future. The lump sum amount and all the earned interest are used up, so that when we get to the December 31st, 1996 closing date of loss, there will be nothing left. All of that lump sum will exactly be used up, and all of the interest earnings on that lump sum will be exactly used up, and there's not a nickel left. River City Terminals will have been made exactly whole. They won't be any worse off because of the carcinogenic spill, and they won't be any better off.

THE COURT: Members of the jury, you've just heard the witness here testify to something about 1996, and it is assumed between and among counsel here that since the evidence will concern that fact, counsel have agreed that the contract was renewable for a five-year period. That is what you're talking about.

MR. ATTORNEY: Two years thereafter. Total of 12.

THE COURT: That those facts are not established up to this point, but that this witness has made some projections based on that assumption, and the evidence that you will hear on that question will still be subject to your judgment of the evidence and its credibility.

Q. Did you determine the appropriate methodology to follow to arrive at a lump sum figure which would make River City whole, no more, no less?

A. Yes, sir. That was one of my tasks in this case.

Q. And let me ask you first of all, what were the principal sources of information that you relied upon in order to arrive at your conclusion as to the right methodology to follow?

A. First and foremost I relied upon the 1983 contract between River City Terminals, the corporation, and Oil, a corporation. That contract was the alpha and

the omega. That was the most important foundation for what I did.

The contract specified in exact detail how revenues were going to flow from Oil to River City Terminals at a minimum throughput of 100,000,000 gallons a year. Not only did it provide in great detail for the original period and for each renewal period what the cents per gallon reimbursement would be as every one of those 100,000,000 gallons a year flowed through, but the contract actually broke down the revenue components into three subcomponents: a capital component, an operating component, and a utility component. And it specified what the reimbursement rate would be at that guaranteed 100,000,000 gallons for each of those three components. That reimbursement rate changed with each renewal period. So they were very exact as to how revenues would flow.

They even, in the contract, dealt with the question what if construction cost a little more than we think it will. How is that excess to be dealt with? That was all covered in the contract.

So the economist in this kind of case must take the contract and apply the best economic theory to the contract. You don't tear up the contract and make it fit the model that you want to use.

And so once I saw the contract, and once I understood the case, it was very clear to me the economic model that should be used, and that's the model that we've used.

I also relied, by the way, on many, many conferences over these years, between 1985 and now, that involved Mr. Owner, Mr. Accountant and Mr. Manager. I was in a number of conferences with them to get the background of River City, what the contract said, and so on.

So if I had to say what I had mainly relied on, it would be the contract and those conferences.

Q. What is the significance to an economist in your situation to find a contract as specific as the Oil-River City Terminals contract?

A. I have never been involved in a commercial damages case—and I've done about 100 of them—where it was so easy to project revenues.

To project revenues I simply said, look we're going to take that guaranteed 100,000,000 gallons and we're not going to assume any more than that; it's guaranteed. And I said to John Accountant, you need to flow the revenues and all three components exactly as the contract says to do it. I didn't have to look at the past revenues in carcinogen, because, of course, they didn't have a past revenue in carcinogen. The first shipment leaked. I wouldn't have to have had that because I had a contract that would enable me to project into the future without predicting. The contract said exactly what revenues were going to be. I wish all the cases in which I worked had revenues defined by a contract.

Q. All right. Now, you've mentioned Mr. Accountant, can you tell us what his role was and how he interacted with you in connection with arriving at the proper sum which would compensate River City Terminals?

A. I think I can do that, Mr. Attorney, by talking about my four tasks, the four things that I was to do. And I think you'll see the interaction between me and Mr. Accountant.

My first task, as we've already discussed, was to develop the economic

theory, the economic model that was going to be used to calculate loss. That was number one.

Number two, I supervised the certified public accountant, Mr. Accountant, to be sure that his calculations—and he's the one that actually did all the calculations—to be sure those calculations were consistent with the economic model that I developed.

Third, in order for Mr. Accountant to do those calculations, I had to provide him with some input as an economist—and we'll talk about this a little bit more later—but, specifically, the contract and the revenue component were tied to the inflation rate.

Since we're projecting out into the future, I had to predict what the inflation rate would be—would have been for the next five years. And you'll see a little later that my prediction was four and one-half percent.

I also had to give Mr. Accountant an estimate of what interest rates would be for the next five years, because we have to do something called discounting to present value. And the key variable in discounting to present value is the interest rate—that is the rate at which a jury award can be invested—because it's those interest earnings that will make up part of the economic loss. So we have to take the losses out here in the future, and we have to lower them by discounting to this lump sum today, so that when you provide the lump sum, it will earn interest, and the principal and the interest will exactly restore, in this case, economic loss.

I know that was complicated. But, at any rate, the interest rate prediction I made was six and-a-half percent.

Now, interest rates on short term U. S. bills right now are less than six and-a-half percent. But I'm predicting what I think they will average in the next five years. So my inflation prediction was four and-a-half percent, my interest rate prediction was six and-a-half percent. What an economist calls the real interest rate, which is the difference between an interest rate and inflation, was, therefore, two percent. That is very consistent with predictions being made by many other economists and organizations, and is actually a little bit more than the average real interest rate for the last 20 years of American history.

Q. Dr. Economist, save that for later.

A. I'm sorry. That was the third thing that I was supposed to do.

And the fourth thing that I was supposed to do is, once Mr. Accountant made all those calculations, to check the calculations and be sure that they were, in fact, consistent with the economic model that I had provided in the first place.

Those are the four things I did. And, obviously, that involved a great deal of interaction with Mr. Accountant.

Q. All right. Now then, do you have an opinion, based on reasonable economic certainty, as to the methodology which is most appropriate to use to arrive at this lump sum figure that will make River City Terminals whole?

A. I absolutely do.

Q. What is that methodology, what is it called?

A. That methodology is called the lost profits approach. But it is also called a

time-series approach under Oz law. What we're going to do is project what the profits would have been, operating under that contract year by year by year, from 1985 through 1996. We're then going to look at what happened to River City Terminals, and we've had a loss at River City in each and every year up until the trial date. And then we have fixed costs that will continue out through 1996. And the difference between what they would have made and what, in fact, did happen, that absolute difference is the economic loss in this case. And again, for future years we have discounted back to present value.

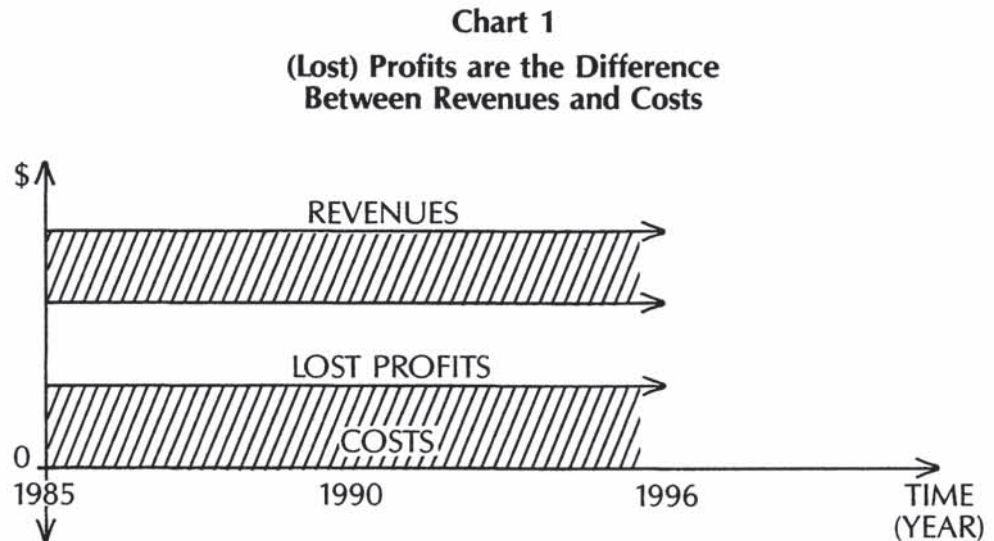
Q. All right. Now, I'd like, if you would, to try to put this in context by using some graphs which you prepared to show the application of this time-series methodology and a couple of different situations which may help the jury to understand exactly what we're talking about in the case of River City Terminals. Could you come down and assume your academic role for a moment?

THE WITNESS: Your Honor, can I step down?

THE COURT: Sure.

Q. All right. We have a chart that is identified as Chart 1. Can you tell us what you are illustrating with that chart?

A. Well, I'll just read the title of the chart. It's chart number one. And it says: Lost profits are the difference between revenues and cost. We're going to start simple and then get a little bit more complex, but it really doesn't have to be all that complex. Can I explain the graph?



Q. Please do.

A. First of all we must label the axes. Let's start right here at point zero. As we move up this way we're measuring in dollars. So this scale starts at zero, right here. We can measure in one dollar, two dollars, three dollars, four dollars. We can measure in \$10,000, \$20,000, \$30,000. Or we can measure in \$100,000 from zero, to 100,000, 200,000, 300,000. But as you're higher on the graph,

you're talking about greater and greater amounts of money, whatever units of measure that are being used.

On the horizontal axis we'll start at 1985, and we want to know the amount of loss in 1986, '87, '88, '89, '90, '91, '92, '93, '94, '95, '96. And then we're going to stop it on December 31st, 1996.

Now, what this chart points out is that when someone like me projects lost profits, we're really projecting revenues, and we're predicting costs as they would have occurred to a business. If revenues were represented by this line, then for each point in time we could look up here and go over and find out what the dollar amount of revenues are. So for each point in time we're estimating what revenues are. Usually an economist will do that based on the track record of the business in the past, in past times before the injury occurred. It wasn't relevant in this case because we had the contract that told us for a guaranteed minimum of 100,000,000 gallons a year, exactly what the reimbursement rate would be in three revenue components. So we didn't have to predict from the past. We just played out the contract. And that was my instruction to Mr. Accountant: at 100,000,000 gallons a year, use what the contract says is going to happen in terms of revenues. Because it couldn't be more explicit.

We then have to project out what the cost would have been to River City Terminals, or any company, to produce those revenues. And most of the cost prediction, by the way, is left to Mr. Manager—who was an expert on terminal operations. And Mr. Accountant worked with Mr. Manager to properly allocate costs. However, in terms of economic theory, I did talk to them a lot about how to handle something called fixed costs versus variable costs. That became important, and I'm sure we'll talk about that, too.

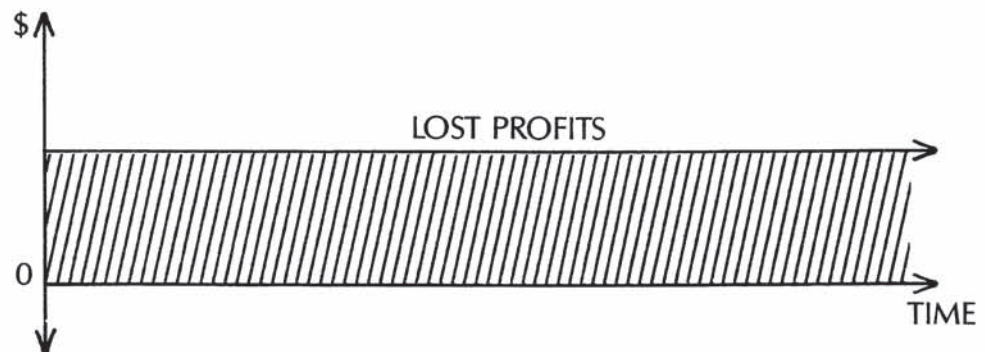
The point of this chart is it provides the difference between revenues and costs. If at any time period you sell something for four dollars, and the cost is three dollars, your profit is one dollar. Four minus three equals one. Well, instead of showing on all the graphs both the revenue line and the cost line, we only need the shaded area to show the lost profits. We can simply show lost profit directly. That's what I'm going to do in the graphs to come.

And the shaded area between zero and what the profit would have been in each time period is exactly the same as the shaded area between revenues and costs. We can either show it by showing the revenues and cost and the shaded loss, or we can be more simple and show what the profits would have been. And, of course, if they were lost, they're not profits anymore...now they're lost profits. From now on I'm only going to show profit lines, but you know that behind every profit line was a revenue projection and a cost projection.

Now, you'll notice this graph goes down here below zero. Because in our free enterprise system we have the right to make profit, but we also have the right to make loss, and companies do lose money. So that if in any given year costs were up here above revenues—let's say it cost four dollars and revenues were three dollars, so you've lost one dollar. We would show that below the zero on the vertical axis, and it would be down here somewhere. So losses are going to be below the zero line, profits are going to be above the zero line. That's what this chart does.

- Q. All right. Can we go to the next chart, please?
- A. Now—
- Q. Tell us what that shows in terms of illustration of commercial loss and how it differs from the prior example.
- A. The title of my Chart 2 is lost profits of a destroyed company. A company is totally wiped out. Let us assume a tornado came around and blew away the terminals. Gone. Ceased to exist. I've done many cases in which that was true. We would, here again, use the same two axes on the graph. We're measuring the dollars going up, we're measuring the time movement across this way. Since the company is destroyed there is no post-injury scenario. They're not doing anything post-injury. They're dead, just as if it were a wrongful death case. The company's been murdered. So commercial loss in any time period is the difference between the profits that we think would have occurred and zero. The shaded area for a destroyed company is lost profits to that company for whatever the relevant time period should be. That's what this graph shows.

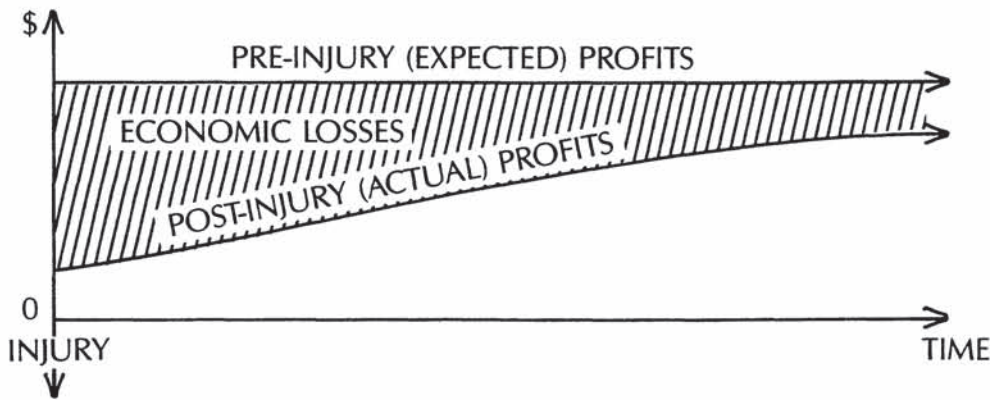
Chart 2
Lost Profits of Destroyed Company



- Q. All right. Tell us about Chart 3, please.
- A. Chart 3 depicts a very typical situation that I have found in commercial damages cases. Again we've still got the zero down here, we're still measuring dollars going up this way and still measuring time this way. What commonly happens is that, pre-injury, the company was going to make profits at this level. I'm just drawing it in to illustrate what the profits would have been.
- Now, assume that this is a company that made several different products—and many companies do; they're conglomerates; they make a lot of different products. Let's say the bad thing only happened to one of their products, but the other products were fine, they weren't affected. What typically will happen is that the company will still make some profits in the post-injury scenario, but they will be lower, and over time, in many cases, they will move back up closer to where they would have been, and sometimes they catch up, and it's a fixed period of loss. The point is, though, loss didn't go down to zero any-

more, because the company is expected to do something called mitigating damages. It is expected to do its very best, even though it's wounded, to make the highest profit. It is the absolute difference at any point in time between the profits that would have occurred to that company had not the bad thing happened and profits that are now coming to the company, or are projected to come to the company, because the bad thing did happen. The difference is economic loss. That's what that chart shows.

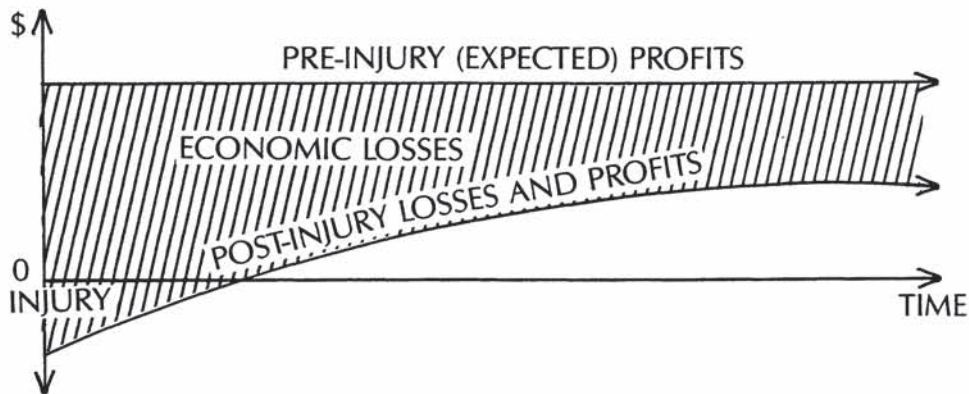
Chart 3
An Injured Company With Lowered Profits



Q. All right.

A. And, finally, Chart 4. This is a situation that I have found most common where the product line destroyed is a big part of the total company. Maybe they've got two things they do; in our case they process carcinogen products and non-

Chart 4
An Injured Company Recovering

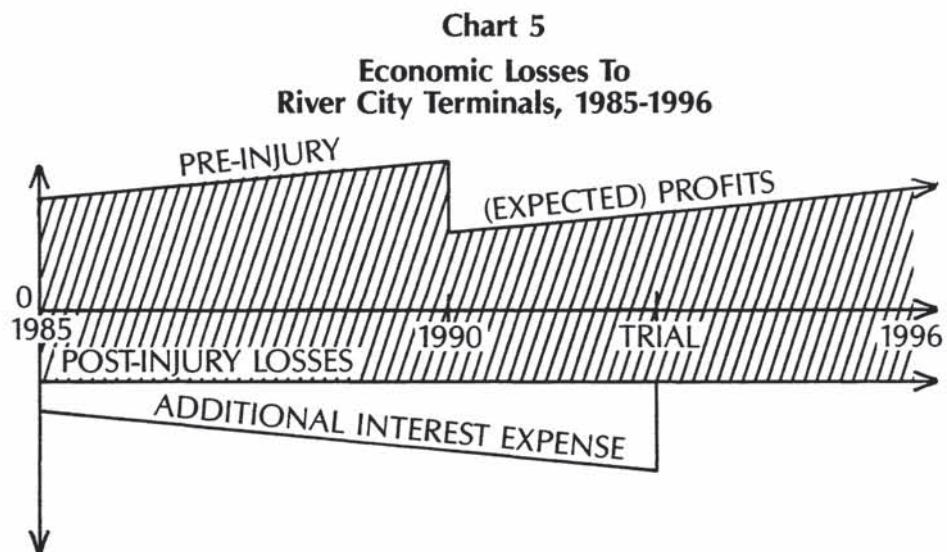


carcinogen products. And carcinogen was a big part of the company, or was clearly soon to generate most of company revenues—and *that's* what was destroyed.

More simply, they were to grow many apples and several oranges. But all of their apple business was wiped out. You will find particularly in those cases, because the injury affects the big part of the company, that because of the injury, they're thrown down here in losses. Now, remember this is the zero point. And so they're still struggling, but for many months and years, they are actually sustaining losses. And we would hope that they would eventually pull out and get back to profits.

Again, they had to *try* to make profits after the spill. But what if a company must try to make profits to mitigate damages, but, in fact, sustains losses. Economic loss is again the absolute difference between the profits that would have happened, continuing below the zero line, to the losses that did happen; loss is always the shaded area between what would have been and what is.

- Q. All right. Doctor, now let's get closer to the River City situation and look at the River City losses—Chart 5.
- A. It's certainly a prettier picture than my hand-drawn graphs.



- Q. Will you please, with the aid of the chart, demonstrate the categories of damages which, in your opinion, comprised each part of the total economic loss sustained by River City Terminals?
- A. In the case of River City Terminals, the carcinogen business was to have been more than half of their business. Clearly, you'll see when Mr. Accountant adds specific numbers to this chart, River City would have made significant profits in the absence of the spill. How do I know that? They had a contract. It spelled out revenues. It said what the revenues were going to be in each and every year, time period after time period.

What happened, though, is the loss was not just the green area of the profits they would have made. In fact, they were thrown into a situation where they still had all their fixed costs: all of the money that had been put into building and actually modifying the tanks and building the pipelines—all of what they had done to configure their business for the carcinogen business. All of that still existed, but there were no carcinogen revenues coming in. Revenues ceased.

So we have a situation after the injury where they still had the burden of what we call fixed costs, interest on the loans necessary to do that construction, rent, and depreciation being the three biggest components. So their actual situation is thrown down here below the line.

Economic damages then become the absolute difference, as we said before, between the profits that would have started flowing naturally from the operation of the contract between Oil and River City, and the losses that have, in fact, occurred and will continue to occur because those facilities, and that land, and that capital equipment, isn't producing any revenue. There's no carcinogen being shipped.

Let me note that the rest of the business was still able to make a small profit after the spill and its publicity. Mr. Accountant will show that the non-carcinogen part of the business has been making a profit since 1985. The problem is that because of those fixed costs for the carcinogen facilities, the overall company has been reduced to losses. And the only way they've been able to stay solvent is to borrow money. And they have been borrowing money in contemplation of an award that will make them whole. So that when they get that award they can pay back their loans, they can pay back the interest on those loans. They will have the amount of money that they would have had anyway had the spill not occurred and had carcinogen revenues come in according to the contract, and also have exactly enough money to pay back their necessary borrowing.

So we really have three components of economic loss if you want to look at it that way. The green area, the profits that would have occurred; the red area, the losses that have occurred, because they stayed open; and the orange area of the borrowing that had to occur *unless* we force the wounded business to shut down. And we're going to stop that orange area after the trial date. Because we're assuming that with an award that makes them whole, they receive enough money to pay back the loan, there is no more orange area, and it stops. So when we project out beyond the trial date the orange area ceases.

12 THE LAW AND PUBLIC POLICY

12.1 Introduction

Although the tort reform movement is very much alive, the rate of change in state laws resulting from tort reform has slowed in the past several years. During the past two decades, tort reform generally has consisted of setting limits to preclude "excessive" verdicts by limiting plaintiffs' rights to recovery on certain elements of damage, often "non-economic" damages and, frequently, damages resulting from medical malpractice. Critics of reform point out that in Colorado, where a reform package was instituted several years ago, a number of the anticipated benefits have not materialized. Automobile insurance rates, for example, have increased, not decreased, subsequent to the reforms. In another area, a reform proposal to move railroad workers' claims under the Federal Employer's Liability Act (FELA) to a no-fault, state administered workers' compensation system does not appear to have achieved savings.¹ The debate over the long term future and fairness of the civil litigation system has not produced any definitive consensus, as to either the source of problems or the solutions.

There is widespread belief and anecdotal evidence, if not proof, that the personal injury process is out of hand. Olson² and Huber and Litan³ detail with a critical eye the expansion of litigation in the personal injury arena. Proponents argue that the current system needlessly inhibits product development and results in high medical costs due to excessive defensive procedures. They point to the relatively large number of lawyers in the United States compared to other countries as evidence of the need for reform. Editors of the influential *Wall Street Journal* have campaigned for the so-called English Rule, whereby the losing party pays the costs of litigation for the other side, as a way to dissuade prospective litigants from filing frivolous lawsuits.

Reform opponents claim that the research indicates that these concerns are overstated, that both the number of suits and the size of damage awards have increased proportionately more in commercial litigation than in personal injury cases,⁴ that

¹ Michael W. Babcock and Michael Oldfather, *Does FELA Repeal Belong on the Tort Reform Agenda?*, JOURNAL OF FORENSIC ECONOMICS, Vol. 3, No. 2, pp. 3-13, 1990.

² Walter K. Olson, *THE LITIGATION EXPLOSION*, Truman Talley Books, New York, 1991.

³ Peter W. Huber and Robert E. Litan, eds., *THE LIABILITY MAZE*, The Brookings Institution, Washington, D.C., 1991.

⁴ Roxanne B. Conlin, "Litigation Explosion": *Tempest in a Teapot?* TRIAL (November 1991), pp. 114-118.

runaway awards are few and far between, and that most large punitive damage awards have been dramatically reduced on appeal. Adversaries of reform maintain that unsafe products should be driven from the market, that excessive insurance company profits on malpractice premiums explain the high costs of medical care, and that legal rights and remedies in other countries are at unacceptably low levels. Kindregan and Swartz review and oppose a number of reform proposals, including limiting compensation for pain and suffering through legislative caps.⁵

A recent comprehensive report by the highly respected American Law Institute concluded that businesses are at times unfairly penalized by inconsistent and excessive damage awards for non-economic losses, and that the court system can be inhospitable to plaintiffs with legitimate claims.⁶ Among other proposals, the ALI study recommended allowing awards only to severely injured plaintiffs, requiring juries to use a scale setting forth damages for specific injuries, making hospitals rather than physicians liable for injuries suffered, disallowing evidence on defendants' wealth in setting punitive damage awards, and allowing juries to base awards on the probability, rather than proof, that victims' damages were caused by exposure to toxic substances.

The Judicial Conference of the United States, Committee on Rules of Practice and Procedure, recently proposed changes in the Federal Rules of Civil Procedure.⁷ These proposals include limiting each side to 15 interrogatories and 10 discovery depositions, amending Rule 702 to limit expert testimony to that which is "reasonably reliable" and that will "substantially assist" the trier of fact, and requiring a written report by each expert expressing all opinions. The amendment to Rule 702 could mean that scientific opinion may not be allowed in court until a majority of experts find it reliable.

Huber expresses concern over the admission of research that has no standing in the scientific community.⁸ Ciresi and Wivell, however, hold that the authors of Rules 702 and 703 deliberately avoided the requirement that the opinion be "generally accepted" in the field and intended that courts be generous as to what is allowed into evidence. They argue that so long as opinions are helpful and rely upon facts and data reasonably relied upon by experts in the field, the rules are intended to allow juries, not judges, to determine the weight given to an expert's opinion.⁹

The litigation process and its rules affect the allocation of billions of dollars annually. Naturally any change in rules will inspire vigorous debate by the prospective winners and losers of shifting rights. There is little disagreement that the current system is expensive, protracted and time consuming. The evidence for, and con-

⁵ Charles P. Kindregan and Edward M. Swartz, *The Assault on the Captive Consumer: Emasculating the Common Law of Torts in the Name of Reform*, ST. MARY'S LAW JOURNAL, Vol. 18:673, 1987.

⁶ Amy Dockser Marcus, *Limits on Personal-Injury Suits Urged*, THE WALL STREET JOURNAL (April 23, 1991), p. B1, Col. 3.

⁷ *Proposed Amendments to Federal Rules of Civil Procedure*, Committee on Rules of Practice and Procedure, Judicial Conference of the United States, Administrative Office of the United States Courts, Washington, D.C. 20544, 1992.

⁸ Peter W. Huber, *GALILEO'S REVENGE: JUNK SCIENCE IN THE COURTROOM*, Basic Books, 1991.

⁹ Michael V. Ciresi and Martha K. Wivell, *Protecting Your Evidence Against 'Junk Science' Attacks*, TRIAL (November 1991), pp. 35-40.

sequence of, this growing expense is the "explosion of private alternative dispute resolution (ADR) services over the past decade."¹⁰ In private, disputing parties can negotiate the rules among themselves and hire a neutral to resolve the dispute. At a considerable savings of money and time, disputants can choose among mediation, arbitration, minitrials, moderated settlement conferences, and summary jury trials. Just as American businesses have unofficially privatized the package delivery system, setting up services that bypass the U. S. Post Office to deliver the majority of parcels, litigants are now beginning to privatize civil justice, reducing the expense and, in particular, the delays common in courts today. It is becoming increasingly routine for contracting parties to agree in advance to circumvent the judicial system and require ADR to resolve all contractual disputes. As the use of ADR services continues to expand, the debate over tort reform may become less relevant over time.

12.2 The Law and Wrongful Death

The total offset method, frequently referred to as the "Alaska Rule," is misnamed. Wage growth rates different from discount rates are allowed in Alaska Stat. § 09.17.040(b). Subsection (c) of the statute permits the parties to use the total offset method, first discussed in *Beaulieu v. Elliot* 434 P.2d 665 (Alaska 1967), only if both agree to do so. Perhaps the total offset method should be referred to as the "Beaulieu Option."

Reflecting the fall in the purchasing power of a dollar, Indiana recently raised the medical malpractice limit from \$500,000 to \$750,000; Wisconsin also raised its cap. The effects of inflation over time may cause other states to periodically revise various caps and limits set forth under tort reform.

The U. S. Court of Appeals for the Seventh Circuit, in interpreting Illinois law which bars pre-judgment interest, allowed for the "augmentation" of plaintiff's past losses using inflation to bring them to present value. *In Re Air Crash Disaster Near Chicago, Ill., Etc.*, 644 F.2d 633 (1981). The court argued that such augmentation is logically implied when damages are brought to present value.

As a correction to Table 1, Column 5C, of the bound volume, Illinois Pattern Jury Instruction 31.04 allows for the deduction of a decedent's "customary personal expenses and other deductions" rather than the maintenance deduction indicated in the bound volume, under *Rasmussen v. Clark*, 346 Ill. App. 181, 104 N.E.2d 325 (2d Dist. 1952). The X should be in Column 5B. Further, as a correction to Column 6B, Illinois Pattern Jury Instruction 32.03 allows for the "reasonable value of the services" of which a spouse has been deprived, under *Blair v. Bloomington & Normal Ry., Elec. & Heating Co.*, 130 Ill. App. 400 (3d Dist. 1906).

In calculating present value, Massachusetts requires that the present value date be the date of filing the case; the clerk of court adds interest on the award from that date onward, under *Griffin v. General Motors Corp.*, 403 N.E.2d 402, 380 Mass. 362 (1980) and *MacDonald v. Federal Laboratories, Inc.*, 724 F.2d 243 (1984).

Michigan statutes now allow interest on past losses to be awarded and require that juries award losses expressed in future dollars; the judge discounts future losses

¹⁰ Larry Ray, *Emerging Options in Dispute Resolution*, ABA JOURNAL (June 1989), pp. 66-73.

using a simple 5 percent interest rate per year, affecting Column 2C.¹¹ The law in Michigan is not clear on whether personal living expenses of the deceased should be subtracted, affecting Column 5D, with rulings both ways: *Wycko v. Gnodtke*, 361 Mich. 331, 105 N.W.2d 118 (1960), denied child rearing deductions, but *Miller v. State Farm*, 410 Mich. 538, 302 N.W.2d 537 (1981), ruled for the deduction of personal consumption. The law on deductions for taxes in Michigan is likewise not settled, again with rulings on both sides of the issue: *Johnson v. Penrod Drilling*, 510 F.2d 234 (5th Cir. 1975) held that future tax rates are too speculative to consider, but *Downs v. United States*, 522 F.2d 990 (6th Cir. 1975) permitted consideration of the impact of taxes.

12.3 The Law and Personal Injury

Many of the comments regarding computation of damages in Section 12.2 above are applicable to personal injury as well as wrongful death cases. These are all logically ascertainable by the reader and do not require repetition or special comment here.

Collateral source income is commonly not allowed as an offset in most states, but that may be slowly changing. Kentucky now allows information regarding collateral source income to be presented to a jury, but offers no guidance to the economist as to its specific inclusion and offset in calculating damages.

Deduction for personal consumption is generally not undertaken in injury cases. But when a victim is permanently institutionalized due to catastrophic injury, it is logical to deduct the reduction in personal consumption expenditures from the medical care costs.

12.4 The Law and Hedonic Damages

A. Personal Injury

The theory of hedonic damages, which compensates for the loss of enjoyment of life, "has moved quietly, case by case, into the mainstream of modern tort law," according to Bodine, former editor and publisher of the *ABA Journal*.¹² To date, a majority of state and federal courts have ruled that it is a separate element of damages, while a minority of courts have ruled that it is a factor in pain and suffering.¹³

In a landmark ruling in *Molzof v. United States* (1992), __ U. S. __, S. Ct. __, 113 L. Ed. 2d 239, Justice Clarence Thomas wrote the majority opinion allowing for

¹¹ Under Michigan S.J.I.2d 53.03 Future Damages—Reduction to Present Cash Value, for cases filed prior to October 1, 1986, the jury reduces damages to present value. In cases filed on or after that date the judge, not the jury, reduces the damages according to M.C.L.A. 600.6306(2): M.S.A. 27A.6306(2). Further, under *Currie v. Fitting*, 375 Mich. 440, 454-455; 134 N.W.2d 611, 616 (1965) and as qualified by *Vannoy v. City of Warren*, 26 Mich. App. 283, 288-289; 182 N.W.2d 65, 68-69 (1970), *aff'd. on other grounds*, 386 Mich. 686; 194 N.W.2d 304 (1972) juries may award interest from the date of injury until the date of trial, at which point statutory interest is awarded to date of payment.

¹² Larry Bodine, *Hedonic Damages Catch On*, THE NATIONAL LAW JOURNAL (March 9, 1992), pp. 27-28. Also, see Larry Bodine, et al, TRIAL MANUAL FOR PROVING HEDONIC DAMAGES, Forthcoming, Lawpress Corp., 1992.

¹³ Larry Bodine, Interview, *Recovering for Loss of Enjoyment of Life*, LAWYER'S ALERT (November 11, 1991), Vol. 11, No. 22, pp. 11-13. Contains a listing of the state and federal circuit rulings.

the loss of enjoyment of life in injury under the Federal Tort Claims Act. *Molzof* struck down the FTCA definition of punitive damages as any damages that go beyond compensating for actual pecuniary loss, reversing decisions in the 1st, 4th, 5th, 7th and 9th U. S. Circuit Courts of Appeals that limited FTCA damages to actual pecuniary loss. Notably, *Molzof* overturned *Flannery v. United States*, 718 F.2d (4th Cir. 1983), cert. den'd, 467 U. S. 1226, 104 S. Ct. 2679, 81 L. Ed. 2d 874 (1984) which held that there must be awareness in order for damages to be meaningful to victim in FTCA cases or else they would be punitive. Punitive damages are not allowed against the federal government under the FTCA.

In *Dunn v. Cadiente*, 503 N.E.2d 915 (Ind. App. 4 Dist. 1987) an Indiana Appellate Court ruled that a victim was entitled to an award for the loss of use or function of part of his body, irrespective of other elements of the damages award, and that mathematical certainty is not required so long as the amount is supported by probative evidence. In *Canfield v. Sandock*, No. 563 N.E.2d 1279 (Ind. 1990), the Indiana Supreme Court held that damages to a victim's ability to function as a whole person are compensable, although it objected to the phrase "loss of quality or enjoyment of life." The court said a different set of words conveying the same thing should be used instead. In *Corgan v. Muehling*, 143 Ill. 2d 296, Illinois allowed for psychological injuries without requiring that a physical injury be manifested. In *Leiker v. Gafford*, 778 P.2d 823 (Kan. 1989), the Kansas Supreme Court ruled that the loss of enjoyment of life is a valid element of pain and suffering, reversing a 1938 decision, *Hogan v. Santa Fe Trail Transportation Co.*, 85, P.2d 28 (Kan. 1938). In *Gregory v. Carey*, 791 P.2d 1329 (Kan. 1990) the state supreme court reiterated its ruling. In *Carey v. General Motors Co.*, 377 Mass. 736 (1976), a Massachusetts case not cited in the bound volume, the court clearly allowed for the diminution of enjoyment of life in injury, in addition to pain and suffering, mental anguish and disability. In *Clement v. Consolidated Rail*, 734 F.Supp. 151 (District Court of New Jersey 1989), the judge denied a motion to dismiss and held that hedonic damages are potentially recoverable in personal injury. In *Eyoma v. Falco*, 589 A.2d 653 (N.J. Super. A.D. 1991), the New Jersey Superior Court allowed for the loss of enjoyment of life for a comatose person, without requiring cognitive awareness, ruling subsequently and contrary to the New York Court of Appeals in *McDougald v. Garber*, 73 N.Y.2d 246 (1989), and agreeing with *Flannery v. United States*, 297 S.E.2d 433 (1982). In *Kirk v. Washington State University*, 746 P.2d 285 (Wash. 1987), the Supreme Court of Washington ruled that the loss of enjoyment of life due to injury was allowed, in addition to pain and suffering disability. This ruling effectively reverses *Blodgett v. Olympic Sav. & Loan Ass'n.*, 32 Wash. App. 116, 646 P.2d 139 (1982), which called such recovery double counting. In *Terry v. CMI*, Civil Action No. 89-C-238, a Mason County West Virginia jury awarded \$272,630 in hedonic damages for the loss of enjoyment of life due to a foot amputation, allowing an economic expert (Brookshire) to testify as to the value of the damages. The case was upheld on appeal; the West Virginia Supreme Court denied a rehearing. Rulings in Wisconsin courts provide clear legal authority to support a separate award of loss of enjoyment of life damages.¹⁴

¹⁴ Gary A. Magnarini and Stan V. Smith, *Hedonic Damages*, WISCONSIN LAWYER, State Bar of Wisconsin (Feb. 1991), Vol. 64, No. 2, p. 17.

While courts are routinely allowing for loss of enjoyment of life damages, still an area of controversy is the admissibility of expert economic testimony, a matter generally within the judge's discretion. Judges even in the same jurisdiction have reached opposite conclusions when presented with similar facts. To date, testimony has been allowed or presented in state courts in Alaska, Arizona, California, Florida, Georgia, Hawaii, Illinois, Indiana, Louisiana, Mississippi, North Dakota, Ohio, Pennsylvania, South Dakota, Tennessee, Texas, West Virginia, Wisconsin, in Federal Courts in the 2nd, 7th, and 9th Circuits, and possibly elsewhere.

B. Wrongful Death

Courts have also continued to expand decedents' rights to recover for the loss of enjoyment of life in wrongful death cases, although currently only a minority of states have allowed decedents to recover such loss, including Connecticut, Georgia, Hawaii, Idaho, and Mississippi, and in U. S. District Courts in the 2nd, 7th, and 9th Circuits. In a Georgia case, *Wood v. APAC-Georgia Inc.*, 179220 Fulton County, Ga., Court (April 4, 1990), a jury awarded \$250,000 for the loss of life's pleasures in the death of a 3-year-old. Notably, the court allowed the jury to hear testimony by an economist (Smith) quantifying this loss. In a Hawaii case, *Conrad, et al. v. Lamb, et al.*, Circuit Court of 3rd Circuit, State of Hawaii Civil No. 89-369 (Hilo), a judge allowed testimony by an economic expert (Smith) and awarded damages to the decedent for his loss of enjoyment of life. In *Fliger v. Horton*, Second District Court, Idaho, Case No. 66622, which later settled, the court ruled in a pretrial motion that "one of the damages which is just under all circumstances is hedonic damages." In a wrongful death case, in Mississippi, *Jones v. Shaffer*, No. 07-CA-59255 (Miss. Dec. 19, 1990), Supreme Court Justice Robertson stated in an opinion, concurring with the majority ruling in the case, that an earlier interpretation of Miss. Code Ann. § 11-7-13 allowed for the recovery of the loss of the value of living in wrongful death in *McGowan v. Estate of Wright*, 524 So.2d 308, 311-13, Miss. 1988. In *Stang v. Hertz*, 463 P.2d 45 and 467 P.2d 14, the Supreme Court of New Mexico ruled that losses are not limited to pecuniary losses, that damages are recoverable by proof of the worth of the life of the decedent, and that the purpose of the wrongful death act is, among other aims, to make negligence that causes death costly to the wrongdoer.

12.5 Public Policy Implications

States, such as Michigan, that provide for statutory discount rates (and other statutory means of calculating damages) risk removing the present value analysis from economic reality. How is the economist to treat such circumstances when the statutory rate is below (or above) the market rate? Should he compensate for any deviation by appropriately decreasing (or increasing) growth rates? By doing so, does he unintentionally thwart the legislature's intent, or does he correct the disparity between the intent and the statute? Legislative mandates may reduce the variety of possible methodologies, but at the expense of defendants when statutory rates are below market rates, or at the expense of plaintiffs when statutory rates are above market rates. It seems most appropriate for the courts to allow economists latitude in selecting the appropriate methodology and rates, trusting the adversarial process

and the jurors to ferret out any inequities.

In the bound volume we argued for the imposition of pre-judgment interest in making awards. This policy compensates for any investment losses from the time the loss was incurred. There is an even stronger argument, absent a provision for pre-judgment interest, to express past losses in "current dollars" by taking inflation into account. In the 1992 Economic Report of the President, all important economic series, including national wealth, gross domestic product, per capita income, personal consumption, private investment, business inventories and sales, imports and exports, are expressed in current dollars. Comparing or combining unadjusted values from various past years is truly mixing apples and oranges. Augmenting past losses due to inflation where pre-judgment interest has been disallowed has been approved in Illinois and possibly elsewhere.

Personal consumption deductions in death cases are required in most states, but there is considerable ambiguity as to what courts mean by personal consumption. For any given definition, the difficulty of measuring a victim's true marginal personal consumption is not insubstantial, whether using data specific to the victim or relying on general survey data. A consistent definition of personal consumption among different jurisdictions would promote not only equal justice under the law, but the development of more consistent economic valuation methodologies as well.

Taxes are frequently barred from mention in court. There are two effects of taxation, as discussed in Section 3.8 of the bound volume, which drive the present value in opposite directions. Which of these two effects dominates depends greatly upon the number of future years being discounted, as well as facts in the case. The complete omission of any mention of taxes may lead a jury mistakenly to conclude that an award for lost earnings should be lowered to take taxes into account. It is unlikely that jurors will recognize that taxes, if taken into account, would also lower the discount rate, and hence raise the present value. If taxes are not to be considered, it would seem best to instruct jurors explicitly about this rather than be silent on the issue. Otherwise, in the absence of any instruction, jurors might be tempted to adjust the award for taxes in a manner likely to be incorrect.

Collateral source income subsequent to an injury or death can arise from various sources. It seems that, from an economic fairness point of view, some of these funds might be logically deducted from the victim's losses, while others might not be. Where the victim was covered against losses, through disability insurance or medical insurance for example, such income should not be deducted. Most states disallow mention of a collateral source, which may lead to double recovery in some instances.

Almost every jurisdiction allows for recovery of intangible or hedonic damages, but some jurisdictions require that the victim have an awareness of the loss. By requiring awareness, courts reduce the penalty for injuries that result in a diminished mental state. The theory behind the requirement of mental awareness is that an award to a victim who cannot appreciate it, and cannot be restored by it, is not compensatory, but punitive. Courts routinely allow awards for pre-death pain and suffering in survival actions even though decedents cannot appreciate awards nor be restored by them. Limiting recovery to instances where there is awareness ignores

one of the economic aims of allocating liability, which is to deter uneconomical accidents.¹⁵

Some courts hold that the loss of enjoyment of life in injury cases should be considered as part of pain and suffering, while other courts hold that it is an element of disability. The majority of jurisdictions consider it as a separate element of damages.¹⁶ We believe that separate itemization allows for more precise measurement of losses, and disagree with courts that have held that unbundling of awards leads to inflated verdicts.

Further, courts do not uniformly allow economic testimony regarding the loss of the enjoyment of life in injury. Such testimony can reduce the wide variation of such awards and assist juries in arriving at more fair and consistent verdicts. We recommend that the concern that such testimony leads to unreasonably high verdicts be addressed by adopting conservative approaches to life valuation, consistent with our recommendation of a conservative approach in all damages estimation.

Courts usually do not allow an award for the loss of enjoyment of life in death cases, except in Connecticut, Mississippi, Georgia, and in U. S. Code 42, Section 1983 actions. Denial of loss to victims in death cases is a subject of current societal debate. Courts have been reluctant to recognize the loss of future life expectancy by a deceased victim, although many courts allow it for injured victims. Lost enjoyment of life calculations applied to a specific survivor, however, may become an entirely new issue.

Generally courts are willing to compensate for the cognitive experience of pain and suffering, even to consequently deceased victims, but they are reluctant to compensate for losses resulting in diminished mental awareness or death where there is no cognitive experience of the loss. Schwartz and Thornton argue that the utility lost by decedents (and cognitively unaware victims) is just as real as the utility lost by survivors; hence there is an inconsistency in statutes requiring awareness, which the authors suggest could be resolved by basing recovery on a lifetime utility theory of loss.¹⁷

There are serious social implications of allowing testimony on, and recovery for, loss of enjoyment of life damages. We support the call for a program to educate judges, lawyers and expert witnesses about the technical issues to speed the development of predictable ranges in these awards, as well as research programs to refine the use of life valuations where their use in court is allowed.¹⁸

Often awards or settlements must be allocated among survivors. Courts frequently use a years-of-dependency formula, whereby the ratable number of years of dependency determines the proportional award. Spouses are deemed to be dependent for the life expectancy of the decedent; children are deemed to be dependent

¹⁵ Richard A. Posner, *ECONOMIC ANALYSIS OF THE LAW*, Little, Brown & Co., 1973, p. 78.

¹⁶ See Annotation, *Loss of Enjoyment of Life as a Distinct Element or Factor in Awarding Damages for Bodily Injury*, 34 A.L.R.4th 293 (1984) at 300-309.

¹⁷ Eli Schwartz and Robert Thornton, *Towards a Utility-Based Theory of Loss in Wrongful Death Cases*, *JOURNAL OF FORENSIC ECONOMICS* (April 1989), Vol. 2, No. 2, pp. 67-74.

¹⁸ Ted R. Miller, *Willingness to Pay Comes of Age: Will the System Survive?* *Northwestern University Law Review* (Summer 1989), Vol. 83, No. 4, p. 906.

until they reach the age of majority. Franz suggests that a blind application of this formula may well contradict reality and that alternatives should be examined for economic fairness.¹⁹

Statutory limitations on certain types of damages, such as those arising in medical malpractice, and non-economic damages limit the rights of a class of claimants. These limits appear to be an arbitrary and illogical attempt to preclude excessive awards. Allowing appropriate testimony as to losses can ensure that jurors are adequately informed as to the values without abridging the rights of the most severely injured class of litigants, or those injured by a particular category of defendants. Many states that adopted caps for certain elements of damages, such as non-economic losses or losses due to medical malpractice, have found it necessary to adjust these over time due to inflation. Such limits should be indexed for inflation so that these limits maintain their real value over time, much as the IRS indexes standard deduction levels for personal tax returns.

(Note: Correction to the admissibility chart, page 254, Column 6B, discussed in Table 1 at the end of Chapter 12: Illinois fully allows for the loss of household services and should have an "X" in Column 6A.)

¹⁹ Wolfgang W. Franz, *The Use of the Years of Dependency Formula in the Apportionment of Wrongful Death Settlements: Criticism and Modification*, JOURNAL OF FORENSIC ECONOMICS (September 1987), Vol. 1, No. 1, pp. 49-59.

13 ESTIMATING DAMAGES IN COMMERCIAL, ANTITRUST, AND LABOR CASES

13.2 Issues in Commercial and Antitrust Cases

F. Year-by-Year Method

An important legal and economic issue persists in estimating lost profits when one or a few product lines or components of the business are affected by a business interruption. The overall business may be seriously injured, but not destroyed, and the issue involves the treatment of fixed costs, or overhead, in the calculation of lost profits. The deduction of (allocable) fixed costs from variable revenues that would have been forthcoming, absent the business "injury," obviously lowers the estimates of lost profits. Any legal parameter that proscribes the deduction of only variable costs from (lost) variable revenues results in a larger estimate of lost profits.

One argument for considering allocable fixed costs as a deduction from (lost) variable revenues is that deductions are made from corporate revenues for such fixed costs as the depreciation on plant and equipment in determining taxable net income. It is argued that such deductions should similarly be made in determining lost profits damages. A related argument is that the lost (variable) revenues could never have been obtained without the land, plant, equipment, and personnel represented by allocable fixed costs.

The contrary view against deducting (allocable) fixed costs from variable revenues may be more consistent with the goal of making the injured (versus destroyed) business whole.¹ Assume that the product line(s) affected would have generated 50 percent of total revenues and that 50 percent of fixed costs are properly allocable to the affected product line(s). The remaining 50 percent of the business—and the plant or corporate entity itself—must still "cover" all of the fixed costs. Revenues from the affected operations were eliminated (or reduced). The only method to recapture the fixed costs allocable to the affected product line(s) is *not* to subtract this 50 percent of fixed costs from the lost variable revenues in determining lost profits and true, economic loss.

The rule on the treatment of fixed costs, if it clearly exists, varies by jurisdic-

¹ An excellent analysis of the investment, opportunity, and outcome approaches to commercial damages is relevant and useful in assessing this issue of economics and law. See Jeffrey Bodington, *Appraising the Profits Lost by a Failed New Venture*, JOURNAL OF FORENSIC ECONOMICS (Winter 1990), Vol. 4, No. 1, pp. 7-14.

tion, and both attorneys and forensic economists must understand any such rule in the relevant jurisdiction. A cautious generalization is that the trend is away from a net profits rule (deducting allocable fixed costs) and toward a gross profits rule (deducting only variable costs from variable revenues). A recent discussion of the gross profits rule is contained in the *Digital & Analog Design Corporation* case, decided by the Ohio Supreme Court in 1989.² The Court endorsed the argument that other parts of the business were forced to cover all of the fixed costs, so that (allocable) fixed costs to the affected portion of the business should not be subtracted from variable (lost) revenues in determining lost profits.

As stated in the bound volume, the courts have singled out “unestablished” businesses for special treatment, and have traditionally denied damages as too speculative in many such cases. A clear trend in United States courts is toward a more liberal treatment of lost profits damages in these cases. Courts nationwide are more likely to admit evidence on the lost profits of a new, or relatively new, business if these profits can be projected with reasonable certainty. Ironically, the forensic economist, the judge, and/or the trier of fact must wrestle with whether a lost profit estimate can be made, should be admissible, and has credibility under this “reasonable certainty” rule.

The economist may have a few months or years of income (or loss) history, but this may not be enough data upon which to base a projection of (lost) profits beyond the business injury. If a projection of lost profits is to be made, then the economist must develop and explain a credible “yardstick” of what profits would have been absent the business injury. The yardsticks which may be used and accepted include the following:

- 1.) Profits of sister franchise operations in comparable markets for comparable time periods.
- 2.) Revenue and/or cost and/or profits projections by industry experts (although the loss estimate is only as credible as the credibility of these foundation experts).
- 3.) Any revenue, cost, and/or profit projections made by the plaintiff company before the business injury occurred.
- 4.) Any revenue, cost, and/or profit projections made by the defendant about the plaintiff company before the business injury occurred.
- 5.) Revenue, cost, and/or profit data for comparable firms operating in the relevant product market before and after the business injury, if such data can be obtained.

G. Using Simulation to Estimate the Value of a Business

Most methods of capital stock valuation are based upon estimates of expected future earnings of the company. Generally accepted economic theory holds that the value of a stock is based upon the present value of its expected future stream of cash flows.³ Where there is an active exchange in a company's stock, the value is deter-

² *DIGITAL & ANALOG DESIGN CORPORATION v. NORTH SUPPLY CO.*, 44 Ohio St. 3d 36, 540 N.E.2d 1358 (1989). Also, see Robert L. Dunn, *RECOVERY OF DAMAGES FOR LOST PROFITS* (Lawpress), 3rd ed., May 1991 Supplement, pp. 95-97.

³ See J. F. Weston and E. F. Brigham, *MANAGERIAL FINANCE* (Dryden Press, 1978), 6th edition.

mined by the combined opinions of buyers and sellers, who presumably take all factors, including their estimate of future income, into account. When the stock is closely held and there is no arm's length exchange to decide its value, projections must be made. An informed estimate of value can be developed by projecting the firm's future cash flow to calculate annual net income and then discounting income to present value.

The present value of the stream of net income is the value of the firm. This makes sense because the buyer of the firm is really buying the stream of net income; the value of the stream is thus the value of the purchase. The discount rate used to calculate present value takes account of the risk that the income stream may be other than projected. The higher the discount rate, the lower the present value. A potential buyer that has great doubts about the stability of future income flow will set a higher discount rate and offer a lower price than one with less doubt. An economist who is estimating the value of the firm will use a discount rate equivalent to market rates for investments of similar risks.

There are other valuation models that use other techniques to arrive at a firm's value. These include capitalizing the dividend stream, summing current earnings plus expected future opportunities, and netting capital budgeting cash flows.⁴ If properly applied, these alternative approaches are generally equivalent and yield the same present value.⁵ This discussion focuses upon the discounted net income approach.

Projecting future income involves projecting many different elements of the firm's operations, each of which has a probability of being different from the projection. Expertise is required to measure the appropriate probability distributions and apply them when projecting sales, cost of materials, wages, rents, interest and other income and expenditure items. Just as projections of lost earnings require the establishment of baseline wages, growth rates and adjustments, projecting company income involves measuring baseline components and projecting their growth and making adjustments.

In litigation, there may be uncertainty about the accuracy of baseline figures, growth rates, the effect of competition and many other items in the calculations. One way to incorporate uncertainty into the projections is to use multiple scenarios to show the sensitivity of the results to changes in the underlying assumptions and conditions, including baseline figures and growth rates. However, that usually amounts to little more than picking a high and low extreme, a middle ground, and making separate estimates. There is no measurement of the probability of one outcome over another and no recognition of the multiple combinations of assumptions that can create either more extreme projections or more centered ones.

Simulation techniques offer an alternative to the less exacting scenario method. They can be used to test every possible combination of the projection variables within the ranges specified and to report on the results, with their probability of

⁴ See *Dividend Policy, Growth, and the Valuation of Shares*, JOURNAL OF BUSINESS (Oct. 1961), pp. 411-433.

⁵ See C. R. Hulten and F. C. Wykoff, ECONOMIC DEPRECIATION OF THE U. S. CAPITAL STOCK, report to the U. S. Treasury, Office of Tax Analysis, Washington, D.C., 1979.

occurrence. Statements like, "There is a 95 percent probability that income will be less than \$12.8 million," or "There is an 80 percent probability that it will be between \$8 million and \$13 million" can often be made from simulation results. It is useful to think of simulation as the equivalent of hundreds of scenarios, each chosen with attention to the probability of the underlying events and conditions it embodies.

While the statistical processes behind sound simulation techniques are beyond the scope of this discussion, insight into the process and its usefulness in litigation can be gained through the following examples. The first example seeks to estimate the value of the stock of a closely held company that operates a harness race track. The second example covers testimony before a state regulating authority that must award to one of three companies an exclusive franchise to conduct greyhound racing. (Details have been changed to mask the identities of the companies.)

Illustrative Case: Valuation of Closely Held Stock

The company operates a harness race track. Its stock is held exclusively by family members, two of whom are divorcing. The value of the corporation must be determined for use in the marital distribution.

To estimate future corporate revenues and expenses it is necessary to project attendance and wagering at the track based upon market area population, family income, inflation, competition and other significant factors. The level of attendance and wagering at racing is influenced by complex economic, demographic, psychological, and business factors. Most businesses have a greater control over business decisions than do race tracks; states set the number of racing days, the price of wagering, and even add their own competition through state-run lotteries. Thus, the value of the stock is based upon myriad future events and conditions that are far from certain and often beyond the control of the operators.

Operating a race track is a risky enterprise. Income depends upon the attendance and wagering of the public and its spending at food and parking concessions. From the gross wagering (the handle) a deduction is made for state taxes and track operations (the take) and the remaining amount is returned to bettors as winnings (payoffs). Thus, track income depends upon the amount of wagering, not on the outcome of the racing. However, there is some tie between winning and wagering: winners of high payoffs are less likely to rewager their winnings than winners of smaller amounts, and those who attend more frequently rewager more of their winnings. Future income also will depend in part upon the state increasing allowable racing days under a pending application made by the corporation.

Expenditures include wages and salaries of track employees, commissions of concessionaires, and the long list of expenses applicable to any business, including utilities, telephone, property taxes, advertising, repairs and other items. The simulation may be used to take account of both normal business transactions and more specialized risks such as the state ruling on additional racing days.

First, a simulation model is constructed that lays out the mathematics of net income. A simplified model is used here to illustrate:

(Annual Attendance) = (Attendance Per Day) × (Number of Days) × (Saturation Adjustment)

(Annual Handle) = (Annual Attendance) × (Average Per Capita Wager)

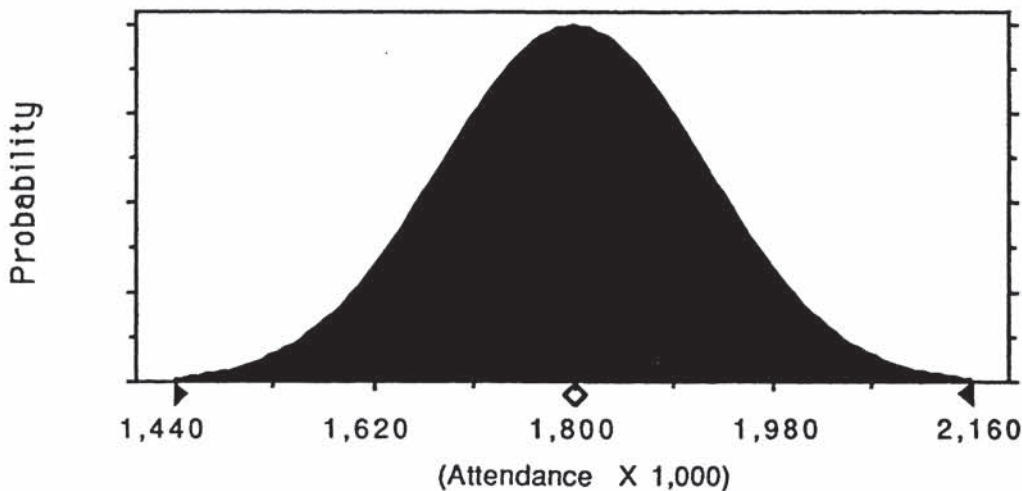
(Gross Income) = (Annual Handle) – (Pari-mutuel Taxes) – (Purses to Winners) + (Net Food Sales)

(Expenses) = (Wages & Benefits) + (Other Operating Outlays) + (Interest on Debt)

(Net Income) = (Gross Income) – (Expenses)

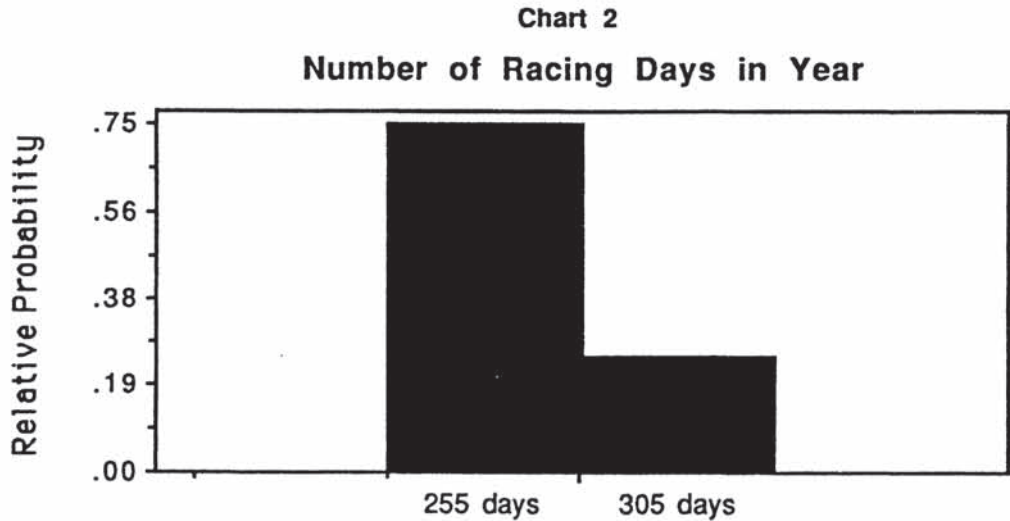
Next, the baseline value for each item is derived, along with a probability distribution that describes the potential for the value to be different. For example, from a statistical analysis of attendance in the track's market, it was determined by the economists that baseline attendance had an expected value of 1,800,000, but could vary according to what is called a "normal distribution." (Technically this might be expressed as having a mean of 1.8 million with a standard deviation of .12.) From this distribution the relative probability of any level of attendance is shown in Chart 1 by the height of the curve above the horizontal axis. Thus, the most likely attendance is 1,800,000 (as specified) while attendance of about 1,680,000 is half as likely. Also, the area of the curve signifies relative probabilities for ranges of values. Thus, there is a 25% probability that attendance will be above 1,885,000.

Chart 1
Attendance



Each item in the model will have either a fixed value or a probability distribution associated with it. In the example, "Number of Days" would ordinarily be fixed at, say, 255, but the state may grant an additional 50 days as requested by the company. If the lawyer determined that the probability of getting the added days was 25%, the distribution in Chart 2 could be included in the calculation.

It is similar in function to the normal distribution just described, but has a different shape to reflect the 75% probability that the track will operate 255 days and the 25% probability it will operate 305 days. No other values are possible (except, perhaps, for bad weather days).

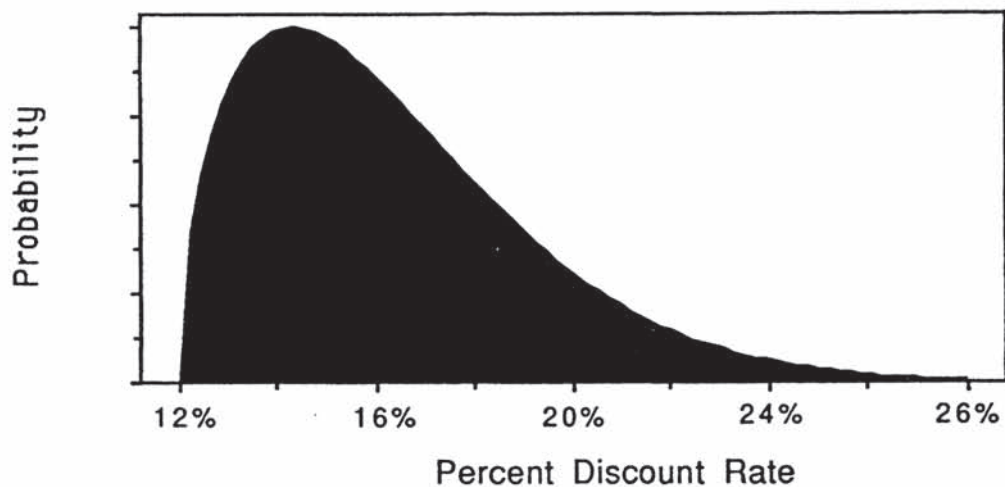


This process continues until each item in the model is represented by either a distribution or a fixed value. Growth rate estimates are then entered. Attendance might be expected to follow local population growth at, say, 0.5% per year. Wagering might grow with the combined effects of inflation and real income growth in the market. The growth of expenses may be estimated separately, or, in a simpler model, tied to inflation. Growth rates may incorporate their own distributions or be fixed, depending upon the sophistication of the model.

To calculate the present value of the income stream, a discount rate must be selected which reflects the return on equities of similar risk.⁶ The Treasury Bill rate is a standard used for risk-free return. Therefore, an appropriate discount rate must be larger to incorporate several risks related to small, closely held equity issues. The final rate might include an equity risk premium, determined from stock market ratios, plus a small company risk premium plus premiums for other risks that might be identified. In this example, a Treasury rate of 7.5% is augmented by an equity premium of 3.5% and a small company premium of 5.0% for a total discount rate of 16%. Separate analysis showed a higher likelihood of rates increasing than of rates decreasing, resulting in the skewed probability of Chart 3.

⁶ See WESTON, J.F. & BRIGHAM, E.F., *MANAGERIAL FINANCE*, 6th Edition, Dryden Press, pp. 646-647.

Chart 3
Discount Rate

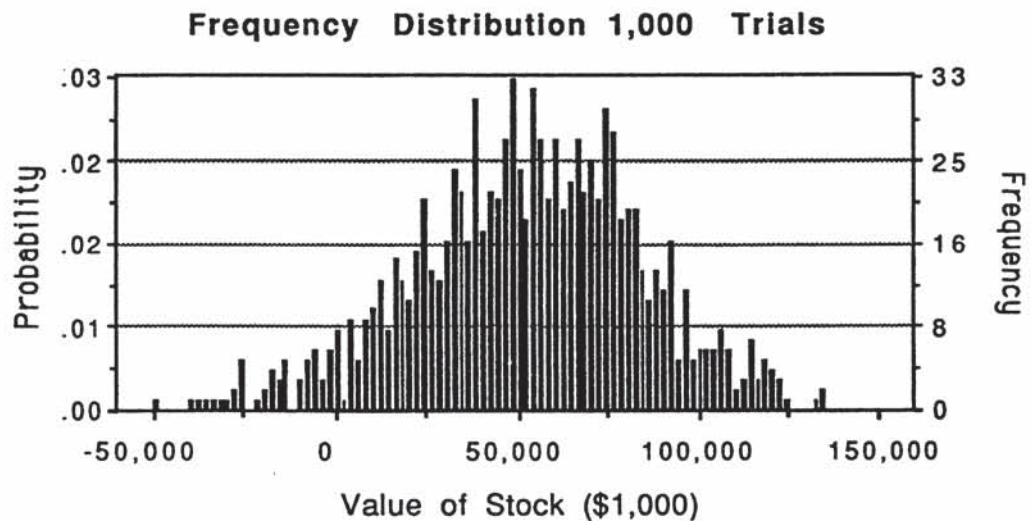


When the model is fully specified, meaning that all its equations are completed, the relationships among them established, and the values of all items entered either as fixed numbers or as distributions, the simulation can be run. Running a simulation is only practical on a computer; the program processes the equations using the fixed numbers that were entered and randomly selecting numbers to use from the distributions. The random selection picks numbers according to their relative frequency as pictured in the distribution. Thus, an attendance figure of 1,800,000 has twice the chance of being picked as one of 1,680,000, as described above.

By repeating the process automatically several hundred to several thousand times, a picture emerges of the likelihood of corporate income levels for each year in the projection. These are discounted to present value and a single picture in the form of a probability distribution of the value of the stock is developed. Chart 4 is the frequency distribution from a version of the simplified model just described. The mean value of the company stock is \$53.5 million. By comparing the areas of the distribution, the probability of other values can be estimated.

There is about a 5.5% probability (represented by the portion of the distribution to the left of \$0 value) that the company will not generate a positive income in the future, leaving only a salvage value for the stock. There is also a 25% probability that it is worth more than \$75 million. Further tests (not shown) show that the negative values were caused by high interest on corporate debt. If a lower interest ceiling could be negotiated, the probability of negative income could be reduced. Additionally, other influences can be tested, such as the effect of changes in the probability of additional racing days being granted.

CHART 4



Illustrative Case: Regulatory Decision to Grant Franchise

In this case, a state racing board has to determine which among three companies is better suited for an exclusive franchise to conduct greyhound racing near a large metropolitan area. All three have passed the board's tests of competence and character. The remaining issue is how likely the new operator is to lose money and put the state at risk of losing tax revenue. Each has submitted detailed financial plans and projections. The economist for Company A has placed all financial submissions on common ground by applying similar projections of attendance and wagering as well as interest rate assumptions relating to long term debt.

A simulation model designed to encompass the critical items of income and expenditure was employed in the task of comparing the pro formas of the three companies under similar criteria. Appropriate probability distributions were associated with projections of attendance, wagering, other income, operating costs and debt service. Simulations were run to compare the probabilities of the three companies earning a positive net income. Charts 5A, 5B and 5C compare the results.

The charts show a substantial likelihood of each track operator running a deficit under the assumptions employed by the commission staff. However, Company C is almost twice as likely to lose money than Company A under the debt service and operating conditions presented in the plans.

Unfortunately, much litigation proceeds with the assumption that values (asset values, life values, etc.) are singular when actually most are better described by probability distributions. This often conveys an all or nothing approach to bargaining. A negotiation in which both parties perceive their different valuations of damages to overlap rather than to be separated by an unbridgeable chasm may proceed more quickly to resolution. As simulation techniques are used more and the concepts of probability levels and confidence levels (not discussed) more widely understood, the negotiations as well as courtroom testimony will proceed more

expeditiously because more middle ground can be uncovered. Also the sensitivity of values to particular assumptions can be more directly evaluated for what they are worth.

Chart 5A
COMPANY A

Frequency Distribution 1,000 Trials

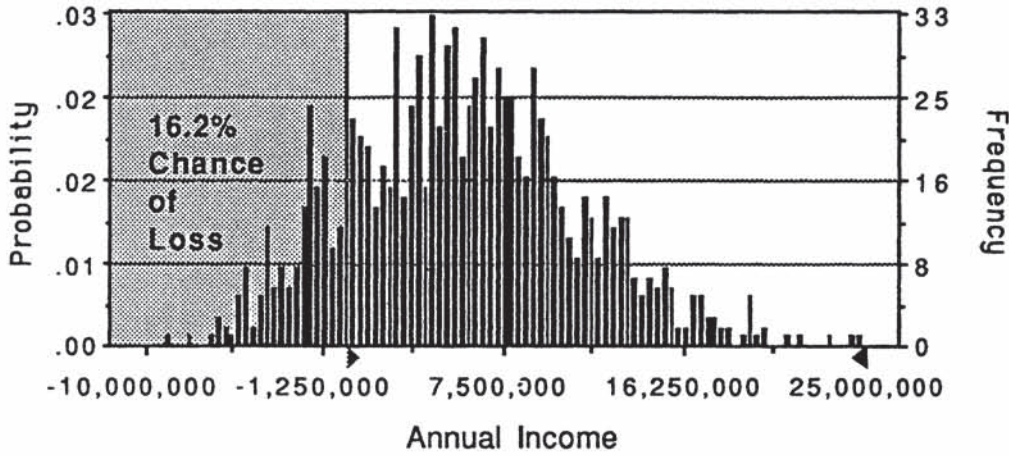
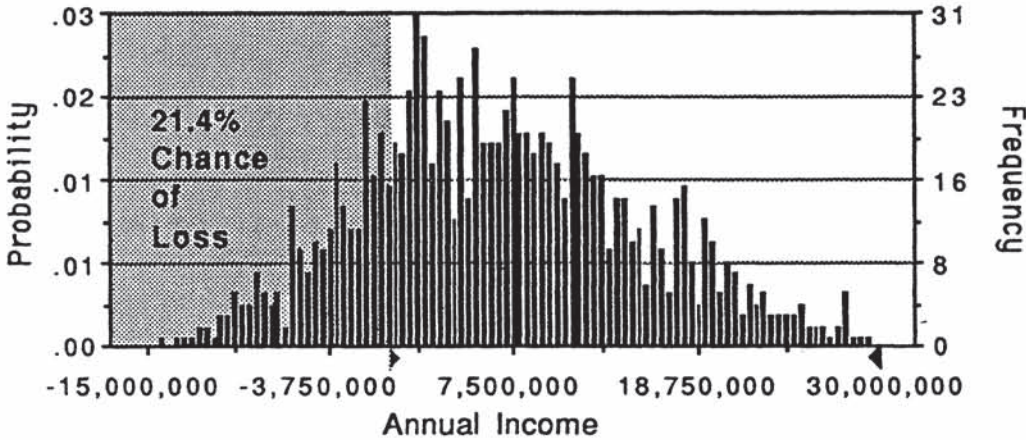
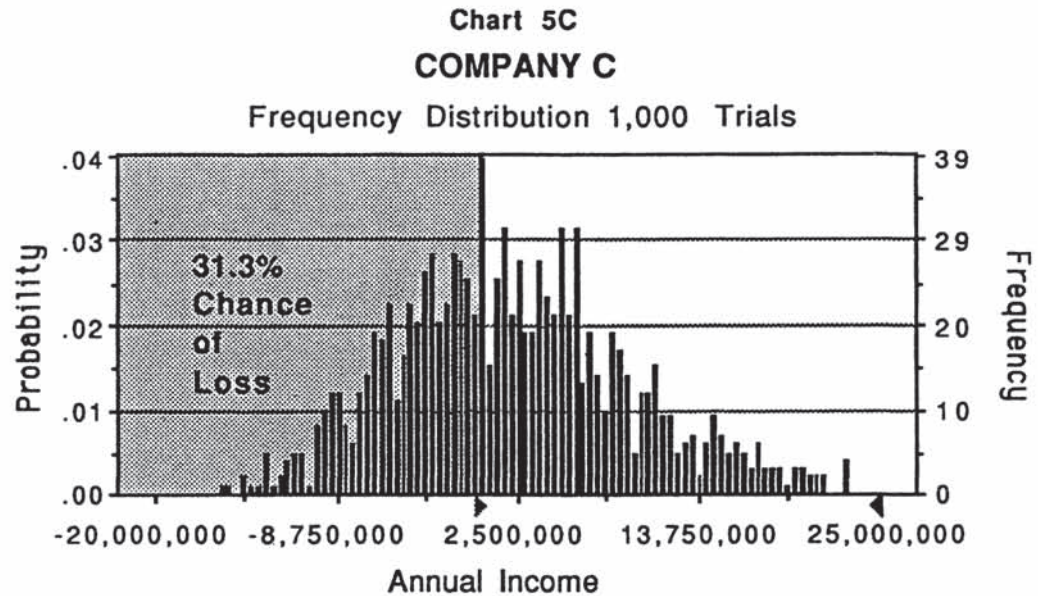


Chart 5B
COMPANY B

Frequency Distribution 1,000 Trials





13.3 Commercial/Antitrust Hypothetical Cases

A sample commercial damages testimony is provided in Appendix 2 to Chapter 11 of this supplement. It revolves around the case of River City Terminals, a corporation severely damaged, but not completely destroyed, by a wrongful act. The sample testimony in this case is an attempt to generalize about how the forensic economist must explain lost profit damages estimates to a trier of fact, even though each commercial damages case has unique characteristics. Some comment on this testimony may be useful.

It should be noted that the forensic economist is best served by organizing testimony from the general to the specific *and* from the simple to the complex. This ideally involves explaining a series of charts, which move from general concepts on calculating damages in lost profits cases to the specifics of the case. The jury must understand how lost profits estimates are derived from both revenue and cost estimates, and they must be comfortable with the justification and accuracy of those estimates.

The economist on direct examination must somehow deal, in these types of cases, with the allocation of fixed costs to the affected portion of the business. As is shown, this often involves the explanation of lost profits as an *absolute difference* between “above the line (zero axis)” profits and “below the line” losses. Mitigation efforts may still need to be discussed, even if the wrongful event produced lowered profits but no losses.

The sample case ends with an interesting twist. The affected (and destroyed) part of the business was to be such a large portion of the overall business that the post-injury business incurred operating losses in each period until the trial. In order to stay open, it was forced to borrow money from a line of credit, with a relatively high interest rate reflecting the uncertainty of a jury award that would

be necessary to pay off the loan and accumulating interest. This additional interest expense was calculated as an element of damages through the date of trial.

Should the wounded business have been forced to close down when its attempts to mitigate damages resulted in operating losses (and the need to borrow money unless the business were forced to close)? Interesting and important questions emerge about what is essentially a “left-to-right” issue—moving through time from left to right along the horizontal axis on the charts. Should the injured business be forced to close—and not attempt to mitigate damages—immediately upon the injury? If not, at what point in time, after the injury, should a business that continues to lose (and therefore borrow) money be forced to close down and thereby “mitigate” damages? How does the forensic economist, and the trier of fact, evaluate “good faith” attempts of the injured business in moving back toward profits? By what set of standards is the judgment made that the wounded business will not survive, must close down to mitigate “left to right” (and below-the-line) damages, and must thereby move to trial as a completely destroyed business?

Assume that a defense economist countered that the appropriate theoretical approach was a capital asset pricing model. River City Terminals should be given back the dollar amount of their investment plus a reasonable (percentage) rate of return on this investment through the life of the contract.

The plaintiff would best counter that the two economists differ fundamentally. The plaintiff’s economist brought the best in economics to the terms of the contract negotiated by River City and OIL before the business injury. In stark contrast, the defense economist completely ignored the contract and arranged data to fit an economic model that he had already decided to use, anyway. Further, the model he picked treated a business only as a “thing”—a physical asset; the contract was made with River City Terminals—a managed business, not a “thing.” Further, the capital asset model peculiarly does not provide for “below the line” losses, when the defense would have been the first to demand that (lowered) mitigating profits in the post-injury scenario be subtracted from pre-injury (higher) profits. From our experience, if all other things are the same, the plaintiff’s side will win this argument more times than not. This may be independent of whether additional interest expense, to stay open as a business, will be accepted by a trier of fact.

13.4 Issues of Damages in Labor and Related Cases

Forensic economists, and especially those who are also labor economists, work on both liability and damages issues in discrimination, wrongful discharge, and other labor cases. Fortunately, more literature is emerging on appropriate methods, and issues, on the liability side of such cases.⁷

⁷ See, for example, Michael Piette, *Economic Methodology and the Analyses of Employment Discrimination*, JOURNAL OF FORENSIC ECONOMICS (Fall 1991), Vol. 4, No. 3, pp. 307-316. (An omission in this article, however, is the critical role of the labor/forensic economist in determining the appropriate labor market definition before any statistical tests can be meaningful); and Kathryn E. Buckner, et al, *The Relationship of Legal Case Characteristics with the Outcomes of Personnel Selection Court Cases*, LABOR LAW JOURNAL (January 1990), pp. 31-40.

The Civil Rights Act of 1991 contains significant provisions that may expand the work of forensic economists in estimating economic damages for alleged victims of discrimination.⁸ In cases of intentional discrimination, back pay is no longer the focus of damages estimates by forensic economists. The new statute limits the amount of compensatory damages per claimant to \$50,000-\$300,000, depending upon the size (in employees) of the defendant business; the benefit/cost ratio of using a forensic economist has thereby increased. A specific element of compensatory damages is *future* pecuniary losses. The experienced economist, therefore, estimates future losses in a manner comparable to personal injury cases. Pre-injury earning capacity is estimated, and residual earning capacity is deducted if it exists. A vocational expert may be needed to help with the post-injury forecast. Also, the economist must be aware that legal guidelines may be different than in personal injury cases. For example, unemployment compensation benefits may not be treated as collateral source income and will be subtracted from pre-injury (termination) earning capacity.

Moreover, the 1991 statute specifically includes the "loss of enjoyment of life" as another element of compensatory damages when intentional discrimination is proven. Credible estimates of lost enjoyment of life (hedonic) damages will certainly become a focus in the litigation of civil rights damages. Section 1983 federal cases are no longer an exceptional use of hedonic calculations in federal courts. The likelihood that hedonic damages will be central to damages litigation in federal courts has increased.

⁸ See text of Civil Rights Act of 1991, Senate Bill 1745 amending Civil Rights Act of 1964, CONGRESSIONAL RECORD-HOUSE (Washington, D.C.: U. S. Government Printing Office, 1991), Vol. 137, No. 164, pp. 9517-9534.