

# The Role of a Forensic Economist in a Damage Assessment for Personal Injuries

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## I. Introduction

*What is a forensic Economist?* In any assessment of damages in a personal injury tort action, a forensic economist is called upon to convert the analysis of all other damage experts into dollar estimates. Experts may be involved in a tort action either to prove liability or to establish damages. For that reason, it is useful to divide experts into the broad categories of liability experts and damage experts. In personal injury litigation, liability experts are involved in trying to demonstrate that something the defendant did or did not do resulted in harms suffered by the plaintiff. Damage experts, on the other hand, place dollar values on the harms that have occurred, regardless of the legal responsibilities for those harms. Damage experts do not need to know who is responsible for the damage in order to project what amounts of money are required to make the injured person “whole” with respect to damages in damage categories made compensable by law and measurable within the bounds of economic science.

Typically, an economic expert is the last expert to appear in the line of testimony presented by both the plaintiff and the defendant. Since an economic expert relies upon all damage experts that came before in making projections, the economist for the plaintiff and the economist for the defense might have substantially different estimates even though both economists used essentially the same methods. The economic expert summarizes the preceding damage testimony into a single aggregate value or several aggregate values based on several different assumptions about the nature of the damage suffered by the plaintiff.

*The Market Basis of Economic Assessments.* Economic experts cannot place dollar values on all damages identified by attorneys and other experts in personal injury tort actions. Some types of harms have no reliable market equivalents. Thus economic experts cannot develop reliable projections of dollar values needed to address those harms. Later in this paper, harms like “reduced enjoyment of life” and “loss of consortium” will be discussed as controversial areas for making projections, but the general rule is that mental states such as “lost enjoyment” and “lost love” represent “intangibles” that are not subject to dollar valuation by economists. There are no economic experts offering testimony about the proper dollar values for the pain and suffering caused by, for example, a broken leg. The cost of treating a broken leg can be projected by an economic expert, but there is no reliable way for an economic expert to project how much money a jury should award for the “pain and suffering” caused by the broken leg. Such questions must be left to the trier of fact.

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Economic experts are limited to making assessments of damage elements for which reasonable market equivalents can be found. “Market value” simply means “the sale price of the thing,” whether the “thing” is a good, service or asset. An economic expert can assess lost earnings by making comparisons based on earnings in the pre injury and post injury labor markets that apply to an injured individual. Life care costs can be assessed because there are market values for the goods and services required in the life care plan. Likewise, family services about which an economic expert can testify are those for which reasonable equivalents with known prices exist in the commercial marketplace or because the time spent by the injured person in producing those services has a market value. An economic expert can make projections if market equivalents for the losses or replacement needs of the injured person can be established in a manner sufficiently reliable and accurate to be admissible into evidence.

*Damage Categories in a Personal Injury Action.* In a personal injury action, damages exist as elements of loss that are compensable in law. In death actions, for example, grief and bereavement are recognizable as harms cause by the death of a loved one, but are generally not compensable. In a personal injury actions, individuals can ordinarily recover for the following harms caused by injuries: Lost labor market earnings; lost job-related fringe benefits; vocational retraining costs, lost ability to perform family services; the cost of life care plans made necessary by an injury; pain and suffering; reduced enjoyment of life; and loss of consortium with other family members. Forensic economists are in agreement that under at least some circumstances lost earnings, lost job-related fringe benefits, lost family services and the cost of care made necessary by an injury can all be projected with the tools of economics. Forensic economists are also in agreement that pain and suffering cannot be converted into dollar estimates by economic experts. In controversy, a small minority of forensic economists believe that the “hedonic damage” concept can be used to measure lost enjoyment and lost consortium. However, the majority of economists reject such a notion. This issue will be considered at some length at the end of this paper.

## **II. A Sample Case for this Paper**

It will be useful to have a sample case that can be used to demonstrate various points that will be made as this paper proceeds. For that purpose, assume that John Doe was born on January 1, 1955 and suffered a closed head injury on January 1, 1998 at the age of 43.0. Losses have been projected as of July 1, 2000. Prior to his injury, John Doe was a franchise store manager earning \$42,000 per year and could have been expected to stay in that position for the remainder of his expected period of labor market involvement. Both plaintiff and defendant agree that John Doe no longer has the capacity to continue functioning as a franchise store manager and that there is no expectation that John Doe will ever recover his physical and/or mental capabilities lost at the time of the event. As a result of his closed head injury, John Doe has suffered impairment such that the vocational expert for John Doe has reported that his earnings will be limited to minimum wage employment, starting at \$10,712 per year, but increasing with experience at normal rates of increase. The vocational expert for the defense has reported that John Doe is employable at several positions paying \$22,000 per year, with normal experience based increases over time. Neither expert has recommended further education or training in light

of the injury. Further details of this case will be developed as the paper proceeds, but these details will be maintained. With the information provided thus far, an economic expert is able to make two different projections of earnings loss, one based on the opinions of the plaintiff's vocational expert and one based on the opinions of the defense's vocational expert. (It is also assumed that the economic expert has been employed by the plaintiff, but that the plaintiff attorney has asked the expert to project losses based on the opinions of both vocational experts.)

### **III. What an Economic Expert Needs from Other Experts**

*The damage assessment process.* The sequence of a damage analysis often begins with the testimony of medical doctors or psychologists regarding the plaintiff's health conditions. That information is then translated into projections of lost employment opportunities for the injured person by vocational experts and projections of future life care treatments made necessary by the injury by a life care planning expert. The economist then converts information about the pre injury earnings of the injured person and the opinions of the vocational expert into a projection of the dollar value of the earnings loss of the injured person. Likewise, the economist converts the costs of life care needs projected by the life care planning expert into another dollar value. The economist may also be called upon to project losses based on family services the injured person can no longer provide as a result of an injury. Finally, a minority of experts claims an ability to provide dollar valued estimates of the reduced ability to enjoy life or lost consortium with other family members because of the injury.

In this process, there is usually no need for the economic expert to have any direct contact with either the injured plaintiff or the medical doctor or psychologist unless one of the claims is for lost family services as a result of an injury. The descriptions of harms caused by the event described by the medical doctor, psychologist and the plaintiff are translated into opinions an economic expert can use by vocational experts or life care planning experts. What is of key importance is that the economic expert understands completely the explicit opinions of the vocational experts and life care planning experts. Since the economic expert is neither a vocational expert nor a life care planning expert (there are some persons with dual expertise, but it is relatively rare), it is critical that the economic expert comprehend the conclusions being proffered. Whether the economic expert fully understands the logic leading to the conclusions is of less importance.

*A key error to be avoided.* Some medical doctors or psychologists make the assumption that percentages of disability can be directly converted into percentages of earnings loss. An injured person might be 50 percent disabled without causing any earnings loss whatsoever. Indeed, a disability might force an individual to give up a lower paying job he loved for a higher paying job he hates. On the other hand, a minor disfigurement or psychological problem might cause an enormous earnings loss. A concert pianist who loses a little finger has been only slightly disabled on any scale of physical functionality, but has very probably lost the ability to be a concert pianist. The magnitude of the earnings loss could be great. The vocational expert plays a critical role in translating whatever disabilities may be caused by an injury into an assessment of earnings loss caused by inability to perform certain job-related tasks because of the disability. A

disability rating and the economic impact of a job loss rating are entirely different processes. An economic expert needs to know only the impact on earnings and would ordinarily be unconcerned about measures of functional disability that might be important to a vocational expert. Regardless of the functional disabilities of an individual, lost earnings are measured in terms of differences in earnings rates before the injury and after the injury, and that is all that an economic expert considers in projecting earnings losses.

### III. Projecting Wages and Salaries

*Establishing Bases (or basis) for Loss Periods.* An economic analysis of damages is a projection that must be based on starting points. In an earnings loss analysis, it is often the case that there are two starting points, or “bases” (sometimes also “basis”). There may be more than two bases if a promotion is expected to occur in the future, but there must be at least two if an injured worker retains some amount of residual earning capacity. One “base” is for the projection of “pre injury” earnings, which is the projection of earnings if the event causing harm had not occurred. The other base is for the projection of “post injury earnings,” which is either based on opinions from one or both vocational experts involved in the case or on the worker’s demonstrated “post injury” earnings. Typically, this is stated in terms of “base year earnings,” which may be different years for the “pre injury” and “post injury” earnings streams. For example, John Doe is assumed to have been injured on January 1, 1998. January 1, 1998 was selected to simplify the analysis because that date has the impact of making earnings for 1997 an appropriate base year for future projections. John Doe is assumed to have earned \$42,000 in 1997.

In order for that figure and year to be a suitable “base” earnings rate, several more assumptions must be introduced. Assume that John Doe had regular pay increases in every year for the past nine years and that there was nothing unusual about his earnings in 1997, which represented a modest increase compared with his 1996 earnings and so forth going back nine years. Under these circumstances, it is reasonable to assume that John Doe’s earning capacity was most accurately measured by his 1997 earnings. That rate then becomes the basis for projecting earnings increases for the remainder of his expected work life. If there were unusual factors in 1997, it would be important to take into account earnings information in previous years in arriving at a fair and reasonable measure of base earnings.

Suppose, for example, that John Doe had been involved in a special project for which he was paid \$5,000 in 1997. If such special projects had not occurred in the past and were unlikely to occur in the future, 1997 earnings would have been an inappropriate base and 1996 earnings of \$39,000 might have been a more reasonable and fair base. Another possibility is that a worker may have had irregular earnings such that the pattern over all years for which earnings were available varied considerably from year to year. If this was the case, an adjusted base calculation might be required to develop an appropriate trend average for earnings over a five year period rather than using actual earnings in any one year as the base. For a detailed explanation of this methodology, see Martin and Vavoulis [2001] and Ireland et al. [1998]. However, the underlying goal is to find a rate for base annual earnings during a specific year that fairly and reasonably represents the average amount of earnings the worker would have been expected to earn as that

year. The rate for that year then becomes the basis (base) for all future projections of earnings.

The post injury earnings base may be the last full year of earnings before trial or may be the annual earnings rate reported by one or both vocational experts. It will often not be the same year used as a base for pre injury earnings, so that an upward adjustment of the pre injury earnings rate to reflect expected increases through the year used for the post injury base earnings rate is required to make reasonable comparisons. In the sample case, if John Doe earned \$42,000 in 1997 and the vocational expert for the plaintiff opines that he can only now earn \$10,712 in 2000, John Doe must be given wage increases for 1998, 1999 and 2000 to develop an appropriate comparison of the two earnings streams in the year 2000. For example, in those years, it would have been reasonable to project 3.3 percent wage increases for each year. Accordingly, John Doe's expected pre injury earnings would reflect an increase to \$43,386 in 1998, \$44,818 in 1999 and \$46,297 in 2000. For purposes of projecting loss in the year 2000, \$46,297 should be compared with \$10,712 in minimum wage earnings, not \$42,000. Likewise, of course, since the defendant's vocational expert projected \$22,000 in 2000, that figure should be compared with \$46,297, not \$42,000.

*Dealing with Promotions.* If there is evidence that John Doe had a chance for a promotion with a significant salary increase in the year 2002, the base for pre injury earnings from 2002 and thereafter might be based on the expected earnings with that promotion. Suppose, for example, that John Doe had a reasonable chance for a promotion in the year 2002 with an expected raise of \$10,000 at that time. Assume further that 2.913 percent wage growth is expected for 2001 and 2002. This would mean that John Doe would be projected to earn \$47,645 in 2001 and \$49,033 in 2002, not considering the promotion. If the raise associated with the promotion was expected to be \$10,000, the earnings loss projection that included the promotion would use a value of \$59,033 for 2002 instead of \$49,033. In such a circumstance, an economic expert would often be asked to make a projection with and without the promotion. Note, however, that the raise of \$10,000 creates another base earnings amount, pegged to the year 2002.

*Growth Rates in Damages Projections.* Almost all base earnings figures need to be adjusted over time to account for expected increases in those earnings. The same will be true of job-related fringe benefits, estimates of family service losses and life care costs. Inflation is much less of a problem in our economy now than it was in the 1970's and 1980's, but growth in most economic categories is the normal expectation. Thus, growth rates must be projected, directly or indirectly, for all damages categories. (Indirect projections by using "net discount rates" will be discussed below). Growth rates can vary over time. Younger workers, for example, can generally be expected to have higher earnings growth rates than older workers. As a general rule, wage growth is fastest for workers in their 20's, next fastest for workers in their 30's and so forth. This is a general phenomenon called the "age-earnings" cycle. See, for example, Borjas [1996] or Kaufman and Hotchkiss [1999]. Wage growth rates that are adjusted for age effects are called "age-earnings adjusted figures." However, some economic experts choose instead to project losses on a "straight-line" basis that uses an average for all ages [Ireland et al, 1998; Martin and Vavoulis, 1999]. Both methods will produce fair results if used with common sense and caution.

#### IV. Applying Discount Rates, Net Discount Rates and Real Discount Rates

*Discount Rates in Damages Projections.* What forensic economic experts often call “present value” is not consistent with “present value” in the way present value is calculated in non litigation contexts. In most legal venues, there is a prohibition against economic experts adding “pre trial interest.” As such, what economic experts actually calculate is “the actual value of past damages plus the present value of future damages.” That notwithstanding, calculations of future values are reduced to present value in most legal venues (but not in cases tried under state law in Pennsylvania or New York, as will be discussed below). An economist’s choice of a discount rate is one of the most controversial topics in forensic economics, but a “discount rate” is simply an interest rate used to reduce future values to present value. Interest rates are determined from day to day in bond and money markets and reported in business sections of daily newspapers. In general, the controversy over discount rates stems from three different sources: (1) Which type of asset to use in selecting a discount rate; (2) what set of maturities to use in projecting values of that interest rate; and (3) whether to use historical averages, current values or forecasts of that interest rate in making projections. These arguments continue to rage in papers published in the *Journal of Forensic Economics*, the *Journal of Legal Economics* and *The Earnings Analyst*, the *Litigation Economics Digest* and the *Journal of Risk and Insurance*. For a discussion of these controversies, see Martin and Vavoulis [2001] and Ireland et al. [1998].

While it is not possible to comprehensively discuss all issues relating to the selection of a discount rate in this context, two important points can be made. First, a qualified economic expert will clearly identify which interest rate is the basis of his or her discount rate. For example, one economic expert might indicate that the interest rate used in an analysis is the 10 Year U.S. Treasury Bond rate and that the rate being used is the most recent value reported in the *Economic Report of the President*, 2000. Another economic expert select current quotes for U.S. Treasury securities for appropriate periods into the future as of April 1, 2000, as reported in the *Wall Street Journal* on that date. In this instance, a number of different rates are being used for periods into the future matching periods into the future being projected. At any given time, current interest rates are available for up to 30 years into the future. Still another economist might indicate that the discount rate being used is a five year average of the Municipal AAA rate as reported in the *Economic Report of the President*, 2000, ending with the year 1999. Second, as suggested in the examples offered, some economic experts use a single discount rate, while others provide discount rates based on the length of time until losses are projected to occur. The latter method is sometimes referred to as a “mixed rate portfolio” method. In financial circles, a curve showing different rates for different periods to maturity is called a “yield curve.” Some economic experts use a single discount rate, while others use more complicated formulations that involve using multiple discount rates matched to periods in the future along a yield curve.

*The Pfeifer Case.* The terms “below market discount rate” and “case by case method” are taken from the most important legal decision governing projections of economic damages in personal injury actions at the federal level. That case is *Jones & Laughlin Steel Co. v. Pfeifer* (1983), 103 S. St. 2451, 2555. Technically, this decision of the United States Supreme Court only applies to litigation under the Jones Act and the Federal Employer’s Liability Act, but in fact it is used as a

statement of standards for all personal injury actions tried under federal law (but not all personal injury actions tried in federal courts). Some diversity actions (trials involving more than one state) are tried in federal courts under the state law of one of the states involved. In such actions, *Pfeifer* standards would not apply. In federal case law, the term “below market discount rate” is sometimes interpreted as using “real discount rates” and sometimes as “net discount rates” in the terms used by economists. The “case by case method” refers to projecting specific growth rates and discount rates for each case in the manner described above. The purpose of this section is to explain the meaning and alternative methods implied by “real discount rates” and “net discount rates.” Of the two, net discount rates are probably easier to understand, so the discussion will begin there.

*The Net Discount Rate Method.* In the “case by case” method described above, an economic expert projects losses by projecting specific rates of wage increase and specific discount rates over the period of earning capacity for the worker. All of the values projected are expressed in what are called “actual dollars,” or “nominal” dollars, which are the specific dollar amounts expected in future years. These nominal or actual dollars are then reduced to present value by the actual interest rates expected in future years. To project a specific damage amount three years into the future, a current base value must be increased by the rate of increase expected in each of the next three years to obtain the expected actual dollar amount of damages three years from now. That figure must then be reduced by the amount of expected interest that could be earned on that money if it was available now. Although this must be done geometrically, it is conceptually similar to adding wages and subtracting interest. If wages could be expected to increase by 2 percent per year and the discount rate is expected to be 5 percent a year, the process involved is similar to adding 2 percent per year and subtracting 5 percent per year. That is almost equivalent to subtracting 3 percent a year. The correct “geometric” derivation involves dividing 1 plus the gross discount rate (5 percent) by 1 plus the rate of wage increase to get a number equal to 1 plus the net discount rate. Thus  $1.05/1.03 = 1.0194174$ , and the net discount rate is 1.94174 percent. That value is quite close to the 2 percent achieved by simple subtraction but, as indicated, 2 percent is not quite accurate. [In an example below, a reversed calculation is made in which the net discount rate is assumed to be 3.0 percent, and a wage growth rate of 2.91262 percent is derived from a 6.0 percent discount rate. It is an identity that  $(1 + \text{Net Discount Rate}) = (1 + \text{Discount Rate}) / (1 + \text{Wage Growth Rate})$ . Thus, if any two of the three rates is known, the third rate can be derived easily.]

If it is assumed that wage increases and discount rates can be applied in a “linear fashion” (meaning that the rates are not assumed to change over time) a net discount rate can be used to remove inflation from both wage increases and discount rates. This allows results to be expressed in “real” terms. This will be shown below.

*The Real Discount Rate Method.* Wage increases contain three general elements that may all increase over time. One element is that wages go up over time due to inflation. The second is that the productivity of labor throughout the economy increases. The third may be that the specific job skills and added education of a worker may increase the productivity of that worker. When a “net discount rate” is calculated, the inflation element is removed, but general

productivity and specific productivity increases remain part of what is calculated in a net discount rate. This can be broken down still further such that the discount rate includes only “real” interest net of inflation without any consideration of productivity gains. With this method, wages are then increased each year based on expected productivity increases (but not inflation) and reduced to present value based on a real interest rate. If productivity increases exist at all, a real discount rate will always be larger than a net discount rate because productivity increases would have to be subtracted from the net discount rate to get the real discount rate. This method will not be illustrated, but is as sound methodologically as the other two methods that will be illustrated in Tables 1-4 below.

## V. Earning Capacity and Expected Work Life

The final element in a wage loss projection is a determination of period of time over which losses will occur. There is some controversy among forensic economists over whether work life should be based on the period of time over which a person would be expected *to be able* to work (earning capacity) or the period of time over which a person would be expected to *actually* work (expected earnings). The arguments on both sides are complex and will not be discussed here, but any calculation based on either concept must acknowledge uncertainty factors in an individual’s working life that prevent an economic expert from simply assuming that an individual would retire at any given age. For an example, for an economist to simply assume that an individual’s work life would have been the number of years from the date of the injury until the individual’s 65<sup>th</sup> (or some other) birthday fails to recognize that there is some chance the individual would have or will die before reaching the age of 65. Likewise, there is some chance that an individual would have become unable to work because of an injury unconnected to the current event or sickness at some point before the individual’s 65<sup>th</sup> (or some other) birthday. There is also some chance the individual might have voluntarily retired before 65 and some chance that the individual would have been unemployed for periods of time before reaching the age of 65.

These negative contingencies can be taken into account by use of either “statistical worklife tables” or “the LPE system.” Until 1986, the Bureau of Labor Statistics compiled “worklife expectancy” tables and many economists still use *Worklife Estimates: Effects of Race and Education*, Bulletin 2254, U.S. Department of Labor, Bureau of Labor Statistics, February 1986. These tables have been updated as of 1997-98 by Ciecka, Donley and Goldman [1999-00] and as of 2001 by Skoog and Ceicka [2001]. A review of different methods and calculations is provided in *Life and Worklife Expectancies* by Richards and Abele [1999]. That volume also contains and explains other methods for developing tables showing expected work lives for individuals. The LPE approach is explained in Brookshire and Smith [1990] and reviewed in both Martin and Vavoulis [2001] and Ireland et al. [1998]. With this method, a specific probability of survival for each year is established from life tables. Likewise, probabilities that a worker would participate in each year and be employed each year are established from government data relating to labor market participation and employment. (A worker is considered a labor market participant if either employed or seeking employment, so unemployed workers are included with a labor market participation percentage. For example, if a worker had a 99.5



percent chance of surviving through the next year, an 85 percent probability of being a labor market participant and a 97 percent chance of being employed, the joint conditional probability that individual would have earnings next year would be 0.8203 ( $0.995 \times 0.85 \times 0.97 = 0.8203$ ). The figure 0.8203 would be called that worker's "worklife probability for that year."

While the LPE system is sound for some purposes, it produces results that are hard for juries to adjust. Because the LPE system depends on three joint conditional probabilities for each year of possible work life to age 100, the damage estimate is a function of complex probabilities for each of those years. With a statistical worklife expectancy table, a jury can add or subtract a year or two from the average reported result based on evidence that the injured worker was more or less likely to have had an average labor market performance. However, with an LPE calculation, the jury confronts annual joint conditional probabilities and cannot easily use the derived fractions of years to make reliable adjustments for special characteristics of the worker.

## **VI. Developing Sample Case Tables Showing Earnings Loss**

*Explaining Tables 1-4 at the end of this paper.* The preceding discussion puts all of the elements needed for an earnings loss analysis in place. Base earnings figures are needed. Projected rates of wage increase are needed. Discount rates are needed. Finally some way to deal with the loss period is needed. In the sample case developed earlier, John Doe was born on January 1, 1955 and injured on January 1, 1998 and had earned \$42,000 in 1997. The vocational expert for the plaintiff has projected that John Doe became able to earn \$10,712 as of the start of 2000. The defense expert has projected that John Doe became able to earn \$22,000 as of the start of 2000, with damages being determined as of July 1, 2000. It will now be assumed further that both sides agree that John Doe could not have returned to work at any time during 1999. Because it is somewhat easier to understand, calculations are presented in real net dollars first (Tables 1 and 2) and then in actual dollars (Tables 3 and 4). In the tables, the columns labeled "year" and "age" are self explanatory. Columns labeled "Pre Injury" show expected earnings if the event had not occurred. "Post Injury" shows projected earnings given that the event has occurred. "Lost Earnings" shows the numerical difference between "Pre Injury" and "Post Injury." "PresValue" shows the present day value of the values shown in the "Lost Earnings" column. Finally, the "Cumulative" column provides a running total of the present day values of annual losses up to that year.

Looking at Table 1 for the year 2003, for example, John Doe would be 48 years of age. His Pre Injury projected earnings in real net 2000 dollars is \$46,297. His Post Injury projected earnings in real net 2000 dollars is \$10,712, based on the opinions of the plaintiff's vocational expert. The difference is \$35,585. Discounted to present value at a net discount rate of 3.0 percent, that value is worth \$32,565 in year 2000 real net dollars. The total value of past actual losses and the present value of future losses through the year 2003 is \$224,445. If John Doe was expected to have a work life of 18.5 years from the date of his accident and his projected work life was not shortened by the event other than for the two years between his injury and the start of 2000, total earnings losses would be \$581,541. Table 2 is developed in the same way as Table 1 except that the defense VE's \$22,000 per year as of 2000 is used instead of the plaintiff VE's \$10,712, with

total earnings losses of \$425,048.

Table 3 replicates the values from Table 1 in actual dollar values and Table 4 replicates the values from Table 2 in actual dollar values. In Table 3, wage increases after 2000 are projected at 2.91262 per year and a 6.0 percent discount rate is used to reduce future values to present values as of July 1, 2000. (This rate was derived by dividing 1.06 by 1.03, where 6 percent is the discount rate and 3.0 percent is the net discount rate, as explained earlier. In the previous example, the rate of wage increase and the discount rate were known and a real discount rate was derived. In this instance, the discount rate and the net discount rate are known and the rate of wage increase is derived.) Looking at the row based on the year 2003, wages are now shown as \$50,461 in 2003 in the “Pre Injury” column and \$11,676 in the “Post Injury” column. The value in the “Difference” column has now risen from \$35,565 to \$38,786, but the present value of \$38,786 at a 6.0 percent net discount rate is still \$32,565 and the cumulative present value through the year 2003 remains \$224,445. The observant reader will note that the cumulative figure in the year 2017 is \$1 less than in Table 1. This the result of minute rounding error. From a damage standpoint, Tables 1 and 3 are telling exactly the same story. Tables 2 and 4 are identical to the nearest dollar, regardless of minute rounding differences.

*Alternative Presentations.* It would be possible to add two more tables that used a real interest rate with productivity increases that contained the same present value of damages shown in Tables 1 and 3 and also Tables 2 and 4. However, two sets of paired tables using two different methods to arrive at the same results is sufficient to make the point that values can be presented in different ways while retaining the same results. As was discussed in the previous section, it may be useful to project lost earnings beyond the amount that would be expected of an individual with an average worklife expectancy. Facts may be presented at trial which may point to a longer or shorter work life than would be projected for an average person. As such, a report that contains annual amounts projected beyond an average worklife expectancy allows the trier of fact to make adjustment for ways the injured worker seems different from an average person with the same demographic characteristics.

The presentation in this paper is a conservative presentation because it does not include years beyond the average expected work life for a person similar to John Doe. It is important to understand that work life information is compiled based on averages, not factors unique to any one individual. John Doe might have (and perhaps still) like working more or less than other high school graduates. He might have been healthier or less healthy than the average high school graduate. His above average earnings for his age and education level might enable him to retire earlier than other high school graduates, but those higher earnings might also have made it more attractive for him to continue working. All of these issues suggest that an economic expert, both before and after an injury, should be very careful not to claim that the figures that have been presented are precise estimates for John Doe. They are estimates that provide results for an average person with John Doe’s characteristics, not for John Doe himself, about whom an economic expert knows relatively little and has no expertise that would enable the economic expert to make more precise projections.

## VII. Special Rules: Pennsylvania and New York

*Special Rules.* More than in other areas of testimonial expertise, both judges and state legislatures are sometimes inclined to develop special rules for how economic calculations should be performed by economic experts. In almost all states, adding pre trial interest for the period from the date of an injury to the date of trial is prohibited. Judges are often asked to make statutory adjustments to add past interest, but may have special rules for how this should be done. This is particularly important in the United States, where each individual state has its own legal system. For that reasons, exceptions may exist to the types of calculations described above as the general approach taken for assessing lost earnings. However, two states, in particular, have approaches that are so different from that general approach that it is important to make special note of them. Those states are Pennsylvania and New York. Other states also have special rules of certain types for special types of cases, but Pennsylvania and New York have special rules that apply to all personal injury actions in those states. Those two states will be discussed in turn.

*Pennsylvania.* Pennsylvania employs what is called “the Pennsylvania Rule.” As with all legal “rules,” it is not always interpreted in precisely the same fashion. However, the essence of the rule is that economic experts are required to assume that the inflationary part of wage increases offsets the discount rate. The key case governing this requirement is *Kaczkowski v. Bolubasz*, 491 Pa. 561, 421 A.2d 1027 (1980). Because of this case, most economic experts in Pennsylvania project earnings losses with out applying wage increases or discounting to present value. In effect, this would meant that “Lost Earning” columns and “PresValue” columns would look the same in Tables 1 and 3. Tables 2 and 4 would not be produced at all.

*New York.* New York has enacted special structured judgement laws, CPLR 50-A & B, to govern tort awards in personal injuries. This dramatically bifurcates the role played by economic experts in tort cases into pre trial and post trial involvements. During the pre trial period, including the trial, an economic expert projects future wages or future costs without making any reduction to present value. This is different from Pennsylvania because the projection of losses does include increases in the future because of inflationary impacts where that is not allowed in Pennsylvania. If a case goes to trial, juries decide total amounts to be awarded for each category of losses *and also decide the number of years over which the future loss should be awarded.* (Past losses are determined in the same way as in other states, with no pre trial interest.) At this first stage, an economist’s calculations would look like Tables 2 and 4 through the “Lost Earning” column. The “PresValue” column would be deleted and the “Cumulative” column would be an accumulating value for the numbers in the “Lost Earning” Column.

In most states, juries are not asked to determine specific loss periods, but this is an important aspect of a jury’s rulings in New York. For example, a jury must rule both that the earnings loss is a specific number of dollars and that the period over which that loss has occurred is a specific number of years. The second stage is the post trial hearing at which the financial responsibilities of the defendant are spelled out. Here again, past losses in all damages categories are treated in the same way as in other states and are paid immediately. However, with respect to future

losses, New York's laws make a distinction between earnings losses and other types of losses. Earnings losses are awarded in terms of an annuity for a period certain equal to the loss period specified by the jury. Other types of losses are awarded in terms of life contingent annuities for the periods specified by the jury. At this stage, an economist works with life insurance representatives to price annuities consistent with the decisions of the jury. An economist also performs a separate present value calculation based on the values of the annuities to determine payments to attorneys who have represented plaintiff's on a contingency basis at the trials. For a more detailed explanation, see Riccardi [1996].

### **VIII. Dealing with Job-Related Fringe Benefits and Taxes**

*Tax considerations.* Dealing with Job-Related Fringe Benefits and taxes involves a very complex set of issues if done with full attention to detail. For state actions in most states, the tax issue is moot because tax liabilities against lost earnings are not taken into account in projecting lost earnings. In federal actions, actions in South Carolina, Hawaii, New Jersey and a few other constituencies, taxes are deducted from lost earnings. This leads to a complex set of issues relating to how an individual's future tax liabilities can be anticipated. The most important aspect of this is that most tax rates fall if an individual has lower earnings because of an injury. (For individuals with sufficiently high incomes, \$76,000 in 2000, the reverse is true for Social Security taxes, but this is offset by higher federal and state personal income taxes.) Under a progressive income tax system, there is effectively a tax savings that offsets part of lost earnings. Economic experts may use current marginal tax rates as a proxy for future marginal tax rates, but the calculations can become quite involved.

Whether or not to subtract taxes is a quite important issue. In a state like Illinois, for example, a railroad worker may pay federal income taxes in marginal tax range of 28 percent, 3 percent for state income taxes, 6.2 percent in Tier I taxes (essentially Social Security taxes), 1.45 percent Medicare taxes and 4.9 percent Tier II (a special railroad pension program funded by 4.9 percent employee taxes and 16.1 percent by railroad employers). That implies that 43.55 percent of an earnings loss would need to be deducted as tax liabilities of the railroad worker were injured at work and the case was governed under FELA (Federal Employers' Liability Act) rules in federal court. If the same worker was injured in an automobile accident on the way to work, the case would be tried under Missouri state law and the 43.55 percent applicable tax rate would not be considered.

*Valuing "legally mandated" job-related fringe benefits.* Job-related fringe benefits are normally divided by an economic expert into *legally mandated* and *discretionary* fringe benefits. "Legally mandated" fringe benefits are those provided by law from taxes paid by employers (and, in some instances, also by employees). These programs would include Social Security, Medicare, the Railroad Retirement system at the federal level and workers' compensation programs and unemployment compensation programs in the states. Some claims of fringe benefit loss are specious. Employers are required to pay 1.45 percent Medicare taxes on all earnings of employees, but these taxes go into a general fund to pay for Medicare in a manner that is unaffected by how much an employer pays with respect to any particular employee. All workers

become eligible for Medicare benefits at age 65, regardless of how many Medicare taxes have been paid by that worker or his employers. This is also generally true of unemployment fund taxes paid by employers to states, though lost ability to draw unemployment benefits is a legitimate job-related fringe benefit loss. [Note, however, that it is inconsistent to project full time employment and also include a value for lost unemployment compensation. Only if a calculation of losses allows for periods of possible future unemployment can unemployment compensation be included as a possible fringe benefit.] Legally mandated pension/disability programs like Social Security and the Railroad Retirement System are in a more intermediate position. Amounts employers pay in taxes to those systems do have some effect on the eventual benefits received by workers, but generally the benefits are worth only fractions of tax dollars paid. Further, there are United States Supreme Court cases ruling that economic experts may not project losses in the form of reduced retirement benefits under the Social Security System (but not the Railroad Retirement System). These rulings probably do not apply to state court systems, but developing reliable projections of lost retirement benefits under either system is a complex and technical process. See Taylor and Ireland (1996) for a discussion of case law on this issue.

*Valuing “Discretionary” Job-Related Fringe Benefits.* “Discretionary” is a somewhat misleading label for job-related fringe benefits that are not legally mandated. An individual worker may have no choice in whether or not to participate in “discretionary” fringe benefit programs. For example, a minimum amount of life insurance may be provided to a worker whether or not that worker would have chosen to purchase that amount of life insurance. Many employer provided life insurance coverages have minimum levels that are provided to all workers, with options for workers to purchase additional amounts with or without employer subsidizations. Many employers have private pension programs and participate in optional governmental programs such as Simplified Individual Retirement Accounts, Keogh plans, 401k plans and 403b plans. In some cases, employers make matching contributions, meaning that the amount of contributed by the employer depends on the amount contributed by an employee.

Attaching an appropriate dollar value to an injured worker’s access to a 401k plan the worker had not used prior to an injury is quite difficult. It is typical for younger workers not to participate when young, but to become participants as they become older. Hence the fact that an individual had not participated in the past is not an indicator that the individual would not do so in the future. Further, even if an employer makes no matching contribution, a 401k plan still has value to a worker because it tax protects the savings of that worker. It is difficult to place specific dollar values on such advantages.

Pension programs and health insurance are the two primary job-related fringe benefits. Life insurance may also be provided, but is a much smaller value and quite complex to assess in any case. Generally, the value of life insurance is to insure that a flow of financial support to family members would continue in the event of a worker’s death. To the extent that an injury causes part of a worker’s future earnings to become guaranteed by a tort recovery, it offsets part of the life insurance a worker would have chosen to maintain. Disability insurance is also difficult to assess for the same reason and adds the additional difficulty that legal collateral source rules prevent an economic expert from discussing this issue. If a worker is disabled enough to lose

part, but not all, of the worker's earning capacity, disability insurance payments may or may not become available to the injured person. If they do, they cannot be discussed because of collateral source rules. Even if they do not, the replacement of the lost portion of a worker's future earnings through a tort award represents an offset to the lost value of disability insurance.

Medical insurance is also quite complex to assess. The cost of medical insurance to an employer depends on characteristics of the whole group of the employers' employees. Thus, the cost to an employer of a medical insurance plan for a work force with many older employees will be higher, while the cost to an employer with a much younger workers will be lower. This means that the group cost of a younger worker in an older employee group will be higher than average, while the group cost of an older worker in a younger employee group will be lower than average. Ultimately, employer costs for providing group coverage to all workers may have little to do with the costs to a specific worker for replacing medical insurance, especially if the worker's injuries make the worker a bad risk to private carriers. If the consequence of an injury is that a worker is shifted from a medical/dental plan with one employer to a medical/dental plan with another employer, the differences between the plans may be so complex that only an insurance expert could value the differences. If the consequence of an injury is that a worker has lost medical/dental coverage altogether, either because the worker cannot work or the new employment provides no medical/dental coverage, the appropriate measure of loss is the cost of the worker of obtaining comparable medical coverage in a private market.

When making such valuations, forensic economists must be aware there are provisions in law that medical insurance can be extended for a period of up to several years under an employers' group plan. Some employers also provide extensions (particularly in the railroad industry) beyond the legally required period. During the period of extended coverage, the loss often consists of any increase in the cost to the employee for maintaining the insurance. It should also be borne in mind that in most venues past lost medical insurance can only be claimed as a loss if the injured worker had out of pocket medical expenses (unrelated to the injury in litigation) during the period from the injury to the present. It should also be kept in mind that the primary loss period for medical insurance ends at age 65, when Medicare coverage begins.

*The use of simple percentages.* Many economic experts respond to the complexities involved in assessing job-related fringe benefits by using simple percentages taken from "employer" cost data provided by the Bureau of Labor Statistics or the U.S. Chamber of Commerce. These data include all costs to employers without regard to the amount of loss that would result to an injured worker and are generally unreliable for measuring individual worker losses, particularly if such elements as overtime pay, vacation pay, holiday pay and shift pay differentials are not subtracted from amounts being projected as losses. Since all "pay" is already included in past earnings records, it is double counting to add them again as fringe benefits. Employer cost measures also include employer tax payments for Social Security, Medicare, Workers' Compensation and Unemployment Insurance as lost fringe benefits without attempting to determine how and to what extent loss of these payments actually harms injured workers. Thus counting employer tax payments significantly overstates actual losses to injured workers. Given the complexities involved in measurement, many economic experts use percentage estimates that are more

modest. It is not feasible in most instances to perform complete analyses of each job-related fringe benefit provided by a particular employer. Further, there is no guarantee that the worker would continue to work for the same employer as before an injury or will continue to work for the new employer after an injury. This is particularly problematic if the injured worker has not yet taken new employment, but is expected to do so in a job whose job-related fringe benefits are as yet unknown.

*Sample Case Development.* Tables 1-4 could be adjusted to include percentage estimates for job-related fringe benefits by adding columns for fringe benefits, or by simply adding a percentage to the lost earnings figure. One particular danger is that development of such options may result in production of multiple tables by an economic expert. A good loss report can be done with relatively few tables. While multiple tables can enhance “disclosure” in the sense that it assists the other side in replicating calculations, multiple tables that are not necessary can also have the effect of simply “padding” reports to make them longer.

## **IX. Dealing with Lost Family Services**

*The nature of family services.* An injured worker may have lost the ability to perform some or all of the family services he or she was performing before an injury. With psychological injuries this can be a much bigger loss than is obvious on the surface. Family services include standard tasks performed around the home such as cooking meals, cleaning the home, maintaining the lawn, fixing appliances that break, painting the home, shopping for needed items and so forth. However, family services also include managing the economy of the home and providing guidance, care and counsel, particularly to minor children. Physical injuries are likely to reduce an individual’s ability to perform tasks in the first category, but may have little influence on the more important second category. Psychological injuries, on the other hand, may have little influence on the ability to perform simple functional tasks, but have much greater impact on the ability to manage the home economy and provide guidance, care and counsel. Reductions in this area need to be carefully documented by a psychologist or some other family expert, but can be a quite important part of losses.

*Replacement cost versus opportunity cost.* Economic experts use two general approaches for valuation: Replacement cost and opportunity cost. A lost earnings analysis is essentially a replacement cost analysis. The goal is to determine a sum of money in the present that would replace a stream of lost earnings in the future. In a family services analysis for a personal injury, a replacement cost analysis is an assessment of the cost of replacing the family services that the injured person had previously been able to provide. An opportunity cost analysis, on the other hand, would value the lost opportunity to provide family services based on the pre injury earnings rate of the worker. If a worker could have earned \$10 per hour in the labor market for time spent providing family services, the value of the services can be estimated as \$10 per hour, with adjustment for taxes and job-related fringe benefits associated with the \$10 per hour rate.

*Mitigation Offsets for Lost Family Services.* Many unqualified economic experts ignore the fact that personal injuries that do not reduce life expectancy do not reduce the amount of time

available to an injured person. Reports will be issued with assumptions that a worker has lost, say, 6 hours per week of family services based on some assessment of the functional tasks an individual can no longer perform. The individual has not “lost” those six hours, but has lost the ability to use those six hours in the same way as before the injury. To the extent that individuals who can no longer cut the lawn now cook, clean and do dishes with the time previously spent cutting the lawn, the amount of loss may be significantly offset. What often happens in families is that a personal injury results in a reassignment of domestic tasks such that the injured person now performs more of tasks that are still possible and other family members are freed up to do the tasks that the injured family member cannot perform. To be sure, this reassignment represents a loss to the family, but it is not a loss equal to the number of hours of services that have needed to be reassigned. It may be, however, that the injury increases the amount of personal maintenance time an individual must spend. In cases of this sort, it is reasonable to assess lost time based on increased maintenance time.

*Sample Case Development.* Because of the difficulties in developing reliable offsets based on reassignment of tasks within families, it can be very difficult to provide specific dollar values for lost family services. In such cases, where allowed by law, it may be most useful to provide index values for lost family services, leaving the decision as to the starting annual value to the trier of fact. For example, an economic expert could provide an estimate for each \$1,000 of lost family service value as of this year, projected to growth at normal discount rates to perhaps age 70. Using a net 3 percent discount rate, \$1,000 per year in net real terms for 30 years has a present value of \$19,601. The trier of fact would then have to determine the amount of loss per year and multiply that amount by \$19,601 per \$1,000 of loss. Thus, for example, \$2500 of annual loss would have a present value of loss in net real terms to age 70 of \$49,003. Several caveats go with this type of calculation. First, even absent the injury at issue in litigation, it is unlikely that the injured person could have provided family services of the same quality right up to the end of his or her life expectancy. Second, over time the amount of expected family services would be likely to change. If minor children are involved, a significant amount of time will be freed up when those minor children become adults. This would not be true, however, if the injured person is involved in caring for a disabled child who would not be expected to leave home as an adult.

## **X. Dealing with Life Care Costs**

*The role of a life care planning expert.* Life care expenses will be involved when an injury implies the need for future medical or psychological treatments or necessitates ongoing expenses that would not have been needed in the absence of an injury. The value of these ongoing costs, to the extent they can be predicted as occurring at specific times, can be projected by an economic expert as a separate element of damages. Under ordinary circumstances, a life care plan will have been developed by an expert who specializes in the preparation of such plans. The life care planning expert will examine the recommendations of the medical doctors and psychologists and prepare a report showing what purchases and services will be needed over time to satisfy the recommendations of the doctors or psychologists. An economic expert will require the report of the life care planning expert to indicate the type of good or service needed



the cost of that service in present day terms, and the period of time over which such goods and services will need to be purchased. The economist will then project the future costs of the recommended flow of goods and services and reduce those costs to present value. This can be done by the various methods described earlier for projecting the present value of lost earnings. This is shown using the net discount rate method only in Table 5.

*Sample Case Development.* Table 5 assumes that John Doe requires future life care expenses through life expectancy to age 78. The life care plan includes \$70,000 of immediate expenses for non medical goods and services and \$50,000 of immediate expenses for medical goods and services and \$30,000 per year in each category, based on the report of the life care planning expert. Most life care plans are more complex than as shown, but Table 5 is based on the assumption that the plan requires ongoing annual expenses, including the first year, of \$30,000 in each category. Thus, the total for non medical goods and services in the first year is \$100,000 (\$70,000 in immediate costs and \$30,000 in ongoing annual costs) and the total for medical expenses in the first year is \$80,000 (\$50,000 in immediate costs and \$30,000 in ongoing annual costs). In many actual plans, there are important changes as various ages are reached. In this simplified plan, the only significant change is from the first year to the second year. The reason for dividing between “non medical” and “medical” expenses is that the MCPI, the medical portion of the Consumer Price Index, has growth faster than other portions of the CPI for the past 25 years. It is arguable that this will not continue indefinitely into the future. However, most life care plans project greater increases for medical expenditures than for non medical expenditures. In Table 5, the appropriate real net discount rate for non medical expenditures is assumed to be 3.0 percent, while the appropriate real net rate for medical expenditures is assumed to be 1.5 percent. Since the same \$30,000 starting value was used for each category, the impact of a 1.5 percent difference in net discount rates is illustrated. By the last year of the plan, the present value of non medical expenses at \$30,000 per year is \$11,311, while the present value of the same current \$30,000 per year of medical expenses is \$18,354.

*Errors to avoid.* There can be overlaps between life care expenses and other categories of loss. Life care planning experts may sometimes include life care expenses that were not caused by an injury in litigation, such as annual medical examinations that an individual would have needed with or without the injury. Likewise certain of the recommended items for purchase, such as home computers, might have been purchased by the injured person even without the injury. Similarly, some life care plans contain provision for some services around the home that may have already been included in an assessment of family services requiring replacement. A good economic expert will be careful to avoid double counting items in a life care plan that have already been evaluated in other parts of the damage analysis. However, at the same time, simple offsets should not be used casually with complex replacements. Feldman and Egge [1995] offer an important caution against making offset assumptions until the basis of those assumptions has been carefully scrutinized. If an individual’s injuries are so catastrophic that the individual is institutionalized and the cost of institutional care includes meal provision, it does not follow that lost earnings should be reduced by the amount the individual would have spent on food outside the institution. There is a profound difference between the quality of meals eaten before the injury and after the injury in an institutional setting. If there is a reduction for meals in an

institution, it should be much smaller than pre injury expenditures on food.

## **XI. The Hedonic Damage Controversy**

*Introduction to the hedonic damage controversy.* As indicated in the introduction to this paper, a minority of economic experts believe that assessments can be made of the dollar value of an individual's ability to enjoy life and even of the value of the consortium of the family member with the injured individual. Brookshire and Slesnick [1999] surveyed 681 members of the National Association of Forensic Economics and received 184 usable responses. Of those respondents, 76.41 percent were unwilling to present hedonic damage testimony (Question 10), but 81.67 percent were willing to critique a plaintiff's economist's report presenting hedonic damages (Question 11). The author of this paper has taken a very strong position against such testimony. The majority of economic experts in personal injury cases, even though the majority of cases for which experts are hired are on the plaintiff side, do not believe that economists can provide reliable or accurate values for intangible emotional impacts of injuries (including deaths). This means that hedonic damage estimates are not likely to appear in most litigation, but such estimates are likely to be a central issue in a case if such estimates are provided. When introduced by economic experts, hedonic damage estimates significantly increase the overall amount of damages claimed by plaintiffs. The size of the increase in damages and the fact that most case law has rejected the admissibility of such projections tends to make the hedonic damage claim instantly a central focus.

Several basic facts about this type of damages claim are important. First, a relatively small number of individuals provide the lion's share of hedonic damage projections. Second, reported cases have gone decisively against the admission of this testimony, but it is likely to be admitted in state cases in New Mexico and may be admitted in other states as well [Ireland, Johnson and Taylor, 1997; Ireland, 2000]. This does not include hundreds of trial court admissions that did not result in reported decisions. Courts have found either that (1) experts may not testify about intangible values (Louisiana, in particular) or (2) the scientific basis for the testimony is unreliable under Rule 702 of the Federal Rules of Evidence, particularly as interpreted by the United States Supreme Court in *William Daubert et al v. Merrell Dow Pharmaceuticals, Inc.*, 609 US \_\_\_, 113 S. St. 2786, 125 L. Ed. 2d 469 (1993).

There are two varieties of this testimony. One variety provides values from what is called the "value of life" literature in economics [see Viscusi, 1993 for a thorough review]. With this approach [Palfin and Danninger, 1990], an economic expert testifies about values used by agencies of the United States Government to place safety values on human lives. The range, as reported by Viscusi, is quite large, but the economic expert suggests that the expert might use these values as "benchmarks" for the value of lost enjoyment of life, or lost consortium. The other variety, developed by Brookshire and Smith [1990], starts from a presumed "central tendency" in the value of life literature. In their 1990 book, this figure was \$3.5 million. They subtracted \$800,000 from this figure for "human capital" (lost earnings, lost fringe benefits and lost household production) to obtain a "net" \$2.7 million for the dollar value of the enjoyment of life for an average person alive and in the population with a life expectancy of 45 years. The 45

year life expectancy is then divided into \$2.7 to obtain a 1989 annual value for the enjoyment of life of \$60,000 per year.

Opponents of this type of methodology point out numerous speculative leaps of faith that must be performed. First, for the value of life to have any meaning to an economist, it must be assumed that an individual who has died could be “made whole” (the “restitution” principle in Canada) by being provided a sum of dollars. Second, it must be assumed that the value to a life person of being alive, separate from earnings and life enjoyment, must be zero. Thirdly, it must be assumed that a value representing an aggregate willingness to pay for safety is a measure of the value of an individual’s own life for other purposes. Fourth, it must be assumed that someone presenting this testimony, who has presumably performed none of the studies himself or herself, is expert enough with the methodology to judge the analytic accuracy of the whole literature.

For those opposed to this methodology, terms like “Alice in Wonderland” are often used to describe the “hedonic damage” approach. This method of deriving annual life enjoyment figures from the value of life literature is unknown to economists in academic institutions and is a source of amusement to them when explained. Economists generally know about and accept the notion that values from the “value of life” literature can be used to provide guidelines for amounts to be spent on safety prevention of fatalities. However, economists do not place dollar values on pleasure or love for any other purpose than testifying in litigation. In that sense, “hedonic damage expertise” characterized by on New York judge as a “discredited venture” along with “clinical ecology, trauma-cancer expertise or the Benedectin plaintiffs’ statistical machinations,” was sharply contrasted with “forensic documentation, which may prove helpful to a fact finder.” The case was *United States v. Starzeczyel*, 880 F. Supp. 1027; 1995 U.S. Dist LEXIS 4216 (1995).

Every knowledgeable economist recognizes that economists cannot place values on all of the losses suffered when an individual is injured or killed. However, most economists and other economic experts will readily concede that intangible damages such as lost enjoyment, lost love, pain and suffering, and grief and bereavement, cannot be measured by the tools of economic expertise. This author has seen one publication that has addressed the measurement of enjoyment in a serious scientific fashion. It is not about economics, but about psychology, *Well-Being: The Foundations of Hedonic Psychology* by Kahneman, Diener and Schwartz [1999]. The first chapter in this volume by Daniel Kahneman on “Objective Happiness” deals with practical measurement questions relating to impacts of injury on long term happiness. Kahneman describes the “treadmill effect” at some length and provides reference to psychological research in this area. The fact that Kahneman was a co-winner of the Nobel Prize in economics in 2001 speaks to the respect with which his work is held by the economics profession.

This effect suggests that objective measurements of happiness are raised only slightly when significant increases in income occur and that even fairly serious injuries do not reduce personal happiness in the long run as much as might be expected. Translated into terms of economics, the practical implications are that: (1) Money payments cannot increase an individual’s overall level of happiness significantly; and (2) After a period of adjustment, many injuries do not prevent

individuals from becoming about as happy as they were before the injury, though less capable along many other dimensions of life. This is quite consistent with reasons why many experts in law and economics argue that it is not efficient to compensate intangible losses in tort actions [Viscusi 2000]. Developing that argument, however, would require significant extensions of this paper that would go beyond its scope.

Table 1-Earnings Loss Based on Plaintiff VE in Net Real Dollars

| Year | Age | Pre Injury | Post Injury | Lost Earning | PresValue | Cumulative |
|------|-----|------------|-------------|--------------|-----------|------------|
| 1998 | 43  | \$43,386   | \$0         | \$43,386     | \$43,386  | \$43,386   |
| 1999 | 44  | \$44,818   | \$0         | \$44,818     | \$44,818  | \$88,204   |
| 2000 | 45  | \$46,297   | \$10,712    | \$35,585     | \$35,585  | \$123,789  |
| 2001 | 46  | \$46,297   | \$10,712    | \$35,585     | \$34,549  | \$158,338  |
| 2002 | 47  | \$46,297   | \$10,712    | \$35,585     | \$33,542  | \$191,880  |
| 2003 | 48  | \$46,297   | \$10,712    | \$35,585     | \$32,565  | \$224,445  |
| 2004 | 49  | \$46,297   | \$10,712    | \$35,585     | \$31,617  | \$256,062  |
| 2005 | 50  | \$46,297   | \$10,712    | \$35,585     | \$30,696  | \$286,758  |
| 2006 | 51  | \$46,297   | \$10,712    | \$35,585     | \$29,802  | \$316,560  |
| 2007 | 52  | \$46,297   | \$10,712    | \$35,585     | \$28,934  | \$345,494  |
| 2008 | 53  | \$46,297   | \$10,712    | \$35,585     | \$28,091  | \$373,585  |
| 2009 | 54  | \$46,297   | \$10,712    | \$35,585     | \$27,273  | \$400,858  |
| 2010 | 55  | \$46,297   | \$10,712    | \$35,585     | \$26,479  | \$427,336  |
| 2011 | 56  | \$46,297   | \$10,712    | \$35,585     | \$25,707  | \$453,044  |
| 2012 | 57  | \$46,297   | \$10,712    | \$35,585     | \$24,959  | \$478,002  |
| 2013 | 58  | \$46,297   | \$10,712    | \$35,585     | \$24,232  | \$502,234  |
| 2014 | 59  | \$46,297   | \$10,712    | \$35,585     | \$23,526  | \$525,760  |
| 2015 | 60  | \$46,297   | \$10,712    | \$35,585     | \$22,841  | \$548,600  |
| 2016 | 61  | \$46,297   | \$10,712    | \$35,585     | \$22,175  | \$570,776  |
| 2017 | 62  | \$23,148   | \$5,356     | \$17,792     | \$10,765  | \$581,541  |

Table 2-Earnings Loss Based on Defense VE in Net Real Dollars

| Year | Age | Pre Injury | Post Injury | Lost Earning | PresValue | Cumulative |
|------|-----|------------|-------------|--------------|-----------|------------|
| 1998 | 43  | \$43,386   | \$0         | \$43,386     | \$43,386  | \$43,386   |
| 1999 | 44  | \$44,818   | \$0         | \$44,818     | \$44,818  | \$88,204   |
| 2000 | 45  | \$46,297   | \$22,000    | \$24,297     | \$24,297  | \$112,501  |
| 2001 | 46  | \$46,297   | \$22,000    | \$24,297     | \$23,589  | \$136,090  |
| 2002 | 47  | \$46,297   | \$22,000    | \$24,297     | \$22,902  | \$158,993  |
| 2003 | 48  | \$46,297   | \$22,000    | \$24,297     | \$22,235  | \$181,228  |
| 2004 | 49  | \$46,297   | \$22,000    | \$24,297     | \$21,588  | \$202,815  |
| 2005 | 50  | \$46,297   | \$22,000    | \$24,297     | \$20,959  | \$223,774  |
| 2006 | 51  | \$46,297   | \$22,000    | \$24,297     | \$20,348  | \$244,122  |
| 2007 | 52  | \$46,297   | \$22,000    | \$24,297     | \$19,756  | \$263,878  |
| 2008 | 53  | \$46,297   | \$22,000    | \$24,297     | \$19,180  | \$283,058  |
| 2009 | 54  | \$46,297   | \$22,000    | \$24,297     | \$18,622  | \$301,680  |
| 2010 | 55  | \$46,297   | \$22,000    | \$24,297     | \$18,079  | \$319,759  |
| 2011 | 56  | \$46,297   | \$22,000    | \$24,297     | \$17,553  | \$337,312  |
| 2012 | 57  | \$46,297   | \$22,000    | \$24,297     | \$17,041  | \$354,353  |
| 2013 | 58  | \$46,297   | \$22,000    | \$24,297     | \$16,545  | \$370,899  |
| 2014 | 59  | \$46,297   | \$22,000    | \$24,297     | \$16,063  | \$386,962  |
| 2015 | 60  | \$46,297   | \$22,000    | \$24,297     | \$15,595  | \$402,557  |
| 2016 | 61  | \$46,297   | \$22,000    | \$24,297     | \$15,141  | \$417,698  |
| 2017 | 62  | \$23,148   | \$11,000    | \$12,148     | \$7,350   | \$425,048  |

Table 3-Earnings Loss Based on Plaintiff VE in Actual Dollars

| Year | Age | Pre Injury | Post Injury | Lost Earning | PresValue | Cumulative |
|------|-----|------------|-------------|--------------|-----------|------------|
| 1998 | 43  | \$43,386   | \$0         | \$43,386     | \$43,386  | \$43,386   |
| 1999 | 44  | \$44,818   | \$0         | \$44,818     | \$44,818  | \$88,204   |
| 2000 | 45  | \$46,297   | \$10,712    | \$35,585     | \$35,585  | \$123,789  |
| 2001 | 46  | \$47,645   | \$11,024    | \$36,621     | \$34,549  | \$158,338  |
| 2002 | 47  | \$49,033   | \$11,345    | \$37,688     | \$33,542  | \$191,880  |
| 2003 | 48  | \$50,461   | \$11,676    | \$38,786     | \$32,565  | \$224,445  |
| 2004 | 49  | \$51,931   | \$12,016    | \$39,915     | \$31,617  | \$256,062  |
| 2005 | 50  | \$53,444   | \$12,366    | \$41,078     | \$30,696  | \$286,758  |
| 2006 | 51  | \$55,000   | \$12,726    | \$42,275     | \$29,802  | \$316,560  |
| 2007 | 52  | \$56,602   | \$13,096    | \$43,506     | \$28,934  | \$345,494  |
| 2008 | 53  | \$58,251   | \$13,478    | \$44,773     | \$28,091  | \$373,585  |
| 2009 | 54  | \$59,947   | \$13,870    | \$46,077     | \$27,273  | \$400,858  |
| 2010 | 55  | \$61,693   | \$14,274    | \$47,419     | \$26,479  | \$427,336  |
| 2011 | 56  | \$63,490   | \$14,690    | \$48,800     | \$25,707  | \$453,044  |
| 2012 | 57  | \$65,340   | \$15,118    | \$50,222     | \$24,959  | \$478,002  |
| 2013 | 58  | \$67,243   | \$15,558    | \$51,684     | \$24,232  | \$502,234  |
| 2014 | 59  | \$69,201   | \$16,011    | \$53,190     | \$23,526  | \$525,760  |
| 2015 | 60  | \$71,217   | \$16,478    | \$54,739     | \$22,841  | \$548,600  |
| 2016 | 61  | \$73,291   | \$16,958    | \$56,333     | \$22,175  | \$570,776  |
| 2017 | 62  | \$37,713   | \$8,726     | \$28,987     | \$10,765  | \$581,540  |

Table 4-Earnings Loss Based on Defense VE in Actual Dollars

| Year | Age | Pre Injury | Post Injury | Lost Earning | PresValue | Cumulative |
|------|-----|------------|-------------|--------------|-----------|------------|
| 1998 | 43  | \$43,386   | \$0         | \$43,386     | \$43,386  | \$43,386   |
| 1999 | 44  | \$44,818   | \$0         | \$44,818     | \$44,818  | \$88,204   |
| 2000 | 45  | \$46,297   | \$22,000    | \$24,297     | \$24,297  | \$112,501  |
| 2001 | 46  | \$47,645   | \$22,641    | \$25,005     | \$23,589  | \$136,090  |
| 2002 | 47  | \$49,033   | \$23,300    | \$25,733     | \$22,902  | \$158,993  |
| 2003 | 48  | \$50,461   | \$23,979    | \$26,482     | \$22,235  | \$181,228  |
| 2004 | 49  | \$51,931   | \$24,677    | \$27,254     | \$21,588  | \$202,815  |
| 2005 | 50  | \$53,444   | \$25,396    | \$28,048     | \$20,959  | \$223,774  |
| 2006 | 51  | \$55,000   | \$26,136    | \$28,865     | \$20,348  | \$244,122  |
| 2007 | 52  | \$56,602   | \$26,897    | \$29,705     | \$19,756  | \$263,878  |
| 2008 | 53  | \$58,251   | \$27,680    | \$30,570     | \$19,180  | \$283,058  |
| 2009 | 54  | \$59,947   | \$28,487    | \$31,461     | \$18,622  | \$301,680  |
| 2010 | 55  | \$61,693   | \$29,316    | \$32,377     | \$18,079  | \$319,759  |
| 2011 | 56  | \$63,490   | \$30,170    | \$33,320     | \$17,553  | \$337,312  |
| 2012 | 57  | \$65,340   | \$31,049    | \$34,291     | \$17,041  | \$354,353  |
| 2013 | 58  | \$67,243   | \$31,953    | \$35,289     | \$16,545  | \$370,898  |
| 2014 | 59  | \$69,201   | \$32,884    | \$36,317     | \$16,063  | \$386,962  |
| 2015 | 60  | \$71,217   | \$33,842    | \$37,375     | \$15,595  | \$402,557  |
| 2016 | 61  | \$73,291   | \$34,827    | \$38,464     | \$15,141  | \$417,698  |
| 2017 | 62  | \$37,713   | \$17,921    | \$19,792     | \$7,350   | \$425,048  |

Table 5-Life Care Costs in Net Real Dollars

| Year | Age | Non Medical | PresValue | Medical  | PresValue | Cumulative  |
|------|-----|-------------|-----------|----------|-----------|-------------|
| 2000 | 45  | \$100,000   | \$100,000 | \$80,000 | \$80,000  | \$180,000   |
| 2001 | 46  | \$30,000    | \$29,126  | \$30,000 | \$29,557  | \$238,683   |
| 2002 | 47  | \$30,000    | \$28,278  | \$30,000 | \$29,120  | \$296,081   |
| 2003 | 48  | \$30,000    | \$27,454  | \$30,000 | \$28,690  | \$352,224   |
| 2004 | 49  | \$30,000    | \$26,655  | \$30,000 | \$28,266  | \$407,144   |
| 2005 | 50  | \$30,000    | \$25,878  | \$30,000 | \$27,848  | \$460,871   |
| 2006 | 51  | \$30,000    | \$25,125  | \$30,000 | \$27,436  | \$513,431   |
| 2007 | 52  | \$30,000    | \$24,393  | \$30,000 | \$27,031  | \$564,855   |
| 2008 | 53  | \$30,000    | \$23,682  | \$30,000 | \$26,631  | \$615,169   |
| 2009 | 54  | \$30,000    | \$22,993  | \$30,000 | \$26,238  | \$664,399   |
| 2010 | 55  | \$30,000    | \$22,323  | \$30,000 | \$25,850  | \$712,572   |
| 2011 | 56  | \$30,000    | \$21,673  | \$30,000 | \$25,468  | \$759,712   |
| 2012 | 57  | \$30,000    | \$21,041  | \$30,000 | \$25,092  | \$805,845   |
| 2013 | 58  | \$30,000    | \$20,429  | \$30,000 | \$24,721  | \$850,995   |
| 2014 | 59  | \$30,000    | \$19,834  | \$30,000 | \$24,355  | \$895,184   |
| 2015 | 60  | \$30,000    | \$19,256  | \$30,000 | \$23,996  | \$938,435   |
| 2016 | 61  | \$30,000    | \$18,695  | \$30,000 | \$23,641  | \$980,771   |
| 2017 | 62  | \$30,000    | \$18,150  | \$30,000 | \$23,292  | \$1,022,213 |
| 2018 | 63  | \$30,000    | \$17,622  | \$30,000 | \$22,947  | \$1,062,782 |
| 2019 | 64  | \$30,000    | \$17,109  | \$30,000 | \$22,608  | \$1,102,499 |
| 2020 | 65  | \$30,000    | \$16,610  | \$30,000 | \$22,274  | \$1,141,383 |
| 2021 | 66  | \$30,000    | \$16,126  | \$30,000 | \$21,945  | \$1,179,455 |
| 2022 | 67  | \$30,000    | \$15,657  | \$30,000 | \$21,621  | \$1,216,732 |
| 2023 | 68  | \$30,000    | \$15,201  | \$30,000 | \$21,301  | \$1,253,234 |
| 2024 | 69  | \$30,000    | \$14,758  | \$30,000 | \$20,986  | \$1,288,978 |
| 2025 | 70  | \$30,000    | \$14,328  | \$30,000 | \$20,676  | \$1,323,983 |
| 2026 | 71  | \$30,000    | \$13,911  | \$30,000 | \$20,371  | \$1,358,264 |
| 2027 | 72  | \$30,000    | \$13,506  | \$30,000 | \$20,070  | \$1,391,839 |
| 2028 | 73  | \$30,000    | \$13,112  | \$30,000 | \$19,773  | \$1,424,725 |
| 2029 | 74  | \$30,000    | \$12,730  | \$30,000 | \$19,481  | \$1,456,936 |
| 2030 | 75  | \$30,000    | \$12,360  | \$30,000 | \$19,193  | \$1,488,488 |
| 2031 | 76  | \$30,000    | \$12,000  | \$30,000 | \$18,909  | \$1,519,397 |
| 2032 | 77  | \$30,000    | \$11,650  | \$30,000 | \$18,630  | \$1,549,677 |
| 2033 | 78  | \$30,000    | \$11,311  | \$30,000 | \$18,354  | \$1,579,342 |

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