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Leo M. O'Connor

Robert E. Miller

# THE ECONOMIST-STATISTICIAN: A SOURCE OF EXPERT GUIDANCE IN DETERMINING DAMAGES

*Leo M. O'Connor* and Robert E. Miller***

## I. Introduction

Controversy over current efforts to pass national and state "no-fault" automobile insurance laws, as well as existing state plans,[1] accents the much more complete relief afforded an injured tort victim under the present system—a system which allows certain tort victims to recover for essentially all economic loss, past and future, depending on the assessment of fault and, in some instances, the character and degree of fault. The full recovery available under the prevailing system must be weighed against the achievement of limited compensation regardless of fault provided by proposed and existing "no-fault" statutes. Although this article will not pursue the current "no-fault" debate, its subject, the economic measure of personal injury damages,[2] goes to the heart of one of the most critical policy issues in this raging controversy. Hopefully, the following discussion will cast some light, albeit indirectly, on a conflict embroiled in rhetorical heat.

An attorney representing an injured tort victim is, of course, responsible to the court as an officer and to his client as a fiduciary. As such, he should, where appropriate, present evidence by way of the expert opinion of a qualified economist-statistician that will assist a trier of fact in arriving at a just and fair verdict which will reflect, as far as possible, the true amount of future economic losses sustained as a result of the negligence of another.

The decision to employ the expert testimony of an economist-statistician should be carefully made, for all cases do not lend themselves to this trial technique. Generally, the services of an economist-statistician are valuable only in those cases in which there is significant future economic loss. No matter how serious the injury, if there are only pain and suffering, there is little need for the opinion of an economist-statistician. In most jurisdictions in the United States, the measure of recovery for pain and suffering, either past or future, need not be reduced to present value. Likewise, any wage loss incurred to the date of trial is generally not reducible to present value; it is only the future economic loss at the time of trial which must be reduced to present value. But, regardless of injury, when there is substantial future economic loss, the use of the economist-statistician becomes almost mandatory.

One purpose of using an economist-statistician is to assist a court and jury

* Past President, California Trial Lawyers Association. B.S., University of San Francisco, LL.B., University of San Francisco.

** Professor of Economics, California State University at Chico. A.B., A.M., University of Miami, Ph.D., Bryn Mawr College.

1 *See, e.g.*, S.945, 92d Cong., 1st Sess. (1971); MASS. ANN. LAWS ch. 90, § 34 (1971).

2 Discussion of the economics of personal injury litigation and of the use of the economist-statistician (or "econometrician") as an expert witness in personal injury litigation has been presented by the economist-statistician coauthor and others in what is now a fairly large literature on the subject; *e.g.*, Robert E. Miller, *Capital Value of Man in Law*, CALIF. TRIAL LAWYERS J., Summer 1969, at 28.

in determining the true economic losses sustained by an individual whose earning capacity has been impaired or totally eviscerated by affording more precise criteria for evaluation. Needless to say, both the plaintiff's counsel and the defense counsel should avail themselves of this expert opinion evidence in the interest of justice.

From the standpoint of trial technique, it is not only necessary to lay the foundation for the expert's testimony, but to make the trier of fact receptive. The trial attorney should, during his opening statement and during voir dire examination, if permitted in the particular jurisdiction, explain his planned use of an economist-statistician and his purpose in doing so. In this way the trial attorney places himself in an excellent position at the conclusion of the trial to point out to the court and jury that he has attempted to bring all the facts before them for their consideration and that his argument is based on evidence and amounts to something more than his own naked conclusions.

How then is such information provided to the court and jury? Simply, an economist-statistician is called upon as an expert witness to provide the court and jury with an opinion of the future earnings which the plaintiff or decedent would have enjoyed if he had not been injured or killed. Less simply, such expert testimony also provides an opinion on the future "economic value" rather than just the future earnings. The concept of "economic value" encompasses evaluations concerning partially disabled persons, nonworking housewives, children, and includes considerations such as future medical and attendant care costs, future housekeeping costs, and home self-maintenance services.

The economist-statistician's opinion usually projects substantial economic loss. For example, consider a man with a demonstrated earning capacity of $10,000 per year who dies at age 35. Assuming 35 more productive years at the same earning capacity, economic damages would include an amount representing a future earnings loss of $350,000. This simple computation serves to point up the contrast between the relatively low limit on recovery fixed by no-fault automobile insurance plans and the "real economic value" of a person.

Workmen's Compensation legislation presents a disquieting parallel. Using the above facts, Workmen's Compensation limits recovery to a fraction of future economic value. Liberal California, for example, would provide a series of periodic payments limited to a maximum of from $25,000 to $28,000[3]—hardly compensation for a $350,000 loss.

A striking example of the inadequacy of Workmen's Compensation is to be found in a recent case in which the economist-statistician coauthor of this paper testified as an expert witness.[4] Briefly, four United Airlines pilots returning to their homes as passengers on a United Airlines flight after assigned work flights were killed when the plane crashed.[5] Although settlement was made by United Airlines with the estates of all other passengers, the airline argued that the four pilots were employees even though flying as passengers; and as such,

3 CAL. LABOR CODE § 4702 (West Supp. 1972).

4 Callahan v. United Air Lines, Inc., Civil No. 71-38-HP, 71-073-HP, 71-874-HP, 71-875-HP (C.D. Cal. July, 1972).

5 The airline industry refers to the status of such travel as "deadheading"—in this case, a singularly inappropriate term.

their estates were entitled only to Workmen's Compensation—again, a very modest sum in relation to the pilots' future economic value based upon $20,000 to $40,000 per year salary levels at death. In the ensuing litigation the plaintiffs argued that the pilots were passengers, not employees; and as such, their estates were entitled to sue for full economic damages and were not limited by Workmen's Compensation provisions. This argument was based on early 20th-century legislation, curiously enacted at the instigation of the then-powerful railroads. The statute provided that employee-passengers were passengers and was designed to preclude Workmen's Compensation claims against the railroads. The argument prevailed, and subsequently verdicts were obtained for economic damages which ranged from $426,500 to $800,000—amounts which contrast sharply with the alternative Workmen's Compensation payments of $25,000 to $28,000 per pilot.

Within this frame of reference, just what does the economist-statistician expert witness do to arrive at defensible computations of economic loss which at first glance appear extraordinary? Essentially, the economist-statistician does just what was done in the simple computation above—a task well within the competence of an attorney, court, or jury.

An interesting and most helpful guide for initially estimating the "economic damages value of a case" is that in rough calculation the effect of the present value discount will approximately offset the effect of future wage or salary increases. For example, given the reasonable but approximate averages of 4% per annum long-term future wage or salary increase and 4% per annum long-term investment return for the present value discount, both factors cancel out, leaving earnings times life expectancy or better "life-work" expectancy as a sound but rough estimate.

But, to provide a defensible and more acceptable calculation, much more must properly be considered. Briefly, specific and general socioeconomic information concerning the plaintiff or decedent must be considered. Specific socioeconomic information about the plaintiff or decedent includes his pre-injury or death circumstances—age, color, sex, family, education, occupation, demonstrated earning capacity, employment fringe benefits, etc. In certain cases this information is used to identify his "statistical cohort"—those persons in our society with similar socioeconomic characteristics. This technique is of particular value in determining the economic value of persons with no work history—such as non-working women, children, etc.—by reference to the projected experience of their statistical cohorts. Relevant general socioeconomic data mainly from published federal government agency sources is used to identify the expected pattern of life and life-work and the wage-price-interest rate nexus required to project earnings, medical care costs, etc. (For reference, a list of such information and data is shown in Appendix I.) With this information and data, the economist-statistician can effectively compute the impaired or lost economic value suffered as a result of injury or death.

Usually, the economist-statistician will summarize his computations in a formal report which includes a statement of assumptions. This report will normally be accompanied by copies of relevant government source documents. The

entire package is provided to the attorney for several reasons—first, to indicate the results of the calculations of impaired or lost economic value; secondly, to provide in effect a text of the economist-statistician's planned presentation in court; and thirdly, to provide the attorney with a major exhibit for use during pretrial settlement negotiations. For reference, abridged versions of two representative appraisals prepared for actual cases are shown in Appendix II.

As noted above, to prepare such a report specific socioeconomic information about the plaintiff or decedent and general socioeconomic data must be considered and appropriately utilized in the computations of economic value. This information is not only the basis of the report but is also the real basis for accepting any expert opinion. Clearly the calculated economic value of a person—the dollar amount—is no better than the information, data, and assumptions that have gone into its preparation. The economist-statistician's opinion stands or falls not on the resultant dollar computations but on the convincing explanation of the basis for his calculations.

Before identifying and explaining these major assumptions, it might be well to note the relevance and reliability of the economist-statistician's appraisals of impaired or lost economic value.

## II. Relevance and Reliability of Appraisals of Impaired or Lost Economic Value

An estimate of impaired or lost economic value particularly in cases involving children or housewives who would be expected to seek subsequent employment but who have not demonstrated earning capacity before injury or death is often met by the response that such calculations are too speculative or conjectural to be admissible as evidence and as a consequence are worthy of little note in pretrial settlement negotiations. It is argued that admitting these calculations into evidence usurps the province of the trier of fact.

This position may be refuted by noting that, as with any expert opinion, the calculation of economic loss is meaningful not necessarily as fact but only as credible opinion to aid the court and jury in determining an appropriate compensatory award. The question should be one of weight, not admissibility. To overcome the force of the attack on admissibility, the estimate of impaired or lost economic value must rest on methods beyond the competency of laymen and in the special province of the expert.

The need for expert analysis is reflected in much of the literature. For example, in connection with the testimony of a professional economist-statistician on the question of evaluating a mother's services lost to her surviving children, one court has said:

> As knowledge becomes more professionalized, specialists will more frequently be called upon as expert witnesses. This is the judicial by-product of an age of pervasive technology and expanding social sciences.[6]

6 Merrill v. United Air Lines, Inc., 177 F. Supp. 704, 705 (S.D.N.Y. 1959).

Further, a most persuasive decision has been rendered by the Supreme Court of Montana in which Justice Castles wrote regarding an estimate of future earnings:

> This court agrees that the testimony and exhibits of Heliker [an economist-statistician] were speculative in nature, but no more so than any other evidence that has for its purpose the proof of future action or events. The issue before the trial judge, as seen by this tribunal, was whether the testimony of Heliker should be allowed, in order to give the jury some basis upon which to reach a conclusion in regard to the possible future earnings of the decedent, or whether to leave the jury unguided and hope that by their common knowledge and sense of justice they might arrive at a more accurate estimation of damages. It appears to us that in this particular case the element of conjecture is reduced significantly by the admission of expert testimony as to the possible future earnings of the decedent. It also appears that this expert testimony is not only the best evidence, but the only evidence available in this case to prove future earnings.[7]

With regard to the argument of reliability, it must be recognized that the estimate of impaired or lost economic value, although to some degree speculation, is at least expert opinion. It is the best and only evidence. The essential point here in the defense of this evidence is that it is an estimate based upon data which possesses statistically significant limits of reliability. For example, the probabilities and amounts of error are specified for the data given in the *1970 Census of Population.* In the data for California, for instance, the annual median income figure given for persons with four or more years' college education has only a one chance out of one hundred of being in error more than one per cent.

Further, those who question the meaningfulness of estimates of impaired or lost economic value should take into account just what the computations purport to show, which often is only a median value, *i.e.,* that value above and below which 50% of all possibilities lie, albeit with specified variability limits. In this regard, it is sometimes forgotten that the universally accepted mortality table figures give only this same median value. As an example, a 35-year-old white male has a life expectancy of 36 years; this simply means that about half of all men currently 35 will die after age 71 and about half before age 71. A given 35-year-old man may die tomorrow or live past the end of the mortality table and on into his nineties.

Having addressed the questions of relevance and reliability, what are the major assumptions upon which the economist-statistician's appraisals of impaired or lost economic value are made and what explanations support their use?

## III. Death Cases

It might be best to begin with a brief discussion of the basis for computing lost economic value in death cases since estimates of impaired economic value in injury cases are an extension of the more familiar procedure in death cases. Superficially, as noted in the introduction, the necessary computations are simple.

7 Krohmer v. Dahl, 145 Mont. 491, 402 P.2d 979, 981 (1965).

Given the age of the deceased, his average life expectancy can be read from an appropriate mortality table. This figure is then multiplied by his earnings at death to estimate his lost lifetime earning capacity. The result is then usually reduced to its present value by selecting an appropriate rate of interest with which to enter a table of interest rate projections—hardly a sophisticated calculation. But, as indicated previously, our contemporary society is a function of many complex institutional factors, and any thoroughly developed opinion of the deceased's lost economic value would of necessity be based on many considerations besides life expectancy and earnings at the time of death.

In cases involving a child[8] or non-working housewife who would have been expected to seek subsequent employment—cases where earning capacity was not demonstrated before death—these same factors are considered. However, the evaluation is made on the basis of potential rather than demonstrated earning capacity—a potential determined in accordance with the individual's personal characteristics, *e.g.*, age, sex, family socioeconomic status, educational attainment or potential, aptitude, intelligence, physique, etc. This data, it will be recalled, is used to identify the "statistical cohort" utilized to project the decedent's earning capacity.

In any event, the factors to be taken into account, listed in Appendix I, reflect the sophisticated computations necessary to give a thoroughly developed opinion of the lost economic value. A perusal of this list should show why such opinions are now almost always prepared for pretrial settlement negotiation and court presentation by professional economist-statisticians usually from the faculty of local universities. The listing also indicates why the argument that opinions of impaired or lost economic value are "an invasion or usurpation of the province of the jury" is hardly tenable. It must be patent that consideration and computation of all these factors are beyond the normal competency of the layman and in special province of the expert.

But further, and more critically, the economist-statistician must be able to appropriately include all these factors and the assumptions of the case into his appraisal. For example, an extrapolation of past rising wage rates several decades into the future would hardly be a defensible assumption without a supporting explanation of the labor market and the basis for rising money wages in our economy. In point of fact, the usual assumption reflects the past pattern of national money wages in our society which have increased on an average of some 4 to 5 per cent per annum over the last several decades. The use of this assumption over any significant number of years into the future will, of course, result in the prediction of relatively large future annual earnings.

In order to lay a more understandable foundation for this prediction, it is helpful to look back at some actual increases. For example, the national average

8 The economist-statistician's appraisal of the lost economic value of a child begs the issue of the legal use of such an opinion considering the question of "loss to whom." Nevertheless, such appraisals are often requested by attorneys to reflect lost economic value as a part of pretrial preparation and settlement negotiations; further, parents do have some legal claim for loss of future economic support from a child which of course is a function of his or her future economic value; and for the "lost" costs of child rearing from the date of birth to the date of death which can also readily be calculated as noted in the text.

hourly wage rate in manufacturing industries in 1930 was $0.55 per hour; whereas in 1970, it was $3.37. The annual figures based on this hourly data and a 40-hour week are $1,150 for 1930 compared to $7,010 in 1970—a 610 per cent increase.

However, it should be observed that the projection of such an increment into the foreseeable future should not be based merely on the fact that it happened in the past. Although it is sometimes argued that the past is the best mirror of the future, the more rational explanation of this projection is that defined economic forces caused this pattern of increase and that these same forces will probably continue to operate into the foreseeable future. These forces form the vehicle our society has elected to distribute our growing productivity, *i.e.*, of the two alternatives of falling prices or rising wages, we have elected rising wages as the means of distributing our growing productivity.[9]

Parenthetically, it might be well at this point to respond to those critics who urge that consideration of future wage increases is too speculative. In effect their position is that there will be no change—probably the most indefensible position in view of the realities of modern economics and historical analysis. Further, current policies of the federal government, state and local governments, industry, financial institutions, and insurance companies presume such future increases, *e.g.*, the Nixon Administration's Pay Board's announced policy to "hold" wage and salary increases to an average of 5.5% per annum.[10]

As a further frame of reference, it should be noted that the pattern of average price increases over the same 40-year period has been about one half the average money wage increases or about 2 to 3 per cent per annum.[11] This factor gives the basis for projecting future costs of such needs as, for example, medical care. It also provides the basis for estimating the "real" wage increase of some 2.5 per cent per annum which represents one part of the total distribution of the average 3.5 per cent per annum productivity increase. The differential of about 1 per cent between the 2.5 real wage increase and the 3.5 per cent productivity increase reflects the distribution to those receiving income other than wages and salaries, *e.g.*, profit, rent, and interest recipients. Thus, approximately two-thirds of the productivity increase, or 2.5 of the 3.5 per cent, goes to wage and salary earners and approximately one-third of the productivity increases, about 1.0 of the 3.5 per cent, goes to other income receivers.

Similarly, the contrasting pattern of past fluctuating interest rates could not defensibly be projected over the next several decades without a supporting explanation of the money market and the use of interest rates as a major tool of federal government monetary policy. This factor is, of course, necessary to make the present value computation from the standpoint of the expected returns from various "prudent investments" — such as savings and loan accounts, government

9 "Phillips Curve" economic analysis depicts the inverse relationship between rising wages and prices and unemployment—the latter, of course, being a politically, socially, as well as economically untenable condition.

10 There are, of course, many other illustrations of the "built-in" pattern besides the regular changes in wages and salary in industry and government, *e.g.*, the periodic increases in Social Security, the minimum wage, military pensions, etc.

11 In this regard, consider the Nixon Administration's Price Commission announced policy to "hold" price increases to an average 2 to 3 percent per annum.

bonds, mutual funds, or other investments yielding even higher returns. Usually, the average return from savings and loan accounts or federal government long-term bonds, 3.5 per cent per annum over the last several decades, is selected as being most appropriate for this purpose, considering the requisite security and facility of withdrawal. However, use of such an investment return in the face of current higher rates often requires explanation. The 3.5 per cent per annum figure is a projected average—a figure around which interest rates may be expected to fluctuate. Although at present higher rates are available, the assumption is that interest rates will fall to and below the average in the long run.

Parenthetically, current wage and price increase rates are equally above their averages, and are similarly projected to fall to and below their computed averages in the long run. There is no more justification for projecting the current and unusually high interest rates over the long run than there is for using current and equally high wage or price increases for such projections. Further, this 3.5 per cent per annum investment return is consonant with the rates used by life insurance companies as the basis for computing their premium rates and annuity contracts.

As in the case of determining the appropriate wage pattern, it should be noted that the projection of an interest rate into the foreseeable future should not be based merely upon historical fluctuations but, rather, should rest on the fact that there are defined economic forces that have caused this pattern and that they will probably continue to operate into the foreseeable future. The movement of interest rates up and down within an identifiable range (contrasted with the upward spiral of wages and prices) is due not only to the interaction of the supply and demand of loanable funds but even more so to the use of the interest rate by the federal government to influence the direction of the economy. Interest rates are deliberately increased in a period of excessive economic expansion to deter further expansion and are deliberately decreased in a period of excessive economic contraction to deter further contraction.[12] In sum, wages and prices have a "built-in" bias upwards; whereas, interest rates tend to fluctuate.

More specifically, let us assume a highly simplified version of the "classic" case to illustrate the use of the necessary assumptions and factors. The facts are as follows:

> Decedent—Male, age 35 at the time of his death, federal government civil servant, earning $17,403 per annum, and who will receive no future pay raises other than those reflecting the general pattern of national wage increases.[13]

12 Where appropriate, more subtle and detailed explanations than the supply and demand of loanable funds and federal government policy can be offered, *e.g.*, the "natural" rate of interest as adjusted by price anticipations, etc.

13 For illustration, this is the salary in the 1970 Federal Government General Schedule Pay Table for a GS-12, of the 18 regular pay grades, in the top or tenth step of the ten in-grade periodic increases. The unrealistic assumption precluding consideration of any future promotions is, of course, to simplify the illustration; or, if preferred, it is an application of the now much-quoted "Peter Principle" that an individual will be promoted until he reaches a level of incompetency and there remain.

Family—Wife, age 30 at the time of his death, housewife. Child, age 10 at the time of his death.

Date of trial—Two years after his death.

The usual approach would be to take into account and compute two flows of money based upon specific information relating to the decedent, general data relating to the decedent's "statistical cohort" and relevant local and national economic-statistical factors as necessary.

I. A flow of lost economic value—This flow is computed by evaluating the decedent's life expectancy economic values which encompass earnings based, of course, on his life-work expectancy.[14] Considerations include (1) demonstrated earning capacity at the time of his death, (2) actual earning increases from the date of death to date of trial, (3) stipulated future earning increases such as contractual or customary periodic increments, (4) assumed future earning increases as reflected in average local and/or national wage patterns, (5) promotion potential to more responsible and higher paying positions, (6) monetary value of nonpaid employement fringe benefits,[15] and (7) monetary value of decedent's home self-maintenance services.[16]

II. A flow of offsetting economic value—This flow is computed by evaluating the decedent's own terminated consumption expenditures based upon family size and ages,[17] and any other qualifying factors,[18] as may be appropriate.

Then, after separating each of these flows of money into two time periods—

14 Life-work expectancy indicates the median number of years persons of a given age will spend in the labor force before retirement as compiled and published by the U.S. Department of Labor. The more well-known life expectancy indicates the median number of years persons of a given age will live and is compiled and published by the U.S. Department of Health, Education, and Welfare. Interestingly and importantly, each of these expectancies is based upon the experience of both well and ill persons. The use of average rather than individual data is predicated on the impossibility of prognosticating any individual's future and the ability to do so for large numbers of people.

15 This non-paid component of earnings is a significant factor in the computation of the lost flow of economic value in our society and even more so in other nations. For example, U.S. Department of Labor studies indicate that the monetary value of non-paid employment fringe benefits, such as hospitalization plans, etc., in the United States are now some 15 percent of earnings. In Western Europe, they are in the magnitude of some 50 percent of earnings, and, as a further frame of reference, in Japan, they are some 100 percent of earnings.

16 This factor is not very significant in the computation of the lost flow of economic value, but it is important from the standpoint of emphasizing a person's money value. For example, U.S. Department of Commerce and other agency data reflect that the monetary value of a homeowner's home self-maintenance services are in the general magnitude of some one percent per annum of the home value.

17 This factor can be determined from the decedent's family expenditures pattern or from published data showing the percentage of family expenditures allocable to the several family members according to average family income, size, and ages.

18 This factor takes into account the "collateral source" rule, which from a legal standpoint determines for the economist-statistician which of the offsetting flows of income should be considered and which should not, such as life insurance proceeds.

one from the date of death to the date of trial and one from the date of trial to the end of life expectancy—the future evaluation of each flow is reduced to its present value. The difference between the two present value figures is the present value of the net future economic loss.

For illustrative purposes, consider but one element of our civil servant's economic value—his expected earnings. Assume the decedent's demonstrated earning capacity at time of death to be $17,403. This figure is adjusted to the date of the trial by the actual earnings changes that occurred from the date of death to the date of the trial. A reasonable result might be $19,004 which would then be projected over his remaining life-work expectancy[19] of 27 years to age 64 with perhaps a 4.5 per cent per annum earnings increase—a rate of increase reflecting the national average over the past several decades. Thus, both to and from date of trial computations would yield his life-work expectancy earnings—$36,407 to the trial date and $963,718 from the date of trial. To these figures must be added his other economic values, *e.g.*, monetary value of employment fringe benefits, home self-maintenance services, etc. Parenthetically, it should be noted that this computation of expected earnings does not result in a definitive prognostication but only an approximate, albeit competent, bench mark or frame of reference to guide the trier of fact. It is a projection no doubt higher or lower than what will actually occur. In short, it is the best available estimate.

The next step is to reduce the future earnings plus any other computed future values to their present values by an assumed investment return of, for example, 3.5 per cent per annum. Applying this assumption in the present case will reduce the future earnings of $963,718 to a present value of $563,300 which yields a total expected earnings loss of $599,707 when added to the computation of earnings to trial date.[20] The reduction of a future monetary loss to present value is simply a procedure to determine that sum which will generate a flow of money into the future sufficient to restore the lost or impaired future flow of money. The present value is, of course, necessarily less than the total future monetary loss because of the investment return available on the present value sum of money while it is held for periodic disbursement in the future.

Parenthetically, this present value sum of $563,300 will not be obtained by the use of the usual present value reduction table of the "present value of $1 per year."[21] The table value would result in $616,800—a $53,500 error—due to the table's use of a linear vice the required curvilinear projection. The correct computation must either be made in steps of one year or, more efficiently, by a special

19 Life-work expectancy for men age 35 is approximately 29 years from which the two years from the date of death to date of trial must be subtracted. Alternatively, his life-work expectancy can be projected to the mandatory federal government employee retirement age 70. It would be best to offer both calculations—one based on retirement at age 64 and the other at 70.

20 It should be noted that this sum is only one—albeit the major one—element of economic value to which other elements would have to be added, *i.e.*, monetary value of employment fringe benefits, and others subtracted, *i.e.*, terminated consumption expenditures of the decedent.

21 *See* CALIFORNIA JURY INSTRUCTIONS CIVIL 547-49 (5th ed. P. RICHARDS ed. 1969). This authority is commonly referred to as the "Book of Approved Jury Instructions" or "B.A.J.I."

mathematical formula.[22] While hardly necessary for this computation, an electronic computer does provide, in the form of a printout, an excellent vehicle for demonstrating the present value reduction process. (See Appendix II.)

## IV. Injury Cases

How can this procedure be extended to estimate the impaired economic value of a wrongfully injured person? Superficially, the necessary calculations are again quite simple. Given the estimated lifetime earning capacity of the individual, determined as above, and expert medical opinion as to the percentile degree of permanent physical or mental injury, a simple evaluation is possible. The product of these figures may be viewed as a rough estimate of the impaired earning capacity of the individual. As before, this result is reduced to its present value—once again, hardly a sophisticated calculation.

But, any meaningful estimate of the injured person's impaired earning capacity would have to consider the specific effect of the individual's injury on his earning capacity. In the event that the injury should be totally disabling, the procedure for estimating impaired earning capacity would be similar to that in a death case—except for the unneeded offset for the decedent's terminated consumption expenditures and the possible addition of medical and attendant care costs.

However, most injuries are not totally disabling.[23] Further, some injuries, although characterized as resulting in a specific percentile permanent physical disability, may not functionally disable the injured person in his occupation and thus leave his earning capacity unimpaired. For example, the loss of an eye in the case of an attorney may not affect his capacity as an attorney at all. Thus, there would be little basis for an appraisal of impaired earning capacity. On the other hand, some injuries, although also characterized by a specific percentile permanent physical disability, may result in full functional disability in the injured person's occupation. For example, the loss of a hand in the case of an automobile mechanic would entirely eliminate his earning capacity as an automobile mechanic. This latter circumstance would surely provide a basis for an appraisal of impaired earning capacity.

Where an injury is not totally disabling but does fully or partially preclude continued employment in the injured person's occupation, an effective procedure for estimating impaired earning capacity is to first determine the individual's projected earnings in any available alternative occupations and then, depending on the extent to which he has been precluded from pursuing his present or former occupation, determine the projected loss were he to continue in this occupation. Alternative occupations will almost always result in lesser annual earnings than before the injury, as usually the individual is either untrained and inexperienced in the new activity or he is functionally limited to occupations requiring little

22 The economist-statistician coauthor has developed such a formula. Robert E. Miller, *B.A.J.I. and the Economist,* CALIF. TRIAL LAWYERS J., Fall 1971, at 89.

23 *See* DIVISION OF INDUSTRIAL ACCIDENTS, STATE OF CALIFORNIA, SCHEDULE OF RATING PERMANENT DISABILITIES (1966).

or no training with corresponding low annual earnings. If the injured person is to continue his occupation at a reduced level, the projected earnings loss is often easily computed—*e.g.*, part-time work, part-time pay. Thus, the individual's annual earnings differential whether it results from a new occupation or part-time pursuit of his regular occupation is readily determinable. It is this annual earnings differential that is utilized to calculate lifetime impaired earning capacity. When these computations are to be based upon annual earnings in a new occupation, there is a wealth of published economic-statistical data available identifying average earnings of individuals by occupation. For example, the U.S. Department of Labor provides numerous such publications. Another source, of great value, is the decennial U. S. Department of Commerce Census of Population which gives this information nationally, for each state, and for major metropolitan areas.

A complicating factor in estimating economic loss in injury cases is the possibility of changing physical or mental disability. Although the individual continues his occupation after injury and maintains previous earnings, it may, nevertheless, be appropriate to make an appraisal of impaired earning capacity where there is expert medical opinion that the injury will partially or completely preclude him from continuing his occupation at some time in the future. This expert opinion should contain an estimate of the future date and degree of progressive disability.

For example, if an individual suffered a leg injury and there was expert medical opinion of a 20% permanent physical disability, but notwithstanding, he continued working and earning as before, there would be little basis for an appraisal of impaired earning capacity. However, if the physician in the case also stated that in ten years the injury would progress to 50% permanent physical disability and that the individual would then be unable to accommodate the injury and continue working and earning fully in his occupation, there would certainly be a basis for such an appraisal.

## V. Cases With No Demonstrated Earning Capacity

The *1970 Census of Population* is also a source of valuable data for cases involving a child or nonworking housewife who would be expected to seek subsequent employment—cases where earning capacity had not been demonstrated before death or injury. For example, consider the following census information:

(1) One third of all workers are women.
(2) One half of all women (ages 18 to 64) are working.
(3) Two fifths of all working women are over 45 years of age.
(4) Two thirds of all working women are married.

In addition to information on the average annual earnings of individuals by occupation, this publication gives information on the average annual earnings of individuals according to their educational attainment level. This combined

data provides the basis for an effective procedure for estimating the future lost or impaired earning capacity of individuals who have not demonstrated earning capacity before injury or death.

Thus, in either an injury or death case, the individual's characteristics, *e.g.*, age, color, sex, family socioeconomic status, educational attainment or potential, intelligence, physique, etc., are considered. This information can then be used for two mutually supporting calculations to estimate the future impaired or lost earning capacity for the individual. In the first, the individual's characteristics would identify those occupations most probable had he not suffered injury or death. For example, in a death case there is great force to the presumption that the deceased son of a small business owner—a young man with demonstrated ability and interest—would have eventually taken over his father's business. Similarly, a deceased housewife with high educational attainment and intelligence could readily be presumed to have qualified for a teaching position after her minor children reached the age of 18. In injury cases, the identification of probable occupations is followed by a determination of those precluded on the basis of medical opinion. For instance, presumably a boy who lost an eye would be precluded from pursuing certain operative occupations such as truck driving due to his loss of stereoscopic vision.

With the information on probable occupations and data from the *1970 Census of Population* giving the average annual earnings of the individual's "statistical cohort" in each occupation, an average annual earnings for all his probable occupations can be determined. In death cases, this value would directly provide the basis for estimating lifetime lost earning capacity. In injury cases, it would indicate the earnings differential between what is now possible and what would have been probable. In either case other general or specific factors may be brought to bear on the ultimate determination.

In the second supporting method, the individual's educational attainment level or evidence of his educational attainment potential can be utilized with data from the *1970 Census of Population* giving average annual earnings by education for the individual's "statistical cohort." For example, the Census of Population for California indicates that urban-sited males over the age of 25 with four or more years of college education have a current annual median earnings of $13,650—as adjusted to date by U.S. Department of Labor data on wage rate changes. In death cases this value would be the basis for estimating lifetime lost earning capacity. In injury cases, where educational potential has been reduced by the injury (*e.g.*, loss of sight or hearing) this value is used to determine the earnings differential between what is now possible as a result of the injury and what would have been probable had the individual fulfilled his educational potential.

With regard to cases involving the death of a child, it should be mentioned at this point that the costs of rearing a child to maturity often constitute a substantial offset. The determination is similar to that for the terminated consumption expenditures of a deceased father, and the relatively simple computation is based on the per cent of family income allocated to each member of the family.

## VI. Cases Involving the Costs of Replacement Mother-housewife Services

There is a special methodology for making an appraisal of the impaired or lost economic value suffered by a family as a result of the injury or death of a mother and housewife. The process of determining the economic measure of her future services as a mother and housewife as contrasted with the measure of her future earning capacity is an area of considerable interest. The procedure for estimating the family's economic loss due to the injury or death of the mother and housewife is fundamentally a process of measuring the cost of replacement for child care and domestic help. The computation is based on current and projected wage rate data for persons performing such services. Additionally, in cases of a partially disabling injury, it is necessary to determine the effect of the functional disability involved so that a more accurate estimate of necessary replacement child care and domestic help can be made. As indicated previously, a specific percentile permanent disability may only coincidentally reflect economic loss. Here, as before, a functional analysis is the sounder approach.

## VII. Cases Involving the Costs of Medical and Attendant Care Services

The costs of medical and attendant care services can be a very important factor in determining the appropriate amount of compensation. For example, in the case of a quadraplegic, lifetime medical and attendant care can often cost several million dollars. Given expert medical opinion as to the amount of future medical and attendant care costs, it is feasible to project within a specified degree of reliability these expenditures over the life expectancy of the individual and to obtain the measure of economic loss due to the injury. In so doing the price increase factor must be taken into account. To illustrate the effect of this price factor, consider the result that based on the general pattern of prices—though medical costs are rising much more rapidly—medical care costs in the year 2000 will be approximately twice what they are today.

## VIII. Conclusion

Finally, it should be added that although the calculations for estimating impaired or lost economic value are complex, their summary explanation and presentation in court need not and should not be too involved. In general, after qualifying the expert witness and positing the required predicates through an appropriate hypothetical question, a short explanation of the necessary assumptions and factors supported by a visual presentation in the form of a large chart showing the results of the appraisal is both sufficient and appropriate. Only upon challenge in cross-examination need the detailed computations be offered.

## Appendix I

## A LISTING OF AN ECONOMIST-STATISTICIAN'S CONSIDERATIONS IN APPRAISING FUTURE ECONOMIC VALUE

### I. Individual Socioeconomic Data

1. life expectancy
2. work-life expectancy as distinct from life expectancy
3. education and educational potential
4. occupation
5. earnings
6. contractual salary or wage increments as defined by employer policy or in union contracts
7. contractual position or job promotion as defined by employer policy or in union contracts
8. salary or wage potential as identified by employment supervisor
9. position or job promotion potential as identified by employment supervisor
10. postretirement earnings potential (as in the case of retired military personnel)
11. contractual bonus and/or profit-sharing-plan provisions
12. bonus and/or profit-sharing-plan potentials
13. salary or wages in kind (such as food and lodging for farmers, seamen, restaurant workers, domestics, etc.)
14. employee pension plan
15. employee group medical insurance
16. employee group life insurance
17. employee group disability insurance
18. medical and attendant care requirements
19. monetary value of child care
20. monetary value of housekeeping services
21. monetary value of home self-maintenance services

### II. General Socioeconomic Data

1. anticipated salary and wage changes based upon projected national wage patterns
2. anticipated price changes based upon projected national price patterns
3. anticipated interest rates based upon projected national interest rate patterns
4. present value discount rate based upon projected national interest rate patterns
5. equivalent family income levels to adjust for diminished family size
6. consumption expenditure levels to adjust for deceased's expenditures
7. Social Security, etc. benefits, retirement and survivor (recognizing "collateral source" rule)
8. age-earnings cycle
9. cost of medical care as physician and nursing fees
10. cost of medicines
11. cost of medical equipment
12. cost of attendant care
13. cost of replacement housekeeping care
14. cost of replacement mother care
15. life insurance proceeds (recognizing "collateral source" rule)
16. cost of child rearing

## Appendix II

## REPRESENTATIVE APPRAISALS OF LOST OR IMPAIRED ECONOMIC VALUE*

### A. Death of a Mother-housewife

Appraisal Assumptions

Factors Given—as part of hypothetical question

1. Jane Doe was killed on 3 July 1968 at age 23 (22.6 years).
2. She was married and had three minor children and was occupied as a wife-mother-housekeeper to her family at the time of her death.
3. She had some prior work experience at the time of her death.
4. Her husband's age was 24 (23.9 years) at the time of her death.
5. Her husband is currently unemployed.
6. Her children's ages at the time of her death were as follows:

| | |
|---|---|
| Dorothy | 5 (4.51 years) |
| Daniel | 3 (3.4 years) |
| Richard | 4 months |

Factors Added—as part of direct testimony

1. Jane Doe's lost economic value can be measured by the following considerations:
   - I. the cost of full-time live-in substitute mother care for her family until her youngest child reaches age 18 in 1986.
   - II. the cost of full-time live-in substitute housekeeper care for her family until her youngest child reaches age 18 in 1986, based upon:
     - A. a current cost of $700 per month plus employer's Social Security tax, or
     - B. the California minimum wage level for women.
   - III. the cost of part-time substitute housekeeper care for her husband after her youngest child reaches age 18 in 1986 for his remaining life expectancy
   - IV. the lost earnings after her youngest child reaches age 18 in 1986 for her remaining life-work expectancy
2. The cost of full-time live-in substitute mother care can best be measured by the average median earnings of full-time schoolteachers in the Sacramento area at the time of her death, *i.e.*, $9,528 per year plus two days' time off per week and two weeks' holiday per year and employer's Social Security tax.

* These appraisals have been abridged. In the process repetitive material, listings of sources, and detailed computations have been eliminated.

3. Her lost earning capacity can be measured by the California minimum wage level for women at the time her youngest child reaches age 18 in 1986.
4. Her lost economic value should include the monetary value of median non-paid employment fringe benefits.
5. Her lost economic value should not include any promotion potential to higher paying or more responsible positions.
6. Her lost economic value should be reduced by her own terminated consumption expenditures but only after her youngest child reaches age 18 in 1986 under the view that until such time this reduction would generally be offset by the additional cost of providing food and living accommodations for the full-time live-in substitute mother and housekeeper.
7. The median family income in the Sacramento area will be $22,239 per year as of 1986.
8. Her lost economic value should be adjusted by the national pattern of average wage increases over the past several decades, *i.e.*, 4.5% per annum.
9. Her lost economic value should be adjusted by the national pattern of average price increases over the past several decades, *i.e.*, 2.5% per annum.
10. Her lost economic value should be reduced to its present value by an average "prudent man" investment interest rate such as for savings and loan association accounts or for federal government bonds over the past several decades, a rate of 3.5% per annum.

Time Relationships—as part of direct testimony

1. Jane Doe's life expectancy at the time of her death was 53.8 years to the age of 77 in 2022.
2. Her life-work expectancy from 1986, the year her youngest child reaches 18, was 18.2 years to the age of 59 in 2004.
3. Her husband's life expectancy at the time of her death was 46.3 years to the age of 70 in 2014.
4. Her husband's life-work expectancy at the time of her death was 37.9 years to the age of 62 in 2006.
5. Her children's life expectancies exceeded her life expectancy at the time of her death.
6. The present value reduction should be computed back to the date of trial.
7. The date of trial will be June 1972.

Some Considerations of Law

1. These assumptions indicate the economic value of Jane Doe had she not been killed. They do not include any consideration of "benefits" her family may receive due to her death in view of the "collateral source" rule.
2. These computations are gross value as no consideration is given to income taxation on lost earnings or offsetting interest income in determination of present value, investment commissions or fees, legal costs, etc.

Appraisal Results

Lost Economic Value (adjusted for wage and price changes and reduced to present value)

1. To date of trial
   - I. Cost of full-time live-in substitute mother care for her family: 61,320
   - II. Cost of full-time live-in substitute housekeeper care for her family
     - A. based upon current cost of $700 per month: 31,615
     - B. based upon the California minimum wage level for women: 20,405

*Total loss to date of trial*
   - A. based upon current cost of $700 per month: 92,935
   - B. based upon the California minimum wage level for women: 81,725

2. From date of trial
   - I. Cost of full-time live-in substitute mother care for her family until her youngest child reaches age 18 in 1986: 248,350
   - II. Cost of full-time live-in substitute housekeeper care for her family until her youngest child reaches age 18 in 1986
     - A. based upon current costs of $700 per month: 128,060
     - B. based upon the California minimum wage level for women: 76,404
   - III. Cost of part-time substitute housekeeper care for her husband after her youngest child reaches age 18 in 1986 for his remaining life expectancy: 128,590
   - IV. Lost earnings after her youngest child reaches age 18 in 1986 for her remaining life-work expectancy including the monetary value of non-paid employment fringe benefits: 93,480

*Total loss from date of trial*
   - A. based upon current cost of $700 per month: 598,480
   - B. based upon the California minimum wage level for women: 546,460

   Less terminated consumption expenditures of: 127,340

*Net loss from date of trial*
   - A. based upon current cost of $700 per month: 471,140
   - B. based upon the California minimum wage level for women: 419,120

3. To and from date of trial

*Net loss*

Reflecting the alternative valuations of the cost of a housekeeper:
   - A. based upon current cost of $700 per month: 564,075
   - B. based upon the California minimum wage level for women: 500,845

## ILLUSTRATIVE COMPUTATION OF LOST EARNINGS

FACTORS

| | |
|---|---|
| BASE AMOUNT | 8008.00 |
| TIME PERIOD | 18.00 YRS |
| GROWTH RATE | .0450 |
| DISCOUNT RATE | .0350 |

| Year* | This Year's Loss | Increase In Loss Over Last Year | Accumulated Loss |
|---|---|---|---|
| 1.00 | 8,008.00 | | 8,008.00 |
| 2.00 | 8,368.36 | 360.36 | 16,376.36 |
| 3.00 | 8,744.94 | 376.58 | 25,121.30 |
| 4.00 | 9,138.46 | 393.52 | 34,259.75 |
| 5.00 | 9,549.69 | 411.23 | 43,809.44 |
| 6.00 | 9,979.42 | 429.74 | 53,788.87 |
| 7.00 | 10,428.50 | 449.07 | 64,217.37 |
| 8.00 | 10,897.78 | 469.28 | 75,115.15 |
| 9.00 | 11,388.18 | 490.40 | 86,503.33 |
| 10.00 | 11,900.65 | 512.47 | 98,403.98 |
| 11.00 | 12,436.18 | 535.53 | 110,840.16 |
| 12.00 | 12,995.81 | 559.63 | 123,835.97 |
| 13.00 | 13,580.62 | 584.81 | 137,416.59 |
| 14.00 | 14,919.75 | 611.13 | 151,608.33 |
| 15.00 | 14,830.37 | 638.63 | 166,438.71 |
| 16.00 | 15,497.74 | 667.37 | 181,936.45 |
| 17.00 | 16,195.14 | 697.40 | 198,131.59 |
| 18.00 | 16,923.92 | 728.78 | 215,055.51 |

PRESENT VALUE OF THE ACCUMULATED LOSS IS 151,318.48

* Year one is 1986—the year when Jane Doe's youngest child will reach 18 and Mrs. Doe could have been expected to seek employment. The present value of $151,318.48 is computed as of 1986. This figure, if reduced to its present value as of the date of trial, will yield $93,480 as indicated in the appraisal results.

ILLUSTRATIVE DISBURSEMENT OF A FUND REPLACING LOST EARNINGS

| Year | Beginning Balance | Payment | Total | Interest Earned | Ending Balance |
|---|---|---|---|---|---|
| 1 | 151,318.48 | | 151,318.48 | 5,296.15 | 156,614.63 |
| 2 | 156,614.63 | 8,008.00 | 148,606.63 | 5,201.23 | 153,807.86 |
| 3 | 153,807.86 | 8,368.36 | 145,439.50 | 5,090.38 | 150,529.89 |
| 4 | 150,529.89 | 8,744.94 | 141,784.95 | 4,962.47 | 146,747.42 |
| 5 | 146,747.42 | 9,138.46 | 137,608.96 | 4,816.31 | 142,425.28 |
| 6 | 142,425.28 | 9,549.69 | 132,875.59 | 4,650.65 | 137,526.23 |
| 7 | 137,526.23 | 9,979.42 | 127,546.81 | 4,464.14 | 132,010.95 |
| 8 | 132,010.95 | 10,428.50 | 121,582.45 | 4,255.39 | 125,837.83 |
| 9 | 125,837.83 | 10,897.78 | 114,940.05 | 4,022.90 | 118,962.96 |
| 10 | 118,962.96 | 11,388.18 | 107,574.77 | 3,765.12 | 111,339.89 |
| 11 | 111,339.89 | 11,900.65 | 99,439.24 | 3,480.37 | 102,919.61 |
| 12 | 102,919.61 | 12,436.18 | 90,483.43 | 3,166.92 | 93,650.36 |
| 13 | 93,650.36 | 12,995.81 | 80,654.55 | 2,822.91 | 83,477.46 |
| 14 | 83,477.46 | 13,580.62 | 69,896.84 | 2,446.39 | 72,343.23 |
| 15 | 72,343.23 | 14,191.75 | 58,151.48 | 2,035.30 | 60,186.78 |
| 16 | 60,186.78 | 14,830.37 | 45,356.41 | 1,587.47 | 46,943.88 |
| 17 | 46,943.88 | 15,497.74 | 31,446.14 | 1,100.61 | 32,546.76 |
| 18 | 32,546.76 | 16,195.14 | 16,351.62 | 572.31 | 16,923.92 |
| 19 | 16,923.92 | 16,923.92 | 0 | 0 | 0 |

## B. Injury of Youth

### Appraisal Assumptions

Factors Given—as part of hypothetical question

1. John Doe was injured on 19 July 1970 at age 24 (23.9 years).
2. He was a fourth-year college student at the time of his injury studying for a teaching credential in mathematics.
3. His injury will preclude him from obtaining any or at best only minimal future gainful employment.
4. His injury has and will in the future necessitate some continuing medical care.

Factors Added—as part of direct testimony

1. John Doe's compromised economic value can be measured by the following considerations:
   I. lost earnings
      A. total lost earnings based upon the income levels of representative statistical cohorts as measured by median annual earnings as of date

of trial including the monetary value of median non-paid employment fringe benefits
1. college graduate as of date of trial: 14,761
2. elementary or high school teacher as of date of trial: 10,208

B. differential lost earnings based upon the income levels of representative statistical cohorts assuming some gainful employment at the minimum wage level

II. cost of medical care
A. cost of nursing care computed on the basis of a unit loss of 8 hours per day 7 days per week 52 weeks per year
B. cost of physician care and medical equipment computed on the basis of a unit of loss of $1,000 per year

NOTE: Both A and B may be adjusted by an appropriate multiple of their respective units of loss.

2. The cost of the nursing care unit of loss can be reflected by the current median annual earnings of full-time practical nurses in the Los Angeles area of $4,936 plus employer's Social Security tax and two weeks' vacation each year.
3. His compromised economic value should be adjusted by the national pattern of average wage increases over the past several decades, *i.e.*, 4.5% per annum.
4. His compromised economic value should be adjusted by the national pattern of average price increases over the past several decades, *i.e.*, 2.5% per annum.
5. His compromised economic value should be reduced to its present value by an average "prudent man" investment interest rate such as in savings and loan association accounts or in federal government bonds over the past several decades, a rate of 3.5% per annum. (Although alternative investments such as mutual funds would generally pay more, they are not considered appropriate from the standpoint of security and the operational difficulty incurred by having to continually sell off part to provide the necessary monthly income. However, for comparative purposes, the differential factor for calculating the present value at an assumed return of 5% would be minus 18%.)

Time Relationships—as part of direct testimony

1. John Doe's life expectancy at the time of trial is 44.5 years to the age of 70 in 2016.
2. His life-work expectancy at the time of trial is 36.0 years to the age of 62 in 2008.
3. The present value reduction should be calculated back to the date of trial.
4. The date of trial will be June 1972

Compromised Economic Value (adjusted for wage and price changes and reduced to present value)

1. To date of trial—not included in appraisal

2. From date of trial
   I. Lost earnings
      A. total lost earnings based upon the income levels of representative statistical cohorts
         (1) college graduate as of date of trial: 610,545
         (2) elementary or high school teacher as of date of trial: 422,225
      B. differential lost earnings based upon the income levels of representative statistical cohorts assuming some gainful employment at the minimum wage level
         (1) college graduate as of date of trial: 432,815
         (2) elementary or high school teacher as of date of trial: 244,490

   II. cost of medical care
      A. cost of nursing care on the basis of a unit of loss of 8 hours per day per week 52 weeks per year: 400,415
      B. cost of physician care and medical equipment on the basis of a unit loss of $1,000 per year: 34,765