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Economic Valuation for Wrongful Death

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ECONOMIC VALUATION FOR WRONGFUL DEATH

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I. INTRODUCTION***

If a man who is the family wage earner dies in an accident caused by another, how much is his life worth to his surviving family? If a wife and mother who does not work outside the home dies

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in an accident, how much is her life worth to her surviving family?

At common law, there was no right to recover damages for the wrongful death of another.[1] North Carolina General Statutes § 28A-18-2, however, provides a cause of action for wrongful death in North Carolina, and provides the basis upon which damages may be awarded.[2] The primary concerns of a plaintiff proceeding under

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1. Christenbury v. Hedrick, 32 N.C. App. 708, 234 S.E.2d 3 (1977).

2. N.C. GEN. STAT. § 28A-18-2 (1976 & Cum. Supp. 1983) read as follows:

(a) When the death of a person is caused by a wrongful act, neglect or default of another, such as would, if the injured person have lived, have entitled him to an action for damages therefore, the person or corporation that would have been so liable, and his or their personal representatives or collectors, shall be liable to an action for damages, to be brought by the personal representative or collector of the decedent; and this notwithstanding the death, and although the wrongful act, neglect or default, causing the death, amounts in law to a felony. The amount recovered in such action is not liable to be applied as assets, in the payment of debts or legacies, except as to burial expenses of the deceased, and reasonable hospital and medical expenses not exceeding one thousand five hundred dollars ($1,500) incident to the injury resulting in death; provided that all claims filed for such services shall be approved by the clerk of the superior court and any party adversely affected by any decision of said clerk as to said claim may appeal to the superior court in term time, but shall be disposed of as provided in the Intestate Succession Act.

(b). Damages recoverable for death by wrongful act include:

(1) Expenses for care, treatment and hospitalization incident to the injury resulting in death;

(2) Compensation for pain and suffering of the decedent;

(3) The reasonable funeral expenses of the decedent;

(4) The present monetary value of the decedent to the persons entitled to receive the damages recovered, including but not limited to compensation for the loss of the reasonably expected

a. Net income of the decedent,

b. Services, protection, care and assistance of the decedent, whether voluntary or obligatory, to the persons entitled to the damages recovered,

c. Society, companionship, comfort, guidance, kindly offices and advice of the decedent to the persons entitled to the damages recovered;

(5) Such punitive damages as the decedent could have recovered had he survived, and punitive damages for wrongfully causing the death of the decedent through maliciousness, wilful or wanton injury, or gross negligence;

(6) Nominal damages when the jury so finds.

(c) All evidence which reasonably tends to establish any of the elements of damages included in subsection (b), or otherwise reasonably tends to establish the present monetary value of the decedent to the persons enti-

the statute often center around proving those factors listed in the statute as possible components of the damage award. The difficulty inherent in a wrongful death action lies in reaching a fair and reasonable estimate of the lost income the decedent could have earned but for an untimely death, and the loss of such intangibles as decedent's society and companionship.

This article examines one method of offering evidence on those factors listed in section (b) of the statute, particularly loss of income and the value of services rendered by the decedent, through the use of an expert economist. Sections III and IV of the article present the approach of two expert economists to this task through the use of two hypothetical case studies.

II. OVERVIEW OF WRONGFUL DEATH STATUTE

North Carolina's wrongful death statute is designed to provide compensation to plaintiffs for the loss of a decedent due to the wrongful act or negligence of another. Recovery is allowed under the statute only where the defendant's wrongful act, neglect or default would have entitled the deceased to an action for damages if he had lived.[3]

The wrongful death statute allows recovery for six types of damages: medical expenses resulting from the injury,[4] compensation for decedent's pain and suffering,[5] funeral expenses,[6] punitive damages,[7] nominal damages,[8] and the present monetary value of the decedent to his beneficiaries for the loss of the reasonably expected net income, services, protection, care and assistance, society, companionship, comfort, guidance, kindly offices and advise of the decedent.[9] To recover these damages, plaintiff must satisfy the jury by the greater weight of the evidence as to the amount he is entitled to recover for the death of the decedent.[10] The statute

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tled to receive the damages recovered, is admissible in an action for damages for death by wrongful act.(d) In all actions brought under this section the dying declarations of the deceased shall be admissible as provided for in G.S. 8-51.1.

3. N.C. GEN. STAT. § 28A-18-2(a) (Cum. Supp. 1983).
4. *Id.* at § 28A-18-2(b)(1) (1976).
5. *Id.* at § 28A-18-2(b)(2).
6. *Id.* at § 28A-18-2(b)(3).
7. *Id.* at § 28A-18-2(b)(5).
8. *Id.* at § 28A-18-2(b)(6).
9. *Id.* at § 28A-18-2(b)(4).
10. Brown v. Moore, 286 N.C. 664, 673, 213 S.E.2d 342, 348 (1975).

does not place a limit upon the amount of damages which may be awarded.[11] That determination is left to the discretion of the jury, subject to the judge's power to set aside a verdict when, in his opinion, equity and justice so require.[12]

Conversely, a jury may refuse to award damages when the evidence either does not establish to its satisfaction facts which will allow a reasonable determination of plaintiff's losses[13] or will not reasonably support an assessment of damages.[14]

Thus, the presentation of evidence going to the issue of damages is a crucial stage in a wrongful death proceeding. While few of the factors listed in the statute as possible components of the damage award are capable of accurate determination, those presenting the most challenging problems of proof are found in section (b)(4). That section allows recovery for loss of the present monetary value of the decedent to his beneficiaries, including compensation for the loss of (1) net income, (2) protection, care, assistance and service, and (3) companionship, comfort, guidance and society.[15] It is important to remember that a jury is ordinarily not required as a matter of law to award damages for any or all of the factors listed in this section of the statute.[16] Given the fact that any damages recoverable under this section will vary from case to case according to the age of the deceased, the age of the beneficiary, and the relationship with the deceased, and that any award must be reduced to present day value,[17] it would be difficult, if not impossible, to formulate a general rule of application for the measurement of these damages.[18]

However, the purpose of the North Carolina wrongful death statute is to put the survivors in the same position, as nearly as possible, as they would have been had the death not occurred.[19] Obviously aware of the conflict in the statute's purpose and the difficulty of proof inherent in measuring the intangibles for which damages may be recovered under the statute, the drafters provided

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11. Brendle v. General Tire and Rubber Co., 408 F.2d 116 (4th Cir. 1969).
12. 286 N.C. at 673, 213 S.E.2d at 349.
13. *Id.* at 674, 213 S.E.2d at 349.
14. *Id.* at 673, 213 S.E.2d at 348.
15. N.C. GEN. STAT. § 28A-18-2(b)(4) (1976).
16. 286 N.C. at 674, 213 S.E.2d at 349.
17. N.C. GEN. STAT. § 28A-18-2(b)(4) (1976).
18. Bowen v. Constructors Equip. Rental Co., 283 N.C. 395, 418, 196 S.E.2d 789, 804 (1973).
19. *Id.* at 395, 196 S.E.2d at 789.

that a broad range of evidence is admissible on the issue of damages.[20] Section (c) of the statute says all evidence which reasonably tends to establish any of the elements of damages included in section (b) of the statute, or otherwise reasonably tends to establish the present monetary value of the decedent to persons entitled to receive the damages recovered, is admissible in an action for damages arising out of wrongful death.[21]

One important type of evidence which has been allowed in North Carolina on this issue is the testimony of expert economists. This testimony is particularly helpful in proving the value of lost household services, and lost future income. The North Carolina Court of Appeals allowed an expert economist to testify to the monetary value of household services in *Thorpe v. Wilson*,[22] noting that the computations necessary to determine the amount of damages recoverable from the loss of reasonably expected net income, services and society of a decedent, and the present value of those damages, are beyond the ability of the average person.[23] There the court noted that expert testimony is often the only form of evidence available to prove future earnings.[24] Similarly, in *Rutherford v. Bass Air Conditioning Co.*,[25] the Court of Appeals allowed an expert economist to give his opinion of the present monetary value of the "reasonably expected net income for the statistical group of persons to which the deceased belonged."[26]

The most common attack upon the testimony of an expert economist in a wrongful death action is that his testimony is speculative. However, the North Carolina Supreme Court in *Brown v. Moore*,[27] said that damages in any wrongful death action are bound to be uncertain and speculative. Thus a jury may indulge in speculation where it is necessary and where sufficient facts exist to support such speculation.[28]

The following section demonstrates the approach of two economists to the difficult task of measuring the loss to a plaintiff re-

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20. N.C. GEN. STAT. § 28A-18-2(c) (1976).

21. *Id.*

22. Thorpe v. Wilson, 58 N.C. App. 292, 299, 293 S.E.2d 675, 680 (1982).

23. *Id.* at 297, 293 S.E.2d at 679.

24. *Id.* at 298, 293 S.E.2d at 679.

25. 38 N.C. App. 630, 639, 248 S.E.2d 887, 893 (1978), *disc. rev. denied*, 296 N.C. 586, 254 S.E.2d 34 (1979).

26. *Id.*

27. 286 N.C. at 673, 213 S.E.2d at 348.

28. *Id.* at 673, 213 S.E.2d at 349.

sulting from the premature death of a family member. This demonstration includes two case studies concerned primarily with the determination of lost income of the family breadwinner, and the valuation of services rendered by a non-employed homemaker in a traditional family.

III. Purpose and Overview of Expert Economist's Testimony

The purpose of the economist's testimony in a wrongful death action is to attempt to measure the loss to survivors occasioned by the premature death of the person in question. By nature, this must be, to some degree, speculative as it involves the measurement of future values that would have been realized had the premature death not occurred.[29] The economist must provide a realistic and objective appraisal of these values based upon objective and statistical probabilities.

For the purpose of this discussion, the procedure for measuring this loss has been segmented into five separate calculations: Calculation 1 - Appraisal of Future Lost Income; Calculation 2 - Appraisal of Future Fringe Benefits; Calculation 3 - Value of Household Production Services; and Calculation 4 - Truncating Recovery For Life Expectancy. Then Calculations 1, 2, and 3 are adjusted to present value in Calculation 5.

A. Appraisal of Future Lost Income (Calculation 1)

The appraisal of future lost income is based on the assumption that the deceased person would have lived to earn income for his worklife expectancy. The worklife expectancy is the length of time the average worker at a given age will work. The Bureau of Labor Statistics of the United States Department of Labor publishes tables which estimates how long people will work at a given age.[30] The estimates are different for men and women, and for persons who were actively engaged in the labor force and those not actively in the labor force at the time of death. The economist must categorize the deceased accordingly and calculate his estimate of lost earnings only for the period it could be expected the deceased would have worked.

Worklife expectancy calculations do not allow for interrup-

29. 286 N.C. at 673, 213 S.E.2d at 349.

30. U.S. Dep't. of Labor, Bureau of Labor Statistics, Bull. No. 2157, New Worklife Estimates (November, 1982).

tions in the worklife caused by involuntary unemployment. Thus, an additional adjustment must be made to allow for this factor. The most appropriate discount for unemployment is the historical unemployment rate over some period for the location where decedent worked and, if available, the occupational category of the decedent.[31]

Forecasting future income over the period of the worklife expectancy is the next step. Forecasting this future income involves the determination of a growth rate in earnings. Historical data indicates that workers at all levels have experienced growth in earnings. In economic terms, growth in earnings is attributable to two sources—productivity gains and general wage level changes.

The relevant growth rate of concern is the "real" growth rate, which is that growth over and above general price level changes. Historically, real earnings have grown at approximately two percent over the period since World War II. During the period of the 1970's, the real growth rate has been much lower, approximately 1.4 percent.

The use of a real growth rate at this juncture of the appraisal will require the use of a real interest rate in calculating the present value later in the appraisal. Some economists feels that a proper "apples to apples" analysis requires them to compare all variables in "real" rather than "nominal" terms. Real terms are arrived at by adjusting nominal incomes and interest rates for price level changes.

Other economists, including the authors, feel that a presentation in nominal terms is equally accurate and much more understandable to a jury of laypersons. A nominal analysis also avoids the problem of selecting an appropriate price level indicator. Nominal prices, interest rates, and earnings include all of the elements which the underlying economic conditions bring to bear in the marketplace at one point. Adjustment to real terms permits more facile intertemporal comparisons but is not necessary; it makes an analysis more complicated and increases the level of difficulty when making an explanation to a group of laypersons. The analyses presented in this article will be made in nominal terms.

The principal problem in forecasting incomes into the future is a determination of the growth rate to be used. A number of ap-

31. The analyses in this paper are based upon statewide compilations by the Employment Security Commission of North Carolina, an official letter dated 4 February 1983.

proaches may be selected. Unfortunately, each has problems associated with it and none is perfect. It must be remembered that the economist is attempting to project the role that one individual would have played in an economy; that is, an earnings capacity over a future period. In doing this, he must classify that individual as a part of a group, by age, sex, race, education, occupation, and other factors such as geographical location. The economist then calculates the expectations based upon characteristics and applies them to individuals.

There are four approaches which might be used to determine an applicable earnings growth rate, depending upon the circumstances: the minimum wage approach, the occupation specific approach, the cohort characteristic approach, and the individual earnings history approach.

The minimum wage approach is by far the most conservative. It assumes that the individual would experience a growth in income equal to the changes in the minimum wage over time, which can be forecast by the historical growth rate. This approach is often used in the case of a minor or persons who have never worked. For those who were employed at the time of death, the appropriate starting point is the actual hourly wage rather than the minimum wage.

The occupation specific approach to growth rates relies upon the actual wage rates in the occupation of the decedent or for which the individual was trained or educated if unemployed. Historical evidence of growth rates in that occupation are then applied to the future worklife expectancy of the individual. Unfortunately, this approach is often untenable because the best government statistics are maintained on occupations by broad category.[32]

The cohort characteristic approach relies upon cohort data to determine growth rates. Using this method, the expert matches the characteristics of the individual to a class of workers by sex, race, and education. Recognition of age is provided by the statistical methodology which reports earnings by age groups. A growth rate is determined by reference to historical rates for each cohort. A primary advantage of the cohort methodology is that it gives recog-

32. The United States government statistics tend toward broad categories, such as "professional and technical workers"; "sales workers"; "craft and kindred workers"; and "farmworkers". Other United States government statistics report by industry, such as "petroleum and coal product workers". Still others report by family situation, such as "families maintained by females" or "married couple families".

nition to the lifespan pattern of earnings. Normally the young worker who may begin at the minimum wage will not continue at the minimum wage throughout his worklife.[33] Cohort data allows for age-related earnings patterns while the minimum wage approach does not.

The individual earnings history approach applies the growth rate of the individual's earnings history. Here the actual earnings of the individual are traced and a growth rate is calculated. This rate is then applied to the decedent's worklife expectancy. This method is particularly useful for managerial workers, commission salespersons, and professionals who have been employed for a period of time.

The choice of the earnings growth rate is an important part of the economist's work and one of several places where professional judgment is critical. Statistical or actuarial techniques deal only with classes of persons and impute classification variables to individual cases. Whenever the individual is distinguished from his or her broad classifications by education, experience, past earnings record or other factors, an adjustment is called for.

When earnings have been projected for worklife expectancy, the next step is to deduct that portion of those earnings that would have been paid in taxes, both federal and state.[34] Clearly, claimants in wrongful death actions are not entitled to that part of future earnings that would have been paid to the government in taxes. Information on taxation may be obtained from the Internal Revenue Service and the State Department of Revenue. Other United States government publications provide data on average effective tax rates at various income levels.[35]

The final step in forecasting income is allowing for personal consumption of the deceased. The heirs are entitled only to that income that would remain after allowance for what the decedent would have himself consumed.[36] The best source of data on consumption expenditures is the *Revised Equivalence Scale*, a United

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33. Economists refer to this as "life cycle" earnings; data indicate the tendency to enjoy growth in real wages through one's thirties and forties, only to see a fall off from the peak in the later years of one's worklife.

34. 286 N.C. at 673, 213 S.E.2d at 349; N.C. GEN. STAT. § 28A-18-2(b)(4) (1976); N.C.P.I. CIV. § 106.75 (1977).

35. U.S. DEP'T. OF REVENUE, I.R.S., STATISTICS OF INCOME, INDIVIDUAL INCOME TAX RETURNS (Annual).

36. *See supra* note 34.

States government publication.[37]

In summary, the first calculation calls for the projection of net future earnings for the decedent. Earnings should only be forecast for as long as statistical evidence indicates the decedent would have worked. A separate deduction should be made to allow for unemployment—that is, the possibility some portion of the worklife expectancy would not generate income because of loss of jobs. Next, there must be an allowance for taxes based upon United States government publications which provide data on average effective tax rates at various income levels as well as data on marginal tax rates. Finally, personal consumption must be deducted from the expected net earnings after taxes. The resulting value is "net future earnings".

B. Appraisal of Future Benefits (Calculation 2)

The second step is to estimate the value of employer-provided fringe benefits, if there are any. The most precise method is to ascertain the cost of fringe benefits provided by the employer in the most immediate period before the death. This amount can then be extended into the future, according to some expected rate of growth in these costs. It is generally best to use a different growth rate than the one used for earnings, so the projections can be precisely based on the cost factors for the fringe benefits themselves. However, in the absence of historical data on the individual's fringe benefit contributions value, nationwide data on growth in employee benefits may be used.[38]

One problem which arises with fringe benefits is that their inclusion for currently non-employed persons may be regarded as too speculative by some observers. Nevertheless, in modern society, employee benefits are a substantial part of total employee compensation and should be addressed with some rigor in any valuation.

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37. U.S. DEP'T. OF LABOR, BUREAU OF LABOR STATISTICS, BULL. NO. 1570-2, REVISED EQUIVALENCE SCALE FOR ESTIMATING EQUIVALENT INCOME OR BUDGET COSTS BY FAMILY TYPE.

38. Statistical data on the extent of fringe benefits, employee benefits, and the amount paid by employers can be found in various publications such as: U.S. SOCIAL SECURITY ADMINISTRATION, SOCIAL SECURITY BULLETIN (Monthly); U.S. BUREAU OF LABOR STATISTICS, HANDBOOK OF LABOR STATISTICS (Annually); ANNUAL WAGE SURVEYS: METROPOLITAN AREAS, UNITED STATES AND REGIONAL SUMMARIES (Various years).

C. *Value of Household Production Services (Calculation 3)*

In addition to recovery for future earnings and fringe benefits of the decedent, loss of services is recoverable. The North Carolina wrongful death statute allows for recovery of loss of "services, protection, care and assistance of the decedent, whether voluntary or obligatory, to the persons entitled to the damages recovered . . ."[39] The economic value of such lost services may be obtained by one of four methods: minimum wage substitution approach, service worker substitution approach, the multiple workers substitution approach, and the alternate time/opportunity cost approach.[40] The first two approaches assume that the services of an individual may be replaced by purchasing them from a single individual hired from the market.

The minimum wage substitution approach replaces the services of a household member with those of a person outside the household requiring, at the very least, the payment of the prevailing legal minimum wage. The minimum wage substitution approach underestimates the value of such services because it would be impossible to obtain some of these services, such as management services, at the minimum wage.

The service worker substitution approach values the nonmarket productive time of an individual at the value of a labor market worker whose occupational title most closely approximates the responsibilities of the individual whose services were lost. In reality, there is no one best occupational title which reflects the many and varied responsibilities of, for example, a homemaker who at various times may perform the services provided by a cook, laundress, chauffeur, financial manager, nurse, dishwasher, and seamstress, among others. The problem is to find wage data for an occupational title which more realistically reflects the prevailing wage necessary to hire household service workers, although all wage data bases available do not include a job title of this nature.

The multiple workers substitution approach applies different

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39. N.C. GEN. STAT. § 28A-18-2(b)(4) (1976).

40. For the original research and comprehensive discussion see: Hawrylyshyn, *The Value of Household Services: A Survey of Empirical Estimates*, 22 REVIEW OF INCOME AND WEALTH 101-131 (1976); Hawrylyshyn, *Toward a Definition of Non-Market Activities*, 23 REVIEW OF INCOME AND WEALTH 79-96 (1977); Gauger, *Household Work: Can We Add It to the GNP?* 65 JOURNAL OF HOME ECONOMICS 12-15 (October, 1973); Walker and Gauger, *The Dollar Value of Household Work*, BULL. No. 60 (N.Y. State College of Human Ecology, Cornell University, 1973).

market wage rates to different types of household production. This method argues that replacement of the decedent's services would occur by hiring a number of different market workers to replace the services lost. For example, in order to obtain the value of time inputs into food preparation, the time would be valued at the average market wage rate of food and kindred products workers, the occupational title which most closely reflects the task being valued. For some components of nonmarket production, however, there is no job title for which average wage rates are available, which closely approximates the household tasks to be replaced, such as shopping, management, and nonphysical care of family members. For those activities, the legal minimum wage should be used to derive the value of the loss of services. The values of lost services in each category of household production are then added to obtain the total value of an individual's nonmarket productive time. This method, while more complicated, more accurately estimates the true replacement cost of nonmarket productive time of individuals.

The alternate time/opportunity cost approach assumes that whenever individuals choose to engage in any activity, they implicitly forego the opportunity to engage in the next most productive use of that time. Among the foregone opportunities for individuals engaging in nonmarket production is paid market work.[41] If the individual is employed for pay in the labor market, the wage that he/she could receive, based on productivity characteristics such as age, education and experience, if employed, is the opportunity cost of his/her time. In practice, this may be estimated by applying a wage function modeling the relationship between workers' characteristics and their wage rates to the individual's situation in order to derive an alternative wage or opportunity cost of a nonemployed individual's time.

To operationalize any of these methods for a specific case, data are needed regarding the amounts of time spent in all household production activities, comprehensively defined to include all purposeful activities which provide satisfaction or utility for the family. One typical categorization used in several major studies includes ten categories of household production: food preparation; dishwashing; house care; outside home, yard, car, and pet care; clothing care; clothing construction; physical care of family members; non-physical care of family members; shopping; and manage-

41. Hawrylyshyn, *Toward a Definition of Non-Market Activities*, 23 REVIEW OF INCOME AND WEALTH 79-96 (1977).

ment.[42] Although the inclination of legal practitioners is to gather personal accounts of the amounts of time a decedent spent in these activities from the spouse or other relatives, this often results in extremely imprecise estimates. Research in the methodology of collecting time-use data suggest that an individual's recall of time expenditures over a period even as short as a week in the past produces discrepancies in reports when compared to daily diary or daily recall methods. Non-eyewitness accounts from other individuals are less reliable.[43] Such methods also do not take into account differences in household production time allocation over periods when changes in the individual's age and family composition have been shown to significantly alter time inputs into household production.[44] More appropriate is the use of survey data on a large sample of family members' time allocation where individuals of different ages, different employment status, and different family compositions are represented. While many data bases are available for use, the data from a sample whose characteristics most closely approximate the decedent's should be chosen.

Wage data for workers in relevant occupational categories is also necessary in order to value the loss of such services if the minimum wage approach is not deemed appropriate. In North Carolina such data are available in the *State Labor Summary*, published monthly by the North Carolina Employment Security Commission.[45] Other sources of wage data are also available, but they are not limited to North Carolina workers and, therefore, are less appropriate.[46] Just as was the case for wage rates for earnings calculations, these wage rates used for valuing services are projected into the future by applying an appropriate growth rate.

D. Truncating Recovery for Life Expectancy (Calculation 4)

Only certain persons are entitled to recover under the wrong-

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42. K. WALKER & M. WOODS, TIME USE: A MEASURE OF HOUSEHOLD PRODUCTION OF FAMILY GOODS AND SERVICES (Washington, D.C.: American Home Economics Association, 1976).

43. *Id.*

44. *Id.*; Hall, *The Case of the Late Mrs. Smith: Preparing Testimony for the Court*, JOURNAL OF HOME ECONOMICS 33-35 (January, 1975); Walker, *Homemaking Still Takes Time*, JOURNAL OF HOME ECONOMICS 621-24 (October, 1969).

45. N.C. EMPLOYMENT SECURITY COMMISSION, N.C. INSURED EMPLOYMENT AND WAGE PAYMENTS (1981).

46. *Supra* note 32. The reader might consult U.S. DEP'T. OF LABOR, U.S. BUREAU OF STATISTICS, EMPLOYMENT AND EARNINGS (January, 1983).

ful death statute.[47] It follows that their recovery can only be allowed for as long as the beneficiary or claimant can be expected to live. If the life expectancy of the claimant is shorter than the worklife expectancy of the decedent, recovery to the claimant will be cut off at the claimant's life expectancy.[48] The statutory North Carolina mortuary tables are used for the purpose of estimating life expectancies.[49] The statutory North Carolina mortuary tables are also used for calculation of the value of services. The reader will recall worklife expectancy (always shorter than life expectancy) is used for projecting work earnings,[50] but the entire life expectancy of the decedent is used for projecting lost household services.

E. Adjusting for Present Value (Calculation 5)

In Calculations 1, 2, and 3, the dollar values of future earnings, future fringe benefits, and future household and other services are forecast generally on the basis of historical growth rates if they accurately reflect future expectations. The next step is adjusting for present value.

A dollar today is worth more than a dollar tomorrow. The wrongful death award will be made today to compensate for lost values expected and estimated in the future. It would grossly overstate the loss if these future dollar amounts were not "discounted" back to their present value. Each of the three streams of future values must be discounted back to present value.

The selection of a discount rate is a critical part of the economist's calculations and requires a great deal of professional judgment. As discussed under calculation 1, a nominal discount rate is employed by the writers. The economist should select a discount rate that reflects the realistic and objective expectation of what interest rates will be over the period for which the funds awarded will be expected to provide income. To understand this, one must reflect upon the entire wrongful death award process. The wrongful death award is a lump sum that is supposed to be available to provide income to the beneficiaries or claimants that will replace the losses suffered because of the decedent's wrongful and prema-

47. 283 N.C. at 418-19, 196 S.E.2d at 805.
48. *Id.* at 419, 196 S.E.2d at 805.
49. N.C. GEN. STAT. § 8-46 (1981).
50. *Supra* note 30.

ture death[51]. One cannot assume that the beneficiaries and claimants enjoy special investment and money management skills; neither can one assume they would be willing to assume any considerable investment or market risk. Thus, one should use a risk-free yield that can reasonably be expected to prevail in future years.

It would be wrong to use some average corporate bond interest rate. Corporations pay relatively high rates of interest on long-term borrowings but corporate bondholders are not free from the possibility of default and delay or total loss of principal and interest. It is also wrong to use short term or "money market" rates. These rates fluctuate widely and, by definition (of short term), cannot be locked in for the long period of time that income needs to be provided. For these reasons, the economist should use the historical long-term average yield of United States government bonds. United States government bonds can be bought in reasonably moderate amounts, require no investment management when held to maturity and can be found in various maturities. It is best to use an exponentially-smoothed, long-term average rate that gives emphasis to the recent year's experience but also includes the experience of the last few decades. The correct discount rate today based on long-term government bonds is 7.6 percent.[52]

Some economists have used the average yield on AAA tax-exempt bonds. The tax-exempt rate will usually be lower than the United States government rate. A *lower rate* will yield a *higher award*. Some economists have argued this award is appropriate and justified because the beneficiaries or claimants will have to pay taxes on the interest from the award. However, the North Carolina Court of Appeals held in *Scallon v. Hooper*[53] that this approach is unduly speculative because it involves projecting tax rates for the entire group of beneficiaries.

IV. CASE STUDIES

Two case studies are presented in this section. Both are fictitious but are nevertheless broadly based upon actual cases the writers of this article have worked upon.

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51. Chandler v. Chemical Co., 270 N.C. 395, 154 S.E.2d 502 (1967).

52. FED. RES. BULL. (June, 1982).

53. Scallon v. Hooper, 58 N.C. App 551, 555, 293 S.E.2d 843, 845 (1982), *disc. review. denied*, 306 N.C. 744, 295 S.E.2d 480 (1982).

A. Case 1: Wrongful Death of a Principal Income Earner in a Traditional Family

This section of the article provides an example of an economist valuation of the damages incurred by the wrongful death of a man killed in an automobile accident on May 1, 1983. For purposes of exposition, we will refer to him as William K. Best. Best was 40 years old on January 15, 1983. He was employed in a bank as a Loan Officer. He had been with the bank for fifteen years and had moved up quite well. He considered himself a success and his employers were happy with his performance. At the time of Best's death, he was earning $32,000 a year from the bank, plus excellent fringe benefits.

To extend our earnings forecast into the future, it is necessary to try to get an understanding of how Best's earnings have changed in the past. For this reason, the economist must seek the employer's records of what Best earned in each of the fifteen years he was employed at the bank. The fifteen years of earnings were used to calculate a compound annual average rate of growth of 8.2 percent. This compound average annual rate of growth is a fair indicator of the rate at which his salary has been increasing over the last fifteen years. It is selected as the rate at which his salary would have continued to advance over the rest of his worklife had he not been killed in the automobile accident.

In addition to his salary, Best enjoyed very generous fringe benefits from his employer. His employer indicated that the cost to the employer of the fringe benefits in the most recent years was $5,760. The economists examined the actual expenditures over the last fifteen years, that is, the entire period of Best's employment, and again calculated a growth rate. They found the growth rate in fringe benefit costs to be 14 percent, considerably more than the earnings growth rate in salary of 8.2 percent. The method is the individual growth rate technique.

Mr. Best was survived by a widow who was 37 years old, a daughter 16 years old, and a son 12 years old. He was handy and worked around the house, so included in the total valuation of loss will be valuation of the services provided to the household.

1. Earnings

Table 1[54] is a calculation of the present value of future earn-

54. *See* Table 1 in Appendix.

ings. Begin with the indicated 1983 salary of $32,000. Assume that it would have grown at 8.2 percent over the next 21 years. Twenty-one years is the "worklife expectancy" of William Best. It is the only appropriate figure to use in this sort of calculation. The future income amounts are discounted at 7.6 percent, the compound average rate of return on United States government securities in recent years.[55] Notice that the growth rate has the effect of increasing the $32,000 year by year; but when the discount rates are applied for present value, the future estimates are considerably reduced as they are discounted back to their present value. The total of this evaluation is $710,815, the present value of gross earnings loss. Next, the economist must make a deduction for the possibility that Best would have been unemployed. We estimate the appropriate unemployment discount factor at 5.2 percent, which is the average rate of unemployment in the North Carolina economy over the last 12 years.[56]

The next step is to deduct for taxes. Clearly, Best would have to pay federal and North Carolina taxes. The appropriate tax rate would be 22 percent.[57] This amount is deducted from the present value of expected future earnings.

Finally, it is necessary to make some deduction from the present value of expected future earnings for that portion of the expected future earnings that Best would himself have consumed. Naturally, his beneficiaries cannot expect to enjoy everything he earned. According to United States government statistics and budget studies, a reasonable estimate of the cost of personal consumption for Best, given his family composition, is 24 percent.[58] Deducting for consumption of $125,613 leaves us with a net present value of future earnings after deductions for possible unemployment, taxes, and personal consumption of $397,774.

2. *Fringe Benefits*

There remains to estimate the value of the fringe benefits that the employer would have provided had William Best not been killed in the automobile accident. In Table 2[59] the present value of fringe benefits is calculated. The reader should note that fringe

55. FED. RES. BULL. (Monthly).
56. *Supra* note 31.
57. *Supra* note 35.
58. *Supra* note 37.
59. *See* Table 2 in Appendix.

benefits are not taxed, so it is not necessary to make any deduction for taxes. The reader will recall that consumption is allowed for at the rate of 24 percent. Notice the present value of fringe benefits, increasing each year at a rate of 14 percent, but discounted back year by year at 7.6 percent, amounts to a total gross of $228,760. After an allowance for possible unemployment at 5.2 percent and for that portion of the fringe benefits that Best himself would have consumed (24 percent) the residue or the net present value of future fringe benefits lost because of wrongful death is $164,818.

3. *Services*

Now that we have calculated the net present value of future earnings and the net present value of future fringe benefits that were lost to the family of Best because of his death, there remains the task of estimating the net present value of future services. Estimating the value of future services provided to the household can be a difficult, controversial undertaking. In these calculations is used the conservative minimum wage substitution approach for valuing the hours it is estimated Best would have worked in the home. In the event of a case of a homemaker, such as Case II below, where the services are more complicated and far more extensive, a more sophisticated method of analysis will be employed.

For the analysis that follows regarding services, time-use studies are utilized based on the research of a Cornell University team that indicate the average number of hours a man with similar characteristics to Best would spend working around the house.[60] These hours are multiplied by the minimum wage which is adjusted upward over the years based upon the historical rate of growth in the minimum wage since 1960.[61] For these calculations, it is necessary to go further into the future than with lost earnings. In the first two tables, we needed to go only as far as Best's worklife expectancy;[62] but for valuations of services we must go for Best's entire life expectancy. According to North Carolina Mortuary Tables, this is 33 years.[63] Total value of services lost because of premature death is $55,293.[64]

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60. WALKER & WOOD, *supra* note 42.

61. U.S. DEP'T. OF LABOR, MINIMUM WAGE AND MAXIMUM HOURS STANDARDS UNDER THE FAIR LABOR STANDARDS ACT (Annual).

62. *See* Calculation 1 at p. 52 *infra*.

63. N.C. GEN. STAT. § 8-46 (1981).

64. *See* Table 3 in Appendix.

The final step is to put together the three components of the total loss occasioned by the premature and wrongful death of Best. First, there is the net present value of future earnings; second, the net present value of future fringe benefits; and third, the net present value of future household services. These three are summarized below.

SUMMARY CASE 1

WILLIAM K. BEST

William K. Best
Date of Birth: January 15, 1943
Date of Death: May 1, 1983
Age at Death: 40.29 years.

Life Expectancy at completed age 40:	33.29
Less: Period to May 1, 1983	.29
Remaining Life Expectancy	33.00

Survivors: Spouse, Sally
Born: August 1, 1946—Life Expectancy 35.95 years*
Son, James
Born: April 15, 1971
Daughter: Ann
Born: March 12, 1967

*Since Sally Best has a life expectancy greater than William K. Best, no cut off of analysis is required.

Valuation

Net Present Value of Lost Earnings (Table 1)	$397,774
Net Present Value of Lost Fringe Benefit Contribution (Table 2)	164,818
Net Value of Lost Services (Table 3)	55,293
Total Loss	$617,885

B. Case 2: Wrongful Death of Non-Employed Homemaker in a Traditional Family

Mrs. Julia MacLean
White, Age 37
Housewife - Not employed outside the home.
Survivors: Husband, age 42; children, ages 16, 14, 12.
Education: Bachelor of Science, University of North Carolina, 1967.

In this case, since Mrs. MacLean was not employed outside the home, no lost wages or fringe beneifts are to be evaluated.

The value of lost services is calculated using each of the four methods. Table 4[65] includes the calculations using the minimum wage substitution approach. The minimum wage of $3.35 for 1983 is estimated to grow at the historical growth rate of the minimum wage of 5.64 percent. The hours spent by Mrs. MacLean in providing all services to her family are shown as 2701 hours per year during the time each of her children would have been under age 18 and still living at home. These annual hours of household production services would be expected to change over her life expectancy, given the family's characteristics.[66]

The column of gross value of services is calculated by multiplying each wage by each annual hour of household production time. Then the present value of each year's lost service, using the 7.6 percent discount rate, is calculated. Using this method, the net present value of lost services of Mrs. MacLean is $170,433.

The second method of calculating the value of services, the service worker substitution approach, is illustrated for Mrs. MacLean in Table 5.[67] The average wage rate for North Carolina service workers, as reported in the *State Labor Summary* by the Employment Security Commission for June, 1982 was $4.65. This wage is estimated to increase at the historical growth rate for service worker's wages, which as reported by the Bureau of Labor Statistics[68] for the years 1970-82, has been 7.3 percent. The same amounts of household production time that Mrs. MacLean would have contributed to her family and the same discount rate of 7.6 percent are used in this calculation. Using the service worker substitution approach, the net present value of Mrs. MacLean's lost services is $291,468.

The third method utilizes a multiple workers substitution approach which assumes services in different household production tasks would be replaced by different workers. Because the service worker substitution approach utilized a beginning wage rate of $4.65, which closely approximates an average of the various rates reported in the *State Labor Summary* for the other occupational categories utilized by this method, the results are very similar to those using the second approach. The net present value of Mrs.

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65. *See* Table 4 in Appendix.

66. *Supra* note 42.

67. *See* Table 5 in Appendix.

68. U.S. DEP'T. OF LABOR, BUREAU OF LABOR STATISTICS, 30 No. 1, EMPLOYMENT AND EARNINGS 424 (January, 1983).

MacLean's lost services over her life expectancy was calculated to be within $2,500 of the figure from method two. For purposes of brevity, calculations for the multiple workers substitution approach are not presented.

Shown in Table 6[69] are the calculations for the present value of Mrs. MacLean's services utilizing the alternative time/opportunity cost approach. Because she was not employed in the labor market at the time of her death, it is necessary to calculate a market wage (or "earnings capacity") had she been employed. This was done using a wage function derived from data from a national sample of women from the *Current Population Survey*.[70] A market wage for a white female with the following characteristics was calculated: 37 years old, 16 years of schooling, employed full-time, living in the Southern region in a suburban area, and married with children. The wage rate a woman with these characteristics could be expected to earn is $10.98 per hour, which is roughly equivalent to an annual income of $21,960. The growth rate at which this wage is projected to increase is the same 7.3 percent employed using the other three approaches. The same annual hours of household production services and the same discount rate of 7.6 percent are also employed here. The present value of the lost services of Mrs. MacLean using this method is $704,770.

SUMMARY CASE 2
Mrs. Julia MacLean

Born: November 30, 1945	
Died: December 12, 1942	
Life Expectancy Completed Age 37	35.95
Less: November 30-December 12, 1982	.03
Life Expectancy at Death	35.92

Survivor:
Mr. MacLean, age 42
Born: May 30, 1940
Life Expectancy of 42 year old - 31.57 years.*

*Since Mr. MacLean has a life expectancy shorter than Julia MacLean, a cut off in analysis is required at the life expectancy of Mr. MacLean.

69. *See* Table 6 in Appendix.

70. Garfinkel and Haveman, *Earnings Capacity and Its Utilization*, THE QUART. J. OF ECON. 375-85 (Aug., 1978).

APPENDIX

TABLE 1

PRESENT VALUE OF FUTURE EARNINGS

WILLIAM K. BEST

Date	Year	Future Earnings at 8.2% Growth	Present Value at 7.6%
1983	0	$32,000	$32,000
1984	1	34,624	32,178
1985	2	37,463	32,357
1986	3	40,535	32,538
1987	4	43,859	32,719
1988	5	47,455	32,901
1989	6	51,346	33,085
1990	7	55,557	33,270
1991	8	60,112	33,455
1992	9	65,042	33,642
1993	10	70,375	33,829
1994	11	76,146	34,018
1995	12	82,390	34,207
1996	13	89,146	34,398
1997	14	96,456	34,590
1998	15	104,365	34,783
1999	16	112,923	34,977
2000	17	122,183	35,172
2001	18	132,202	35,368
2002	19	143,043	35,565
2003	20	154,773	35,764
			$710,815
	Less Unemployment (5.2%)		39,805
			$671,010
	Less Taxes		147,662
			$523,387
	Less Consumption (24%)		125,613
			$397,774

TABLE 2

PRESENT VALUE OF FUTURE FRINGE BENEFITS

WILLIAM K. BEST

Date	Year	Future Fringe Benefits at 14%	Present Value at 7.6%
1983	0	$5,760	$5,760
1984	1	6,566	6,102
1985	2	7,485	6,464
1986	3	8,533	6,849
1987	4	9,727	7,256
1988	5	11,089	7,688
1989	6	12,642	8,145
1990	7	14,412	8,630
1991	8	16,429	9,143
1992	9	18,730	9,687
1993	10	21,352	10,263
1994	11	24,341	10,874
1995	12	27,749	11,313
1996	13	31,634	12,206
1997	14	36,063	12,932
1998	15	41,112	13,702
1999	16	46,867	14,516
2000	17	53,429	15,380
2001	18	60,909	16,295
2002	19	69,436	17,264
2003	20	79,157	18,291
			$228,760
		Less Unemployment (5.2%)	11,895
			$216,865
		Less Consumption (24%)	52,047
			$164,818

TABLE 3

PRESENT VALUE OF FUTURE SERVICES

WILLIAM K. BEST

Date	Year	Minimum Wage	No. of Hours	Value of Services	Present Value at 7.6%
1983	1	$ 3.35	621	$ 2,080	$ 2,080
1984	2	3.54	621	2,198	2,054
1985	3	3.74	730	2,730	2,385
1986	4	3.95	730	2,884	2,354
1987	5	4.17	730	3,044	2,322
1988	6	4.40	730	3,212	2,290
1989	7	4.65	511	2,376	1,583
1990	8	4.91	511	2,509	1,563
1991	9	5.18	511	2,647	1,541
1992	10	5.47	511	2,795	1,520
1993	11	5.78	511	2,954	1,502
1994	12	6.10	511	3,117	1,481
1995	13	6.45	511	3,296	1,465
1996	14	6.81	511	3,478	1,443
1997	15	7.19	511	3,674	1,425
1998	16	7.59	511	3,879	1,406
1999	17	8.02	511	4,098	1,388
2000	18	8.46	657	5,558	1,760
2001	19	8.94	657	5,874	1,738
2002	20	9.44	657	6,202	1,715
2003	21	9.97	657	6,550	1,693
2004	22	10.53	657	6,918	1,671
2005	23	11.12	657	7,306	1,649
2006	24	11.74	657	7,713	1,627
2007	25	12.40	657	8,164	1,606
2008	26	13.09	657	8,600	1,585
2009	27	13.82	657	9,079	1,563
2010	28	14.60	657	9,592	1,544
2011	29	15.41	657	10,124	1,523
2012	30	16.28	657	10,606	1,504
2013	31	17.19	657	11,294	1,484
2014	32	18.15	657	11,925	1,464
2015	33	19.17	657	12,595	1,445
					$55,293

TABLE 4

PRESENT VALUE OF FUTURE SERVICES OF MRS. JULIA MacLEAN

MINIMUM WAGE SUBSTITUTION APPROACH

Date	Year	Minimum Wage at 5.6%	Number of Hours	Gross Value	Present Value
1982	0	$ 3.35	2,701	$ 452	$ 452
1983	1	3.35	2,701	9,048	8,409
1984	2	3.54	2,701	9,559	8,256
1985	3	3.74	2,701	10,101	8,108
1986	4	3.95	2,701	10,672	7,961
1987	5	4.17	2,701	11,271	7,814
1988	6	4.41	2,555	11,267	7,260
1989	7	4.65	2,555	11,881	7,115
1990	8	4.91	2,555	12,551	6,985
1991	9	5.18	2,555	12,253	6,492
1992	10	5.47	2,227	12,210	5,869
1993	11	5.78	2,227	12,892	5,760
1994	12	6.10	2,227	13,622	5,656
1995	13	6.45	2,227	14,398	5,556
1996	14	6.81	2,227	15,221	5,459
1997	15	7.19	2,227	16,068	5,355
1998	16	7.59	2,227	16,986	5,261
1999	17	8.02	2,227	17,950	5,167
2000	18	8.46	2,227	18,962	5,073
2001	19	8.94	1,935	17,396	4,325
2002	20	9.44	1,935	18,377	4,246
2003	21	9.97	1,935	19,419	4,170
2004	22	10.53	1,935	20,523	4,096
2005	23	11.12	1,935	21,688	4,023
2006	24	11.74	1,935	22,915	3,950
2007	25	12.40	1,935	24,203	3,878
2008	26	13.29	1,935	25,572	3,808
2009	27	13.82	1,935	27,023	3,740
2010	28	14.60	1,935	28,548	3,672
2011	29	15.47	1,935	30,151	3,604
2012	30	16.28	1,935	31,848	3,539
2013	31	17.19	1,935	33,646	3,473
2014	32	18.15	1,935	35,548	1,944
					$170,433

TABLE 5

PRESENT VALUE OF FUTURE SERVICES OF MRS. JULIA MacLEAN

SERVICE WORKER SUBSTITUTION APPROACH

Date	Year	Minimum Wage at 5.6%	Number of Hours	Gross Value	Present Value
1982	0	$ 4.65	2,701	$12,560	$ 619
1983	1	4.65	2,701	12,560	11,673
1984	2	4.99	2,701	13,478	11,641
1985	3	5.35	2,701	14,450	11,600
1986	4	5.75	2,701	15,531	11,586
1987	5	6.16	2,701	16,638	11,536
1988	6	6.61	2,555	16,889	10,882
1989	7	7.09	2,555	18,115	10,848
1990	8	7.61	2,555	19,444	10,821
1991	9	8.17	2,555	20,874	10,797
1992	10	8.76	2,227	19,509	9,378
1993	11	9.40	2,227	20,934	9,352
1994	12	10.09	2,227	22,470	9,330
1995	13	10.82	2,227	24,096	9,298
1996	14	11.61	2,227	25,855	9,272
1997	15	12.46	2,227	27,748	9,248
1998	16	13.37	2,227	29,775	9,223
1999	17	14.35	2,227	31,958	9,200
2000	18	15.40	2,227	34,296	9,175
2001	19	16.52	1,935	31,966	7,948
2002	20	17.73	1,935	34,308	7,928
2003	21	19.02	1,935	36,804	7,904
2004	22	20.41	1,935	39,493	7,882
2005	23	21.90	1,935	42,377	7,860
2006	24	23.50	1,935	45,473	7,839
2007	25	25.21	1,935	48,781	7,815
2008	26	27.05	1,935	52,342	7,793
2009	27	29.03	1,935	56,173	7,773
2010	28	31.15	1,935	60,275	7,752
2011	29	33.42	1,935	64,668	7,729
2012	30	35.86	1,935	69,389	7,708
2013	31	38.48	1,935	74,759	7,687
2014	32	41.29	1,935	78,896	4,369
					$291,468

TABLE 6

PRESENT VALUE OF FUTURE SERVICES OF MRS. JULIA MacLEAN

ALTERNATE TIME/OPPORTUNITY COST APPROACH

Date	Year	Opportunity Cost at 7.3%	Number of Hours	Gross Value	Present Value
1982	0	$ 10.98	2,701	$ 1,483	$ 1,483
1983	1	10.98	2,701	29,657	27,562
1984	2	11.78	2,701	31,818	27,482
1985	3	12.64	2,701	34,145	27,405
1986	4	13.56	2,701	36,626	27,323
1987	5	14.55	2,701	39,300	27,248
1988	6	15.62	2,555	39,909	25,716
1989	7	16.76	2,555	42,822	25,644
1990	8	17.98	2,555	45,939	25,567
1991	9	19.29	2,555	49,286	25,491
1992	10	20.70	2,227	46,099	22,160
1993	11	22.21	2,227	49,462	22,097
1994	12	23.83	2,227	53,069	22,034
1995	13	25.57	2,227	56,944	21,973
1996	14	27.44	2,227	61,109	21,915
1997	15	29.44	2,227	65,563	21,851
1998	16	31.59	2,227	70,351	21,791
1999	17	33.89	2,227	75,473	21,726
2000	18	36.37	2,227	80,996	21,669
2001	19	41.87	1,935	81,019	20,144
2002	20	44.93	1,935	86,940	20,090
2003	21	48.21	1,935	93,286	20,034
2004	22	51.73	1,935	100,098	19,978
2005	23	55.50	1,935	107,393	19,920
2006	24	59.56	1,935	115,249	19,867
2007	25	63.90	1,935	123,647	19,810
2008	26	68.57	1,935	132,683	19,759
2009	27	73.58	1,935	142,377	19,702
2010	28	78.95	1,935	152,768	19,647
2011	29	84.71	1,935	163,914	19,591
2012	30	90.89	1,935	175,872	19,536
2013	31	97.53	1,935	188,721	19,482
2014	32	104.65	1,935	202,498	11,074
					$704,770