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INFLATION AND THE VALUATION OF FUTURE ECONOMIC LOSSES

Peter A. Formuzis* and Dennis J. O'Donnell**

I. INTRODUCTION

When an individual is wrongfully disabled or killed, the task of determining the present value of the individual's economic loss is often assigned to an economist. This determination is a function of two factors. The economist must first evaluate the individual's ability to earn money in the future on the basis of that individual's past earnings record, age, education, sex, race, and other pertinent characteristics. This investigation will yield the appropriate base earnings to be used in the economic analysis. Because the court's objective is to award the sum of money today that will replace future earnings lost due to disability or death, the economist must also consider the appropriate rate of interest at which to discount any future earnings projections to present value. Discounting future earnings to present value is necessary to prevent overcompensation. Because money can earn interest, the sum given today is necessarily less than the amount of future loss.

In determining present value, the economist must deal with the problem of inflation. The indeterminate rate of future inflation obviously affects the rate at which earnings and wages will change. Inflation will also significantly affect future interest rates. Both wage earners and lending institutions must continuously adjust their incomes for inflation or face a loss in purchasing power over time. These adjustments are among the major factors determining future wage growth rates and future interest rates.

II. INFLATION AND THE COURTS

Recent court decisions and current economic literature have dealt at length with assessing the present value of future economic loss in the presence of inflation. Recognizing the importance of inflation, the New Jersey Supreme Court decided that "fair and just

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compensation in wrongful death cases must be based on a jury consideration of the effect of future inflation"¹ and that "it is simply unrealistic to ignore the problem of inflation."² Similarly, the Sixth Circuit Court of Appeals stated that "inflation is a fact of life within the common experience of all jurors" and that "some consideration of probabilities is inevitable in any fair award of damages."³ Similar language affirming the responsibility of the trier of fact to consider inflationary factors appears in a large number of cases.⁴

These cases emphasize the importance of inflation in determining a "fair" settlement where "fair" reflects a sum that most precisely replaces the future economic loss of the damaged individual. Although numerous factors must be considered in making a fair appraisal, the economists' treatment of future inflation has a particularly significant impact on the ultimate figure.

Courts, however, are caught between the realization that inflation is a fact of life and the belief that economists cannot predict the future rate of inflation with any reasonable accuracy. As a result, some courts limit expert economic testimony to "analyses of trends of future wage increases and discount rates generally,"⁵ while disallowing any presentation of a specific figure based on these trends. The Eighth Circuit, in *Heiman v. Medlin Marine, Inc.*,⁶ has adopted a similar limitation: "We are committed to the rule that although an expert witness may not project an inflationary rate over a person's life expectancy, the trier of fact may consider future increases or decreases in the purchasing power of money."⁷ The upshot of these rulings is to replace the economist's opinion with the opinion of a jury or judge.

The problem of accurately predicting inflation, however, cannot be solved by simply shifting the responsibility for estimating a present value of future loss from the economic expert to the jury or trial judge. As Judge Ross stated in his dissent in *Heiman*: "How can we allow a federal judge to do what the acknowledged experts in the field cannot; that is, to project a specific annual inflation rate over a person's life expectancy."⁸ A projection is implicitly or explicitly made whenever present value is determined. Moreover, shifting responsibility to the jury or judge may increase the risk of an unfair

1. *Tenore v. Nu Car Carriers*, 67 N.J. 466, 480, 341 A.2d 613, 620 (1975).

2. *Id.* 67 N.J. at 482, 341 A.2d at 622.

3. *Bach v. Penn Central Transp. Co.*, 502 F.2d 1117, 1122 (6th Cir. 1974).

4. *E.g.*, *Johnson v. Serra*, 521 F.2d 1289, 1295 (8th Cir. 1975); *Mills v. Tucker*, 499 F.2d 866, 868 (9th Cir. 1974); *Perry v. Allegheny Airlines*, 489 F.2d 1349, 1353 (2d Cir. 1974).

5. *Tenore v. Nu Car Carriers*, 67 N.J. 466, 483-84, 341 A.2d 613, 622 (1975).

6. No. 75-1258 (8th Cir. April 14, 1976).

7. *Id.*

8. *Id.*

award, an unreasonably low award to the plaintiff, or in roughly equal probability, an unfairly large judgment against the defendant.

III. THE ECONOMIST AND INFLATION

A common practice of economists in predicting future inflation rates during periods of price stability was to project the historical rate of inflation into the future. Of the many ways economists might approach the problem, this is the most objectionable.⁹

Although editorial writers are fond of saying that if you laid all the economists in the world from end to end you would never reach a conclusion, economists widely agree that the actual rate of inflation over the next ten, twenty, or thirty years cannot be predicted by projecting the historical rate of inflation. As a result, both economists and the courts now agree that forecasting future inflation by projecting the historical rate of inflation is unacceptable because it is unreliable and speculative.

Fortunately, a method does exist by which one can fairly estimate economic loss in wrongful death and impaired earnings capacity cases. This method adequately takes account of inflation without requiring a forecast of inflation. The method, recently discussed by Professor John A. Carlson,¹⁰ involves postulating only the relationship between the rate of wage growth and the rate of interest. Professor Carlson argues that since inflation is built into the rate at which wages grow (or change) and into the rate at which interest rates grow (or change), the effect of inflation on future economic loss can be eliminated by permitting these two factors to cancel each other out.

The theory underlying Professor Carlson's offsetting technique is that the rate of wage growth and the rate of interest (i.e., the discount rate used in determining the present value of total loss) respond to inflation in the same amount and in a stable, predictable fashion. Our own investigation into this relationship suggests that the rate of wage growth and the rate of interest do not change equally in the presence of inflation. They do, however, change in a predictable fashion.

IV. THE SOLUTION

The present value of future economic loss is influenced primarily by two components: (1) the rate of wage growth; and (2) the rate of interest or discount. The rate of interest reflects the real rate of

9. This method was held inadmissible in *Bach v. Penn Central Transp. Co.*, 502 F.2d 1117 (6th Cir. 1974).

10. Carlson, *Present Value of Future Earnings*, 62 A.B.A.J. 628 (1976).

return on capital and the expected rate of inflation, while the rate of wage growth reflects labor productivity and the expected rate of inflation. Both wage rate growth and interest rates rise when inflation increases and decline when inflation decreases because the expected rate of inflation is a component in both series. When inflation accelerates, labor pressures management to raise wages in order to maintain real earnings, as well as to anticipate future inflation. This accounts for the association between inflation and wage rates.

The inflationary component of interest rates was initially described by Irving Fisher.¹¹ He noted that when inflation accelerates, lenders add an inflation premium onto interest rates in order to maintain the real value of their interest payments.¹² Borrowers, on the other hand, are able to pay the premium because with inflation they are repaying their loans with cheaper dollars. This behavior accounts for the positive association between inflation and interest rates.¹³ Because changes in inflation have statistically dominated the changes in the other determinants of wage growth and interest rates, there is a very close correlation between the two, which is represented in the chart.

The evidence presented in the chart on the relationship between the interest rate and the rate of wage growth is based on a three-year *moving average*.¹⁴ One purpose of the three-year moving average is to iron out erratic changes that are not relevant in typical earnings loss projections. Erratic changes from year-to-year may be attributed to many factors including government monetary and fiscal policies, the number of major labor union contracts negotiated and the level of investment. Accordingly, the use of a three-year moving average illustrates more clearly the long term relationship between wage growth and interest rates.

The absolute difference between the two lines in the chart, indicating that the rate of wage growth exceeds the rate of interest, is due primarily to the relationship between the rate of increase in labor productivity and the rate of return on capital (i.e., the productivity of capital) respectively.

11. FISCHER, APPRECIATION AND INTEREST (1896).

12. *Id.* at 134.

13. For more recent evidence on the "Fisher Effect", see Friedman, *Factors Affecting the Level of Interest Rates*, 1963 CONFERENCE PROCEEDINGS, UNITED STATES SAVINGS AND LOAN LEAGUE, YOHE & KARNOVSKY, INTEREST RATES AND PRICE LEVEL CHANGES, 1952-64 (1969).

14. A moving average is computed for a given year by taking the observed interest rates for the year in question, the preceding year, and the following year and computing their numerical average.

CHART
WAGE GROWTH AND INTEREST RATES, 1953-74
(Three Year Moving Averages)



* Rates of wage growth were computed from the rate of change in total wages in the private sector.
 ** Interest rates represent an average of the U. S. Treasury 91 day bill rate, one year bill rate, and the rate on 3-5 year notes.

To accurately establish present value totals and to account for inflation without having to predict it, one must establish statistically the differential between the rate of wage growth and the rate of interest. The appropriate statistical technique to establish this differential is regression analysis. Regression analysis determines the equation which fits both series of data (i.e., wage growth rates and interest rates) together and minimizes the possibility of error in using one to predict the other. In this case, we are using the rate of wage growth to predict the rate of interest.

Regression analysis of these series yields the following equation: $r = -1.4 + 1.01W$, where r is the rate of interest (used as the rate of discount in the "present value" formula) and W is the rate of wage growth. This equation explains 85% of the relationship between the two variables,¹⁵ and demonstrates that the rate of interest remains a constant 1.4 percentage points less than the rate of wage growth. On the basis of this analysis, the present value of lost future earnings can be ascertained by selecting a rate of discount and then setting the rate of wage growth 1.4 percentage points above the rate of discount.

We have chosen a discount rate by averaging the interest rates on United States Government bills and notes with maturities ranging from 91 days to 5 years with an average maturity of approximately three years. An investment portfolio of this type adequately protects the plaintiff against inflation through the relatively rapid turnover of his securities. This three year length of maturity for the portfolio is also consistent both with the reliable relationship between interest rates and wage growth found in our regression analysis, and with the well documented three-year planning horizon of consumers.¹⁶

Professor Carlson, while arguing that a conservative approach would be simply to equate the rate of wage growth with the rate of discount so that they exactly offset each other, recognizes that the evidence may support setting the rate of wage growth above the rate of discount. Although both Carlson's approach and our approach, which sets the rate of wage growth 1.4 percentage points higher than the rate of discount, adequately resolve the problem of producing present worth totals that are approximately independent of the rate of inflation in terms of general methodology, the difference between the estimates is substantial where the projection extends far into the future. For example, using a six percent rate of discount in a projection which runs thirty years, our present worth total would be

15. The remaining 15% is explained by variables not included in this analysis.

16. FRIEDMAN, A THEORY OF CONSUMPTION FUNCTION (1957).

twenty-two percent higher than Professor Carlson's.

In *United States v. English*,¹⁷ the court recognized that exactly offsetting the two rates *cannot be assumed* and that the trier of fact may employ "only such estimates of future [inflation] as are based on sound and substantial economic evidence and as can be postulated with some reliability."¹⁸ The validity of the court's opinion in *English* is substantiated by the evidence presented in the above chart. The rate of wage growth should not be assumed to equal the rate of discount when the evidence shows it to be 1.4 percentage points above it. Our method does not require a forecast of future inflation. Our method is also consistent with the most recent court decision¹⁹ and we have shown in a number of statistical tests that it produces "fair" present worth amounts projected over future periods, where the rate of inflation is taken as an unknown factor.

When the rate of wage growth is set above the rate of discount, the present value of future economic loss decreases as the rate of discount increases. This means that the result is not completely independent of the rate of inflation because the rate of discount reflects inflation. However, with only a 1.4 percent gap, the effect is small and can be safely ignored.

V. THE RATE OF DISCOUNT

In selection of the proper rate of discount, economists have used interest rates on riskless government securities which can be readily purchased and which do not require the investor to have specialized knowledge of financial markets. Inflation raises an additional problem in the selection of the rate of discount. United States government securities are chosen because of their low risk of default. Due to the inverse relation between interest rates and security prices, however, an element of risk is involved in selecting long-term securities during an inflationary period. When market interest rates rise, the prices of previously issued securities fall. The longer the term until maturity of the security, the greater the fall in price for a given rise in interest rates. This relationship is well known to all persons familiar with corporate and government bond markets.

Inflation locks a plaintiff who has invested a court award in long-term securities into the interest rates that existed at the date of purchase. He can not improve his position by selling those securities because their prices would be reduced by the market to the point where he would receive no gain. His only other alternative,

17. 521 F.2d 63 (9th Cir. 1975).

18. *Id.* at 75-76.

19. *United States v. English*, 521 F.2d 63 (9th Cir. 1975).

holding the securities, does not allow him to maintain the real value of the continuous earnings that the award was intended to replace.

If the award approved by the court is actually to serve its purpose, the plaintiff must be able to protect himself against unforeseeable inflation. The only reasonably sure way in which the plaintiff can keep pace with inflation is by purchasing short-term securities. Short-term riskless government securities mature rapidly without capital loss, thus providing funds to purchase newly issued securities whose interest rates reflect the current rate of inflation.

VI. A TEST OF THE METHOD

Our approach yields an estimate for present worth which can be tested for its ability to replace the actual earnings the plaintiff would have received if uninjured. The tests were designed and carried out as follows: (a) twenty random accident dates were selected between 1955 and 1965. In each accident it was assumed that the individual lost all earnings capacity; (b) in each case, the work-life was expected to end in 1975; (c) a rate of discount using the rates on short-term government securities on the date of the accident was computed along the lines described in the preceding section and the rate of wage growth was set 1.4 percentage points above this discount rate; (d) from this information an award representing the present value of future earning loss was calculated; and (e) the award accumulated interest at the actual rates that prevailed between the date of the accident and the end of the worklife, while withdrawals from the principal were in accordance with actual earning in the intervening years.

The results of these tests were strikingly consistent. In no case did the principal remaining at the end of the worklife in 1975 contain more than six months income too much or too little.

This outcome provides convincing evidence that our method adequately protects against inflation and yields "fair" present worth sums. During the period 1955-1965 there was no indication that the economy would experience the inflation that occurred during the 1965-1975 period. Yet our method yielded sums which were "fair" both to the plaintiff and to the defendant. If our method were "perfect," the principal sum would be exactly zero at the end of the worklife. Due to the random fluctuations in the economic system, no such precise result is possible.

VII. CONCLUSION

The research presented here indicates that an estimate of economic loss in impaired earnings capacity or wrongful death actions

can be achieved despite inability to predict inflation. The method involves setting the rate of wage growth 1.4 points above the rate of discount and then calculating the present worth sum. The rate of discount should be calculated from riskless government securities with an average maturity of three years.

Using this method a present worth sum can be calculated which does not involve projecting inflation, which is "fair" to both plaintiff and the defendant, and which allows the plaintiff to protect himself against unpredictable future rates of inflation.

This method has been used successfully in trial courts on numerous occasions in Montana, Washington, California, Colorado, and the Dakotas.

