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An Empirical Evaluation of Two Methods for Estimating Economic Damages: Authors' Reply

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In our article (Lambrinos and Harmon, 1990), we conclude that both the offset approach and the augmented approach — the offset approach augmented by an age earning profile — underestimate lifetime earnings relative to the present value of the actual earnings, and that the magnitude of the error is greater for the offset approach than for the augmented approach. Using actual earnings for 1971 to 1983 reported in the Panel Study of Income Dynamics (PSID) and the discount rate of 4.1 percent, we report that the augmented approach provides a more accurate estimate of the present value of actual earnings than does the offset approach.

In his review of our article Harris (1991) states the following conclusion:

Thus, whether estimated present values are judged to be overestimated or underestimated in comparison with actual present values can depend upon the interest rate selected to discount actual earnings. Furthermore, since the mean actual present value is a function of the interest rate selected to discount actual earnings, the magnitude of the errors found by Lambrinos and Harmon when evaluating the accuracy of the two estimating approaches can be effected as well.

Harris is correct to point out that the rate of discount will determine whether the offset and/or the augmented approach over or under estimate the actual loss, and whether the augmented or the offset approach has a smaller mean error. In his comment, Harris used private average annual earnings and the specific case of a 30 year old high school graduate. In this reply, we have re-estimated the mean errors using PSID data for a variety of rates of discount. The data include a variety of age and educational attainment categories. Table 1, column 2, reports the mean present value of actual earnings from our sample of 13-year-individual-earnings histories for various discount rates ranging from 1 percent through 10 percent.

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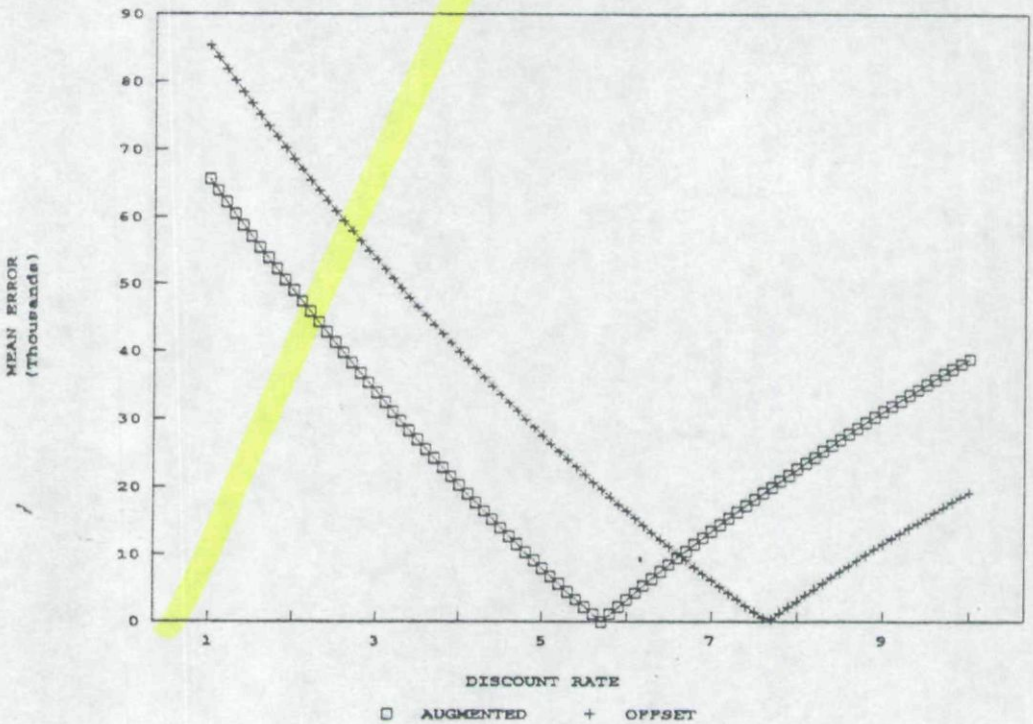
Table 1
Actual Present Values and Mean Errors at Various Rate of Discount

Interest Rates (1)	Actual Present Value (2)	Mean Error for Augmented ¹ (3)	Mean Error for Offset ² (4)
1.0%	\$225,375	\$-65,733	\$85,364
2.0	208,651	-49,009	-68,640
3.0	193,565	-33,922	-53,554
4.0	179,931	-20,288	-39,920
5.0	167,586	-7,943	-27,575
6.0	156,390	3,252	-16,379
6.5	151,182	8,460	-11,171
6.6	150,170	9,472	-10,159
6.7	149,167	10,475	-9,156
6.8	148,174	11,468	-8,163
7.0	146,216	13,426	-6,205
8.0	136,955	22,687	3,055
9.0	128,511	31,131	11,499
10.0	120,799	38,843	19,211

¹ Column 3 is the difference between the augmented estimate of \$159,642 and column 2.

² Column 4 is the difference between the offset estimate of \$140,011 and column 2.

Figure 1
Mean Errors for Offset and Augmented Approaches at Various Interest Rates



Columns 3 and 4 report the mean errors for the augmented and offset approach at these discount rates. The data in Table 1 reveal that the break even point is between 6.6 and 6.7 percent. That is, for rates of discount below the range 6.6 to 6.7 percent, the augmented approach has a smaller mean error, and for rates of discount above this range the offset approach has a smaller mean error. In Figure 1, the absolute values of the mean errors are equal at some discount rate, the augmented approach has a smaller mean error at rates below this level, and the offset approach has a smaller mean error at rates above this level.

The sensitivity of the break even point to the discount rate and the specific age-earnings profile adjustment used is illustrated in Table 2. For the majority (70 percent) of the educational attainment categories for the ages 25 to 34 years, the break even discount rate is above 7 percent. Therefore, on balance the data show that the augmented approach is better than the offset approach for young individuals. This is not surprising given that the age-earnings profile adjustments become relatively minor as the age of the individual increases.

Table 2
Rates of Discount which Equalize the Mean Errors
for the Offset and Augmented Offset

Age Category	0-11 Years	High School	Some College	College	More Than College
25-29	6%-7%	7%-8%	8%-9%	8%-9%	9%-10%
30-34	7 -8	7 -8	6 -7	5 -6	8 -9
35-39	6 -7	7 -8	7 -8	6 -7	7 -8
40-44	6 -7	7 -8	5 -6	5 -6	7 -8
45-49	6 -7	9 -10	4 -5	4 -5	2 -3
50-54	8 -9	4 -5	2 -3	2 -3	7 -8

The principal implication of Harris's comment, in our opinion, for evaluating the augmented and offset approaches is to raise the issue of what is the proper discount rate for calculating present value of actual earnings. The issue of the proper rate of discount is one that has been debated extensively in the economic damages literature and certainly will not be settled here. Harris may be correct to argue that the rate we used, 4.1 percent, was too low to be used as a discount rate in 1970. However, it may be appropriate because of the rising inflation of the 1960's and not, as Harris argues, due to the rising inflation of the 1970's. Suppose an economist were estimating future earnings in 1970 for the period 1971 to 1983, then the discount rate would be based upon the interest rates available for the years up to and including 1970. This is the approach we chose for selecting a discount rate for actual earnings. For the same reason, we disagree with Harris's suggestion of using actual interest rates available during the 1971 to 1983 period.

Despite the rising inflation and interest rates in the 1960's, we would caution against using the 1970 interest rate as a discount rate. Whether the rate in one year will predict future interest rates better than an average over past years is not clear. It is important to note that interest rates reversed this increasing trend in the immediate years after 1970 before rising once again. For example, the yields on 3 month treasury bills fell from 6.5 percent in 1970 to 4.3 percent in 1971 and 4.1 percent in 1972 (Council of Economic Advisors, 1990).

The issue of whether to use a tax exempt yield or a before tax yield is one that should not depend on whether the earnings are before or after tax.¹ From an economic perspective, it is assumed that the principal plus the entire interest income equal the economic loss suffered by the plaintiff. If a before tax rate of return such as treasury bonds is used, then a portion of the interest income from such bonds would be taxed under federal income tax rates. Assuming that the individual is in the 28 percent bracket, the 3 year treasury bond rate in 1970 of 7.29 percent (Council of Economic Advisors, 1990) would reduce to an equivalent tax-free yield of 5.25 percent. In summary, we agree with certain aspects of Harris's comment and take issue with others. We concur that the selection of the rate of discount is important and that the use of an average of interest rates over the 1961 to 1970 period may not be appropriate due to the increasing inflation in this period. We do not think it is appropriate to use rates of discount taken from the 1971 to 1983 period since these rates would not be known in 1970. Rather, our view is that the discount rate should be selected from interest rates for the years up to and including 1970. Finally, for discount rates up to roughly 6.6 percent, our conclusion — the augmented approach has a smaller mean error — still stands.

References

1. Harris, William G., 1992, Comment on An Empirical Evaluation of Two methods for Estimating Economic Damages' " *Journal of Risk and Insurance*, this issue.
2. Lambrinos, James and Oskar R. Harmon, 1989, An Empirical Evaluation of Two Methods for Estimating Economic Damages," *Journal of Risk and Insurance*, 56:733-39.
3. Council of Economic Advisors, *Economic Report of the President*, 1991 (US GPO: Washington D.C.)

¹ Whether taxes are deducted from earnings is an entirely separate matter and will vary by law across the states. From an economic perspective, one may argue that the economic loss should be based upon net of tax earnings since the plaintiff would not have received gross earnings had the injury not occurred.

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