The New Hedonics Primer for Economists and Attorneys

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Edited by

John O. Ward
Thomas R. Ireland

The Value of Life to Close Family Members: Calculating the Loss of Society and Companionship

by Stan V. Smith

Over the past two decades, the value-of-life literature in economics has developed to the point where it can provide useful guidance to jurors in assisting them in the valuation process. Hence it has been used by economists to calculate the loss of enjoyment of life damages in personal injury and wrongful death cases. This literature can also serve to provide estimates for the loss of society and companionship as a result of the death of a close family member.

This evidentiary approach to measuring the loss of enjoyment of life, often called hedonic damages, is arrived at by subtracting human capital values from whole life values. The whole life values are obtained using the value-of-life results based on the willingness-to-pay approach. This approach measures the costs of investing in safety equipment and safer consumer behavior, as well as inducements provided to workers who undertake risk in the workplace. The literature on the willingness-to-pay and the willingness to accept payment is extensive and well reviewed by Viscusi (1993) and Miller (1990). Measurement problems are not fully resolved but are no more acute that in most other areas of forensic economics.

The details of the methodology for calculating the loss of enjoyment of life are rather well-known by now and can be found in Smith (1993, 1990, and 1987), Brookshire and Smith (1992 and 1990), Miller (1990) and elsewhere.

Value of life estimates are frequently based on what members of a family spend to safe a life. If a person places a smoke detector in his own bedroom, he is expressing a lower-bound to the value of his life in an amount equal to the cost of the detector (purchase price, installation, batteries, etc.) divided by the reduction in the risk of death. If, for example, the detector costs $25 dollars and reduces the risk of death by 1 chance in 100,000, then the value of life expressed is $2.5 million.

Now, suppose that a detector is placed in the bedroom of a child by a parent who seeks to preserve the society and relationship with that child? What value of life is expressed? The same value, $2.5 million. But the is the value *to the family* of the child's life.

This conclusion has been arrived at by Miller (1989):

> "When...individual's survivors may recover for their own loss
> of enjoyment, whole life costs can again be used to estimate the
> appropriate level of compensation."

Chestnut and Violette (1990) come to a similar conclusion:

> "We conclude that the WTP estimates are potentially useful
> when the definition of compensation involves putting a dollar
> figure on non-financial losses to the deceased or to survivors."

The following report shows the loss of Society and Companionship due to the death of 12-year-old girl, Jane Doe, survived by her parents. The losses are calculated from the date of death, January 1, 1990, through to the life expectancy of the parent expected to live the longest, Jane's mother, when Jane would be 48 years old.

The basis for the value of life is a $2.3 million dollar average value of life in 1998 dollars for a statistically average person. (See Brookshire and Smith, 1990 and 1992 for details). Past growth rates and an assumed future growth rate of 0.69 percent in this value are based on a the growth in wages as a proxy for long-term increase in the average ability-to-pay. A discount rate of 1.97 percent is applied.

January 1, 1996
Mr. Paul Barrister
456 Justice Ave, Ste 50
Chicago, IL 60000

Re: Jane Doe

Dear Mr. Barrister:

You have asked me to calculate the value of relationship or society and companionship sustained by Jane Doe's surviving family, as a result of her death.

Jane Doe was a 12-year-old, Caucasian, female child, who was born on January 1, 1978, and died on January 1, 1990. Jane Doe's remaining life expectancy is estimated at 68.3 years. This data is from the National Center for Health Statistics, *Vital Statistics of the United States, 1991*, Vol. II, Sec. 6, Life Table, Washington: Public Health Service, 1995.

I have reviewed certain materials provided to me including: (1) the depositions of Sue and Tom Doe; (2) an interview with the Doe's; (3) statements from relatives and friends regarding Jane Doe; and (4) the Case Information form.

I have made a number of assumptions for the purposes of calculating these losses, which are explained below. Aside from specific studies cited, my methodology is based on general economic studies on past growth rate and interest rate behavior, as well as studies regarding the value of life.

My estimate of the real growth factor per year is 0.69 percent. This growth rate is based on wage growth data published in monthly issues of the U.S. Bureau of Labor Statistics, *Monthly Labor Review* (Washington, DC.: U.S. Government Printing Office), for the real increase in wages from 1974 through 1994.

My estimate of the real discount rate is 1.97 percent. This discount rate is based on the real rate of return on U.S. Treasury bills from 1974 through 1994, published in the *Economic Report of the President*. This rate is consistent with a projection of the long term future rate on these instruments published by Ibbotson Associates, Chicago, in its series *Stocks, Bonds, Bills and Inflation*. This publication, which I originated, is generally regarded as the most widely accepted source of statistics on the rates of return on investment securities, relied upon by academic and business economists, insurance companies, banks, institutional investors, CPA's, actuaries, benefit analysts, and economists in courts of law.

Real growth and discount rates are net of 5.53 percent inflation based on the Consumer Price Index from 1974 through 1994, published in monthly issues of the U.S. Bureau of Labor Statistics, *CPI Detailed Report* (Washington, DC: U.S. Government Printing Office).

Economists have long agreed that life is valued at more than the lost earnings capacity. My model of the value of life provides an estimate based on many economic studies on what we, as a contemporary society, are willing to pay to preserve the ability to live a normal life. The studies examine incremental pay for risky occupations as well as a multitude of data regarding expenditure for life savings by individuals, industry, and state and federal agencies.

My estimate of the value of life is consistent with estimates published in other studies that examine and review the broad spectrum of economic literature on the value of life. Among these is "The Plausible Range for the Value of Life," *Journal of Forensic Economics*, Vol. 3, No. 3, pp. 17-39(1990), by T. R. Miller. This study reviews 67 different estimates of the value of life published by economists in peer-reviewed academic journals. The results, in most instances, show the value of life to range from approximately $1.6 million to $2.9 million dollars in 1988 after-tax dollars, with a mean of approximately $2.2 million dollars.

The underlying studies fall into three general groups: (1) consumer behavior and purchases of safety devices; (2) wage risk premiums to workers; and

(3) cost-benefit analyses of regulations. For example, one consumer safety study analyzes the costs of smoke detectors and the lifesaving reduction associated with them. One wage premium studies examine the differential rates of pay for dangerous occupations with a risk of death on the job. Just as workers receive shift premiums for undesirable work hours, workers also receive a higher rate of pay to accept a increased risk of death on the job. A study of government regulation examines the lifesaving resulting from the installation of smoke stack scrubbers at high-sulfur, coal-burning power plants. As a hypothetical example of the methodology, assume that a safety device costs such as airbag costs $460 and results in lowering a person's risk of premature death by one chance in 5,000. The cost per life saved is obtained by dividing $460 by the one in 5,000 probability, yielding $2,300,000.

Tables 1 through 3 show the loss of relationship sustained by Jane Doe's surviving family. The value of preserving the ability to live a normal life is also a measure of the value placed on the loss of relationship or society and companionship by all of society, the great majority of which is captured by close loved ones. Thus, it is an estimate of their value of the relationship with the deceased. Close family members place at least the same or greater value on their relationship with the deceased as compared to statistically unknown persons with whom they have no relationship and for whom the concern for lifesaving is less tangible.

Based on Sue Doe's remaining life expectancy of 36.4 years, my opinion of the loss of the relationship to survivors as a result of the death of Jane Doe is $2,450,509-Table 3. The loss of the relationship is expected to last until the death of the family member with the longest remaining life expectancy, which in this instance is Sue Doe. This relationship loss includes the pecuniary value of companionship, advice, and guidance. This loss is premised upon a statistically average relationship.

A trier-of-fact may weigh other factors to determine if these estimated losses should be adjusted because of special qualities or circumstances that economists do not as yet have a methodology for analysis.

In each set of tables, the estimated losses are calculated from January 1, 1990, through an assumed trial or settlement date of January 1, 1996, and from that date thereafter. The last table in each set accumulates the past and future estimated losses. These estimates are provided as an aid, tool and guide for the trier-of-fact.

If there is additional data which I have not yet taken into account, please let me know so that I may incorporate new information into a supplement of this analysis.

Sincerely,

Stan V. Smith
President

Table 1 - Loss of Past Relationship of Jane Doe to Survivors
1990—1995

Year	Age	Relationship	Cumulate
1990	12	$ 65,646	$ 65,646
1991	13	68,823	134,469
1992	14	72,326	206,795
1993	15	74,944	281,739
1994	16	77,329	359,068
1995	17	80,181	$439,249
Jane Doe		$439,249	

Table 2 - Present Value of Future Relationship of Jane Doe to Survivors
1996—2026

Year	Age	Relationship	Discount Factor	Present Value	Cumulate
1996	18	$80,734	0.98066	$79,174	$ 79,174
1997	19	81,291	0.96173	78,180	157,354
1998	20	81,852	0.94315	77,199	234,553
1999	21	82,417	0.92493	76,230	310,783
2000	22	82,986	0.90706	75,273	386,056
2001	23	83,559	0.88954	74,329	460,385
2002	24	84,136	0.87235	73,396	533,781
2003	25	84,717	0.85550	72,475	606,256
2004	26	85,302	0.83897	71,566	677,822
2005	27	85,891	0.82276	70,668	748,490
2006	28	86,484	0.80687	69,781	818,271
2007	29	87,081	0.79128	68,905	887,176
2008	30	87,682	0.77599	68,040	955,216
2009	31	88,287	0.76100	67,186	1,022,402
2010	32	88,896	0.74630	66,343	1,088,745
2011	33	89,509	0.73188	65,510	1,154,255
2012	34	90,127	0.71774	64,688	1,218,943
2013	35	90,749	0.70388	63,876	1,282,819
2014	36	91,375	0.69028	63,074	1,345,893
2015	37	92,005	0.67694	62,282	1,408,175
2016	38	92,640	0.66386	61,500	1,469,675
2017	39	93,279	0.65104	60,728	1,530,403

Table 2 (cont) - Present Value of Future Relationship of Jane Doe to Survivors 1996—2026

Year	Age	Relationship	Discount Factor	Present Value	Cumulate
2018	40	93,923	0.63846	59,966	1,590,369
2019	41	94,571	0.62613	59,214	1,649,583
2020	42	95,224	0.61403	58,470	1,708,053
2021	43	95,881	0.60217	57,737	1,765,790
2022	44	96,543	0.59053	57,012	1,822,802
2023	45	97,209	0.57912	56,296	1,879,098
2024	46	97,880	0.56794	55,590	1,934,688
2025	47	98,555	0.55696	54,891	1,989,579
2026	48	39,694	0.54620	21,681	$2,011,260

Jane Doe $2,011,260

Table 3 - Present Value of Net Relationship of Jane Doe to Survivors 1990—2026

Year	Age	Relationship	Cumulate
1990	12	$65,646	$65,646
1991	13	68,823	134,469
1992	14	72,326	206,795
1993	15	74,944	281,739
1994	16	77,329	359,068
1995	17	80,181	439,249
1996	18	79,174	518,423
1997	19	78,180	596,603
1998	20	77,199	673,802
1999	21	76,230	750,032
2000	22	75,273	825,305
2001	23	74,329	899,634
2002	24	73,396	973,030
2003	25	72,475	1,045,505
2004	26	71,566	1,117,071
2005	27	70,668	1,187,739
2006	28	69,781	1,257,520
2007	29	68,905	1,326,425
2008	30	68,040	1,394,465
2009	31	67,186	1,461,651
2010	32	66,343	1,527,994
2011	33	65,510	1,593,504
2012	34	64,688	1,658,192
2013	35	63,876	1,722,068
2014	36	63,074	1,785,142
2015	37	62,282	1,847,424
2016	38	61,500	1,908,924
2017	39	60,728	1,969,652
2018	40	59,966	2,029,618
2019	41	59,214	2,088,832

Table 3 (cont) - Present Value of Net Relationship of Jane Doe to Survivors 1990—2026

Year	Age	Relationship	Cumulate
2020	42	58,470	2,147,302
2021	43	57,737	2,205,039
2022	44	57,012	2,262,051
2023	45	56,296	2,318,347
2024	46	55,590	2,373,937
2025	47	54,891	2,428,828
2026	48	21,681	$2,450,509

Jane Doe $2,450,509

January 30, 1996
Work Notes
Basic Facts: 12-Year-Old Girl Killed In Auto Accident.

Name: Jane Doe
Date Of Death: 1-1-90
Date Of Trial: 1-1-96
Date Of Birth: 1-1-78

Age At Date Of Death: 12.0
Remaining Life Expectancy At Date Of Death: 68.3
Total Life Expectancy At Date Of Death: 80.3

Race/Gender: White Female

Growth Rate: 0.69%
Discount Rate: 1.97%

Family Background
Sue Doe-Mother, Born 1-1-45, Age 45, RLE 36.4
Tom Doe-Father, Born 1-1-40, Age 50, Re 26.9

Relationship
1990 = 60000 (1988 Base) * 5.71% 65646
1991 = 65483 * 4.84% = 68823
1992 = 68718 * 5.09% = 72326
1993 = 71294 * 3.62% = 74944
1994 = 74567 * 3.18% = 77328
1995 = 77328 * 3.69% = 80181

Thru Mother's RLE Of 36.4 Years (Age 48.4 For Jane)

Future Growth At .69%

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