
Risk, the Willingness-to-Pay, and the Value of a Human Life

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Abstract: Empirical estimates of the value of a life based on the willingness-to-pay concept have been used in formulating public policy decisions involving safety and environmental regulations and by some state courts as a measure of the legal value of a human life in personal injury cases. The basic idea of the willingness-to-pay concept is that by examining how people value small risk changes we can estimate the value of the entire life. The paper argues that the use of the willingness-to-pay concept is theoretically inappropriate and demonstrates that because people are risk averse, willingness-to-pay estimates of the value of a life will generally overstate the relevant economic value.

INTRODUCTION AND OVERVIEW

The economic and legal literature has devoted considerable space and discussion to the willingness-to-pay concept as a means for estimating the value of a human life. Empirical estimates of the value of a human life based on the willingness-to-pay concept have then been used to help formulate public policy decisions involving safety and environmental regulations and other governmental decisions potentially affecting the probabilities of loss of life. Some state courts have adopted the willingness-to-pay concept as one measure of the legal value of a human life in cases of wrongful death and personal injury (this legal version is referred to as “hedonic damages”).¹ Notwithstanding the widespread use of this means of measuring the value of a human life, the idea remains controversial. The purpose of this paper is to analyze the concept and to demonstrate that

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estimating the value of a human life on the basis of a willingness-to-pay concept is theoretically wrong.

WILLINGNESS-TO-PAY AS A MEASURE OF THE VALUE OF A HUMAN LIFE

The statistical approach to estimating the value of a life is based on two types of empirical studies:

- (1) Studies on how much people are willing to pay for additional safety and safe behavior from such items as airbags, smoke detectors, and larger tires;
- (2) Labor studies on how much more workers must be paid to accept jobs with a higher probability of death or injury in occupations such as underground coal mining.

Both of these types of studies provide estimates of the value of a human life by multiplying the additional dollars people are willing to pay for reducing their risk of dying (or accept for increasing their risk of dying) times the corresponding probability of death.

A study by Miller (1990) reviewed more than sixty of these studies and estimated the consensus value of human life (exclusive of the capital value) at approximately \$2.2 million in 1988 dollars. While Miller did discuss several potential biases from income, age, risk levels, taxes, and the difference between perceived and actual risk estimates, he concluded that the estimates of the value of a human life could be “credibly used in prospective benefit-cost analyses” and would “provide guidance to the court on the reasonable range of value for total damages” (Miller, p. 32).

Critics of the use of hedonic damages have attacked the concept through several avenues. Frankel and Linke (1992), building on the work of Broome (1978), pointed to the distinction between the willingness to accept payment for a small risk and the value of the entire life. They noted the potential problem of assuming that each person’s individual perception of risk is an accurate measure of the real risk. They discussed how, if we follow the logic behind the willingness-to-pay concept, the individual decisions of many people to smoke or not use their car’s seatbelts would seem to imply that the value of these lives are quite low. It is this sensitivity of the estimate of the value of the human life to the particular situation of willingness-to-pay that may account for the large variance in estimates found in various studies.² The large variance produces serious questions about what is a good estimate for the value of a life. Others, including especially Havrilesky (1993), point to a variety of other problems, including the irrelevance of low incremental risk valuation to a whole life, the

irrelevance of an anonymous statistical life in legal issues involving a specific individual; the potential for serious social misallocations, the potential for statistical inaccuracy of small risk valuations, and the high variance of estimates.

Notwithstanding these criticisms, the idea of estimating the value of a life on the basis of our willingness-to-pay, possibly because of the ease of calculation and the appearance of simplicity, has many advocates and is commonly cited in government studies and court proceedings. We suspect that much of its popularity lies in the high dollar figure typically generated through such estimates, which can be used to bolster arguments of plaintiffs and various interest groups.

WHAT THE CONCEPT REALLY MEASURES

The theoretical problem with the willingness-to-pay concept as a means for measuring the value of a life stems from a faulty assumption that the economic value of a life can be estimated from our willingness to pay for a small reduction in the risk of fatal injury or our willingness to accept a stated compensation for a small increase in the risk of death. The value of a life when derived in this manner, unlike the values of other economic goods, confounds the economic measure of the value of the life with the degree of risk aversion associated with the life. The measure considers two economic factors: (1) the economic value of the life (the future market and non-market production of the individual) implicitly assuming the decision-maker is risk neutral with respect to the incremental risk and (2) the value associated with the decision-maker's risk aversion with respect to the incremental risk. Since the first factor, (1) above, is the economic value of the life prior to the consideration of changes in value because of the additional small probability of death found in (2) above, (1) alone represents the relevant value of a human life. To also include the value of the risk aversion associated with value of a life adds an unnecessary element. Despite what the proponents of the willingness-to-pay concept claim, this measure is not the value of the life.

To understand the problem with the willingness-to-pay concept, we should begin by noting that willingness-to-pay estimates would not be used if we had market price measures to tell us what things are actually worth. Obviously, we do not have a market price for a human life. We can only observe the hourly, monthly, or even annual market salaries that are paid for a portion of a person's time devoted to work and the value of non-market production. Proponents of the willingness-to-pay concept have reasoned that by examining how we value small risk changes we can

estimate the value of the life. Yet risk aversion implies that the monetary value of additional risk-taking must contain some element for the value of risk that goes beyond what the market price of a human life alone would provide. This means that the additional dollar a worker requires for a small incremental risk in losing his or her life has some separable component for the economic value of marginal risk-taking by the risk-averse worker. Thus, in a case where a worker requires an additional \$1 for an additional one-in-five-million chance of dying, the dollar represents the chance of losing his or her valuable life as well as compensation for his or her aversion to risking life. This implies that the additional dollar can be broken into two parts: the portion for the statistical value of risking one's life if one were risk neutral (with respect to the incremental risk) and the portion for one's risk aversion (with respect to the incremental risk). The value of the life, without any additional risk, is measured properly only by the first portion—the statistical value of risking one's life if the person were risk neutral with respect to the incremental risk. To also include consideration of one's risk aversion to incremental changes in risk would overstate the economic value of the life.

To illustrate this distinction, consider how the willingness-to-pay concept might be used to value an asset whose value is already known—for example, a house with a market value of \$200,000 (exclusive of land). If we momentarily ignore that the market value of the \$200,000 house is already known, we could estimate the value of the house by our willingness to pay for fire insurance (for our risk aversion). Based on the average premium homeowners in California paid for fire insurance in 1998 and the cost of repairs for damages from fire, the willingness-to-pay estimate of the value of the \$200,000 house would be approximately \$320,000 (this estimate was derived from California Department of Insurance premium and cost data, 1998). This estimate, greater than the actual market price of the house, reflects the statistical value of risking one's house if one were risk neutral with respect to the incremental risk and a substantial portion for risk aversion that the house might burn down. This difference between the actual market value of the \$200,000 house and the willingness-to-pay as if the house value is \$320,000 is not anomalous. While we know the market price of the house is only \$200,000, our risk aversion of the house being damaged by fire makes it worthwhile to purchase actuarially unfair insurance. Only if actuarially fair insurance (without other added costs or profit) were available would a valuation of the house by our willingness-to-pay for insurance produce a willingness-to-pay estimate equal to the actual market price.

When applied to people, the same issue arises. The actual value of a life to a risk-averse person will almost always be less than the willingness-

to-pay concept would find. Only if individual perceptions of risk are wrong, or the equivalent of actuarially fair insurance is available, can we expect accurate calculation of the value of a human life based on our willingness to pay.

The inability to separate measures of risk aversion from measures of underlying economic value suggests that public-policy decisions or legal measures of the value of a human life in wrongful death cases should not be based on the willingness-to-pay concept. This measure reflects both the underlying value of the life and the aversion to risk associated with the life. Just as no court or public policy decision would or should use a willingness-to-pay measure significantly greater than the market value of a house to measure the value of the house, we should not be fooled into using a willingness-to-pay measure of a human life that is similarly inflated by our risk aversion simply because we lack current market prices for a human life telling us that the willingness-to-pay calculation is wrong.

NOTES

¹Recently some state courts, including two district courts of appeal in California, have disapproved the use of hedonic damages and have ruled that testimony related thereto is inadmissible. On January 31, 1996, one California appellate court concluded that "After full briefing and oral argument we conclude the trial court order striking the claim for hedonic damages was correct." Two years later, the Second District Court of Appeal, in *Loth v. Truck-A-Way* (60 Cal. App. 4th 757, 70 Cal. Rptr. 2d 571 (1998) in remanding for a new trial, concluded that "the expert's testimony on hedonic damages was inadmissible as a matter of law and its admission was prejudicial."

²From his review of 67 studies, even after omitting 20 studies, Miller's mean estimate of \$2.2 had a one-standard-deviation value of \$.65 million (Miller, p. 32).

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