



The Value of Life: A Multidisciplinary Approach

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Abstract

Assigning value to human life is very controversial. The subject, given its intrinsic importance, has, in my experience, always succeeded in capturing students' attention and interest when applied in different contexts, disciplines and levels. The activity is very interactive, student-centered and can be easily modified to fit needed educational and pedagogical outcomes. This paper explains how the topic can be applied to different academic disciplines and different educational levels, from secondary to post-secondary. Initially created as an exercise for students of economics, the activity can seamlessly be used in several disciplines. In economics and related disciplines, value is generally considered the individual maximum price a person is willing to pay for a certain good: it is a subjective value. More generally, though, economic value is just one of the many aspects of value, which include, but are not limited to, sentimental value, religious value, aesthetic value and so on, and for this reason very difficult to quantify. In many societies throughout history, humans had a price – a market price - based on specific individual characteristics, and to a certain extent fully tradeable. Today, we talk about value of life in different contexts. The idea of placing a monetary value on human life is the springboard for applications in several disciplines, from philosophy and literature, to mathematics, history, economics and jurisprudence, with a strong foundation of methodology and empirical analysis.

Keywords: *Interdisciplinary, interactive activity, social sciences, education methodology, value of life.*

1. Introduction

This exercise is born out of one of the main problems that instructors of Principles of Microeconomics and Macroeconomics encounter when teaching students that are not majoring in Economics [3] [6]. As Stephen B. Young (2012, p.20), the Global Executive Director of the Caux Global Round Table wrote:

Modern micro and macroeconomic analysis depends on mathematics for its analysis and its predictions. But use of mathematics, in turn, favors assumptions about human nature that are too simplistic and not in line with emerging anthropological and neurological understandings.

The traditional approach to the study of economics is often alien and difficult about which to relate for non-economic students. Several authors (Frank, Jacobson, Young among others) have begun to push more experiential and applied learning in principles classes, but the most commonly used textbooks still suffer from the same problem.

In observing what topic, with deep theoretical and practical economic implications, has the ability to capture student's attention, few were as universally powerful as the question of placing a monetary value on human life. The topic is not a trivial one. In fact, in most economic decisions that involve policies such as pollution regulations, healthcare and so on, policymakers routinely assign a monetary value on human life. Usually, when first asked the direct question, most student seem puzzled, as it appears that implicitly, the value of a human should be infinite. Depending on the discipline, there can be several approaches to guiding students to understand that although ideally life should be sacred, in practical situations, that is not a feasible outcome. For a history class, a simple mention of slavery, showing actual prices for human beings -of which there are ample primary sources- should suffice. In economics, examples abound: from the calculation of the value of a statistical life, (VSL) used to determine environmental regulations, to the quality adjusted life-year (QALY), or the formula used to compensate victims of the September 11, 2001 terrorist attacks in the United States.

Once the topic has been approached, the activity can be tailored depending on the scope of the lesson. The versatility of the lesson is limited only by the creativity of the instructor. The next section describes the approach used for economics students. Then, some examples will be presented on how the activity can be adjusted for other subjects, specifically mathematics and history.

2. The Activity

When teaching economics students, the activity begins by dividing students into small groups and writing on the board some questions: What is the value of a human life? Do all lives have the same value? Who should decide the value of a human life? Why is there a need to assign value to human life?

After the students had some time to think about the questions, the instructor gives a brief introduction of the topic with examples and references to the specific content area. This is a very good moment to introduce the concepts of scarcity and the problem of allocating limited resources. If every human life has infinite value, any form of compensation, even for minor injury, would have to be infinite. Mathematically,

$$\infty \times n = \infty, \text{ with } 0 \leq n \leq 1,$$

with $n=0$ representing perfect health and $n=1$ death, with fractions of n representing varying degrees of injury. With such constraints, the only possible outcome is an eye for an eye society [9]. Since no material compensation could ever be amassed to reach the infinite value necessary to indemnify any form of physical damage, the only viable alternative is for another person (the perpetrator, but in some cultures a relative or kin of the perpetrator) to suffer an equal damage. In many cultures, past and present, that was, and still is, the case. Clan feuds that continued for generations are the product of such a situation. When monetary or material compensation is introduced, the change is equivalent to reducing the worth of a human life from infinite to a finite amount [5].

The next step is to introduce the difference between an average value - used mostly in regulatory policy making, since it is impossible to know the exact individuals affected - and the value of a specific individual, used mostly for compensation in tort law. The three main methods used to value human life are the following [4] [9]:

i) Forgone earnings: Estimate individual earnings had the person remained alive. The value is equal to discounted future earning, but in that case the value of a retiree (no earnings) is zero or possibly negative. The result is different values for different people.

ii) Revealed preference methods: It measures the willingness to pay to reduce risk of death for purchase for life-saving devices. All lives have the same value, since it is an average of individual decisions.

iii) The hedonic method of valuing life: It uses regression analysis and adjusts the wage differentials in different professions for levels of fatality risk, education, age, injury risk, etc. It is more accurate than just looking at wage differential. As in case ii, all lives have the same value.

In addition, a methodology called quality of adjusted life years (QALY) is sometimes used in the medical field and is based on the age of the person and the expected number of years left to live, adjusted for quality of life (i.e., a year of healthy life counts more than a year with, say, diabetes). The controversial nature of the technique is obvious.

Giving real-life example of value of life applications is important to make the exercise relevant. An example of compensation based on individual factors is compensation for the September 11, 2001 terrorist attacks in the United States. On average, death payments have been a little over \$2 million; the minimum payment was \$250,000 and the maximum \$7.1 million. Compare that with US compensation of civilian victims in the war in Afghanistan, rarely above the \$4,000 per victim [2].

After that, students are asked to determine what variables should be used and they should be measured. The final result is a function that would give the value of a human being based on the selected characteristics and ways to calculate it.

3. Adapting the Activity to Different Courses

3.1 Mathematics

The activity lends itself well for students of mathematics. The topic involves the application of mathematical properties with implications for outcomes. For example, once there is general agreement on the list of variables, it is time to shift the focus to the more technical and mathematical aspects of the function-building process. An important step is deciding the type of relationship of each variable with the final value. The types of relationships most commonly used are linear, quadratic (parabolic), exponential (with its inverse, logarithmic), binary, and constructed ad hoc for specific cases. Limiting our examples to linear and quadratic relationships, the choice of the relationship has very different implications. A linear relationship between the two variables (for example value of a human life and age) implies a constant rate



of change. In the case of age (the independent variable) and value (the dependent variable) an increase in one year of age always produces a constant change in value. The relationship is,

$$Y=aX+b, \text{ where } a \text{ and } b \text{ are constants.}$$

With this model, the question becomes: who is more valuable, older or younger people? In quadratic relationships, a constant change in the independent variable causes the change in the dependent variable first to increase, reach a maximum, and then to decrease.

$$Y=aX^2+bX+c, \text{ where } a, b, \text{ and } c \text{ are constants.}$$

In this case we would assign greater value to people of working age. All these decisions have important implications for the final outcome.

Another mathematical aspect that can be stressed, which has also profound philosophical implications, is the type or average to be used in order to concentrate the variables into a single value. The use of an arithmetic mean would have property to smooth out a single low value. The use of the geometric mean would, on the other hand, greatly penalize a single low value. In essence, we are answering the question: are we the worst thing we have ever done?

3.2 History

A history module based on the value of life can be very easily adapted to different courses. It could be an overview of major changes in the way human life is evaluated by focusing on specific historical periods and geographical areas. A US History course, for example, would have plenty of primary sources regarding the price of slaves, or the value placed on the killing of Native Americans.

4. Conclusion

In my experience using this exercise, I have found that across all levels and courses, the idea of placing value on human life always succeeds in grabbing students' attention. In many cases, students refer to this exercise even later in the course. Although created for introductory students of economics, its adaptability to different subject matters and flexibility to be modified to fit different skill levels make this exercise a valuable pedagogical tool. This paper suggests two possible applications beside economics. It can easily be adapted to a wide array of disciplines, such as anthropology, philosophy, ethics, statistics, and most social sciences.

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