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CAN ONE ESTIMATE THE VALUE OF LIFE OR IS IT BETTER TO BE DEAD THAN STUCK IN TRAFFIC?

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Abstract—In an analysis of whether to replace STOP signs by YIELD signs, the value of a life lost was pegged at $1,500,000 and the value of time at $6.71/hour. These numbers imply that when the sum of traffic delays accumulated by many drivers is equal in duration to the average lifetime lost in a fatal crash (37.3 years), the cost of such delay is higher than the cost of an average lost life. Most find this to be disturbing. If so, why is it that estimates of the value of time and life allegedly based on people's preferences are at odds with what most prefer? A search for the root of this problem leads to Schelling's distinction between the value of death to those who die and the value of the probability of dying to those who live. He thinks that while it is not possible to put a value on one's own death, it is possible to put a value on changes in the probability of one's own death. I think that this distinction does not solve the problem. If it is impossible to have preferences for consequences that would have to be experienced posthumously, it cannot help to make the event of death still more remote by a dimly perceived probability. People may be willing to express preferences and econometricians may be eager to interpret them. But, inasmuch as these preference are vacuous, they have no interpretation and attempts to do so may lead to the noted inconsistency. Consistent use of a wildly incorrect value of life in cost-benefit analyses involving risk leads to consistently incorrect conclusions. Instead of using a questionable value of life in dispassionate-looking computations, it may be better to give legitimacy to public decisions more directly by a mechanism akin to a ballot or a jury.

There is no escape from the need for politicians, civil servants and professionals to make choices on behalf of a public. The habit of guiding, justifying or making such choices by computations of cost and benefit is so ingrained in our minds, so enmeshed in the fabric of society, that we do not stop to ponder the propriety of doing so. Yet, we may be reaching beyond the boundary of what in good conscience is possible. I intend to question whether computation is the best way to confer legitimacy on decisions made on behalf of a public and involving risk to life.

1. A STRANGE RESULT

The source of my concern is best illustrated by an example to which most readers can apply their own intuition. McGee *et al.* (1989) attempt to give guidance on when STOP signs at intersections should be replaced by YIELD signs. The principal benefit of replacing STOP signs by YIELD signs is that it saves the motorist time; the main drawback is that it degrades safety. If this decision is to be based on expected consequences, one cannot avoid the trading of life and limb against time. In analyses of this kind one often makes use of publicly sanctioned values of life and time. On the authority of the Federal Highway Administration (Technical Advisory T-7570.1, 1988) a fatality was valued at about $1,500,000. The median time value used was $6.71/hour. Both values are supposedly based on people's stated or revealed preferences. (McGee *et al.* thoroughly examine the sensitivity of their conclusions against a wide range of values. However, my purpose is not to debate the validity of their conclusion; it is to question the unit value of life recommended for use in analyses of this kind).

The use of these values leads to a strange result. Take the average years of life lost to a person killed in a road accident to be 37.3 (Faigin, 1991). This is to be valued at $1.5 million. Consider now a number of intersections over a period of time where road users jointly accumulate 37.3 years of traffic delay. At $6.71/hour, the total cost of this delay

is $2.2 million. Thus, the value of 37.3 years of delay accumulated by many road users in fractions of a minute each, is larger than the value of a life of the same duration. In loose but brutal language these unit costs imply that it is preferable to be dead than stopped in traffic. To many this appears to be perverse. They think that the value of a lifetime lost must be much larger than the value of an equal time lost (by many) in traffic.

Not everybody thinks the result perverse. Some suggest that were a lower value of time used, or were the value of life pegged a bit higher, the juxtaposition of the two values would raise no eyebrows. Indeed, since the publication of McGee *et al.* in 1989, the "willingness-to-pay" value of life for the United States has been revised to about $2 million (Faigin, 1991).

Others argue that future years of a life lost need to be discounted to their present value and therefore one cannot directly compare a future year lost to traffic delay now. (The suggestion that future years ought to be discounted as if people could keep their time in interest-bearing deposits is not accepted by all. See, eg. Loewenstein, 1992).

Some say that it is nonsense to sum the few seconds apiece that many different people wait at a STOP sign (see eg. Strand, 1993) and it is folly to compare this strange time-aggregate with years of life lost to an anonymous person. Therefore, so the argument goes, a comparison of "dead time" and "delay time" is contrived, devoid of clear meaning and relates to no choices that people make; in short, that the juxtaposition of incompatible values can be neither disturbing to intuition nor perverse. This argument would have to be taken seriously were its moral not violated by its proponents. One can counter as follows. Life is the passage of time. If time has value, why not measure the value of life in the currency of time? To do so is surely not less natural than to value both life and time in terms of money, and then to use $-time and $-life in a single benefit-cost computation, as if the noted problems of comparison were removed by the magic of a dollar sign.

Still others argue that how much people are willing to pay for changes in risk or travel time is determined by obscure psychological processes; that no result of these ill-understood processes can be considered odd, surprising or perverse. In essence, the claim is, that the preferences of sovereign consumers, however perverse they seem to be, are not subject to questioning. This objection misses the point. The source of our perplexity is that when two values allegedly extracted from people's preferences are juxtaposed, the result is strangely at odds with most people's intuition.

In spite of these arguments and explications by those who do not consider the result of the juxtaposition of the two values strange, many still feel that in decisions made on behalf of a public, a lifetime lost cannot possibly be valued at less than traffic delay of the same duration accumulated by many. In other words, that the values of time and life recommended for use in economic analyses are inconsistent with the preferences of most. But the sole purpose of such economic analyses is to come to decisions that are in accord with what people would prefer to have! Did out thinking go wrong, and if so, where?

2. SEARCHING FOR THE ROOT OF THE PROBLEM

To avoid a common obstruction to fruitful discussion, I begin by abandoning a false lead. The very enterprise of searching for a numerical value of life is nonsense to some. They will claim that being alive is infinitely more important than all else, which is why the aforementioned result seems perverse. Such an opinion may be a legitimate guide for private conduct. However, it cannot be used to guide public conduct in a society in which decisions made by some affect other people's risk of death and the expenditure of their time and money. For one, were life valued infinitely more than all else, no money would be left for education or garbage collection, because extant opportunities to save lives can bankrupt the richest country. Also, with the turn of the ignition key all drivers indicate that the benefit of the journey is greater than the finite probability of dying in its course. Therefore, a person proclaiming that life's value is infinite, has a source of value different from that guiding the choices that most people make. It follows that when one has to make "public decisions," and if these are to be in accord with what the most affected

persons would like to have done, life's value is not infinite. Thus, the sensation that the values of time and life now suggested for use are out of kilter, must not be derived from the notion that life's value is infinite. From here on we must accept that in decisions made on behalf of a public, the use of a finite value of life is legitimate. Were the cost of an average lost lifetime, say, one hundred or one thousand times that of an equal duration of traffic delay, one might not bat an eye; it is the suggestion that the two values are approximately the same that rubs one the wrong way.

The problem must have something to do with the way in which the value of life and time are estimated. Such estimates are usually obtained by econometric methods from data collected in various settings in which people reveal their preferences by making choices or by saying what choice they would make. The problem might be due to a gross error in the estimated value of time. (For a review of methods of valuing time, see eg. Hensher, 1989). However, situations in which time is traded for money are plentiful and therefore, so are the opportunities to estimate what value people attach to it. In addition, no grave moral nor conceptual difficulties beset value-of-time estimation. For these reasons the search for the roots of the problem will focus on attempts to estimate the value of life.

For the estimated value of life to reflect peoples' preferences, it must be possible for people to have the corresponding preferences. However, it seems impossible for a person to have preferences when one of the prospects involves one's own death. Surely the words "choice" and "preference" have meaning only if one expects to live and experience the consequences of the choice. It is for this reason that one can not meaningfully speak of the preference between being dead and being delayed in traffic, as I did earlier. That people cannot have preferences about posthumous consequences defines a boundary beyond which the derivation of value based on choice and preference cannot go; it is a limit that utilitarians, welfare economists and econometricians cannot trespass. To insist that people can have preferences about an option, the consequences of which they can not hope to experience, is to negate the ordinary meaning of the words "choice" and "preference."

However, this does not mean that for public decisions there cannot be a broad consensus that someone's life is more important than traffic delay of equal duration as accumulated by many road users. So, even if putting value on one's own life is impossible, the perversity of the relative values of time and life now in use still persists.

Even though there can be no preferences for posthumous consequences, it is said that people can have preferences amongst options when one feature is the *probability* of dying. This liberating distinction is usually attributed to Schelling (1968). It has become the foundation of risk evaluation or at least one of its central tenets. The distinction is between the cost (or value) of a death and the cost (or value) of changes in the probability of dying. The former cost is borne by persons who died and those who were touched by their lives and death, while the latter applies to all those exposed to the probability of dying, but are still alive. The realization that estimates for the value of life are nowadays based on preferences over probabilities of dying, not the cost of not being alive, points to the root of the problem.

3. A SMALL AND A BIG ENSEMBLE

When we compared the value of time (estimated from choices people make) and the value of life (estimated from how people respond to differences or changes in the probability of dying), it appears that they cannot both be correct. I suspect that the problem is with the estimation of the value of life. To identify the source of the problem, a parable that is free of life-death metaphysics is introduced.

Consider the task of estimating the value of a rest area along a certain freeway. The direct way to estimate is to sum the value of the rest area to those who actually use it. An indirect way to estimate is to sum the value of the rest area to potential users, say, those using the freeway alongside which the rest area is located.

For reasons to be discussed shortly, I will impose on the potential users a "requirement of rationality." That is, that the value of the rest area to a potential user must be the product:

$$\text{(probability of use)} \times \text{(value in use)}.$$

When this requirement is met, and if the potential users can correctly estimate both probability of use and value in use, the direct and indirect methods of estimation should yield similar answers. After all, the estimate obtained indirectly from the bigger ensemble of potential users is the mathematical expectation of the estimate obtained directly from the smaller ensemble of actual users. Therefore, should the two alternative ways of estimating the value of the rest area yield very different answers, one would question whether the potential users can assess their probability of use, or the value of the rest area to them, or both. Furthermore, if the direct and indirect estimates are widely discrepant, one would have to conclude that the indirect estimate (that obtained from the preferences of potential users) cannot be used in lieu of the direct one (the estimate derived from the choices of the actual users).

We can now return to the question of valuing life. Recognizing the impossibility of having preferences amongst choices involving one's own death, Schelling's stratagem was to replace the small ensemble of those who die and grieve for the dead, by the larger ensemble of "potential victims," those who are exposed to the probability of dying. It is in this sense that the rest area parable is similar to Schelling's situation. In Schelling's situation my "requirement of rationality" means that people in the larger ensemble of potential victims make their choices considering the product:

$$\text{(probability of dying)} \times \text{(loss of dying)}.$$

If so, and if the two factors in the product are correct, then the unique way in which probabilities combine to form a mathematical expectation would ensure that the value to the small ensemble (of victims and grievers) is similar to the value of the big ensemble (of potential victims). In our specific case, it would ensure that the value of the *actual additional deaths* due to the conversions from STOP to YIELD signs and the value of the *change in the probability of death* to the users of these intersection are indeed similar.

Consider now what would happen if the potential users of the rest area (those passing by on the freeway) do not know what a rest area looks like from inside, not having used one before. Nor do these potential users have a clear idea about the frequency with which they might use it. When pressed, the potential users would still venture to give us estimates of the value of using the rest area and their assessment of the probability of using it. The sum of the products of these estimates still represents what the potential users think the value of the rest area is. However, it is a number of the same kind as one would obtain by averaging responses of a sample of passers by who were pressed to give their estimate of the mass of the earth. One will not be surprised if, under these circumstances, the value of the rest area to potential users was very different from its value to the actual users.

Imperfect as it is, the "rest area parable" shows that for the value to actual users of the rest area and the value to its potential users to be in agreement (of the kind that exists between realizations of random variables and their expected value) one must insist that potential users be able to assess correctly the product of their own probability of use and their value in use. Otherwise the direct estimate (derived from the smaller ensemble) and the indirect estimate (based on data from the larger ensemble) may be vastly different.

Similarly, when it comes to the valuation of an option which will cause death to some, people in the ensemble of potential victims must be able to correctly assimilate into their preferences both the probability of their death and its value. But it remains impossible to have preferences for an option involving the death of the deciding organism and it is meaningless to speak about them. Moreover, people have no sensors for probabilities. As is well know, even after extensive instruction people have difficulty with judgements involving probability. Under these circumstances, it is hardly surprising that

preferences expressed by potential victims are as whimsical as would be the preferences of potential rest area users who do not know what a rest area is and have no idea how frequently they might use it (or of persons guessing the mass of the earth). Estimates of value of life derived from such whimsical preferences are likely to be spurious. A spurious estimate of the value of life is likely to be inconsistent with a valid estimate of the value of time.

I now return to the requirement of rationality. Some will argue that the value of the rest area derived from what the potential users think, is still a legitimate estimate, even if it is very different from the value of the rest area to the actual users. Furthermore, that the process of valuation is not to be constrained by a normative rule such as the "requirement of rationality." This argument is an assertion of the primacy of beliefs held by people, no matter what their basis. Whether some beliefs are more legitimate than others is a difficult yet intriguing question. However, even before it is addressed, practical problems arise.

If we dropped the requirement of rationality and the demand that the potential users be able to assess both probability of use and value in use, we would have two discrepant estimates for the value of the rest area; one from the small ensemble of actual users, the other from the big ensemble of potential users. Which of these two discrepant but now legitimate values should be used for making public decisions? It is of course possible to think of an even larger ensemble, say, that of all licensed drivers, and to derive from their opinions yet another value for the same rest area. If all possible ensembles are legitimate, the multiplicity of legitimate but discrepant values of the same thing makes the notion of "value" lose its usefulness in decisions made on behalf of a public.

For a "value of life" estimate to be useful for public decisions, one may have to insist that an ensemble is a legitimate source of value only if the persons in it can correctly assimilate into their preferences the probability of the consequence to them and its value, should the consequence materialize. Correct assimilation means that they can assess the probabilities, can have preferences for consequences and can combine these in accord with the requirement of rationality. (Further discussion of this issue is relegated to a Note 1 at the end of the paper.) Thus, if people cannot form probability-weighed preferences about their death, the estimate of the value of life derived from what they say or how they choose is of little interest for public decisions. Schelling's stratagem does not solve the problem of assigning value to life; what was impossible to do in the first place, is only compounded by the necessity to somehow take into account small probabilities.

In a state-of-the-art review Lawson (1989, p. 43) concludes that the results of all studies deriving the value of life from people's preferences

> fail to reveal either a single most reasonable value or a schedule of values for different types or magnitudes of risk changes. The overwhelming characteristic of the combined evidence is its extraordinary diversity: the imputed value per death avoided (in 1989 Canadian dollars) varies from only about $200,000 up to as much as $50 millions.

This diversity is an additional hint that what is being estimated is some spurious number.

Of course, such a diversity of estimates can come about in many ways. Thus, for example, Savage (1993) and others maintain that it matters how much one dreads a particular kind of death, and that it matters also how uncertain people are about their risk of so dying. In addition, Savage (1992) says that the value that people assign to death seems to depend on age, income, schooling, gender and race. Therefore "practitioners should not strive for, and use, a common valuation of life" (p. 89) for different hazards. While factors of this sort may explain diversity, doing so creates more problems than it solves. If "Blacks have higher levels of dread and perceived threat than do non blacks" (Savage 1992, p. 2), are decision makers to value a black person's live saved at more than a white person's life?

4. LEGITIMACY OF RISK DECISIONS

The analysis by McGee *at al.* (1989) was to be the basis of guidelines for the use of STOP and YIELD signs. It is an example of an "economic analysis" coupled with a "risk analysis." I will call such a coupling of both elements a "technical risk evaluation"

(following, eg. Grima *et al.*, 1986). Technical risk evaluations aim to give legitimacy to public decisions that affect safety. The claim to legitimacy rests on an argument of "implicit consent" (see eg. McLean, 1986, pp. 22–24). To have implicit consent in this case requires several steps. First, one determines how much some people were found willing to pay for reducing their probability of dying (such as when deciding whether to buy smoke detectors, safety equipment for cars, or when deciding to decline an offer of more pay for more dangerous employment, etc.). In such studies the value of life is established. One also determines how much some other people were willing to pay to save travel time (as, eg. when choosing a toll road or a more expensive but faster mode of travel). In such studies the value of time is established. Next one estimates the changes in travel time and in the probability of dying which, say, the replacement of STOP signs by YIELD signs would entail. Finally, with all these estimates in hand, one can calculate whether, where or when a STOP to YIELD conversion would be of benefit. The claim to implicit consent rests on the argument that a rational person holding the aforementioned values of time and life, would agree with the choice that the analyst has made by computation. Inasmuch as the values of time and life used by the analyst are said to represent the relevant public (in this case the road users), the claim is that the public would also give its consent to the choice reached by such a computation. The consent is implicit because the question is not put before the public directly.

One characteristic of such a technical risk evaluation is that it involves the public only as subjects whose choices are noted, and later used as the raw material from which the analyst extracts values; all else is a matter of more or less dispassionate modelling, estimation and computation. Another trait of this process is that once the value of life has been estimated, the same value tends to be used in many similar technical risk evaluations. This promotes the consistency of public decisions, at least within the same agency. Because few wish to deviate from what is commonly done, rather similar values of life end up being used by many agencies. (It is thought selfevident that there is merit in the consistent use of a common value of life. A dissenting opinion is expressed in Note 2).

The technical risk evaluation process will lead to a correct recommendation if the value of life used in it is tolerably accurate. But, as I have argued, the value of life recommended for common use is in danger of being very wrong. Because we are unsure what the right value is, the chance that the chosen value is tolerably accurate is small. Under such circumstances, it is probable that the consistently used process of technical risk evaluation recommends public decisions that are consistently at odds with what the public wants to have.

The discussion has so far revolved around the difficulties of assigning value to life. Value of life estimation occupies center stage only if one intends to engage in the computations of a technical risk evaluation when there is risk to life. But the question is not how to do a correct computation. Rather, the question is how to give legitimacy to public decisions that affect the survival of some. The computations of a technical risk evaluation is but one way of attempting to do so. Can one think of an alternative way that is not in peril of being consistently wrong?

The essence of legitimacy is consent. Instead of the implicit consent on which the computation-based technical risk evaluation rests, consent could be explicit, saying: "yes" or "no." This is how legitimacy is conferred on decisions by ballots, referenda, elections, jury verdicts etc. Consider the now familiar task of setting guidelines on when STOP or YIELD signs are to be used. A representative sample of road users (like a jury) could be instructed on the traffic delay and accident changes associated with the conversion from STOP to YIELD signs. The instruction of such a sample of road users requires the same kind of technical information about the delay and safety consequences of STOP and YIELD signs as the technical risk evaluation. After due deliberation, these road users would come to a choice. However, instead of using values of time and life obtained by econometric methods, these people will have to use the technical information about delay and safety and on this basis state their preference directly. The verdicts of these people would give legitimacy to guidelines on the use of STOP and YIELD signs in the jurisdiction they represent. This is one possible way in which a "direct legitimacy machine" might work.

The suggestion to use a "direct legitimacy machine" instead of the omnipresent computations of the technical risk evaluation may be thought to be odd, naive and threatening. It may be thought odd for being different from what is now commonplace; it may sound naive because there are obvious practical problems that seem unsurmountable as long as no attempt has been made to tackle them; it is threatening because bureaucracies, professions and professionals have a vital interest in the continued acceptance of decision-by-computation. Some quantitative aspects of a possible "direct legitimacy machine" will be explored in a separate paper. However, a qualitative comparison of the two competing ways for giving legitimacy to public decisions involving risk to life can be undertaken here.

Because a person cannot express meaningful preferences when one option is death, both the "sample of road users" and the econometrician's "subjects" face the same impassable barrier. However, beyond this similarity, there are also important differences between the judgements required by road users and the econometrician's subjects. The road users will be asked to think explicitly in terms of number of deaths per year while the "subject" is making choices involving the probability of dying. The road user will bring to his or her judgement not only a personal fear of death but also moral, cultural and community norms. The "subject," in contrast, judges on the basis of a personal fear of death and a dimly perceived probability of its occurrence. Viewed in this light, it would be difficult to claim that the road user's judgement is inferior to the subject's; it is less circuitous and different in content. Therefore, on this score, the computation-based technical risk evaluation is not better than the "direct legitimacy" approach.

Yet the direct legitimacy approach has important advantages. First, the value judgements on which it rests are made with human, not mathematical consistency. So there is a lesser chance of being consistently wrong. Second, the reliability of decisions reached by the direct legitimacy machine increases with the size of the sample of road users in accord with well known statistical laws. Thus, one can always name a sample size that is expected to make better decisions than those possible by computation.

There is perhaps another important advantage to the direct legitimacy approach. The claim has been made earlier that estimating the value of life is not merely practically difficult, but that it is impossible when the only guide to value is what people prefer. If this claim is valid, the direct legitimacy approach clearly separates what is technically possible (the estimation of delay and of accident frequency and severity associated with STOP and YIELD signs) from what is beyond the ability of professionals to do.

It appears then that it is feasible to give legitimacy to public decisions involving risk to life directly; that the direct legitimacy approach has no more difficulty with value judgements than does the computation-based technical risk evaluation; that direct legitimacy avoids the danger of being consistently wrong; and that the direct legitimacy approach separates what professionals with quantitative skills can do well from what may be beyond quantification in some meaningful sense.

The point of this (existentialist) argument is to claim that it may not be possible to approach decisions affecting risk to life in the same way as one approaches the design of an electrical circuit. When it comes to the boundary of life, reasoning based on preferences does not seem to have meaning even when rendered remote by the device of inserting probability before death. If this is true, the legitimacy of public decisions affecting the life of some, may need to be established by more direct means.

Dostoevsky's "underground man" recoils at the claims made in his day by some natural scientist that:

> we only have to discover these laws of nature, and . . . all human actions will then, of course, be tabulated according to these laws, mathematically, like tables of logarithms up to 108,000, and entered in an index.

And in another place he says:

> Oh, absurdity of absurdities! . . . by the way of the most inevitable logical combinations to reach the most revolting conclusions . . . and therefore grinding your teeth in

> silent impotence to sink into luxurious inertia, brooding on the fact that there is no one even for you to feel vindictive against, that you have not, and perhaps never will have, an object for your spite, that it is sleight of hand, a bit of juggling, a cardsharper's trick, . . .

"Notes from the Underground" was published in 1864, long before technical risk evaluation became popular.

NOTES

Note 1.

The suggested test of ensemble legitimacy (that persons in the ensemble be able to *correctly* assimilate into their preferences the probability of the consequence and its value to them) is not yet useful. How can one know whose preferences are correct if the correct value is not known? Eventually one must confront the difficult question of whether peoples' beliefs and preferences should be accepted without questioning or whether one can make distinctions, saying: the opinion of this person is more trustworthy or genuine than the opinion of that one.

One practical difficulty of regarding all beliefs as given, primordial and equally trustworthy has been mentioned earlier. Because the decision one reaches depends on the value chosen and this, in turn, depends on the ensemble of persons from which the value is elicited, one can find a suitable ensemble and justify most decisions. This does not endow public decisions with much legitimacy. In addition, to regard people's beliefs as being beyond question is professional dogma and political ideology more than a reflection of what happens in reality. As parents, educators or clergymen we attempt to affect the values and beliefs of others. Obviously we cannot think that the values we wish to change are sacrosanct or unalterable. As salespersons and advertisers we make our living by shaping people's tastes. It would be very strange to regard the result of such efforts as primordial and sovereign. As governments we do not take people's behaviour as beyond question; otherwise, no government would enact, say, seat belt wearing laws. Nor do we go about our daily routines thinking to attach the same weight to an opinion based on observation to one based on hearsay. All these are good reasons for attempting to clarify the circumstances and attributes that make the opinion of one person better than that of another; one ensemble a better source of value than another.

On the other hand, the danger of saying that one person's taste or preference is more trustworthy than another's is obvious. Therefore, the reasons for the dogma and ideology are not only understandable, they may be worth having. The potential for evil that goes with making the quality of people's beliefs subject to gradation and ranking may far outweigh the damage due to questionable legitimacy of public decisions involving risk.

There may be some middle ground between these two opposing arguments. Most would agree, for example, that a person who has used a commodity has a better idea of its value than a person who has only seen its picture. So that the notion of one ensemble being a more reliable source of value than another could be given clarity in noncontroversial terms. Perhaps philosophers, experts on ethics or psychologists already have the answers, only I do not.

It is unlikely that the dogma of reliance on people's preferences, no matter how uninformed these are, will be opened to questioning. After all,

> Every tool of management decision that is currently a part of management science, operations research, or decision theory assumes the prior existence of a set of consistent goals. Almost the entire structure of microeconomic theory builds on the assumption that there exists a well-defined, stable, and consistent preference-ordering. (March, 1976, *Organizational Theory*, p. 331)

The inclination of most practitioners of the arts enumerated in the quote will be to defend what they do.

There is a price to be paid for the reluctance to consider the legitimacy of people's beliefs to be subject to gradation. The price is that the edifice of decision-making with all

its sophisticated paraphernalia cannot distinguish between conclusions reflecting uninformed opinions, spurious judgements and wild guesses from conclusion based on sound information and informed reflection.

Note 2.

Consistent use of the same "value of life" by public bodies is commonly viewed as a virtue. Many would like to see such a value declared and followed by all. This view is based on the ostensibly compelling argument that the marginal cost of saving lives should be the same across all opportunities to do so. This argument can be made tangible as follows. If the best program administered by agency A can save a life for $100,000, while the best program of agency B saves a life for $500,000, and if the lives saved by both agencies are equivalent, surely it is a waste of four lives to let agency B spend the $500,000. The money should go to agency A. (Not all lifes and deaths are equivalent. However, the discussion to follow would not benefit from making such distinctions.)

The argument is indeed compelling. To follow its dictum one only needs to identify opportunities to save lives, to determine in each case the cost of doing so, and to transfer money to the agencies in charge of the *least-cost* opportunities. The cost-per-life-saved is a reflection of the nature of opportunity and present day cost. It has nothing to do with what people are willing to pay for saving a life. Therefore, however compelling the above argument, it may not be used to advocate the use of a common value of life based on *willingness to pay*.

The least cost-per-life-saved points out the direction in which money budgeted for saving lives should flow from one agency to another. But agency budgets are not noted for their liquidity and those seeking to establish a common value of life amongst many agencies know it. Their concern is not to bring about a transfer of money from one agency to another but rather to affect the overall size of the budget for saving lives.

But, even if this is the objective, there is no obvious virtue to a common value. Suppose that people would be willing to spend about $600,000 to save a life. However, the Safety Uniformity Commissar found that agency A can save a life for $100,000 and declares this to be the current common "value of life" to be used by all agencies in their justifications. Now we have inefficiency of a different kind. Agency B has money and will not give it to agency A; it could save a life for $500,000, which people still think worthwhile, but cannot justify doing so.

Suppose now that the Commissar has got it right and the common value of life is declared to be $600,000. Both agencies A and B can now spend their safety budgets. But, unless the budget of agency A is increased, the gross inefficiency noted at the outset remains. For every life agency B is saving, five could have been saved by agency A. Thus, merely having a common value of life, even if correct, does not help.

In summary, there is virtue in declaring what is the lowest cost at which a life can be saved *provided* that budget money is allowed to flow to the agency that can exploit such opportunities. This cost has nothing to do with attempts to estimate the "value of life." There is also merit in declaring a common "value of life" (based on peoples' willingness to pay) *provided* that the budgets of all agencies are adjusted so that the marginal cost of saving a life is the same in each agency and does not exceed the declared common value. If the above conditions are not met, there is no evident merit to declaring a common value of life to be used by all.

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