Incorporating Fear Assessment Into Cost-Benefit Analysis

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Fear Assessment: Cost-Benefit Analysis and the Pricing of Fear and Anxiety

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Cost-benefit analysis ("CBA") has become standard practice at EPA, OSHA, FDA, CPSC, NHTSA, and other environmental, health and safety agencies. These agencies are required or permitted by some (although certainly not all) of the statutes they administer to employ CBA in making regulatory choices. Executive Order 12,866 generally instructs regulatory agencies in the Executive Branch to conform to a cost-benefit criterion, where statutorily permitted, and to prepare formal cost-benefit documents, for review by OMB, in the case of sufficiently “significant” rules.

What, exactly, is CBA? Economists tend to link CBA to a technical notion known as “Kaldor-Hicks efficiency.” I believe that this linkage is mistaken, and have argued to that effect (along with Professor Eric Posner) in a number of articles. Rather, Posner and I suggest, CBA is best understood as a rough-and-ready guide to overall well-being. In deciding whether to promulgate regulatory measures, agencies – including environmental, health and safety agencies – should consider whether the gains in well-being to those individuals who benefit from the measures are large enough to outweigh the losses to those who are made worse off. Overall well-being is surely not the only normative consideration relevant to regulatory decision, but it is one such consideration, and one that agencies ought to take account of – with the crucial caveat, of course, that a focus on overall well-being must be legally permissible. CBA, in turn, is a practicable tool for assessing whether regulatory measures increase or decrease overall well-being.

CBA, ideally, involves three steps. The “costs” and “benefits” of a given regulatory choice – the effects of that choice on human well-being – should first be identified, then quantified, and finally measured in dollars. These “costs” and “benefits” may include pecuniary losses and gains, but can encompass many other kinds of welfare impacts as well. For example, if EPA is undertaking a full CBA of some regulation imposing more stringent controls on a pollutant, it will surely seek to determine the compliance costs of the regulation. These compliance costs translate into pecuniary losses for the firms subject to the regulation, the workers employed at those firms, and the consumers who purchase products from the firms. But it has also become standard practice, at EPA and some other agencies, to quantify and monetize the effects of regulatory choice on human mortality and morbidity. So EPA will probably conduct a “risk assessment” of the anti-pollution regulation. Lower levels of the pollutant will mean fewer premature deaths and fewer cases of certain diseases. Risk assessors at the agency will try to estimate the number of premature deaths and disease cases avoided by the anti-pollution regulation, and the EPA’s CBA will translate those mortality and morbidity numbers into dollar figures so as to make them commensurable with the compliance costs of the regulation. This may seem extraordinary to those unfamiliar with CBA, but it has become quite routine for agencies to place a price tag on life-saving (a typical valuation would be $5 or $6 million per premature death avoided) as well as disease-avoidance.

Finally, EPA might go beyond the pecuniary and physical (death and disease) effects of the regulation, and consider less tangible costs and benefits. There is now a large, scholarly literature in applied economics that attempts to determine the monetary valuation of a variety of environmental amenities such as the enjoyment experienced by visitors to parks or other protected areas, the recreational benefits of hunting and fishing, the improved visibility that accompanies better air quality, smell- or noise-avoidance, the “esthetic” benefit of viewing a nice landscape, and the sheer satisfaction of knowing that a site, ecosystem, or species exists. Literally hundreds if not thousands of so-called “contingent valuation” or “revealed preference” studies exist in the academic literature, seeking to measure these sorts of environmental benefits on a money scale. (“Contingent valuation” is an interview-based technique for monetizing welfare costs and benefits. Respondents are asked how much they would be willing to pay in dollars to secure a given benefit, or willing to accept in return for a given loss. “Revealed preference” studies seek to infer individual monetary valuations by looking to actual behavior or market data – for example, the effect on housing prices of vistas and eyesores, or the travel costs that park visitors are willing to incur.) And EPA, in its actual cost-benefit practice, has taken account of these less tangible environmental costs and benefits, as well as pecuniary, mortality, and morbidity effects.

My suggestion is that environmental, health and safety agencies should also (at least sometimes) count fear and anxiety as a cost for purposes of CBA. EPA,
OSHA, CPSC, OSHA, and FDA should engage in fear assessment, just as they now engage in risk assessment. Risk assessment means quantifying the effect of agency choice on death, illness, and injury and—if the agency is doing CBA—converting those numbers to monetary values. By analogy, fear assessment would mean predicting the effect of regulatory measures in abating (or increasing) the fear and anxiety states that various members of the population experience, and then placing a price tag on this psychological impact.

CBA, again, is a tool for determining whether a regulatory choice increases or reduces overall well-being. A full CBA should therefore identify, quantify, and monetize all of the ways in which a regulation would affect human welfare, including its fear/anxiety effects—without the important caveat, to be considered in a moment, that CBA itself can be costly and that these “deliberation costs” may justify limiting its scope.

Why not fear assessment? After all, fear and anxiety are a genuine cost: a genuine setback to human well-being. The cost, here, is psychic rather than physical—suffering an unpleasant mental state rather than losing a limb or losing your life. But psychic changes can genuinely constitute a change in welfare. Philosophers like Jeremy Bentham and J.S. Mill argued that human well-being is solely a matter of mental states, “pains” and “pleasures.” This view is too extreme, I think, but surely it is the case that psychological distress—fear and anxiety—is one kind of welfare cost. Indeed, the law has long recognized this in areas other than regulatory practice: for example, in the ancient tort of assault; in the more modern emotional-distress torts (epitomized by intentional fear-inflation, although unlike assault not limited to fear-inflation), and in the compensability of fear as a component of pain and suffering damages. And there is plenty of evidence that some (if not all) of the hazards regulated by environmental, health and safety agencies are the target of substantial fear. Consider the popular fear of toxic waste dumps (epitomized by Love Canal), of carcinogenic food additives (for example, the Alar scare), of cancer more generally, of genetically modified food, of all things nuclear (reactors, waste, irradiated substances) and, recently, of mad cows.

In fact, agencies do occasionally price fear, anxiety, or other sorts of psychological distress. The FDA last year proposed a rule that would reduce the allowable defect rate in medical gloves. The agency reasoned that fewer defective gloves would mean fewer cases in which medical personnel come into contact with human blood. Such blood-contact incidents have a variety of costs: they can cause blood-borne diseases such as HIV or hepatitis; they can lead medical personnel to order blood-screening tests, which are expensive; and the incidents can cause fear and anxiety in the exposed workers. The FDA quantified and monetized all of these costs, estimating that the proposed rule would prevent 100,000 blood-contact incidents annually and that the fear/anxiety cost of each incident was $13.

FDA’s recent attempt to measure and price the fear-reduction benefit of safer medical gloves is an excellent example of regulatory fear assessment. It is also very unusual. The AEI-Brookings Joint Center maintains a database of 48 “significant” rules, issued between 1996 and 1999, where agencies prepared full cost-benefit documents for OMB review. In 13 of the 48 rulemakings, the agencies explicitly quantified and monetized death, illness, or injury. In 7 other rulemakings, the agencies explicitly quantified without monetizing mortality or morbidity effects. But there is only a single rulemaking in the database where an agency provided quantitative estimates, or monetary valuations, of fear, anxiety, or other forms of psychological distress. Perhaps even more surprisingly, although the academic literature is full of studies attempting to value morbidity, mortality, and environmental amenities, only a few academic economists have sought to estimate the cost of fear.

Why? Is there a principled reason for agencies to eschew fear assessment? I think not. There may be an historical reason why they do. The rise of risk assessment in the federal government, and the concomitant pricing of life and morbidity by regulatory agencies, is due in no small part to a seminal 1980 decision by the Supreme Court, the “Benzene” case (Industrial Union Dep’t v. American Petroleum Institute), which demanded that OSHA quantify health benefits before regulating workplace toxins. A few years after this decision, in Metropolitan Edison v. People Against Nuclear Energy, the Court rejected a claim by a group of Harrisburg residents, living near the Three Mile Island nuclear plant, that the Nuclear Regulatory Commission was required to file an environmental impact statement addressing the psychological effects of restarting the plant. The Court held that psychological distress was not, without more, the kind of environmental impact that would trigger NEPA (the National Environmental Policy Act). Just as Industrial Union fueled risk assessment, Metropolitan Edison dampened fear assessment—or so a plausible historical explanation for current cost-benefit practices might go. But this is an explanation, not a justification. There is no good reason, I suggest, for environmental, health and safety agencies undertaking CBA to generally ignore fear and anxiety effects.

One objection to fear assessment concerns quantification. “Fear just can’t be measured.” But in fact there are various fear/anxiety scales regularly employed by psychiatrists and experimental psychologists, such as the Spielberger State–Trait Anxiety Inventory, the Hamilton Anxiety Rating Scale, the Beck Anxiety Inventory, and the Covi Anxiety Scale; and also a small academic literature where such scales have been employed to measure the effect of waste dumps, toxic and radioactive accidents, air pollution, and workplace asbestos in producing fear and anxiety among individuals aware of these hazards. Another objection to fear assessment involves uncertainty. How can we know for certain how many states of anxiety or fear will be caused by a hazard, how intense these states will be, how long they will last? But uncertainty is a pervasive feature of regulatory choice. Consider that risk assessors never

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448 U.S. 607 (1980).
know for certain how many deaths or illnesses will be avoided by hazard mitigation and what the compliance costs of mitigation will be. Well-developed, generic techniques for handling uncertainty about costs and benefits currently exist; these could readily be extended to fear assessment.

A third objection is that fear and anxiety, particularly the popular "dread" of certain environmental, health, or safety hazards, is irrational. Yet irrational fears, no less than rational fears, constitute genuine welfare setbacks. Consider two hypothetical individuals, Jim and June. Jim is irrationally certain that his chance of dying on a bumpy airplane ride is 1 in 100, and is quite distressed during the 6 hour ride. June rationally believes that the chance of dying from a blood-borne illness, with which she has just been diagnosed, is 1 in 100, and like Jim is quite distressed for the 6 hours until she learns that the diagnosis was erroneous.

Fear, technically, is an unpleasant affective state—a bad sensation or "feeling"—caused by the subject's belief that he or she is at substantial risk of physical harm. In Jim's case, the belief is unwarranted; in June's case, the belief is warranted. But in both cases the individuals incur a real affective cost.

It is sometimes said that communication and education, rather than direct regulation of feared hazards, is the least cost-effective way to mitigate fears. This is an open, empirical question—some fears are resistant to education—but in any event the communication/education point does not undercut fear assessment. Rather, it suggests that where fear is at issue regulators should consider a wider array of possible regulatory measures, including informational and educational measures, as well as direct prescription. If an informational measure truly is the best "technology" for fear-reduction, in some regulatory context, then a well-conducted CBA (incorporating fear assessment as a component) will select that measure as the optimal one.

A more important worry about fear assessment, I believe, concerns deliberation costs. The very process of CBA is costly. The causal linkage between hazards and various kinds of welfare impacts will need to be estimated. Predictive models will need to be developed, and uncertainty about the models or model parameters will need to be handled. Money valuations for the impacts will need to be determined, either by searching the existing literature or by undertaking new valuation studies. Policy staff at the agency will need to review the analysis, as may external monitors such as OMB or congressional committees. Is all this analytic effort worth the benefit (the benefit in better regulatory choices) when it comes to fear and anxiety? Not necessarily. In general, the deliberation costs of full-blown CBA are not always justified, even for standard costs such as compliance costs or mortality. Executive Order 12,866 requires full-blown analysis only for certain "significant" rules, which as defined by the Order are only a small fraction of the rules that agencies promulgate. On the other hand, the benefits of full-blown analysis sometimes do outweigh the deliberation costs—and that is true for fear and anxiety, just as it is true for other categories of welfare setbacks and improvements. Rough threshold guidelines for when agencies should perform fear assessment could readily be developed. These guidelines might look to, inter alia, the size of the population exposed to the hazard; whether the population is particularly resistant to fear (for example, workers who self-select into high-risk occupations); whether the hazard is generically "dreaded," as is nuclear power; and whether the particular hazard has become salient to the exposed population, for example because of media attention.

Finally, it might be objected that fear assessment is self-defeating in the long run. If agencies incorporate fear-reduction benefits in CBA, fear entrepreneurs will have an added incentive to make citizens fearful of the hazards that the entrepreneurs want eliminated. This objection would be quite serious, I think, if agency decisions were insulated from legislative control, or if legislative decisions were themselves driven by CBA. Imagine a technocratic world in which both Congress and agencies conscientiously resist popular pressure and use CBA to reach their choices; in such a world, shifting from traditional CBA to a CBA that incorporates fear assessment could well end up, perversely, causing a greater amount of fear. For now, however, fear entrepreneurs have a large incentive to incite fear, regardless of the details of agency CBA, since agency decisions can always be reversed by legislators who are (predictably) sensitive to popular fears. Consider that fear-mongering is already a familiar part of the politics of environmental, health, and safety regulation even though agencies, with a few exceptions, do not currently quantify and monetize fear.

How, exactly, should fear and anxiety be measured? And how should the measurement be converted to a dollar value? These are technical problems, best engaged by applied economists. My tentative suggestion is that agencies engaged in fear assessment might use fear-days as their basic unit. A "fear-day" is a day during which the individual is substantially more fearful or anxious than population norms. This is just the kind of unit now regularly employed by agencies and economists for CBA of acute physical morbidities such as headaches, angina, congestion, cough, sneeze, nausea, or eye irritation. Monetary prices are assigned to headache-days, angina-days, congestion-days, etc. For a given regulatory intervention, the fear assessor might (1) estimate the number of fear-days avoided by the intervention, relative to the status quo; and then (2) price each avoided fear-day at a standard price. For technical reasons, a price per fear-day is best estimated (I think) using "contingent valuation" rather than "revealed preference" techniques. Applied economists, this days, wouldn't think twice about conducting interviews where subjects are asked for their willingness-to-pay to avoid a bad headache, a stuffy nose, the loss of an ecosystem, an ugly view, or an incremental risk of death. Interviews focusing on willingness-to-pay not to be afraid pose no greater conceptual or practical difficulties. Another possibility is using interviews to measure fear or anxiety on a QALY scale—a welfare scale used by health economists—and then converting the results to dollars with a standard conversion factor.
My view of fear assessment makes it a separate component of CBA. Fear states need to be separately predicted and priced. Some scholars have advanced a different proposal: that fear costs be incorporated in CBA by attaching a fear premium to particularly dreaded deaths. For example, regulatory agencies might ascribe $6 million to each premature death in a car crash or industrial accident, but $12 million to cancer deaths, given that cancer is especially feared. The trouble with this proposal is that it assumes a tight correlation between death-reduction and fear-reduction. Imagine that by promulgating increasingly stringent measures an agency can prevent an increasing number of cancer deaths: 10 with the least stringent measure, 20 with a more stringent one, 30 with the most stringent one. There is absolutely no reason to assume that the aggregate fear-days avoided by the second and third measures will be, respectively, twice and three times the aggregate fear-days avoided by the first measure. Fear correlates with perceived risk, not actual risk, and only then in a very rough, non-linear way. Banning a food additive or closing down a waste dump entirely might well have a dramatic effect in reducing fear but a much less dramatic effect in reducing death, as compared to the status quo and less stringent regulatory alternatives, since it may well be the sheer existence of the hazard that accounts for most of the fears about it.

I have argued here for the pricing of fear and anxiety by environmental, health and safety agencies since these are governmental bodies that are generally conversant with CBA and since popular fears and anxieties are substantially affected by their choices. Unfortunately, in this post-9/11 world, EPA, OSHA, FDA, and NHSTA aren’t the only federal agencies fighting terror. The war against terrorism is, of course, mainly a war against the physical violence that terrorists seek to wreak, but is also a war against the anticipatory and resultant fear flowing from this violence. I cannot address the matter at length here, but believe that CBA should in some contexts be employed by the Department of Defense, the Department of Homeland Security, and other national security bodies. If so, CBA by these agencies should also (with due sensitivity to deliberation costs) include a fear assessment.