COMMENT ON "IMPOSED RISK"

James L. Johnston

There are at least two grounds on which to commend Gerald Sauer's paper on imposed risk. One is the powerful criticism he offers of traditional regulation by government for handling (or should I say, mishandling) problems of externalities. The other is the courageous attempt to fashion a new judicial institution for settling disputes arising out of situations, like the typical pollution problem, where liability is not well defined.

The system proposed is a two-step process. The first is a kind of arbitration where participation by the "defendant" is voluntary. If the judgment at the first stage goes against the defendant, the system progresses to the second stage; otherwise the process is completed.

At the next stage a full-scale hearing is conducted and the burden of the argument shifts to the defendant. The decision is rendered by a panel, which also decides on the size of the damage award. In the first stage legal fees would be borne by the plaintiffs. Only if there were a successful judgment at first stage would the burden of the legal fees (for both stages) fall on the defendant.

Sauer correctly concludes that once decisions develop a pattern and become predictable for a set of cases, disputes will tend to be settled outside of the hearing process. The reason, of course, is that final decisions, when they can be anticipated, tend to dominate the earlier negotiations. However, that same argument can be used to question whether the first stage of the hearing process can use one set of rules for the burden of proof and legal fees and another set for the second stage. It would seem that rules at the second stage would dominate the first stage and the negotiations that might precede it. Thus, the intent of having a modest barrier at the first stage against nuisance suits is effectively defeated.

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Sauer expects that only problems with a nontrivial probability of occurrence will be brought to his dispute settlement machinery, or indeed to any mechanism or institution devoted to the definition and enforcement of property rights. That is only partially true. The missing consideration is the magnitude of the damage. Decisions sought will be those where the product of the probability of occurrence *and* the damage that would result is significantly greater than the ordinary ambient riskiness of going about one's life.

There is also a question about risk. Specifically, it is not a single-dimensioned attribute. For example, water quality for irrigation purposes is adversely affected to a serious extent when only traces of boron are present, yet the suitability of such water for human consumption is unaffected.

The foregoing are, of course, minor flaws. I do not mean to imply, however, that the paper will stand as a contribution if only a few repairs are made. There are some fundamental problems that cannot be so easily accommodated. One is that risk and damage are unknowable to any workable extent. Consequently, the system may not produce the appropriate damage awards. The implication of this is serious. Without an improvement in the definition and enforcement of property rights the allocation of resources will be further distorted. An even more serious problem is the fashioning of a complex legal institution in advance of fully understanding the problem of externalities and what free-market institutions already exist for accommodating them.

Gerald O'Driscoll makes the point eloquently in his comments on the Epstein paper elsewhere in this journal. Markets already address externalities where it is worth it to do so. So-called "failures" of the market are little more than examples that some economists present to their students to help the freshmen understand the rudiments of supply and demand. Only the least competent economists turn that exercise into a campaign to make the world conform to the "pure and perfect competition" model.

This is not to say that the market has already devised all the solutions and none remain. Before advocating a new institution, however, it would seem appropriate to take inventory of what free-market solutions have previously emerged in selected instances. It would also seem reasonable to quantify in a gross fashion the value of attempting to improve the property rights, so that the cost of any new institution could be weighed against it. What these two steps imply is that the market may have already worked out solutions to the serious problems, and the remaining cases may be too costly to

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solve with the present technology.

If one were to make a list of market solutions to externality problems, it might be rather long. The following is just a partial one, but still instructive: Law suits, injunctions, and arbitration; insurance; sales tied in with excludable goods; patents and copyrights; clubs; social ostracism; unitization of oil fields; fish farms; rentals of bees; hunting preserves; fishing licenses where the proceeds go for restocking; toll roads, vehicle registration fees, and motor fuel excises that can only be spent on roads; and cable-TV scramblers.

These all imply that competition and the potential gain from excluding free riders is sufficient in many areas. On the other hand, government institutions, including the new quasi-judicial ones that attempt to improve environmental quality, are not subject to the same discipline and are not forced to demonstrate that a positive net contribution results from their existence.

Indeed, there is reason to believe that government regulation to cope with environmental externalities may make the problem worse. It is to Sauer's credit that he offers a strong critique of regulators. To my mind, however, a couple of important aspects are omitted. First, vesting decision-making authority with regulators who bear neither the full rewards for successes nor the full liability for their mistakes actually creates a new externality without eliminating the old one.

In addition, there is seldom a systematic trade-off between the costs and benefits of regulation or standard, to say nothing of an attempt to identify spillover effects from the regulations. Perhaps the worst case is when regulations specify the particular abatement technology to be used, such as stack-gas scrubbers for coal-fired boilers. The effect here is to retard the development of more effective abatement technologies.

There may be ways to repair Sauer's proposal so that the political system does not turn his suggested solution into an additional problem. If there are, I am unaware of them. All this leads me to worry whether one can reasonably expect Sauer's legal machinery to actually produce an improvement. While I would hope for the best, I am prepared for the worst.

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RADIATION POLLUTION AND CANCER: COMPARATIVE RISKS AND PROOF

Bernard L. Cohen

Radiation

One of the most important physical phenomena in our universe is the existence of electromagnetic waves. They consist of electric and magnetic fields rapidly reversing in direction and propagating through space ("radiating") at a speed of 186,000 miles per second. The number of times per second the direction of the fields go through a cycle (i.e., reverse and then reverse again back to their original direction) is called the frequency, and it determines their behavior and the uses that can be made of them. Frequencies around 1 million cycles/sec are used for radio broadcasting; television uses about 100 million cycles/sec; radar and microwave ovens use about 10 billion cycles/sec; frequencies around 10 trillion cycles/sec are called "infrared"; our eyes sense frequencies of 400-750 trillion cycles/sec, so we call electromagnetic radiation in this range "light"; frequencies of a few quadrillion cycles/sec are called "ultraviolet"; frequencies above a quintillion cycles/sec are called "X-rays," and still higher frequencies are known as "gamma rays." A remarkable property of these radiations is that they occur in bursts, with each burst containing a definite amount of energy, which is proportional to the frequency. In many ways these bursts of radiation may be thought of as particles.

When one of these particles passes close to an atom, the electrons orbiting the atom feel the force of its rapidly oscillating electric field and are shaken back and forth by it. If there is enough energy in the particle of radiation, this shaking is strong enough to knock the electron loose from the atom. Only the highest frequency particles, X-rays and gamma rays, have enough energy to completely

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