Volume Title: Measuring and Managing Federal Financial Risk

Volume Author/Editor: Deborah Lucas, editor

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-49658-9

Volume URL: http://www.nber.org/books/luca07-1

Conference Date: February 8-9, 2007

Publication Date: February 2010

Chapter Title: Comment on "Environment and Energy: Catastrophic Liabilities from Nuclear Power Plants"

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Chapter URL: http://www.nber.org/chapters/c3075

Chapter pages in book: (257 - 260)

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Comment William Pizer

Key decisions in public policy often come down to efforts to weigh the costs and benefits of various alternatives. In order for such efforts to be meaningful, it is important to include all major sources of costs and benefits—otherwise, what may *appear* to be a reasonable choice can turn out to be quite the opposite when a full accounting occurs. The question would then seem to be, what are the key categories of costs and benefits?

This could be the primary focus of Heal and Kunreuther, who turn their attention to a broad category of such costs and benefits—environmental assets and liabilities—in order to see if there are any lessons for current policymakers. Their chapter breaks down into two parts: first, a review of environmental assets and accounting; and second, a review of environmental liabilities and insurance, with a particular emphasis on nuclear power. Each part offers lessons for improving public policy decisions.

The first section reviews a number of examples where environmental assets have or have not been valued. The Catskills provide significant value to New York City in terms of their ability to cleanse and stabilize the flow of water to New York. Forests offer value in terms of sequestered carbon dioxide that otherwise contributes to global climate change. Oil, gas, coal, and other mineral deposits have very clear market value. Soil provides agricultural productivity. And the climate system, to date, has provided relatively stable climate and weather patterns that have allowed regions to develop and

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specialize—such as Florida's balmy weather or the Rockies' extensive ski resorts. Among these, only the Catskills watershed and mineral resources are examples where natural assets have been recognized, valued, and addressed by economic decisions. Elsewhere, public policy has failed to value these assets with, over time, likely adverse economic consequences.

The second section shifts to liabilities. Some, like the Superfund program and nuclear plant liabilities, are relatively well defined. Others, like the costs of hurricanes and terrorist acts that are not privately insured, are much more opaque. A variety of different approaches have evolved to deal with these liabilities, typically involving some notion of shared public-private risk, as they do not satisfy the conditions for pure private insurability. The nuclear liability program, designed to cover the costs of a nuclear accident and defined by the Price-Anderson Act, is characterized by about $10 billion in pooled private liability. Yet, as the authors show, the potential liability may be ten to one hundred times that—liability that rests with the federal government. Because of the nature of the private insurance, both its size and structure, Heal and Kunreuther argue that plant operators have insufficient incentive to pursue safer operations. In particular, they advocate a system of third-party inspections coupled with insurance premiums linked to inspection results.

In this way, Heal and Kunreuther offer some very specific advice: account for environmental assets and design insurance schemes to properly incentivize behavior. Consider public schemes when liabilities do not satisfy conditions for insurability.

Yet while that advice *could* be the primary focus of the chapter, it is not. The first line of the abstract states "[we] argue that the degradation of natural capital can lead to social risks which ultimately will end up to some degree as the responsibility of the Federal government." A later statement drives home the point regarding Hurricane Katrina: "the public expects the Federal Government to step in and offer restitution in situations such as Katrina." This is a very important point: while the government may or may not seek to take action to preserve natural assets, to avoid liabilities, or to develop explicit insurance programs, it will *always* have liability.

In this way, many public policy choices that may seem to be about action or inaction—for example, regarding climate change—are really about action now versus action later. The same can be said for natural disaster risk, terrorism, or encouraging nuclear power. The latter is a particularly interesting case, as nuclear power itself represents a fundamental risk-risk tradeoff—the risk of a nuclear accident versus the risk of climate change (which will be greatly increased without nuclear power). Here, we have choices both about how we will manage the nuclear risk and how we will balance it—through more or less effective public insurance subsidies—against climate change risk.

Climate change, thus viewed by Heal and Kunreuther, remains a cata-

strophic risk born by the Federal government that should be met with both suitable mitigation and appropriate insurance tools. The ambiguity of risk in this case—concerning both the likelihood and consequence of adverse events—is simply a reason private insurance against climate change will not arise. However, there is another view about the ambiguity of risk in this case. Recent work by Weitzman (2009), and consequent criticism by Nordhaus (2009), take the notion of catastrophic risk a step further—arguing that in extreme cases catastrophic risk can actually throw into question the entire apparatus of cost-benefit analysis.

Weitzman makes the point that conventional cost-benefit analysis relies on some notion that increasingly improbable and adverse events can, at some point, be neglected. Otherwise, our analysis becomes dominated by efforts to estimate the likelihood and magnitude of increasingly rare and super-catastrophic events—efforts that are highly speculative and eventually somewhat meaningless. Weitzman argues that this is precisely the case of global climate change, owing to the unprecedented level and rate of change in greenhouse gas concentrations, uncertainty about the potential of significant positive feedbacks, and no understanding of what a 10 or 20 degree temperature change really means. Nordhaus, meanwhile, argues that we can and should do our best to estimate the likelihood and consequence of various climate change outcomes and use that estimate to inform decision-making. That is, he assumes the probability of increasingly rare events fades more rapidly than the consequences of those events expand.

Weitzman is trying to make an extreme point—that in the case of climate change, conventional cost-benefit analysis is overwhelmed by the catastrophic risk and it is unbounded, with the policy implication that we should do virtually *anything* to contain that risk. This reminds one of a high school debating tactic in the 1980s—the "nuclear option"—where each team would attempt to tie whatever side of an issue they were arguing against to an increased risk of nuclear war. Such an outcome would be catastrophic, and therefore must be avoided. But how does one know how much is enough?

A weaker version of Weitzman's point is one where the cost-benefit is overwhelmed by the catastrophic risk, but is not unbounded. In Heal and Kunreuther's analysis of a worst-case nuclear accident, for example, damages could be on the order of a $1 trillion (what they refer to as "almost unthinkable costs"). Such a risk might be enough to overwhelm the cost-benefit analysis of a $1 billion nuclear power plant, but it is not unbounded.

In some people's minds, this is precisely the calculus—nuclear power is not worth it. Others are okay with nuclear power, perhaps owing to an analyst's calculations that put the expected value much lower, efforts to mitigate that risk through various measures, or a notion that this unknowable risk on the nuclear accident side has an equilibrating unknowable risk on the other side—perhaps the likely environmental consequences from climate change if nuclear power is off the table.

All of this should be a bit humbling, particularly as regards climate change but also more generally for cost-benefit analysis with ambiguous risk. Cost-benefit analysis, and particularly analyses involving catastrophic risk, should not be viewed as a formulaic way to make decisions. It is a valuable part of the decision process—maybe the most valuable part. But, in the end, values and judgment play an extremely important role.

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