

DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS
DIVISION OF AGRICULTURE AND NATURAL RESOURCES
UNIVERSITY OF CALIFORNIA AT BERKELEY

WORKING PAPER NO. 766

**ECONOMIC ANALYSIS IN POLICY EVALUATION, DAMAGE ASSESSMENT
AND COMPENSATION: A COMPARISON OF APPROACHES**

by

W. Michael Hanemann

and

Andrew G. Keeler

• *This paper was originally produced June 1995* •

California Agricultural Experiment Station
Giannini Foundation of Agricultural Economics
May, 1996

**ECONOMIC ANALYSIS IN POLICY EVALUATION, DAMAGE ASSESSMENT
AND COMPENSATION: A COMPARISON OF APPROACHES**

W. Michael Hanemann
Department of Agricultural & Resource Economics
University of California, Berkeley

Andrew G. Keeler
Department of Agricultural & Applied Economics
University of Georgia, Athens

Prepared for presentation to the 1995 AERE Workshop
on
Government Regulation and Compensation:
Implications for Environmental Quality and Natural Resource Use

June 5-6, 1995
Annapolis, MD

ECONOMIC ANALYSIS IN POLICY EVALUATION, DAMAGE ASSESSMENT AND COMPENSATION: A COMPARISON OF APPROACHES

1. Introduction

This conference examines two areas of much current interest in environmental policy -- takings and natural resource damage assessment -- where, as we speak, what had been considered quite settled areas of law are being reconsidered by both the legislative and judicial branches of government in a fairly dramatic manner. Moreover, these rather sudden events come against the backdrop of a gradual but pronounced and widespread shift in sentiment that economics should play a much larger role in environmental policy in the future than it did during the first twenty-five years of the modern era of environmental regulation. As environmental economists, we are obviously excited about the opportunities and challenges lying ahead. Our purpose in this paper is to comment on how economics can and should address these challenges. At the same time we want to sound a cautionary note. We believe that economics will play a more useful and successful role if it pays adequate attention to the goals of judicial processes, the kinds of decision and policies that existing institutions are capable of making, the context of the decision in question, and the underlying conception of fairness as well as of efficiency. We can learn not only from the theory of policy analysis in the abstract, but from the limitations of policy analysis in practice.

Although this conference focuses on compensation for takings and natural resource damages, we include policy evaluation within our focus since, in the environmental area, this both has a longer history as an arena for the application of sophisticated economic analysis and is the one most familiar to many economists. Compared to the legal settings in which issues of compensation for takings and natural resource damages have tended to be played out, policy evaluation is more like home turf for a majority of economists, especially of the academic variety such as ourselves. Our goal is a comparison of the methodologies of economic analysis in these three settings.

An enormous literature has developed on the use of economics for policy evaluation, going back to the 1950s and the cost-benefit analysis of federal water projects. At that time, the focus was on the valuation of changes in supply of market commodities such as irrigated crops, urban water supply, hydropower, or navigation. By the early 1960s, this had expanded to include some non-market valuation, especially use values such as recreation, and health and safety benefits from public health programs. During the 1970s, this expanded to include nonuse values such as aesthetic values for visibility and existence values for fish and wildlife. By contrast, natural resource damage assessment is a child of the 1980s, especially the late 1980s. Although CERCLA was enacted in 1980, the first suits for natural resource damages were brought under state law in Colorado around 1985. Indeed, although the CERCLA Type B rules were promulgated in 1986, since many States had decided to challenge them as violating the language and intent of CERCLA, when states did contemplate suits for natural resource damages they

focused on state as much on federal law.¹ Two events in 1989 changed things dramatically -- the grounding of the *Exxon Valdez* on March 24 1989, and the DC Appeals Court ruling in the *Ohio* case on July 14, Bastille Day, 1989 that set aside key provisions of the Type B Regulations. Since then, and especially since the settlement of the government suits for damages from the *Exxon Valdez* in 1991, a fierce battle has been waged over the economic sections of the rules that will be issued by DOI for damage assessment under CERCLA and by NOAA for damage assessment under the 1990 Oil Pollution Act.

Economics has played a relatively small role in existing takings litigation, except for garden- variety valuation exercises. Compensation for regulatory taking became headline news in environmental policy following the Supreme Court's *Lucas* decision in 1992, and it has received even more attention with recent proposals that would trigger regulatory takings with minimal instead of total diminution of property value. If these changes in the law occur, through either judicial precedent or congressional legislation, and some partial diminution of value becomes the criterion for a finding of takings, this is likely to create a considerable demand for economic analysis to determine whether or not the criterion is satisfied. Economic methodologies for analyzing regulatory costs and determining their impact on landowners and other asset holders could become highly influential in takings cases.

In all three areas, therefore, a trend is emerging to make economic studies central to the outcome of the administrative or judicial processes that determine winners and losers and set the *de facto* incentives that guide behavior. Because of this trend, it seems appropriate to investigate the methodologies that will be used. How are these studies conducted? What economic principles are applied? Are they applied in the same way in each arena? If not, is there any cogent rationale for the differences? These are the questions on which we will focus. This paper represents some initial observations on these themes rather than the definitive conclusions.

To those who would apply it for purposes of administrative and legal decision making, economics offers two key contributions. On the one hand, it provides the substantive tools used to value things in monetary terms, whether for benefit-cost analysis or by way of compensation for takings or natural resource damages. On the other hand, it provides normative guidance as to how the larger enterprise should be designed and conducted -- when compensation is called for, what its magnitude should be, etc. The economic notion of value and the economic notion of efficiency are our two most distinctive exports to the outside world. We believe that others -- judges or lawmakers, for example -- should give deference to the economic paradigm in these matters and, for the most part, they are happy to oblige. Sometimes, however, there are moments where things proceed less harmoniously, when the application of economic paradigms produces a discordant note. These discordancies can be of great interest because they may reveal a conflict in underlying goals, values, or methodologies. By focusing on them, one may gain insight into foundational assumptions that are so ingrained and instinctive that they arouse little attention

¹This happened, for example, with the oil spill in San Francisco Bay in April 1988 [Hanemann (1992)].

within the field itself.

This is the approach that we will follow here, considering not just the similarities but especially the differences in how economic paradigms are applied in the three areas of environmental decision making. We start by discussing the economic concept of value in Section 2, and the economic concept of efficiency in Section 3. In Section 4, we discuss the economic concept of optimization. In Section 5 we discuss issues related to takings. We expect to raise more questions than we shall answer. However, we believe that these issues of economic methodology sufficiently important to warrant our preliminary enquiry.

2. Value in Economics

We take as our starting point a recent critique by Cummings (1991) of the legal and administrative uses of economic paradigms which focuses in particular on market value as the standard of compensation for government condemnation of private property. Cummings cites a case in the 1950s where the federal government condemned 156,000 acres of land owned by Indian tribes in North Dakota that were to be flooded for the construction of Garrison Dam. The tribes were paid \$12.5 million, based on the then prevailing per-acre market value of land in North Dakota. However, he continues, "there was in 1950, and continues to be today, the feeling by many that just compensation was not achieved by the \$12,5 million paid the Tribes for their taken lands....the 'fair market' settlement did *not* leave the Indians 'whole'" (pp. 465-6). Prior to the condemnation, the Indians were economically self-sufficient; after it, they became almost totally dependent economically on the federal government. In this case, at least, paying them market value did not make them whole.

What went wrong? Cummings identifies two distinct failures of the market paradigm as it was applied in this case -- violations of the assumptions of perfectly competitive markets and perfectly mobile agents. The Indians were bound to the area both by the terms of nineteenth century treaty settlements with the United States and by ties of custom, religion and culture. They were not free, as Cummings put it, to move from North Dakota to Florida to spend their money on similarly productive land there. Furthermore, because of their immobility, if they had sought to buy 156,000 acres somewhere else in North Dakota to substitute for the land they had lost, they would have had to pay considerably more per acre than what they had been given. What they were paid was based on recent farmland prices in the area, a market where annual transactions involved much smaller quantities of land than 156,000 acres. If the demand for land increased by that magnitude, land prices in the area would rise substantially. As buyers, the Tribes would have faced something much more like a monopoly market than a competitive one.

To overlook this distinction was simply "bad" economics and, in Cumming's view, it made for "bad" law. He saw it as one of "the all too frequent instances where economic paradigms are used uncritically and accepted (particularly by the courts) as offering *objective* measures for social and economic effects of alternative water allocation schemes.... Congress and the courts have seemingly imputed to economic paradigms -- principally the market paradigm --

a level of objectivity which simply does not exist. Put another way, these entities, in their use of economic paradigms, have failed to appreciate the assumptions underlying the paradigm, and these assumptions have many times involved the very equity issues at issue before them. In such cases, the economic "model" used included assumptions which effectively preempted the role of Congress of the court's role in addressing an equity issue" (463-4).

We strongly concur both with Cummings' specific criticism that lawmakers and courts err when they take market prices as an adequate basis for determining whether individuals have been made whole, and with his general concern that, in their zeal to use apply economic paradigms, lawmakers and courts may fail to appreciate the underlying assumptions, with highly undesirable consequences. In this paper, we want to extend Cummings' critique in several ways. With regard to market prices as a standard value, we believe that these can be misleading for more reasons than monopoly power and the immobility of agents. Even with competitive markets and perfectly mobile agents, market prices fail as a measure of value for *non-marginal* changes in the allocation of market goods. As we show, this opens a up a Pandora's box of complications both for the assessment of individual welfare and for the aggregation of welfare over individuals.

Before proceeding, we should mention that the tendency of equating value with market prices seems to us to be pretty deeply ingrained not only among lay people but also among many economists. Moreover, it is not surprising that this should be so. There is something very attractive about the notion that one can use market prices to measure value. When one wants to value something, whether for legal, administrative or other purposes, it certainly simplifies things if the value is something that is objective and robust, something that is not hypothetical or speculative, something that doesn't require lots of assumptions, something that doesn't require complicated measurement procedures which could be a source of uncertainty and disagreement. To the casual observer, prices seem to fit the bill perfectly. However, this can often be an illusion. When one looks at actual prices in real markets, there is usually an embarrassing *multiplicity* of prices. Not only are there many different versions of what is essentially the same commodity, but also any given version is likely to be on sale at different prices from different suppliers due the absence of legal retail price maintenance in the US (as opposed, say, to the UK). This is demonstrated both by personal experience -- we can get a candy bar for \$0.40, \$0.50, \$0.55, and \$0.85, depending upon whether we buy get it at a discount drugstore, supermarkets, or the airport -- and by systematic academic research.² What one takes as a price for the purposes of analysis often depends greatly on the judgment of the researcher, and on the assumptions that she chooses to make. Moreover, in some cases, such as the Indian tribes' litigation discussed by Cummings, the relevant issue is what the prices *would be* under some circumstances other than those that have been observed. There is an irreducible element of counterfactuality or hypotheticality in such extrapolation.

These difficulties aside, market prices work satisfactorily as welfare indicators for

² See Pratt, Wise and Zeckhauser (1979) on the widespread variation in the prices of household appliances in the Boston area, and Willis et al. (1993) on the variation in real-estate appraisals in Britain.

marginal changes in market goods that are divisible and are consumed in small increments. Otherwise, they don't. For non-marginal changes, or for commodities that are not perfectly divisible and not consumed in small increments (land could well be an example), they can be unreliable measures of value. In general, as has been understood since Hotelling (1938) recast Dupuit's (1844) analysis in the terms of modern, ordinal utility theory, the correct measure of value is the change in consumer's and producer's surplus, i.e., the change in areas under demand and supply curves. This recognition has led to an important paradigm shift which moves the central focus of valuation in economics away from market prices and towards demand and supply curves as the core repositories of value. These functions are behavioral relations, and the key implication of the paradigm shift is that economics is not just the study of markets but more generally the study human preferences and behavior.

Let us state this more directly in terms of the paradox of value which was first resolved by Adam Smith in 1776. Economics make a fundamental distinction between demand curves and supply curves -- between what something costs, and what it is worth. To be sure, sometimes the distinction vanishes. At the margin, there is no difference between the two -- if you know one, you know the other. Furthermore, if one takes the individual's welfare as the sole focus of value,³ the appropriate compensation for loss of a commodity that is divisible, non-unique and freely replaceable is the *lesser of* what it is worth or what it costs to be replaced. In those cases, what something costs *is* a valid measure of what it is worth. Otherwise, it is not.

This has several important implications. If one thinks of cost as objective and preference as subjective, this restores to valuation the subjective element, the contingent element, one could also say the human element -- valuation is about what people like and dislike, what they would or would not do when something happens. These are questions that can be answered systematically, but not without some assumptions, some speculation, some uncertainty.⁴ It also has considerable strategic importance with respect to heterogeneity in preferences and the aggregation of welfare. When one uses market price to measure marginal value for a freely divisible market good, heterogeneity in preferences becomes irrelevant, and aggregation is trivial. At the margin, all consumers who face the same price have the same marginal value, regardless of preferences, income, or anything else. Simply by knowing the price, but without knowing anything else about the consumers, one knows everything there is to know about their marginal value. One can do policy analysis without knowing the demand curve! Moreover, since everybody has the same marginal value, aggregation of marginal value across consumer's is entirely unproblematic, regardless of whether or how one weights individuals differentially. Thus, using market price to measure value sweeps under the rug the economic difficulties associated with use of the potential compensation principle for welfare judgments. This is not so when one

³ Which, in our opinion, CERCLA does not do.

⁴ As Randall (1994) points out, the Austrian school emphasizes that, if one defines cost in terms of opportunity cost, there is an irreducible subjective component to cost as well. To measure the cost of something in terms of what an individual forgoes to get it depends on what she was contemplating and was otherwise inclined to select.

deals with non-marginal changes, or commodities that are not freely divisible. Then one *does* have to know the demand curve, and heterogeneity of preferences becomes an important consideration.

Let us return once more to the case of the Indian Tribes. If they had been participants in the land market during the period used to determine the compensation for their land, buying or selling land at the prices subsequently employed to value the land for Garrison Dam, presumably there would be less feeling of injustice concerning their transaction with the U.S. government. They would have demonstrated that, at least at the margin, they did value an incremental acre of land at the price that was subsequently offered to them. We presume, however, that the tribes were *not* active in the land market at that time; i.e., *other* people were buying and selling land at these prices, but not the tribes. This would have come about because they had *different* preferences from these other people. Other people were willing to sell land in North Dakota at \$80/acre, say; the Tribes weren't. With heterogeneous preferences, market prices don't tell you the marginal value of non-participants -- they provide a *lower* bound on the marginal value of potential sellers' and an *upper* bound on that of potential buyers. Because these individuals are not participating in the market, one knows that these bounds are not tight. This illustrates the complexities caused by heterogeneity of preferences when one attempts to do welfare evaluations with aggregate market data.

3. Efficiency in Economics

If one reviews the history of welfare economics, something of a paradox appears. In the 1890s, Marshall and Pareto had introduced the criterion we now call Pareto Optimality -- that it is impossible for one person to gain from a change without anybody else losing. It was soon recognized that this was a stringent criterion which could not be applied in many cases of interest, where there were both gainers and losers. Thus, the Pareto welfare criterion provided only an incomplete ordering of possible outcomes. In 1939, Kaldor and Hicks ushered in the "new welfare economics" based on the potential compensation principle -- i.e., regardless of whether any compensation actually occurred, a change was desirable if the gainers could potentially compensate the losers and still be ahead. This offered the prospect of making economic judgments in a manner that was free of value judgments. One might wonder why it was thought desirable that one should be able to pass judgment on matters affecting people's welfare without at the same time making value judgments regarding those people or their conduct. The answer is rooted in history. This was the height of logical positivism, and the desire to be a real Science was widely in vogue. Just as real men don't eat quiche, it then was believed that real Scientists don't make value judgments. Efficiency could be cleanly separated from equity, and the potential compensation principle permitted economists to make judgments regarding the former that were gratifyingly devoid of all considerations of the latter.

Scitovsky soon showed that the potential compensation principle was logically inconsistent, and many others remarked on its unacceptable ethical implications, which aggregated dollars of gain and loss regardless of to whom they accrued. After a decade of

attempts to remedy these defects, it was concluded that there was no way to devise a criterion for welfare judgments without introducing value judgments or imposing highly stringent restrictions on the form of preferences [Chipman (1987), Hammond (1991)]. In the absence of costless, lump-sum transfers, efficiency could not be defined in the abstract, divorced from the actual distribution of wellbeing among members of a population. By 1957, the new welfare economics was generally recognized to have been a failure.

The paradox is that, since then, it has flourished. It is accepted more widely and more uncritically by economists now than in the 1950s. What was seen as a failure at the time, is now an old and hallowed friend. Nothing of substance has changed -- no way has been discovered to avoid the logical inconsistencies and unattractive ethical implications associated with the potential compensation principle. It is just that economists have grown used to them, have learned to live with them. Rather than logic or ethics, this is a triumphant demonstration of cognitive dissonance reduction.

Two points should be noted. First, the potential compensation principle puts enormous faith in counterfactual analysis. In applying it, the economist in effect says: I haven't observed any compensation being paid, and I don't expect to observe any in the future, either, but I am confident that I we have correctly calculated the amount of compensation that would be found acceptable if it were offered. In focusing on counterfactuals, the economist may put himself in the enviable position of making predictions that are unverifiable and, therefore, irrefutable. Second, blind adherence to the potential compensation principle is something that drives a wedge between economics and other fields. The desire to be a Science, to aim for generality, to avoid particulars, and to eschew interpersonal welfare comparisons is not a motivating force in other fields, including government and law.

4. Optimization in Economics

The economics of policy analysis looks at continuous policy instruments and objective functions -- e.g. maximizing social welfare through the choice of a pollution tax rate -- and generally arrives at an optimum. In takings decisions, the Courts are usually asking a yes or no question: is it a compensable taking or isn't it? Making fine distinctions among compensation amounts or legal principles is not necessarily helpful in understanding why courts act the way they do.

Economics is precise and continuous in its modelling; the law is coarse, discontinuous, and discrete. Economic policy analysis frequently looks for exactly the right answer. In compensation decisions, it is frequently a case of "should we compensate or not," with the question of how much compensation largely left out of the decisions. To the extent that economic analysis produces complex rules which depend on the presence, measurement, and complex interaction of a number of factors, it may simply be too complicated to provide useful guidance to economic decision-makers in an ex-ante sense. The law limits decision variables to fewer, identifiable factors (although cases still become horrendously complex) and uses a simple

or unidentified functional form to balance the factors. The degree of precision in economic analyses frequently outstrips the available information. The law doesn't have the luxury of this degree of precision; courts are called upon to render yes-or-no, does-it-or-doesn't-it decisions in individual cases.

Policy analysts in economics, public policy, and law focus on the consequences of policy on future incentives, institutions, and outcomes. Takings cases certainly set up expectations of how future claims will be decided, and these guide effectively determine the set of incentives facing economic actors. However, the law is specifically determining one ex-post case at a time. It is the individual facts of that case, and the conception of what is just in that particular circumstance in light of constitutional principles and previous decisions, that guides outcomes. That this is a highly subjective determination is evidenced by the process of appeal and the frequency of reversal of lower court decisions. There are excellent reasons why environmental policy should in general consist of ex-ante regulations which set up clearly predictable consequences. However, compensation is more about fairness as much as efficiency; what is fair can not necessarily be determined before the individual circumstances of a takings case are known.

Another ex-ante ex-post distinction has to do with the efficiency consequences of flexibility. In all forms of government regulation there is an inherent tension between rules and discretion. A clear set of rules applied in all circumstances gives economic actors clear signals of what consequences particular actions will have, and create a precise set of universally understood property rights. However, there is a definite value to allowing discretion in the regulatory process -- tailoring regulations to individual circumstance and the implementation or enforcement level. Discretion has value because regulations need to be kept reasonably simple, because information is always incomplete when regulations are written, because regulatory capacity is limited, and because novel circumstances will always occur. The Supreme Court's desire to keep compensation decisions for regulatory takings on a case-by-case basis can be seen as a desire to remain on the discretion end of the rules vs .discretion continuum.

Ex-ante policies can provide only a categorical distinction among individuals. The law recognizes the circumstances of actual, named, flesh-and-blood people whose claims and conflicts do not necessarily fit the ex-ante categories that policies create.

5. Takings

Takings decisions have appeared to observers and critics to be inconsistent. Economists studying the law usually focus on the efficiency consequences of legal rules. Consistent rules are favored because they promote reduced uncertainty, which ordinarily produces improved efficiency. However, in takings the Courts are largely concerned with fairness as well as efficient precedent. The existing legal standard for takings that has been applied with no great consistency at least partially reflects the Court's balancing the public's rights with individual rights in an effort to do what is fair, not what is efficient.

The context of these decisions is important because neither fairness nor efficiency is a universal principle; each depends on the individual circumstances of cases and on the background understanding and attitudes toward rights. In regulatory takings cases what is frequently at issue is the public's right to environmental quality/ecological diversity balances against individual's rights of unfettered economic activity. It is consistently true that the public's rights trump in the sense that government has the power to stop ecologically damaging use of property. Whether they must pay compensation when exercising this trump is the question at issue.

A key contextual issue is whether damage to ecosystems is regarded as a harm (nuisance) or whether a healthy ecosystem is a public benefit. This is an arbitrary distinction in economics but one which is important for determining rights in takings cases.

Economic analysis concentrates on finding an optimum policy. Given an objective and constraints, there is ordinarily a single best thing to do. For policy analysis, the objective bears a close relationship to Pareto criteria. Economists that compare the efficiency consequences of alternative policies ordinarily base the normative content of the analysis to the Kaldor-Hicks compensation test. Some economists make efficiency and/or philosophical arguments that property rights are sacrosanct and that, through compensation or other means, government policy should meet the straightforward criteria of not making anyone worse off. In the event that the state appropriates these rights, those holding this position believe that compensation must be paid.

Legal and economic scholars have made a wide variety of criticisms and proposals relating to the efficiency of alternative rules for determining regulatory takings cases. Many of these have also considered whether the proposed rules are fair. Pareto improvement is certainly one concept of what is fair -- when individuals are made worse off then a policy may not be fair. Compensation can make those individuals "whole" in the legal sense and "not worse off" in a Paretian sense. However, few would maintain that this is the sole criterion for fairness.

Efficiency -- Existing economic and legal theories and what they say

The legal literature on takings has generally argued that there is no clear and consistent rule about compensation for regulatory taking -- the Supreme Court has by default or by design created a situation where various tests can be applied in an essentially *ad hoc* way. However, the legal and economic literature has put forth a wide a variety of arguments over which rules would be efficient.

A primary concern has been the effect of compensation on investment behavior. If individuals believe that a compensable taking will take place in the future, they may over-invest in improvements that will no longer be productive after the taking if compensation will include those investments (Rose-Ackerman, Innes). Based on this argument, full compensation is inefficient. However, if property owners believe that a regulatory taking will occur because of some particular aspect of their property (a historic building, a dune system) they have incentives to destroy that aspect to prevent a future taking. In this case, a policy of compensation would prevent inefficient (dis)investment.

A second argument is that compensation promotes efficiency by providing insurance. When future takings actions are inherently unpredictable and those affected by possible takings are risk-averse, then assets will not change hands for productive reasons even when it would be efficient to do so. The risk premium demanded by the buyer will simply be larger than the efficient level. However, if compensation acts as a form of insurance, this problem will be overcome. Rose-Ackerman proposes a rule of thumb where the size of loss is compared to the wealth of the owner in determining whether compensation-as-insurance is necessary. Houses are a major component of individual wealth, so compensation is required on efficient insurance grounds. Large corporations should be regarded as risk-averse enough to self-insure and should therefore not receive compensation. Rose-Ackerman believes that such rules of thumb can be applied by the Courts so that takings compensation to provide insurance protection to those who need it.

Mistrust of the calculations of public officials is argued to be another reason why paying compensation is efficient. If compensation is not paid, the costs of takings will not be adequately considered relative to the benefits. Rose-Ackerman believes that this is not valid - either regulators are true cost-benefit analysts, in which case net benefits are maximized, or they are the result of a public choice-like political process where the desires of interest groups carry the day. She proposes as an exception the case where political interests in the latter process have difficulty being effectively heard by the political process. In this case, requiring compensation for takings would cause their interest to be more strongly represented. However, Cooter and Ulen give more weight to the argument that public officials will over-regulate if compensation is not required. The current spate of takings legislative initiative also give this argument substantial weight.

One commentary maintains that it would be inefficient to compensate because owners have already factored the probability of uncompensated taking into their calculations (Harvard Law Review 1993). The suggested remedy is a Coasean system with property rights vested in the State. The argument is that the State has property rights to regulate land use and development in any way it wants. To avoid this outcome, however, the owner of the property may purchase an exemption from the state whose price is a function of the cost of the environmental damage.

In addition to the radical shifting of rights and power from private owners to the State, this Coasean proposal suggests a system with potentially staggering transactions costs to determine the price tag for ecosystem damage. However, a transactions cost argument exists against paying compensation to the private property owner. If each potential diminution of value triggers litigation and accompanying studies to determine extent of diminution, the cost to Government and property owner combined will entail a loss beyond that of the transfer of rights from the individual to the State. Noncompensated taking would avoid these expenses.

Sax has argued that polluters who could not have anticipated that their activities were harmful have historically borne the economic consequences of regulation. He believes that compensation was not provided in order to encourage adaptive behavior, which in turn

encouraged efficient use of the regulated assets. Industrialization was encouraged by not compensating its victims. It is difficult to see how this applies to land and natural services. If the redefinition of property rights on a parcel requires protection of natural services that diminish the land's financial value to the owner, then land as a commodity has been redefined. If someone can use that land more productively (or better figure out how to get around or evade the limitations placed on the land) then they'll buy the land. In fact, it seems possible that not compensating will lead to willful damage or to not selling the land to more "adaptable" owners in the hope of later political reversal, while compensating may make it possible for more "adaptable" owners to purchase and use the land in ways consistent with the redefined property right.

There is usually little conflict over whether takings have been effected for a proper public purpose -- whether the action is in the legitimate interests of the public. If the taking can survive a benefit/cost test, then in a traditional takings case (for example, land taken for a highway) the public should gain enough benefit that citizens can collectively be taxed to provide compensation and still come out ahead. However, Sax's argument implies that this is not necessarily true where takings are in support of ecosystem preservation. If it is the rights of nature (in the sense used by Roderick Nash) that are infringed, there will not necessarily be collective public or private entities that find it in their interest to compensate private right holders *on nature's behalf*. We can recognize that the conception of rights recognized by most individuals includes rights extended to ecosystems and even to inanimate entities. These rights are not absolute; the conflict with other rights and decisions must be made which balance the rights. However, compensation from the winners to the losers in these takings cases is impossible because the winners are ecosystems. Individuals and groups that support the position that nature has rights do not take on the financial obligation that they might in cases where the rights in question were their own.

The Endangered Species Act and Section 404 wetlands cases that have been so important in inverse condemnation takings cases (as well as *Lucas*) are exactly about ecosystem rights, not about direct damages to human welfare of the kind ordinarily considered as nuisances. In this context the question of compensation is markedly different. The logic that says that winners should pay when they win can not hold because of the nature of the "winners."

The optimal tax literature presents an argument why compensation is not efficient in cases where the desirability of the taking is not in question. If compensation is paid, the government must raise the money through taxation and the resulting distortion in incentives reduces economic activity and overall welfare. If compensation is not paid, no such distortion occurs.

Confusion of Efficiency and Fairness

There is no single economic theory of fairness to apply to takings cases, and no single legal theory of fairness seems to make sense of judicial decisions in the area. However, trying to be fair to property owners is at the heart of the current conflict over compensation. There is an instinctive feeling that taking away property is not fair. For economists, this can be connected with the notion of Pareto improvement -- transactions should not make the holder of a property right worse off.

It is interesting that the language of judicial takings tests is reminiscent of both Pareto and potential-Pareto criteria. A sufficient condition for compensation is that the public policy being proposed does not advance a proper public purpose. This condition is not ordinarily at issue; usually (as in *Lucas*) it is the effect on the value of property and not the validity of public purpose that is contended (there have been exceptions to this in wetlands cases). An economic interpretation of "proper public purpose" is "does it pass a benefit-cost test?" If the purpose is not legitimate, compensation must be paid. If the purpose is sufficiently legitimate then whether compensation is paid depends on a number of other factors.

We ordinarily have an efficiency test for whether an action should be taken and then treat the question of equity (which in this context is the question of compensation) separately. However, the judicial test combines the two -- if the action is efficient, then compensation may not be required (it depends as well on the extent of the diminution of property value). If the action is not efficient (and we are using efficient here as "meets a proper public purpose" -- still a loose correspondence) then compensation will be required. In other words, if something is a potential Pareto improvement, compensation is not required to make it an actual Pareto improvement. However, if an action does not meet the PPI test, then the losers must be compensated. In neither case is the orthodox Pareto criterion met.

Economists have a hard time understanding this confusion between the desirability of regulation and the payment of compensation. In the takings legal decisions, good greater than harm seems to be a prerequisite in takings cases that goes relatively unchallenged. Whether compensation is efficient **and** whether it is fair seems to have little to do with the overall efficiency of the government's regulatory program.

Fairness - Implications of Judicial decisions and Legal Theories

What we think is essential to keep in mind is that fairness is a more complex concept in the judicial context (and for takings in particular) than using compensation to make owners whole. As policy analysts we recognize that the Pareto criteria is too restrictive in that many good policies will not pass. The potential Pareto criteria is too permissive in that policies or decisions that make people substantially worse off are allowed. We generally recognize that some intermediate ground is necessary in practice -- the desirability of policies that improve public welfare depends on who is made worse off, by how much, in what context.

The law is concerned with answering this latter set of questions. We need to remember that the 5th Amendment is based on fairness and that it is this notion that is traded off against other objectives in determining compensation. Whether a government action that affects the value of private property requires compensation is not as simple as choosing a welfare criterion and applying it.

First, we should be careful about assuming that the property rights being infringed are unequivocal. As discussed above, the exercise of private property rights is widely seen as infringing the public's rights to ecosystem quality, or infringing the rights of the ecosystem itself.

A consideration of fairness must look at both sets of rights, not just those of the property owner.

We should also not necessarily assume that there is historical precedent for demanding compensation when private property rights are affected by government action. There is a case that there is no historical record of compensation for regulation which reduces economic value of property (Harvard Law Review 1993). Therefore, owners should have included a probability-weighted discount factor reflecting the loss associated with such a taking. Providing compensation to property owners would therefore result in a windfall to property owners who have purchased their property below the price that would have pertained in the expectation of compensation. Sax argues that property has always undergone a redefinition in response to societal needs and changing social, technological, and economic conditions. This is consistent with much of the literature on property rights as efficient institutions.

Although policy analysis has certainly included cases of ecosystem damage like water diversion, land use, and forestry policies, the regulations which have caused the biggest political conflagrations and garnered the most analytical heat have been concerned with environmental threats to human health. This has been true of major legislation on air and water quality, hazardous waste disposal, and environmental remediation. The environmental amenities or damages in takings cases are almost entirely ecosystem quality: wetlands, coastal protection, forestry and fisheries regulations. The public's right to health is more strongly protected and more unanimously supported than the public's right to a diverse environment. The line between a property use which qualifies as a nuisance because it infringes the rights of others and one which merely denies a public benefit becomes much more subjective.

Policy analysts in economics, public policy, and law focus on the consequences of policy on future incentives, institutions, and outcomes. Takings cases certainly set up expectations of how future claims will be decided, and these effectively determine the set of incentives facing economic actors. However, the law is specifically determining one ex-post case at a time. It is the individual facts of that case, and the conception of what is just in that particular circumstance in light of constitutional principles and previous decisions, that guides outcomes. That this is a highly subjective determination is evidenced by the process of appeal and the frequency of reversal of lower court decisions. There are excellent reasons why environmental policy should in general consist of ex-ante regulations which set up clearly predictable consequences. However, compensation is more about fairness as much as efficiency; what is fair can not necessarily be determined before the individual circumstances of a takings case are known.

Flexibility vs. rules: judicial decisions are a means of implementing this tradeoff

Another ex-ante ex-post distinction has to do with the efficiency consequences of flexibility. In all forms of government regulation there is an inherent tension between rules and discretion. A clear set of rules applied in all circumstances gives economic actors clear signals of what consequences particular actions will have, and create a precise set of universally understood property rights. However, there is a definite value to allowing discretion in the regulatory process -- tailoring regulations to individual circumstance and the implementation or enforcement

level. Discretion has value because regulations need to be kept reasonably simple, because information is always incomplete when regulations are written, because regulatory capacity is limited, and because novel circumstances will always occur. The Supreme Court's desire to keep compensation decisions for regulatory takings on a case-by-case basis can be seen as a desire to remain on the discretion end of the rules vs. discretion continuum.

References

- Chipman, J. S. "Compensation Principle," in J. Eatwell, M. Milgate and P. Newman (eds), *The New Palgrave Dictionary of Economics* London: Macmillan, 1987
- Cooter, Robert, and Thomas Ulen, *Law and Economics*, Scott, Foresman, and Co.: Glenview, Illinois (1988).
- Cummings, Ronald G., "Legal and Administrative Uses of Economic Paradigms: A Critique," *Natural Resources Journal* 31, Winter 1991.
- Hammond, Peter J. "Interpersonal Comparisons of Utility: Why and How They Are and Should Be Made," in Jon Elster and John Roemer (eds), *Interpersonal Comparisons of Well-Being*, Cambridge University Press, 1991
- Hanemann, W. M., "Natural resource Damages for Oil Spills in California," in K. Ward and J. Duffield (eds), *Natural Resource Damages: Law and Economics*, New York: John Wiley, 1992.
- Hanemann, W. Michael and Ivar E. Strand, "Natural Resource Damage Assessment: Economic Implications for Fisheries Management," *American Journal of Agricultural Economics* 75 December 1993.
- Innes, Robert, "An Essay on Takings," *Choices* 1, 1995.
- Note, "Taking Back Takings: A Coasean Approach to Regulation," *Harvard Law Review* 106, February 1993.
- Peterson, Andrea L., "The Takings Clause: In Search of Underlying Principles Part I -- A Critique of Current Takings Clause Doctrine," *California Law Review* 77 December 1989.
- Peterson, Andrea L., "The Takings Clause: In Search of Underlying Principles Part II --Takings as Intentional Deprivation of Property Without Moral Justification," *California Law Review* 78 January 1990.
- Pratt, John W., David A. Wise, and Richard Zeckhauser, "Price Differences in Almost Competitive Markets," *Quarterly Journal of Economics*, 93, May, 1990, 189-212.
- Randall, Alan, "A Difficulty with the Travel Cost Method," *Land Economics*, 70:1, February 1994, 88-96.
- Rose-Ackerman, Susan , *Rethinking the Progressive Agenda,*" The Free Press, New York (1992)
- Sax, Joseph, "Property Rights and the Economy of Nature: Understanding Lucas vs. South Carolina Coastal Council," *Stanford Law Review* 45, 1993.