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Legal and Administrative Uses of Economic Paradigms: A Critique

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1. INTRODUCTION

Goals related to the economic and social welfare of people have always been basic to the ends sought in water resources development and administration. Over the last two to three decades, growing water scarcity in many parts of the world has led to competition for water resources between different groups of people as each group of people sees their economic and social goals threatened by water scarcity. This competition for water has introduced to water administrators and legal scholars a broad set of challenges. In the United States, the surge in interstate and intrastate litigation concerning rights to water resources presents legal scholars with the challenge of sweeping changes in water law. Water administrators are faced with the challenges imposed by growing demands for better and more efficient means for developing and managing water resources.

As the judiciary, legislators, and administrators strive to meet the contemporary management challenges associated with water scarcity, reference is increasingly made to economic paradigms as a source of guidance for analyzing efficient rules related to the allocation of scarce resources. In many ways, this development may be viewed as a healthy one. Economic principles, along with those of hydrology, engineering, law, and public administration (to name but a few relevant disciplines), have their appropriate uses in the development of sensible strategies for water resources development and management. There is a basis for concern, however, with the all too frequent instances where economic paradigms are used uncritically and are accepted (particularly by the courts) as offering objective measures for social and economic effects of alternative water allocation schemes. As is demonstrated below, such uncritical use of economic paradigms can, at best, mislead legal and management scholars and, at worst, result in decisions which are later found to distort the ends sought by them.

Thus, concern in this paper is focused upon the pitfalls of the uncritical
use of basic economic paradigms. The common theme which will run through these discussions will be the question: How can "bad" use of economics lead to "bad" law? This theme is developed with the use of two case studies involving cases wherein the Congress and the courts have seemingly imputed to economic paradigms—principally the market paradigm\(^2\)—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 or the court's role in addressing an equity issue.

To these ends, a case study involving the condemnation of land by the U.S. government is examined in section 2. The use and misuse of discounting procedures in adjudications of water rights is discussed in section 3. Concluding remarks are offered in section 4.

2. THE MARKET PARADIGM, FAIR MARKET VALUE, AND JUST COMPENSATION\(^3\)

The first case study to be considered centers upon a quandary faced by the U.S. Congress in the late 1940s to early 1950s. This historical example has contemporary relevance inasmuch as a Special Commission created by the Secretary of the Interior in 1985 has been considering means by which the problems created by earlier Congressional actions might be ameliorated.\(^4\) At issue was the U.S. government's condemnation of 156,035 acres of land from the Three Affiliated Tribes (hereinafter "Tribes") that reside on the Ft. Berthold reservation.\(^5\) The reservation is located in the northern part of the State of North Dakota. The condemned lands were to be flooded as a result of the federal government's construction of the Garrison Dam, authorized by the Flood Control Act of 1944.\(^6\)

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\(^2\) The market paradigm is also referred to as the model of a perfectly competitive market. For a detailed discussion of this paradigm, and its implications for the assessment of water markets, see Brajer, Church, Cummings, & Farah, *The Strengths and Weaknesses of Water Markets as They Affect Water Scarcity and Sovereignty Interests in the West*, 29 Nat. Res. J., 489 (1989).

\(^3\) This section draws from work conducted by the author for the Legal Division of the Three Affiliated Tribes at Ft. Berthold (Newtown), N.D.; see R. Cummings, *Valuing the Resource Base Lost by the Three Affiliated Tribes as a Result of Lands Taken from Them for the Garrison Project* (Legal Department, Three Affiliated Tribes, February, 1986). The author wishes to gratefully acknowledge the support of this work by the Legal Division.


For later purposes, it is important that one understand that the taken lands included virtually all of the Tribes' arable lands—lands amenable to irrigated agriculture and forestry.\(^7\)

The Indians were paid $12.5 million as "just compensation" for the condemned lands.\(^8\) For readers to whom "just compensation" is not a term of art, a bit of clarification may be useful. The Fifth Amendment of the U.S. Constitution provides that private property shall not be taken for public use without just compensation.\(^9\) While early judicial efforts to give substance to the "just compensation" requirement were somewhat demanding, requiring a "full and perfect equivalent" for the property taken,\(^10\) the "full and perfect equivalent" criterion was soon refined to require that "[the owner] is entitled to be put in as good a position pecuniarily as if his property had not been taken. He must be made whole but is not entitled to more."\(^11\) The measure which is generally accepted by the courts as one which would satisfy the "make whole" criterion is the market price of the property in question.\(^12\)

Central to the theme of this section is the manner in which the U.S. Supreme Court has effectively equated equity, or fairness, with market prices. This acceptance is seen in a 1943 decision of the Court:

> The owner [of condemned property] has been said to be entitled to the 'value', the 'market value' and the 'fair market value' of what is taken. The term 'fair' hardly adds anything to the phrase 'market value', which denoted what 'it fairly may be believed that a purchaser in fair market conditions would have given' or, more concisely, 'market value fairly determined'. . . .\(^13\)

The $12.5 million awarded to the Indians by Congress was based upon the then prevailing market value of land in North Dakota.\(^14\) The criteria for the Fifth Amendment requirement of just compensation were then considered to have been satisfied.\(^15\) However, 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.

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7. See Meyer, Fort Berthold and the Garrison Dam, 35 N.D. Hist. 3-4 (Summer/Fall, 1968).
9. U.S. Cont., amend. V.
12. Id. Criteria applicable for cases where market prices are not available are seen, for example, in United States v. Toronto, Hamilton & Buffalo Navigation Co., 338 U.S. 396, 402 (1949); and United States v. Chester Fuller, 409 U.S. 801, 803 (1973).
A number of Congressmen were moved to argue that "something" was wrong with the government's settlement with the Tribes—the "fair market" settlement did not leave the Indians "whole." However, concerned Congressmen were unable to do more than assert that the compensation was not "moral." They could not articulate precisely why they believed fair market value failed to provide just compensation in this case.

Observations of economic conditions on the reservation before and after the condemnation tend to lend empirical support to the argument that something was wrong with the settlement. The Fort Berthold Indians were economically self-sufficient prior to the condemnation; following the condemnation, notwithstanding receipt of market values for the taken lands, the Indians have become almost totally dependent, economically, upon financial support from the U.S. government.

The failure of market value to provide compensation which squared with the equity ends mandated by the Fifth Amendment and which was sought by the Congress in this case can be attributed directly to two distinct failures of the market paradigm as it was applied to this particular condemnation case. Among the fundamental assumptions which underlie this paradigm are: 1) the market has many buyers and sellers, all of whom have perfect information, and of primary interest here, 2) all factors of production are perfectly mobile.

The first failure of the market paradigm in maintaining the rationale for equating market price with just compensation is reasonably straightforward. Given the perfect mobility assumed in the market paradigm, workers are perfectly mobile, and resources (such as land, or water) in one location are substitutable as an economic base for those located in any other location. A market price for the resource at location A is the capitalized value of returns (profits) to the resource owner at location A, and should therefore be adequate to purchase resources at any other location B whose profit-related characteristics are roughly the same as at location A. Incomes (wages) to workers are not included in the capitalized

17. Id.
18. R. Cummings, supra note 3.
19. Id.
20. Factors of production include: land, capital, and of particular importance here, labor. Brajer, Church, Cummings & Farah, supra note 2.
21. "Perfectly competitive markets are characterized by . . . firms and resources are freely mobile, with no obstacles, such as patents or licenses, to prevent new firms from entering or existing firms from leaving the industry." W. McEachern, Economics: A Contemporary Introduction 525 (2nd ed. 1991).
value which determines the market price.22 Such incomes are costs to the resource owner. With the sale of the resource at location A, mobile workers will simply move to jobs at other locations.

In the case of the Indians, however, neither the Tribes as the resource owners, nor the individual Tribal members as the workers, are mobile. For example, they cannot move from North Dakota to Florida to obtain equally productive land at prices received for land in North Dakota, nor would they reasonably be expected to by treaty.23 Recalling that the taken lands included virtually all of the Tribes' arable lands, such land served as a unique economic base for the generation of incomes. The value of the land to the Tribes then includes all incomes earned by workers. This follows from the fact that, absent the resource, workers have no alternative employment. The "price," or value, of land in this instance is the capitalized value of all incomes—wages to workers plus profits—generated from the resource.

Thus, the market paradigm describes conditions under which exchanges take place between many willing buyers and sellers, all of whom are perfectly mobile.24 Under such a paradigm, values derived from such arms-length transactions could reasonably be expected to "make whole" the participants in any exchange. It then follows that if one is to use this paradigm as a rationale for equating market prices with "fair" or just compensation to unwilling sellers whose resources are taken by condemnation, one must require the existence of the conditions assumed by the paradigm. Of course, herein lies the problem in cases involving the condemnation of reservation lands. Absent an abrogation of treaty, it will generally be the case that a condition which is critical to the market paradigm is missing in such cases: labor resources will not be mobile. The logic of value structures drawn from the market paradigm is therefore not applicable to value structures for tribal resources. One must then conclude that the rationale for equating market price with just compensation in the "make whole" sense set out by the Court is substantively flawed when applied to these resources.

The substance of a second related failure of the market paradigm as a rationale for equating market price with "just compensation" is given context by the following analysis. The Indians wish to stay together as

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22. To be precise, this capitalized value determines the supply price of the resource and, at the margin, this supply price equals the demand price. The capitalized value is the "present discounted value" of an asset with infinite life. See W. Nicholson, Microeconomic Theory 702-703 (4th ed. 1989).

23. [[T]his Reservation is formed] ... in order to obtain the means necessary to enable them [the Tribes] to become wholly self supporting by the cultivation of the soil and other pursuits of husbandry. ... " Preamble for the Treaty of March 3, 1891, 51st Cong., 11th Sess., Ch. 543, 26 Stat. 1032 (1891), Agreement with Indians on Ft. Berthold Agency.

a Tribe and must earn their living on the reservation. Since they were
paid "fair market value" for their condemned lands, and land is important
to their ability to generate incomes, could they simply have gone below
the dam site and bought 156,035 acres of similar land to replace the
condemned lands? Is this not what "fair" market value means?
Here again the issue of mobility is of central importance. Basic to the
market paradigm is the assumption that factor markets are at an equilib-
rium across markets.\textsuperscript{25} If the market price for a particular quality of land
in area A is substantively higher than in area B, \textit{mobile} buyers will move
from area A to area B until market prices in the two areas are roughly
the same.\textsuperscript{26} Within this context, consider the situation faced by the Tribes.
Between 1950 and 1955, the amount of farm land bought and sold each
year in the Tribe's area of interest was some 35,100 acres;\textsuperscript{27} thus, market
prices for farm lands were based upon this level of transactions. It is
surely obvious that had the Indians attempted to purchase 156,035 acres
of land in this market—increasing the "normal" demand for farm land
some five times—farm land prices would have become highly inflated.
An immobile Indian population cannot relocate to distant regions or states
in which land might be obtained at prices which they received for their
condemned lands. Therefore, the paradigm of \textit{competitive} markets does
not apply. In terms of purchasing land in the market, the immobile Indians
would essentially be hostage to a very limited number of potential sellers
of land in the area adjacent or in close proximity to the reservation. The
paradigm of \textit{monopoly markets}\textsuperscript{28} would then more closely describe the
conditions faced by the Tribes. Pre-condemnation competitive prices would
then necessarily be much lower than post-condemnation monopoly prices.
Pre-condemnation prices for land could not possibly leave the Tribes
"whole" when remaining whole would require purchasing land at post-
condemnation prices.
These discussions make the case that "bad" economics in some classes
of condemnation proceedings can result from a lack of understanding of
the conditions requisite for an operable, competitive market, particularly
from a lack of understanding of the requirement of perfect mobility. In
the specific case of the Ft. Berthold reservation, "bad" economics resulted
in "bad" law. This "bad" law was legislation which awarded compensa-
tion that demonstrably fails the judicially established criteria for just

\textsuperscript{25} Factors of production include land, labor and capital. Factor markets are markets in which
these factors of production are bought and sold. Equilibrium in these markets occur when prices are
such that the quantity of a factor offered for sale equals the quantity of the factor which is demanded.
\textit{See} W. McEachern, supra note 21 at chs. 25 and 26.

\textsuperscript{26} Id.

\textsuperscript{27} R. Cummings, \textit{supra} note 3. This area would include Oliver and Mercer counties.

\textsuperscript{28} A monopoly market is a market with but one seller of a good or a factor of production. \textit{See}
W. McEachern, \textit{supra} note 21 at ch. 22.
compensation. Pre-condemnation market prices would surely have been inadequate to cover the replacement of lands at post-condemnation market prices. More to the point, any market price, determined by capitalized profits alone, would fail the "make whole" criterion for just compensation when both resource owners and workers are immobile.

3. THE SOCIAL TIME PREFERENCE PARADIGM AND THE DISCOUNT RATE

The second case study to be examined involves discounting procedures used in benefit-cost studies. The context for this case study is the adjudication of water rights reserved to Indian reservations in the United States which have been ongoing over the last three or four decades. The basis of these adjudications is the 1908 U.S. Supreme Court decision in Winters v. United States. In Winters, the Court determined that, by establishing treaties with the various Indian tribes, Congress intended to reserve to the Tribes the rights to resources required to fulfill the purposes of the treaty.

In 1963 in Arizona v. California, the U.S. Supreme Court ruled that the amount of water reserved to the Indians under the Winters rule was subject to a limit. This limit is the amount of water which a Tribe can demonstrably put to use, presently and in the future, for "practically irrigable acreage." A Special Master for the Court heard arguments in a reopening of Arizona v. California for the purpose of adjudicating reserved rights in boundary lands, and ruled that: "for present purposes, a finding that annual benefits exceed costs will suffice for a finding of practicable irrigability." While the Master's report was later set aside by the Court, the Court's position in terms of the use of benefit-cost measures as a demonstration of "practically irrigable acreage" remains an open question.

The use of "economic feasibility" as a demonstration that water could be "practically" put to use in future years might appear on its face to be

29. Social time preference refers to society's preference between consumption of goods and services "today" and in future periods, typically expressed as a rate. A discount rate is akin to a rate of interest; a discount rate is used to adjust future values to current values. A social discount rate is the discount rate used to discount future values by society as represented by the federal government. See O. Herfindahl & A. Kneese, Economic Theory of Natural Resources, ch. 5 (1974). A. Dasgupta & D. Pearce, Cost-Benefit Analysis: Theory and Practice, ch. 6 (1978).
30. See A. Dasgupta & D. Pearce, supra note 29.
31. 207 U.S. 564 (1907).
32. Id.
35. In this regard, see a discussion of the divided opinion of the Court concerning the Big Horn River Adjudication reported in 3 Water Strategist (October, 1989).
reasonable. As such, at issue would be the comparison of a discounted flow of future benefits with a discounted flow of future costs, or equivalently in some instances, the comparison of annualized benefits with annualized costs. Following typical practice in benefit-cost analysis, let annual benefits which would derive from the development of water resources be fixed at $B; let project costs be measured by $C. The economic feasibility test would then involve the following comparison. Define $CRF$ as the capital recovery factor used for determining annualized values,\(^{36}\) \(r\) as the discount rate, and \(t\) as the useful life of the water project. Compare $B$ with $C[CRF]$, \(CRF = \frac{r}{(1 - \{1 + r\}^{-t})}\). If $B$ is at least as great as $C[CRF]$, the posited present and future use of the water is economically feasible, and if $B$ is less than $C[CRF]$, it is not. Obviously, one’s choice for \(r\) for the purposes of this comparison is important. The weight given costs, the CRF, \(1.01\) if \(r\) is ten percent, \(.063\) if \(r\) is six percent, and \(.032\) if \(r\) is two percent.\(^{37}\) If development costs are $200 million, feasibility would then require that benefits be at least as great as $20.2 million, $12.6 million, or $6.4 million, if the value of \(r\) is taken to be ten percent, six percent, or two percent, respectively.

We may then ask: What is this “discount rate?” Continuing the general theme of this paper, this is to inquire, first, as to the character of the economic paradigm relevant for a discount rate, as well as for one’s choice of a value for \(r\). Second, we inquire as to the extent to which alternative uses of this paradigm square with the Supreme Court’s concern with intergenerational equity for affected Indian reservations. We begin with a focus on the paradigms relevant for discounting.

While there are a number of paradigms which argue a rationale for a discount rate,\(^{38}\) and still more which argue how a discount rate should be chosen,\(^{39}\) the paradigm which would seem to be most appropriate for benefit-cost analyses would arguably be that related to “social time preference.”\(^{40}\) Social time preference refers to society’s preference between present and future consumption, where such preference is stated as a rate. Thus, if we know that it would require $110 of goods and services available for consumption in the future to compensate society for giving up $100 in consumption “today,” a discount rate based upon social time preference would be taken to be ten percent.

In terms of choosing a discount rate, the social time preference paradigm would have us look to opportunity costs associated with any given investment. What consumption opportunities must society give up today

\(^{36}\) A. Dasgupta & D. Pearce, supra note 29, at 168.
\(^{37}\) Assumes \(t = 50\) years.
\(^{38}\) As but a few examples, see generally R. Lind, Discounting for Time and Risk In Energy Policy, (1982), and C. Howe, Natural Resource Economics, ch. 8 (1979).
\(^{39}\) Id.
\(^{40}\) Supra note 29.
if scarce funds are to be used, for example, to finance a water project, and how does society value those foregone opportunities? As one might expect, there is little consensus among economists, or indeed, government agencies, as to how one measures "how much is given up" or "how does society value what is given up." To provide the reader with just a taste for this lack of consensus it is sufficient to note that the U.S. Office of Management and Budget has, for the last 17 years, used a ten percent discount rate; the Government Accounting Office uses discount rates based upon the Treasury borrowing rate—usually, the average nominal yield on treasury debt with maturity between one year and the number of years in the life of the project under analysis; and the Congressional Budget Office is using a two percent rate as a real, inflation free, discount rate. Most importantly for the arguments of this paper, the discount rate which agencies of the federal government involved in land and water reclamation projects are required to use is mandated by law: the average rate of return on long-term government debt.

When considering the reserved rights issue, the courts are faced with an issue involving equity, which in turn involves the following line of deduction and a primary question. A Tribe has reserved to it those water resources required for its present and future uses. Equating "practically irrigable acreage" with "economic feasibility," the courts seek a measure which might demonstrate whether future uses are reasonable by determining whether a reasonable individual might, at any future time, invest the funds required to achieve such uses. This demonstration requires the use of a discount rate. In terms of equity, what discount rate should the Court allow?

In Arizona v. California, the Special Master accepted the "standard" discount rate used by agencies of the federal government, around seven percent at that time. Testimony was not seemingly presented pointing

43. Id.
44. Id.
45. Burness, Cummings, Gorman, & Lansford, Practically Irrigable Acreage and Economic Feasibility: The Role of Time, Ethics, and Discounting, 23 Nat. Res. J., 289 (1983). It is generally recognized amongst economists that this rate, which is a nominal rate of interest, is inappropriate for use in benefit cost analyses which (as they almost always do) use constant prices for valuing benefits and costs. If real, inflation free, prices are used in the analysis, a real, inflation free, discount rate must be used. Id.
to the inappropriate purposes for which this rate was used: a measure of a real discount rate. Nor is it clear that the Special Master was apprised of the issues underlying the paradigm of discounting which were directly relevant to the equity issue facing him. A social time preference rate must reflect a society's valuation of opportunity costs. A discount—social time preference—rate can be estimated only if there is agreement as to which "society" is to value opportunity costs.

To give some perspective to this issue, if the "society" relevant for the Court's deliberations is the United States as a whole, then the opportunity costs as valued by the body politic in the United States is relevant. As noted above, a rate between two percent and ten percent might be considered an "appropriate" measure of that society's real opportunity costs. Suppose, however, that the society relevant for the Court's deliberations is the reservation society, or the Tribe. Such a supposition might seem warranted by the language of treaties between the United States and these Tribes which express respect for the Indians' wish to preserve their culture and values. Under this supposition, it is the valuation of opportunity costs by the Indian society which is relevant for the choice of a discount rate, and its value is obtained in the same way that we estimate such values for the United States: by looking at values foregone from investment. If the courts find that equity considerations dictate the valuation of opportunity costs as such values are held by the Indian society, differing cultural and valuation systems will no doubt manifest themselves in different discount rates. For example, one may find that a Tribe continually uses its own funds to repurchase lands that once belonged to the reservation, but which passed out of trust status largely due to the General Allotment Act. With the most generous assumptions as to future earnings from the purchased lands, the undiscounted value of these earnings are much less than the cost of the land. Thus, the implied social rate of time preference—the rate implied by actual investment patterns of the Tribe—would be zero or negative.

The "bad" economics—"bad" law point at issue here is therefore a bit different from, and perhaps a bit more subtle than, the point discussed above in section 2. Here we have the potential for the courts' use of

50. This argument is weakened, of course, if one wishes to interpret congressional approval of treaties as implying a congressional intent to encourage the absorption of the Indians into the white man's society.
51. General Allotment Act, 49th Cong., Sess. II, Ch. 119, 24 Stat. 388 (1887). This act had the effect of allowing individual Indian families on reservations to sell their allocated lands to non-Tribal buyers.
“bad” economics. This potential is realized when the courts uncritically accept the economists’ choice of a discount rate. This choice involves a judgment about values, cultures, and equity and is part and parcel of the substance of issues which the courts are to decide: Whose values are to be relevant for the social time preference rate to be used in discounting? Obviously, “bad law” can result from the court’s efforts to resolve issues involving intergenerational equity if its tools are economic methods which embody assumptions which implicitly “resolve” these issues.

4. CONCLUDING REMARKS

It is clear that economics can and should play an important role in the formulation and implementation of water resources management and development plans. The basic various paradigms of the economist can be most useful in suggesting means by which the generation of incomes from water developments can be enhanced by such things as direct and indirect pricing mechanisms. The essential substance of economic analyses—tradeoffs—is typically central to the problems facing Congress, the court, or the water manager.

The point made here is simply that courts, the Congress, and resource administrators cannot accept the paradigms of economics uncritically. It is most important that they understand the assumptions underlying the paradigm, as those assumptions might relate directly to issues of primary concern to them. This is to say that the economist’s paradigms may not be considered to be “objective,” in the sense of being free of values. The essence of this argument, and something of a summary of the arguments developed above is given by the following:

If the law is to use economic measures for its ends, the courts must clearly understand the equity implications of alternative structures . . . for economic analyses. The courts must do what the economist cannot: determine the structure of economic feasibility analyses that squares most closely with the courts’ concern with fairness and equity.52

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52. H. Burness, supra note 45, at 291.