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Economic Theory and the Environment

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The nature of one’s perception of an object or event is largely dependent upon one’s own perspective. This assertion also applies to matters of policy, where characterization of an issue is closely related to the analytical perspective adopted by the observer. With respect to legal issues, including environmental concerns, an economic approach to the law purports to provide useful insights into legal systems. This paper seeks to accomplish several objectives. Section I of this paper justifies the use of economic theory in seeking to understand the law. Sections II and III provide a broad overview of both welfare economics and environmental economics. The primary focus here is on the fundamental economic concept of social efficiency. Finally, Section IV outlines and attempts to respond to criticisms of economic analysis as it is applied to the law in general, and environmental law in particular. The central argument of this paper is that, despite some important criticism, economics is a useful analytical approach for environmental issues.

I. UTILITY OF ECONOMICS IN ANALYZING LAW

There are at least three important contributions that economics can make to legal analysis. First, economics aids legal scholars in gaining a necessary external perspective on their discipline. 2 Second, economics provides a framework for understanding the interactions between legal institutions and market forces. Third, economics highlights the importance of incentives in shaping behavior and outcomes. These contributions are particularly relevant to environmental law, where the allocation of resources and the achievement of sustainability are central concerns.

1. Mr. Russell S. Jutlah has received his B.A. Economics with Distinction, in addition to two advanced degrees of LL.B. and a LL.M. The author gratefully acknowledges his thesis supervisor and second reader, Professors Ian Townsend-Gault and Jutta Brunnee of the Faculty of Law, University of British Columbia, respectively, for the very helpful comments and insights in developing his LL.M. thesis, GREAT LAKES ENVIRONMENTAL POLICY: THE ECOSYSTEM APPROACH AND AN ECONOMIC PERSPECTIVE. This paper is largely based on a chapter of that work.

2. See Richard A. Posner, ECONOMIC ANALYSIS OF LAW, 27 (5th ed. 1998) (reporting insights of pioneers have been generalized, empirically tested and inte-
ond, on a normative level, economics helps to explain value conflicts by showing how much of one value, specifically efficiency, must be sacrificed to achieve another value. Finally, on a positive level, economics contributes to an understanding of the underlying reasons for certain legal decisions and of the economic effects of specific legal outcomes.

A. External Perspective on Law

Economics contributes to legal scholarship by providing scholars with a necessary external perspective. As Werner Hirsch noted, one point of contact between law and economics involves:

[T]he criticism voiced by some that legal scholars view the law too much from within - too much in terms of the law's own logical structure. When the law steps outside itself, these critics claim, it lacks a well-developed theoretical or empirical apparatus with which to explore the world around it. Yet as legal scholars look outside law, they find that economics has developed paradigms that seem to provide a powerful analytic framework for the study of law.

Thus, because the law does not exist in a social vacuum and is actually only one aspect of a larger social structure, external perspectives provide useful insights to legal scholarship.

The recognition that law is not, and should not be treated as an autonomous discipline is one of the legacies of legal realism. Legal realism was a dominant legal movement during the 1920s and 1930s that sought to place the study of law within a broader
social context. The particular attraction of using economics to understand law stems from the interdependence of the two disciplines, which Nicholas Mercuro and Steven Medema succinctly summarized: "[A] change in law or working rules leads to a change in the incentive structure which in turn leads to a change in institutional behavior which in turn leads to a change in economic performance." The utility of economics in legal analysis is therefore premised on the close interconnections between legal and economic processes. As outlined below, economics also contributes to both normative and positive legal analysis.

B. Clarification of Value Conflicts

Although economics cannot claim greater moral authority than other social scientific approaches, on a normative level, it contributes to the clarification of value conflicts by demonstrating the inefficiency of particular types of activities. Richard Posner observed "Although the economist cannot tell society whether it should seek to limit theft, the economist can show that it would be inefficient to allow unlimited theft and can thus clarify a value conflict by showing how much of one value - efficiency - must be sacrificed to achieve another." Thus, the focus of economics upon efficiency is useful in legal analysis because it provides a benchmark founded on one type of value, efficiency, against which other competing values may be compared. Economics therefore sets forth one type of measure for balancing competing values. Hence, by revealing the inefficiency of particular social goals, economics contributes to the overall selection of specific, workable goals.

In addition to contributing to the choice of social objectives, economics may also demonstrate the inefficiency of the specific means chosen to achieve those objectives. For example, if society determines that limiting theft is a desirable objective, economic

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8. Mercuro & Medema, supra note 6, at 66.
10. See id. (noting "many legal doctrines rest on inarticulate gropings toward efficiency").
11. See id. (finding idea of providing one type of measure to balance competing values is objective plainly central to law in pluralist society).
12. Demonstration of the inefficiency of particular social goals requires that economic value can be properly assigned in all relevant contexts. The criticism that economic valuation is not possible in all relevant circumstances is discussed in Section IV below.
analysis could demonstrate that certain types of measures would lead to greater prevention at lower costs.\textsuperscript{13} As Posner notes, this denotes a normative contribution because “[i]f the more efficient methods did not impair any other values, they would be socially desirable even if efficiency were low on the totem pole of social values.”\textsuperscript{14} Thus, economics can assist in resolving value conflicts by focusing on efficiency and thereby providing a frame of reference for the assessment of competing social objectives and the means to achieve those objectives.

C. Explanation of Legal Decisions

In addition to its general analytical and normative contributions, economic analysis of law also plays a positive role by attempting to explain legal rules and outcomes without seeking to change them or to make them better.\textsuperscript{15} In asserting that many areas of the law “bear the stamp of economic reasoning,” Posner noted that:

> [g]ranted, few judicial opinions contain explicit references to economic concepts. But often the true grounds of legal decision are concealed rather than illuminated by the characteristic rhetoric of opinions. Indeed, legal education consists primarily of learning to dig beneath the rhetorical surface to find those grounds, many of which may turn out to have an economic character.\textsuperscript{16}

Legal rules and outcomes very often directly affect the manner in which parties' resources are allocated.\textsuperscript{17} Thus, it seems logical that the law may promote or, at least, be consistent with economic concerns; and it surely may be illuminated by economic analysis.

Positive economic analysis can illuminate the legal system at several levels.\textsuperscript{18} First, with respect to the common law, economic

\begin{itemize}
  \item \textsuperscript{13} See Posner, \textit{supra} note 2, at 27 (finding normative economic analysis as means by which society attempts to expose certain goals as inefficient and reveal availability of greater prevention at lower costs through different methods).
  \item \textsuperscript{14} Id. (explaining normative and positive aspects of this theory and that true grounds of legal opinions are often concealed by rhetoric of opinions).
  \item \textsuperscript{15} See id.
  \item \textsuperscript{16} Id. Posner further stated that “[i]t would not be surprising to find many legal doctrines rest on inarticulate groupings toward efficiency, especially since so many legal doctrines date back to the nineteenth century when laissez-faire ideology, based on classical economics was the dominant ideology of the educated classes.” Id.
  \item \textsuperscript{17} See id. (noting not every common law doctrine or legal decision is, or promotes efficiency; but common law is still system for maximizing wealth of society).
  \item \textsuperscript{18} See Posner, \textit{supra} note 2, at 28 (introducing role of positive economic analysis of law).
\end{itemize}
analysis of legal doctrine and judicial reasoning can demonstrate the considerable extent to which particular areas are permeated by economic concerns. For example, in highlighting the parallels between legal and economic considerations, Posner observed that resolution of many private legal disputes requires consideration of the future impact of the decision, including its impact on the frequency of accidents and the costs of precautions. Second, positive economic analysis can focus on the institutional features of the legal system, for example, to explain the allocation of law enforcement responsibilities between the public and private sectors. Finally, positive economic analysis can provide insights into the estimation or prediction of behavioral responses to a change in the legal environment. As Hirsch observed, economic analysis can make major contributions in providing answers to such questions including the likely effects of a proposed law, the effects of an existing law, and whether its objectives were met.

In sum, economics can contribute to our understanding of law in three important respects: (1) by providing a necessary external perspective; (2) by clarifying value conflicts through demonstrating the inefficiency of particular types of activities; and (3) by explaining legal rules, outcomes and institutions, and facilitating empirical analysis. Welfare economics is one of the primary disciplines from which economic analysis of law has been drawn. Section II pro-

19. See id. at 27 (noting that “many areas of law, especially but not only the great common law fields of property, torts, crimes, and contracts, bear the stamp of economic reasoning”).

20. See id. at 28. Posner explains that the dichotomy between lawyers and economists is overstated because the economist is interested in the future effect of the case to establish a rule for people engaged in dangerous activities, while the lawyer wants to establish precedent for future cases. See id. Posner also notes, “[o]nce the frame of reference is expanded beyond the immediate parties to the case, justice and fairness assume broader meanings than what is just or fair for this plaintiff and this defendant. The issue becomes what is a just and fair result for a class of activities.” Id.

21. See id. at 27 (noting that statutory or constitutional fields, as opposed to common law fields, are less likely to promote efficiency and are still likely to be effected by economic concerns and economic analysis).

22. See W.Z. Hirsch, LAW AND ECONOMICS: AN INTRODUCTORY ANALYSIS 8 (2d ed. 1988) (providing analogy to criminal law stating that if society insisted that punishment provide deterrence and retribution through incarceration, and not merely deterrence, analyst will be forced to reach different efficiency conclusions about criminal justice system).

23. See id. (noting little evidence that economists or lawyers are particularly well qualified to select most appropriate objective functions and that many economists have tunnel vision since they find it more agreeable to engage in partial equilibrium analysis rather than general equilibrium analysis.)

vides an overview of welfare economic theory and, in particular, strives to highlight the centrality of the concept of social efficiency. The concept of social efficiency, as outlined in Section III, is fundamental to environmental economics.

II. WELFARE ECONOMIC THEORY

According to S. K. Nath, welfare economics involves the study of "the possible effects of various economic policies on the welfare of a society."25 A central concern of welfare economics is how to attain a socially efficient or optimal allocation of scarce resources within an economy.26 Thus, welfare economists are concerned with developing models and prescribing measures to achieve an efficient outcome.27 In contrast to the normative nature of welfare economics, the other main branch of economics, positive economics, addresses questions of measuring the economic impact of changes in several economic variables.28

Within welfare economics, the objective of maximizing social welfare requires a social welfare function, a general statement of the factors that affect the well-being of a society as well as approximate relative weighting of those objectives.29 It is important to note that the variables of a social welfare function are those economic conditions that affect welfare either directly or indirectly and increase, decrease or maintain person's or group's welfare is not only descriptive, but also persuasive and suggestive of recommendation).

25. Id. Nath further suggests the study of welfare economics inherently involves making policy recommendations to contribute to the welfare of a society. See id. "Any statement which implies a recommendation can be shown to be based on at least one ethical (or value) judgment. An ethical value judgment can be defined to be any statement which states or implies that something is desirable (or undesirable!) and which is not derived from any technical or objective data but instead from considerations of ultimate value, i.e. ethical considerations." Id.

26. See P. Bohm, SOCIAL EFFICIENCY: A CONCISE INTRODUCTION TO WELFARE ECONOMICS ix (2d ed. 1987). The term "scarce resources" refers to the limited availability of virtually all entities valued by economic agents within an economy. See id. Hence, the term implies tradeoffs or choices between competing uses of such entities. See id.

27. See id. (discussing how welfare economics attempts to arrive at socially efficient solutions to resource allocation problems of national (or local) economy).

28. See Nath, supra note 24, at 25. Nath notes that a strict concept of social welfare function is only used for abstract and pedagogic purposes. See id. Specifically, for setting the general conditions of social welfare to be at a maximum, and for illustrating the derivation of these conditions with the help of algebra, set theory, geometry, and other math, in the process of teaching. See id.

29. See id. Nath's simplified definition differs from a more strict definition of a social welfare function. See id. Specifically, Nath states "a relation between social welfare as the dependent variable and a number of independent variables which determine social welfare." Id.
through their impact on political, cultural and other non-economic conditions. In essence, a social welfare function may be interpreted as a kind of rule for ranking alternative social states. The significance of the social welfare function is that a proposition regarding any kind of ideal economic arrangement in a society cannot be formulated without implicit or explicit reliance on a social welfare function. Clearly, there are considerable difficulties in constructing social welfare functions and translating them into practical guidance for economic policy. For present purposes, however, the key point is that a statement stating the objectives of social policy is necessary before any rules for optimality can begin to be formulated.

The concept of social efficiency or optimality is fundamental to welfare economics because it is the discipline's central objective. A "social optimum" may be defined in general terms as the distribution of wealth, leisure and other relevant things that maximize social welfare within a given period according to a well-defined social welfare function and subject to technical and other relevant constraints. Although ethical judgments underpin conceptualization of all social welfare functions, there is virtual unanimity within modern welfare economics in viewing social welfare as dependent on individuals' well being or "utility." More specifically, welfare economists almost all agree that social welfare is improved if at least

30. See id. at 26 (warning that welfare economics is not concerned with idea of "economic welfare").
31. See id. at 27 (noting alternative interpretation of social welfare function as "master-ordering").
32. See id. at 25 (describing "social welfare function" as concept of fundamental importance in welfare economics).
33. See E.J. Mishan, Welfare Criteria: Resolution of a Paradox, in ECONOMY EFFICIENCY AND SOCIAL WELFARE: SELECTED ESSAYS ON FUNDAMENTAL ASPECTS OF THE ECONOMIC THEORY OF SOCIAL WELFARE 35 (1981). Mishan describes the idea of a "social welfare function" as a "pleasing and nebulous abstraction" and lists several obstacles to its construction, including: the ambiguousness in compiling and arranging the welfare of each individual in society, the difficulty in discovering the effect of alternative arrangements on the welfare of each individual in a society and the cost of such a discovery. Id.; see also Nath, supra note 24, at 30.
34. See Mishan, supra note 33, at 35. The terms "social efficiency" and "optimality" are synonymous in this paper.
35. See id. Mishan states, "[s]ocial Optimum, in practice, may not be an arrangement which can be claimed or proved to maximize social welfare during a period, but rather one which seems to be about the best arrangement from the standpoint of social welfare according to about as refined a statement of the social objectives as the policy-makers can be expected to formulate - a statement which is usually likely to be well short of a well-defined social welfare function." Id.; see also Nath, supra note 24, at 30.
36. See Mishan, supra note 33, at 36 (noting that individuals judge their own utility levels); see also Nath, supra note 24, at 36.
one person’s situation is improved and no person’s situation is worsened.\textsuperscript{37} This type of improvement in social welfare is called a “Pareto improvement.”\textsuperscript{38} Thus, a Pareto optimal allocation of resources is achieved when no person can be made better off without making someone else worse off.\textsuperscript{39}

The Paretian conception of optimality is almost universally accepted by welfare economists as the appropriate conceptual foundation for evaluating alternative allocations.\textsuperscript{40} Nicholas Rescher argued that:

\begin{quote}
[t]here is little that economists of different schools and persuasions agree on almost universally, but the Pareto Principle seems to be among the few exceptions to this rule. Virtually without exception, economists, decision theorists, social-choice theoreticians, and the like, are inclined to espouse it as a well-nigh self-evident truth. It is viewed as so secure in itself as to qualify as a touchstone by which the adequacy of social-choice mechanisms can be assessed.\textsuperscript{41}
\end{quote}

Thus, within welfare economics, Pareto optimality represents a socially efficient allocation of resources and the ideal against which alternative allocations may be assessed.\textsuperscript{42}

It is clear that the Pareto criterion, which excludes changes in welfare that adversely affect someone’s interests, is virtually impossible to meet in practice given the expansive range of interests in a pluralist society.\textsuperscript{43} Therefore, if the Pareto criterion were strictly applied and only those policy changes yielding Pareto improve-

\textsuperscript{37} See Mishan, \textit{supra} note 33, at 36 (using Paretian social welfare to define Paretian optimal allocation).

\textsuperscript{38} See Posner, \textit{supra} note 2, at 14. The “Pareto improvement” is also referred to as the “Pareto-superior transaction.” See \textit{id}.

\textsuperscript{39} See \textit{id.} (explaining goal as achieving unanimity of all affected persons).

\textsuperscript{40} See Mishan, \textit{supra} note 33, at 35 (explaining Paretian optima); see also N. Rescher, \textit{Economics Versus Moral Philosophy: The Pareto Principle as a Case Study, in Unpopular Essays on Technological Progress} 69 (1980).

\textsuperscript{41} Rescher, \textit{supra} note 40, at 69 (defining “Pareto improvement” and “Pareto optimal” as “key components”).

\textsuperscript{42} See \textit{id.} at 69-70. It is essential to note that different distributions of resources (and hence utility levels) among the individual members of the society result in different Paretian optima. See \textit{id.} at 70. Furthermore, the Paretian concept of social improvement (i.e. that the community is better off when at least one person is better off and no one is worse off) does not enable someone to choose between two Paretian optima. See \textit{id.} at 71.

\textsuperscript{43} See \textit{id.} at 71-72 (noting that rational person’s preference is for his/her own gain, but it is possible and desirable that that person be concerned also with welfare of others).
ments, or solely positive effects, were implemented, policy decisions would be severely biased towards the status quo since very few would meet the criterion. Consequently, the response of welfare economists and policy analysts is to evaluate competing policy alternatives on the basis of potential Pareto improvements. The less demanding criterion of potential Pareto improvement, known as the Kaldor-Hicks principle, merely requires that aggregate welfare gains exceed aggregate welfare losses. Thus, in theory, if the "gainers" are able to compensate the "losers" and still remain better off, the proposed policy change is desirable under the Kaldor-Hicks principle as increasing social welfare. As discussed in greater detail in Section IV(i)(b) below, the Kaldor-Hicks criterion does not require that compensation actually be paid for an increase in social welfare.

It is important to note that, although the Kaldor-Hicks principle constitutes the practical evaluative criterion of many welfare economic analyses, the Pareto principle provides the theoretical foundation for the criterion.

Given certain stringent and unlikely assumptions, standard welfare economic theory demonstrates that the necessary conditions for Pareto optimality are satisfied by a competitive economy in equilibrium. In essence, the major part of the conditions that must be fulfilled to achieve Pareto optimality, and hence social efficiency, are efficient production and efficient consumption. Specifically, the allocation of commodities in the economy should be such that, first, in producing goods, it should be impossible for one producer to be able to convert an additional unit of one good into another at a rate different than another producer of those goods (i.e. equal "marginal rates of transformation"), and second, in consuming goods, no consumer should be more willing than another consumer to be more willing than another consumer to be more willing than another consumer to be more willing than another consumer to be more willing than another consumer.
consumer to sacrifice more of one good for another good (i.e. equal "marginal rates of substitution"). However, the important point for the present discussion about welfare economics is the assumptions or conditions that underlie the analysis.

The assumptions or conditions for a perfectly competitive market are that: (1) all individuals aim to maximize their utility; (2) all firms maximize profits, including adoption of least-cost methods of production; (3) all economic agents are rational; (4) all economic agents have perfect knowledge about the future and about relevant present activities; (5) all economic agents are free to adjust the amount of sales and purchases that they would make and the amount of work they would like to do; (6) no externalities exist; (7) markets come to equilibrium at stable prices at which there is no excess demand or supply; (8) the number of companies is variable; and (9) neither producers nor consumers are able to affect market prices. Thus, the assumptions or conditions necessary for a perfect competitive market relate to both behavioral features of participants and institutional aspects of the economy.

As the discussion above has sought to highlight, the normative goal of welfare economic theory is to maximize social welfare, measured by the private welfare of each individual in society. Furthermore, as noted above, it is well settled within welfare economics that a perfect competitive market maximizes social welfare, or achieves a Pareto optimum, through a socially efficient allocation of resources. The existence of a perfect competitive market, and thus the socially efficient allocation of resources, requires the fulfillment of several heuristic behavioral and institutional assump-


49. In this paper no attempt is made to present the technical analysis leading to the conclusions about the central significance of equal marginal rates of transformation and substitution, or to the broader conclusion that the necessary conditions for Pareto optimality are met at a competitive equilibrium. Such a discussion may be found in any number of standard or introductory texts on welfare economics. See e.g. Bohm, supra note 26, at 2-19; Hirsch, supra note 5, at 214-15.

50. See Nath, supra note 24, at 36-37 (laying out conditions for perfectly competitive market). In essence, an "externality" is a cost or benefit that is imposed or conferred by one economic agent on another as an incidental result of the former agent's activities. See id. The concept of externalities is discussed in greater detail in Section III below.


52. See Nath, supra note 24, at 36 (stating "from a Pareto social welfare function follows the definition of a Pareto optimal allocation of society's resources - namely, one which can be altered only by increasing the utility of some individual at the expense of the utility of others").
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However, as economists and policy-makers plainly realize, these necessary conditions for a perfect competitive market very rarely, if ever, exist in practice. One reason for the failure to attain a socially optimal allocation of resources involves the existence of externalities, a practical reality which runs contrary to assumption six as noted above. As Section III will illustrate, the concept of externalities is fundamental to the economic analysis of environmental issues and is central to the field of environmental economics.

III. EXTERNALITIES AND ENVIRONMENTAL ECONOMICS

As noted above, one important reason why markets fail to facilitate efficient allocation of resources is the existence of externalities. Before discussing the content of the concept of externalities, it is important to understand its centrality to environmental policy. As Krister Hjalte, Karl Lidgren and Ingemar Stahl stated: "[m]any, or perhaps most of the environmental issues that have been discussed in the past few years can be analyzed in terms of externalities or in terms of the price system's failure to convey correct information about a resource's relative scarcity." In short, externalities are a significant cause of market failure. Thus, the concept of externalities seems to form an important theoretical basis for environmental policy prescriptions.

Despite the centrality of externalities to environmental economics, the issue of precisely defining the concept of externalities is the subject of some debate. An externality exists when not all of

53. See id.
54. See N. Hanley et al., ENVIRONMENTAL ECONOMICS IN THEORY AND PRACTICE 22-56 (1997) (analyzing market failure for environmental resources).
55. See Krister Hjalte et al., ENVIRONMENTAL POLICY AND WELFARE ECONOMICS 7-8 (1977) (discussing externalities as unpredictable). Although Hjalte's comment was made more than two decades ago, it remains apt today.
56. See id. at 7-9 (asserting that social efficiency is arguably threatened by externalities and that there is no definite answer to this problem).
57. Id. at 8.
58. See Hanley et al., supra note 54, at 29-37; see also M.A. Santos, LIMITS AND SCOPE OF ENVIRONMENTAL LAW 62-64 (1995) (noting that environmental problems are not caused by any single factor, but are result of several areas of neglect). Three factors have played a role in the environmental crises: 1) the prescriptive nature of environmental values, 2) growth and attitudes, and 3) the fact that society is not maximizing the benefits of fundamental economic and scientific principles. See id.
the implications or costs of a consumption or production activity are fully borne by the person undertaking the activity.\textsuperscript{60} William Baumol and Wallace Oates stated that "[a]n externality is present whenever some individual’s (for example, A’s) utility or production relationships include real (that is, non-monetary) variables, whose values are chosen by others (persons, corporations, governments) without particular attention to the effects on A’s welfare."\textsuperscript{61} Thus, an externality involves the imposition of a cost or the conferral of a benefit on an economic agent as an incidental result of the activities of another economic agent.\textsuperscript{62}

A few examples of externalities may serve more fully to illuminate their character. Some pervasive and serious examples include the following:

a. Disposal of toxic wastes;

b. Sulfur dioxide, particulates, and other contaminants of the atmosphere;

c. Various degradable and nondegradable wastes that pollute the world’s waterways;

d. Pesticides, which, through various routes, become imbedded in food products;

e. Deterioration of neighborhoods into slums;

f. Congestion along urban highways; and

g. High noise levels in metropolitan areas.\textsuperscript{63}

\textsuperscript{54} (1952); J.E. Meade, THE THEORY OF ECONOMIC EXTERNALITIES 15-23 (1973). At this point, the definitional issue will not be explored in any detail because the primary concern here is to delineate the concept in broad terms and to explain in greater detail its relevance to environmental policy.

\textsuperscript{60} See Hirsch, supra note 5, at 14 (stating, "[T]echnically, one individual’s (household’s, government’s or firm’s) consumption can enter into another’s utility (or production) function without proper market compensation because of imperfect appropriation of entitlement or rights.").

\textsuperscript{61} Baumol & Oates, supra note 59, at 17. Baumol & Oates’ definition is conditioned on the absence of regulatory pressures for the control of activity. See id. They conclude that the threat of government intervention can force the polluter to concern himself with the effects on emissions, but they do not say that those concerns disqualify those emissions as an externality. See id. at 17 n.10.

\textsuperscript{62} See id. at 17. This definition rules out situations where someone deliberately acts to affect another person’s welfare. As Baumol and Oates stated, "[i]f I purposely maneuver my car to splatter mud on a pedestrian whom I happen to dislike, he is given no choice in the amount of mud he ‘consumes,’ but one would not normally regard this as an externality." Id. at 17.

\textsuperscript{63} See id. at 12 (citing various common examples of externalities).
Each of these examples reflects the essential nature of externalities, that is, the failure to incorporate fully the social costs, or broader affected interests into a cost calculation or decision. The failure to incorporate all social costs into an economic decision has significant, often detrimental, ramifications for social welfare. Generally, the impact of the activity on others may result in a divergence of the private costs of the person undertaking the activity from the full social costs. In essence, the person undertaking the activity disregards, through self-interest or ignorance, the negative impact of his or her activities on others. The result is that the person continues the activity up to a privately optimal level. In other words, the person continues to act until it yields no further net benefit to them regardless of the fact that, at some reduced level of activity, the welfare of the community is maximized.

With respect to environmental issues, the divergence of private costs and social costs is reflected in environmental degradation, such as excessive pollution, and, more generally, in a failure to achieve the socially optimal allocation of resources. From an economic perspective, at the root of the externality is the absence of an exchange institution in which the polluter pays an appropriate price for the environmental damage caused. This price system fails to convey the relative scarcity of environmental resources.

64. See Hirsch, supra note 5, at 14-15 (discussing several classes of externalities distinguished in economic literature); see also Baumol & Oates, supra note 59, at 18-21 (noting both public and private externalities as two broad classes). The essence of the distinction between these two classes of externalities relates to the depletability of the external costs. See id. at 18. Public externalities are "undepletable" in the sense that an increase in the number of people suffering from the external costs will not reduce the average impact of those costs. See id. at 19. Examples of environmental externalities that take a public (undepletable) form are polluted air and water, and noise and neighborhood slums. See id. at 20. In contrast, private externalities are "depletable" because the external costs are divisible among the individuals upon whom they are imposed. See id. One example of a private (depletable) externality, noted by Baumol and Oates, is the case of coal spilled from passing trains that is gathered by fuel-needly individuals. See id. This is a private externality because the total quantity of coal available is reduced with every additional piece found by a gatherer. Such practical examples of private environmental externalities are rare. See id. Thus, environmental externalities can take either a public (undepletable) or a private (depletable) form. However, because the basic policy prescription is the same for public and private externalities and as a result of the rarity of the latter type of externality, this paper does not distinguish between the two cases while discussing the concept of externalities. See id at 18-21.

65. See Hirsch, supra note 5, at 265 (noting that when parties to transactions generate externalities, but they fail to consider their implications in making decisions, optimal resource allocation is unlikely).

66. See Hjalte et al., supra note 55, at 5-7 (contending that for price system to function effectively, it must encompass all factors of production process). The price system fails to convey the relative scarcity of environmental resources. See id. at 7.
price for imposing the external costs. Therefore, based on economic theory, the fundamental policy issue facing those seeking to restore or to achieve the socially optimal allocation of resources is how to ensure that external costs are internalized. As some commentators have observed: "[T]he efficient resolution of environmental externalities calls for polluting agents to face a cost at the margin for their polluting activities equal to the value of the damages they produce and for victims to select their own levels of defensive activities with no compensation from polluters." Thus, within the context of environmental protection, the objective is to achieve a socially optimal allocation of resources by ensuring that polluters, and others whose activities may adversely affect environmental quality, bear the full costs that their activities may impose.

Based upon this theoretical foundation, environmental economics seeks to develop a number of policy prescriptions aimed at contributing to environmental policy. Although the degree of reliance and choice of economic instruments varies considerably between countries, the underlying idea of the policy prescriptions is essentially the introduction of surrogate prices to provide the necessary allocative incentives.

67. See Hanley et al., supra note 54, at 29; see also, Sharon Beder, Charging the Earth: The Promotion of Price-based Measures for Pollution Control, 16 ECOLOGICAL ECONOMICS 53 (1996) (noting that environmental resources such as timber, fish and minerals are bought and sold in market but that their price does not include damage to environment and therefore they are overused or abused because they are so cheap).

68. See Beder, supra note 67, at 52-53 (describing economists' approach that externalities not taken into account in market transactions should be "internalized" so that firm causing external cost is obliged to pay for it).


70. See generally, Beder, supra note 67, at 52-53 (describing economic argument that subjecting use of environmental resources to price-based measures is most effective means of dealing with environmental problems).

71. See Cropper & Oates, supra note 69, at 675-76 (noting that economists have suggested unit taxes, effluent fees or marketable emission rights as means to regulate pollution).

72. See id. at 675. For a comparative table listing various federal environmentally-related taxes and charges in member countries of the Organisation for Economic Co-operation and Development (OECD), see OECD, EVALUATING ECONOMIC INSTRUMENTS FOR ENVIRONMENTAL POLICY, 20-22 (1997). For a discussion of the potential use of economic instruments to address toxic pollution within the Great Lakes region, see Hickling Corporation, Economic Instruments For the Virtual Elimination of Persistent Toxic Substances in the Great Lakes Basin, Report prepared for International Joint Commission (IJC) (1994). For an ecologically economic perspective on the ways in which the theory and application of economic instruments is
It is important to note that elimination of an externality will not result in abatement of all pollution. Some pollution will occur even at a socially optimal allocation of resources, notwithstanding the absence of external costs. Pollution, and other forms of environmental degradation, are generally incidental results of profitable economic activity. From an economic perspective, a decrease in pollution is socially advantageous only if it increases the welfare of victims of pollution by more than the corresponding decrease in the welfare of those causing the pollution. Therefore, even a socially efficient allocation of resources involves some degree of pollution.

In sum, as the foregoing discussion strives to highlight, environmental economic theory provides a prescriptive and descriptive framework for addressing environmental degradation. The prescriptive aspect of environmental economics is the goal of maximizing social welfare, including allowance of a socially optimal level of pollution. Its descriptive feature is that environmental degradation, including excessive pollution, occurs when social costs diverge from private costs for any number of reasons related to market failure, particularly the existence of externalities. Furthermore, environmental economics prescribes several forms of economic instruments aimed at achieving efficient use of resources through the introduction of appropriate pricing signals. It is now relevant to outline environmental economics and its conceptual foundations, and to strive to address some criticisms that have been levied against these frameworks. Section IV undertakes this objective.

IV. CRITICISMS OF THE ECONOMIC APPROACH TO ENVIRONMENTAL ISSUES

A. Criteria for Social Efficiency – The Pareto and Kaldor-Hicks Principles

1. Pareto Principle

As noted above, the Pareto principle is almost universally accepted by economists as a “touchstone by which the adequacy of shaped by the interests, values and ideologies of their proponents see generally, Beder, supra note 67.

See Revesz, supra note 51, at 3.

See id. Under the economic perspective, having less pollution may be just as unwanted as having more pollution. Thus, a socially optimal amount of pollution is a delicate balance between the welfare of the victims and the welfare of the polluters. See id.

One area of study that has criticized both “mainstream” economics, particularly environmental economics, and ecology is ecological economics. Apart
social-choice mechanisms can be assessed." Some commentators criticize the Pareto principle as an unjustified measure of social welfare. First, critics of the Paretian approach to social welfare argue that the approach is founded on the untenable presupposition that individuals choose between competing social states on the basis of "blinded self-interest." Thus, critics argue, the economic approach from the introduction to the discipline provided here, this paper will not independently examine the critiques by students of ecological economics, but rather will include ecological economic criticisms with the others outlined in Section III. As Robert Costanza stated in the inaugural issue of Ecological Economics:

Environmental and resource economics, as it is currently practiced, covers only the application of neoclassical economics to environmental and resource problems. Ecology, as it is currently practiced, sometimes deals with human impacts on ecosystems, but the more common tendency is to stick to "natural" systems. [Ecological Economics] is intended to be a new approach to both ecology and economics that recognizes the need to make economics more cognizant of ecological impacts and dependencies; the need to make ecology more sensitive to economic forces, incentives, and constraints; and the need to treat integrated economic-ecologic systems with a common (but diverse) set of conceptual and analytical tools. [Italics in original]

Robert Costanza, What is Ecological Economics? 1 ECOLOGICAL ECON. 1, 1 (1989). Thus, ecological economics seeks to develop a new analytical framework by focusing on the intersection of the disciplines of ecology and economics. See C.J. Cleaveland, Basic Principles and Evolution of Ecological Economics, in The Institute for Research on Environment and The Economy & The Canadian International Development Agency, Ecological Economics: Emergence of A New Development Paradigm 30 (Proedit Cassette ed., 1993). For a discussion of the methodological and conceptual issues of ecological economics, see generally Malt Faber et al., Ecological Economics: Concepts and Methods (1996). Although the conceptual foundations of this evolving discipline will, perhaps, emerge with greater clarity in the future, some commentators seek to distinguish ecological economics from neoclassical economics. See, e.g., Costanza et al., An Introduction To Ecological Economics (1997). They want to distinguish between the two on the basis that in addition to the neoclassical goal of efficient allocation, ecological economics sets the goals of limiting economic activities to a sustainable scale and of fair distribution. Specifically:

We see three basic problems: allocation, distribution, and scale. Neoclassical economics deals extensively with allocation, secondarily with distribution, and not at all with scale. Ecological economics deals with all of these, and accepts much of neoclassical theory regarding allocation. Our emphasis on the scale question is made necessary by its neglect in standard economics. Inclusion of scale is the biggest difference between ecological economics and neoclassical economics. . . .It is clear that scale should not be determined by prices, but by a social decision reflecting ecological limits. Distribution should not be determined by prices, but by a social decision reflecting a just distribution of assets.

Id. at 80-81; see also International Joint Commission (IJC), 1995-1997 Priorities and Progress Under The Great Lakes Water Quality Agreement 34 (1997) (comparing ecological and neoclassical economics).

76. Rescher, supra note 40, at 69.
77. See id.
78. See id. at 71. "Blinded Self-Interest" is only one alternative discussed by Rescher, when taking a closer examination of "the Tacit Presupposition." Id. Case
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proach to social welfare leads to the questionable conclusion that widening disparities in levels of well being are socially rational and desirable.\(^{79}\) Second, critics of the Pareto principle argue that, although transitive reasoning implies that successive improvements in total welfare are preferable, such reasoning cannot be used to justify increasing disparities in welfare.\(^{80}\) Rather, critics assert that a sense of justice, involving at least some modicum of egalitarianism, fatally undermines the position that Pareto improvements are always desirable, even if they result in further disparities in welfare.\(^{81}\)

Thus, critics of the Pareto principle conclude that the principle unjustifiably subordinates other important, competing principles, such as distributive justice and egalitarianism.\(^{82}\) Moreover, critics contend that highlighting and combining competing principles relating to social welfare involves precisely the underlying issues that should be addressed, rather than using them to judge undefended presuppositions, such as the Pareto principle.\(^{83}\)

The criticism above, that the Pareto principle is unjustified as the ultimate criterion of social welfare because it ignores important ethical issues, is not new.\(^{84}\) It is recognized within the fields of welfare economics and Law and Economics as a valid concern.\(^{85}\)

Posner acknowledged that:

- The dependence of even the Pareto-superiority concept of efficiency on the distribution of wealth - willingness to pay, and hence value, being a function of that distribution

1, or "Blinded Self-Interest," asks whether one would like to have an alternative that gives them the return x or return y, when no information about how others fare is given to that person. See id. On the other hand, case #2, or the "Holistically Constrained Communal Interest," allows one to have a certain distribution across a whole population (they receive return x) or one that gives them variant distribution (and they receive return y). Id. (emphasis added).

79. See id. at 72.
80. See id. (questioning whether it really improves matters to let ever wider disparities open up between hapless many and fortunate few).
81. See Rescher, supra note 40, at 73 (claiming that there remains that part of the "sense of justice" which involves at least modicum of egalitarianism, even in absence of preferable). Rescher goes on to contend that it is necessary to look at picture of social-preferability assessment of utility distribution in both a microscopic as well as macroscopic regard. See id. at 77 (claiming that putting Pareto Principle into controlling position requires us to maintain that conflicting principles of distributive justice and egalitarianism should be discounted or subordinated to it).
83. See id. (stating that these difficult issues cannot simply be brushed aside).
84. See Nath, supra note 24, at 65-69 (discussing flaws of assumptions underlying Pareto welfare economics, and need for inclusion of ethical judgements in concept of social optimum).
85. See Posner, supra note 2, at 15 (discussing absence of ethical considerations in Pareto Principle analysis).
further limits efficiency as an ultimate criterion of the social good. If income and wealth were distributed differently, the pattern of demands might also be different and efficiency would require a different deployment of our economic resources. Economics does not answer the question whether the existing distribution of income and wealth is good or bad, just or unjust, although it can tell us a great deal about the costs of altering the existing distribution, as well as about the distributive consequences of various policies; neither does it answer the ultimate question whether an efficient allocation of resources would be socially or ethically desirable. [Footnotes omitted.]

Thus, the Pareto Principle optimality is limited by its inability to resolve distributive equity issues, which, as critics argue, requires balancing with other principles. Notwithstanding this limitation, however, Pareto optimality can offer valuable insights into the efficiency of an economy. Furthermore, as argued in Section I, in focusing on efficiency as one important value of a society, economics can contribute to the clarification of value conflicts by providing a frame of reference for the assessment of competing social objectives as well as means to achieve those objectives. Therefore, despite the limitations of economics in providing ethical guidance on issues of distributive equity, the discipline still makes an important contribution to normative as well as positive issues.

2. Kaldor-Hicks Principle

In addition to attacks on the Pareto principle, critics challenge economists' reliance on the Kaldor-Hicks principle. Kaldor-Hicks requires that any change result in a positive net benefit to society.

86. Id. at 15 (discussing limits of efficiency as ultimate criterion of social good).

87. See Rescher, supra note 40, at 77 (stating that it is understandable why economists, theorists, and their congeneres are reluctant to get involved with balancing egalitarian principles and instead prefer to settle matter on basis of straightforward and mechanical considerations such as those of Pareto Principle).

88. See Posner, supra note 2, at 15 (discussing Pareto Principle and stating that although economist's competence in discussion of legal system is limited, economists are able to predict effect of legal rules on value and efficiency, in their strict technical senses, and on existing distribution of income and wealth).

89. See Mishan, supra note 33, at 4 (discussing principles of resource allocation). As noted in Section II above, under the Kaldor-Hicks principle, if the increase in welfare of those who benefit from a change exceeds the decrease in welfare from those who bear costs from the change, from a social cost-benefit perspective, the change is desirable.
As many commentators validly pointed out, the Kaldor-Hicks principle does not require actual compensation by "gainers" to "losers" for policy changes. Rather, the principle merely (and unsatisfactorily, in detractors' views) requires that those who benefit could, if a system of perfect transfers existed, compensate those who lose. Therefore, a standard criticism of the Kaldor-Hicks principle is that, even though potential social welfare could be increased, some individuals or groups might be made significantly worse off.

The criticism that the Kaldor-Hicks compensation criterion does not require actual compensation validly highlights the principle's shortcomings as an instrument for social decision-making. Ultimately, the concern about compensation highlights the importance of distributive measures and raises fundamental questions about the appropriate mechanism for addressing perceived inequities.

B. Realism of Fundamental Economic Assumptions

A number of critics challenged the validity of economic theory on the basis that its underlying assumptions are unrealistic and untenable. These criticisms are generally directed at some of the institutional and behavioral assumptions noted in Section II and, in particular, the assumption that economic agents act in a self-interested, rational manner.

These criticisms appear to reflect a lack of understanding regarding the nature of theoretical analysis. Assumptions are neces-

90. See Posner, supra note 2, at 14 (pointing out that policy changes under Kaldor-Hicks principle can occur "regardless of whether or not compensation was paid").
91. See id. (pointing out that under Kaldor-Hicks concept, winners could compensate losers, whether or not they actually do so).
92. See Mishan, supra note 33, at 257 (discussing maxims of normative allocation economics). An obvious extension of this point is that the Kaldor-Hicks compensation test ignores distributive effects. See Posner, supra note 2, at 17. This criticism is discussed in Section IV(i)(b) below.
93. See Mishan, supra note 33, at 5 (claiming that Kaldor-Hicks principle is capable of self-contradiction).
94. See Posner, supra note 2, at 29 (pointing out that economic analysis of law arouses considerable antagonisms). Posner discusses several criticisms of economic analysis of law: 1) economics is reductionist and lawyers and judges do not speak its language; 2) the normative underpinnings of the economic approach are so repulsive that it is inconceivable that the legal system would embrace them; 3) the economic approach to law manifests a conservative political bias; and 4) that the economic approach to law is criticized for ignoring "justice." See id.
95. For a discussion of the subjective values upon which neoclassical economic assumptions are founded, see R.P. Malloy, A New Law and Economics, in Law and Economics: New and Critical Perspectives at 15-18.
sary in economics as well as within other fields of social and scientific inquiry for the obvious reason that some degree of abstraction is necessary to advance understanding of complex realities. 96 Indeed, a theory that sought to reproduce in its assumptions the complexity of reality would lose its explanatory import and become merely a description. 97 Thus, by founding analytical models on certain simplified behavioral attributes, economics enhances its ability to describe and explain particular phenomena and to predict outcomes. Ultimately, arguments that attack the validity of economics on the basis of its basic assumptions are misguided because they fail to recognize that theories should be judged primarily on the basis of their descriptive, predictive, and prescriptive contributions.

C. Valuation of the Environment

In addition to criticizing underlying principles and assumptions, critics attack the evaluation of economic costs and benefits in environmental decision-making. 98 The subtleties of the extensive debate on environmental cost-benefit analysis make extensive review tenuous. As a result, after briefly outlining some dominant approaches used in cost-benefit analysis, this article will highlight some of the alleged deficiencies identified by critics.

Cost-benefit analysis has three major uses: (1) to assess the economic feasibility of particular projects; (2) to rank alternative investment projects; and (3) to optimize the scale of a given project. 99 Thomas Cinti observed that "[t]he underlying assumption of cost benefit analysis is that efficiency will be achieved when the marginal benefit realized from a new technology is just equal to the marginal cost incurred implementing it." 100 Therefore, the ultimate objec-

97. See Posner, supra note 2, at 18 (discussing apparent unrealistic assumptions that underlie economic theory).
98. See Dr. Terrence S. Veeman, Benefit-Cost Analysis in Environmental Decision-Making: Procedures, Perils, and Promise, Address at Symposium sponsored by the Society of Environmental Biologists Alberta Chapter (February 19 & 20, 1985), in Economy & Ecology: The Economics of Environmental Protection 129 (1985) (contending that difficulties associated with cost-benefit analysis can be overcome with greater sophistication in evaluating and greater attention to environmental considerations).
99. See id. at 130 (contending that determination of economic feasibility is primarily used method of cost-benefit analysis in North America).
100. Thomas A. Cinti, The Regulator’s Dilemma: Should Best Available Technology or Cost Benefit Analysis Be Used To Determine the Applicable Hazardous Waste Treatment, Storage and Disposal Technology?, 16 Rutgers Computer & Tech. L.J. 145, 155
tive of cost-benefit analysis is to facilitate systematic decision-making on the efficiency of resource allocation by identifying and assessing the proposed project's impact on environmental, economic and other interests.

The difficulty in evaluating potential impacts arises from the need to value entities, such as the environment, for which no identifiable market exists. Because of the absence of a market for particular amenities, it is necessary for decision-makers to attach values, defined in terms of how much people would be willing to pay for the amenities if they were marketed. The two main types of approaches to non-market valuation in environmental cost-benefit analysis are direct and indirect methods. Direct, or stated preference, methods seek to infer individuals' opinions on environmental quality by asking them to state their preferences for the environment. For example, one widely used type of direct method is the contingent valuation method. This method may involve surveying individuals about their preferences between different scenarios or, alternatively, asking them the maximum they are willing to pay for an increase in environmental quality or to accept compensation for avoiding a decrease in environmental quality. In contrast to direct methods, indirect methods seek to derive values of environmental costs and benefits by examining individuals' behavior in related markets. Essentially, indirect methods focus on


101. See Hanley et al., supra note 54, at 356-57 (discussing lack of market for, and undervaluation of, environmental resources). Environmental resources provide both direct and indirect services. See id. But there is no private or public market for them, and frequent mis-pricing or under-pricing of services requires policy makers to use other methods to assess their value. See id.

102. See id. at 383-84 (introducing direct and indirect methods of valuing environmental resources using direct surveys or indirect observation of related markets to determine individuals' maximum "willingness to pay" for environmental quality). For a critical discussion of methodologies which may be used by the courts to assess environmental harm, see Ontario Law Reform Commission, The Assessment of Damages for Harm to the Environment, in Report on Damages for Environmental Harm (Ch. 3) (1990).

103. For a summary of both approaches, including outlines of different methods within each type and examples of applications, see Hanley et al., supra note 54, at 383-424.

104. See Hanley et al., supra note 54, at 383 (describing direct or stated valuation method).

105. See id. (discussing contingent valuation method). This method, while controversial, was widely used. See id.

106. See id. at 404 (introducing indirect methods of valuation). For example, the indirect methods "infer" the value that individuals place on environmental
what individuals actually chose and what they had to forego in order to obtain it. For example, in one type of indirect method of non-market valuation, hedonic modeling, individuals' valuation of air quality improvements is inferred by considering their behavior in the related market for housing, particularly with respect to their willingness to pay for site-specific amenities.107

As alluded to above, there is a difference between direct and indirect methods. As V. K. Smith observed, the difference between the two approaches:

arises from what the analyst does in constructing the choice elements. For indirect methods, the task parallels 'detective work' - trying to determine what people sought and what they had to give up to get it. By contrast, for the methods generally included under the broad heading of contingent valuation this process requires the analyst to present a credible, understandable and relevant choice option.108

Nonetheless, despite this difference, the underlying logic of direct and indirect approaches to non-market valuation are the same, specifically, both involve developing a monetary measure of economic value by reconstructing the elements of a choice and identifying the tradeoff underlying each individual’s decision.109

Based in part on the common underlying logic of various approaches to non-market valuation, critics argue that cost-benefit analysis has systematic limitations that seriously undermine its validity in environmental decision-making processes.110 This criticism resources by identifying what individuals pay to get to those resources and enjoy them.

107. See id. at 411-16 (discussing hedonic pricing approach).

108. See Vincent Kerry Smith, Estimating Economic Values For Nature, in METHODS FOR NON-MARKET VALUATION xiii-xiv (1996) (asserting that same basic logic underlying contingent evaluation applies to indirect methods). In this particular piece, the author uses the term "survey method" rather than "direct method." See id. Close scrutiny of these terms reveals their synonymous nature. See id.; see also Hanley et al., supra note 54, at 383-418 (evaluating methods for valuation).

109. See Smith, supra, note 108, at xiii (discussing fundamental similarities between direct and indirect approaches to non-market valuation). "An object of choice can be anything an individual wishes to acquire. It defines . . . whatever is obtained from an implicit tradeoff inherent in a choice." See id. at n.1.

110. In addition to the criticisms examined in this article, other criticisms of cost-benefit analysis include: (1) the potential for strategic bias in contingent valuation studies, (2) the potential for "embedding," in which the value placed on a good in a contingent valuation study depends on the extent that it is embedded in other goods, and (3) the sensitivity of preference models to changes in an individual’s information. These criticisms are largely recognized by economists, and con-
includes the views that: (1) the application of cost-benefit analysis is too broad from an environmental ethics perspective; (2) the identification of costs and benefits is seriously undermined by scientific uncertainty; (3) the attempt to assign values discounts less easily assessed non-pecuniary values; (4) cost-benefit analyses are founded on inaccurate assumptions about the way in which people value gains and losses; (5) the process of attempting to make non-marketed entities "monetary" results in their devaluation; and (6) cost-benefit analysis fails to address issues of equitable distribution.

First, cost-benefit analysis is attacked on ethical grounds. In essence, criticisms based on environmental ethics perspectives challenge the moral foundations of cost-benefit analysis. Two illustrative examples of ethical criticisms are outlined briefly here. First, some commentators attacked cost-benefit analyses on the basis that there are many instances, including in environmental regulation, where a decision may be morally right even though its benefits do not outweigh its costs.111 Steve Kelman, for example, argued that although there is a broad range of individual and social decisions where it is sufficient to consider whether an act's benefits exceed its costs, certain questions of moral judgment involve the natural environment and should remain outside the purview of cost-benefit analysis.112 Kelman claimed:

[F]or the common run of questions facing individuals and societies, it is possible to begin and end our judgment simply by finding out if the benefits of the contemplated act outweigh the costs. This very fact means that one way to show the great importance, or value, attached to an area is to say that decisions involving the area should not be determined by cost-benefit calculations. This applies, I think, to the view many environmentalists have of decisions involving our natural environment.113

111. See Steven Kelman, Cost-Benefit Analysis: An Ethical Critique, in PEOPLE, PENGUINS, AND PLASTIC TREES 384-85 (Christine Pierce & Donald VanDeVeer eds., 2d ed. 1995) (demonstrating, by example of truth-telling, that some decisions are morally right even if their costs exceed their benefits).

112. See id. at 386-87 (discussing incorporation of value judgments in cost-benefit analysis, and suggesting that subjecting environmental decisions to cold calculation blocks influence of values that initially spawned environmental concern).

113. Id. at 387.
Thus, environmental cost-benefit analysis is criticized on the ethical basis that the natural environment should be outside the range of such calculations.

Secondly, another ethical criticism of cost-benefit analysis is based on its anthropocentric nature. For example, Douglas Booth argued that “. . . under an ethics of environmental concern the scope of possible cases where cost-benefit analysis can be legitimately applied from an ethical point of view is narrower than commonly believed by environmental economists.”114 Clearly, these ethical critiques of environmental economics are important because they raise fundamental issues about our relationships with other natural entities and suggest that economically irrational choices may sometimes be “right.” It is well beyond the scope of this article to attempt to reconcile these widely diverging views about humanity’s proper sphere of activity. Nonetheless, despite the significance of ethical critiques of cost-benefit analysis, such critiques do not address the pressing practical issue of how to resolve competing interests affecting the environment.

The second basis for attacks on a cost benefit analysis is the observations that the costs and benefits of a project are seriously undermined by scientific uncertainty. Ted Schrecker’s observations concerning the obstacles in identifying the benefits of health and safety regulations are also illustrative of critics’ concerns within the broader environmental context:

An extensive recent review of research on the benefits of health and safety regulation isolated several areas of scientific uncertainty or conflict: the demonstration of cause-effect relationships; limited availability of epidemiological data linking exposures with actual human illness; the limitations of models used to predict dispersion of pollutants within the environment; dose-response relationships; the validity of interspecies extrapolation; and the extent of im-

114. Douglas E. Booth, Ethics and The Limits Of Environmental Economics, 9 ECOLOGICAL ECON. 241, 241 (1994) (discussing environmental ethics in context of humanity as focus of moral concern). Booth analyzed two approaches to environmental ethics: the first is based on the view that human beings are the focus of moral concern; and the other is based on the notion that moral concern can also be extended to non-human entities. See id. Booth concluded that if human beings alone are the focus of moral concern, the application of cost-benefit analysis to environmental issues is illegitimate in cases where environmental damage is harmful to human health and where the natural environment is so highly valued that compensation to those who suffer loss is infeasible. See id. at 249-50. Further, Booth found that cost-benefit analysis cannot legitimately be applied where moral concern is extended to non-human entities. See id.
pacts on especially sensitive individuals or groups. [Footnote omitted.] 115

On the basis of these and similar concerns relating to the identification of environmental impacts, critics argue that the efficacy of cost-benefit analysis in addressing environmental issues is seriously flawed.

Considerable informational limitations face both policy-makers and others seeking to address environmental problems. However, the practical reality of imperfect information does not mean that an attempt to identify the implications of a proposed project should not be made. Rather, in the absence of perfect knowledge, cost-benefit analysts should attempt to make known all scientific uncertainties or assumptions on which the assessment is known based explicitly. 116 Express recognition of the limitations of the analysis would improve its process, albeit not necessarily its substantive content, in two ways. First, express recognition of the scientific shortcomings and underpinnings of cost-benefit analyses would help address the concern that such analyses are misleading. Second, those involved in the development of environmental policy, including the scientific community, would have a clearer understanding of the areas in which further research is required. Thus, as argued here, the most appropriate way of dealing with scientific uncertainty in cost-benefit analysis is to expressly recognize the areas of uncertainty, but not to altogether reject the process of striving to consider costs and benefits in environmental decision-making.

Third, in addition to criticism surrounding the broad application of cost-benefit analysis and the identification of impacts, critics attack the second primary stage of cost-benefit analysis, the assignment of values to identified costs and benefits. 117 One persistent criticism is that cost-benefit analysis distorts or discounts less easily assessed non-pecuniary values. 118 The implication of this is that non-marketed "goods", such as the environment, are undervalued


116. See generally id. and accompanying text (discussing practical uncertainties underlying cost-benefit analysis).

117. See id. at 49. Once benefits are estimated, a value is attached to them, which is determined by how much people are willing to pay for the benefits if they are marketed. See id. This is the most cited problem of cost-benefit analysis – assigning dollar values to benefits that are not normally the subject of market transactions. See id.

118. See P.C. Schulze, Cost-benefit Analyses and Environmental Policy, 9 Ecological Econ. 197, 197-98 (1994).
in decisions relating to use or protection. Critics argue that non-pecuniary values in planning decisions, litigation and reform proposals are discounted relative to more easily appreciated and measured financial data.

It is not disputed here that cost-benefit analysis is better able to deal with values that are already or easily quantified. However, because of the varied and important uses of this type of inquiry in social decision-making, critics of cost-benefit analysis must first establish that cost-benefit analysis systematically results in unjust outcomes before rejecting the process. At present, the claim that cost-benefit analysis is systematically unjust is not founded on compelling empirical foundation.

Fourth, another criticism of cost-benefit analysis, which is related to the issue of valuation, is that such analyses are founded on inaccurate assumptions about the way people value gains and losses. Under standard economic theory, an item has value only to the extent that people are willing to give up something in order to acquire or keep it. In neoclassical welfare economic theory, individuals’ willingness to pay for an increase in welfare and their willingness to accept compensation to avoid a decrease in welfare are viewed as equivalent ways of measuring either a decrease or an increase in welfare. Critics argue that the assumption that people equally value avoided losses and a foregone gain is false. Rather, they argue that increasing evidence shows that people gen-

119. See generally Smith, supra note 108 (discussing how values for environment are constructed from people’s choices); see also Kelman, supra note 111, at 387. One criticism is that people have different preferences and are subject to different constraints as they make their choices. See id. For example, the dollar value imputed to the non-market goods that most people would wish to avoid will be lower than otherwise, because people with a weak aversion to these goods or strong constraints on their choices will be willing to take the good at less of a discount than the average person. See id.

120. See J.L. Knetsch, Economics, Losses, Fairness, and Resource-Use Conflicts, in GROWING DEMANDS ON A SHRINKING HERITAGE: MANAGING RESOURCE-USE CONFLICTS, 20, 23 (M. Ross & J.O. Saunders, eds., 1992); see also Kelman, supra note 111, at 387-88


122. See Kelman, supra note 111, at 388. Another problem with cost-benefit calculations is that the attempts of economists to measure people’s willingness to pay for non-marketed goods assumes that there is no difference between the price a person would require for giving something up to which they have a preexisting right and the price they would pay to gain something to which he has no right. See id.

123. See Kentsch, supra note 120, at 25.

124. See Hanley et al., supra note 54, at 395.
erally value losses more than equivalent gains, and reductions in losses more highly than foregone gains. Steve Kelman argued:

[T]he attempts of economists to measure people's willingness to pay for non-marketed things assume that there is no difference between the price a person would require for giving up something to which he has a preexisting right and the price he would pay to gain something to which he enjoys no right. Thus, the analysis assumes no difference between how much a homeowner would need to be paid in order to give up an unobstructed mountain view that he already enjoys and how much he would be willing to pay to get an obstruction moved once it is already in place. Available evidence suggests that most people would insist on being paid more to assent to a worsening of their situation than they would be willing to pay to improve their situation. [Italics in original.]

Thus, critics maintain that, in attempting to value non-marketed goods, economists ignore the disparity between people's assessment of positive and negative changes in economic well-being. Moreover, critics claim that this disparity can often seriously undermine the efficacy of cost-benefit analysis.

Fifth, cost-benefit analysis is fundamentally attacked on the basis that the very act of attempting to make environmental and other non-marketed values "monetary," results in their devaluation. Proponents of this view claim that the act of pricing may decrease value for two main reasons. First, in many circumstances, non-market exchange is linked to the creation of certain values not associated with market exchange. As a result, "[i]f a good becomes less associated with the production of positively valued feelings because of market exchange, the perceived value of the good declines to the extent that those feelings are valued." In addition, pricing may

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125. See Kelman, supra note 111, at 385. The difference arises from such factors as being accustomed to and psychologically attached to that preexisting right. See id.

126. See id. at 387 (noting inconsistency between people's assessment of positive and negative changes in economic well-being, which should be taken into account when valuing non-marketed goods).

127. See id.

128. See id. at 389 (noting how spontaneity and various other feelings come from personal relationships).

129. Id. at 389. In the environmental context it can be seen in many instances such as streams or forests: for the people who ascribe value to them, part of their value comes from their positions as repositories of values, which the non-market sector represents. See id.
decrease value because value of non-marketed objects is based partly on the objects’ positions as repositories of values represented by the non-marketed sector. Second, proponents of the view that the act of pricing may decrease value claim that the value of a good purportedly may decrease by removing the possibility of announcing that the item is “not for sale.” Moreover, when an object is priced, the issue of its perceived value constantly arises, which may lead to the erosion of individuals’ assessment of the object’s worth. On these grounds, some argue that economic valuation of non-marketed objects can result in their devaluation.

The view that the assignment of economic value to a non-marketed item may result in its devaluation, however, is based on the premise that non-marketed sectors yield special value to humans. Proponents of the argument assert that pricing per se may reduce value and, therefore, place central, but implicit, importance on a dichotomy between the marketed and non-marketed sectors. Nonetheless, their argument does not provide any insight into the origins of the boundaries of these sectors. In other words, the argument fails to address the basic issue of why markets exist and the source of economic value. Consequently, the argument that pricing per se reduces value is considerably undermined by its implicit and undefended assumption that markets and prices are necessary for economic value. Conversely, as Steven Edwards observed:

Indifference is the cornerstone of rigorous definitions of economic values. Something’s economic value - whether it be a marked commodity, an unpriced environmental resource, or sympathy for future generations - is determined entirely by its ability to yield personal utility. Markets and prices are not necessary conditions for economic value. Rather, markets and prices emerge from collective economic behavior when people can be excluded from the use and benefits of things unless they pay for them. Traditional markets and prices provide only one mecha-

130. See Kelman, supra note 111, at 389 (pointing out that this seems certainly to be case for things in nature, such as pristine streams or undisturbed forests).
131. See id. (discussing how stating that something is not for sale affirms, enhances, and protects thing’s value in number of ways).
132. See id. The marker “not-for-sale” enhances a resources value. See id. That marker shows that a resource is valued for its own sake, whereas selling a resource for money demonstrates that the resource’s value is only based on its inherent worth. Secondly by saying something cannot be transferred places it in the exceptional category. See id.
nism whereby these values are revealed. Limiting economics to the analysis of traditional markets is arbitrary.\textsuperscript{133} Therefore, as illustrated above, cost-benefit analysis raises fundamental issues about the nature of economic value. Moreover, the argument that the assignment of economic values to non-marketed items may result in their devaluation ignores the basis of economic value, and is premised on the untenable assumption that the division between marketed and non-marketed sectors is rigid and static.

Finally, cost-benefit analysis is criticized on the basis that it fails to address the social problems associated with inequitable distributions of costs and benefits. Critics argue that the Kaldor-Hicks principle, which requires that any change resulting in a positive net benefit to society, incorrectly assumes that those who bear costs under one decision will eventually benefit from another.\textsuperscript{134} Hence, they claim that the principle assumes that, over the long run, everyone will ultimately benefit sufficiently to compensate for their losses.\textsuperscript{135} In their view, the position that "losers" under one policy will be "winners" under another is false because the analysis depends upon the existing wealth and entitlement distributions in society.\textsuperscript{136} As Cinti stated, cost-benefit analysis usually fails to consider the entitlements of the parties, even though "the initial asset positions of the parties can affect the outcome of the analysis if the cost is great enough to be a substantial portion of the non-entitled party's asset position."\textsuperscript{137} On this basis, critics claim that the Kaldor-Hicks principle, which is central to cost-benefit analysis, ignores distribution effects.\textsuperscript{138}

There are two compelling responses to the criticism that cost-benefit analysis accords insufficient attention to distribution issues. First, the charge has little to do specifically with the methodology of cost-benefit analysis. In principle, there is no reason why equitable


\textsuperscript{134} These criticisms closely parallel the criticisms that the Kaldor-Hicks principle does not require actual compensation of "losers" by "gainers." See Cinti, \textit{supra} note 100, at 160 n.96. The Kaldor-Hicks principle also assumes that "losses" and "wins" will "tend to even out" as the process is perpetuated again and again. See \textit{id}. This latter criticism was discussed in Section IV(i)(b) above.

\textsuperscript{135} \textit{See Cinti, supra} note 100, at 160-61 (weighing ultimate benefits against losses).

\textsuperscript{136} \textit{See id.} (attempting to apply criticism in context of environmental matters).

\textsuperscript{137} \textit{Id.} at 161-62.

\textsuperscript{138} \textit{See id.} at 160 (characterizing this particular criticism as also conflict between efficiency and equity).
concerns cannot be incorporated into the cost-benefit decision framework. Rather, the issue of distribution is closely related to the identification and weighing of costs and benefits, and these concerns should reflect society's view of the relative merit of competing interests. Thus, there is no theoretical reason why distribution concerns could not be systematically included in cost-benefit analyses.

Second, even if distribution concerns could not be systematically included in cost-benefit analyses, there are other means, such as taxes and direct expenditures, to address inequities caused by changes in policy. Thus, although decision-makers should include distributional issues in their assessments of costs and benefits, other wider public programs exist to effect redistribution if project-based efforts are not fully effective. Some proponents of cost-benefit analysis have argued it is generally not a good idea to attempt to address distribution concerns in cost-benefit analysis, and that alternate means are more efficient for redistribution. However, it seems that efforts to address distribution concerns should also occur at the project-based level because it is at this level that stakeholders can present information with sufficient detail and focus to ensure the project's ramifications can be more clearly understood.

Thus, the argument that cost-benefit analysis accords insufficient attention to distributive issues validly highlights the importance of equitable considerations. However, the argument does not seriously undermine the methodology of cost-benefit analysis because there is no reason, in principle, why such concerns could not be included in a cost-benefit analysis. Furthermore, even though every effort should be made to include distribution issues in project-based cost-benefit analyses, distributional concerns may also be addressed in broader public programs.

139. See id. at 161-62 (stating Kaldor-Hicks principle assumes frictionless economy). As Cinti also acknowledged, the criticism that plays into a cost-benefit analysis is affected by, but usually fails to consider, that the initial asset positions of the parties can be largely mooted by considering the purpose of environmental legislation. See id. Cinti also suggested that because the express purpose of most environmental legislation is to protect "human health and/or the environment," the effects of the prior distribution of wealth are lessened substantially. See id. at 162.

140. For example, some commentors argue that only one tax and expenditure package should be used to address equitable concerns because: (1) efforts to address distribution issues within cost-benefit analysis would be inefficient; (2) treating distributional concerns within each project would lead to transfers within a small subset of the community; and (3) the view that distributional issues should be addressed on an individual project basis reflects an unsubstantiated presumption that some groups systematically lose out more than others. See Leonard & Zeckhauser, supra note 121, at 250-51.
In sum, as outlined in the foregoing section, the economic approach to environmental issues is criticized on a number of grounds. This section examined three groups of criticism, including: (1) the criteria for social efficiency, specifically, the Pareto and Kaldor-Hicks principles; (2) the realism of fundamental economic assumptions; and (3) valuation of the environment through cost-benefit analysis. Only some of these criticisms are valid, and as noted above, such criticisms involve: (1) concerns with limitations of efficiency principles with respect to distributive equity and compensation; (2) ethical questions about the moral foundations of cost-benefit analysis; and (3) concerns about traditionally inaccurate assumptions about the way in which people value gains and losses. All of the examined criticisms, even those that are not compelling, are important because they help put the field of economics in perspective relative to other social concerns.¹⁴¹

V. Conclusion

In attempting to demonstrate the general environmental relevance of economics, this paper seeks to achieve three main goals. First, it attempts to justify the use of economics in analyzing the law. As discussed above, economics can contribute to our understanding of law by providing a necessary external perspective, clarifying value conflicts by demonstrating the inefficiency of particular types of activities and placing values, albeit imperfectly, on environmental goods. Second, this paper strives to provide a broad overview of welfare economics and environmental economics, in particular, to highlight the meaning and centrality of the concept of social efficiency in these fields. As outlined above, welfare economics seeks to maximize social welfare, measured in terms of aggregate individual utility. Yet, the existence of externalities is a significant reason within the environmental context, for failing to achieve a socially optimal allocation of resources. Finally, a third main objective of this paper is to outline and respond to the criticisms of an economic approach to environmental law. Ultimately, this paper endeavors to illustrate that, despite some important criticisms, economics remains a useful approach to analyzing environmental issues.

¹⁴¹. This paper does not purport to provide a response to all of the criticisms examined. Rather, notwithstanding the criticisms, this paper has sought to demonstrate the general relevance of economics to environmental law and policy.