Property Rights in Two States of Nature: A Discussion of Evolving Rights

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1. Introduction

This is a companion paper to Richard Epstein's *Property Rights in Two States of Nature*. The paper first discusses four axioms that relate property rights to liberty and the environment. The idea of "two states of nature" is discussed using an analogy of a walled city to illustrate the two states. The wall itself is a solution to a first state of nature problem. Rules, customs and traditions established within the wall form solutions to a second state of nature problem. The walls, whether of stone or parchment, provide boundaries that define life space for the community. Different property rights institutions evolve to form boundaries that conserve resources and foster the creation of wealth. Following this discussion, the paper then describes elements of a process by which the rights Epstein describes evolve. The discussion, which focuses on institutional change, follows Epstein's piece, roughly section-by-section.

The piece is organized as follows: the next section offers four property rights axioms and introduces the notion of property walls. These are order generating devices, both physical and legal, that have been developed by human communities for assuring sustainable communities. Section two develops a framework for illuminating the process of institutional change. This section uses the notion of Environmental Kuznets Curves to develop a discussion of property rights evolution. The picture of property rights evolution that is developed is illustrated graphically and then applied in the next section. The paper ends with a short concluding section.

2. Property Rights, Liberty, Two States of Nature and Walls

Let us begin with four property rights axioms that form a foundation for this paper.

1. There can be no liberty without property rights. The rights do not have to be private property rights, but there must be property rights that define access to resources. Liberty expands with expanding property rights.
2. There can be no individual wealth without private 2-D property rights, rights that are defined honorably and defended by the community. 2-D rights relate wealth to individual people, as opposed to the collective community.
3. Wealth cannot be maximized without 3-D property rights, rights that are defined, defended, and which can be devised or transferred voluntarily to other right

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holders. 3-D rights provide incentives for individual right holders to allocate their property rights to highest and best use.

4. Environmental quality cannot be guarded or enhanced without well defined transferable property rights held by ordinary people. A human community cannot afford the cost of hiring enough environmental police to provide comparable protection.

The axioms recognize notions that property rights enable liberty, which is to say the ability of individuals to have creative access to life-enabling resources, and when fully developed give incentives for wealth creation. The last of the axioms is specialized to environmental resources, which in truth are no different from any other resources. 3-D environmental property rights encourage ordinary people in the process of creating wealth to protect and enhance the quality of environmental resources.

An understanding of the processes that give rise to property rights for land and then other environmental resources may be improved by thinking about a human community in a state of nature, which is to say that they live in a world without property rights to land. Survival is the critical goal to be achieved. The human community cannot survive and sustain itself without order. A first form of order can be thought of as coming from the top down. A second form of order can be seen as evolving spontaneously from within the community as rules of custom, tradition, and formal law evolve.

In a very real sense generating top down and bottom up order maps into property rights institutions that must be invented and operated by the community. And both processes can be thought of as building walls.

In the ancient world, walled cities provided order to human communities that chose to live within the walls. The walls, which were provided and maintained by the central government—top down—formed a foundation for systems of internal rights that evolved from the bottom up. Through time, of course, human communities learned that forming protected communities with parchment and moveable armies or police was more effective than building physical walls. Parchment could define internal walls as well. An individual freeholder could have a parcel of land defined by deed. With each deed came boundaries. And with multiple boundaries came potential spillover effects. Freeholders on one parcel of land could affect life's quality for holders of adjacent rights. Rules had to evolve for resolving boundary problems, whether by common law, code, or by custom and tradition. In this sense, then, there were and are two states of nature. Even today, human communities still struggle to achieve order by living within the walls formed by nation-states, walled communities, condominiums, and neighborhood associations. And within these walled communities, human communities still seek to invent new property rights institutions that enable the creation of protection of new wealth that includes newly recognized environmental resources.

3. Environmental Kuznets Curves and Evolving Property Rights to Nature

Imagine a human community that has solved the basic problem of generating order. The community lives within the parchment walls formed by constitution or by custom and tradition. But while order has been achieved along some critical dimensions of life, newly realized dimensions emerge as the community grows and prospers. Environmental Kuznets Curves (EKC) have become a standard graphical device for illustrating a relationship between levels of environmental quality at a specified location, let us say the level of dissolved oxygen in a segment of a major river, and the corresponding levels of income of the people who live in the river's vicinity. Depending on the size of the community examined, some measurement of average income, such as per capita income or per capita GDP, is commonly used. Of course, alternate measure of environmental quality can be used, such as concentrations of particular air pollutants, the share of forest land denuded, or even levels of some odor-forming activities, such as swine production. It should be noted that the data mapping that results is simply a relationship between an economic variable and a chemical or biological variable; it is not a relationship between income and pollution, unless pollution is defined strictly in chemical or biological terms without regard to human exposure, damage, or invasion of property rights. Indeed, one can imagine components of an EKC that might exist in a state of nature as described by Epstein, this prior to the development of any legal framework that involves rights to the affected natural resource.

The general case, which is shown in the accompanying figure, shows environmental quality deteriorating as average incomes rise from very low to higher levels. Then, with continued increases in income, the rate of environmental deterioration declines, reaches zero, and eventually reverses, so that environmental quality improves with rising income. As just described, the general case illustrates an EKC segment in the left portion of the chart that can be referred to as race to the bottom and then a region in the rightmost section that is described as race to the top. While the figure illustrates the general case, not all EKC estimates result in a nicely shaped inverted U. In some cases, the EKC is simply an upward sloping line. A vast amount of empirical research has been completed on EKCs for a large number of pollutants and activities that might produce what lawyers and Epstein refer to as nuisances and trespass actions.[2] The inverted U curve comes through in a large number of empirical studies, but certainly not in all.

[2] Bruce Yandle, Madhusudan Bhattarai, and Maya Vijayaraghavan, *Environmental Kuznets Curves: A Review of Findings, Methods, and Policy Implications*, RS-02-1a, Update, Bozeman, MT: PERC, 2004.

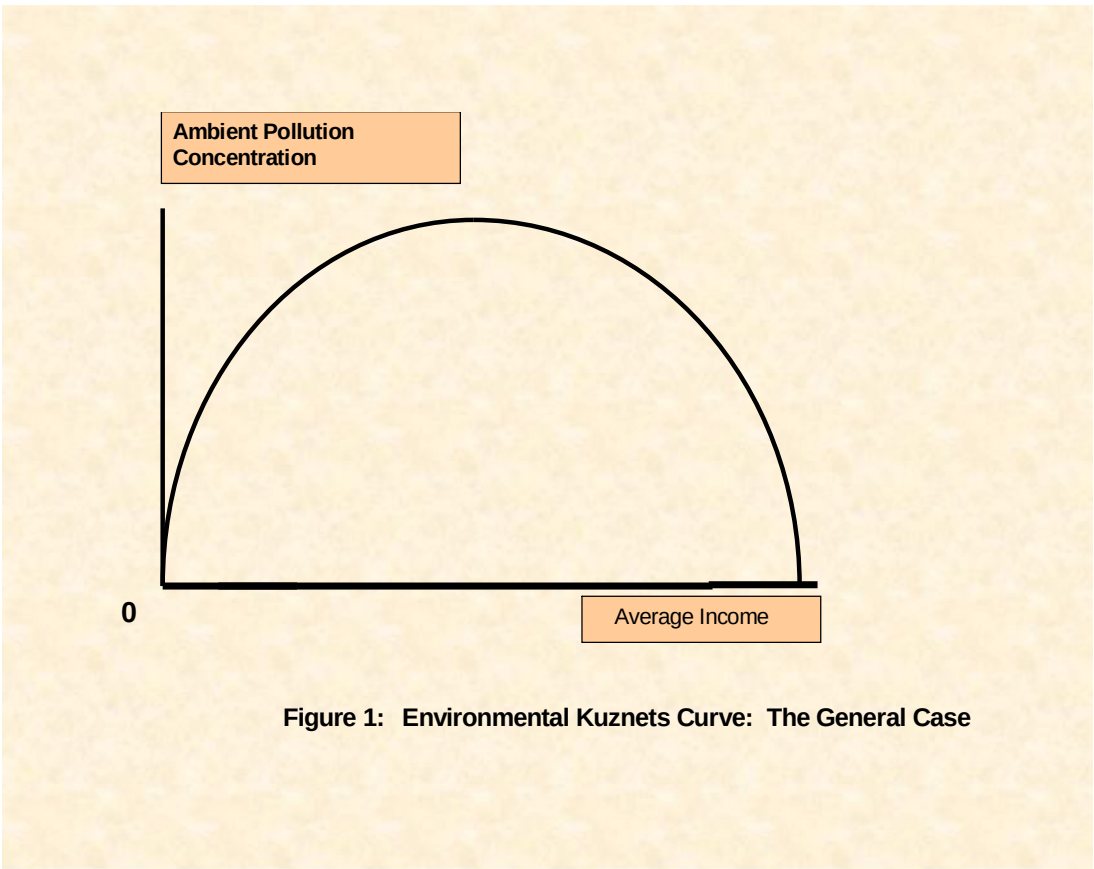

Figure 1: Environmental Kuznets Curve: The General Case

Of course, any point on the EKC is associated with a particular income level and a particular level of environmental quality. More to the point of Epstein's paper, every point on an EKC is associated with a bundle of property rights or a legal regime for the environmental resource being considered. Movement along the EKC can then be associated with movement across different property rights specifications. For example, in the early stages of income growth, access to rivers for the purpose of waste removal may be unrationed. Put differently, the river is a common-access resource, a commons. Then, as incomes rise and the river's assimilative capacity becomes crowded, crude rules for rationing access may develop. The river rules transform the commons to common property for a community of people. The access rights are limited to members of a particular community. Others may be excluded by custom, tradition, or force.

With continued development, higher incomes, and improved scientific knowledge, the community may afford to invest in specialized property rights defining and enforcing activities. Custom and tradition may give rise to rules of law with transferable rights enforced by judges, courts, and officers of the court. The rules of law may define a bundle of property rights where each right can be held and traded by private parties.

Alternately, or concomitantly, the access or use of the resource in question may become regulated by a governmental institution. Certain regulatory property rights may be devised. Individuals wishing to use the regulated resource must obtain government permits and follow prescribed rules described by the permit.

Movement from a commons to enforceable rights that can be privately traded or to government regulation is costly. Resources will be used in operating the legal institutions. Costly steps must be taken to measure and enforce the rights in question. Legal and other technologies must be discovered, adopted, and maintained. For institutional change to be wealth creating, the marginal gains from re-specified rights must be greater than the added cost of designing and operating the revised institution. Rules of property that evolve and survive competitively across time and space may then be viewed optimistically, though not assuredly, as wealth-enhancing institutions. Competitive evolution is key here. If people and resources can move across political and legal jurisdictions, then durable wealth-creating rules will be discovered as people vote with their feet. Where movement is costly, or where the rules are the same no matter where one moves, then the evolutionary process that gives rise to wealth-creating rules is snuffed out.

The property rights institutions that may evolve in a competitive process are presented graphically in Figure Two. Here we see various property rights stations that begin with a commons at the top of the chart and end with private property or regulated property at the chart's bottom. The schematic assumes that a constitutional government exists in the background, one that will show respect for the rights of individuals and assist in enforcement of contracts. The various stations are connected with arrows that show potential direction of movement from one station to another. It will be noticed that the arrows are double-pointed. There can be reversals in property rights definition. A resource or use that may have been initially wrapped in private property rights can become a commons at some later period, and vice versa. Such movements may be explained by changes in income or by technological changes that cause property owners to return their resources to nature. For example, this happened in the Western United States when surplus horses were released on public land after they were no longer valuable to ranchers and farmers.

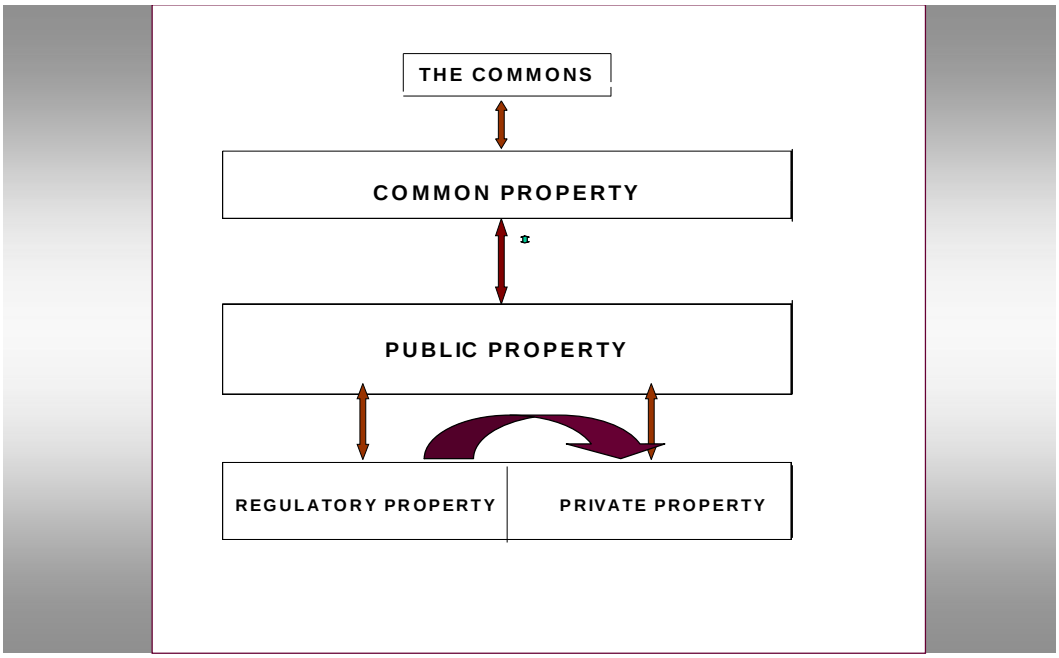

Figure Two: Property Rights Stations

A choice in the property rights path is shown in lower part of the chart where property rights might become either privately held, transferable rights, or regulatory rights managed by government. The intersection implies a political choice. Resources that may at one time have been regulated by markets and private property rights can be transferred by government action, or simply taken, and made subject to a regulatory mechanism. For example, water quality in some U.S. rivers was at one time managed by common law rules, which allowed for contracting among parties. In 1972, water quality and the use of rivers and streams were made subject to federal regulation with the passage of the Federal Water Pollution Control Act. Alternately, rights that were subject to regulation can become subject to contracts and markets. This is seen in the case of Vittel, the bottler of mineral water in France.[3] Vittel turned to markets and contracting with farmers after being unsuccessful in efforts to obtain a regulatory solution to control the invasion of nitrates from agriculture into its mineral water supply. A 19th century transition occurred in Germany's Ruhr basin.[4] It involved a movement of water quality from common access to private property. The late 19th century Ruhrverband organized segments of the Ruhr near Essen as a corporation. Discharge and withdrawal rights were bought and sold

[3] Chrisphe Depres, Giles Grolleau, and Naoufel Mzoughi, On Coasean Bargaining with Transaction Costs: The Case of Vittel, Working Paper 2005/3 CESAER, Dijon, Cedex FRANCE.
[4] Bruce Yandle, Environmental Turning Points, Institutions, and the Race to the Top, Independent Review, Vol. 9, 2, Fall 2004, 211-226.

by the Ruhrverband. It may be noted that shifts in property rights institutions generally make for interesting case studies.

4. Applying the Framework to Epstein's Paper

Temporal Externalities. With an appeal to John Locke and a community living in a state of nature, Richard Epstein's paper begins with a discussion of first possession of land rights and temporal externalities. These externalities are costs imposed on a collective population when a private decision maker fails to take account of the long run effects of his actions. And why would one be myopic by choice? Epstein explains by reference to property rights. His discussion takes one immediately to the private property rights station in Figure 2. The model that evolves shows how development of 3-D property rights, rights that are **defined**, **defendable**, and **divestible**, can cause a landowner to internalize the cost of actions he might take in the course of using his land for productive purposes, which is to say the decision maker properly takes account of long run implications. It is the 3-D property rights in land that cause the owner to take account of both short- and long-run considerations. When the asset value of the land as determined in markets captures the effects of actions taken on the land, then the owner will more carefully take account of his actions. A cutting plan that might yield more timber revenues in the short run may reduce the value of the long-run value of the land. Simply stated, the problem of temporal externalities—a lack of connection between the future costs of current actions—is minimized by 3-D rights and markets.

Boundary Problems. Professor Epstein's discussion of boundary disputes brings us to EKCs and the evolution of rules of law and regulation. Epstein describes two kinds of problems where boundary disputes involve invasion of an unwanted costs on a party on one side of a property line by someone on the other side of the boundary. At common law, the law of nuisance and trespass would be called on to deal with the problem. Code law would also contain rules for dealing with the problem of uninvited costs. Returning to the earlier water quality story, we can envision a community that has traditionally disposed of human and other waste by discharging the unwanted materials into a river that passes through the community. (The facts suggested closely resemble the situation in Essen, Germany, and the Ruhr River in the late 19th century.) So long as the ratio of waste to stream flow is small, and the level of dissolved oxygen high, there is little problem. As the community and income grows through industrialization, the river waters are used more intensely. Rising income generates longer life expectancies, a new appreciation of leisure time, and a greater appreciation of the value of the river. Meanwhile the river deteriorates as result of the combined actions of multiple dischargers. We might imagine this situation being described by approaching the peak of the EKC.

The problem of too much waste in rivers has been handled across time and space in at least three ways, each with its own legal regime. These are broadly illustrated at the bottom of Figure 2. First, where asymmetry exists among users of an environmental asset, a rule of law may evolve that recognizes the rights of owners and occupiers of riparian land. This can apply in cases of air, water, noise or odor pollution that drifts

from one person's land activity to that of another. If a deteriorating river reduces the value of riparian rights, and if riparian rights are recognized, then, at common law, downstream parties have a cause of action against the waste dischargers, if the dischargers can be cheaply identified. The action of the polluter can be enjoined and damages charged. This is in effect a private property rights solution. Incidentally, the common law solution, which gives clean water rights to parties downstream, allows the affected parties to contract around the rule, or as Epstein explains, the parties can contract through the sale and purchase of easements. By either means, parties downstream can sell their rights to the upstream discharger. Alternately, where fully transferable rights exist, the upstream discharger can simply purchase the riparian land and the associated rights.

Residual or *de minimus* damages. Reference to Epstein's discussion of residual or *de minimus* damages that are just too small to justify dealing with may be usefully inserted here. To some degree, the definition at law of *de minimus* is the result of a benefit-cost judgment. And both parts of the judgment—cost and benefit—are affected by the cost of making accurate measurements of what is being controlled. For example, certain pollution seeking bacteria now make it possible to identify accurately small dischargers of harmful waste where previously this could not be done at reasonable cost.[5] The bacteria make it relatively cheap to regulate what were *de minimus* pollution sources. In a similar way, observations of biological marker species in streams that are sensitive to certain pollutants can be done at lower cost than would be incurred by continuous laboratory testing of samples. This makes tighter control possible. The development of low cost flu stack gas monitors has made it possible for air quality standards to be set more readily for individual smoke stacks, and for market transactions to be made that allow trading of air emission reduction rights. These new property rights can be enforced by resort to data obtained from the stack monitors. Simply put, *de minimus*, or what might be termed the tolerated level of "live and let live" pollution is determined by the cost of monitoring. As monitoring costs fall, so goes the level of *de minimus*.

Boundaries and symmetry. Richard Epstein's discussion of symmetry carries us to yet another solution developed by human communities. When most if not all parties are both dischargers and receivers of waste, for example where people live around a lake that is a receiver of waste, it is cheaper to find a collective solution instead of relying on case-by-case adjudication. There are in turn at least two collective solutions. A first is seen in the approach taken on the Ruhr in the 19th century where certain features of the river, and indeed the river itself, were privatized by a not-for-profit corporation. This early river basin association took ownership of and managed water quality. The legal boundaries that previously existed between owners and occupiers of riparian land were replaced by a larger property rights boundary, one that encircled the river basin itself. The newly formed bundling of rights established a level of water quality experienced by all members of the communities who were no longer allowed to pollute each other. Once the quality control was in place, dischargers of waste were charged fees based on the quality and

[5] Discussion of bacteria and marker species is found in BioBasics, http://www.biobasics, gc.ca/English/View.asp, visited May 24, 2005.

quantity of their waste. Withdrawers of water were also charged. The first boundary problem was solved by establishing a new set of all encompassing boundaries.

Yet a third approach to Epstein's boundary problem may be taken when the state by way of statute chooses to regulate the actions of private parties. This action effectively redefines property rights. Certain specified rights to the use of environmental assets are made public property. Preexisting private rights are erased, and the new public property is managed by regulation. When cast in terms of the boundary problem, the move to state "ownership" and regulation theoretically erases all intermediate boundaries that may have existed previously. For example, when the European Union developed water quality standards and approaches for rivers and streams in all member countries, the older property rights institutions, like those in the Ruhr, were modified. Where the Ruhr community had managed water quality for the basin, the EU rules attempted to manage water quality in uniform ways for the entire community. Intermediate boundaries were erased. Arguments that favor such macro approaches sometimes revolve around the boundary problem, where differing environmental quality standards within neighboring political units cause pollution to leak from one unit to another. Other supporting arguments are cast in terms of progressive government, where centralized management by the brightest and best leads to economies in the design, implementation and enforcement of regulated property rights.

Within this third approach one finds "hard" and "soft" approaches being taken, where hard relates to command-and-control regulation and soft refers to the use of performance standards and economic incentives and mechanisms. In both cases, the state may set a constraint on the total amount of pollution to be allowed in time and place. Thinking in these terms, implies a richer schematic than the one shown in Figure 2. In effect, the lower left hand Regulatory Property station contains multiple elements. The body politic may choose either technology-based command-and-control regulation, performance standards that allow regulated parties to find their own solutions, or constrained market approaches that allow regulated parties all options for achieving the desired outcome, including purchasing improvement production from other parties. Of course, the politics of instrument choice is itself a fascinating study, since the distributional effects vary and are large for the alternate outcomes.

How Large the Boundaries? The question of how large to set the boundaries for regulating outcomes again contains benefit-cost consideration. Of course, putting the action in these terms suggests a public interest theory of government, which is to say that government acts in ways to maximize the net benefits of actions when political decisions are taken. Assuming a public interest story, instead of a story about special interest rent seeking, brings us to consider the benefits and costs of expanding the domain of control. One can start with a neighborhood where government seeks to regulate air pollution, let us say. Rules can be established for a small zone, and air pollution reduced from the sources in that zone. Of course, depending on wind patterns, air pollution can be blown into the smaller zone from sources beyond the boundary that has been set. Extending the boundary potentially captures the uncontrolled sources, which can be viewed as a marginal benefit to those who live in the initially designated neighborhood. However, the

cost of agreeing on the level and type of control will rise if the extension of boundaries increases heterogeneity of the population. This is more likely to be the case if incomes vary significantly across the expanded control space. (Recall the EKC.) As boundary extension continues, one-suit fits all envelopes more activity. Costs rise to the extent that the suit doesn't fit the expanded population. Consideration of control domains lifts the importance of including flexibility of standards to be achieved and methods for achieving them as the domain becomes larger. Command-and-control regulation may be the lower cost way to deal with pollution problems within relative small spaces that contain homogeneous populations. Performance standards and the use of contracting and flexible market solutions become more desirable as the control space expands to include nation states and larger heterogeneous populations.

4. Final Thoughts

Richard Epstein has provided a property rights paper that begins with a state of nature and explains how wealth creating and preserving property rules evolve. His paper carries the reader through discussions of external costs that may be generated in the context of time and space. His analysis deals with interacting agents who are positioned in symmetrical and asymmetrical situations. He ends his paper with a discussion of regulation, regulatory takings, and compensation.

I have developed a framework for thinking about Epstein's analysis that linked evolving property rights institutions to Environmental Kuznets Curves. My story in turn links rising incomes to a demand for environmental quality. A demand for property rights institutions derives from the demand for environmental quality. Throughout my discussion, I have avoided direct consideration of the political economy of regulation, which is a critical element in any analysis of institutional change. In this sense, then, my discussion of movement through the property rights stations becomes more troublesome when regulatory property emerges in the story. It is my hope that this Epstein companion piece still offers some useful insights for the interested reader.