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Wisconsin's Water Woes: Applying the Coase Theorem

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A recent article in the Green Bay Press Gazette, "Safe, Clean Water Eludes Many in State" by Ron Seely of the Wisconsin Center for Investigative Journalism, shocked many Wisconsinites who believed clean water issues only existed in far off lands. The result: an estimated 940,000 Wisconsin households relying on private wells use water containing dangerous amounts of arsenic, nitrate, lead, pesticides, E. coli, strontium, radium, molybdenum, or some combination of these pollutants. Health effects from such contaminants include cancer, rickets, diabetes, birth defects, and many more diseases, some fatal.

Essentially, the article begged the question, how is it that so many people in a developed nation are unable to access clean drinking water from their tap? Seely answered with a long list of reasons, from DNR budget cuts to factory farm proliferation; however the issue at stake is truly property rights infringement. Such an issue falls neatly into the hands of an economist armed with the Coase Theorem. This article will aim to reconcile the gross property rights infringement which exists in the pollution of private wells with a working version of the famous Coase Theorem, as described by economist Alan Randall in his 1983 Natural Resources Journal article "The Problem of Market Failure."

Which Coase Theorem to Use

For anyone who has taken an introductory microeconomics course, the Coase Theorem may seem vaguely familiar. The Nobel Prize winning theorem constructed by Ronald Coase in 1960 argues that in the event of an existent externality, such as pollution, assigning property rights to a resource will result in a more efficient allocation of said resource. A common example used in the classroom follows as such: a factory is polluting a river, which becomes a nuisance to the local community. Instead of relying on the heavy hand of the government to settle the dispute, a more efficient method would be to assign the right to the river to either the factory or the community. In either case, parties would then bargain with the other, paying their perceived losses or gains caused by polluting the river. The result is a slightly polluted river, but an altogether efficient allocation of the resource based on the value assigned to the river by the factory and community. At the end of the day, the problem is solved, community residents splash around in the river, and the factory continues making money.

However, this analysis is actually an idealistic pedagogical tool, as described by Randall. This version of the Coase Theroem, which he

labels as the "strong" Coase Theorem, has three important assumptions. (1) The structure of property rights is specified and exclusive, (2) the resulting exchange of property can be enforced at zero cost, and (3) the assignment of rights to either party does not matter. Such assumptions can only be true in theoretical examples, for countless circumstances would upset the realm in which this strong Coase Theorem must exist to operate effectively. Randall first focuses on the problems which arise from the definition of a good as rival, nonrival, exclusive, or nonexclusive.

The goods to which property rights are to be assigned have unique properties; however there are two in particular which determine the efficacy of the eventual implementation of a Coase Theorem solution. First, the exclusiveness of the resource must be examined. Does the definition of the resource allow for non-payers, or free riders, to be excluded from enjoying its benefits? In our river example, a fence along the entire river bank could exclude free riders from benefiting from the river. They would be forced to pay a fee in order to use the resource. But in general, a river would be nonexclusive in that anyone could use the river as they pleased. Second, the definition of a good as rival or nonrival must be examined. Does the consumption of the good by one party deny others a chance at consuming the good? In our river example, many people can simultaneously use the river, making it a nonrival good.

The river, and many other environmental resources in their nonexclusiveness and nonrivalness, is commonly referred to as a public good. But, as Randall argues, this term is confusing and altogether useless. A "public good" is not defined by its properties, but by how the public defines said good. A resource could be nonrival and nonexclusive, but the society in which such a resource exists could define it as a private good. An example of such a resource could be a specific species of fish. Even though human beings cannot be excluded from hunting said fish and their consumption does not deny others the opportunity to consume said fish, a government may issue a license to one company, giving it sole right to commercially hunt that species of fish in the name of species protection by quota. This analysis is important in that it begins to become clearer how societal definitions of resources do not necessarily affect the ability of Coase Theorem solutions to work. What is most important is the actual definition of the good in terms of its exclusiveness and rivalness.

Thus far, we have analyzed how the Coase Theorem ideally functions and the factors which allow it to function effectively. So which combination of factors allows it to function effectively? Randall argues that the first step in implementing a successful Coase Theorem solution in the real world would be to remove the nearly impossible assumptions the strong Coase Theorem operates under. A nonexclusive and nonrival good becomes immediately problematic in that it violates the three assumptions of the strong Coase Theorem. (1) The structure of property rights for nonexclusive goods cannot by definition be exclusive, in that a nonexclusive good cannot have a structure exclusive to only the parties at hand. Other parties outside of the exchange could violate the structure of rights if they are unable to be excluded from the resource. (2) The exchange of

property rights could not be exchanged at zero costs due to, as Randall argues, the physical nature of such a good. Fencing off an entire river to enforce exclusivity obviously entails massive costs, which would make the exchange more than simply an exchange of property. (3) Randall discusses how assigning property rights to the pollution emitters or receptors changes what externalities are perceived to be relevant in the market. If emitters are assigned rights, their removal from the impacts of the pollution would lead them to not consider the actual financial impact of their emission relevant, and the resulting trade would favor the emitters. The opposite would be true if the receptors were assigned property rights, for they would value the relevancy of the externality at the actual level of impact or greater, resulting in an exchange which favors the receptors. If this dynamic is true, then there can be no exchange of nonexclusive property rights in which assignment does not affect outcome.

What remains is what Randall terms a "weak" Coase Theorem, which is a Coase Theorem devoid of the ideal assumptions and is only effective for resources which are exclusive and rival. However, such a theorem is simply a renaming of already existent market forces which work to create allocative efficient market equilibrium. Ownership of property, and sufficient laws to protect ownership of property, allow agents to seek comparable returns when exchanging their property with others. Changes in scarcity and technology do undermine the value of owned property in some cases, but rational agents in such a market have the ability to exchange and reallocate their resources to maximize their personal benefits. For all purposes, Randall's weak Coase Theorem should be the version of the Coase Theorem we choose to use when discussing Wisconsin's water issues.

Applying the Weak Coase Theorem

So why go through all the trouble of discussing Randall's analysis of the Coase Theorem? As it turns out, such a discussion allows us to discuss the pollution of private wells in an interesting manner.

Seely's article generally discusses private wells as a nonexclusive, nonrival resource. Essentially, he is not describing the wells themselves but the *aquifers* which private wells draw from. If we attempt to offer a Coasian solution to such an issue, it would be impossible due to the nonexclusive and nonrival nature of aquifers in Wisconsin. Anyone can drill a new well (barring permit and financial ability) and the consumption of aquifer water does not affect the ability for others to consumer aquifer water (in the short run).

In this sense, the endemic pollution of private wells cannot have traditional market equilibrium or solution, because the resource is not defined in such a manner which allows market forces to act upon it. If we continue to discuss the pollution of private wells in terms of aquifer pollution, the market will never move towards the equilibrium in which emitters are able to emit an efficient amount of pollution and receptors are willing to receive that level. In order to discuss a market solution to private well pollution in Wisconsin, we must begin to discuss private wells as exclusive and rival resources protected by property rights commonly defined by our capitalist system. Only by altering our societal definition of private wells are we able to allow the

pollution of said wells to be vulnerable to market forces.

It is clear how such a redefinition would function within a weak Coasian Theorem. Private well owners, protected by their right to hold and have their private property protected, would be able to exchange their polluted well for the value lost from their well being polluted. This would monetarily compensate private well owners for the extra costs of purchasing bottled water, re-drilling a new well, or having a filtration system put in. Polluters would then have the ability to pollute only as much as the exchange would devalue private wells.

There are several factors previously discussed which add detail and robustness to this solution. Being that wells are placed on private property, the structure of property rights would be sufficiently exclusive to exclude free riders. Transaction costs would be relatively low in that monetary compensation is a primary example of a low transaction cost method of exchange, and the assignment of rights favors towards eliminating water aquifer pollution altogether. If long term aquifer viability is more highly valued over short term economic growth, then this allocation would be described as desirable. If the opposite valuation is true, then it could be described as undesirable and a move away from market equilibrium.

Randall further discusses more ways in which the weak Coase Theorem functions in his analysis of *res communis* property holdings. *Res communis* property is defined as property held in common, such as a boat pier owned by several parties. Randall argues that using a *res communis* notion of property holdings in a weak Coase Theorem solution is the most viable solution. Optimally, given the rights structure already existent in private well ownership, each individual would have the ability to bargain with the pollution emitter for compensation for their own well. This would allow individuals the ability to extract the exact amount which their specific case warrants. In economics terms, the private well owners would be able to act as perfect price discriminators and extract maximum surplus, or benefit, from the polluter. However, this method clearly increases transaction costs to what could be a level which results in that no bargaining is the most efficient solution.

The better option, although less efficient, would be to use a *res communis* notion of property rights, treating the wells as property of the community. This would result in the community bargaining collectively with the emitter and a common price at which the emitter compensates all individuals in the community. Some individuals would enjoy surplus benefits, where their compensation needs are lower than the set compensation amount, and others would be harmed by a compensation amount less than their compensation requirements. Although the outcome is arguably less than perfectly efficient, it is more efficient than the previous status quo in which individuals were having their property rights infringed upon and suffering losses due to such infringement. Only redistribution within the bargaining community would correct his inefficiency.

Although Ron Seely's article on the water issues in Wisconsin was shocking, the economics behind such a phenomenon are understandable. When we choose to define water rights as nonexclusive and nonrival,

we deprive the market the ability to efficiently allocate the resource. Water pollution then appears as an externality to us, needed to be corrected by the DNR or EPA, when a reframing of our notion of private wells could suffice at lower costs. When we enable the forces which our economic system creates, we are able to more efficiently solve problems which arise.

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