Externalities and the "Coase Theorem"

The "Coase Theorem" has been one of the most influential contributions to come from economics in the last fifty years. Its influence on the law has been especially profound.

The so-called "theorem" goes something like this:

"If property rights and liabilities for an activity are fully assigned, then an efficient outcome will result, even in the presence of externalities. Moreover, the level at which the activity is carried out will not depend on the particular assignment of rights and liabilities."

An Externality Example:

Suppose one party engages in an activity that produces a **benefit** for itself, but which **damages** other parties. Let's suppose that the first party is a firm, whose production activity generates profit but also pollutes the air or water, adversely affecting one or more nearby residents, or negatively affecting the profitability of one or more nearby firms. In the simplest case, let's suppose that it's just a single consumer who suffers damages from the firm's production. Let x denote the level of the externality-generating activity, in this case the firm's production; let $B(x)$ denote the resulting benefit to the firm (its profit); and let $D(x)$ denote the damage to the consumer (for example, the amount he would be willing to pay to eliminate the effects the externality imposes on him). We're assuming here that both the benefit and the damage are measured in dollars, and we'll assume that the net social benefit of operating the activity at level x is $v(x) = B(x) - D(x)$. The socially (Pareto) optimal level of the activity is therefore the level x at which $B'(x) = D'(x)$, *i.e.*, where the marginal benefit equals the marginal damage. Coase emphasized that the optimal level of the damaging activity is *not* zero, and he described how the two parties should be expected to bargain to an outcome in which they agree that the activity will be operated at the optimal level, with one party paying compensation to the other — just as we described in our public-good example of the water level in the lake.

In fact, there is no formal difference between this situation and our earlier two-person public good problem. Figure 1, below, depicts the "Kolm diagram" for this situation. Note that in the core allocations the externality-generating activity is always operated at the Pareto level, but that both the direction and the size of the compensation depend upon which party has the right to set the level of x. In this example, then, the Coase Theorem could easily be formalised as an actual theorem.

But the simplicity of the example also allows us to see a number of caveats, any of which would change the Coase result, in some cases by only a little, but in others it would be significantly changed:

(1) If the objective of either party has income effects, then the level of the activity will not be determinate, and in particular it will depend upon which party has the right to set the level of x and would therefore receive compensation. This effect would not typically be large.

(2) If there is a large number of individuals on either or both sides of the "market," then the bargaining or transaction costs can become prohibitively large, making it unlikely that a core (or Pareto) outcome will be achieved by bargaining.

(3) If there is a large number of individuals on either side of the market, then the core, unlike in the no-externalities case, is not small. The various core allocations will differ considerably in the distribution of the compensations paid and/or received, further increasing the difficulties in even achieving a core allocation.

Why has the "Coase Theorem" been so influential? Most likely it's because Coase's article ("The Problem of Social Cost") was published in the *Journal of Law & Economics*, and was written in the style of law journals — no mathematical symbols or equations; every idea presented as an actual externality that had arisen in legislative or court cases (albeit always a two-party externality); and descriptions and citations of actual legal cases and case law on every page. It's had an enormous impact on the legal profession. In fact, by some measures it's the most-cited law review article of all time, from 40% to 80% more citations than the second-most-cited.

The effect of Coase's paper has been that when microeconomics predicts that an outcome will be inefficient (or not in the core), we're likely to ask ourselves whether the participants would themselves devise some means to overcome the inefficiency. In both the legal and economics professions, the focus now tends to be on the barriers to efficient outcomes, and why the barriers can't be overcome. This focus on barriers to efficiency, and on whether the barriers are likely to be overcome without intervention, is not restricted to externalities and public goods. Other examples are incomplete markets for dealing with uncertainty; adverse selection; and moral hazard.

Incidentally, Coase himself did not describe this idea as a theorem, and was apparently not happy that is was described that way. His paper pointed out that the felicitous outcome he was describing would often not be achieved, due to the attendant transaction costs.
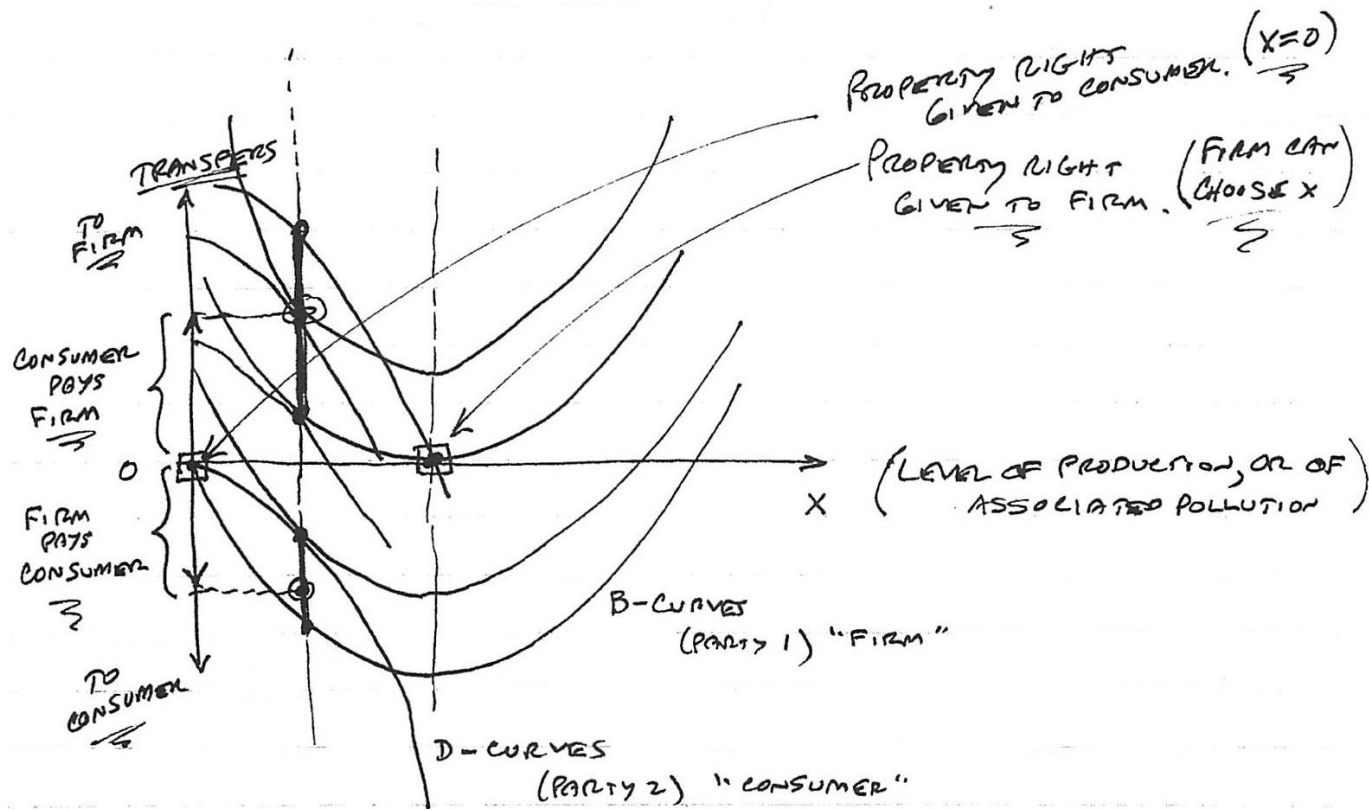
Figure 1