Comments on Elinor Ostrom's "Governing the Commons,"

by Joaquim Silvestre,
Department of Economics,
University of California
Davis, CA 95616

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1. The externality question

Governing the Commons offers important insights to a variety of issues, in particular to the design of stable and robust institutions, the creation of norms and the process of institutional change. I have nothing to say on these. My comments will focus on a different theme, dear to economists but which the book leaves somewhat implicit, namely the analysis of external effects.

External effects (or externalities) can refer to production, to consumption or to both, and can be positive or negative. We say that producer A causes a negative external effect on producer B when an increase in A's production level reduces the amount (or quality) of the output that B can obtain with a given combination of inputs. A negative external effect induces a discrepancy between the private cost of intensifying A's activity (that is, the additional cost to producer A) and the social cost, which includes the additional cost imposed on B. The examples of Common Pool Resources discussed in Governing the Commons are particular instances of negative external effects in production.

2. The spirit of Adam Smith

Garrett Hardin's 1968 paper "The Tragedy of the Commons" argues that we must, in his words, "exorcize the spirit of Adam Smith" and abandon the policies of laissez-faire. Governing the Commons contests Hardin's position and shows that outside intervention is not always justified.

The reaction of Governing the Commons against an established view (a view reflected not only in Hardin, but also in Olson and in Prisoner Dilemma models) reminds me of Ronald Coase's paper "The Problem of Social Cost" (1960). Ronald Coase, the most recent Nobel Laureate in Economics, wrote it to frontally attack the then dominant view on external effects. The fact that we meet in Coase's home turf - he has been at the University of Chicago for several decades- offers an excuse for emphasizing - perhaps overemphasizing- the relationship between Governing the Commons and "The Problem of Social Cost." One immediately apparent similarity is that both are more empirically oriented than the work that they contest: Governing the Commons is centered around the detailed discussion of a dozen cases, whereas "The Problem of Social Cost" presents and discusses ten judicial decisions.

Both Governing the Commons and "The Problem of Social Cost" carefully define their subject matters. Coase's paper begins with the words "This paper is concerned with those actions of business firms which have harmful effects on others." To illustrate, consider the case of Sturges, a doctor, who finds it impossible to auscult his patients for diseases of the chest when his neighbor Bridgman, a confectioner, operates two noisy mortars and pestles in connection with his business.

Governing the Commons focuses (p.26) on "small scale CPRs where the CPR is itself located within one country and the number of individuals affected varies from 50 to 15,000 persons who are heavily dependent on the CPR for economic returns." A typical example is an inshore fishery: as fishers increase their catch, the stock of fish decreases and the catch per unit of effort sharply declines.

The two examples are particular cases of negative external effects among producers, and both Governing the Commons and "The Problem of Social Cost" are concerned with the achievement of non-wasteful outcomes in their presence.[1] Symmetry, or the lack of it, is the main difference between the two: the second case is symmetric in what each fisher affects the productivity of every other fisher in the same way, whereas in the first case the doctor is affected by the confectioner, but not vice-versa. (The effect is unidirectional.) These are pure, extreme cases. The effects are often multidirectional, but not perfectly symmetric, see, for example, the discussion of the Central and West groundwater basins in the Los Angeles area (Governing the Commons. Ch. 4), where the West Basin is downstream from the Central Basin.

Coase contests the established doctrine, stemming from Alfred Pigou's The Economics of Welfare (1920), which calls for the intervention of an outside regulatory agency . The agency should either limit the amount of noise that the confectioner is allowed to generate or establish a fee-subsidy scheme that induces an efficient level of noise from the confectioner. The scheme is based on the existing discrepancy between the private and the social marginal cost of operating the mortars and pestles: a properly computed tax per hour of noise (or a subsidy per hour of silence) gaps the discrepancy between private and social marginal costs. It expresses the same idea as the "coercive" parking meters of Hardin, or the penalty scheme on overgrazing herders discussed in Game 2, p age 9-10, of Governing the Commons, see Figure 1.

Coase questions the need for outside intervention and asserts that an efficient outcome may also result from a "bargain between the parties." In a

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[1] By "non wasteful" I mean "Pareto-optimal" or what economists call "efficient." This is synonymous with "socially rational" as used in Governing the Commons.

parallel manner, Governing the Commons contests the established view according to which only outside intervention, in the form of privatization or "socialism," may avoid the tragedy of the commons. Governing the Commons analyzes a variety of cases, and concludes that, in many instances, the individuals involved in the exploitation of a common pool resource will organize and create efficient institutions. Both Governing the Commons and "The Problem of Social Cost" show that, in the presence of negative production externalities, the involved parties often find efficient arrangements without the need for outside intervention.

3. The conditions for efficient laissez faire

I must immediately add that both approaches strongly qualify their advocacy of nonintervention. Coase's original discussion in his 1960 paper goes as follows. Efficiency is achieved when the bargaining between the parties is costless, or, in a synonymous if somewhat idiosyncratic expression, when there are "no costs involved in carrying out market transactions." But:

> "This is, of course, a very unrealistic assumption. In order to carry out market transactions, it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on. These operations are often extremely costly, sufficiently costly at any rate to prevent many transactions [...] "

Once the transaction costs are taken into account, it is not necessarily true that socially desirable bargains that modify or rearrange the initial property will always be negotiated. In Coase's words:

> "Once the costs of carrying out market transactions are taken into account, it is clear that such rearrangement of rights will only be

> undertaken when the increase in the value of production consequent upon the rearrangement is greater than the costs which would be involved in bringing it about."

Coase's argument reflects the idea expressed in Game 5, p. 16, of Governing the Commons, see Figure 2. In Game 5, an agreement between the herders has a cost, per capita, of e/2, and the agreement itself yields the herders a gain of 10 per capita with respect to the nonagreement outcome. Governing the Commons argues that the outcome of the game will be the efficient solution as long as $e/2 < 10$. Indeed, even though Game 5 has two Nash (and subgame-perfect) equilibria, only the first one, where both play (A,D), is a trembling-hand perfect equilibrium (the other one, where both play ($\tilde{}$A, D), is not trembling-hand perfect because the strategies ($\tilde{}$A, D) are weakly dominated by (A,D)).

Realistic situations may well be more complex. Game 5 simplifies the bargaining process by assuming that, once the herders agree to cooperate, there is a unique outcome $(10 - e/2, 10 - e/2)$, where they divide the transaction costs exactly by two. The assumption is justified in Governing the Commons by appealing to the symmetry of the underlying prisoner's dilemma game. But even if the payoffs are symmetric, the herders may differ in other features, say age or bargaining shrewdness, which may affect the eventual division of the costs. Moreover, as mentioned above, perfectly symmetric real-life situations are rare. A more realistic variation on game 5 may have a complex bargaining game instead of the single outcome $(10 - e/2, 10 - e/2)$. But the more realistic variations may not mintain the original prediction that cooperation will occur as soon as its aggregate gains (namely 20 in game 5) exceed the transaction costs (namely e).

4. The initial property rights.

Economists in the Coasian tradition have emphasized the importance of well-defined property rights for attaining efficient transactions. The statement found in the widely used textbook of Public Economics by Harvey Rosen (1988) is representative:

> " [...] the efficient solution will be achieved *independently* of who is assigned the property rights as long as *someone* is assigned these rights. This result, known as the **Coase Theorem,** implies that, once property rights are established, no government intervention is needed to deal with externalities [Coase, 1960]" (p. 137, italics and boldbace in the original).

Typically, the proponents of this view fail to empirically justify or to precisely argue the assert that well-defined property rights are crucial for efficient negotiation. Actually, what established rights offer is an initial status quo which somewhat limits the possible outcomes of the negotiation. But is not clear why one needs a precisely defined initial status quo to engage in useful negotiation. Coase did think in 1960 that private property rights were important. For instance, we can read in "The Problem of Social Cost," p. 119: [2]

> "Of course, if market transactions were costless, all that matters (questions of equity apart) is that the rights of the various parties be well defined and the results of legal actions easy to forecast."

But, to his credit, he has since conceded that they are logically superfluous. Quoting Steven N. S. Cheung (1982, p. 37), Coase (1988, p. 14-15) writes:

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[2] See also page 104: "It is necessary to know whether the damaging business is liable or not for damage caused, since without the establishment of this initial delimitation of rights there cannot be market transactions to transfer or recombine them."

> "Cheung has even argued that, if transaction costs are zero, the assumption of private property rights can be dropped without in the least negating the Coase Theorem' and he is no doubt right."

Chapters 4 and 5 of Governing the Commons suggest that well-defined initial property rights are not essential for the achievement of efficiency. Chapter 4 discusses the Raymond, Central and West groundwater basins, whereas Chapter 5 refers to those in San Bernardino County. In the former cases, the users have managed to negotiate an efficient agreement, whereas in the latter cases they have not. The two groups of cases differ in some significant ways, but not on the definition of the initial property rights. Indeed, such property rights were rather confuse in the California legal system and the results of legal actions rather impredictable. We read in Governing the Commons, page 108:

> "The simultaneous existence of the doctrines of correlative and appropriative rights in the same state introduced considerable uncertainty about the relative rights of one groundwater producer against the others. The uncertainty was compounded by the presence of a third common-law doctrine that enabled groundwater producers to gain rights through 'adverse use' or prescription."
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> [...]
>
> "The situations in these basins can be characterized as an open-access CPR for which clear limits have not been established regarding who can withdraw how much water."

The success stories of the Raymond, Central and West groundwater basins show that well-defined initial property rights are not necessary conditions for the successful negotiation of an efficient agreement.

5. **Distribution and the ownership of the resource**

Consider a fishery where the fishers have cooperatively agreed to limit their catch in an efficient manner. Each fisher obtains a given return from her fishing effort. I wish to argue that the return partly reflects the appropriation of a fraction of the fishery's value.

In order to define the value of a common pool resource, imagine for a moment that it has been privatized and turned over to a profit-maximizing firm. The firm then exploits the resource in a regime of sole ownership: it hires fishers, paying them wages, and it sells the fish. I define the value of the resource to be the profits of such hypothetical firm. Essentially the same value could be defined as the proceeds of auctioning off the right to fish to a single beneficiary. As a third interpretation, one could visualize a regime where an efficient number of tradeable permits have been issued. The market valuation of the total amount of permits issued would again express the value of the resource.

When the fishers cooperatively agree on limiting production, the return to a fisher can be then seen as composed of two parts. First, a wage income, equal to what the fisher would earn were she employed by the hypothetical sole-ownership firm, or, more precisely, equal to the marginal value product of the fisher's time multiplied by the hours spend fishing. The second component, defined as the amount that she actually earns minus the first component, reflects the appropriation of a fraction, proportional to the time spent fishing, of the value of the resource.

More generally, efficiency schemes based on quantity limits of quotas, whether agreed upon by the exploiters themselves or imposed by an outside agency, imply a particular distribution of the value of the resource.[3] Schemes

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[3] See Dasgupta (1982, Chapter 2).

based on Pigovian fees and subsidies, on the contrary, offer several levels of freedom in the distribution of that value. On the one hand, they allow for alternative distributions among the producers who exploit the resource. On the other, they allow for channelling part of the value of the resource outside the group of producers, for instance, to the consumers, or to the general public.

True, in most of the examples discussed in Governing the Commons it is natural to confine the distribution of the value of the resource to the producers, say, to the irrigators or to the fishers. As is the case with the Valencian hereters ("heirs"), the irrigators may have exclusive property rights to the resource that have been recognized for centuries. Another reason may be that the irrigators or the fishers are poorer, as a group, than the general population, or poorer than the consumers of the vegetables or fish that they supply. Keeping the value of the resource in the hands of the producers helps equalizing the distribution of income.

But there are other instances of common pool resources, say oilfields on public lands, which should be seen as owned by the general public rather than by the exploiters of the resource. The exploiter may also be relatively wealthy. It may then be desirable to channel part of the value of the resources to other groups. Governing the Commons correctly emphasizes (p. 17) that:

> "[i]t is difficult for a central authority to have sufficient time-and-place information to estimate accurately both the carrying capacity of the CPR and the appropriate fines to induce cooperative behavior."

But, despite the disadvantages of centralization, a Pigovian fee-subsidy scheme may be superior to a free agreement between the exploiters in cases where the benefits from the commons should be shared among a larger group.

A related idea, present in Martin Weitzman (1974), in John Roemer (1989) and in my recent paper (1992), is based on the observation that a move towards efficiency may well hurt some people. A flexible scheme that permits to redirect the benefits as to compensate the losers may be useful. An example will illustrate. Imagine a fishery which, in the initial status quo, is inefficiently operated at the open-access or noncooperative equilibrium level. Now the fishers organize and efficiently limit their fishing effort. They are now better off. But what about the consumers of the fish? The effects on their welfare depend on whether the aggregate catch is, in the new steady state, higher or lower than before. As noted in Governing the Commons (p. 145), the inefficiency of the open access solution often shows itself as a lower catch per unit of effort, but the total catch may actually be larger in the inefficient open access solution than in the cooperative, efficient solution. In this case, the cooperation among fishers does solve the tragedy of the commons, but, to some extent, at the expense of consumers. A Pigovian fee-subsidy scheme may distribute the gains more equitably.

6. Conclusion

To conclude, let me mention some insights from Governing the Commons and from the more recent experimental work by Elinor Omstrom and her coauthors that I find particularly suggestive. First, the experimental and empirical evidence of the value of forms of communication that are useless in game-theoretic terms. Second, the asymmetry in the success of cooperating in order to avoid large losses and cooperating in order to obtain large gains. Third, the emphasis on the relative importance of costs to the individual producer: in the cases studied, the producers are heavily dependent on the CPR for economic returns. [4] Altogether, this work is a major contribution to the understanding of the emergence of efficient arrangements. Its results are important for all social scientists.

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[4]This is, I believe, a major difference between the production externalities contemplated in Governing the Commons or in "The Problem of Social Cost," on the one hand, and most *consumption* externalities on the other. Typically, consumption externalities affect the welfare of an individual in a less fundamental way (e.g., pollution may double a small probability of a particular cancer), even when the aggregate social damage is nonnegligible.

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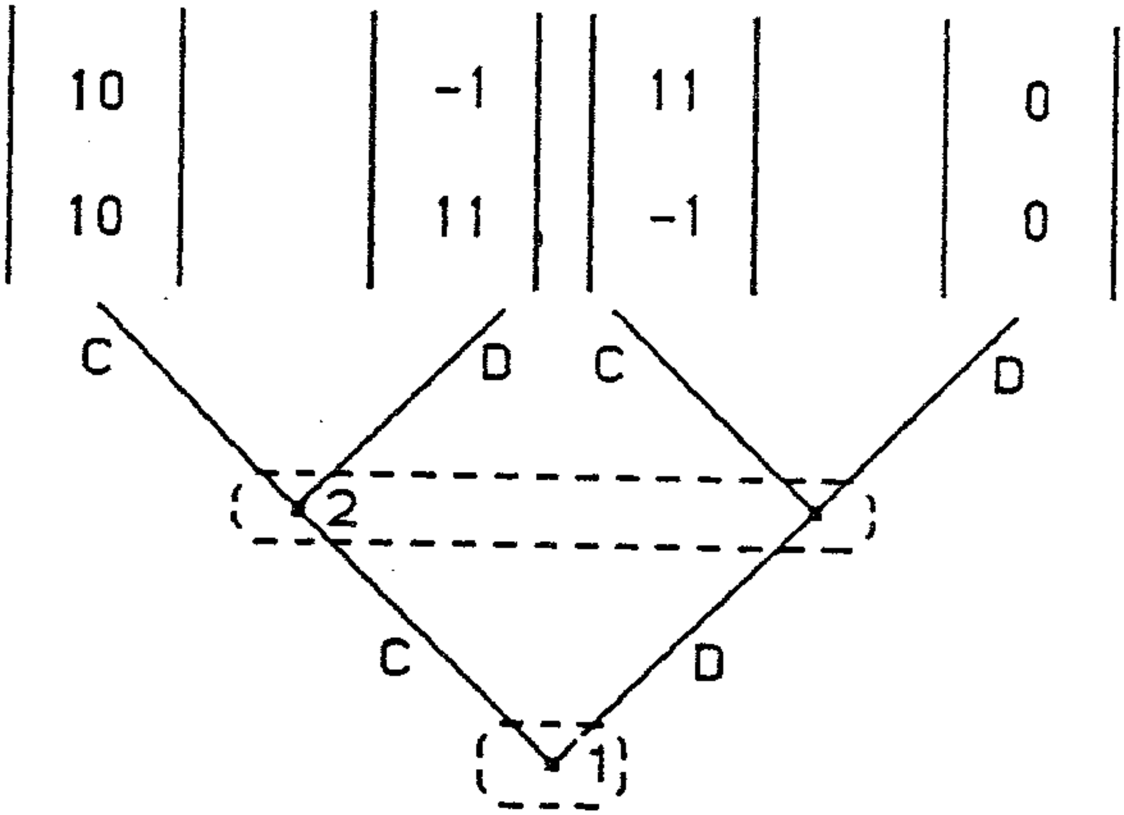

FIGURE 1

A PRISONER'S DILEMMA GAME
(OSTROM, 1990, p. 4)

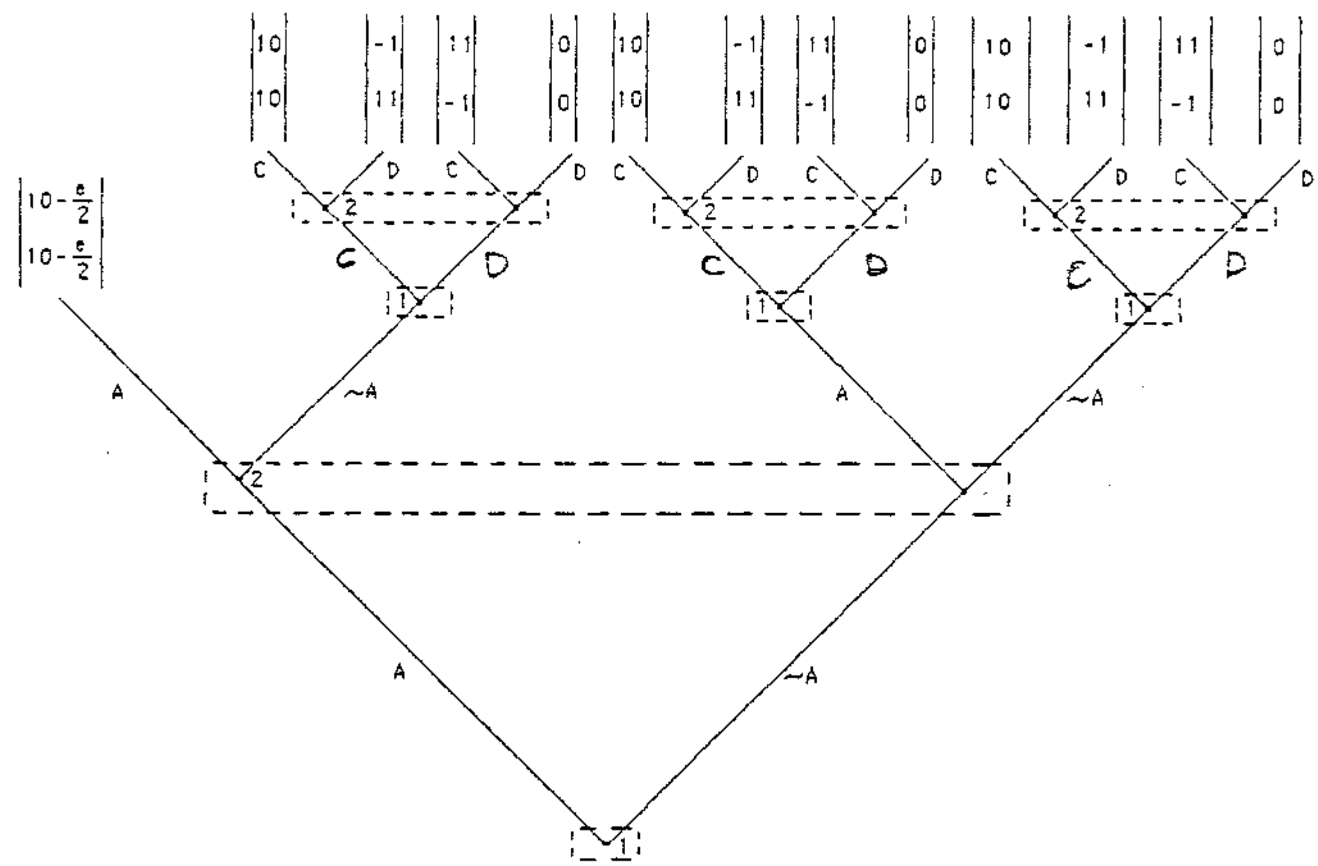

FIGURE 2

THE CONTRACT-ENFORCEMENT GAME
(OSTROM, 1990, GAME 5, P. 15)