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Does the allocation of property rights matter in the commons?

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ABSTRACT

A popular solution to the Tragedy of the Commons is to create private property rights to access the commons. If resource users care about the welfare of others, they may be unwilling to respect property rights regimes that lead to unfair or inequitable outcomes. We explore in a series of laboratory experiments whether it is possible to undermine the efficacy of property rights solutions through the allocation process. We find that both the extent to which property rights are enforced and how they are allocated significantly affect extraction and compliance. Our findings suggest that one of the most popular allocation methods is suboptimal: we observe that occasional enforcement and the proportional allocation of property rights is dominated by no enforcement and the equal or inverse allocation of property rights. Our results support the view that allocation matters for property rights solutions to the commons problem.

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1. Introduction

“The allocation might be on the basis of wealth, by the use of an auction system. It might be on the basis of merit, as defined by some agreed-upon standards. It might be by lottery. Or it might be on a first-come, first-served basis, administered to long queues. These, I think, are all the reasonable possibilities. They are all objectionable.”

- Hardin (1968).

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The property rights approach to solving the Tragedy of the Commons has gained increasing popularity with policymakers, particularly in the United States.¹ Property rights solutions in fisheries have gone from being illegal in US waters from 1996 to 2002 to now accounting for 65% of fish caught in federal waters.² Privatizing access to public pastures has been used for some time to control overgrazing in the US (Gardner, 1963), hunting rights are often allocated in lotteries or sold (Bishop et al., 1983; Boxall, 1995), and conflicts over water use have been reduced by either formally or informally allocating water rights to individual farmers (Ostrom, 1990). Many of these systems allocate access rights to individual fishers, hunters, or farmers.³

When property rights solutions are implemented in practice, governments typically try to set the total quantity of rights assigned at some socially efficient target. For example, individuals are allocated rights to harvest and the total sum of all the rights allocated equals a socially desirable total harvest. Further “economic” efficiency gains might be possible if rights are tradable: the rights to harvest should end up in the hands of those who value them the most.⁴ Regardless of whether property rights are tradable or not, if the total amount of rights allocated equals a socially desirable target, then the actual allocation of rights should not hinder achievement of the target as long as property rights are perfectly enforced.⁵

In practice, however, property rights represent a form of social contract and are almost always, to some degree, incomplete. In particular, property rights are rarely perfectly enforced. In most societies, the actions of citizens and firms are not constantly monitored to ensure that all laws and rights are being respected at all times. Thus, many property rights rely on a mix of both external penalties and social norms in order to function (Tyler, 1990; Ellickson, 1991). Social norms are unenforced rules of behavior that are based on beliefs of how individuals should behave in a given situation. Humans are presented with countless opportunities to violate the property rights of others with little to no chance of detection but strong social norms appear to prevent this from happening on a regular basis.

There is growing evidence that social norms can be eroded by the introduction of formal regulatory institutions. Gneezy and Rustichini (2000a), for example, demonstrate that parents were less deterred from arriving late in day-care centers after the introduction of a monetary fine. Cardenas et al. (2000) provide experimental evidence that the regulatory solution for an environmental dilemma failed because it appeared to crowd out cooperative behavior.⁶ Furthermore, there is widespread experimental evidence that humans have social preferences (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Fehr and Gächter, 2000; Charness and Rabin, 2002; Camerer, 2003), which supports field observations of humans incurring personal costs to adhere to a social norm that they perceive as equitable (Libecap, 1994; Tyler, 1990; Winter and May 2001).

Thus, property rights solutions to the commons problem may depend on how they interact with social norms, in ways that have not been apparent to many scholars. We demonstrate in a controlled experimental framework how subtle behavioral manipulations can undermine property rights solutions by discouraging compliance. Our laboratory experimental setup and our behavioral interventions are straightforward. Subjects play a negative externality game in groups of four (similar to the game in Walker et al. (2000)). Each subject makes an extraction decision; extraction confers private benefits but imposes a social cost on everyone in the group. The symmetric Nash equilibrium is to have too much extraction relative to the socially optimal amount. We introduce a property rights solution by capping the total amount of extraction at the socially optimal level and then allocate rights to extract this total.

Our first behavioral intervention varies the degree to which property rights are enforced. Interestingly, we find a clear non-monotonic relationship between compliance and enforcement. When individuals are never monitored, property rights are better respected and extraction is closer to the social optimum than when individuals are occasionally monitored. This suggests that external monitoring may crowd out intrinsic motivations to adhere to a social norm. Not surprisingly, when monitoring is very frequent, subjects respect property rights. Yet, in terms of group profits, frequent monitoring does not fare better than no monitoring when taking into account the costs associated with monitoring.⁷

The findings from the first intervention provide new insights for the experimental literature studying sanctions and compliance with laws (Schulze and Frank, 2003; Tyran and Feld, 2006; Kube and Traxler, 2011; Schildberg-Horisch and Strassmair, 2012). This literature suggests in contrast to our findings that non-deterrent (i.e. mild) sanctions, despite some drawbacks, are still useful to stimulate compliance. For example, Tyran and Feld (2006) observe that imposing mild sanctions increases contributions in a public goods experiment and, in particular, if they are endogenously imposed. Kube and Traxler (2011) show that formal sanctions partially crowd out informal sanctions (peer sanctions) in a public goods experiment but they still increase social welfare. Schulze and Frank (2003) study a corruption experiment and find that sanctions destroy the

¹ See Engel and Lueck (2008) for an overview and an introduction to a series of papers on property rights and the environment. It should be noted that the majority of “property rights” approaches to solving environmental problems involve the allocation of revocable permits and not full ownership of the commons in the sense of Honoré (1961). In the language of Schlager and Ostrom (1992), these permits typically include access and withdrawal rights but may not include many of the other rights associated with full property rights.

² <http://seafood.edf.org/our-work-fisheries>.

³ Lynham (2014) provides over 100 examples of access rights systems that allocated rights to private individuals.

⁴ Whether economic efficiency is independent of allocation has been the topic of both recent theoretical (Mackenzie et al., 2008; Anderson et al., 2011) and empirical (Fowle and Perloff, 2013) debate.

⁵ For example, if a government regulator wishes to reduce total pollution from 150 units to 100 units or less, the actual allocation of 100 permits to produce one unit of pollution is irrelevant in terms of achieving the overall goal. With perfect enforcement, allocating all 100 permits to one firm or 50 permits to two firms will result in the same aggregate level of pollution. Cost minimization and efficiency might be very different under these two allocation schemes.

⁶ However, see Abatayo and Lynham (2016) for a recent critique of this finding.

⁷ As we will explain later, this result holds for group profits after penalties are deducted.

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