



## Analysis

## Do conservation auctions crowd out voluntary environmentally friendly activities?



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## ABSTRACT

Research has shown that introducing external incentives to encourage pro-social behavior, such as monetary rewards or regulation, may crowd out voluntary pro-social activity. This has implications for the appropriate design and use of such incentive-based programs. This study investigates motivational crowding out in the case of conservation auctions, a relatively new tool that provides monetary incentives to encourage landowners to adopt environmentally friendly management practices. Our experimental evidence shows that the introduction and subsequent removal of a conservation auction significantly reduces voluntary provision of environmental quality (via monetary donations to an environmental charity), compared to a control group that does not experience an auction. We also attempt to examine some economic theories of behavior that explain this effect according to either individual motivations or social interactions, and our initial exploration finds that crowding out occurs regardless of whether or not participants have opportunities to interact with one another during the experiment.

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## 1. Introduction

Conservation auctions are a relatively new tool for environmental management and a subject of increasing interest in several countries. Auction programs in Australia, the United States, Canada and elsewhere have been used to provide incentives for landowners to improve environmental quality by adopting beneficial management practices (BMPs). They are appropriately used for BMPs that impose a net cost on landowners, such as habitat protection or suspension of irrigation, which would normally be under-provided from a societal perspective (Pannell, 2008). In a competitive tender process, landowners submit bids for a limited number of conservation contracts to adopt specific BMPs. The best bids, based on environmental and cost-effectiveness criteria, are selected and the winners enter into contract with the government.

Auctions have the potential to offer a cost-efficiency advantage over another tool to encourage BMP adoption, fixed cost-share grants. BMP adoption costs are often heterogeneous among landowners since they depend on land and farm characteristics, as well as existing management practices. Because these costs are only known to the landowner, it is difficult to tailor payments to real adoption costs and achieve maximum cost-effectiveness. Conservation auctions have the potential to overcome this problem of asymmetric information; since optimal bids

are a function of the net costs of adoption, the auction mechanism reveals information about these costs (Latacz-Lohmann and Van der Hamsvoort, 1997). While cost revelation is imperfect because landowners have an incentive to extract rent by bidding above costs, careful auction design can reduce such rent-seeking behavior (Cason and Gangadharan, 2005; Cason et al., 2003; Hailu and Thoyer, 2006; Rolfe et al., 2009; Vukina et al., 2008).

However, a concern with conservation auctions is that, in some situations, introducing external incentives to undertake pro-social activities may reduce the amount of such activities that individuals are willing to provide voluntarily (Frey, 1997).<sup>1</sup> Individuals may voluntarily undertake pro-social activities, including improving environmental quality, for a number of reasons, including altruism or a concern for social norms (Nyborg and Rege, 2003). However, a growing body of evidence shows that these motivations can be crowded out by the introduction of external mechanisms, including economic incentives (Bowles, 2008; Deci et al., 1999; Frey and Jegen, 2001). In environmental contexts, this has been shown for the case of common pool resources (Cardenas et al., 2000; Volland, 2008), weakly enforced sanctions for pollution (Tenbrunsel and Messick, 1999), and public good games with specified minimum contributions (Reeson and Tisdell, 2008). Monetary incentives, like the ones offered in conservation auctions, have also been found to cause crowding out (Frey and Oberholzer-Gee, 1997; Gneezy and Rustichini, 2000; Goeschl and Perino, 2012). In fact, crowding out

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<sup>1</sup> While our discussion focuses on crowding out as a potential outcome of incentive based policies, it is also possible that “crowding in” may occur as a result of motivational crowding (Frey and Jegen, 2001).

has been shown to occur in the context of a competitive tender experiment that is similar to a conservation auction (Reeson and Tisdell, 2010).

This study has two aims. The first is to provide further evidence on whether conservation auctions are likely to result in motivational crowding out of pro-social behavior. We follow the general format of Reeson and Tisdell's (2010) public goods experiment, but with some modifications intended to make the experiment more closely parallel to a conservation auction. The second is to begin exploring whether an experimental context can provide us with any evidence to begin distinguishing among the various economic models that have been proposed as potential explanations of crowding out.

## 2. Why Might Conservation Auctions Cause Crowding Out?

A number of economic theories have been developed to explain why individuals may rationally undertake actions that are privately costly, but socially beneficial (Nyborg and Rege, 2003). Each of these provides some explanation why landowners may voluntarily adopt privately costly BMPs and why this behavior may be crowded out by introducing external incentives.

Some theories suggest that individuals undertake pro-social behavior primarily because of their own internal motivations or beliefs. The theory of altruism holds that improving the well-being of others contributes to an individual's utility (Becker, 1974; Schmid and Robison, 1995; Schwartz, 1970). Warr (1982) shows theoretically that altruistic contributions to a public good are completely crowded out by government contributions. Thus, landowners may stop adopting BMPs voluntarily when others are paid to adopt them instead. Impure altruism, a variant, states that individuals receive utility (warm glow) simply from the act of contributing to a public good; in this case, crowding out still occurs, but is incomplete (Andreoni, 1990).

Theories of commitment argue that individuals contribute to a public good even when it does not increase their utility, because they are willing to place constraints on their own private utility maximization for the sake of the common good (Nyborg, 2000; Sen, 1977; Sugden, 1984). These theories imply that landowners may adopt BMPs simply because they believe that it is "the right thing to do." However, introducing external monetary incentives may change the frame of reference for a particular decision from an ethical one to a business one, thus crowding out moral motivations (Bowles, 2008; Tenbrunsel and Messick, 1999). If this happens, landowners may no longer be willing to adopt costly BMPs for ethical reasons without being paid.

A second set of theories suggest that the actions or reactions of others can influence pro-social behavior. One argument holds that individuals gain utility from social approval, which can be obtained by following social norms, or undertaking actions of which society approves (Hollander, 1990; Levitt and List, 2007; Nøstbakken, 2009; Nyborg et al., 2006; Rege, 2004). If there is a positive social norm toward BMP adoption, landowners may receive sufficient utility from social approval of their actions to make such a decision worthwhile. However, it is possible that when payments are introduced, observers will assume that those who contribute are motivated not by social norms but by the external financial rewards. This crowds out the social or "reputational" incentive to contribute (Benabou and Tirole, 2006).

Theories of fairness or reciprocity argue that individuals contribute to public goods because they gain utility from reciprocating the "kind" actions of others who have also contributed (Falk and Fischbacher, 2006; Levine, 1998; Rabin, 1993; Segal and Sobel, 2007). In this case, landowners would adopt BMPs because others are doing so, and the utility of reciprocating, by contributing to environmental quality that is enjoyed by those others, outweighs the cost of adoption. As with social norms, introducing payments may reduce the perception that people adopt BMPs out of "kindness," and therefore reduce the incentives of others to reciprocate.

## 3. Experimental Design

To empirically investigate whether conservation auctions, like other external incentives, can cause crowding out, we designed a laboratory experiment to simulate the incentives associated with BMP adoption and conservation auctions. The basic structure of the experiment draws on work by Reeson and Tisdell (2010) who investigated crowding out using public goods experiments that included an auction. However, although conservation auctions are intended to elicit contributions to a public good, a public goods game may not be the best way to represent these programs experimentally because the benefits that are typically sought (such as species preservation via habitat protection) are widely distributed among many members of society, while only a small subset of individuals have the ability to contribute. Instead, we used a modified dictator game where participants were given the opportunity to make voluntary contributions that were costly to them, but provided benefits to society. Specifically, each participant was told that they represented a landowner with a hypothetical farm to manage, and were asked to decide whether to adopt (unspecified) BMPs on their farm. To adopt BMPs, they had to pay a specified amount out of their initial monetary endowment. If a participant chose to adopt BMPs, the experimenters made a real donation to an (unnamed) environmental charity on their behalf.

Each experimental session consisted of 12 rounds. In each round, each participant was endowed with \$2 (their "farm profits"). Each participant was told their individual costs for various levels of BMP adoption (0%, 25%, 50%, 75% and 100% of "the practices that will work on your farm"). These costs were drawn from real data on BMP adoption (wetlands restoration) by Canadian farmers in a Manitoba watershed (Boxall et al., 2009), scaled to match the \$2 endowment, and ranged from \$0.04 to \$0.76 in experimental dollars per 25% increment. There were ten different adoption costs (one per participant), which were redistributed among participants each round. This mimics a restart effect in each round (Andreoni, 1988). Because experimental procedures changed during the auction treatment (to be discussed shortly), this avoided confounding the potential restart effect of these changes with any treatment effect that may be present. Participants were also told the social benefit associated with these levels of adoption, which was fixed at a \$0.50 donation to a Canadian environmental charity for each 25% increment adopted. Based on these costs and benefits, participants were invited to choose their desired level of BMP adoption, subject to the condition that they could only adopt BMPs that they could afford to pay for out of their endowment. The cost of the chosen adoption level was deducted from the \$2 endowment for that round, and participants were told their earnings for that round and the monetary donation that would be made on their behalf. Each subsequent round began with a new \$2 endowment and a new decision regarding BMP adoption.

The experiment was implemented using z-Tree (Fischbacher, 2007), a software designed for conducting economic experiments. Each participant was seated at an individual computer terminal and made decisions anonymously, using the computer software. Throughout the experiment, each participant's computer displayed information about their current adoption costs and benefits, decisions in past rounds, and an ongoing tally of earnings. Total earnings were paid in cash at the end of the experiment, and participants were also told the total amount of the donation to be made on their behalf.

To examine whether conservation auctions can cause crowding out, an auctioned sharing subsidy was used during some experimental sessions. In these sessions, the first four rounds followed the procedure described above. However, between the fourth and fifth rounds, the auction mechanism was introduced.<sup>2</sup> Similarly to real conservation

<sup>2</sup> As in Reeson and Tisdell (2010), participants in all treatment groups had been told that the procedures might change during the experiment, but not how or when. This was necessary to prevent strategic behavior from influencing the experimental results.

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