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Analysis

The Bobolink Project: Selling Public Goods From Ecosystem Services Using Provision Point Mechanisms☆

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ABSTRACT

We report a two-year field experiment that solicited residents of Jamestown, Rhode Island, USA, to fund contracts with farmers willing to provide public goods associated with improving the nesting success of grassland birds, particularly the Bobolink. This experiment explores the potential to leverage valuation research for the purpose of enhancing charitable contributions in a manner consistent with developing markets for ecosystem-service public goods; we focus on individuals' willingness to contribute revenue. The direct-mail marketing experiment collected over $16,000 through four provision point, money-back guarantee mechanisms: a voluntary contribution mechanism with a proportional rebate; a pivotal mechanism based on the Clarke tax; and two novel uniform price mechanisms, each presented in discrete choice and open-ended response formats. We find that citizens do respond strategically: consistently lower offers in the open-ended format suggest a high incidence of cheap riding, but also a significant effect of higher suggested offer thresholds. These framing effects dominated differences among mechanisms, as revenue generated from the proportional rebate and one of the uniform price mechanisms approached the potential for revenue generation estimated under the incentive compatible pivotal mechanism.

1. Introduction

The provision of public goods remains a perpetual challenge for any society striving to improve the general welfare, and for economists seeking to understand societal or individual responses to opportunities involving public goods. For example, environmental economists address obstacles to measure the benefits of, or willingness to pay (WTP) for, public goods, while experimental and behavioral economists strive to understand institutions that provide public goods, or mechanisms that might improve their provision (Andreoni, 1993; Cropper and Oates, 1992; Falkinger et al., 2000; Groves and Ledyard, 1977; Kling et al., 2010; Ledyard, 1995; Smith, 2000). This includes a growing literature focused on factors affecting charitable giving (often emphasizing the effects of matching or lead donations) (e.g., Huck et al., 2015; List and Lucking-Reiley, 2002; Karlan et al., 2011) and efforts to develop payments and markets for public goods like ecosystem services (Banerjee et al., 2013; Ferraro, 2008, 2011; Ribaudo et al., 2010).[1] Our study takes a step toward developing better methods to integrate values for public goods into individual and business decisions.

This objective places our approach at the cross-roads of the literature on charitable giving and the literature on environmental valuation. Our broad research agenda is to leverage the insights and techniques of mechanism design and laboratory experiments on public goods in field applications, particularly to capture private value in support of ecosystem service public goods in real communities. Experimental literature has established that provision point (PP) mechanisms generally outperform standard donations solicitations, so we focus on evaluating

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[1] List (2011) provides a recent and extensive review of charitable giving literature.

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how implementation of PP mechanisms will affect the proportion of value captured as revenue. We are thus motivated, in part, by insights from valuation research, where the concern has been controlling sources of bias; however, our context emphasizes how aspects of WTP or donation solicitations, often called framing effects,[2] might squeeze out a higher percentage of value as revenue. The solicitation frame may transform the potential of a willingness to pay (valuation) into a potential for actual payment (a willingness to contribute, and pay, revenue). Thus, our perspective is broader than the emphasis in empirical literature on charitable giving: we not only strive to field-test factors that enhance actual donations, but we also strive to identify the relationship between donations and the potential maximum donation one could expect, i.e., maximum willingness to pay. Charitable organizations – as well as entrepreneurs developing private markets for (agriculturally-associated) public goods – might well benefit from our perspective of evaluating contributions relative to value.[3]

However, unlike much of the literature on charitable giving, and somewhat similar to the literature on environmental valuation, we are not constrained by the existence of an on-going, actual charity or privately moderated market for a public good. We deploy our own (simulated) business, the Bobolink Project, under a trademark our team co-created,[4] the *Nature Services Exchange (NSE) of Jamestown*. We do not evaluate approaches already deployed. Rather, in the spirit of Portney (2004), we examine innovations that may create social benefits, with provision point mechanisms existing as an innovation deserving field-testing. Moreover, we introduce two, novel uniform price mechanisms to the field context. We argue that our uniform price mechanisms comprise an innovation attractive to funders while building on literature establishing the provision point (Bagnoli and Lipman, 1989; Bagnoli and McKee, 1991) and associated rebates (Marks and Croson, 1998; cf., Spencer et al., 2009; Gailmard and Palfrey, 2005) as improvements over simple voluntary contribution mechanisms (i.e. simple solicitation of donations).[5] In addition, we pick up the incentive properties of the discrete choice (DC) format widely used in valuation research (Carson and Groves, 2007; Carson et al., 2014; cf. Vossler et al., 2012), and explore whether a solicitation framed as a DC could enhance revenue generation. In these respects, our study also illustrates an exploratory approach that a creative entrepreneur might adopt in proposing a new, market-based approach for public goods, such as some currently non-marketed ecosystem services.

With such motivations, our focus will not be on comparing the actual revenues generated by our different treatments, although we do that. Rather, we focus on the factors affecting the potential to generate revenues through effects on individuals' willingness to offer contributions, because this knowledge may aid a new entrepreneur to optimize her plan for a real business delivering public goods, whether charitably or for-profit. Therefore, we consider some of the framing effects identified in valuation literature as tools for our marketing materials, leading us to employ some of the corresponding econometric methods in valuation to estimate not willingness to pay, but instead to estimate the willingness of an individual to offer a contribution (a donation, or addition to revenue). Our core econometrics, then, estimate a "willingness to contribute" (WTC) that is not always the same as a revelation of value, as ours is a marketing experiment designed, in part, to assist an entrepreneur to optimize a plan for revenue generation. This approach offers an entrepreneur insights not only for a choice among mechanisms, but also choice in framing, for example, in choosing a format or suggesting contribution levels to stimulate individuals toward higher realization of revenue.[6]

2. Establishing the Field Experiment: Concerns From the Literature

Our agenda necessarily pushes experimental economics and mechanism design more deeply into an applied arena that is less well controlled, but where understanding behavior is critical if economics is to benefit society (cf., Krutilla, 1981; Portney, 2004). This field experiment necessarily faces idiosyncrasies of human psychology (cf. Camerer and Fehr, 2006; Plott and Zeiler, 2005) and practical barriers to implementation of theoretically incentive-compatible mechanisms (cf. Laffont, 1987, p. 567). While demand revelation and efficiency are of broad interest to economists, our practical limitations led us to focus on revenue generation since that is a key driver to Pareto improvements achieved through private provision of public goods.

We report on a large scale, natural field experiment (cf. List, 2008; Harrison and List, 2004) that applies a previously-studied mechanism and introduces two new mechanisms to elicit actual monetary contributions from private citizens. Operating as *Nature Services Exchange (NSE) of Jamestown*, we conducted a direct mail campaign among all residents of Jamestown, Rhode Island, USA, eliciting payments in support of grassland nesting bird habitat. This good benefits homeowners who seek a community with a rural character, or an agrarian landscape in harmony with nature, comprising aesthetic public goods that the Millennium Ecosystem Assessment [MEA] (2005) would classify as cultural ecosystem services.[7] Using a split-sample design, our analysis assesses the potential of three provision point mechanisms to generate revenues in the form of voluntary contributions and therefore to serve as real, market-making mechanisms for public goods, with *NSE* acting as broker. Mechanisms and solicitations that capture a larger portion of willingness to pay as actual revenues may better support new, continuously functioning markets for public goods. However, because our experiment enters an environment with unknown distributions of both values and potential contributions, our solicitations could not be optimized a priori, so that our comparison across mechanisms requires statistical modeling. Here, direct comparison of total contributions, as done in many studies of charitable giving (reviewed by List (2011)), is not appropriate across all our treatments; therefore, our design anticipated parametric modeling.

Theoretical analysis and laboratory experiments with non-coercive mechanisms demonstrate that different payment and provision rules have systematic effects on the level of contributions (see Ledyard, 1995; Spencer et al., 2009). Rather than engaging experimental volunteers for a researcher's game in an obvious laboratory context with well-defined values, the field experiment engages community residents around a real public good of potentially unexamined value affecting

[2] In valuation literature Mitchell and Carson (1989) and Louviere et al. (2000) review framing effects and associated aspects of stated preference valuation, with Carson and Groves (2007), Carson et al. (2014), and Vossler et al. (2012) adding depth on the role of incentives for truthful response. Taylor (1998) provides an early experiment with contingent valuation incentives, while Spencer et al. (1998) address choice experiments.

[3] Markets for ecosystem services may involve for-profit or not-for-profit entrepreneurship. We use both the language of revenues and of donations and contributions nearly interchangeably throughout this study, but often favoring the term revenue because our research agenda links payment to delivery of a specific action or quantity of a good, potentially for profit, rather than to a common donation supporting the mission of an organization.

[4] Our collaborators in deploying the project included EcoAsset Markets, Inc., a small business in Providence, RI, which was developing ecosystem service products at the time this project was initiated. EAM's successors continue to hold the trademark; the authors hold no stake in or financial connection to EAM.

[5] Li et al. (2016, cf., 2014; Li, 2015) identifies the game theoretic equilibria of our novel uniform price mechanisms, and provides experimental laboratory evidence of coordination and efficiency success.

[6] Our presentation in the experiment did not promote contributions as a charitable donation. At the time of the field experiment, we had not established a formal charitable entity, and our partners in marketing (see n. 4) were a for-profit business. We did not address whether framing our solicitations explicitly as for-profit or not-for-profit would affect contributions, leaving this issue for future research. Our project was funded under a program to stimulate market-based delivery of ecosystem services, which is different than but not necessarily exclusive of charitable fundraising; for this reason our framing, introduced below, was designed to mimic a profit-making approach under the *NSE* label.

[7] We will not sort out competing frameworks for ecosystem services here; see Johnston and Russell (2011). Jamestown residents were asked to pay for the specific action of hayfield management centered on Bobolinks. Such hayfields may provide goods the MEA defines as cultural services, supporting services (habitat supporting aesthetic benefits), regulating services (carbon storage, nutrient removal), or others.