Enhancing fundraising with refund bonuses

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A B S T R A C T

The provision point mechanism as a method of funding threshold public goods is extended with refund bonuses. Each contributor not only has his contribution refunded in the case of insufficient contributions but also receives a refund bonus proportional to his proposed contribution. As long as the refund bonus pool does not exceed the net value of the public good, in equilibrium the public good is always provided and refund bonuses are never distributed. In this paper, we empirically investigate this extension of the provision point mechanism in a laboratory experiment by testing its properties on allocative and distributive efficiency, equilibrium coordination, and invariance to information distribution. Individuals respond to the incentives induced by refund bonuses as predicted, but systematic deviations exist that are consistent with quantal response equilibrium. Since this simple mechanism has considerable practical potential especially in crowdfunding, these promising initial results call for further experimental work.

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1. Introduction

The voluntary provision of public goods remains one of the most challenging problems of economic design. Starting with the seminal works of Clarke (1971), Groves (1973), and Groves and Ledyard (1977), many novel solutions have been proposed to this problem, which at least until Olson (1965) was deemed impossible to resolve. Yet when technological developments made the application of decentralized provision methods feasible, the choice of practitioners – particularly in crowdfunding – fell on the simple voluntary contribution mechanism or, with a restriction to threshold public goods made henceforth, the provision point mechanism of the same form used by Benjamin Franklin in 18th-century America.[1] This choice was motivated by the simple structure of the mechanism and not its incentive properties, since it is fraught with the classical free riding problem and subject to the asymptotic non-provision result of Mailath and Postlewaite (1990).

Despite its weak implementation properties, the provision point mechanism helped raise over 5 billion US dollars (estimated) in crowdfunding revenue worldwide in 2013, a nearly ten-fold increase in revenue since 2009 (Massolution, 2014).[2] However, a valid concern can be raised about the robustness of the present growth of crowdfunding, especially for community, charity, or creative projects. The current growth may be primarily driven through contributions submitted by the

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[1] In the economics literature, the provision point mechanism was formally introduced by Palfrey and Rosenthal (1984) and Bagnoli and Lipman (1989). For reviews of experimental evidence on its performance, see Ledyard (1995) and Chen (2008).

[2] While Kickstarter, the largest crowdfunding platform, reports the success rate of 39% of its initially pre-screened fundraising campaigns (Kickstarter, 2015), the success rate can be as low as 10% for Indiegogo, the second largest (The Verge, 2013).

population of socially minded consumers, and growth may wane as this population is exhausted.[3] Consequently, the problem of attracting contributions from a broader range of consumers will come to the fore if high levels of voluntary contributions are to be sustained and grown. As a possible solution to this problem, Zubrickas (2014) proposes a refinement to the provision point mechanism that improves its properties up to strict implementation while retaining its simple structure. The present paper is an experimental study of the proposed refinement and its properties.

The idea of the refinement is to introduce refund bonuses that are paid in the event of insufficient contributions.[4] As Zubrickas (2013, 2014) demonstrates, with refund bonuses set to increase in own contribution, the only equilibrium outcome is the provision of public goods. Either competition for refund bonuses or preference for the public good induces sufficient contributions. For example, consider the problem of raising funds for a $10,000 public project. As under the standard provision point mechanism, the mechanism designer solicits contributions toward the project, which is financed out of contributions if they are sufficient for this purpose. If the threshold is not reached, contributions are refunded and, additionally, the mechanism designer gives every contributor a refund bonus equal to, say, 10% of their contribution.[5] As long as the net utility from the project exceeds the maximal amount of refund bonuses payable (i.e., 10% of $10,000), the only equilibrium outcome is the implementation of the project and the refund bonuses are not dispensed. Furthermore, by manipulating refund bonus rules it is possible to implement the project in a unique equilibrium with Lindahl prices. Lastly, on the normative side of analysis, the mechanism ensures that an individually rational contributor always gets a positive utility either from the public good or from the refund bonus whereas free-riders may end up with nothing.

In the present paper, we test the equilibrium predictions of this new provision point mechanism brought about by the introduction of refund bonuses. We form hypotheses related to allocative efficiency, equilibrium coordination, distributive efficiency, and invariance to information distribution. The latter hypothesis draws on the aggregative structure of the mechanism that implies that only the knowledge of aggregates matters for individual contribution behavior. Our experimental results offer empirical support for Nash equilibrium predictions by demonstrating that consumers respond to economic incentives in predicted ways. The most distinguishing prediction is the non-monotonous rate of provision with respect to the level of refund bonus. Namely, too generous refund bonuses will work against provision as consumers would rather coordinate on a total contribution just short of the provision point. Our empirical results exactly demonstrate this relationship: Despite generous refund bonuses, consumers choose to contribute less but, in line with the theoretical prediction, only marginally less as we observe little difference in total contributions across different refund bonus treatments. We also compare the provision point mechanisms with and without refund bonuses. We find expected differences in performance levels in favor of refund bonuses, which occur with a larger group size and heterogeneous population. With respect to predictions on invariance to information distribution and, in part, on equilibrium coordination, the closest fit is obtained when we refine the theoretical model with bounded rationality that underlies the quantal response equilibrium (Rosenthal, 1989; McKelvey and Palfrey, 1995).

The present paper belongs to the strand of literature on non-coercive methods of fundraising for public projects. The idea of using pecuniary incentives in order to induce contributions appears in a number of works. For example, Falkinger (1996) studies a mechanism that rewards contributors with above-average contributions, and Morgan (2000) studies one that induces contributions with the help of lotteries. Goeree et al. (2005) demonstrate the advantages of the all-pay auction design in fundraising. Gerber and Wichardt (2009) study a multi-stage mechanism that pre-commits consumers to optimal contributions with conditionally refundable deposits. For experimental evidence on the performance of these mechanisms, see Falkinger et al. (2000), Morgan and Sefton (2000), Lange et al. (2007), Corazzini et al. (2010), and Gerber et al. (2013) who all report improved allocative efficiency. For alternative fundraising methods, also see Varian (1994), Kominers and Weyl (2012), and most recently Masuda et al. (2014). However, apart from the lottery mechanism, the practical applicability of these mechanisms is questionable because of their complexity and concerns for group manipulability (which does not arise in our mechanism with refund bonuses). Furthermore, in many of these mechanisms distributive efficiency is likely to fail as, e.g., Kearney (2005) empirically demonstrates in the case of the lottery mechanism which proves highly regressive.

The remainder of the paper is organized as follows. Section 2 presents the provision point mechanism with refund bonuses, discusses its properties, and formalizes testable hypotheses. Section 3 describes the experimental design and Section 4 presents the empirical results. In Section 5, we refine the model with bounded rationality and discuss empirical implications. The last section concludes.

2. Refund bonuses and theoretical predictions

2.1. Model

There is a public good (PG) project that benefits a group of N consumers. The cost of the project is C and its total value to the consumers is V, with $V > C$. Consumer i's individual value for the PG is given by $v_i, i = 1, \ldots, N$, where $v_i \in [0, C)$

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[3] For instance, in an empirical study on crowdfunding Kuppuswamy and Bayus (2014) report that a campaigner's own social network and contributions coming from it make an important factor for the success of the project. With increasing project sizes, the role of this factor may accordingly diminish making it harder to reach the contribution target.

[4] Also see Tabarrok (1998) for a related idea.

[5] The assumption is that the mechanism designer has a budget of her own, but one could think of many alternative sources of refund bonuses, e.g., seed money initially raised from first movers.