Strategic incentive for giving can be counterproductive

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Abstract

In an experimental test of a modified dictator game, I find that incentivizing a dictator to give at least a small proportion of her endowment drives non-incentivized giving to zero. This reduces overall giving relative to the standard dictator game. Thus, introducing strategic incentive for giving can be counterproductive.

Keywords: dictator game; giving; strategic incentive.
JEL classification: C91, D90.

1 Introduction

Entities designing mechanisms often aim to maximize social behavior from participants. For example, governments/charities often aim to maximize fundraising to finance schemes. In this paper we compare two common methods adopted to achieve this aim: relying entirely on personal generosity versus designing a game/mechanism that incentivizes participants to give at least a small amount. Examples of the latter include introducing additional cess/tax to raise revenue.

The dictator game has been used to observe social preferences when no "real" incentive to give exists. Recall that in the dictator game, a dictator unilaterally decides how to split an endowment among himself and his counterpart. The dictator game has also been used to understand the motivation for giving. Different motivations have been tested by studying the degree of "crowd-out" from imposing a lump-sum tax on the dictator (see Bolton and Katok (1998), Eckel, Grossman, and Johnston (2005), Ottoni-Wilhelm, Vesterlund, and Xie (2017), and Vesterlund (2016) for a survey). In the with-tax treatment of these studies, the tax amount is exogenously removed from the dictator's endowment, and then the dictator decides how to split the remaining endowment. This literature finds that total giving (inclusive of tax) by the dictator is non-decreasing with tax.

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However, paying/not-paying a tax is a non-trivial strategic choice in many situations; for instance, in countries with high levels of tax evasion, where not all evaders can be prosecuted. Thus, in this article, I design and test a novel game called the 10-90 game, where the payoff maximizing strategy is to give 10 percent of the total endowment (the "strategic incentive" to give), but giving less or more than that remains possible. Further, I contrast total giving in the 10-90 and standard dictator games to study the effect of this strategic incentive for giving.

2 The 10-90 Game

The 10-90 has two stages, a total "pie" of \$100, and two players: A and B. Player A is the dictator in stage 1 with \$10 at her disposal. In stage 1, A chooses how much, if any, of this \$10 to transfer to B. Player A's first-stage decision determines both of their first-stage earnings, and it also determines the probability with which A or B becomes the dictator in stage two and decides how the remaining \$90 is split. The more A transfers to B in the first stage, the more likely A is to be dictator in the second stage. In particular, if A transfers \$$x$ out of the \$10, then she has an $\frac{x}{10}$ chance of being dictator in the second stage, while B has a $(1 - \frac{x}{10})$ chance. Whoever is the dictator in the second stage (can be A or B) then decides how much, if any, of \$90 to transfer to the other player. Each player's total earnings are sum of their earnings from the two stages. The game has perfect information.

In 10-90, under risk-aversion/neutrality, in Subgame Perfect Equilibrium (henceforth SPE), A should give \$10 in stage 1, become dictator again in stage 2 for sure, and give nothing in stage 2; while (off equilibrium) if B becomes dictator in stage 2, she should give nothing to A. The SPE is robust to a "plausible" degree of risk-loving.[1] Under risk-aversion/neutrality, A's SPE strategy is optimal since it maximizes A's expected earnings (expected earnings equal 90) *and* this maximized earning accrues for sure. Thus, there is a *strategic incentive* to give \$10: one forgoes expected earning if one deviates.

Note that A can give more than \$10 (across the two stages) without any risk: give \$10 in stage 1, become dictator for sure in stage 2, and give any amount up to \$90 in stage 2.

3 Experimental procedures

The experiment comprised of two between-subject treatments: the one-shot 10-90 game and the one-shot standard dictator (henceforth SD) game. Each treatment had two sessions, with each session conducted at a different pair of educational institutions in Delhi and Ahmedabad, India. Participants in the player A role were students in the classroom of one institution, while participants in the player B role were students in the classroom of the paired institution. Participants could see the other set of participants via a video call, but didn't know which individual among them was their counterpart player A/B, or the identity of the counterpart institution. Participants

[1] For a CRRA utility function $u(m) = \frac{m^{1-r}}{1-r}$, if $r > -8$, the SPE remains unchanged.

Stage	Dictator	Mode	Mode freq.	Sample size	Median	Mean	Std. Dev.	Mean 95% CI
I	A	10	15	40	9	7.6	2.9	[6.4,8.7]
II	A	0	28	30	0	1.33	5.7	[-0.7,3.4]
II	B	0	6	10	0	5	8.4	[0.05,9.95]
II	D2 (A or B)	0	34	40	0	2.25	6.6	[0.2,4.3]

Table 1. First-stage and second-stage giving in the 10-90 game.
Note: The confidence intervals (CI) are obtained by bootstrapping.

noted their decisions on a paper survey instrument (weblink), with decisions communicated via the experimenters for a sequential-move implementation.

Each of the two games was worth 100 experimental currency (henceforth EC), where 1 EC equals 3 INR (Indian Rupee). The participation fee was INR 100, so average earning was INR 250.[2] Average duration was 30 minutes. The experiment ended with a survey and cash payments.

4 Results

I start by analyzing the 10-90 results. **First stage:** The mean (median) amount given is 7.6 EC (9 EC), which is significantly lower than 10 (see Figure 1 and Table 1). Thus, the SPE stage 1 prediction finds only limited support.

Second stage: There is an overwhelming tendency among second-stage dictators (henceforth D2), A or B, to give nothing (see Table 1 and Figure 2). Player B give more as D2 than player A (p-value = 0.016 from a rank-sum test). However, B is not responsive to A's stage 1 choice. The correlation between A's stage 1 transfer to B and B's stage 2 response is an insignificant -0.39.

Result 1: *The dictators in stage 2 of 10-90 gives close-to-nothing to their respective counterparts. So, the stage 2 SPE prediction holds.*

Next, we compare the 10-90 and SD games. In my test of the SD game, consistent with the findings of the Engel (2011) meta study, the mean (median) amount given by the dictator is 24.4 EC (30 EC). I compare this with the *total giving* in 10-90. To obtain comparable *total giving*, I only look at those 10-90 participants in the player A role who were also dictators in stage 2, i.e. they were dictators for the entire 100 EC.

I find that mean total-giving in 10-90 was 10.03 EC out of 100 EC, which is significantly lower than the 24 EC in the SD game (p-value < 0.01 in a rank-sum test; also see Table 2).

[2] In PPP terms, 1 USD = 18.2 INR (OECD 2018 data).

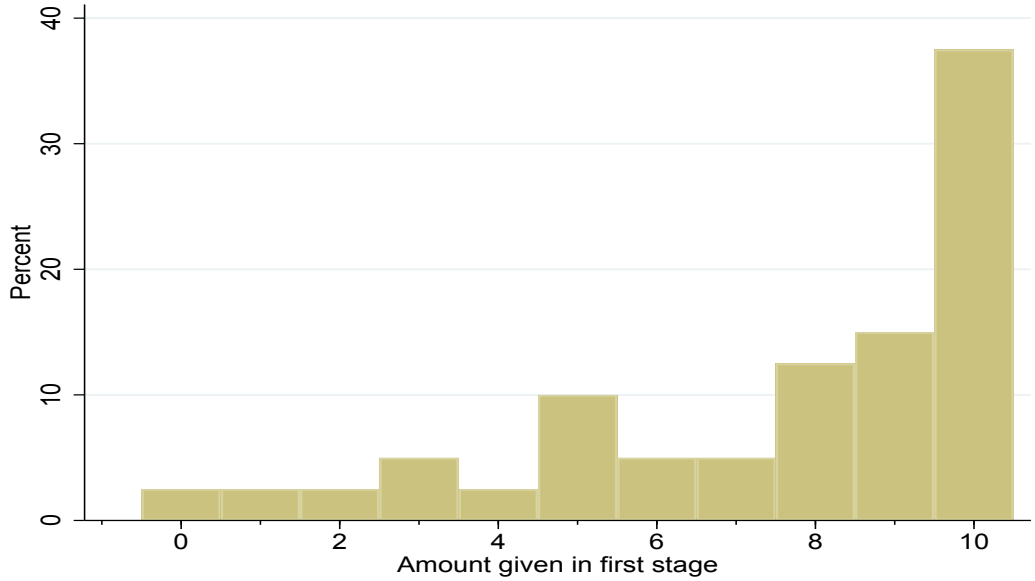

Figure 1. Giving in stage 1 of the 10-90 game.

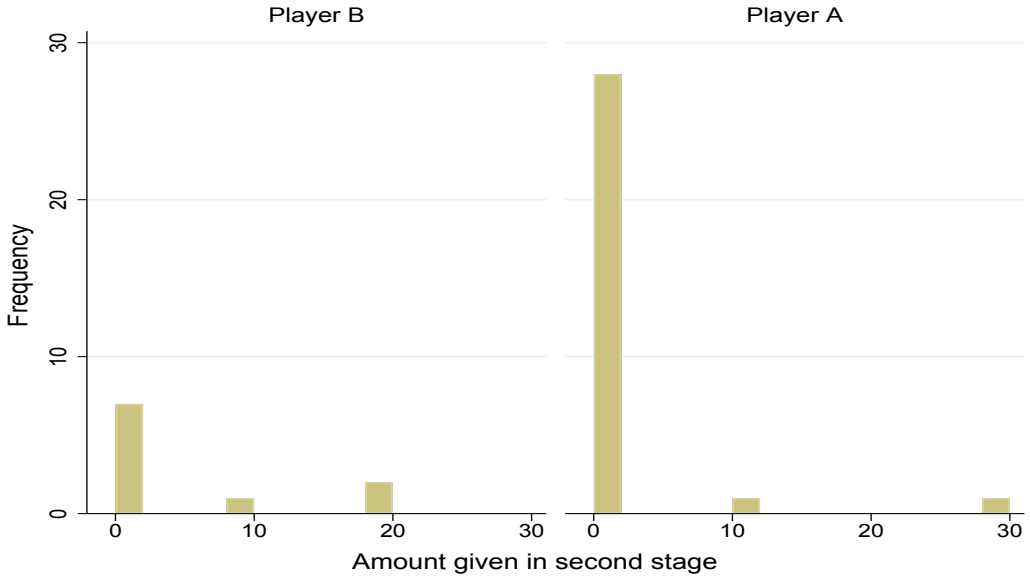

Figure 2. Giving in stage 2 of the 10-90 game.

Dependent variable: total giving		
10-90 dummy	-10.4***	(3.3)
Male	5.5*	(3.1)
Constant	54.6	(31)
No. of Obs.	60	
R^2	0.42	
Controls	Yes	
Session dummies	Yes	

Table 2. Total giving in SD game versus 10-90 game.
Note: ***: two-tail p-value<0.01. *: two-tail p-value<0.1. Only player A who were dictators in both stages are included in the 10-90 data. Errors are clustered by participant. Controls are Age and Major.

Result 2: *Comparing across participants who were dictators for the entire 100 EC, total giving in the 10-90 game is significantly lower than in the standard dictator game.*

Result 2 shows how introducing strategic incentive for giving can have a negative effect on the generosity of individuals. Although participants in the A role in 10-90 could have avoided all uncertainty and still matched the mean amount (24 EC) given by standard dictators (give 10 EC in stage 1, and 14 EC more in stage 2), they give significantly lower. As Figure 1 specifies, more than half the 10-90 player A participants do avoid almost all uncertainty by giving 9 or more EC in the first stage, but then after retaining the dictatorial position, they give nothing in stage 2 (Result 2).

5 Discussion

The purely selfish behavior in stage 2 appears closely related to the findings of Hoffman et al. (1994) and Cherry, Frykblom, and Shogren (2002), who find more selfish behavior among dictators who believed they had earned their position (based on performance in a quiz). In the context of this article, such a belief may have occurred due to player A giving most/all of the 10 in the first stage.

My results also mirror the findings of List (2007) and Bradsley (2008), in that social preferences seem to depend on the institution. While these studies introduce the possibility of *taking* by dictators, and find that this reduces giving significantly, I report a similar result from introducing a strategic incentive for giving. Result 2 is starkly different to the findings from the literature on motivation for giving (Vesterlund (2016)): they find that making giving mandatory weakly increases total giving, while I show total giving can strictly decrease when giving a small amount is made strategically optimal, but not mandatory.

Clearly, introducing the strategic incentive to give need not always decrease giving. For instance,

if optimal giving is large enough,[3] such an incentive may increase giving. But if incentivizing large transfers is not possible (e.g. if a high tax rate is not possible), Result 2 shows that introducing incentives for giving can be counterproductive.

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[3] E.g. under risk aversion/neutrality the SPE of a 40-60 game (instead of the 10-90 game) implies A gives 40.