The Optimal Number of Charities

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Abstract

In this paper charity brings some joy of giving; it yields more contributions to public goods than standard "subscription", but its creation is costly. We compare the *laissez-faire* number of charities with both the second and the first-best level. In general, *laissez-faire* implies an underprovision of both charities and public goods.

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1 Introduction

Charitable organizations represent in several countries a sizeable and growing sector of the economy. In 2003, an estimated 800,000 US charities (double the 1990 figure) received over 180 billions dollars in individual donations representing about 2% of personal income (*The Chronicle of Philanthropy*, January 6, 2005 and Andreoni, 2005). Despite its importance, the economic functioning of charitable markets is still largely unexplored (Andreoni, 2005). For example, while private firms' entry determinants have been extensively studied, there is relatively little research on entry decision by charities or on the optimal number of these organizations. One exception is Rose-Ackerman (1982) that develops a theoretical framework where free entry leads to too much entry and excessive fund-raising as charities ignore the diverting impact of their fund-raising efforts on the donation received by others.

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In this note, we underline other forces that may lead to a divergence between the *laissez-faire* outcome and the optimal number of charities. We develop a simple model of voluntary contributions where individuals can contribute to the public good directly or through some charities, in which case it brings some joy of giving. The creation of a new charity entails a private fixed cost of entry. After characterizing the *laissez-faire* outcome, we derive the first best optimum allowing for the social planner to include or not the joy of giving into its objective function. We also explore the second best solution where the social planner only controls the number of charities. Our main findings are: i) while the optimal number of charities is zero when the social planner ignore the joy of giving effect, the second best solution calls for the presence of charities; ii) in this case, the *laissez-faire* number of charities is suboptimal unless the joy of giving is very high; iii) when the social planner includes the joy of giving component, the *laissez-faire* solution always involve too few charities compared to the second best solution. The suboptimal number of charities results from the public good aspect of creating a charity and from the fact that an individual ignores that, by creating a new charity and thus increasing the number of donors, it reduces the cost supported by existing contributors.

2 Model

The economy consists of N individuals who are *ex ante* alike. They have an endowment equal to y and devote it to private consumption c_i or to a contribution s_i to some public good Z. The contribution to the public good can be either direct or go through some charity, in which case it brings some joy of giving. More formally, let us assume that we have p charities, involving each a single individual. The utility of each of these p individuals is written as:

$$U(c_s, s, Z) = u(y - s - f) + h(s) + v(Z)$$

where the subscript s denotes individuals having a charity, $u(\cdot)$, $h(\cdot)$ and $v(\cdot)$ are strictly concave utility functions. f is the fixed cost associated with the creation of a charity, $h(\cdot)$ represents the joy of giving and $v(\cdot)$ the utility for the public good Z. The public good Z is the sum of individual contributions, that are chosen in a non-cooperative way.

Turning to the $N - p$ individuals who have no charity and are given a subscript 0, their utility is given by:

$$U(c_0, Z) = u(y - s_0) + v(Z).$$

For the sake of simplicity we assume that for these individuals $s_0 = 0$ as soon as there is a charity. We thus distinguish two cases: $p = 0$ and $0 < p \leq N$.

i) $p = 0$. Then each individual chooses s_o that

$$Max_s \quad u(y - s_0) + v(Ns_0),$$

given the s_0's of the other $N - 1$ individuals. This yields the following FOC:

$$-u'(c_0) + v'(Ns_0) = 0. \tag{1}$$

ii) $p \leq N$. Then s results from the following problem solved by each of the p contributors:

$$Max_s \quad u(y - s - f) + h(s) + v(ps).$$

In equilibrium, we obtain the following condition:

$$-u'(c_s) + h'(s) + v'(ps) = 0. \tag{2}$$

As to the other $N - p$ individuals, as $s_0 = 0$ by assumption, their utility reduces to

$$u(y) + v(ps).$$

From (2) , one can easily show that $s = s(p)$ with $s'(p) < 0$. For further use we define the elasticity of s with respect to p:

$$0 \leq \eta = -s'(p)\, p/s = \frac{pv''(ps)}{u''(c_s) + h''(s) + pv''(ps)} \leq 1.$$

So far we have assumed that p was given. We now turn to its determination in a *laissez-faire (LF)* economy. Starting with $p = 0$, then a charity is introduced if:

$$u(y - s - f) + h(s) + v(s) > u(y - s_0) + v(Ns_0) \tag{3}$$

With $p > 0$ an additional charity is introduced as long as

$$u(y) + v(ps(p)) < u(y - s(p+1) - f) + h(s(p+1)) + v((p+1)\, s(p+1)) \tag{4}$$

or

$$u(y - s(p+1) - f) - u(y) + h(s(p+1)) + v'(ps)\ \ \Delta(ps(p)) > 0.$$

Expressed in continuous terms, free entry should stop when the following condition is satisfied:

$$u\left(y-s\left(p\right)-f\right)-u\left(y\right)+h\left(s\left(p\right)\right)+v'\left(ps\right)\left(s\left(p\right)+\frac{\partial s}{\partial p}\right)=0. \qquad (5)$$

One clearly sees from (3) and (4) that the creation of a charity is made desirable when the fixed cost is not too high and the joy of giving is important. In the following section we compare this *laissez-faire* solution with the first-best optimal solution.

3 The first-best optimum

To define the first-best we take the sum of individual utilities. The key issue is whether or not social welfare includes the joy of giving component of individual utilities. In other words, are we going to launder out individual utilities from the warm glow effect of charities? To keep the problem open, we will consider the two alternatives.

Social welfare is thus expressed as:

$$\left(N-p\right)u\left(c_0\right)+p\left[u\left(c_s\right)+\varepsilon h\left(s\right)\right]+Nv\left(Z\right)$$

where $\varepsilon \in \{0,1\}$ and Z is the amount of public good. We assume that the social planner can allocate the available resources Ny to consumption and to contributions. Contributions are used to finance the public good: $Z=ps$. The social planner can also determines the number of charities.

This problem can be represented by the following Lagrangean expression:

$$\begin{aligned}\mathcal{L} &= \left(N-p\right)u\left(c_0\right)+p\left[u\left(x_s-s\right)+\varepsilon h\left(s\right)\right]+Nv\left(Z\right)\\ &\quad -\mu\left[Z+\left(N-p\right)c_0+p\left(x_s+f\right)-Ny\right]\end{aligned}$$

where μ is the multiplier associated with the resource constraint and x_s is the resource allocated to each contributor. Maximizing $\mathcal{L}$ with respect to c_0, x_s, s, Z and p, we obtain:

$$u'\left(c_0\right)=u'\left(c_s\right)=\varepsilon\ h'\left(s\right)=Nv'\left(Z\right)=\mu$$

and

$$\begin{aligned}\frac{\partial \mathcal{L}}{\partial p} &= u\left(c_s\right)-u\left(c_0\right)+\varepsilon\ h\left(s\right)-\mu\left(x_s+f-c_0\right)\\ &= \varepsilon\ h\left(s\right)-u'\left(c_0\right)\left(s+f\right). \qquad (6)\end{aligned}$$

If $\varepsilon = 0$, there is no reason to go through costly charities to finance the public good: $s = 0$ and $p = 0$.

However if $\varepsilon = 1$, any value of p can occur depending mainly on $h(\cdot)$ and f.

To get more insight let us look at the SOC of (6) for $\varepsilon = 1$.

$$\frac{\partial^2 \mathcal{L}}{\partial p^2} = h'(s)\frac{\partial s}{\partial p} - u"(c_0)\frac{\partial c_0}{\partial p}(s+f) - u'(c_0)\frac{\partial s}{\partial p}.$$

If we take the particular case where $u(\cdot) = h(\cdot)$, $s = c_0$. Then

$$\frac{\partial^2 \mathcal{L}}{\partial p^2} = -u"(c_0)(s+f)\frac{\partial s}{\partial p} < 0.$$

We now examine whether the FB solution can be decentralized.

When $\varepsilon = 0$, the FB implies $p = 0$. In that case there is no joy of giving. Individuals contribute to the public good in the traditional way. Assume that this contribution benefits from a subsidy σ financed by a lump-sum tax T. Then, the problem of each contributor is:

$$Max_s \quad u(y - s(1-\sigma) - T) + v'(Ns)$$

where each agent considers that the contributions of the other $p-1$ ones are given. At the equilibrium, there are all equal. The FOC are:

$$-u'(c_0)(1-\sigma) + v(Ns) = 0.$$

One can easily see that if $1 - \sigma = \frac{1}{N}$ or $\sigma = \frac{N-1}{N}$ one gets the optimal solution.

When $\varepsilon = 1$, if the optimal p is positive, decentralization is more difficult. One needs a subsidy on the p contributions and interpersonal transfers to guarantee equal consumption between contributors and non contributors. One also needs to control p.

4 The second-best problem controlling only the number of charities

We now consider the following question: assuming that the social planner can only control the number of charities, can we say that the number it chooses is higher or lower than the LF number? To see that, we differentiate the social welfare function with respect to a continuous p. Social welfare is given by:

$$SW = (N-p)u(y) + p[u(y-s-f) + \varepsilon\, h(s)] + Nv(ps).$$

And thus

$$\begin{aligned}\frac{\partial SW}{\partial p} &= u(c_s) - u(y) + \varepsilon\, h(s) + p\left[\varepsilon\, h'(s) - u'(c_s)\right]\frac{\partial s}{\partial p} \\ &\quad + Nv'(Z)\left[s + p\frac{\partial s}{\partial p}\right].\end{aligned}$$

Substituting (5) into this expression, we write

$$\begin{aligned}\left.\frac{\partial W}{\partial p}\right|_{LF} &= (\varepsilon - 1)\, h(s) + p\left[\varepsilon\, h'(s) - u'(c_s)\right]\frac{\partial s}{\partial p} \\ &\quad + (N-1)\left[s + p\frac{\partial s}{\partial p}\right] \\ &= (\varepsilon - 1)\, h(s) + \eta s\left[u'(c_s) - \varepsilon\, h'(s)\right] + (N-1)\, v'(Z)\, s(1-\eta).\end{aligned}$$

From this expression we can compare the level of p in the LF and in the second-best (SB). We have:

$$p_{SB} > p_{LF} \text{ if } \eta s\left[u'(c_s) - \varepsilon\, h'(s)\right] + (N-1)'(Z)\, s(1-\eta) - (1-\varepsilon)\, h(s) > 0.$$

The first term reflects the positive externality that an additional charity has on the utility of the individuals having already a charity: their contribution decreases, but this is partially offset by less joy of giving. From (2) we know that this term is positive.

The second term is the positive externality that an additional charity has on the whole society by allowing for more public good. Finally, the last term is the joy of giving that in the case where $\varepsilon = 0$ is not taken into account by the social planner and then plays in favor of p_{LF}.

To sum up, when $\varepsilon = 1$, $p_{SB} > p_{LF}$; when $\varepsilon = 0$, this will not be the case if the joy of giving is very high.

5 Concluding remarks

To conclude, we discuss the impact of relaxing some of our hypothesis. First, allowing each charity to provide a warm glow effect to several individuals should not significantly affect the contribution outcome. It may however make the creation of a new charity even more difficult as each individual has an incentive to wait for others to bear the fixed cost (see Bilodeau and Slivinski, 1996). Second, allowing for the individual without charity to contribute should not significantly affect the nature of our results. Third, if charities

produce differentiated public goods, this could reinforce the private incentive for creating additional charities. However, the first and second best number of charities is also likely to increase at least if the social planner takes into account the individuals' taste for diversity.

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