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PRIVATE GIVING TO PUBLIC GOODS*

JAMES ANDREONI
Department of Economics
University of Wisconsin—Madison

I. INTRODUCTION

According to two national surveys over 85 percent of all households make donations to charities while over 50 percent of all tax returns include deductions for charitable giving. In total, the charitable sector of the American economy accounts for about 2 percent of GNP with average giving of over \$200 per household in 1971, ranging from \$70 for the lowest income quartile to \$350 for the highest quartile. Religious organizations collected about \$10 billion in 1981, health organizations and hospitals raised over \$7 billion, and civic orchestras received \$150 million in donations.¹ This indicates that participation in the charitable sector is high and fairly broad based, and that in aggregate the charitable sector is a significant proportion of the U.S. economy.² Furthermore, investigations in the interaction between private and public giving to charities have generally found that government donations *incompletely* crowd out private sector donations. Studies by Clotfelter (1985) and others³ indicate that a one dollar increase in government contributions to charitable activities is associated with a decrease in private giving of only about 5 cents.

The work to be summarized in this paper is directed at determining how successful standard economic models have been at describing these characteristics of private charity and, in turn, how appropriate these models are for policy determination. The customary approach has been to model charity as a pure public good in the Samuelsonian sense, as in Olson (1965), Hochman and Rodgers (1969), Schwartz (1970), Becker (1974), Warr (1982), Young (1982), Roberts (1984, 1987) and others.⁴ This is done by assuming that contributors care about the utility of some representative poor person or, equivalently, the total amount of resources devoted to the consumption of all poor people.⁵ Utility is then taken to depend on consumption of private goods and on the total supply of the public good, i.e., individuals gain no utility from their gift *per se*. Stated differently, preferences are assumed to be purely altruistic.

It is generally agreed, however, that giving is motivated by many things other than altruism. Guilt, sympathy, an ethic for duty, a taste for fairness, or a desire for recognition may all influence an individual's contribution to charity. The question is can the traditional model of altruistic giving be general enough to capture the important and interesting aspects of privately provided public goods, even if it ignores these social effects. The results reported in this paper suggest that the answer is no. The traditional model fails to confirm even the broadest empirical observations about charity. The results imply that an assumption of altruistic preferences leads to a very limited model with little, if any, predictive power. A truly descriptive model of privately provided public goods must be generalized to include other non-altruistic motives for giving. This proposition is described in section II below, while section III discusses a new direction for the economics of charity to pursue. Section IV is a conclusion.

*This paper is a summary of my 1986 dissertation "Essays on Private Giving to Public Goods," written at the University of Michigan. I would like to thank my dissertation chairmen Theodore Bergstrom and Hal Varian for their guidance. I am also grateful to Lawrence Blume and John Chamberlain, who served on my dissertation committee, and John Miller for assisting in the experiments reported in the third chapter of the dissertation.

II. THE INVARIANCE PROPOSITION OF PUBLIC GOODS

a) A Public Goods Model of Charity

Begin by constructing a simple model of charity as a public good. For brevity, consider the case in which all individuals have identical utility functions and differ only by wealth endowments. As shown in Andreoni (1986, 1988), all of the results derived here generalize easily to heterogeneous tastes.

Assume for simplicity that there is only one private good and one public good. Let x_i be consumption of the private good by person i and let g_i be i 's gift to the public good. Individuals are endowed with exogenous wealth w_i . Assume that the total services of the public good can be measured in dollars and so $G = \sum_{i=1}^n g_i$ is the total provision of the public good. Utility is represented by a continuous and strictly quasi-concave function $U_i = U(x_i, G)$. This is a traditional purely altruistic model of privately provided public goods.

Individual donations functions can be found by solving the maximization problem

$$\begin{aligned} \max_{x_i, g_i} & U(x_i, G) \\ \text{s.t. } & x_i + g_i = w_i, \\ & g_i \geq 0. \end{aligned}$$

Let $G_{-i} = \sum_{j \neq i} g_j$ be the gifts of everyone but person i . Alternatively, $G_{-i} = G - g_i$. Assuming that individuals behave as Nash utility maximizers, and so treat G_{-i} as constant, it follows that this maximization problem is equivalent to

$$\begin{aligned} \max_{x_i, G} & U(x_i, G) \\ \text{s.t. } & x_i + G = w_i + G_{-i}, \\ & G \geq G_{-i}. \end{aligned} \tag{1}$$

Solving this yields a continuous demand function for the public good:

$$G = \max\{f(w_i + G_{-i}), G_{-i}\} \quad i = 1, 2, \dots, n. \tag{2}$$

If the inequality constraint in (1) is not binding, the choice of gifts per person i will be $G = f(w_i + G_{-i})$, or equivalently, $g_i = f(w_i + G_{-i}) - G_{-i}$. The donation function $f(\cdot)$ is simply the Engel curve.⁵

b) Complete and Near-complete Crowding Out

This choice problem (1) is illustrated in Figure 1. Only the thick-lined part of the budget constraint is available to the consumer. If the indifference curve were tangent to the thin-lined section of the budget, i.e., the person would rather be a recipient than a donor, then the person is constrained to a gift of zero.

Figure 1 also illustrates a well established finding in these models: complete crowding out. If we imagine the government as a player in this economy, then a lump sum tax on i which is donated to the

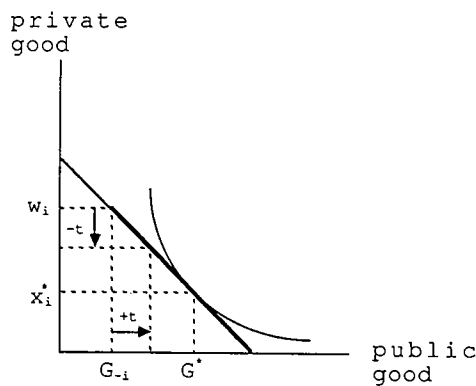


Figure 1

public good by the government is equivalent to a simultaneous decrease in w , and increase in G_{-i} of the same amount. As seen in Figure 1, this simply represents a movement *along* the budget constraint and does not effectively change the opportunity set of the consumer. By simply reducing the post-tax gift by the amount of the tax the consumer can be restored to the utility maximizing bundle. Lump sum taxation, therefore, crowds out private giving dollar-for-dollar.⁷ Moreover, this has an extension to re-distributions of income. A simultaneous tax increase on one individual and tax decrease on another will not change the total supply of the public good. Hence, total giving will also independent of the distribution of income.

This theoretical finding obviously does not correspond to the empirical finding of only slight crowding out. But this alone does not discredit the model. Notice in Figure 1 that complete crowding out depends on the ability of the consumer to restore the original bundle. If the tax were sufficiently high then the person would be constrained to the corner solution and hence would not be able to fully offset the tax. Total contributions would rise in this case. Likewise, if the government taxed a non-giver, this would have an even greater positive effect on total gifts. Using aggregate data, therefore, we should expect to observe incomplete crowding even if the traditional model is valid. The question which follows naturally from this, however, is if taxing a non-giver will raise the equilibrium gifts, by how much will they rise?

We can answer this question by returning to the donations functions (2). Suppose the government taxes a non-giver an amount Δ and donates this to the public good. This tax is like an exogenous increase in G_{-i} for all i . Totally differentiate i 's donation function:

$$dg_i = f'_i(dG_{-i} + \Delta) - dG_{-i} - \Delta.$$

Substituting $dG_{-i} = dG - dg_i$ and rearranging

$$dg_i = -\frac{1-f'_i}{f'_i}(dG + \Delta).$$

Sum across all i and solve for dG :

$$dG = -\frac{\sum \frac{1-f'_i}{f'_i}}{1 + \sum \frac{1-f'_i}{f'_i}} \Delta.$$

The change in total giving is, therefore,

$$dG + \Delta = \frac{1}{1 + \sum \frac{1-f'_i}{f'_i}} \Delta \geq 0.$$

How do we evaluate this? If charity is a strictly normal good, i.e., f'_i is bounded strictly away from 1, then there exists a number β such that $0 < \beta \leq \frac{1-f'_i}{f'_i}$. It follows that $\eta\beta \leq \sum_{i=1}^n \frac{1-f'_i}{f'_i}$. This in turn implies

$$dG + \Delta \leq \frac{1}{1 + n\beta} \Delta.$$

For large n the right hand side of this inequality is approximately zero. As the number of contributors approaches infinity an exogenous increase in donations will have no impact on the equilibrium provision of the public good. Even for small numbers of contributors, however, the impact of the tax can be barely perceptible. This is especially true if f'_i is small. For example, suppose that f'_i is a constant equal to .10 for all i . Take $n = 10$. One can show that a $\Delta = \$100$ would increase the equilibrium level of giving by only \$1.10. For $n = 100$, the same Δ would increase the equilibrium by less than \$.01. Hence, even if crowding out is incomplete, it must be near-complete. The public goods approach to altruism, therefore, fails to explain the observation of only small degrees of crowding out.

c) The Limits of Altruism

Figure 2a illustrates another interesting feature of the pure public goods approach. Under the assumption of identical tastes the expansion path of each individual must follow the same line from the origin. Also, since G is a public good each individual must consume the same quantity. Finally, each

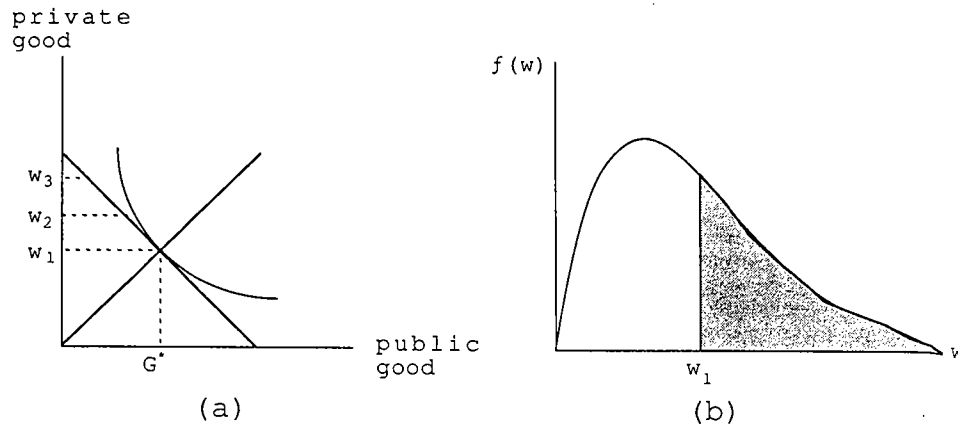


Figure 2

giver is, in equilibrium, choosing G^* as the solution to their maximization problem. Together these imply that the indifference curves of all givers must be tangent to the budget at the point (w_1, G^*) . Hence all givers must be consuming private goods equal to $x^* = w_1$ and contributing all income in excess of this to the public good: $g_i^* = w_i - x^*$ for all givers. Person 3 is giving $g_3 = w_3 - x^*$ for instance, while persons with wealth less than or equal to w_1 are making gifts of zero.

With this last result we can neatly divide the economy into givers and non-givers on the basis of income: those with wealth above w_1 are givers and those with wealth below are not. If we posit a probability density function to describe the distribution of income in the society then we can measure the fraction of givers by the area under the tail beyond w_1 . This is shown in Figure 2b.

Since in the United States economy the number of consumers of charity and public goods is large, it is natural to ask what happens to the proportion of givers as the size of the economy grows. We can imagine the economy growing by drawing an additional person randomly from the income distribution in the Figure 2b. If this new addition to the economy has wealth below w_1 then this will obviously have no effect on the public good. If on the other hand the person has wealth above w_1 then total giving must rise.⁸ Suppose it rises to G^{**} in Figure 3a. It would then be the case that only those with wealth above w_2 would be givers. We see in Figure 3b that the proportion of society giving shrinks as a result. It is fairly intuitive to see that as the population increases the proportion of society giving can be expected to shrink and that in the limit as the population approaches infinity it must shrink to zero. As it does so, total giving converges to a finite positive number. The limiting amount of charity is that which makes the richest person in society just indifferent between giving and not. This is derived explicitly in Andreoni (1986, 1988).

This is clearly a very strong result and can be shown to hold under quite general assumptions about both preferences and wealth. The theoretical implication is that participation in charitable giving should be rare and should be confined to the particularly wealthy. But as was observed in the introduction, a substantial fraction of individuals in all income classes make donations. Hence the public goods approach has again failed to explain a basic observation about giving.

All of the results in this section point to a general theoretical conclusion which must hold for private giving if the public goods model is to be valid. This conclusion, which is stated as an invariance proposition, indicates that there is virtually no policy tool available for influencing private provision:

The Invariance Proposition of Public Goods: *The private supply of a public good is invariant, or approximately invariant, with respect to joint provision with the government, redistributions of income, and changes in the population.*

III. NEW DIRECTIONS

The previous section established that the traditional approach to charity lacks the predictive power desirable in an economic model. Is there a reasonable alternative? In the introduction it was observed that contributions to charity have many qualities in common with private goods—people may give for

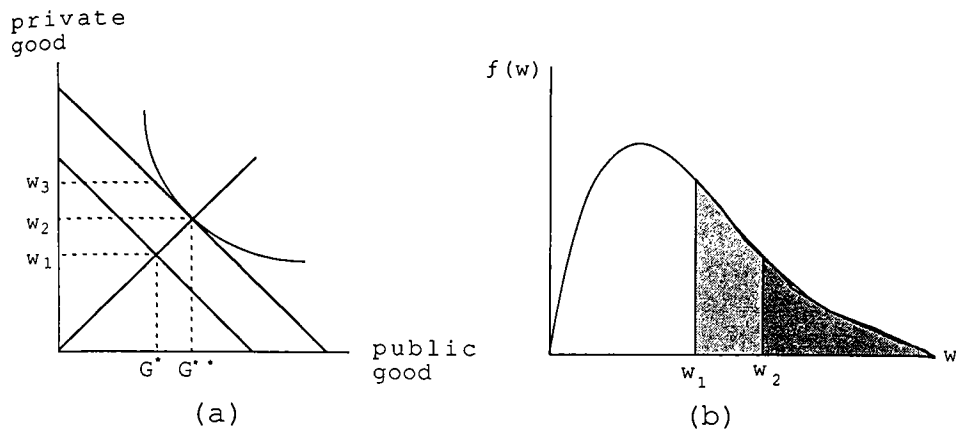


Figure 3

social acclaim, to relieve guilt, or simply to experience a “warm-glow” from giving. This suggests that it might be better to model charity as a pure private good: $U_i = U_i(x_i, g_i)$. Predictions in this case would be trivial: crowding out would be very slight since the only effects of government provision would be the income effects of taxation. However, a pure private goods approach is also unsatisfactory since it ignores the interdependence of utility which is commonly felt to exist in these jointly consumed goods. An obvious alternative is combine the two approaches by assuming utility $U_i = U_i(x_i, G, G_i)$. In this case we are assuming individuals are “impure altruists” or simply “warm-glow givers.”

What are the predictions of such warm-glow giving? These are presented formally in Andreoni (1986, 1987), and while there are some surprises, the main results are quite intuitive. Unlike the pure altruism approach, taxation will only *incompletely* crowd out private giving regardless of whether a giver or non-giver is taxed. Moreover, for taxation to completely crowd out or for redistribution of income to be neutral it is necessary that preferences be purely altruistic. Hence, as long as even a small fraction of society is motivated by some private goods concerns, we would expect fluctuations in government taxation and support to have large impacts on the budgets of charities. This holds for both direct grants to charities and subsidies to giving.

IV. CONCLUSION

This paper has considered the traditional model of private charity which assumes that charity is a pure public good. A standard result from these models is that government contributions should crowd out private gifts dollar-for-dollar. It was shown that in large economies this model is unable to explain any of the general observations about charity markets. To regain any predictive power, models must consider the fact that gifts to charity have characteristics in common with private goods, such as producing a “warm-glow” from giving. When generalizing the model in this way it is seen that the complete crowding out hypothesis, which has been the hub of many policy oriented papers, can no longer be taken as the basis for policy analysis.

FOOTNOTES

¹These figures are quoted from the 1975 National Survey of Philanthropy, Survey Research Center; Giving USA, the 1981 Annual Report of the American Association of Fund Raising Council; and from the 1970–1971 Consumer Expenditure Survey, as reported by Reece and Zieschang (1985).

²These facts would be even more striking if they included the value of volunteer labor. See Menchik and Weisbrod (1986).

³See Abrams and Schmitz (1978, 1984), and Schiff (1986), for example. All of these studies were based on aggregate data.

⁴Non-Nash variants of the Samuelsonian model have been considered by Cornes and Sandler (1984) and by Sugden (1985).

⁵Although the discussion here is in terms of charity, the analysis applies equally well to other privately provided public goods like public radio and television, political parties and lobbying groups, the American Cancer Society, and trade associations.

⁶It is assumed that f is differentiable, and $0 < f' \leq a < 1$. This assumption is innocuous. It simply assures that both the public good and the private good are normal. Under these conditions, a unique Nash equilibrium can be shown to exist (Andreoni 1986, 1987).

⁷For formal proofs of this proposition see Warr (1982) and Bergstrom, Blume and Varian (1986), and Andreoni (1986).

⁸This is shown explicitly by Bergstrom, Blume and Varian (1986).

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