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Optimal tax treatment of private contributions for public goods with and without warm glow preferences

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Abstract

Tax-favored contributions for financing some public goods may be a useful part of optimal nonlinear income tax and expenditure policy. There are two sides to the potential gain from subsidized donations. First, for a given level of public good provision, higher private donations from high earners than low earners eases the incentive compatibility constraint for donors and so can raise social welfare. This follows since considering a lower-paid job includes a perception of a drop in public good provision. Second, private donation reduces consumption, easing the resource constraint. This paper explores optimal policy, using first a model with standard preferences and then a model with a warm glow of giving. In addition to showing the conditions for the level of public goods, the paper considers the pattern of optimal subsidization across earnings levels. Analysis of optimal taxation with warm glow preferences is sensitive to the choice of preferences that are relevant for a social welfare evaluation. After considering optimal rules with formulations of social welfare which do and do not include warm glow utility, the paper considers the choice of normative criterion. Like the earlier literature, this paper assumes that organizing private donations is costless while tax collection has a deadweight burden. Since private charitable fundraising is very far from costless, the paper is an exploration of economic mechanisms, not a direct guide to policy.

Keywords: Optimal income tax; Charitable contributions; Warm glow

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The US relies on tax-favored contributions for financing some public goods[1] as well as having direct government expenditures. There are a number of reasons why such reliance may be useful. From a political perspective, this approach shifts some decision making from the legislative process to the decisions of individual donors (and the managers of charitable organizations). This includes religious organizations for which direct expenditures are constitutionally banned. From an economic perspective, this approach can be a useful part of optimal tax and expenditure policy. This paper explores the latter issue, using first a model with standard preferences and then a model with a warm glow of giving (Andreoni, 1989, 1990). While standard preferences are very distant from empirical reality, it seems useful to examine the economic mechanisms in this setting before examining a more realistic model with warm glow preferences.

The focus is on the interaction between an optimal nonlinear income tax and subsidized donations to finance public goods. The model uses an additive preference structure so that the incentive compatibility constraint is not affected by the level of a publicly provided public good implying that optimal public provision in the absence of donations satisfies the Samuelson rule. The optimality of the Samuelson rule does not generally carry over to optimal provision with subsidized donations, although deviations are plausibly small. The paper also considers the pattern of optimal subsidization across earnings levels. While relevant for analysis of tax deductibility of charitable donations, the analysis does not get that far.

Analysis of optimal taxation with warm glow preferences is sensitive to the choice of preferences that are relevant for a social welfare evaluation. After considering optimal rules with formulations of social welfare which do and do not include warm glow utility, the paper considers the choice of normative criterion.

Conditions for the optimal level of publicly provided public goods have been studied with different types of taxation available (Atkinson and Stern, 1974; Boadway and Keen, 1993; Kaplow, 1996). Equilibrium with privately provided public goods has been studied by Warr (1982) and by Bergstrom et al. (1986). The impact on equilibrium of subsidies for private contributions for public goods has been analyzed by Boadway et al. (1989) in a setting with lump-sum taxes. Analyses of tax expenditures for private contributions for public goods have been done by Feldstein (1980) and Roberts (1987). Closest to this analysis are those of Atkinson (1976) and Saez (2004), which analyze the optimal tax treatment of voluntary donations in the cases of parametric progressive and linear income taxes. This paper focuses on private contributions with optimal nonlinear income taxation.

There are two sides to the potential gain from subsidized donations. First, for a given level of public good provision, higher private donations by high earners than low earners eases the incentive compatibility constraint for donors and so can raise social welfare. This follows since considering a lower-paid job includes a perception of a drop in public good provision. Second, private donation reduces consumption, easing the resource constraint. While this observation is readily shown in the two-types model used by

[1] This includes covering fixed costs for private goods with low marginal costs.

Boadway and Keen to analyze public provision of public goods, the analysis in the text uses instead a more tractable model of income taxation where the hours of work are fixed for any job rather than being a choice variable for workers (Diamond, 1980; Saez, 2002).

Briefly considered is a setting with multiple public goods that must receive uniform subsidization. Like the earlier literature, this paper assumes that organizing private donations is costless while tax collection has a deadweight burden. Since private charitable fundraising is very far from costless, the paper is an exploration of economic mechanisms, not a direct guide to policy.

1. Standard preferences

1.1. Optimal public provision

To begin, we consider a variant of optimal income tax model in Diamond (1980) to which we add a single public good (as in Boadway and Keen, 1993). In this model, labor hours at a given job are not adjustable, implying that a job involves a nonvarying level of disutility, different for workers with different skills. To focus on the primary issue of the contrast between public and private provision, we assume that individual preferences are additive in the utility from the public good. A worker of type n can only work at a job that has productivity n or lower. Disutility from work at a job with productivity m for a worker of type n ($m \leq n$) is additive and denoted a_{mn}.[2] If a type-n worker is holding down a type-m job, then utility is $u[c_m] - a_{mn} + v[G]$, where c_m is the consumption from after-tax earnings, G is the level of public good, with u and v both increasing, concave and twice differentiable. We also assume the Inada condition for u. If not working, we simply set labor disutility equal to zero and assume the same utility functions of public and private good consumption. There may be a type-0 worker who has no productivity and does not work.

We assume that lower skilled jobs are less difficult: for $m_1 < m_2 \leq n$ we have $a_{m_1 n} \leq a_{m_2 n}$. We assume that lower skilled workers find any job more difficult: for $m \leq n_1 < n_2$ we have $a_{mn_1} \geq a_{mn_2}$. We make these convenient assumptions even though neither is plausible once we consider the varying nature of different jobs, with workers having different relative productivities in different jobs. Determining equilibrium would then require solving for an equilibrium with a more complex description of the next-best alternative. The same issue would arise in the Mirrlees model with multiple types of skills of differing values in different jobs. We assume that the optimum allocates each type of worker to its own skill-level job (except in one section below). I conjecture that sufficient conditions for the optimum to have this character are that the difference in disutilities decline with skill—that

[2] In the Mirrlees model, a worker can provide any number of hours of labor at a fixed wage per hour, with the wage depending on skill. In practice, the opportunities in the labor market have a more complex structure. In the model in Diamond (1980) each individual has two opportunities—a particular job or no work at all. Here we effectively assume that each person has two job opportunities, just as Mirrlees assumes the next best alternative is to provide the effective labor of a slightly lower-skilled worker.

is, the higher the skill the less the increase in disutility for any step up in job productivity,[3] that there are similar relative numbers of different workers, and that the economy be poor enough to need this much work. Thus, if a worker chooses some skill level, no more highly skilled worker would choose a lower skill job. But this disutility condition alone does not rule out having no workers at some jobs and several types at others. With private donations, the analysis is potentially more complicated.

Restricting analysis to allocations where each type of workers is at the matching skill, social welfare maximization is:

$$\text{Maximize}_{c,G} \qquad \sum N_n(u[c_n] - a_{nn} + v[G])$$

subject to:

$$E + pG + \sum N_n(c_n - n) \leq 0$$

$$u[c_n] - a_{nn} + v[G] \geq u[c_m] - a_{mn} + v[G] \text{ for } m < n \text{ for all } n \tag{1}$$

where N_n is the number of workers with skill n, E is other government expenditures and p is the cost per unit of the public good.[4] Forming a Lagrangian, we have

$$L = \sum N_n(u[c_n] - a_{nn} + v[G]) - \lambda\left(E + pG + \sum N_n(c_n - n)\right) + \sum\sum \mu_{nm}(u[c_n] - a_{nn} + v[G] - (u[c_m] - a_{mn} + v[G])) \tag{2}$$

Assuming that the next best alternative for any worker is the next job down in productivity, with no other incentive compatibility constraints binding, the Lagrangian becomes

$$L = \sum N_n(u[c_n] - a_{nn} + v[G]) - \lambda\left(E + pG + \sum N_n(c_n - n)\right) + \sum \mu_{nn-1}(u[c_n] - a_{nn} + v[G] - (u[c_{n-1}] - a_{n-1n} + v[G])) \tag{3}$$

Given the additivity of utility in the public good, the FOC for public good provision is

$$\sum N_n v'[G] = \lambda p \tag{4}$$

With the next best alternative for any worker being the next job down in productivity, the consumption of each type appears in two incentive compatibility constraints, except for the highest and lowest types. Thus, the FOC for consumption levels for all but these two types are

$$N_n(u'[c_n] - \lambda) = \left(\mu_{n+1n} - \mu_{nn-1}\right)u'[c_n] \tag{5}$$

[3] For $n' < n$, $m' < m$: $a_{mn'} - a_{m'n'} > a_{mn} - a_{m'n}$.

[4] As usual with optimal tax models, individuals are assumed to view their options as given, with the implicit assumption that there is no response of the government to a deviation from the anticipated individual response. This is not equivalent to a game where individuals would perceive that the government must respond to any behavioral change that alters the government budget constraint.

with the same expression holding for the highest and lowest types without a Lagrangian for the nonexistent incentive compatibility constraint. Each of the incentive compatibility constraints is binding, implying rising consumption with skill (so that workers are willing to take the highest skill job for which they are able). That is, with public good utility dropping out of the incentive compatibility constraint, consumption rises with skill to offset the increase in labor disutility from a more difficult job:

$$u[c_n] - u[c_{n-1}] = a_{nn} - a_{n-1n} \tag{6}$$

In this setting, the pattern of marginal taxes can be very different from that in the Mirrlees model (Diamond, 1980; Saez, 2002).[5]

As shown by Boadway and Keen and Kaplow using the Mirrlees model, with this additive structure of benefits we obtain the Samuelson rule. The same holds here.

1.2. Increasing social welfare by subsidized private provision

In the equilibrium occurring with optimal taxation and public provision, no worker would make a voluntary contribution to the public good. Since, by assumption, everyone has a nonnegative marginal utility from increases in public good provision, the Samuelson rule for public good provision ensures that no single individual would have a marginal rate of substitution large enough to warrant a voluntary contribution.[6] We begin by showing that social welfare can be improved from this allocation by inducing individuals with the highest productivity to make subsidized contributions. The gain from private donations has two sides. One side looks at the social cost of the resources given up to finance the public good. A contribution to financing the public good by the highest type reduces their consumption rather than government resources (without violating the incentive compatibility constraint), which is a gain for social welfare. The second side looks directly at incentive compatibility. With private contributions, a highest type worker considering switching to a lower paid job would then perceive a drop in public good provision. Thus, compared with completely public provision, there is a weakening in the incentive compatibility constraint. This can be used to tax the highest workers more heavily (net of contributions), freeing up valuable resources. Since no other workers can earn this much, this opportunity for the highest earners does not change the equilibrium for other workers. With preferences the same (apart from labor disutility) across skill levels, if those with the highest income are just willing to contribute a little to the public good, those with lower incomes are not willing to contribute, so we do not need the restriction that only the highest earners have access to subsidized donations for this argument. The two sides of this effect are shown in two separate proofs of this welfare gain.

[5] The structure of allowable government controls in this maximization is meant to shed light on how actual policies might be carried out. As pointed out by an anonymous referee, as a corollary of Cremer and McLean (1988), with a finite and known number of each type, it is possible to achieved the first best by threatening zero consumption to everyone if the self-reporting of types does not match the known distribution. The irrelevance for policy modeling of a noncredible government threat should be obvious to everyone.

[6] We assume throughout the section without warm glow preferences that in the absence of subsidization there are no private donations, even though the Samuelson rule may not hold.

We begin by considering the level of private donations. For later use we use general notation, although in this subsection we restrict the subsidy to the highest earners. Denote by s_n the fraction of the public good contribution by a worker holding a job of skill n that is financed by the government. We denote earnings net of tax by x_n and the addition to the public good financed by the donation by g_n, so that we have

$$c_n = x_n - (1 - s_n)pg_n \tag{7}$$

Given the opportunity to contribute, a worker of type n choosing a job of type n makes the donation decision to maximize utility which can be written:

$$u[x_n - (1 - s_n)pg_n] - a_{nn} + v[G_{\sim n} + g_n] \tag{8}$$

where we have introduced the notation $G_{\sim n}$ equal to the aggregate level of public good financed by contributions by other workers and the government as perceived by a worker of type n (including the donations by others of the same type). In equilibrium, own contribution plus perceived contributions of others will sum to the level of supply, G.

The contributions for workers who make positive contributions satisfy

$$(1 - s_n)pu'[c_n] = (1 - s_n)pu'[x_n - (1 - s_n)pg_n] = v'[G_{\sim n} + g_n] = v'[G]. \tag{9}$$

We turn now to an argument that the social welfare optimum with only public provision can be improved. This argument uses the assumption that all workers of the highest type have the same preferences, thereby making the gain from weakening the incentive compatibility constraint straightforward. Below we consider a more complex argument for the same result that extends to diverse public good preferences among workers of the highest type. Starting with the equilibrium with the optimal taxes and government provided public good supply in Section 1.1 above, denoted by adding an * to variables, consider raising the after-tax income of the highest type enough to finance all of the public good, given the subsidy rate needed for them to be willing to contribute to provide the same level of public good as at the optimum. This combination of transfer and donation subsidy leaves the real allocation totally unchanged but, as we will see, weakens the incentive compatibility constraint, thereby allowing a welfare improvement by increasing the taxation (lowering the consumption) of the highest type. Denote the skill level of the highest workers by n^{H}. In order to induce them to donate enough to provide the same level of public good while having the same consumption level, we must use a subsidy level that satisfies the individual first order condition:

$$(1 - s_{n^{\mathrm{H}}})pu'\left[c^*_{n^{\mathrm{H}}}\right] = v'[G^*] \tag{10}$$

Net of tax income must be sufficient to finance both consumption and donation:

$$x_{n^{\mathrm{H}}} = c^*_{n^{\mathrm{H}}} + (1 - s_{n^{\mathrm{H}}})g_{n^{\mathrm{H}}} = c^*_{n^{\mathrm{H}}} + (1 - s_{n^{\mathrm{H}}})G^*/N_{n^{\mathrm{H}}}. \tag{11}$$

To see that we have weakened the incentive compatibility constraint without altering the allocation of resources (and so have the potential to further raise welfare by increasing the taxation of high earners and decreasing the taxation of all lower earners) we can compare the incentive compatibility constraints with public and private provision. Note that by choosing x and s the government can select c and g. This is the place where we use

the uniformity of preferences among the highest type workers. The incentive compatibility constraint with government provision

$$u[c^*_{n^H}] - a_{n^H n^H} + v[G^*] \geq u[c^*_m] - a_{mn^H} + v[G^*] \text{ for } m < n^H \tag{12}$$

changes to the following with subsidized private provision

$$u[c^*_{n^H}] - a_{n^H n^H} + v[G^*] \geq u[c^*_m] - a_{mn^H} + v[G^* - g_{n^H}] \text{ for } m < n^H \tag{13}$$

Thus the perceived drop in public good supply if switching jobs weakens the incentive compatibility constraint, allowing an increase in social welfare as long as this constraint is binding. The same argument can be seen from a dual perspective. With public provision, a worker can contribute to the public good, but faces a price p when doing so. With a subsidy, the price falls to $(1-s_{n^H})p$, thereby raising utility if there is a positive donation. Switching to a lower job decreases income and therefore decreases the utility gain from the decline in the price of the public good since less (zero) will be donated at this price. Having different subsidies for different earnings levels permits the government to exploit this opportunity, although such differentiation in pricing is not needed for the argument used here.

The other side of the role of private donations can be seen in the following argument supporting the same conclusion that subsidized donations by the highest type can raise social welfare. This argument is more complex, but has the virtue of carrying over to settings where the public good preferences of the highest type might vary. As noted above, at the optimum with public provision that satisfies the Samuelson condition, no worker would make an unsubsidized donation to add to the public good. Consider the maximal subsidy for the highest type that results in no contribution, denoted S_{n^H}. Consider the impact on the Lagrangian expression from a small increase in this subsidy level without changing compensation levels. This adds to public good provision by the amount financed by donations (which reflects the response to both the subsidy increase and the donations of others). The impact on aggregated utility is the utility gain from the increase in the public good less the utility loss of the highest type from the consumption they give up for the unsubsidized share of the public good increase. This impacts the resource constraint only by the subsidized share of the cost of the increase in public good provision. In addition there is a weakening of the incentive compatibility constraint as above.

To see this formally, we rewrite the Lagrangian expression in Section 1.1 to incorporate donations and evaluate the impact of subsidization at the point of zero donations and compensation and public good provision at the optimum above. We assume that the binding incentive compatibility constraints are that each worker considers the next lower skill job. We simplify the notation by writing μ_{nn-1} as μ_n. The Lagrangian expression in Eq. (2) above is now

$$\begin{aligned} L = & \sum N_n(u[x_n - (1-s_n)pg_n] - a_{nn} + v[G]) \\ & - \lambda\Big(E + pG + \sum N_n(x_n - (1-s_n)pg_n - n)\Big) \\ & + \sum \mu_n(u[x_n - (1-s_n)pg_n] - a_{nn} + v[G] - (u[x_{n-1} - (1-s_{n-1})pg_{n-1}] \\ & - a_{n-1n} + v[G - g_n + g_{n-1}])) \end{aligned} \tag{14}$$

A small increase in the subsidy level for the highest type, n^{H}, will induce small changes in their consumption, the public good level, and government resources, while leaving the consumption of others unchanged. If the public good level changes by $\frac{dG}{ds_{n^{\mathrm{H}}}}$, then the consumption of each high type changes by $(1-s_{n^{\mathrm{H}}})p\frac{dG}{ds_{n^{\mathrm{H}}}}/N_{n^{\mathrm{H}}}$, while the contribution financed by their donation changes by $\frac{dG}{ds_{n^{\mathrm{H}}}}/N_{n^{\mathrm{H}}}$, and the cost to the government budget is $s_{n^{\mathrm{H}}}p\frac{dG}{ds_{n^{\mathrm{H}}}}$. Examining the impact on the Lagrangian, we have

$$\frac{\partial L}{\partial s_{n^{\mathrm{H}}}} = \sum N_n v'[G]\frac{dG}{ds_{n^{\mathrm{H}}}} - (1-s_{n^{\mathrm{H}}})pu'(c_{n^{\mathrm{H}}})\frac{dG}{ds_{n^{\mathrm{H}}}} - \lambda s_{n^{\mathrm{H}}}p\frac{dG}{ds_{n^{\mathrm{H}}}} + \mu_{n^{\mathrm{H}}}\left(-(1-s_{n^{\mathrm{H}}})pu'(c_{n^{\mathrm{H}}})\left(\frac{1}{N_{n^{\mathrm{H}}}}\right)+v'[G]-v'[G]\left(1-\frac{1}{N_{n^{\mathrm{H}}}}\right)\right)\frac{dG}{ds_{n^{\mathrm{H}}}} \tag{15}$$

Simplifying and using the FOC for the consumption of the highest type, Eq. (9), and for public good provision, Eq. (3), we can write this as

$$\frac{\partial L}{\partial s_{n^{\mathrm{H}}}} = \left(\lambda p-(1-s_{n^{\mathrm{H}}})p\left(\lambda-\frac{\mu_{n^{\mathrm{H}}}}{N_{n^{\mathrm{H}}}}u'(c_{n^{\mathrm{H}}})\right)-\lambda s_{n^{\mathrm{H}}}p\right)\frac{dG}{ds_n^{\mathrm{H}}} + \mu_{n^{\mathrm{H}}}\left(-(1-s_{n^{\mathrm{H}}})pu'(c_{n^{\mathrm{H}}})\left(\frac{1}{N_{n^{\mathrm{H}}}}\right)+v'[G]\left(\frac{1}{N_{n^{\mathrm{H}}}}\right)\right)\frac{dG}{ds_{n^{\mathrm{H}}}} = \frac{\mu_{n^{\mathrm{H}}}}{N_{n^{\mathrm{H}}}}v'[G]\frac{dG}{ds_{n^{\mathrm{H}}}} > 0 \tag{16}$$

The positivity of this impact follows from the gain the highest type perceive from their own contributions to the public good. Since they are the highest type, no one else has sufficient ability to fill a job paying this much and so no other type has its incentive compatibility constraint weakened by the subsidization of donations by the highest type. From the social welfare FOC for consumption of the highest type, Eq. (4), and the individual FOC for donations, Eq. (9), this can be expressed in terms of the difference between the low marginal utility of their consumption as a consequence of their being the best paid workers in the economy and the Lagrangian on resources:

$$\frac{\partial L}{\partial s_{n^{\mathrm{H}}}} = \frac{\mu_{n^{\mathrm{H}}}}{N_{n^{\mathrm{H}}}}(1-s_{n^{\mathrm{H}}})pu'(c_{n^{\mathrm{H}}})\frac{dG}{ds_{n^{\mathrm{H}}}} = -(1-s_{n^{\mathrm{H}}})p(u'[c_{n^{\mathrm{H}}}]-\lambda)\frac{dG}{ds_{n^{\mathrm{H}}}} > 0 \tag{17}$$

That is, the gain can be written in terms of the amount of donations and the difference in value of donations in the hands of the donators as opposed to the hands of the government. Writing the expression in this form makes it clear that the argument does not need an assumption that all of the highest types value the public good the same. For example, in a model where some of each type do not value the public good at all the argument still carries over.

This argument rests heavily on the assumption that there is no cost of fund-raising. As stated in the introduction, this is an exploration of economic mechanisms, not a discussion that is directly policy relevant.

1.3. Optimal subsidized private provision with two types of workers

Next let us consider optimizing the allocation with the possibility of subsidizing the contributions of workers with different earnings at different rates. Since the choice of subsidy rate is equivalent to the choice of contribution level, we can let the contributions be the controls. Let us assume there are only two types. As we will see the optimum will have only the higher type contributing (or an equivalent allocation).

To set this up formally, we have

$$\text{Maximize}_{c,G,g} \qquad \sum N_n(u[c_n] - a_{nn} + v[G])$$

subject to:

$$E + pG + \sum N_n(c_n - n) \leq 0$$

$$u[c_2] - a_{22} + v[G] \geq u[c_1] - a_{12} + v[G - g_2 + g_1]$$

$$G \geq \sum N_n g_n; \qquad g_n \geq 0 \quad \text{for all } n \tag{18}$$

The optimum will have one of two forms—either both have the same consumption and (generically) the incentive compatibility constraint is not binding, or the optimum will have the incentive compatibility constraint binding. Both seem theoretically possible even when the constraint is binding with public provision.

Since individual donations enter only the incentive compatibility constraint, if that constraint is binding, the optimum will have only the higher type contributing $g_2>0$, $g_1=0$. In this case, the consumption allocation is similar to that in Section 1.1 above, with $c_2>c_1$, although c_2 is lower relative to c_1 in the incentive compatibility constraint and the Samuelson rule may no longer hold. If the incentive compatibility constraint is not binding, then both skill types have the same consumption—higher skill workers are paid enough more to make their contributions to the public good. They are willing to undertake a more arduous job because of the increase in the public good that they perceive from the higher contribution they make when holding a higher paying job. That is, if the workers care enough about the public good it is not necessary to give higher consumption in order to induce employment at a more difficult job.

In both cases, we have an optimum with $g_1=0$ and $g_2=G/N_2$. If the incentive compatibility constraint does not bind, other allocations of public good contributions are also optimal as long as the incentive compatibility constraint continues not to bind. In the allocation with $g_1=0$, allowing type 1 to contribute with the same subsidy rate as type 2 does not change the equilibrium since type 1 will not contribute (same v', equal or higher u' at $g_1=0$). Note that the allocation could have the property that the highest type receives a net-of-tax, gross-of-contribution income which exceeds their productivity.

Note that the subsidy rate for type 1 can exceed the subsidy rate for type 2 and still support the optimum. Using the maximal subsidy for type 1 that still leaves a zero contribution, we have:

$$(1 - s_1)pu'[c_1] = v'[G] \tag{19}$$

$$(1 - s_2)pu'[c_2] = v'[G] \tag{20}$$

We have $s_1 \geq s_2$ since $c_1 \leq c_2$ with strict inequality if the incentive compatibility constraint is binding.

In the case that the incentive compatibility constraint continues to bind, the constraint becomes

$$u[c_2] - a_{22} + v[G] = u[c_1] - a_{12} + v[G - G/N_2] \tag{21}$$

Contrasting this with a binding incentive compatibility constraint without donations, we note that in the presence of donations c_2 is lower relative to c_1 because of the term $v[G - G/N_2]$ rather than $v[G]$ on the right hand side.

The FOC for the public good satisfies:

$$\sum N_n v'[G] = \lambda p - \mu(v'[G] - v'[G(1 - 1/N_2)](1 - 1/N_2)) \tag{22}$$

This may or may not satisfy the Samuelson rule and can deviate in either direction depending on the shape of the public good utility function, that is the sign of $(v'[G] - v'[G(1 - 1/N_2)](1 - 1/N_2))$. In a large economy ($N_2$ large), if all the donors are making contributions which are a small part of total contributions, then it is plausible that v'' is small enough that $v'[G]$ and $v'[G(1 - 1/N_2)]$ are very close to each other, implying that the Samuelson rule is approximately valid.

With more than two types there are different types of equilibria along the same lines, with the possibility of some incentive compatibility constraints binding and others not binding.

In this setting it does not matter whether the government has the ability to directly contribute to the public good or not, but this would not extend to multiple public goods with uniform subsidization. If public good preferences vary across skills, we might now have lower skill workers contributing to different public goods than higher skill workers.

1.4. Extensions

1.4.1. Optimal uniform subsidized private provision

We turn now to a setting with uniform subsidization, sufficient to induce some private contributions. Since we have assumed that everyone has the same preferences (apart from the disutility of work, which is additive) and that everyone faces the same subsidy rate, the population falls into two categories—those who contribute, all of whom have the same level of private good consumption, and those who do not contribute, and have lower private good consumption. That is, among all those contributing, we have

$$(1 - s)pu'[x_n - (1 - s)pg_n] = v'[G] \tag{23}$$

For those not contributing, we have

$$(1-s)pu'[x_n]>v'[G] \tag{24}$$

What drives the pattern of contributions is the pattern of compensation. Since higher jobs must pay more if they are to be held, it follows that there is a critical value of skill such that everyone with higher skill contributes and has the same consumption and everyone with lower skill does not contribute. The incentive compatibility constraint (compared with the next lowest skill) for a contributor would be

$$u[x_n-(1-s)pg_n]-a_{nn}+v[G]\geq u[x_{n-1}-(1-s)pg_{n-1}]-a_{n-1n}+v[G-g_n+g_{n-1}] \tag{25}$$

When the next lower skill is also contributing, since contributions continue until marginal utilities, and so private consumption levels, are equalized, we can write this as

$$-a_{nn}+v[G]\geq -a_{n-1n}+v[G-g_n+g_{n-1}] \tag{26}$$

Thus, where the incentive compatibility constraint is binding and donations are positive, we have a difference equation for contributions in equilibrium.

With everyone having the same utility of public and private consumption, we have a very peculiar equilibrium. Ranking people by after-tax income, we find that those with low incomes up to some level make no contributions to the public good. Above this level, contributions are so large that everyone has the same marginal utility of private consumption, and so the same level of private consumption.

1.4.2. Diverse preferences with two types of workers

It is straightforward to drop the assumption that all workers of a given skill have the same preferences and assume that a fraction f_n of workers of type n have no utility from the public good. The second argument above that subsidized donations by the highest skill type can improve welfare above the optimum with only public provision carries over to this case. Since those with and without public good concern receive the same pay gross of donations, there is a further constraint on the ability of the government to control both consumption and donations. The incentive compatibility constraints will differ for the workers with different preferences. A type-2 worker who does not value the public good will choose a type-2 job based on own consumption and labor disutility. Given the implied structure of incentive compatibility constraints, in looking for an optimum there are two structures, both of which seem to be possible optima for different fractions of the highest skill types with the different preferences. In one possible optimum all workers of the highest skill work at the highest job, implying that the incentive compatibility constraint on the workers who donate does not bind (since it is strictly implied by the incentive compatibility constraint of nondonators). In the other possible optimum the workers of the highest skill who do not value the public good choose a lower-skilled job and the incentive constraint is binding on the remaining highest skill workers at the highest job. Presumably the allocation that is

better depends on the relative size of the highest types who do and do not value the public good.[7]

1.4.3. Two public goods

In the setting where all workers of a given skill have the same utility functions, we examine some complications arising from multiple public goods. We begin by considering the level of private donations. Given the opportunity to contribute, a worker of type n choosing a job of type n makes the donation decision to maximize utility which can be written:

$$u\left[x_n - \sum (1 - s_n) p g_{kn}\right] - a_{nn} + \sum b_{kn} v_k [G_{\sim kn} + g_{kn}] \tag{27}$$

where we have added a subscript k to distinguish public goods and a multiplier b_{kn} to remind the reader that preferences over different public goods can co-vary with skill level. We denote by s_n the fraction of the public good contribution financed by the government, which is assumed to be the same for all public goods. When different types of workers have different relative valuations of the different public goods, workers of the highest type will only contribute to one public good since they will not generally have the same marginal utility of the different public goods. (This is one of the arguments for the empirical irrelevance of this model of donations.) Thus there may be a role for public contributions when preferences vary by good across skills since subsidized donations by lower-skilled workers weaken the incentive compatibility constraints for higher skilled workers.

1.4.4. No government contribution

The model has a slightly different character if the government lacks the ability to directly contribute to a public good. At the equilibrium level of private supply without subsidy (which might be zero), some subsidy will be worthwhile, with a corresponding adjustment of net-of-tax earnings. The only change in the formal statement of the maximization problem is to have an equality, rather than an inequality, in the definition of G, thereby ruling out public contributions. When the model has multiple public goods and diverse public good preferences across skill levels, then there is an argument for subsidization of donations by lower-skilled workers, which may overcome the impact on the incentive compatibility constraint in some cases. With a restriction to uniform subsidization across goods, the model would more closely resemble US tax policy.

2. Warm glow preferences

The failure of standard preferences to make sense of the pattern of donations has been widely noted (e.g., Andreoni, 1988; Margolis, 1982; Morgan et al., 1977; Ribar and

[7] Another approach to the trade-off between those who do and do not value the public good could be modeled by having a distribution of disutilities for each skill type (as in Diamond, 1980). Then there would be a marginal worker at each type with different margins for those with and without donations and so there would be some effect on labor supply from private contributions.

Wilhelm, 2002; Sugden, 1984). In particular, many people spread their donations widely across charitable organizations even though their contributions are small relative to organizational budgets. Standard theory would direct all donations to the charity with the highest marginal utility of public good consumption until that had been reduced to equal the next highest. With small donations, such a move is unlikely to happen. To explain this pattern, a natural assumption is that of warm glow preferences (Andreoni, 1990).[8] A realistic model of donations would pay close attention to the context of requests for donations as well as awareness of perceived social needs. This paper does not explore such modeling. Instead, we take the simple formulation of Andreoni and explore the implications of such a structure for optimal tax policy.

With warm glow preferences, behavior is modeled as if it maximized utility that depends not just on the final allocation of resources but also on the process that results in that allocation. That is, we add to preferences as above a concave utility of one's own donation, denoted $w[g]$, but no similar per se utility gain from the donations of others or public contributions.[9] In a context of multiple public goods and public subsidies, there are a variety of ways in which such preferences could be modeled, which we do not explore.[10] Thus the public good component of utility is $v[G]+w[g_n]$. This additive structure is simple but not fully plausible. Presumably the warm glow utility also depends on the aggregate level of public good provision. We write the preferences so that behavior is described by maximization of utility written as $u[c_n]-a_{nn}+v[G]+w[g_n]$ Given this structure of preferences, the FOC for individual donations for workers who make positive contributions satisfies

$$\begin{aligned}(1-s_n)pu'[c_n] = (1-s_n)pu'[x_n-(1-s_n)pg_n] &= v'[G_{\sim n}+g_n]+w'[g_n]\\ &= v'[G]+w'[g_n] \end{aligned} \tag{28}$$

That behavior is describable in this way does not necessarily imply that social welfare should be defined in the same way. That is, assume, as above, that the government switches from public provision to private provision, with the level of public good unchanged. Should the warm glows from private provision be part of a gain in social welfare from undertaking this change in financing? Perhaps there is resentment at the need to provide privately what is seen as a government obligation. Perhaps the "warm glow" comes from decreasing the disutility coming from pressure to donate, suggesting that the utility level from warm glow is negative, although with a positive derivative. This would matter in an equilibrium model where the degree of charitable solicitation depended on government policies as to public provision and subsidization of private donations. Below we will discuss the normative issues in this choice. First, we consider optimization with and without incorporation of warm glow in social welfare. For this purpose, we set up the

[8] For some purposes, it would be important to model the underlying psychological bases for warm glow giving. For the questions analyzed here, it seems adequate to use this reduced form model.

[9] Contradicting the latter two assumptions are the efforts of some to get others to donate or to lobby for more public provision. Thus the warm glow seems to come from activities to change public good provision, beyond just one's own donations.

[10] The pattern of giving across charities is complex. Donations to some charities are close warm glow substitutes for donations to similar charities, particularly when the donations are close in time.

optimization with a parameter, θ, that can be set to zero or one, without exploring intermediate values for θ.

2.1. Social welfare optimization

Compared to the problem in Section 1, the objective function may or may not be the same, the resource constraint is unchanged, and the incentive compatibility constraints are changed by the presence of warm glow. Moreover, assuming that contributions can be subsidized but not taxed, there is an inequality constraint that they be at least as large as the endogenous level without any subsidy (rather than simply being constrained to be nonnegative).

The donation level with a zero subsidy (the minimum donation level) satisfies the individual FOC relating the marginal utility of private consumption to the marginal utility of consumption of the public good and the marginal warm glow. This implicit equation for the minimum donation can be expressed in terms of several different variables.

$$pu'[c_n] = pu'[x_n - pg_n] = v'[G_{\sim n} + g_n] + w'[g_n] = v'[G] + w'[g_n] \tag{29}$$

Depending on what control variables are used in the social welfare maximization, one would select the implicit equation in those variables for the minimum donation constraint. For example, if social welfare maximization is expressed in terms of private consumption and total public goods supply, one would have the constraints $g_n \geq g[c_n, G]$, with the minimum donation function given by the first and last expressions in Eq. (29). Note that it is the same function for all with identical preferences, as we assume. Differentiating the implicit equation, we see that the minimum donation is increasing in private consumption and decreasing in total public good supply.

$$\frac{\partial g}{\partial c} = \frac{pu''}{w''} > 0, \quad \frac{\partial g}{\partial G} = \frac{-v''}{w''} < 0. \tag{30}$$

Subject to the minimum donation constraint, we write the social welfare maximization in terms of consumption, total public good supply and donations. Considering the two-types model with one public good, we can write a formulation allowing warm glow to enter ($\theta = 1$) and not enter ($\theta = 0$) social welfare.[11]

$$\text{Maximize}_{c,G} \qquad \sum N_n(u[c_n] - a_{nn} + v[G] + \theta w[g_n])$$

subject to:

$$E + pG + \sum N_n(c_n - n) \leq 0$$

$$u[c_2] - a_{22} + v[G] + w[g_2] \geq u[c_1] - a_{12} + v[G - g_2 + g_1] + w[g_1]$$

$$G \geq \sum N_n g_n; \qquad g_n \geq g[c_n, G] \text{ for all } n. \tag{31}$$

[11] The mathematical formulation of warm glow preferences would also apply to a particular structure of ordinary externalities. In that case, we would count the utility of own consumption, w. What distinguishes a warm glow, and so the question of design of the social welfare function, is the distinction that actual resource use is the same with public and private public good supply, but individual experience is different in these two cases.

As above, without a warm glow, the optimum has no public provision, $G=\sum N_n g_n$. Differentiating, and denoting the Lagrangian multiplier on the relation between the aggregate supply of public good and private donations by v and those on contribution requirements by ξ_i, we have lots of FOC:

$$\frac{\partial L}{\partial c_1} = N_1(u'[c_1]-\lambda) - \mu u'[c_1] - \xi_1 \frac{\partial g[c_1, G]}{\partial C} = 0 \tag{32}$$

$$\frac{\partial L}{\partial c_2} = N_2(u'[c_2]-\lambda) + \mu u'[c_2] - \xi_2 \frac{\partial g[c_2, G]}{\partial c} = 0 \tag{33}$$

$$\frac{\partial L}{\partial G} = \sum \left(N_n v'[G] - \xi_n \frac{\partial g[c_n, G]}{\partial G} \right) - \lambda p + \mu(v'[G] - v'[G-g_2+g_1]) + v = 0 \tag{34}$$

$$\frac{\partial L}{\partial g_1} = N_1 \theta w'[g_1] - \mu(v'[G-g_2+g_1] + w'[g_1]) - vN_1 + \xi_1 = 0 \tag{35}$$

$$\frac{\partial L}{\partial g_2} = N_2 \theta w'[g_2] + \mu(v'[G-g_2+g_1] + w'[g_2]) - vN_2 + \xi_2 = 0 \tag{36}$$

We consider the FOC separately for the values of θ of 0 and 1.

2.2. Warm glow preferences that do not enter social welfare

For warm glow preferences not entering the social welfare function, we set $\theta=0$. This is the setting closest to that in Section 1 above. Warm glow affects the incentive compatibility constraint. Also the condition that donations not be subsidized may not be sufficient for them to equal zero. In this case, the impact of private consumption and public good level on donations will affect the optimal allocation. To consider this case, note that increasing the donation of the high type while lowering the donation of the low type weakens the incentive compatibility constraint while having no other effects, until the lower limit on g_1 is hit. Similarly, donations by the high type dominate public provision. Thus we know that $g_1=g[c_1, G]$. Assuming that public good supply is less than optimal without any subsidization, we also have no binding minimum donation constraint for the high type, $\xi_2=0$. Thus we can write the FOC Eqs. (32) and (33) for the case $\theta=0$ as

$$\frac{\partial L}{\partial c_1} = N_1(u'[c_1]-\lambda) - \mu u'[c_1] - \xi_1 \frac{\partial g[c_1, G]}{\partial c} = 0 \tag{37}$$

$$\frac{\partial L}{\partial c_2} = N_2(u'[c_2]-\lambda) + \mu u'[c_2] = 0 \tag{38}$$

It is possible that the marginal warm glow utility at zero donations, $w'[0]$, is small enough that there can be positive subsidization and still no donation (as in Section 1).

Provided this is not the case, the subsidy for the high type will exceed the zero subsidy for the low type and the gain from limiting the donations of the lower type, $\xi_1 \frac{\partial_g[c_1,G]}{\partial c}$, enters the FOC. I have no simple statement of the effect of this term since this FOC interacts with the other FOC and the incentive compatibility constraint in determining the relative consumption levels of the different types.

Turning to the other FOC, with g_1 at its minimum, Eqs. (34) and (36) become

$$\frac{\partial L}{\partial G} = v'[G]\sum N_n - \xi_1 \frac{\partial g[c_1,G]}{\partial G} - \lambda p + \mu(v'[G] - v'[G-g_2+g_1]) + v = 0 \tag{39}$$

$$\frac{\partial L}{\partial g_2} = \mu(v'[G-g_2+g_1] + w'[g_2]) - vN_2 = 0. \tag{40}$$

It is plausible for all but very large donors that v'' is small enough that $v'[G]-v'[G-g_2+g_1]$ is very small. Then the FOC for public good supply is approximately

$$\frac{\partial L}{\partial G} \approx v'[G]\sum N_n - \xi_1 \frac{\partial g[c_1,G]}{\partial G} - \lambda p + v = 0 \tag{41}$$

Using Eq. (40), we can express the deviation from the FOC with public provision, Eq. (4), as

$$v'[G]\sum N_n - \lambda p \approx \xi_1 \frac{\partial g[c_1,G]}{\partial G} - v = \xi_1 \frac{\partial g[c_1,G]}{\partial G} - \frac{\mu}{N_2}(v'[G-g_2+g_1] + w'[g_2]) \tag{42}$$

Using again the assumption of a small v'', and so approximate constancy of v' and the FOC for individual donations, Eq. (28), we can write this as

$$v'[G]\sum N_n - \lambda p \approx \xi_1 \frac{\partial g[c_1,G]}{\partial G} - \frac{\mu}{N_2}(1-s_2)pu'[c_2] \tag{43}$$

From the FOC for consumption, Eq. (38), this can be written as

$$v'[G]\sum N_n - \lambda p \approx \xi_1 \frac{\partial g[c_1,G]}{\partial G} + (1-s_2)p(u'[c_2] - \lambda) \tag{44}$$

or

$$v'[G]\sum N_n \approx \xi_1 \frac{\partial g[c_1,G]}{\partial G} + s_2 p\lambda + (1-s_2)pu'[c_2] \tag{45}$$

In contrast with a setting of purely public provision, public good supply tends to be increased because it eases the incentive compatibility constraint by lowering the minimal donation of the lower type and because some of the cost comes from consumption of the higher paid rather than from the government budget constraint.

Note that if the two types of workers care about different public goods, it remains the case that type 2 should be induced to contribute all of the public good provision that type 2 likes, while type 1 should not contribute above the minimum, with the public good valued

by type 1 publicly provided. This follows from a uniformity of any subsidy at a given earnings level, independent of which public good is being supported.

2.3. Warm glow preferences that do enter social welfare

By having contributions enter the social welfare function as well as the incentive compatibility constraint, marginal private donations do not directly affect social welfare by the envelope theorem. In this case the FOC Eqs. (32)–(36) become

$$\frac{\partial L}{\partial c_1} = N_1(u'[c_1] - \lambda) - \mu u'[c_1] - \xi_1 \frac{\partial g[c_1, G]}{\partial c} = 0 \tag{46}$$

$$\frac{\partial L}{\partial c_2} = N_2(u'[c_2] - \lambda) + \mu u'[c_2] - \xi_2 \frac{\partial g[c_2, G]}{\partial c} = 0. \tag{47}$$

$$\frac{\partial L}{\partial G} = \sum \left(N_n v'[G] - \xi_n \frac{\partial g[c_n, G]}{\partial G} \right) - \lambda p + \mu(v'[G] - v'[G - g_2 + g_1]) + v = 0 \tag{48}$$

$$\frac{\partial L}{\partial g_1} = N_1 w'[g_1] - \mu(v'[G - g_2 + g_1] + w'[g_1]) - vN_1 + \xi_1 = 0 \tag{49}$$

$$\frac{\partial L}{\partial g_2} = N_2 w'[g_2] + \mu(v'[G - g_2 + g_1] + w'[g_2]) - vN_2 + \xi_2 = 0 \tag{50}$$

It no longer appears that the donations of the low type should never be subsidized. Substituting donations by the low type for those of the high type when only the latter is subsidized is a way of raising social welfare (since they differ in marginal warm glow) that does not change resource use and is attractive for that reason, although it weakens the incentive compatibility constraint and is unattractive for that reason. The dominance of donations of the high type over public provision remains true.

If donations of both types are subsidized (ξ_1, $\xi_2 = 0$), the private consumption FOC Eqs. (46) and (47) have the same form as with fully public provision.

$$\frac{\partial L}{\partial c_1} = N_1(u'[c_1] - \lambda) - \mu u'[c_1] = 0 \tag{51}$$

$$\frac{\partial L}{\partial c_2} = N_2(u'[c_2] - \lambda) + \mu u'[c_2] = 0 \tag{52}$$

The possibility that both types are subsidized allows an optimal consumption FOC without the term $\xi_1 \frac{\partial_g[c_1, G]}{\partial c}$ which is present in the case where warm glow does not enter the social

welfare function. Solving for marginal utilities while assuming that the incentive compatibility constraint is binding ($\mu>0$), we have

$$\frac{u'[c_1]}{u'[c_2]} = \frac{1+\mu/N_2}{1-\mu/N_1} > 1. \tag{53}$$

If donations of both types are subsidized (ξ_1, $\xi_2=0$), the FOC for donations, Eqs. (49) and (50) become:

$$\frac{\partial_L}{\partial g_1} = N_1 w'[g_1] - \mu(v'[G-g_2+g_1]+w'[g_1]) - vN_1 = 0 \tag{54}$$

$$\frac{\partial L}{\partial g_2} = N_2 w'[g_2] + \mu(v'[G-g_2+g_1]+w'[g_2]) - vN_2 = 0 \tag{55}$$

Solving for $w'[g_n]$ we have

$$\left(1-\frac{\mu}{N_1}\right)w'[g_1] = v + \frac{\mu}{N_1}v'[G-g_2+g_1] \tag{56}$$

$$\left(1+\frac{\mu}{N_2}\right)w'[g_2] = v - \frac{\mu}{N_2}v'[G-g_2+g_1] \tag{57}$$

Adding $v'[G]$ to both sides of Eq. (56), we can evaluate the total utility gain from a donation by the lower type

$$\begin{aligned} v'[G]+w'[g_1] &= v'[G] + \left(v+\frac{\mu}{N_1}(v'[G-g_2+g_1])\right)\Big/\left(1-\frac{\mu}{N_1}\right) \\ &= \left(v'[G]+v+\frac{\mu}{N_1}(v'[G-g_2+g_1]-v'[G])\right)\Big/\left(1-\frac{\mu}{N_1}\right) \end{aligned} \tag{58}$$

From the FOC for individual donations, Eqs. (28), (58) and (51), we can evaluate the subsidy level.

$$(1-s_1) = \frac{v'[G]+w'[g_1]}{pu'[c_1]} = \frac{v'[G]+v+\frac{\mu}{N_1}(v'[G-g_2+g_1]-v'[G])}{p\lambda} \tag{59}$$

Similarly, for the high type

$$(1-s_2) = \frac{v'[G]+w'[g_2]}{pu'[c_2]} = \frac{v'[G]+v-\frac{\mu}{N_2}(v'[G-g_2+g_1]-v'[G])}{p\lambda} \tag{60}$$

Taking the ratio

$$\frac{1-s_1}{1-s_2} = \frac{v'[G]+v+\frac{\mu}{N_1}(v'[G-g_2+g_1]-v'[G])}{v'[G]+v-\frac{\mu}{N_2}(v'[G-g_2+g_1]-v'[G])} > 1 \tag{61}$$

Thus the high type receives a higher subsidy. If, as is plausible, v'' is small relative to individual donations, then both types have approximately the same rate of subsidization.

If donations of both types are subsidized (ξ_1, ξ_2=0), and also assuming v'' is small relative to individual donations, the FOC for public good level Eq. (48) becomes approximately:

$$v'[G]\sum N_n - \lambda p + v \approx 0 \tag{62}$$

Consideration of the FOC for total supply parallels that in the case where warm glow does not enter social welfare, with the significant difference that the relevance of warm glow for social welfare reduces the apparent cost of the public good. Substituting from Eq. (50) and then Eq. (28) and then Eq. (52), we have.

$$\begin{aligned} v'[G]\sum N_n \approx \lambda p - v &= \lambda p - w'[g_2] - \frac{\mu}{N_2}(v'[G] + w'[g_2]) \\ &= \lambda p - w'[g_2] - \frac{\mu}{N_2}(1-s_2)pu'[c_2] \\ &= \lambda p - w'[g_2] + (1-s_2)p(u'[c_2] - \lambda) \\ &= s_2\lambda p + (1-s_2)pu'[c_2] - w'[g_2] \end{aligned} \tag{63}$$

If marginal warm glow utility, w', is much larger than marginal public good utility, v', then the last two terms approximately cancel and the FOC is as if the only cost of public goods were the marginal cost to the government of the marginal contribution by the high type. Similarly, the FOC can be expressed in terms of the marginal utilities of type 1.

$$v'[G]\sum N_n \approx s_1\lambda p + (1-s_1)pu'[c_1] - w'[g_1] \tag{64}$$

We have seen that whether the level of subsidy varies a little or a lot across types depends on whether warm glow is not or is part of social welfare. We have also seen that the FOCs for the level of public good differ in the two cases, with a role for the induced change in donations by the low type in the former case and the reduction in shadow cost as a consequence of marginal warm glow in the latter case.

3. Warm glow preferences and the formulation of social welfare

The fact that warm glows improve the description of individual behavior does not necessarily imply that social welfare should be defined including warm glows. That is, assume, as above, that the government switches from public provision to private provision, with the level of public good unchanged. Should the warm glows from private provision be part of a gain in social welfare from undertaking this project? I focus here on the argument as it applies to standard public goods, not donations to support redistribution.

One can argue this issue directly in terms of underlying assumptions about social welfare or in terms of the appeal of outcomes from different assumptions about the formulation of social welfare. The clear argument for inclusion is that these are the preferences that determine behavior and therefore they should be respected by the social evaluation. There are counterarguments based on practicality, psychology and philosophy.

The practicality argument is based on the possibility of misleading policy recommendations from incompleteness of the analysis of warm glows. That is, warm

glow is an evaluation based on the process of determining the final resource allocation, in addition to the evaluation that is based on the actual allocation of resources. With a general equilibrium model, one tracks all uses of resources. If one were only tracking some uses and ignoring others, then the welfare implications of a policy might be distorted by the pattern of inclusion and exclusion in the analysis. Thus, valid partial equilibrium analyses include a numeraire good reflecting the uses of resources that are not modeled in detail in the partial equilibrium setting. That people get pleasure from donating to finance public goods is shown by their pattern of donations. Similarly, people do volunteer work for charities to induce other people to donate. Thus there is a warm glow associated with the donations of others. But people also participate in the political process in a way that cannot be explained solely by economic self-interest. This includes some donations to political campaigns and, of course, extends to voting. If someone gets a warm glow from work on an election that results in an increase in some public good level, then such a warm glow seems to be on the same footing as that from a charitable donation. One can argue that the political warm glow is related to final good outcome, so an increase in subsidy rate would be as appealing as an increase in direct provision. But then, should the warm glow from giving also be related to final outcomes? If the government cuts back direct provision and increases subsidies, should the warm glow of someone who cares about the public good necessarily increase from this aspect of the process? Or does the warm glow come from the net effect? If the latter, substituting subsidized donations for direct provision would not raise welfare but it would be rated an improvement by inclusion just of the warm glow of donations. Let me note that a similar issue arises with loss aversion. Insofar as apparent (framed) gains and losses are the basis for evaluation, then incomplete tracking of the entire process of allocation would give measured welfare gains from substituting some processes for others, even if the final allocation of resources was unchanged.[12]

The basic point here is that just as we need to pay attention to all of resource uses, so too, if we want to count preferences based on process, we need to pay attention to all of the process, not just part of it. At present, paying attention to none of it may be a more valid measure even for those who think utility from process ought to be on the same welfare footing as utility from final resource use.

On the psychological side, it is clear that warm glow is very context dependent. That is, recognizing this source of welfare benefits would call for devoting resources to producing the context where warm glows would occur. But, being context dependent, the outcome becomes very sensitive to the framing. If it were recognized that the government was creating an environment where one donates, much of the warm glow might be removed. Even if the government action were not recognized, there is the issue of whether government should act on preferences as they are or as they would be if people were better informed. Just as the reaction to making a particular gift depends on whether the gift is viewed as an act of generosity or a result of having been taken advantage of, so too warm glows might be unreliable if the government is particularly involved in generating them. And the political process may contain incentives to change the awareness of voters. That is, it is unclear how preferences may be influenced by the process generating the opportunity/

[12] I am reminded of a Mad cartoon of a soldier on guard where each item—his uniform, gun, shelter, were labeled as to whose taxes had paid for that particular item.

need for donations. One cannot quite credit the possibility of someone being happy that the government underprovided a public good so that the opportunity to donate was present.

Recognizing the endogeneity of charitable solicitation raises another issue that matters whether or not warm glow is counted in social welfare. The focus on warm glow has been on the marginal warm glow gain from an increase in donation. But some of this marginal warm glow is thought to come from decreasing the negative feelings associated with social pressure to donate (Keating et al., 1981; Long, 1976; Morgan et al., 1977). In this setting, the role of government policy in determining the amount of social pressure becomes a very important issue. If donation lowers a utility loss from social pressure, public policy that lowers the pressure (for example by larger public provision and, perhaps, lower subsidies) may raise utility measured in this way. More generally, as noted below, the resource-using response of fundraising to public policy is particularly relevant.

The argument on the philosophical side (made by Hammond, 1978 about altruism, but similarly applicable here) is that the use of a social welfare function incorporates the social interest inherent in the public good enjoyment of others (presumably a key part of the reason for a warm glow) and inclusion of warm glow utility is then a form of double counting. That is, it is the role of a social welfare function as a guide to policy to reflect the concerns that people in a society have for others in that society.

In terms of outcomes, inclusion of warm glow preferences calls for using resources to give people warm glows. Somehow this does not seem like a good use of resources.[13]

I do not intend to argue that the process of resource allocation is irrelevant for social welfare analysis, although this can be put in a different vocabulary. Thus coin tosses for fairness in allocation of an indivisible good has been argued to raise social welfare (Diamond, 1967) and denial of the ability to donate can be viewed as a violation of a basic freedom, but choice of a subsidy rate based in part on warm glow utility seems to be in a different category.

4. Fundraising

In the models above, the government can leave room for private contributions in order to alter the effect of income taxation. As modeled here and in the previous literature cited above, the use of private donations does not have any resource cost (unlike the marginal deadweight burden from financing public contributions and the subsidies of private contributions). This is very inaccurate. Considerable sums are spent on fund-raising by organizations that provide public goods. Such an additional source of deadweight burdens should affect the analysis but is not explored here. A model exploring the issues raised in this paper that contained an endogenous level of resource use for fund raising as a function of both public provision and the level and pattern of donation subsidies would be interesting.[14] Going from analysis of models without fundraising costs to policy recommendations seems very premature.

[13] This discussion is on the preferences to use for social evaluations assuming they are measurable. A critical issue is the degree of measurability of warm glow preferences, particularly if they are very sensitive to the context of charitable fund raising or hypothetical questioning.

[14] There is a literature on charitable fund raising. See, e.g., Rose-Ackerman (1982) and Andreoni and Payne (2003) and the references therein.

5. Concluding remarks

This paper has taken the standard optimal tax approach, not recognizing issues in the definition of income as having independent relevance. Taking the latter approach, one could argue that donations reduce income over which a consumer maintains control and therefore ought not to be part of taxable income taken as measuring the latter. This would parallel the view that to the extent that medical expenditures are beyond the choice of a consumer, medical expenses ought to be deducted from the measure of income over which an individual has control. The roles of income definition in terms of the philosophy or the political economy of taxation are separate issues from those considered here.

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