Charitable Contributions of Time and Money

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Charitable activities are widespread in the United States. Almost 70 percent of all households make contributions of money and property, which in total exceed 1 percent of GDP. Almost 40 percent of households volunteered in the month prior to a recent national survey, with each volunteer supplying an average of 229 hours over the course of a year.[1] While there is a large literature on the determinants of financial contributions by individuals, few economists have examined volunteer labor. This paper presents new theoretical and empirical work on charitable contributions of time and money.

We begin by describing a simple theoretical framework that guides our empirical analysis. The framework, which is based on the assumption that the utility people get from altruistic activities depends both on giving and on the value to the recipient of what is given, yields comparative static predictions that are confirmed in the data. When we augment our model with three additional conditions, the strongest of which is that people have no intrinsic preference for giving time or money, the theory provides clear predictions for the patterns giving and volunteering that we expect to see in the descriptive data.

We examine the model's predictions using data collected in 1990 by the Gallup Organization for Independent Sector, a coalition of corporate, foundation, and voluntary organizations whose purpose is to promote philanthropy. The Independent Sector survey contains detailed information on hours volunteered, cash contributions, and a variety of economic and demographic variables. It is the only nationally representative data containing information on both monetary contributions and gifts of time, and the data appear broadly consistent with other surveys. Descriptive tabulations are generally consistent with the theory.

It is natural to expect that giving and volunteering decisions are related, and several authors have speculated about whether the two forms of philanthropy are, at the margin, complements or substitutes. If giving and volunteering are complements, the tax deduction for cash gifts has the added benefit of increasing volunteering as well. If instead, the deduction causes substitution away from volunteerism, the marginal benefits of policy changes could be overstated by ignoring volunteerism. Assessing the substitutability of gifts of time and money, therefore, is necessary to have a complete understanding of the effects of tax policies that

[1]See Independent Sector (1990).

affect monetary giving and volunteer labor.

This paper is the first study to use a representative national sample and utility maximizing framework to examine the joint determination of charitable contributions and volunteer labor. We estimate a version of the analytic model derived from a quadratic utility function, where individual characteristics enter the model through their effect on the marginal utility of income and the marginal utility of volunteer labor. The approach allows us to evaluate policy changes that alter households' budget constraints using estimated preference parameters, so, for example, we can evaluate whether money and time are complements or substitutes using (compensated) Hicksian demands rather than Marshallian demands. Ours are the first estimates of substitutability that do not mingle income with price effects.

Our central estimate of the own-price elasticity of monetary gifts is -0.35, which is considerably smaller than most published estimates but is similar to the permanent tax price elasticity estimated by Randolph (1995). Our estimated income elasticity of 0.28 is also in the bottom of the range of published estimates. The small elasticity estimates are consistent with the fact that the time series pattern of contributions exhibits a fairly stable upward trend over periods of significant variation in tax rates. We discuss a variety of other elasticities and the model fit in section IV.

Like previous papers on volunteer labor, we find that on average gifts of time and money are gross complements. Using a compensated (Hicksian) notion of substitution, however, gifts of time and money are substitutes. The empirical magnitude of the compensated cross-price effects is very small.

Though our elasticity estimates are smaller than others found in the literature, policy simulations show that tax policy can influence charitable giving. Eliminating the deductibility of charitable contributions, as is contemplated in some tax reform proposals, would reduce monetary gifts by 5.7 percent, while volunteer labor would fall by 0.7 percent. Extending deductibility to taxpayers who do not itemize on their returns, as was the law in 1986, would increase monetary contributions by 3.0 percent and increase volunteer hours by 0.6 percent. These simulations and sensitivity analysis are also discussed in section IV.

I. Background

The primary focus of the empirical literature on monetary charitable contributions has been the estimation of price and income elasticities.[2] The most common empirical model regresses the log of contributions against the log of income, the log of the price of gifts (defined as one minus the household's marginal tax rate on contributions), and demographic variables such as age, marital status, and education. Methodological innovations in this literature include Reece (1979), who estimated a Tobit model to account for the fact that contributions cannot be negative; Reece and Zieschang (1985), who modelled the nonlinear budget constraint created by the individual income tax; Feenberg (1987), who used cross-state variation in marginal tax rates in an instrumental variables framework to distinguish price from income effects; and Kingma (1989), who examined a sample of contributors to public radio to mitigate problems that might arise from aggregating different types of monetary contributions.[3] Estimated price and income elasticities vary widely. Price elasticities vary from -0.4 to -3.0, with most estimates falling in a range from -1.0 to -1.3. Estimated income elasticities vary from 0.24 to 1.31, with most estimates less than one.

Randolph (1995) uses a 10-year panel of tax return and instrumental variables techniques to estimate permanent and transitory price and income elasticities. He finds a large transitory price elasticity, which implies that people shift their giving to take advantage of temporary changes in their tax rates. His primary estimate of the permanent price elasticity is -0.51, which leads him to question the ability of tax incentives to permanently influence the level of charitable giving by individuals. Randolph finds the permanent income elasticity is larger than the transitory income elasticity, which suggests that people smooth their giving relative to transitory changes in income.

The economics literature on volunteering is considerably smaller, due in part to limited data. Long (1977), in a conceptual paper, notes that when financial contributions are deductible from the income tax and a

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[2]Clotfelter (1985) surveys the literature on the effects of tax policy on charitable giving. Also see Weisbrod (1988) and Shiff (1990).

[3]Choe and Jeong (1993) estimate a Tobit model of log monetary contributions with a second equation that accounts for the endogeneity of the tax price and contributions. Their estimated price elasticities are in the upper range of published estimates. Slemrod (1989) finds that estimated price elasticities in the literature do not appear to be biased upward by tax evasion.

taxpayer itemizes, the tax treatment of giving money and giving time is symmetric.[4] An implication of Long's analysis is that households who do not itemize face a lower price for volunteering than for charitable giving, all else being equal.

Menchik and Weisbrod (1987) provide a detailed analysis of volunteer labor supply.[5] They point out that people may view volunteer labor as a consumption good or as an investment that improves job skills and contacts. Menchik and Weisbrod note, however, that there are no strong testable implications that distinguish these competing models.[6] Their primary Tobit regression results indicate that volunteer labor is inversely related to net-of-tax wage rates, positively related at a decreasing rate to income, and negatively related to the price of monetary gifts.

Brown and Lankford (1992) were the first to estimate simultaneously a monetary contributions equation and a volunteer hours equation. They used data from a telephone survey of 1,866 Florida households.[7] Brown and Lankford's preferred empirical specification finds the tax price elasticity of monetary gifts is -1.7, while the elasticity of volunteer labor with respect to the tax price of monetary gifts is -2.1 for women and -1.1 for men.

Menchik and Weisbrod (1987) and Brown and Lankford (1992) interpret the negative relationship

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[4]The cost of giving either an hour's worth of money or an hour of time for an itemizer is $(1-\tau)w$, where τ is the household's marginal tax rate and w is the hourly wage, as long as w measures the opportunity cost of time.

[5]Dye (1980) was among the first to examine the determinants of volunteer giving. Segal (1992) examines the relationship between paid employment and volunteer labor, and Segal, Mauser, and Weisbrod (1992) examine the determinants of volunteer labor disaggregating across industries.

[6]Older households have fewer years to benefit from an increase in future wages brought about by an investment in a volunteer job, so Menchik and Weisbrod hypothesize that older households may be volunteering for consumption reasons while younger households may be more likely to volunteer for investment reasons.

[7]Because of nonresponse on questions needed to calculate after-tax income and marginal tax rates, 632 households were in the sample used for estimation. They estimate a "hybrid" Tobit simultaneous equations model, using only qualitative information on time and money for all cases where households do not give both time and money.

between volunteer labor and the tax price of monetary gifts as suggesting these goods are gross complements.[8] The empirical models that are estimated, however, do not come from a well-specified optimization problem, which may limit their usefulness for policy simulations. If preferences are as we model them, for example, estimates from the double-log and Tobit models in the literature are misspecified. In particular, previously estimated price effects would reflect a mixture of utility function parameters, budget constraint variables, and their interactions. In this situation the estimated parameters will not provide accurate estimates of the effect of price changes on gifts of money and time. Moreover, the degree of substitutability of time and money is more clearly assessed using Hicksian demands.[9] To address these and other concerns, we develop a new analytic and empirical framework for examining the determinants of households' decisions to give time and money in the following sections.

II. Analytic Framework

Previous models of monetary contributions and volunteer labor assume that individuals get satisfaction from the hours of time they contribute and from the dollar value of their money gifts. In contrast, we assume that the utility individuals get from their altruistic activity depends on the value of that activity to the charity. For example, if a person can volunteer an hour to do either a low-skilled job or a high-skilled job, we assume that the person would prefer to do the highly skilled job, because it is more valuable to the charity in the sense that the charity would have to pay a higher price to acquire the same service from the market. Hence, we are assuming that people are "warm-glow altruists," that is, they enjoy contributing to charitable organizations and get greater satisfaction the greater the value of their gift to the charity.[10]

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[8]Dye (1980) and Clotfelter (1985) make similar interpretations.

[9]With Marshallian demands monetary contributions could be a substitute with volunteer labor and volunteer labor could be a complement of monetary contributions, or *vice versa*. This feature arises because the cross-price effect includes both price and income effects. Hicksian demands have symmetric cross-price effects.

[10]See Andreoni (1989, 1990) for a discussion of warm-glow altruism. Andreoni (1988) discusses how traditional models of altruism are inconsistent with the observations that (i) most households donate either money or time, (ii) the amount of gifts is large, and (iii) that government donations incompletely crowd out private donations. The theory of warm-glow giving helps reconcile these observations.

We assume people get utility from a composite private consumption good, x; monetary contributions to the charity, m; the value to the charity of volunteer labor, $w'h$, where w' is the imputed wage of the volunteer activity and h is hours of volunteer time; and leisure, l.[11] Hence, utility can be written as

(1) $$U=U(x,m,w'h,l)$$

One can think of w' as the wage the volunteer could expect to be paid for performing similar tasks in the market, or as the wage that the charity would be charged to have the service performed by a paid employee.

We assume individuals maximize utility subject to the budget constraint

(2) $$x + (1-t_1)m + w(1-t_2)h + w(1-t_2)l = w(1-t_2)H$$

where t_1 is the tax rate on charitable deductions, t_2 is the tax rate on wages, w is the person's market wage rate, and H is the endowment of hours. Throughout the paper we treat the tax system as being proportional, hence we do not account for nonlinearities in the budget constraint caused by progressive tax schedules and transfer programs.

When typical assumptions are imposed on preferences, the model yields the following comparative statics results:[12]

(3) $$\frac{dm}{dp} < 0 \quad where\ p = (1-t_1)$$

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[11]Note that the utility function does not include an argument for the total supply of the charity, as is done in Andreoni (1989, 1990). Such an argument could be included without altering any of the predictions to follow. In this simple model, where we are not concerned with the effects of interdependence among altruists, it is sufficient to consider only the warm-glow motives of the givers.

Nested in the formulation of preferences in (1) is the case that people care about the total value of their contribution, that is, $U=U_i(x,m+w'h,l)$. Our empirical formulation is flexible enough to account for this special case. It is unlikely that preferences will be in this form, however, because households would not volunteer if w' is less than the market wage rate – a condition that is likely to be satisfied for most individuals.

[12]We assume continuous, differentiable, and strictly quasi-concave utility functions. Utility increases at a decreasing rate for each argument of the utility function. We also assume that cross partials on the utility function are zero. Detailed derivations of the comparative statics are available in an appendix, available from the authors upon request.

(4) $$\frac{dm}{dw} > 0$$

(5) $$\frac{dh}{dp} \; ? \; 0$$

(6) $$\frac{dh}{dw} \; ? \; 0$$

(7) $$\frac{dm}{dw'}\frac{dh}{dw'} < 0$$

(8) $$\frac{dh}{d\hat{w}}\Big|TI=constant < 0 \quad where\ \hat{w} = (1-t)w\ and\ TI\ is\ total\ income$$

(9) $$\frac{dm}{d\hat{w}}\Big|TI=constant \; ? \; 0$$

(10) $$\frac{dh}{dI} > 0 \quad and \quad \frac{dm}{dI} > 0 \quad where\ I\ is\ nonlabor\ income$$

Results (3) and (4) suggest that the higher the tax rate and the higher the wage rate the more money an individual will give to charity, all else being equal. We cannot make similar predictions for the taxes and wages on volunteering. In (5) and (6) the sign is ambiguous because of offsetting income and substitution effects. With higher wages or lower taxes the individual wants to consume more of all normal goods, including volunteer labor. However, at the same time the opportunity cost of volunteer labor is greater. The relative importance of these two effects is uncertain.[13]

Result (7) indicates that changes in the value of volunteer labor to the charity will have opposite effects on gifts of time and money. If the market value of volunteer labor gets closer to the market wage, the person may volunteer more since the wedge between the value of market and volunteer labor has been reduced.

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[13]This is in contrast to Menchik and Weisbrod (1987), who argue in their consumption model that volunteering will increase with wage rates.

Alternatively, the person may volunteer less since they have become a more efficient volunteer. Whatever the direction of the effect, the person's monetary gifts will change in the opposite direction as an increase (decrease) in time spent volunteering will lead to fewer (more) expenditures on all normal goods, including contributions.

When after-tax wages go up the person will volunteer less controlling for total income (8). This suggests that when the opportunity cost of volunteering is higher, less is done. The effect on monetary contributions, (9), is ambiguous because the cross-price effect depends on whether contributions and volunteer labor are gross substitutes or complements. Finally, (10) implies that as nonlabor income increases people will both volunteer more and make more cash contributions, as long as both activities are normal goods.

a. Implications

The model yields sharp predictions for the empirical relationship between contributions and volunteer labor with the addition of the following three conditions:

(11) $$t_1 = t_2$$

(12) $$w' \leq w$$

(13) $$U_m = U_h \quad whenever \quad m = w'h$$

Condition (11) states that the tax rate applied to charitable deductions of money and property, t_1, is the same as the tax rate on wages, t_2. In practice, this condition only holds for taxpayers that itemize deductions on their tax return. For itemizers, the opportunity cost of an hour of volunteering, $w(1-t_2)$, will always be the same as the opportunity cost of donating to charity the wage from an hour of work, $w(1-t_1)$. For non-itemizers $t_1 = 0$, hence, the tax system favors gifts of time.

Condition (12) suggests the value of the volunteer activity to the charity is less than or equal to the donor's wage rate. If a volunteer can provide services that are valued more highly than what the volunteer receives in the paid labor market, then presumably the volunteer could switch employment to a sector

performing work similar to the volunteer job at an increased wage. Consequently we generally expect that people will volunteer for jobs for which they are "over qualified." Of course, compensating wage differentials for jobs that, for example, offer an unusually nice work environment may make this condition inappropriate, but (12) still provides a useful benchmark. Evidence about the reasonableness of this condition is provided below.

The most restrictive condition is (13). We would like to use our model to make inferences about the relative magnitudes of cash and time contributions. Such statements, however, will depend critically on individual tastes, that is, whether people have any special preference for giving either money or time. In the absence of an *a priori* reason to assume they prefer one to the other, we take as our baseline in (13) that, to the first order, people have no special preference for one or the other. That is, whenever the value of cash gifts equals the value of time gifts, we assume that people are indifferent between a marginal increase in m or $w'h$.[14] While there will undoubtedly be violations of (11)-(13), the conditions serve as a useful baseline from which to build intuition for philanthropic behavior.

Under the conditions given above, a foregone hour of work donated as volunteer labor buys no more of the charitable activity than a foregone hour's wage, donated as money. In general, money contributions will be more "productive" for the charity, controlling for the opportunity cost to the donor. Because the donor cares about the value of his or her contribution to the charity, we should find people first making contributions of money. Only after giving money should we see households volunteer.[15] Thus, we have Implication 1: Gifts of money precede gifts of time when condition (12) holds with strict inequality ($w' < w$).[16]

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[14]This condition may be problematic for parents with younger children, for example, who might be expected to work in schools, coach teams, or engage in other voluntary activities associated with their children. People may also have a first order preference for volunteering as a way to acquire job skills or to learn more about a philanthropic organization, among other reasons.

[15]This is in contrast to a model of pure altruism where, given the baseline conditions (with a strict inequality in equation 4), households would never volunteer.

[16]The first order condition on money gifts is $U_m - \lambda(1-t_1) \leq 0$, and for time gifts is $U_h w' - \lambda w(1-t_2) \leq 0$, where λ is the Lagrange multiplier from the budget constraint. The first-order conditions imply that there are

To the extent the conditions hold, we should observe more people making contributions of money than contributions of time [that is, we should expect to see (a) Prob($m>0$) > Prob($h>0$)]. All volunteers in the data should also have contributed money [(b) Prob($m>0|h>0$) = 1], and there should be no volunteers among the households that did not make monetary contributions

[(c) Prob($h>0|m=0$) = 0]. For non-itemizers $t_1=0$, so the opportunity cost of time contributions is less than the opportunity cost of money contributions, which could lead to violations of implication 1. Moreover, there are obviously some households for whom $w'>w$. As long as most households satisfy conditions (11)-(13), the probability of giving money should be highest among those who volunteer

[(d) Prob($m>0|h>0$) > Prob($m>0|h=0$)] and the probability of volunteering is greater among those who also give money [(e) Prob($h>0|m>0$) > Prob($h>0|m=0$)].

An alternative model where there are fixed or other transactions costs associated with volunteer labor would yield Implication 1. The alternative, however, would not yield Implication 2: The value of money gifts will always exceed or equal the value of time gifts, $m^* \geq w'h^*$, where the superscript * denotes utility maximizing choices. This implication can be seen intuitively by noting that once a person begins with money contributions, time contributions never "catch up." If they did, (12) and (13) imply that the person could increase utility by lowering h and increasing m.[17]

III. Descriptive Data

This study uses data from a survey conducted by the Gallup Organization for Independent Sector. Interviews were conducted in person from March to May, 1990. The sample is designed to be representative of the non-institutionalized civilian population eighteen years and older in the United States, though slight

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only three possible regimes: m=h=0; m>0 and h=0; and m>0 and h>0. The implications follow immediately from the absence of a regime where m=0 and h>0.

[17]Again, this implication can be shown simply by examining the first order conditions. Note that this implication does not suggest that the opportunity cost of money contributions exceeds that of time. It is still quite possible that $m^* < wh^*$.

oversampling was done for black, Hispanic, and affluent households (with incomes over $60,000 in the previous year).[18] The analysis below is based on a subsample that is restricted to heads of households and/or spouses of heads of households.[19]

The Independent Sector data have very detailed information on volunteer activities, which they define as "... not just belonging to a service organization, but actually working in some way to help others for no monetary pay" (emphasis in the original). Respondents were asked whether they volunteered in the past year in each of 14 different areas (for example, education, religion, and youth development), and, for each area, how many hours did they volunteer in the past month and in the past week. Similar information was collected on contributions of money and property made by members of the household. Information was gathered on a variety of additional economic variables including wage rates, employment status, age, education, family size, family income (in ranges), and itemization status. Respondents were also asked about their estimates of w', the value to the charitable organization of their volunteer labor. The data are unique in being a nationally representative sample that contain information on both gifts of money and gifts of time, along with the requisite economic variables for examining the determinants of household philanthropy.

Because comprehensive data on altruistic activity are rare, we present detailed summary results on patterns of monetary gifts and volunteering in Appendix Tables A and B. Fifty-three percent of households make monetary contributions to religious organizations. The next most popular areas are health (32 percent), human services (23 percent), youth development (22 percent), and educational organizations (19 percent). The average annual gift, conditional on giving, is considerably larger for religious contributions ($771) than for the next largest area, education ($246).

Twenty percent of all respondents volunteer for religious organizations. The next most popular areas are

[18]For further sample details see Independent Sector (1990, Appendix C).

[19]Interviews were also conducted with parents of heads of households and children of heads of households. Skip patterns in the questionnaire make these 325 observations incomplete for the purposes of this paper, so these observations are dropped. The sample used in the descriptive work contains 2,402 observations.

education (10 percent), youth development (10 percent), and human services (8 percent). In most areas the typical volunteer donates 9 to 10 hours per month. As with charitable contributors, volunteers tend to have more education and income than the typical person in the population.

The Independent Sector data are broadly consistent with other sources of information on monetary gifts and volunteer labor. Comparisons are summarized in Table 1. The data are strikingly similar to the survey of Florida households used by Brown and Lankford (1992). The figures are similar to data reported in the 1986 Survey of Consumer Finances, though the Independent Sector data suggest that larger numbers of households volunteer.[20] There is a large discrepancy in the prevalence of volunteer labor when the Independent Sector data are compared to the May 1989 Current Population Survey (CPS). Hayghe (1991) discusses differences between the Independent Sector data and the CPS. About two-thirds of the CPS interviews were conducted by phone, whereas all Independent Sector interviews were in person. About half of the volunteer data in the CPS were collected by "proxy respondents" who were significantly less likely to report volunteer activity. In addition, Hayghe suggests that respondents to the Independent Sector survey "were given a clearer definition of volunteer activities and were prompted to recall infrequent or brief incidences of volunteering."

Figure 1 shows the distribution of charitable contributions by income class in the Independent Sector data compared to the distribution reported on tax returns (from Statistics of Income, 1989).[21] A larger share of total contributions are given by middle income rather than high income taxpayers in the SOI data relative to the Independent Sector data, but the distributions still appear to be quite similar. Overall, the Independent Sector data on volunteer labor and charitable contributions appear broadly consistent with other comparable data.

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[20]The 1986 Survey of Consumer Finances (SCF) asks households whether they volunteered more than 150 hours in the previous 3 years. The SCF data are compared to Independent Sector data where households volunteered more than 4.166 (150/36) hours in the previous month. The monetary contributions question in the SCF asks about contributions from households that gave more than $300 in the preceding 3 years. These households are compared to households that gave more than $100 in the last year in the Independent Sector data. See Avery and Kennickell (1988) for a more detailed discussion of the SCF.

[21]Statistics of Income (1989) show that $55.5 billion were taken in contributions deductions on 1989 tax returns. Independent Sector (1990) reports that aggregate contributions are $69.4 billion. Excluding contributions of nonitemizers and political contributions, contributions were $48.1 billion.

a. Evidence on the implications

The survey question on the imputed wage to volunteering, w', reads "... if the organizations or persons for whom you volunteered had to pay for such services, how much do you think it would cost them in wages or salaries on the average per hour?" This question allows us to examine the plausibility of condition (12), that the imputed wage to volunteer activity is less than or equal to the household's wage. To do this, we restricted the sample to respondents working either full- or part-time (dropping 913 households) and to respondents that have complete information on their wage and their estimate of the imputed wage to their volunteer activity. After these exclusions 526 observations remain. Eighty percent of these respondents satisfied condition (12).

Tables 2 and 3 present descriptive tabulations of charitable donations of money and time using the full sample of heads of households and/or their spouses. Considerably more households give money (68.4%) than volunteer (38.9%), which is consistent with part (a) of Implication 1.[22] Among those who contribute, the median annual contribution is $335. Contributions generally increase with income. Among those who volunteer, the median number of hours is 12 per month.

Comparisons of the last 4 columns of Tables 2 and 3 address the other predictions of Implication 1. The third and fifth columns of Table 2 show that the proportion of volunteers who also give money (83.1 percent) is larger than the proportion of cash contributors that do not volunteer (59.5 percent). This result is consistent with prediction (d) and also holds for each income class, both in the probability of giving money and in the median conditional gift. The third and fifth columns of Table 3 show that 47 percent of all households that give money have a volunteer, while only 21 percent of the households that do not give money have a volunteer. This difference is consistent with prediction (e) and also holds for each income class. It appears from column 6 of Table 3 that some households that do not give money may specialize in volunteering because the median monthly hours, particularly for higher-income households, is quite large.

The stronger predictions, (b) and (c), do not hold. As shown in column 3 of Table 3, 83.1 percent of

[22]Recall that Implication 1 has five parts: (a) Prob(m>0) > Prob(h>0), (b) Prob(m>0|h>0) = 1, (c) Prob(h>0|m=0) = 0, (d) Prob(m>0|h>0) > Prob(m>0|h=0), and (e) Prob(h>0|m>0) > Prob(h>0|m=0).

volunteers donate money, rather than 100 percent as predicted by the baseline conditions. Column 5 of Table 3 shows that 21 percent of the households that do not give money still volunteer. When evaluating predictions (b) and (c), however, it is important to recall that the Implication only holds when $t_1 = t_2$. For non-itemizers, $t_1 < t_2$, and we expect some preference for volunteering. Among itemizers we find that 90.1 percent of volunteers donate money, though it is still the case that 24.8 percent of the itemizers that do not give money nevertheless volunteer.

We can use the survey question about the imputed wage to volunteer labor to examine Implication 2 for a subset of the population. We take monthly volunteer hours multiplied by the value of volunteer labor when it is available (or the wage rate when w' is unavailable), and compare this to annual contributions divided by 12 for households that either volunteer or make contributions. Overall, 66 percent of all households have financial contributions that exceed the annual value of volunteer labor.

The descriptive data are generally supportive of the model, though the support for Implication 2 is somewhat weaker than for Implication 1. Recall, however, that condition (13) implies that households do not have an intrinsic preference for giving time or money, which is extremely unlikely to hold for all households.

IV. Empirical Model

Our empirical model follows directly from the theoretical model with one important modification. Because we do not observe hours of work or leisure in the data, we fix hours of leisure in the empirical model. Thus, utility is a function of consumption, contributions, and volunteer labor, $U = U(x,m,w'h)$, and the budget constraint is $-x - m(1-t_1) - w(1-t_2)h + I = 0$ where $I \equiv w(1-t_2)(H-l)$ and H is total hours.[23]

We assume utility is quadratic,

(14) $$U(x,m,w'h) = \alpha'Q - \frac{1}{2}Q'\beta Q$$

[23]The theoretical implications still hold in this case if we consider a two-stage budgeting process where leisure hours are chosen in the first stage. Income, as written, includes the value of volunteer labor.

where α is a 3x1 vector of estimated parameters, Q is a 3x1 vector with the arguments from the utility function (substituting for x using the budget constraint), and β is a symmetric, positive definite 3x3 matrix of estimated parameters.[24] Quadratic utility is often justified as a second-order approximation to an arbitrary utility function.[25] The central advantage for our purposes is that the marginal utility functions are linear in m and h.

Marginal utilities are given by

$$\frac{dU}{dm} = \alpha_1 - \alpha_3\tau_1 - \beta_{11}m - \beta_{12}w'h - \beta_{13}[I-2m\tau_1-\hat{w}h] + \beta_{23}w'h\tau_1 + \beta_{33}\tau_1[I-m\tau_1-\hat{w}h]$$

(15)

$$\frac{dU}{dh} = \alpha_2 - \alpha_3\tilde{w} - \beta_{12}m + \beta_{13}m\tilde{w} - \beta_{22}w'h - \beta_{23}[I-m\tau_1-2\hat{w}h] + \beta_{33}\tilde{w}[I-m\tau_1-\hat{w}h]$$

where $\tau_1 = (1-t_1)$, $\hat{w} = w(1-t_2)$, and $\tilde{w} = \frac{\hat{w}}{w'}$. It is clear from the literature that contributions of time and money vary systematically with observable characteristics. To capture this variation α_1 and α_2 are treated as normally distributed random variables that are linear functions of household characteristics.[26] Thus, characteristics (other than variables that enter the budget constraint and preferences) affect choices only through shifts in the marginal utilities.

Using (15) we derive the likelihood function for the joint distribution of m and h. As shown in Tables 2 and 3, a significant fraction of the population does not give money or time. Thus, our empirical approach results in a four-branch likelihood function. In the first regime respondents give both money and time, so the

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[24]Positive definiteness of β ensures that the utility surface in money-hours-utility space is concave.

[25]Quadratic utility has been used in a variety of empirical applications including Ransom (1987) who examines labor supply of husbands and wives, and Lacroix and Fortin (1992) who examine labor supply in the regular and underground economy. Our empirical approach follows Ransom (1987).

[26]Specifically, the errors are assumed to be distributed bivariate normal, $BVN(0,0,\sigma_m,\sigma_h,\rho_{mh})$.

likelihood contribution is the bivariate normal density using the observed portions of the two expressions in (15), which we refer to as s_1 and s_2, and the Jacobian transformation from the unobservable errors in α_1 and α_2 to the observable variables m and h. In the second regime, respondents give money but not time. In this case, h is replaced by zero in equation (15) and the equality in $\frac{dU}{dh}$ is replaced by a less-than relation. The likelihood contribution for an observation in this regime is described in Appendix A. An analogous set of considerations apply to respondents in the third regime who give time but no money. For respondents that give neither time nor money, the equalities in (15) are replaced by less-than relations. Complete details for the likelihood function are given in Appendix A.

a. Sample and variables

The survey asks each respondent about his or her hours of volunteer labor while the contributions questions refer to contributions for the entire household.[27] We mitigate problems that might arise from the asymmetry of individual and family responses by restricting the sample to respondents that are primary wage-earners for their families. This eliminates 1,196 of the 2,727 observations. We also drop respondents over 65, as their volunteer decisions are likely to be affected by different factors than younger respondents, and respondents that were unable or refused to reveal their volunteer hours, age, education, family size, income, or wage.[28] Dropping observations for elderly households and with missing data reduced the sample by an additional 482 households, leaving a final sample of 1,049.

The dependent variables in the empirical model are charitable contributions of money and property, m,

[27]There are intriguing questions that arise about the allocation of philanthropic activity within the household, such as whether the lower-earning spouse provides a disproportionate share volunteer labor. Segal (1992) uses the May 1989 Current Population Survey to examine patterns of volunteer labor within the household.

[28]To increase sample size, we replaced missing observations on the value of volunteer labor w' with the respondent's wage rate. This imputation applies mainly to households that do not volunteer.

and monthly hours of volunteer labor, h. The after-tax price of donating a dollar to charity, the net wage, and the imputed value of volunteer labor enter the model directly in the functional forms.[29]

We calculate the price of charitable contributions using a simple tax imputation. Filing status is determined by the respondent's marital status and the presence of children. We take itemization status and the number of exemptions directly from survey responses. Households that itemize are assigned the average level of itemized deductions from IRS tax return data, conditioning on income and filing status. Total pre-tax family income is reported in the survey in 13 income ranges. We treat income as a continuous variable, defined as the midpoint of the relevant reported range. Taxable income is family income less the value of exemptions less the greater of average itemized deductions or the standard deduction. The price of charitable contributions is one minus the marginal tax rate on taxable income for itemizers and one for nonitemizers, and is calculated to be independent of the taxpayer's contribution. The resulting price variable is commonly referred to as a first-dollar price in the literature.

The respondent's after-tax wage rate is the self-reported wage rate multiplied by one minus the marginal tax rate for respondents who work. Respondents that are not in the labor market are asked what their wage rate would be if they did work. When available, this hypothetical wage variable is used for the wage of respondents that are unemployed.[30]

Other individual characteristics that have been shown in the literature to be important determinants of

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[29]Brown and Lankford (1992) raise the issue when modelling volunteer labor of whether the wage rate appropriately reflects the opportunity cost of time. Salaried workers, for example, may be unable to work additional hours at their prevailing wage. The Independent Sector data asks respondents whether they would be able to work additional hours at their given wage rate. Of the sample working either full- or part-time, 53 percent responded that they would be able to work additional hours and earn their reported wage. This figure understates the percentage of the employed sample for whom the wage measures the opportunity cost of time as long as people choose jobs with characteristics, including hours, that reflect their preferences. Brown and Lankford's primary specification does not include wages, but rather an "available hours" variable that equals 16 minus average daily hours of work. Our data do not have information on hours of work.

[30]We impute wages for outliers, defined as respondents whose hourly wage exceeds $50, using estimates from a regression of wages (for those with hourly wages less than $50) on family income, and dummies for primary earners, number of earners, full-time, part-time, and interactions of family income with the dummy variables.

philanthropic activity enter the model through α_1 and α_2. These include age, years of education, and dummy variables for having children under 3, gender, ethnicity, homeownership, and the response to a question asking whether your parents were a major influence on your decisions to give to charity. We also allow the marginal utility of giving and volunteering to be affected by income, with the idea that income is a proxy variable for neighborhoods, social networks, and other unobserved factors correlated with tastes. Income also obviously enters the model through the budget constraint.

It aids the optimization procedure for the variables to have a similar order of magnitude, hence the data are scaled. Sample means and scaling factors for variables used in the empirical models are given in Appendix Table C.

b. Estimates

Empirical estimates are given in Table 4. Recall that the coefficients on α_1 and α_2 reflect factors that shift the marginal utilities of giving money and time. The marginal utility from giving both time and money are positively affected by education, income, age, home ownership, and the indicator variable for parents strongly influencing charitable giving. The existing literature typically finds that donations of time and money increase with age, education, and income. We estimate insignificant, negative coefficients on the dummy variable for females. The negative sign is likely to reflect the influence of female-headed families, as the sample is restricted to primary earners. The dummy variables for nonwhite households and "child under three" are also negative. Having an infant or toddler in the house negatively affects the marginal utility of volunteering. Most coefficient estimates are significant at usual levels of confidence.[31]

The estimated correlation between the errors on α_1 and α_2 is large and positive. This implies that unobserved factors that increase the marginal utility of giving money are positively correlated with unobserved factors that increase the marginal utility of giving time. Put differently, people differ in their degree of

[31]The signs of the estimates parameters in Table 4 are the same for both monetary gifts and volunteer labor. Nothing in the model imposes this restriction, and the pattern does not hold in the sensitivity analysis described later.

altruism, and the greater the degree of altruism, the greater the likelihood that they give time and money. This unobserved taste for altruism makes estimating the degree of substitutability between time and money difficult, particularly in a cross-section. The data will commonly show that people who give money (time) will also give time (money). Hence, analysts are likely to infer that gifts of time and money are complements. The comparison should, however, condition on tastes and examine compensated (or uncompensated) cross-price effects. By estimating preference parameters directly, we can make this comparison.

Estimates of β affect the curvature of the indifference surface. For numerical reasons we set β_{23} equal to zero. All but one of the remaining preference parameters are significant.

c. Elasticities

To get a better sense of the relative magnitudes of the coefficient estimates, we simulate the implied elasticities for each right-hand side variable. This is done through a stochastic simulation where we take repeated random draws from the estimated distribution of the error term and fit demands for each household. Closed form solutions for demands are given in Appendix B. Demands for households with negative demands for m or h are set equal to zero, and the unsatisfied latent demand is allowed to affect the structure of demand for the other commodity as is common in the rationed demand literature. Once we calculate each demand, we sum across actual contributions to obtain aggregate contributions. We then take a small change in a right hand side variable and generate new estimates of gifts of money. The percentage change in aggregate contributions divided by the percentage change in the right-hand side variable is the elasticity. Similar calculations are done for hours.

Elasticity estimates are given in Table 5. The primary focus of the literature on contributions of time and money is on price elasticities. Our estimate of the price elasticity of monetary contributions is -0.349, which is considerably lower than most estimates in the literature. The difference does not come from the new data used for this study. A simple double-log model of monetary contributions using the same data and covariates as Table 4 yields a price elasticity of -1.845. The reason for the discrepancy can be seen by examining the functional forms in Appendix B. Even with the simple utility function used for this study,

demand functions are complicated non-linear functions of price. Reduced form coefficient estimates of price miss nonlinear price terms and interactions of price and other budget constraint variables, which makes it impossible to determine the effect of price on demand in the reduced form regression. This concern will apply when comparing estimates from reduced form models to empirical models based on any commonly used, well-behaved specification of preferences.

Our estimated price elasticity is similar to the -0.51 estimate of the permanent price elasticity of contributions in Randolph (1995). Randolph argues that previous estimates of this parameter are biased upward because they mix low permanent and high transitory elasticities. By using the almost ideal demand model of Deaton and Muelbauer (1980), however, he also estimates a less restrictive empirical model than the existing literature. We have no way of distinguishing permanent from transitory price and income effects in our cross-sectional data, but show that similar elasticities come from a well-specified utility-based empirical model.[32] Hence, functional form rather than the permanent-transitory distinction may account for the discrepancy between the previous literature and Randolph's and our estimates.

Our estimates of cross-price effects – the price elasticity of volunteer hours and the wage elasticity of monetary contributions – are small and negative, indicating that these activities are gross complements. All papers in the literature find time and money are complements, but the magnitude of the cross-price effects are generally substantially greater than one. Again, the difference in functional forms explains the results. We find a relatively large wage elasticity of volunteer hours, which suggests volunteer decisions are fairly sensitive to the opportunity cost of time. Estimated income elasticities are also in the lower range of estimated elasticities.[33] Of the covariates used to parameterize tastes, only education has a large effect on giving time and money. Its effect is positive.

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[32]The other structural model in the charity literature, Reece and Zieschang (1985), also estimate a relatively low price elasticity of contributions of -0.85.

[33]Randolph (1995) estimates a fairly large permanent income elasticity of 1.14. Our lower estimate may be partially accounted for by our strong positive education effect. Education is strongly positively correlated with permanent income.

Most of the estimated elasticities are consistent with the comparative static predictions. The negative own-price elasticity of monetary gifts is consistent with (3). The elasticities of hours and monetary gifts with respect to w' have the opposite signs as suggested by (7), while the income elasticity of monetary gifts and hours is positive (10). The elasticity of hours with respect to net wages is negative (8). The close consistency between the empirical estimates and the comparative static implications is striking, as the implications were derived assuming strong separability among arguments of the utility function (other than gifts of time and money). Segal (1992) points out that wage changes affect the price of both volunteer hours and wages, so the comparative static predictions in a more general model would depend on the degree of substitutability or complementarity between leisure and volunteer labor.

d. Additional simulations

We simulate two policies to further illustrate the economic significance of the model estimates. The first eliminates the deductibility of charitable contributions. This proposal has been included, for example, as part of the flat tax proposal offered by Representative Armey.[34] It would raise the price of giving to 1.0 from .67 for 44 taxpayers, from .72 for 175 taxpayers, and from .85 for 206 taxpayers out of the sample of 1,049. We estimate that this change would lead to a 5.7 percent reduction in monetary gifts and a 0.6 percent reduction in hours volunteered.

An alternative policy is to extend deductibility of charitable contributions to nonitemizers. This policy was phased in following by the 1981 tax reform and was fully in place in 1986 (it was scheduled to expire after 1986 and did). Extending itemization lowers to the price of gifts from 1.0 to .67 for 19 taxpayers in the sample, to .72 for 131 taxpayers, and to .85 for 307 taxpayers. We estimate that reinstating this policy would raise aggregate contributions by 3.0 percent and increase aggregate volunteer hours by 0.6 percent.

Our last simulation examines complementarity or substitutability using compensated demands. Given the closed-form expressions in Appendix B, it is extremely difficult (or impossible) to calculate analytically the

[34]We do not model other features of the flat tax proposal in this simulation, such as the change in rate structure and the expansion of the personal exemption that would affect after-tax wages.

expenditure function and Hicksian demands. Thus, we use a numerical approximation (that is exact for infinitesimal changes). The normal Hicks compensation is the amount of money necessary to return a household to the original indifference curve at the new prices. Slutsky compensation is the amount of money needed to consume the original consumption bundle at new prices. Slutsky compensation is simple to calculate for a given price change. For small changes, Hicksian and Slutsky compensation will lead to identical outcomes (Varian, 1992). Thus, we can calculate the change in Hicksian demands as the difference in demands under original prices, and demands under new prices and Slutsky-compensated income. With the modification of using compensated income, compensated elasticities are calculated in the same manner as we calculated elasticities in Table 5.

The compensated price elasticity of monetary contributions is -0.14. The compensated net wage elasticity of volunteer hours is -0.29. The compensated cross-price elasticities are nearly symmetric, and are equal to 0.05.[35] Thus, charitable contributions of time and money are Hicksian substitutes. The empirical magnitude of this relationship is extremely small, however.

e. Model fit

We have taken a significantly different theoretical and empirical approach than what is found in the existing literature on charitable contributions of time and money. For reasons discussed in Clotfelter (1990), however, it is hard to show our model is superior to competing empirical models, because ancillary *ceteris parabus* assumptions rarely hold as policy changes affect the economic variables of interest.

We offer two pieces of evidence that our model does a good job characterizing the economic determinants of charitable contributions of time and money. First, as noted by Auten, Cilke, and Randolph (1992), predictions of a standard model of charitable giving following the 1981 and 1986 tax acts were very different from the actual changes. Hence, the standard model appears to do a poor job characterizing charitable giving. The reason why is easy to see from Table 6, which shows the time-series of aggregate

[35]Exact symmetry does not hold because we did not use infinitesimal changes in prices and wages.

contributions over the 1980s.[36] Despite a reduction in the highest marginal tax rates to 28 (or 33) percent from 70 percent and reductions in tax rates for almost every other income group over the decade, the aggregate pattern of contributions is quite smooth, except for a spike in 1986 prior to the 1986 tax act. It is difficult to reconcile the aggregate pattern of giving with the large price elasticities that characterize the previous literature.

A second way of evaluating the quality of our empirical model is to examine its ability to fit the data it was estimated on. Table 7 shows this model fit overall and by income grouping. It shows that we substantially underpredict the fraction of the population giving money, and slightly underpredict mean contributions. In both cases we capture the fact that the probability of contributing and mean contributions rises with income. The model does a better job of capturing patterns of volunteer labor than monetary contributions, though it substantially overpredicts hours volunteered by low income households.

Across all comparisons in Table 7, it appears that the model captures the behavior of the middle and high income groupings better than it does the low income grouping. It is difficult to evaluate the quality of model fit because there is no benchmark in the literature. The only other simultaneous equations model in the literature, Brown and Lankford (1992), does not report model fit. It would be surprising for our parsimonious empirical model to capture perfectly the complex nature of charitable giving. Nevertheless, the discrepancies between the model predictions and the actual data serves as an important qualification to our empirical results.

f. Sensitivity analysis

We have estimated the model with an alternative specification that drops religious giving and forms of giving that might be interpreted as household consumption or job-related. There is a presumption in the

[36]Data in Table 6 come from various years of the Statistics of Income volumes (Internal Revenue Service) and the Statistical Abstract of the United States, 1994 (Table #610). The IRS data include only itemizers, so the apparent reduction in giving as a percentage of GDP 1986 may simply reflect the fact that fewer taxpayers itemize following the 1986 tax reform.

literature that religious giving is somehow different than other forms of giving. Household consumption, such as contributing to family members' schools or youth activities, or contributing to work-related organizations may have different motives than more altruistically motivated contributions. The remaining forms of giving do not have an obvious link to household consumption, and hence may more accurately reflect altruistic behavior.

Elasticity estimates for this more narrow view of charitable activity are given in Table 8. In general, behavior appears slightly more sensitive to economic variables in this specification. The price elasticity of giving increases (in absolute value) to -0.407 from -0.349, while the income elasticity of giving increases to 0.648 from 0.283. The net wage elasticity of volunteer labor is also larger (in absolute value) as is the education elasticity of volunteer labor. This specification also shows that covariates can have different qualitative effects on gifts of time and money.

V. Conclusions

This paper examines the determinants of charitable contributions of time and money using new data and applying a different theoretical and empirical framework than what has been used previously. The theoretical model, which is based on the idea of warm-glow altruism, yields comparative static predictions that are confirmed in the data. The model, augmented with three additional conditions, gives sharp predictions for the patterns of giving and volunteering that we expect to see in the descriptive data. Tabulations from the only nationally representative data containing information on both monetary contributions and gifts of time, are broadly consistent with the theory.

We estimate a version of the analytic model derived from a quadratic utility function. The utility-based approach allows us to evaluate policy changes that alter households' budget constraints using estimated preference parameters. Our central estimate of the own-price elasticity of monetary gifts is -0.35, which is considerably smaller than most published estimates. Our estimated income elasticity of 0.28 is also in the bottom of the range of published estimates. The low elasticities are the result of the functional form that comes from the household's optimization problem. Estimating a conventional double-log model of monetary contributions with our data and covariates yields an estimated price elasticity in the upper range of

published estimates. Our estimated price elasticity is comparable to recent estimates by Randolph (1995) and is consistent with the fact that the time series pattern of contributions exhibits a stable upward trend over the 1980s, a period of significant reductions in marginal tax rates.

While a large literature examines the determinants of charitable contributions, few papers examine volunteer labor. We find the net wage elasticity of volunteer labor is -0.8, which implies that changes in the opportunity cost of time can have substantial effects on volunteer hours. We find that gifts of time and money are gross complements, but our estimated cross-price elasticity of volunteer labor is far smaller than recent estimates in the literature. The estimates imply, for example, that a policy change that eliminates the deductibility of charitable giving will reduce charitable contributions by 5.7 percent, an effect that will be reinforced by a 0.7 percent aggregate reduction in volunteer hours.

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Appendix A: Likelihood Function

We jointly estimate m and h by maximum likelihood assuming additive errors on the intercept terms (α_1 and α_2), ε_1 and ε_2, are distributed bivariate normal with means of zero, standard deviations of σ_m and σ_h, and the correlation ρ_{mh}. The log likelihood function consists of the product over the relevant portions of the following probabilities,

I. m > 0, h > 0:

$$P_1 = \prod_{i \varepsilon I_1} abs\,(J)\, f(s_1, s_2)$$

where I_1 indicates an observation satisfies m>0 and h>0, s_1 and s_2 are the deterministic portions of equation (15), and J is the determinant of the 4x4 matrix with elements $\frac{ds_1}{dm}$, $\frac{ds_1}{dh}$, $\frac{ds_2}{dm}$, and $\frac{ds_2}{dh}$.

II. m > 0, h = 0: In this case equation (15) becomes

$$s_1^* = X\Gamma - \alpha_3\tau_1 - \beta_{11}m - \beta_{13}[I - 2m\tau_1] + \beta_{33}\tau_1[I - m\tau_1] = \varepsilon_m$$
$$s_2^* = X\Phi - \alpha_3\tilde{w} - \beta_{12}m + \beta_{13}m\tilde{w} - \beta_{23}[I - m\tau_1] + \beta_{33}\tilde{w}[I - m\tau_1] < \varepsilon_h$$

$$P_2 = \prod_{i \varepsilon I_2} \int_{-\infty}^{-s_2^*} abs(K) f(s_1^*, \omega)\, d\omega$$

where I_2 indicates an observation satisfies m>0 and h=0, and K is $\frac{ds_1^*}{dm}$ and $X\Gamma$ and $X\Phi$ are the deterministic portions of α_1 .and α_2.

III. m = 0, h > 0: In this case equation (15) becomes

$$s_1^{**} = X\Gamma - \alpha_3\tau_1 - \beta_{12}w'h - \beta_{13}[I-\hat{w}h] + \beta_{23}w'h\tau_1 + \beta_{33}\tau_1[I-\hat{w}h] < \varepsilon_m$$
$$s_2^{**} = X\Phi - \alpha_3\tilde{w} - \beta_{22}w'h - \beta_{23}[I-2\hat{w}h] + \beta_{33}\tilde{w}[I-\hat{w}h] = \varepsilon_h$$

$$P_3 = \prod_{i\in I_3} \int_{-\infty}^{-s_1^{**}} abs(L) f(\varphi, s_2^{**}) d\varphi$$

where I_3 indicates an observation satisfies m=0 and h>0 and L is $\frac{ds_2^{**}}{dh}$.

IV. m = 0, h = 0

$$P_4 = \prod_{i\in I_4} \int_{-\infty}^{-s_1} \int_{-\infty}^{-s_2} f(s_1, s_2) d\varepsilon_2 d\varepsilon_1$$

where I_4 indicates an observation satisfies m=0 and h=0, and s_1 and s_2 are the deterministic portions of equation (15).

Appendix B: Closed form solutions for elasticities, model fit, and policy simulations

We derive closed form solutions for the empirical model that we used in calculating elasticities, model fit, and policy simulations. Notation is simplified using the following expressions that are functions of preference parameters and budget constraint variables, where all terms are defined in the text.

$$\theta = \beta_{11} - price(2\beta_{13} - \beta_{33} price)$$

$$\psi = \alpha_1 - \alpha_3 price - income(\beta_{13} - \beta_{33} price)$$

$$\varphi = w'(\beta_{23} price - \beta_{12}) + \hat{w}(\beta_{13} - \beta_{33} price)$$

$$\nu = -\beta_{12} + \beta_{13}\tilde{w} + price(\beta_{23} - \beta_{33}\tilde{w})$$

$$\delta = \alpha_2 - \alpha_3\tilde{w} - income(\beta_{23} - \beta_{33}\tilde{w})$$

$$\rho = \beta_{22} w' + \hat{w}\beta_{33}\tilde{w} - 2\hat{w}\beta_{23}$$

Interior solutions of m and h are given by

$$m = \frac{\psi\rho + \varphi\delta}{\rho\theta - \nu\varphi}; \quad h = \frac{\nu\psi + \delta\theta}{\rho\theta - \nu\varphi}$$

When h is rationed, the structure for the demand for m changes. In particular, when $h \leq 0$, m must satisfy

$$m^* = \frac{\psi}{\rho\theta - \nu\varphi}$$

Similarly, when m is rationed the structure of the demand for h changes. When $m \leq 0$, h must satisfy

$$h^* = \frac{\delta}{\rho\theta - \nu\varphi}$$

Table 1: Comparison of Independent Sector Data on Gifts of Money and Gifts of Time with Other Data Sources

Percentage of Households Volunteering by Gender and Employment Status

	Full-time		Part-time		Not Working	
	Men	Women	Men	Women	Men	Women
Independent Sector	41	42	50	57	25	33
Brown and Lankford (1992)	45	45	50	51	30	43

	Average Monthly Hours			**Annual $ Gift**	
	Men	Women	Total	Family	Per Cap
Independent Sector	6.5	7.2	6.8	650	261
Brown and Lankford (1992)	6.7	8.1	7.4	522	212

Percentage of Households Giving More Than $100 or Volunteering More Than 50 Hours

	Volunteer > 50	Gifts > $100	Median Gift > $100
Independent Sector	32.3	50.0	$600
1986 Survey of Consumer Finances	21.2	56.8	$400

Percentage of Population Volunteering by Marital Status

	Single	Married
Independent Sector	30.4	42.4
May 1989 CPS	13.8	23.9

Source: Authors' calculations from the Independent Sector data, 1986 Survey of Consumer Finances, May 1989 CPS. Data are weighted.

Table 3: Volunteer Activity by Income Class

	Total Population		Households Giving Money		Households that do not Give Money	
Income Class	Percentage Volunteering	Median Monthly Hours of Volunteers	Percentage Volunteering	Median Monthly Hours of Volunteers	Percentage Volunteering	Median Monthly Hours of Volunteers
- $9,999	18.9	8	29.3	10	9.8	8
$10,000-$19,999	27.1	11	35.7	10	15.3	15
$20,000-$34,999	41.8	12	49.0	13	25.7	9
$35,000-$49,999	49.0	10	54.6	12	28.8	8
$50,000-$74,999	46.1	11	50.2	12	30.2	10
$75,000-$99,999	47.7	12	50.5	11	31.6	20
$100,000 +	51.0	15	54.4	15	37.8	42
Total	38.9	12	47.0	12	21.0	10

Source: Authors' calculations from Independent Sector data. Data are weighted.

Table 2: Charitable Contributions of Money and Property by Income Class

	Total Population		Households that Volunteer		Households that do not Volunteer	
Income Class	Percentage Giving Money	Median Annual Contributions of Contributors	Percentage Giving Money	Median Annual Contributions of Contributors	Percentage Giving Money	Median Annual Contributions of Contributors
- $9,999	46.4	100	72.0	200	40.4	100
$10,000-$19,999	57.7	215	76.2	300	50.8	190
$20,000-$34,999	69.1	305	81.0	475	60.6	175
$35,000-$49,999	78.4	340	87.2	400	69.7	260
$50,000-$74,999	79.8	525	86.8	625	73.7	400
$75,000-$99,999	85.2	1200	90.2	2388	80.6	675
$100,000 +	79.6	1015	84.9	1250	74.2	820
Total	68.4	335	83.1	505	59.5	250

Source: Authors' calculations from Independent Sector data. Data are weighted.

Table 4: Maximum Likelihood Parameter Estimates, Primary Specification

Parameters	Estimates	Std. Err.	Est./S.E.
α_1			
constant	-0.937	0.052	-17.941
education	0.324	0.041	7.868
income	0.268	0.061	4.427
age	0.211	0.079	2.679
parents influential?	0.157	0.033	4.825
own home	0.144	0.036	3.960
female	-0.038	0.034	-1.134
nonwhite	-0.070	0.035	-2.030
child under 3	-0.038	0.042	-0.918
α_2			
constant	-2.950	0.083	-35.541
education	1.140	0.069	16.509
income	0.430	0.085	5.073
age	0.383	0.090	4.254
parents influential?	0.119	0.071	1.664
own home	0.046	0.087	0.530
female	-0.025	0.057	-0.435
nonwhite	-0.231	0.076	-3.028
child under 3	-0.223	0.082	-2.721
α_3	-0.167	0.036	-4.635
β_{11}	0.263	0.028	9.525
β_{12}	-0.010	0.011	-0.872
β_{13}	0.031	0.013	2.360
β_{22}	0.238	0.020	11.684
β_{33}	0.135	0.013	10.334
σ_m	0.569	0.053	10.852
σ_h	1.783	0.082	21.753
ρ_{mh}	0.690	0.032	21.651

Variable means are given in Appendix Table C. The log likelihood is 2,726.5, obs = 1,049.

Table 5: Simulated Elasticities Based on Table 4 Estimates

Elasticity	**Hours**	**Money**
price	-0.053	-0.349
net wage	-0.823	-0.138
w’	-0.595	0.108
income	0.174	0.283
education	1.314	0.741
age	0.135	0.186
parents impt. influence on char.	0.034	0.147
own home	0.011	0.213
female	-0.004	-0.024
nonwhite	-0.075	-0.047
child under 3	-0.028	-0.007

Data are from the Independent Sector. Details on the simulation are given in the text.

Appendix Table B: Details on Monthly Hours of Volunteer Labor

	Conditional on Volunteering in Specific Area									
Category	%Volunteering	Hours in Area	Total Hours	percent Female	percent Married	Age	Ed	Income	% Giving any area	Avg. Gift any area
Health	7.2	9.6	23.5	63.2	71.2	46.7	14.1	47707	81.2	1100
Education	10.3	10.4	25.1	65.8	78.0	39.9	14.4	47276	83.8	1132
Religious	20.2	10.5	20.1	57.2	72.5	45.5	13.4	39613	88.0	1374
HumServ	8.1	9.7	29.5	50.3	73.6	43.2	14.3	45869	84.5	1139
Environ	2.6	4.4	24.7	41.9	73.2	42.0	14.1	35487	76.5	883
Public/ society	4.1	6.5	27.5	45.0	72.5	46.1	14.7	46721	87.3	1417
Adult rec	4.6	9.0	33.7	36.3	63.3	41.0	14.1	44312	84.5	1162
Arts & cu	4.4	9.4	32.7	53.3	67.7	43.4	14.6	44906	90.7	1299
Wrk-rel o	4.7	7.8	26.4	38.9	73.0	40.5	14.7	50109	81.4	1257
Political	1.9	7.0	21.2	47.2	77.4	47.5	15.2	50439	82.7	1463
Youth D	9.7	9.3	27.2	49.8	80.5	39.0	13.9	45049	85.6	1403
Pri/Com Found	1.0	6.8	27.9	33.3	77.9	53.1	14.4	42972	85.9	1374
Internat	0.7	5.3	27.2	35.1	72.2	44.3	14.5	60233	80.0	1136
Other	2.0	11.5	21.3	46.1	77.0	44.1	13.7	39122	73.3	945
All Areas	38.8		19.1	53.9	71.0	42.9	13.6	41220	83.1	1073
						Full Population				
Sample	38.8		6.8	51.5	65.0	44.2	12.7	35972	68.4	650

Appendix Table A: Details on Annual Charitable Giving

	Conditional on Giving in Specific Area									
Category	%Giving	Gifts in Area	Total Gifts	percent Female	percent Married	Age	Ed	Income	% Vol any area	Total Hrs any area
Health	32.4	125	981	59.5	70.9	47.0	13.4	44229	50.1	9.1
Education	19.1	246	1332	60.8	76.6	42.6	14.2	46600	64.3	11.5
Religious	53.2	771	1095	53.3	72.1	47.2	13.0	39121	51.6	9.1
HumServ	23.0	173	1209	53.8	71.9	45.8	13.9	45109	52.8	11.0
Environ	13.4	78	1056	53.9	71.0	41.2	14.3	48699	51.6	8.1
Public/ society	11.2	101	1139	47.8	74.4	46.8	14.1	44892	56.8	12.6
Adult rec	6.2	111	1327	43.1	78.7	40.7	14.2	48254	62.4	13.3
Arts & cu	9.6	167	1730	57.3	73.8	44.1	14.9	52929	67.2	15.0
Wrk-rel o	8.5	170	1237	46.1	82.0	41.0	14.3	50191	55.6	12.4
Political	8.7	129	1667	39.6	75.9	48.2	14.5	46493	59.7	13.1
Youth D	21.7	113	1081	58.0	75.9	42.3	13.6	43789	61.5	12.7
Pri/Com Found	6.4	101	954	45.6	79.6	46.9	13.1	44081	48.9	9.8
Internat	4.2	165	1372	60.3	74.3	42.7	14.3	47587	57.1	10.8
Other	3.0	158	882	56.4	51.7	45.9	13.1	40552	49.8	7.9
All Areas	68.4		951	52.7	69.1	45.2	13.2	39615	47.1	16.8
						Full Population				
Sample	68.4		650	51.5	65.0	44.2	12.7	35972	38.8	6.8

Table 7: Model Fit of Primary Specification (Table 4)

Income in 1000s	Percent contributing		Mean Contribution $		Percent Volunteer		Volunteer hours	
	Predict	Actual	Predict	Actual	Predict	Actual	Predict	Actual
0-15 (n=222)	28.5	46.8	284	163	19.6	19.4	9.7	2.9
15-30 (n=301)	38.8	61.8	432	445	25.2	30.9	9.1	6.2
30-50 (n=257)	46.5	79.0	583	692	29.8	42.8	8.0	7.5
50-75 (n=181)	55.8	78.5	824	997	35.5	40.3	7.8	7.5
75+ (n=88)	69.2	92.0	1,253	1,850	45.3	47.7	8.5	11.3
All (n=1,049)	44.0	68.3	574	659	28.6	34.4	8.7	6.5

	$s by Contributors		Hours of Volunteers		% Givers volunteer		% Vols giving	
	Predict	Actual	Predict	Actual	Predict	Actual	Predict	Actual
0-15	995	349	49.3	15.0	36.4	28.8	53.0	69.8
15-30	1,113	720	36.2	20.0	41.7	41.9	64.3	83.9
30-50	1,253	876	26.8	17.6	44.8	47.8	70.0	88.2
50-75	1,477	1,271	22.0	18.6	49.2	45.1	77.3	87.7
75+	1,811	2,010	18.8	23.7	56.1	49.4	85.7	95.2
All	1,305	965	30.4	18.8	45.3	43.2	69.7	85.6

Model fit is from a stochastic simulation of the estimates reported in Table 4. Details are given in the text.

Appendix Table C: Sample Statistics for Primary and Alternative Specifications

Variable Name	Mean	Std. Dev.	Minimum	Maximum
Monthly volunteer hours (in 10's)	0.647	1.508	0.000	13.750
Narrow definition of Volhrs (in 10's)	0.213	0.768	0.000	12.150
Total annual contributions (in 1000's)	0.659	1.327	0.000	11.900
Narrow definition of Totcon (1000's)	0.177	0.591	0.000	10.200
Parents an import. influence on giving	0.400	0.490	0.000	1.000
Child under three	0.141	0.348	0.000	1.000
Female	0.262	0.440	0.000	1.000
Own home	0.606	0.489	0.000	1.000
Education (years in 10's)	1.306	0.314	0.300	1.800
Age (in 100's)	0.418	0.121	0.180	0.650
Non-white	0.370	0.483	0.000	1.000
Hourly W' (in 10's)	1.151	0.730	0.100	4.000
Hourly net wage (in 10's)	1.051	0.535	0.144	3.500
Price of monetary gifts	0.910	0.118	0.670	1.000
Income (in 100,000's)	0.370	0.271	0.050	1.277
Observations = 1,049				

Sample statistics for the samples used in Tables 4, 5, 7, and 8. Data are from the Independent Sector.

Table 8: Elasticities from Alternative Specifications

Model Estimated with a Narrow Definition of Charity

Elasticity	**Hours**	**Money**
price	-0.017	-0.407
net wage	-1.401	-0.143
w’	0.002	0.078
income	-0.046	0.648
education	2.129	0.519
age	0.513	-0.101
parents impt. influence on char.	-0.052	0.153
own home	-0.059	0.098
female	-0.050	0.052
nonwhite	-0.134	-0.037
child under 3	-0.014	-0.033

See Appendix Table C for sample statistics and the text for details of the model specification.

Table 6: Aggregate Charitable Contributions Over Time

Year	Contributions[1] Deductions (bil $)	Estimated Total[2] Contribut. (bil $)	Contributions Deducts (% GDP)	Tot Contributions (% of GDP)
1979	22.20		0.89	
1980	25.80	48.60	0.95	1.79
1981	30.80	55.60	1.02	1.83
1982	33.50	59.30	1.06	1.88
1983	37.70	63.20	1.11	1.86
1984	42.10	68.80	1.11	1.82
1985	48.00	73.20	1.19	1.81
1986	53.80	83.90	1.26	1.97
1987	49.60	90.30	1.09	1.99
1988	50.90	98.40	1.04	2.01
1989	55.50	107.00	1.06	2.04
1990	57.20	111.70	1.03	2.01
1991	60.60	116.80	1.06	2.04
1992	63.80	124.30	1.06	2.06
1993	67.20		1.06	

[1]Figures are the total contributions deductions claimed by itemizers on their tax returns. Data are from the Statistics of Income Division of the Internal Revenue Service, Individual Income Tax Returns, various years.

[2]Figures are estimates of the total contributions made by households. Data are from the Statistical Abstract of the United States, 1994, Table 610.