The Influence of Reference Group Contributions on a Family's Charitable Giving

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Abstract

Giving to charity seems to arise from interpersonal comparisons of relative well-being. The purpose of this study is to test if reference group comparisons of charitable contributions influence the propensity to give to charity. Apart from purely altruistic motives, the economics literature on charitable giving suggests that individuals receive utility from their own gifts, from the joy of giving, and supplementary utility if they believe that their contribution will increase their relative status. I hypothesize that when reference group members contribute to charity, individuals of the same group who use donations as a social signal will donate so to maximize utility as their marginal utility from signaling status changes. To test this hypothesis, I undertake an empirical examination of the effect of the average amount contributed by a reference group on the amount an individual in the group donates. The study spans the tax years from 2002 to 2012 and relates charitable giving of a panel sample of U.S. residents to the average amount contributed by their reference group members. During this period, individual federal income tax rates were reduced and certain limitations on itemized deductions were phased out. Changes in the U.S. tax code changed the effective price of giving to charity for donators who itemize their charitable contributions, causing them to change the amount that they contribute. Consequently, their reference group members were affected.

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1 Introduction

In the United States from 2002 to 2012, individuals in the U.S. itemized over $2.1 trillion in charitable deductions[1]. Total charitable contributions by individuals remained at a stable percent of total adjusted gross income (AGI), ranging between 3 percent and 3.6 percent of AGI for contributors who itemize their donations. Figure A.1 depicts the trend of itemized contributions and contributions as a percent of AGI over this period.

Previous research has emphasized the relationship between the amount of charitable contributions and the effective price of giving to charity, which is determined by the tax deductibility of gifts. I will be using changes in the tax code as exogenous variation in the price of giving. This period saw sweeping changes to the U.S. tax code. Signed into law on June 7, 2001, the Economic Growth and Tax Relief Reconciliation Act (EGTRRA) lowered federal individual income tax rates for all taxpayers and provided lower income taxes for married couples by increasing the standard deduction for joint filers. The law also phased out certain limitations on itemized deductions. In 2003, the Jobs and Growth Tax Relief Reconciliation Act (JGTRRA) accelerated particular provisions of EGTRRA, including the reduction of federal individual income tax rates. The two laws were intended to be temporary and contained 'sunset' clauses for the changes in the tax code to expire by 2011. The provisions of EGTRRA were fully extended and the 'sunset' clause was amended for changes to expire after the 2012 tax year with the Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010. Figure A.1 displays the historical occurrences of the tax acts and the total amount of charitable contributions itemized on federal individual income tax returns.

The simultaneous reduction of income tax rates with the removal of the limitations for itemized deductions between 2001 and 2012 presumably affected the amount donated by contributors who itemize for tax deductions. During the tax years of 2005 through 2007, deductions for itemized contributions were over $200 billion real 2012 dollars a year. At the same time, contributions as a percentage of average gross income fell, but remained above 3 percent. Certain Americans who are unaffected by changes in federal income tax or allowances for tax deductions of charitable gifts may change the amount that they donate because of large changes in the amount donated by itemized contributors in their reference group.

The hypothesis put forth is that individuals care about their donation relative to donations made by their reference group. Data gathered from the U.S. Panel Study of Income

[1] The sum of all contributions of cash, other than cash, and carryover from prior years deducted from federal individual income tax from the beginning of 2002 to the end of 2012, in real 2012 dollars.

Dynamics are employed to explore charitable giving at the individual level in relation to the average contribution made by reference group members. I use the state income tax rates of reference group members in neighboring states as an instrumental variable to capture only changes in reference group contributions that are exogenous. This study provides empirical evidence that the average amount contributed by an individual's reference group affects the amount that an individual who care about status donates in a given tax year. The structure of this study is as follows: a brief overview of charitable giving in the United States; a review of current literature; a summary of the data; an outline of the methodology; the resulting effect of reference group contributions on individual donations; concluding remarks; and an appendix of variable definitions and econometric results.

2 Relevant Literature

2.1 Motivations for Charitable Giving

The main focus in the economics literature on charitable giving is on its public-good nature. Feldstein (1975) suggests, "Philanthropic activity generally benefits not only those who are the direct recipients of its service but also those who, like the individual donor, believe that the service should be provided." Altruists gain utility from the utility of others, so any contribution to charity that is spent to provide aid will increase the utility of an altruistic agent. Roberts (1984) provides a model of private charity where individuals are altruistic and care about the consumption of others. The model predicts that in political equilibrium, there will be an overprovision of redistribution to the extent that private charity is reduced to zero. Government provision of public goods will crowd out all altruistic gifts.

An insight was made by Andreoni (1990) who notes that in the purely altruistic model, people are assumed to be indifferent between their own gift to charity and gifts made by others. To account for egoistic preferences, a model where individuals are impurely altruistic is introduced. Individuals derive additional utility from their own gifts and will prefer the bundle of public goods which provides the most warm glow utility, everything else equal. The model of impure altruism incorporates the private benefit from charitable giving and predicts that the distribution of income and government tax policies will affect philanthropic behavior.

Treating charity as a private good allows analysis within the traditional economic model. Abrams and Schmitz (1978) state, "The utility-maximizing individual would make private charitable contributions up to the point where the marginal utility of the last dollar donated equals the marginal utility of the last dollar used privately. The extent of an individual's

charitable contributions will depend on the individual's utility-preference mapping, his [or her] budget constraint, and the relative cost of contributing."

2.2 The Price of Charitable Giving

In the computation of federal income tax, individuals are allowed itemized deductions for charitable contributions, according to 26 U.S. Code §170 Charitable, etc., Contributions and Gifts. In general, the law permits charitable contributions to a total of 50 percent of the taxpayer's AGI to any church, convention, educational organization, organization that provides medical care or medical research, government organization, conservation organization, public organization or private foundation. Contributions made for any other charitable purpose are limited to 30 percent of the taxpayer's AGI for the taxable year, while also limited to the 50 percent aggregate deduction. Contributions which exceed the limitation of the current tax year may be itemized for tax deduction in each of the 5 succeeding taxable years. Also, certain states allow deductions for charitable contributions from state income tax[2].

The influence of price on giving behavior is explored extensively in the economics literature on charitable giving. Feldstein (1975) presents results that indicate "charitable contributions are increased substantially by the current provision of deductibility." The higher a taxpayer's marginal tax rate is then the more they benefit from deducting charitable contributions from their taxable AGI. "The 'price' of one dollar's contribution to a philanthropic organization, measured in terms of foregone income after tax, therefore varies inversely with the individual's marginal tax rate" (Feldstein and Clotfelter, 1976).

Deductions for charitable contributions are one of the major tax expenditures in the United States. Provided through the tax code, tax expenditures constitute foregone revenue in the form of government spending for exemptions, deductions, or credits to select groups or specific activities. "Since the income tax has a progressive structure, tax expenditures formulated as deductions or exclusions generally reduce the progressivity of the tax system" (Faricy, 2011). That is, tax expenditures have regressive effects on the income redistribution and the "use of deductions, exclusions, and exemptions excludes non-taxpayers, the poorest Americans, from tax benefits for social purposes" (Faricy, 2011).

The Omnibus Budget Reconciliation Act of 1990 instituted the Pease Limitation, a temporarily limit on itemized deductions. The Pease Limitation reduces the value of itemized deductions by 3 percent of AGI for every dollar that AGI exceeds a certain dollar threshold, up to a maximum reduction of 80 percent of itemized deductions. The limit was permanently extended with the Omnibus Budget Reconciliation Act of 1993. With the enactment

[2] The deductions from state income tax are typically subject to the same limitations as deductions from federal income tax. Figure 2 depicts the states that allowed deductions from 2002 to 2012.

of EGTRRA in 2001 and JGTRRA in 2003, the Pease Limitation and The Alternative Minimum Tax (AMT), which also limits the amount of charitable deductions that may be made by an individual, had their provisions stripped. Also, EGTRRA provided for a gradual rate reduction of federal individual income tax rates and JGTRRA accelerated the provisions. The Tax Relief Unemployment Insurance Reauthorization, and Job Creation Act of 2010 provided a temporary two-year extension to the 2011 EGTTRA 'sunset'. The act provided for the return to the standard limitations of itemized deductions on January 1st, 2013. The limitations were reinstated, but the American Taxpayer Relief Act of 2012 increased the AGI threshold that triggers the Pease Limitation and thus reduced the number of taxpayers affected. Table 1 lists the reduction of federal tax rates by tax bracket.

The lowering of effective federal tax rates likely caused a decrease in charitable giving by all itemizers, because their overall price of giving rose. During the same period, the reduction of limitations of deductions likely caused an increase in charitable giving by high income contributors who were above or near the threshold for limitation.

2.3 Signaling Theory and Interpersonal Comparisons

Traditionally, economic agents have been portrayed with perfectly independent preferences. Each agent maximizes their utility in regards to prices, a budget constraint, and their own preferences. In reality, the preferences and choices of others often affects a consumer's behavior. Utility maximization of an agent may depend to a lesser or a greater extent on the choices made by others. Feldstein and Clotfelter (1976) suggest, "It is widely believed that the amount that each individual contributes to charity is substantially influenced by the amounts the he [or she] perceives others to be giving." "Fund raisers emphasize the importance of 'leadership gifts', large gifts by some high income individuals that motivate similar individuals to make comparable gifts and lower income individuals to make gifts that are larger than they would otherwise make" (Feldstein and Clotfelter, 1976). The authors add a variable to control for the average giving in an individual's income class and in the income classes above him or her. In a different study on charitable contributions, Feldstein (1975) finds a highly significant result of donor's income to average per capita income and argues that "some measure of relative income should be added" in analysis.

A theory proposed by Glazer and Konrad (1996) is that agents may gain utility from signaling income and use charitable donations to signal status. Charitable giving can act as a mechanism to signal absolute or relative wealth. For some individuals, contributing more than average may provide relative gratification and contributing less than average may cause relative deprivation. If there is interdependence between economic agents in this manner,

there are clearly consumption externalities for charitable giving. Glazer and Konrad (1996) suggest, "Charitable donations may be especially good signals to people who belong to a peer group, but cannot directly see their conspicuous consumption." In circumstances where the consumption of luxury goods may not be visible, donations to charitable organizations may be used to signal income.

An argument presented by Frank (2005) is that comparison with a reference group is a driving factor of behavior that inevitably leads to a positional arms race. The models that incorporate concerns about relative position predict equilibrium with too much expenditure on positional goods. Individuals are forced to consume an inefficient amount of luxury goods in order to 'keep up with the Jonses'. Furthermore, the current structure of tax subsidies grants high income earners a lower effective price of giving, which allows additional consumption of positional goods. For example, if two faculty members gain utility from signaling status through charitable donations, then their utility would depend on the other's contribution. Suppose that the two faculty members have different salaries. Then the faculty member with the higher salary, if they face a higher tax rate, will have a lower effective cost of donating. Therefore, the faculty member with the lower income would be at a disadvantage in terms of signaling status through charitable donations. The lower income earner must divert more resources into charitable donations than the higher income earner to signal an equivalent amount of status.

The welfare implications of tax expenditures for charitable donations are ambiguous. Charity is a public good that is enjoyed by all altruists and provides benefit to many communities and individuals, but donations to charity are a negative externality for any individual who cares about their relative status. Moreover, individuals will prefer donating to charities which make public their contribution, but not necessarily to those organizations with the lowest marginal cost[3]. It is possible that voluntary contributions are not allocated efficiently[4]. If economic agents choose to allocate resources towards only the public goods which provide positional externalities, then there will be an under provision of less glamorous public goods. An empirical analysis of charitable donations made by U.S. residents in relation to contributions of their reference groups over the time period of 2002 to 2012, when the price of giving for itemized contributors drastically changed, would seem to be a

[3] Glazer and Konrad (1996) "observe that many successful nonprofit organizations have high fund-raising costs." Their model provides the explanation that fund-raising activities such as those must provide additional benefit through publicizing donation amounts.

[4] Madigan v. Telemarketing Associates, Inc. is a U.S. Supreme Court dispute entailing a charitable nonprofit corporation organized to provide welfare to Vietnam veterans where "under the contracts, the fundraisers were to retain 85 percent of the proceeds of their fundraising endeavors." Although advertising to provide "a significant amount of each dollar donated" to the veterans' organization for charitable purposes, "the fundraisers knew that 15 cents or less of each dollar would be available for those purposes."

fruitful addition to the economics literature.

2.4 Theoretical Model with Interdependent Preferences

I find it instructive to cast the decision problem at hand within Andreoni's (1990) model of impure altruism, by solving for a donation function that takes the average reference group contribution as an argument. Interdependent preferences among contributors would suggest that the utility gained from donating may be more complex than expressed in the traditional utility function. I hypothesize that utility from contributing to charity depends on the absolute amount as well as the relative amount donated. Define the optimization problem of individual i in time t as

$$\max_{\{C_{it},D_{it}\}} U_{it} = U(C_{it}, D_{it}, R_{it}) \quad \text{s.t.} \quad C_{it} + D_{it} = Y_{it} - \mathrm{T}_{it}(Y_{it}),$$

where D_{it} is the total amount donated to charity, C_{it} is private consumption, R_{it} is the average amount contributed by an individual's reference group, excluding that individual, Y_{it} is the total income of the family, and T_{it} is a lump-sum tax paid to the government that is a function of income. Let w_{it} be disposable income and D be total donations by all group members. It follows that

$$w_{it} = Y_{it} - \mathrm{T}_{it}(Y_{it}),$$

and

$$D_{it} = D - n_{it}R_{it},$$

where n_{it} is the total number of members in an individual's reference group at time t. I assume a Nash equilibrium where all reference group members donate according to their best response, which allows the average reference group contribution to be known and treated as exogenous. Substituting for D_{it} in the optimization problem yields

$$\max_{\{R_{it}\}} \; U_{it}(w_{it} + n_{it}R_{it} - D, D - n_{it}R_{it}, R_{it}).$$

Differentiating with respect to R_{it} and solving for D_{it} yields a donation function, F_{it}, that takes the exogenous variables as arguments

$$D_{it} = F_{it}(w_{it} + n_{it}R_{it}, n_{it}R_{it}) - n_{it}R_{it}.$$

The derivative of F_{it} with respect to the first argument is the individual's marginal propensity to donate for altruistic reasons and the derivative of F_{it} with respect to the second argument

is the individual's marginal propensity to donate for the private good dimension.

The amount donated to charity by an individual depends on their individual characteristics, as well as the number of reference group members, n_{it}, and the average amount contributed by their reference group, R_{it}. I assume that the effect on giving from the number of reference group members asymptotically approaches zero as n_{it} increases. I then assume a functional form for the effect of individual characteristics and the average reference group contribution, R_{it} on individual charitable giving. First, a linear specification for is assumed

$$D^*_{it} = \alpha + X_{it}\beta + \delta R_{it} + \mu_{it},$$

as well as an alternative multiplicative specification

$$D^*_{it} = AX^{\gamma}_{it} R^{\varphi}_{it} e^{\varepsilon_{it}},$$

which emphasizes the interaction between the regressors. Here, D^*_{it} is the true amount donated by an individual i in time t, α is a constant, X_{it} is a vector of individual characteristics and the errors, μ_{it} and ε_{it}, are normally distributed.

The elasticity of average reference group contribution, $\varphi \in [-\infty, \infty]$, is the magnitude to which changes in the average contribution of the reference group affects the amount donated by an individual. If $\varphi = 0$ the individual only cares about their absolute donation, and if $\varphi > 0$ gifts from others increase the marginal utility of an additional donation for the individual, holding everything else constant. This is the parameter of interest to determine the extent to which contributions of reference group members affects the amount donated by an individual in the group.

3 Data

3.1 The Panel Study of Income Dynamics

Data at the family-level are used to study the influence of average reference group contributions on individual charitable giving behavior. The data are available for public use and are collected from the Panel Study of Income Dynamics (PSID), which began in 1968. The PSID collects data on a representative sample of over 10,000 families and is considered the longest running, longitudinal household survey in the world. The PSID sample used in this analysis consists of 6 biennial surveys between 2003 and 2013 that ask the family about their income and charitable donations in the prior year.

The PSID definition of a family unit is a group of people living together in the same

housing unit who are related and economically interdependent. In practice, the head of the family unit is the male half of a married couple or a long-term cohabiting couple. When the family consists of one adult with no spouse, the single adult is considered the head of the family unit. Only the head of the family unit is included in the sample. For analysis, the total amount of charitable donations and income of the entire family are used with the demographic characteristics of the head of the family that is currently residing in the housing unit[5]. Feldstein and Clotfelter (1976) "eliminated a relatively small number of households that did not report one or more key variables." Likewise, I exclude individuals who did not respond to age or education. Also, individuals who were residents of Alaska, Hawaii, or foreign territories were not included in the sample because of a lack of comparable peers. Between 2003 and 2013, there were 12,956 unique heads of a family who were surveyed[6]. There are a total of 48,667 observations in the full sample, which will be used in the calculation of the average contribution of the reference group.

Table 1: The percent of the sample that donates.

Overall	55%
By gross family income	
Less than $\$25,000$	36%
$\$25,000$ to $\$60,000$	51%
$\$60,000$ to $\$100,000$	69%
$\$100,000$ to $\$250,000$	85%
Greater than $\$250,000$	91%

Source: PSID (2015).

"As of the mid-1990's, only around one in three taxpayers even itemized their taxes beyond the standard deduction" (Faricy, 2011). In the PSID sample, 43 percent of the individuals who donate also itemize charitable contributions on their federal tax returns, with a significantly higher proportion for high income. This suggests that high income donators appear to have additional motivation to itemize deductions beyond those of ordinary taxpayers. Feldstein (1975) reports, "In 1970, approximately 90 percent of individual contributions were itemized as tax return deductions." Overall, 68 percent of individual contributions were itemized in the PSID sample, with a substantially higher percent of contributions itemized in higher income classes. This is understandable because the price of giving is inversely

[5] Total charitable donations of an individual are calculated as the sum of all reported donations to health, education, environment, religious, economic relief, international, youth, cultural or any other charitable organizations in a given tax year.

[6] Attrition of individuals in the sample is assumed to be random.

related to marginal tax rate for all donators that itemize their contributions. In fact, for the taxpayers with family incomes greater than $100,000 the average percent of donations that were itemized in a given tax year is greater than 100 percent. Individuals in the high income brackets were much more likely to itemize gifts in subsequent tax years beyond the amount of gifts made in those years. Families in the sample with gross incomes of less than $25,000 itemized on average only 27 percent of charitable contributions made in a given tax year.

3.2 Demographic Controls

The individual characteristics of the family need to be controlled for in the donation function. "Presumably, increases in educational attainment and church membership, ceteris paribus, would serve to encourage increases in charitable contributions" (Abrams and Schmitz, 1978). Feldstein (1975) notes that the changing role of religion may have an influence on charitable giving behavior. Feldstein and Clotfelter (1976) find that demographic characteristics such as age, sex, marital status, educational background, and occupation influence giving behavior. The authors argue "the philanthropic behavior of older taxpayers may differ substantially from the behavior of younger ones. Decisions about current giving and charitable bequests are likely to be more interdependent than at earlier ages" (Feldstein and Clotfelter, 1976). In order to control for these various factors, I include a set of demographic controls for the age, education, sex, marital status, number of children, religious affiliation, and homeowner status of the head of the family unit. Clotfelter (1985), Kingma (1989), and Andreoni (1990) also indicate that these factors are commonly used in empirical studies of charity.

For a measure of income, Feldstein and Clotfelter (1976) suggest defining disposable income as the "total income minus the taxes that would be due if no contributions were made." Therefore, I first calculate the tax burden of the family by multiplying their taxable income by the combination of federal and state individual income tax rates. Next, I subtract the tax burden from the total family income, which includes all transfer and non-taxable income. Disposable income is included as the final demographic regressor.

3.3 The Price of the First Dollar Given

An advantage of this sample is that it includes both donators that itemize and donators that do not itemize. Feldstein and Clotfelter (1976) note that most studies on charitable giving have a sample that is restricted to only taxpayers with itemized returns, which eliminates substantial information of the giving behavior of taxpayer's with lower income. In this sample, 78 percent of families with less than $25,000 in total family income who donate to charity do not itemize their contributions. Abrams and Schmitz (1978) observe that the

relative cost of contributing depends on "whether or not the individual itemizes deductions on his [or her] income tax schedules." "A taxpayer who does not itemize his [or her] deductions has a price of 1 for all charitable contributions" Feldstein and Clotfelter (1976).

The effective price of a charitable contribution is only reduced if the giver itemizes the gift. Otherwise, a \$1 gift costs \$1 regardless of income. However if the giver does itemize, then the \$1 gift that would normally be taxed as part of adjusted gross income at rate T, but is instead deducted. Therefore, the \$1 gift has an economic cost of (\$1 − T) because −T is the opportunity cost of using the dollar of income for a purpose that is not tax deductible. Thus, the effective price of the first dollar of charity for an individual in a given year is equal to one minus the federal and state individual income tax rates if the family itemizes their contributions and the state allows charitable deductions from state income tax, one minus the federal individual income tax rate if the family itemizes their contributions and the state does not allow charitable deductions from state income tax, and equal to one otherwise,

$$P_{it} = \begin{cases} 1, & \text{if } i \text{ does not itemize deductions,} \\ 1 - f_{it}, & \text{if } i \text{ itemizes and state deductions not allowed,} \\ 1 - (f_{it} + s_{it}), & \text{if } i \text{ itemizes and state deductions allowed,} \end{cases}$$

where f_{it} is the federal individual income tax rate and s_{it} the state individual income tax rate[7]. Here, I assume that all contributions may be itemized, because contributions which exceed any limitations may be itemized for deduction in subsequent tax years.

Table 2: The average price of the first dollar given.

Overall	\$0.93
By gross family income	
Less than \$25,000	\$0.98
\$25,000 to \$60,000	\$0.96
\$60,000 to \$100,000	\$0.90
\$100,000 to \$250,000	\$0.81
Greater than \$250,000	\$0.72

Source: PSID (2015).

The price of the first dollar given captures the direction of price discrimination, in favor

[7] Individual income tax rates are determined by total family taxable income, marital status, and the tax brackets of the given fiscal year. The family is assumed to file jointly if married. A fruitful correction would be to simulate with TAXSIM.

of higher income earners, that is inherent with income tax deductions for charitable contributions in a progressive tax code. The nature of income tax deductions for charitable giving might encourage high income earners to over-consume gifts, which in turn influences their reference group members to contribute as well, but at a potentially higher cost. Feldstein (1975) estimated that contributions had an average net price of less than 74 cents. Table 3 shows that the average price of the first dollar given is 93 cents for the entire sample, which is significantly higher. Individuals who had family incomes of greater than $250,000 had an effective price of giving of 72 cents, which is less than Feldstein (1975) estimated, while all other individuals who had lower incomes faced a higher price. Individuals who had less than $25,000 in total family income received a negligible subsidy to their effective price of giving. Feldstein and Clotfelter (1976) argue that the lower average price of charitable gifts for higher income earners has a greater effect on charitable giving than for lower income earners.

3.4 Total Philanthropy in the United States

Prior economic research has shown that individuals care about the aggregate amount of philanthropy provided. Kingma (1989) shows that total contributions do influence behavior, but it is not necessary to distinguish between government and private donations. A weak crowd-out effect has been measured, which indicates that an individual's donation has a negative relationship with total contributions. In the altruism model proposed by Abrams and Schmitz (1978), the contributor's utility depends on the utility of the recipient and "increases in government transfers, ceteris paribus, would lower the recipient's marginal utility of an additional contribution." Thus, "the contributor's marginal utility from an additional contribution is also reduced" and the contributor will "increase expenditures on private goods and reduce charitable transfers until marginal utilities are once again equated" (Abrams and Schmitz, 1978). This model results in partial crowding out, where increases in total contributions cause less than a dollar for dollar reduction in the amount an individual's donates.

In their empirical model, Abrams and Schmitz (1978) include a measure of government giving as the sum of social security and other federal trust fund expenditures to health, education and welfare[8]. For simplicity, to control for total philanthropic provision, I calculate the total amount of U.S. philanthropy for a given year as the sum of all government-sponsored social insurance program receipts and the total amount of itemized charitable contributions

[8] Abrams and Schmitz (1978) note, "While the actual net impact of the social security transfer program is open to question, if individuals believe the program helps the needy, the program's growth could affect private charitable giving."

made by individuals. The data are published by the Internal Revenue Service and are publicly available. Social insurance programs provide Social Security, Medicare, unemployment insurance and many other benefits to the public. Participation in social insurance programs is generally mandatory and the benefits are well-defined. Due to the similar benefits provided, individuals may view contributing to social insurance programs as a substitute for private charity. It is also reasonable to assume that the total amount of itemized contributions is public information. Therefore, the sum of all social insurance receipts plus all private individual contributions represents an accurate total of all philanthropy provided in the U.S.

3.5 The Average Contribution of Reference Group Members

In addition to aggregate philanthropy, it is important to consider with whom the individual compares their gift, if at all. Social groups that an individual belongs to through geographic and occupational interaction "can become points of reference for shaping one's attitudes, evaluations and behavior (Merton, 1968)." For functional analysis, I define a reference group as the other individuals who work in the same industry and the same or neighboring state as the individual. It is reasonable to hypothesize that peers in the same industry and geographic cohorts will influence an individual's giving behavior, because these are the peers with whom the individual interacts on a regular basis.

The industry cohorts are sectors of similar industries as defined by the North American Industry Classification System[9]. There are a total of 20 different industry cohorts, with individuals who did not know their sector constituting an additional cohort. The geographic cohorts are determined by state, constituting all individuals in the same state or neighboring state as the family. Figure 2 displays the similarity between the average contributions of neighboring states. The data suggest that individuals in the same industry and geographic cohorts have similar giving patterns. Figure 1 demonstrates how different industries have markedly different average contributions. The range of average contribution by industry is from $601 in the food services industries to $3,154 in the professional, scientific and technical services industries. Industries that provide publicly beneficial goods and services, such educational services and public administration, give higher average amounts as well.

The average reference group contribution of the family is the average amount donated by all other families in the same industry and geographic cohorts. Where there are fewer than 30 reference group members for an individual in the sample, the average contribution is calculated for all residents of the same state, or neighboring state[10]. The law of averages states

[9] Table A.1 in the appendix provides the corresponding NAICS codes for the industry cohorts.

[10] 17% of the sample had fewer than 30 comparable peers in both their geographic and industry cohorts.

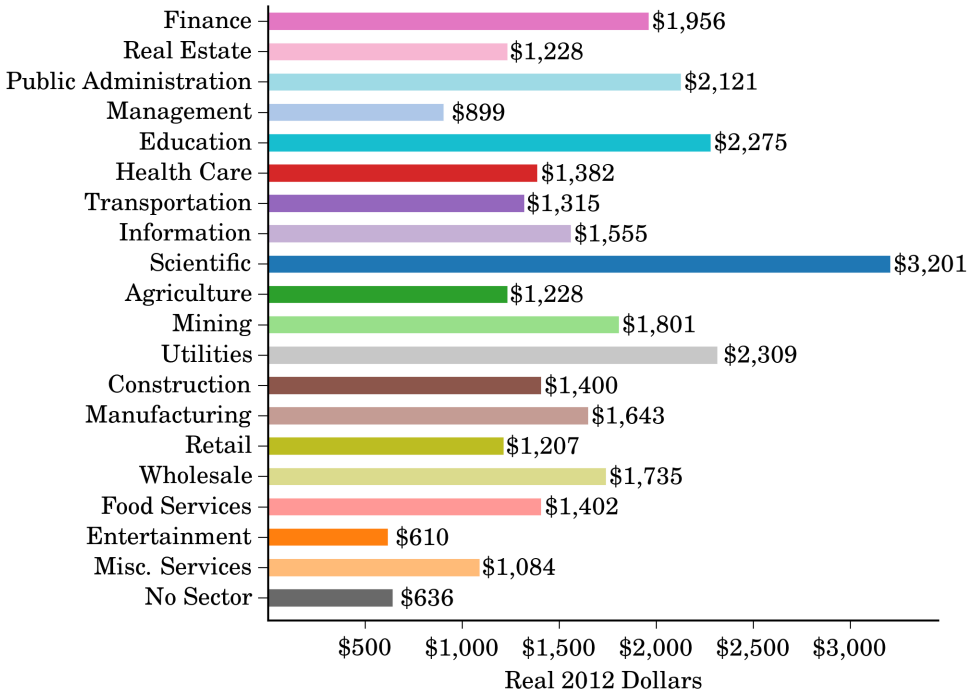

Figure 1: Average annual charitable giving by industry
2002-2012

Notes: The average amount of charitable giving is calculated from the full sample for the total amount of reported donations made in tax years between 2002 and 2012 according to the industry cohort of the head of the family unit's main full-time job.
Source: PSID (2015)

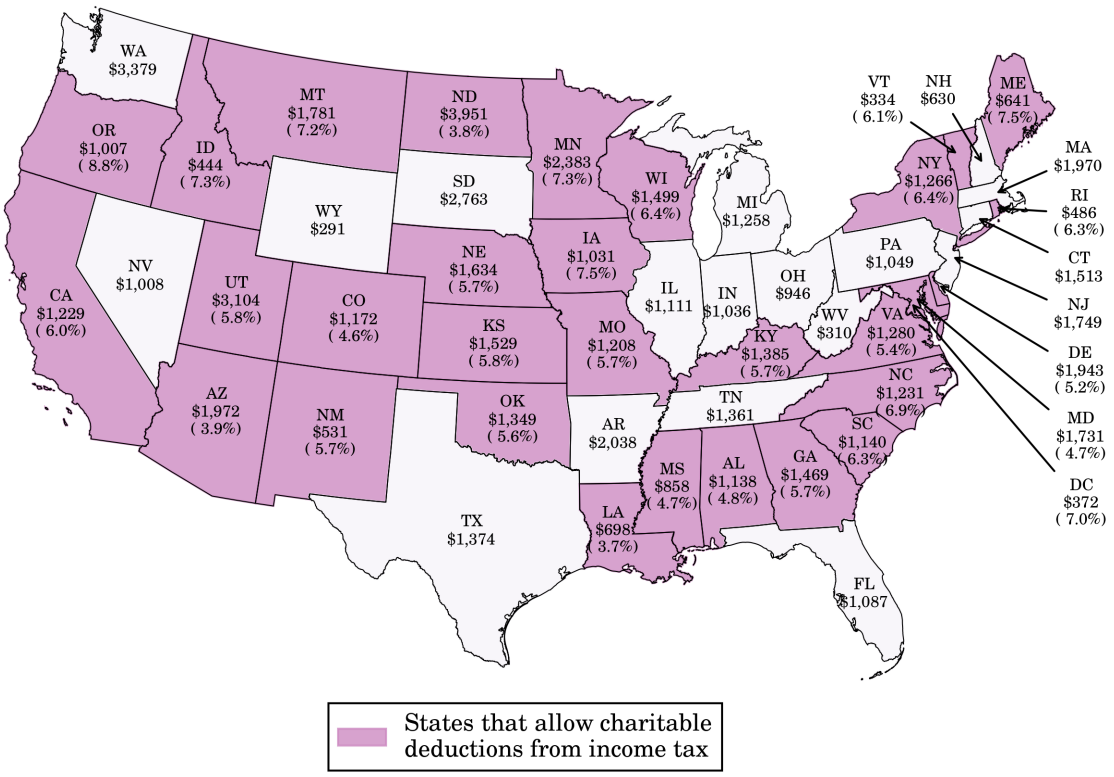

Figure 2: Average annual charitable giving by state
2002-2012

Notes: The average state individual income tax rate of residents in the full sample is in parentheses for any state that allows charitable deductions. The allowance for charitable deductions is defined by a NBER written TAXSIM program; assuming the taxpayer is a single person without children, but with $\$10,000$ of mortgage interest and $\$50,000$ of wage income, $\$1,000$ of cash contributions is added to itemized personal deductions and if the taxpayer's state income taxes goes down by \$5 or more, the state is considered to allow charitable deductions. All states that allowed a deduction for charitable contributions as defined by the TAXSIM program allowed the deduction for the period from 2002 to 2012, with Louisiana allowing deductions by the 2009 tax year. The average amount of charitable giving in real 2012 dollars is calculated from the full sample for the total amount of reported donations made in tax years between 2002 and 2012 according to the state of residence of the head of the family unit.
Source: PSID (2015)

that the sample average converges in probability towards the expected value as sample size increases. Therefore, with sufficient observations in each industry and geographic cohort, an accurate measure of the average contribution of an individual's reference group can be calculated. The average contribution of the reference group is the primary explanatory variable that is of interest in this paper. Changes in the average contribution of an individual's reference group will change the marginal utility of the last dollar donated, if the individual gains utility from signaling status with charitable donations.

3.6 Federal and State Individual Income Tax

Federal and state tax rates are assigned by total family taxable income, marital status, and the current tax year. The information on federal and state individual income tax rates is provided by The Tax Foundation, and all rates are collected from government-issued datasets. Taxable income before contributions is used to determine the marginal tax rate. Figure 2 depicts the states which allowed charitable deductions from state income tax between 2002 and 2012; 30 of the 48 contiguous states, plus Washington D.C., allowed deductions for charitable contributions from state individual income tax during the sample period. Louisiana began allowing charitable deductions by the 2009 tax year. There were 9 states that had no state income tax during the sample period: Arkansas, Florida, Nevada, New Hampshire, South Dakota, Tennessee, Texas, Washington, and Wyoming. The sample period encompasses changes in both federal and state individual income tax rates, which provides exogenous shocks to the effective price of giving for donators that itemize their contributions. Exogenous changes in state income tax rates will allow for the identification of the true effect of reference group contributions on the amount donated by individual members.

4 Methodology

The hypothesis proposed is that the amount donated to charity depends on the average contribution made by the family's reference group. Ordinary least squares, random effects, fixed effects, and two-stage least squares models are used to estimate the response to average reference group contributions. If the coefficient estimated is statistically significant, then the average amount contributed by a family's reference group had an effect on the amount the family donated to charity. All regression models are estimated in the level form of equation (1) and a logarithmic transformation of equation (2) for the period of 2002 to 2012, using the panel sample from the PSID. Observations with a non-positive value for total charity

These individuals had their reference group constitute all the peers in their geographic cohort.

or disposable income are not included in the logarithmic models. The empirical models test the stability of the parameter on the average reference group contribution.

4.1 Pooled OLS

For an initial analysis, all observations are pooled and an ordinary least squares (OLS) model is estimated. The linear regression model is of the form

$$D_{it} = \alpha + X_{it}\beta + \delta R_{it} + \mu_{it}, \tag{1}$$

and the log-linear regression model is

$$\ln D_{it} = \ln A + \gamma \ln X_{it} + \varphi \ln R_{it} + \varepsilon_{it}, \tag{2}$$

where i indexes the family unit, t indexes the year, and the dependent variable, D_{it}, is the total amount donated to charity for a given family in a given year. A vector of independent variables, X_{it}, contains controls for demographic characteristics, total family income, total U.S. philanthropic provision, and the estimated price of giving. The primary variable of interest is the average amount contributed by an individual's peer group, R_{it}. However, this method ignores unmeasured heterogeneity in individual panels. The standard errors are likely to be biased if there is correlation across the residuals of the same individual over time.

4.2 Random Effects

The panel nature of the data allows for individual effects that are assumed to be randomly distributed across the full population. The linear regression model with random individual effects is

$$D_{it} = \alpha + X_{it}\beta + \delta R_{it} + \mu_{it} + \tau_i, \tag{3}$$

and the log-linear regression model with random individual effects is

$$\ln D_{it} = \ln A + \gamma \ln X_{it} + \varphi \ln R_{it} + \varepsilon_{it} + \eta_i, \tag{4}$$

where τ_i and η_i represent individual random effects. In random effects models, the individual effects are assumed to be randomly distributed across the full population of economic agents. The PSID represents a random draw of the population, so it is reasonable to assume that altruistic preferences are randomly distributed across the cross-sections and thus τ_i and η_i represent randomly distributed family-specific disturbance terms which are fixed over time.

The random effects models also assume that the individual effects are not correlated with the other regressors. This allows for fewer estimated parameters and the inclusion of time-invariant regressors.

4.3 Fixed Effects

Certain individual-specific preferences cannot be observed or measured and may not be distributed randomly across the population, but do not change over time. In order to account for nonrandom individual-specific effects, a fixed effects model is estimated that allows the intercept to vary across each family, i. The linear regression model with individual fixed effects is

$$D_{it} = \alpha_i + X_{it}\beta + \delta R_{it} + \mu_{it}, \tag{5}$$

and the log-linear regression model is

$$\ln D_{it} = \ln A_i + \gamma \ln X_{it} + \varphi \ln R_{it} + \varepsilon_{it}, \tag{6}$$

where α_i accounts for individual heterogeneity that does not change with time. The fixed effects models do not allow for regressors that are correlated with the time-varying error component, μ_{it} or ε_{it}. Therefore, sex is excluded in the fixed effects models because the variable does not change over time for any individual in the sample.

4.4 Identification Strategy

There is potential for a common cofounder or two-way causality between the average reference group contribution and an individual's donation. State level trends, the cost of living, or other possible omitted variables may be correlated with both the amount donated by the individual and the average contribution of the reference group. Also, since the individual is a member of their reference-group members' reference group, a change in the individual's donation could cause a change in the amount contributed by their peers. If so, the average contribution of the reference group is endogenous. This presents a potential failure in consistency, for which an instrumental variable (IV) method can be used as a solution.

The price of giving, P_{it}, is a key determinant in the quantity of charity consumed, D_{it}, and is inversely related to an individual's marginal tax rate, $\mathrm{T} = f_{it} + s_{it}$. An individual's marginal income tax rate varies at the state level, so changes in state income tax rates in states that neighbor an individual's state, should affect the price of giving for reference group members in the neighboring states, but should not affect the individual. Cross-state variation in state income tax rates provides a strong instrument that is positively correlated

with the amount reference group members contribute, but not with the amount an individual donates.

4.5 Two-Stage Least Squares

In order to account for the potential endogeneity of the average reference group contribution, the model is estimated in two-stages. In the first stage, the endogenous covariate, R_{it}, is regressed on all of the exogenous variables in the model as well as the instrumental variable, which is not included in the second stage. The predicted values, $\hat{R}_{it}$, are then substituted into the original equation and this second equation is estimated as usual. The instrumental variable is applied to both the random effects and the fixed effects models. This method indirectly estimates the coefficient of average reference group contribution. I postulate the following systems of simultaneous equations to estimate the random effects and fixed effects models with an IV for average reference group contribution. The first equation used to identify changes in average reference group contribution from changes in state income tax rates in neighboring states is

$$R_{it} = \kappa + X_{it}\theta + \omega z_{it} + \nu_{it}.$$

In the second stage, the linear regression model with random individual effects is

$$D_{it} = \alpha + X_{it}\beta + \delta\hat{R}_{it} + \mu_{it} + \tau_i, \tag{7}$$

the log-linear regression model with random individual effects is

$$\ln D_{it} = \ln A + \gamma \ln X_{it} + \varphi \ln \hat{R}_{it} + \varepsilon_{it} + \eta_i, \tag{8}$$

the linear regression model with individual fixed effects is

$$D_{it} = \alpha_i + X_{it}\beta + \delta\hat{R}_{it} + \mu_{it}, \tag{9}$$

and the log-linear regression model with individual fixed effects is

$$\ln D_{it} = \ln A_i + \gamma \ln X_{it} + \varphi \ln \hat{R}_{it} + \varepsilon_{it}, \tag{10}$$

where average reference group contribution, $\hat{R}_{it}$ has been instrumented with the average state income tax rate of reference group members in neighboring states, z_{it}. The instrument is valid if changes in the average state income tax rate of reference group members in neighboring

states will not directly lead to changes in an individual's donation, $\mathbb{E}[\mu_{it}|z_{it}] = 0$. This assumption is met, because the changes in income tax rates of other states do not affect the price of giving for an individual. The instrument is relevant if changes in the average state income tax rate of reference group members in neighboring states are associated with changes in the average contribution of the reference group, $\mathbb{E}[R_{it}|z_{it}] \neq 0$. This assumption is met, because the first stage provided strong evidence for a positive correlation between the average state income tax rate of reference group members in neighboring states and the average reference group contribution. By using only exogenous changes in reference group contributions from changes in neighboring state tax codes, the two-stage least squares method provides estimated coefficients that are expected to be unbiased and consistent.

4.6 Model Evaluation

First, I test if the random effects models are more appropriate than the pooled OLS models. Pooled OLS is potentially biased if there is unobservable heterogeneity amongst the individuals. There is evidence of random individual effects if the variance of the random component is statistically different from zero, $\mathbb{V}[\tau_i] \neq 0$ or $\mathbb{V}[\eta_i] \neq 0$, in the linear and log-linear models respectively. A Breusch and Pagan (1980) Lagrange multiplier test is carried out with the null and alternative hypotheses

$$\begin{aligned} \mathrm{H}_0 &: \sigma_\tau^2 = 0 \text{ or } \sigma_\eta^2 = 0, \\ \mathrm{H}_1 &: \sigma_\tau^2 \neq 0 \text{ or } \sigma_\eta^2 \neq 0, \end{aligned}$$

depending on if the model is linear or log linear. The Lagrange multiplier test statistic is

$$\mathrm{LM} = \frac{NT}{2(T-1)} \left[\frac{\sum_{i=1}^{N} [\sum_{t=1}^{T} e_{it}]^2}{\sum_{i=1}^{N} \sum_{t=1}^{T} e_{it}} - 1 \right]^2,$$

where e_{it} is the residual from the pooled OLS regression. The test statistic is distributed as χ^2 where the null hypothesis is rejected if $\mathrm{LM} > \chi^2_{(2(T-1))}$. Rejecting the null hypothesis leads to the conclusion that the random effects model is more appropriate than the pooled OLS model.

Second, I test if the fixed effects models are more appropriate than the pooled OLS models. An F-test of whether the fixed individual effects, α_i or A_i, are jointly equal to zero

with the null and alternative hypotheses

$$\begin{aligned}
\mathrm{H}_0: &\quad \alpha_1 = \alpha_2 = \cdots = \alpha_n = 0 \text{ for } i = 1, 2, \ldots, n, \text{ or} \\
&\quad A_1 = A_2 = \cdots = A_n = 0 \text{ for } i = 1, 2, \ldots, n. \\
\mathrm{H}_1: &\quad \alpha_1 \neq \alpha_2 \neq \cdots \neq \alpha_n \neq 0 \text{ for } i = 1, 2, \ldots, n, \text{ or} \\
&\quad A_1 \neq A_2 \neq \cdots \neq A_n \neq 0 \text{ for } i = 1, 2, \ldots, n.
\end{aligned}$$

depending on if the model is linear or log linear. The F-test statistic is

$$F = \frac{(\mathrm{SSE}_{\mathrm{OLS}} - \mathrm{SSE}_{\mathrm{FE}})/(N-1)}{\mathrm{SSE}_{\mathrm{FE}}/(NT - N - k)},$$

and the null hypothesis is rejected if $F > F_{(N-1,NT-N-k)}$. Rejecting the null hypothesis of the F-test will indicate that the pooled OLS model is not appropriate.

Third, it is noted that in the random effects models the individual effects are assumed to be part of the composite error term. If it is reasonable to assume that the unobservable heterogeneity is due to preferences unconditionally distributed across the entire population, then the random effects models are appropriate. The estimators of the random effects models will be consistent and more efficient than in the fixed effects models if $\mathbb{E}[X_{it}\alpha] = 0$. If $\mathbb{E}[X_{it}\alpha] \neq 0$

$$\begin{aligned}
\mathrm{H}_0: &\begin{cases} \hat{\beta}_{\mathrm{RE}} \text{ is consistent and efficient,} \\ \hat{\beta}_{\mathrm{FE}} \text{ is consistent, but inefficient.} \end{cases} \\
\mathrm{H}_1: &\begin{cases} \hat{\beta}_{\mathrm{RE}} \text{ is not consistent,} \\ \hat{\beta}_{\mathrm{FE}} \text{ is consistent.} \end{cases}
\end{aligned}$$

Hausman (1978) derived a Wald test statistic

$$\mathrm{W} = (\hat{\beta}_{\mathrm{FE}} - \hat{\beta}_{\mathrm{RE}})'(\mathbb{V}[\hat{\beta}_{\mathrm{RE}}] - \mathbb{V}[\hat{\beta}_{\mathrm{FE}}])^{\dagger}(\hat{\beta}_{\mathrm{FE}} - \hat{\beta}_{\mathrm{RE}}),$$

where the null hypothesis is rejected if $\mathrm{W} > \chi^2_{(2(T-1))}$. If the null hypothesis is rejected, the fixed effects estimators are more conservative. These statistical tests provide ample evidence to conclude whether the pooled OLS, random effects, or fixed effects models are the most appropriate for the data.

5 Empirical Results

Table 3: Regression estimation results

	Pooled OLS	RE	FE	RE-2SLS	FE-2SLS
Variables in Level Form	(1)	(3)	(5)	(7)	(9)
Average Reference Group Contribution	0.16***	0.16***	0.04	1.04***	1.03**
	(0.03)	(0.03)	(0.04)	(0.23)	(0.43)
Total U.S. Philanthropy	0.01	−0.24**	0.70***	0.21	0.15
	(0.19)	(0.14)	(0.23)	(0.18)	(0.33)
Price of the First Dollar Given	−6,383***	−3,455***	−1,557***	−2,992	−1,567***
	(139)	(124)	(138)	(128)	(139)
R^2	0.19	0.18	0.14	0.15	0.11
Observations	48,667	48,667	48,667	48,667	48,667
Variables in Natural Log	(2)	(4)	(6)	(8)	(10)
Average Reference Group Contribution	0.08***	0.11***	0.06*	0.54***	1.08**
	(0.02)	(0.02)	(0.03)	(0.17)	(0.35)
Total U.S. Philanthropy	-0.03	-0.07	0.55***	0.11	-0.08
	(0.09)	(0.07)	(0.13)	(0.10)	(0.03)
Price of the First Dollar Given	−1.84***	−1.10***	−0.61***	−1.11***	−0.62***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)
R^2	0.25	0.25	0.18	0.22	0.13
Observations	23,579	23,579	23,579	23,579	23,579

Notes: Standard errors in parentheses; $^{***}p<0.01$, $^{**}p<0.05$, $^{*}p<0.1$. See Table A.3 for complete regression estimation results.
Source: PSID (2015).

5.1 Model Specification Results

There is sufficient evidence that the pooled OLS models are not appropriate. The Breusch and Pagan (1980) tests soundly reject the null hypotheses that the pooled OLS models are more appropriate than the random effects models. Also, the F-tests reject the null hypotheses that the individual fixed effects are jointly equal to zero, concluding that the fixed effects models are more appropriate than pooled OLS. There is evidence of individual unobservable heterogeneity in the sample, which can be controlled for in the random effects and fixed effects models.

The random effects and fixed effects models are then compared. Hausman's Wald tests provide sufficient evidence that the difference in the fixed effects and random effects models is systematic. Rejecting the null hypotheses is evidence of unobserved individual factors that are not statistically independent of the regressors. Thus, the random effects models are not

consistent. In lieu of the random effects models, the fixed effects models provide the most appropriate estimators. The fixed effects models assume that preferences are distributed conditionally on individual effects in the sample. It is not surprising that the fixed effects models were appropriate for the data. Presumably, much of the variation in giving behavior is due to heterogeneity of altruistic preferences conditional to individuals in the sample. However, if the heterogeneous preferences are randomly distributed across the population, then the random effects models are viable.

5.2 Effects of Demographic Characteristics on Charitable Giving

Feldstein and Clotfelter (1976) found that the additional demographic variables included in their models were generally insignificant, such as age, home ownership, and education. Contrary to their results, I found that age, education, and homeowner status generally had a statistically positive effect on the amount of annual charitable donations in the various model specifications[11]. The estimated effect of an increase in age by one year is an increase in expected charitable giving of between $21 and $26 for any given individual and an increase of between 2 percent to 3 percent for any donator. One additional year of education increases the expected amount of donations by between $113 and $140 for any given individual and by approximately 10 percent for any donator. Owning a home increases expected annual charitable giving by between $181 and $283, for any individual in the sample.

Religiosity, marital status, and the number of children of the head of the family unit are also prominent factors in explaining the variation in charitable giving. On average, individuals with a declared religion donated between $320 and $423 more each year compared to those without a religion. Donators with a declared religion gave between 34 percent and 43 percent more to charity than those without a religion. Married donators gave between 15 percent and 31 percent more than single donators. Each additional child in the family increased annual charitable giving by an average of between 6 percent and 9 percent. The sex of the head of the family unit generally had an insignificant effect on the amount of charitable donations, except for in the linear random effects models.

For individuals in the PSID sample, the income effect was much lower than expected. On average, an increase in disposable income of $100 increases the amount of annual charitable giving by approximately $1 for any given individual in the sample. An increase in disposable income by 1 percent causes an increase in annual charitable giving of between 0.12 percent and 0.19 percent for donators, everything else held constant. Therefore, the implied elasticity with respect to disposable income is significantly less than estimates in prior studies.

[11] Table A.3 in the appendix provides full regression estimation results. The effects discussed here represent a 95% confidence interval.

Feldstein (1975) estimated an income elasticity of 0.82 and Feldstein and Clotfelter (1976) estimated an income elasticity of 0.80. The inelastic response to income suggests that for most individuals, donating to charity is a necessity good. Demand for charity increases less than proportionately with increases in income. Conversely, there will not be large decreases in the amount donated to charity as income decreases. To explain the large discrepancy between charitable contributions of high income and low income earners, there must be additional motivations to donate to charity aside from the income effect.

5.3 Estimated Price Elasticity

Previous research has generally estimated an elastic response of charitable giving with respect to price. This may explain why high income earners, who have high marginal tax rates, appear to donate more than average. Feldstein (1975) comments that the price elasticity of charitable giving tends to cluster around -1.10. Feldstein and Clotfelter (1976) estimated a price elasticity of -1.23 when adjusting for the effect of interdependence amongst individuals. The linear and log-linear regression estimation results are reported in Table 3 for the price of the first dollar given, the total amount of philanthropic provision in the U.S., and the average reference group contribution.

On average, a \$0.01 change in the price of the first dollar given causes a change of between \$16 and \$64 in the amount an individual donates, holding everything else constant. The implied price elasticity ranges from -1.84 in the pooled OLS to -1.10 in the random effects model. However, in the fixed effects models, the estimated price elasticity is approximately -0.60 and is inelastic. This has meaningful policy implications, as tax deductions for charitable contributions are commonly justified by the elastic response with respect to the effective price of giving. Feldstein and Clotfelter (1976) note that an elastic response implies that "philanthropic organizations will receive more in additional funds than the Treasury loses in foregone revenue" when donators are allowed to itemize their contributions. An inelastic response would imply that charitable organizations receive less than the loss of foregone revenue from the deductibility of charitable contributions. My results are consistent with those presented by Clotfelter (1985) and Kingma (1989) who have estimated charitable donations to be inelastic[12].

[12] Kingma (1989) measured a price elasticity of -0.43 for public radio contributions and notes that estimates in aggregate studies range from between -0.95 to -2.10.

5.4 Estimated Crowd-out Effect

In the majority of the models, the estimated elasticity of charitable giving with respect to total U.S. philanthropy is not statistically different from zero. There is not enough evidence to conclude that total U.S. philanthropy has an effect on the amount donated to charity. The coefficients on governmental transfer presented by Abrams and Schmitz (1978) indicated "that a 1 percent increase in governmental transfers (per person) reduces an individual's private charitable contributions by approximately 0.2 percent." In the model presented by Roberts (1984), the prediction is that "private charity to the poor is reduced dollar for dollar by public transfers." The insignificant result of an effect from total U.S. philanthropy suggests that government provision of public goods has entirely crowded out purely altruistic national donations.

5.5 The Effect of Reference Group Contributions on a Family's Donation Amount

I find a statistically significant effect of average reference group contributions on individual donations in all but one of the linear specifications, and in all of the log-linear specifications. This suggests that the amount contributed by reference group members has at least a weak effect on all individuals in the sample. The most striking result is the difference in the effect of average reference group contribution after being instrumented.

After applying the IV method, the effect of the average contribution of the reference group is drastically larger. This is explainable as the IV method estimates a local average effect for only individuals who are affected by the average contribution of their reference group. On average, a $1 increase in the average contribution of the reference group causes approximately a $1 change in annual charitable giving by individuals who are affected by their reference group. This indicates that individuals who are influenced by the average contribution of their reference group members change their giving almost dollar for dollar with the average amount donated by their peers. For donators, a 1 percent change in the average contribution of the reference group causes a change in annual charitable giving of between 0.54 and 1.08 percent for any given donator that is affected by the average reference group contribution.

The results suggest that individuals who care about the average amount contributed to charity by their reference groups are strongly influenced by the amount their peers donate. Presumably, only individuals that are motivated to give to signal status are affected by their reference group's contributions. There is sufficient evidence to conclude that an individual who cares about the size of their relative donation changes the amount that they give pro-

portionately to the average amount given by their occupational and geographic reference group.

6 Conclusion

I have provided evidence that members of a reference group have some degree of interdependence in regards to charitable giving, on average for all families in the PSID sample surveyed from 2002 to 2012. According to the logic presented by Feldstein and Clotfelter (1976), "if each individual's giving does depend positively on the gifts of individuals with the same or greater income" than a decrease in the price of giving for the highest income groups will increase their giving and increase the giving of lower income individuals as well. Although charitable donations are assumed to be made for good intentions, consumption that entails externalities often produces unintended consequences. Charity is undoubtedly a positive aspect of the world, but the welfare implications of large tax deductions for high income donators are not as clear.

Annually, the total amount of itemized deductions from federal individual income tax for charitable contributions is approximately 20 percent of the tax collected. These tax expenditures, while reducing the progressivity of the tax code, also give high income earners a price advantage for the consumption of charity. Frank (2005) theorizes that positional goods should be taxed progressively to attain an efficient market. High income earners should receive less of a charity subsidy than those who earn less. Current tax expenditures provide higher income earners a lower effective price of charitable giving than their comparable peers. If positional externalities are considered, it is possible that charity subsidies induce overconsumption of gifts by high income earners.

An increase in charitable contributions made by an individual will cause an increase in giving by all members of their reference group, with lower income earners paying a higher effective price. It is not clear that the resulting distribution of income is more equitable under these conditions. With the phase out of limitations of deductions with the enactment of EGTRRA, lower income earners had to divert more resources into charitable donations or lose relative status. Charitable contributions are partitioned at private discretion and are spent primarily on conspicuous, albeit well-intentioned, public goods, such as donations to alma maters, churches, and specific causes. The marginal benefit society gained from increased charitable giving may have been offset by a repartitioning of resources from mundane to conspicuous public goods. This transfer may result in an under provision of prudent investment in infrastructure, primary education, and other public goods that are not glamorous and have long-term benefits.

This study demonstrated that the current tax provisions for itemized deductions for charitable contributions may be disadvantageous to low income earners. It was hypothesized that individuals who care about signaling status change their giving as reference group members change the amount that they contribute. With a reduction in federal income tax rates, all donators who itemize their contributions saw an increase in their effective price of giving and thus reduced the amount donated. This reduction in giving, from an increase in price, also caused a further reduction in charitable giving from the effect of reference group comparisons of charitable contributions. On the other hand, donators who itemize their contributions, and who were affected by the Pease Limitation, experienced a reduction in their effective price of giving and gave more on average during the sample period, holding federal income tax rates constant. Individuals who did not benefit from the removal of the Pease Limitation were still affected because of changes in the amount contributed by high income donators in their reference group. If these individuals care about their relative status, then they had to either donate more to maintain status or receive less utility from their charity.

Further research into the motivations for charitable giving should include the effect of interpersonal comparisons on individual charitable donations. A potential extension would be possible with the restricted-use PSID county level data, which would capture comparisons amongst neighborhood peers. Additionally, it should be noted that the sample consists of both donators and non-donators. Presumably, the marginal benefit from the first dollar given is less than the effective price of the first dollar given for any non-donator. It is possible that changes in the average reference group contribution will change the marginal benefit for these individuals, but potentially not to the extent that they donate. The estimates I provided will be biased towards zero if there is a substantial effect of average reference group contributions on the individuals who are censored with zero donations. If this is the case, then Tobit analysis would prove useful.

The justification for charitable deductions from federal and state income tax is that donations provide public goods that are substitutable for government programs. However, the economics literature on charitable giving suggests that there is little incentive for the efficacy of provision amongst nonprofit charitable organizations. Donators largely give for personal, private reasons and pure-altruism is crowded-out by government provision for public goods. Therefore, subsidies for charitable contributions provide private benefit primarily to high income earners. I have shown that, on average, changes in charitable contributions influence the amount donated by members of the same reference group. The giving behavior of individuals who can itemize their contributions affects the giving behavior of individuals who do not benefit from itemizing their own contributions. Greater limitations of itemized deduc-

tions for charitable contributions would reduce the price discrimination currently present in nonprofit markets. This would provide a large benefit to low income earners who are at a disadvantage in maintaining status with their peers.

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Appendix A: Supplementary Tables and Figures

Table A.1: Variable definitions and sources

Variable	Definition
The Panel Study of Income Dynamics	
Total Charity	The total real 2012 dollar value of all donations made by the family unit in the given tax year, contributed to all charitable causes reported by the family unit. The sum includes donations towards; religious organizations, organizations that serve a combination of purposes, organizations that help people in need, health care and medical research organizations, educational purposes, organizations that provide youth or family services, organizations that support or promote the arts and culture, organizations that improve neighborhoods and communities, organizations that preserve the environment, organizations that provide international aid or promote world peace, charitable organizations with any other purpose.
Average Reference Group Contribution	The average real 2012 dollar value of all donations made by PSID respondents in the same industry and the same or neighboring state as the head of the family unit.
State	The actual state of residence of the head of the family unit, with values corresponding to the PSID state codes. Residents of Alaska, Hawaii, and other U.S. territories are not included in the sample.
Industry	The industry cohort of the head of the family unit's first full-time job. The industries are grouped according to the 3-digit industry code from the 2000 Census of Population and Housing: Alphabetical Index of Industries and Occupations. There are 19 industry cohorts used in analysis, with respondents that did not know or indicate a sector constituting a separate cohort. The full industry classifications are; 17-29 Agriculture, Forestry Fishing, and Hunting 37-49 Mining 57-69 Utilities 77 Construction 107-399 Manufacturing 407-459 Wholesale Trade 467-579 Retail Trade 607-639 Transportation and Warehousing 647-679 Information 687-699 Finance and Insurance 707-719 Real Estate and Rental and Leasing 727-749 Professional, Scientific, and Technical Services 757-779 Management, Administrative and Support, and Waste Management 786-789 Educational Services 797-847 Health Care and Social Assistance 856-859 Arts, Entertainment and Recreation 866-869 Accommodations and Food Services 877-929 Other Services 937-987 Public Administration and Active Duty Military

Table A.1: (Continued)

Variable	Definition
The PSID	
Age	The actual age of the head of the family unit.
Education	The actual number of grades completed by the head of the family unit in school, which takes a value of 17 if the head completed at least some postgraduate work.
Sex	A dummy variable that takes a value of 1 if the head of the family unit is female and a value of 0 otherwise.
Religious Affiliation	A dummy variable that takes a value of 1 if the head of the family unit indicated a religious preference and a value of 0 otherwise.
Disposable Income	The total disposable income of the family unit for the given tax year in real 2012 dollars. Calculated as the total income reported by the family unit minus the amount of taxes due. Total family income is comprised of all taxable income, social security income and transfer income of all family unit members. Tax burden is all taxable income of the family unit times the combination of the federal and state income tax rates. A net loss is coded as zero.
Marital Status	A dummy variable that takes a value of 1 if the head of the family unit is legally married or permanently cohabiting and a value of 0 otherwise.
Number of Children	The actual number of persons currently in the family unit who are under 18 years of age, whether or not they are actually children of the head or wife.
Homeowner Status	A dummy variable that takes a value of 1 if the head of the family unit, or anyone else in their family living there, owned their home or apartment and a value of 0 otherwise.
The Tax Foundation	
Federal Income Tax	Individual federal income tax according to the total taxable income of the family and the marital status of the head of the family unit. Single individuals are assumed to file as single and married individuals are assumed to file jointly.
State Income Tax	Individual state income tax according to the total taxable income of the family and the state of residence and the marital status of the head of the family unit.
Price of the First Dollar Given	The cost of the first dollar donated to charity, which is equal to 1 minus the federal and state individual income tax rates if the state allows charitable deductions and if the family unit itemizes tax deductions, 1 minus the federal individual income tax rate if the state does not allow charitable deductions and the family does itemize deductions, and equal to 1 otherwise.
Average State Income Tax of Reference Group Neighbors	The state individual income tax for reference group members of the head of the family unit who live in neighboring states to that of the head of the family unit.
Internal Revenue Service, Statistics of Income Division	
Total U.S. Philanthropy	The sum of all government-sponsored social insurance program receipts and the total amount of itemized charitable contributions made by individuals in the United States in a given year in billions of real 2012 dollars.

Table A.2: Descriptive Statistics

Variable[a]	Mean	Overall Std. Deviation	Between Std. Deviation	Within Std. Deviation
Total Charity	$1,330	$3,736	$2,939	$1,850
Price of the First Dollar Given	$0.93	$0.13	$0.10	$0.07
Average Reference Group Contribution	$1,256	$618	$574	$260
U.S. Philanthropy[b]	$991.7	$83.0	$57.3	$73.1
Age	25	16	17	3
Education	13.1	2.6	2.5	0.6
Sex	0.31	0.46	0.47	
Religious Affiliation	0.84	0.36	0.38	0.05
Marital Status	0.53	0.50	0.48	0.16
Number of Children	0.8	1.2	1.1	0.5
Homeowner Status	0.56	0.50	0.46	0.22
Disposable Income	$40,945	$65,293	$53,151	$34,903
Observations	48,667			

Notes: [a]All variables are in level form. [b]Total U.S. Philanthropy is in billions of real 2012 dollars.
Source: PSID (2015).

Table A.3: Full regression estimation results: all variables in level form

Dependent Variable	Pooled OLS	RE	FE	RE-2SLS	FE-2SLS
Total Charity	(1)	(3)	(5)	(7)	(9)
Independet Variable					
Constant	3,241.83	724.22	1,538.58	−651.39	−416.52
Age	25.75***	24.24***	−4.49	20.95***	22.93*
	(1.10)	(1.40)	(5.78)	(1.71)	(13.29)
Education	124.42***	140.12***	5.02	112.85***	9.46
	(6.38)	(8.16)	(17.13)	(10.59)	(17.40)
Sex	−9.08	−194.58***		−158.05**	
	(48.69)	(60.34)		(67.60)	
Religious Affiliation	423.21***	408.72***	236.31	320.06***	184.29
	(42.63)	(57.92)	(179.94)	(67.34)	(183.03)
Disposable Income	0.0111***	0.007***	0.005***	0.007***	0.005*
	(0.0003)	(0.0002)	(0.0003)	(0.0002)	(0.0003)
Marital Status	324.61***	267.38***	118.98*	261.14***	139.09**
	(48.49)	(50.49)	(64.69)	(51.74)	(65.88)
Number of Children	8.42	40.91***	95.60***	55.17***	97.73***
	(14.53)	(15.10)	(19.38)	(15.60)	(19.58)
Homeowner Status	9.45	222.54***	182.28***	193.79***	181.10***
	(37.74)	(37.07)	(45.08)	(38.90)	(45.51)
Total U.S. Philanthropy	0.01	−0.24**	0.70***	0.21	0.15
	(0.19)	(0.14)	(0.23)	(0.18)	(0.33)
Price of the First	−6,383***	−3,455***	−1,557***	−2,992	−1,567***
Dollar Given	(139)	(124)	(138)	(128)	(139)
Average Reference	0.16***	0.16***	0.04	1.04***	1.03**
Group Contribution	(0.03)	(0.03)	(0.04)	(0.23)	(0.43)
Specification Statistics					
LM		44,381			
F-statistic			6.49		6.37
W			1,104		437
τ		0.50	0.63	0.58	0.61
R^2	0.19	0.18	0.14	0.15	0.11
Observations	48,667	48,667	48,667	48,667	48,667

Notes: Standard errors in parentheses; $^{***}p<0.01$, $^{**}p<0.05$, $^{*}p<0.1$.
Source: PSID (2015).

Table A.3: (Continued): variables in natural log

Dependent Variable	Pooled OLS	RE	FE	RE-2SLS	FE-2SLS
Total Charity	(1)	(3)	(5)	(7)	(9)
Independet Variable					
Constant	1.04	1.54	0.59	−2.45	−3.81
Age	0.02***	0.02***	0.02	0.02***	0.03***
	(0.001)	(0.001)	(0.004)	(0.0001)	(0.01)
Education	0.10***	0.10***	−0.0001	0.09***	0.0002
	(0.0004)	(0.005)	(0.01)	(0.006)	(0.012)
Sex	0.05*	−0.03		0.001	
	(0.03)	(0.04)		(0.04)	
Religious Affiliation	0.43***	0.38***	0.37**	0.34***	0.35*
	(0.03)	(0.04)	(0.18)	(0.04)	(0.19)
Disposable Income	0.19***	0.16***	0.12***	0.15***	0.12***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Marital Status	0.31***	0.25***	0.15***	0.27***	0.19**
	(0.03)	(0.03)	(0.04)	(0.03)	(0.05)
Number of Children	0.07***	0.06***	0.09***	0.07***	0.09***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Homeowner Status	0.11***	0.16***	0.11***	0.14***	0.11***
	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)
Total U.S. Philanthropy	0.01	−0.24**	0.70***	0.21	0.15
	(0.19)	(0.14)	(0.23)	(0.18)	(0.33)
Price of the First	−6,383***	−3,455***	−1,557***	−2,992	−1,567***
Dollar Given	(139)	(124)	(138)	(128)	(139)
Average Reference	0.16***	0.16***	0.04	1.04***	1.03**
Group Contribution	(0.03)	(0.03)	(0.04)	(0.23)	(0.43)
Specification Statistics					
LM		10,166			
F-statistic			4.90		4.56
W			563		280
η		0.58	0.71	0.55	0.70
R^2	0.25	0.25	0.18	0.22	0.13
Observations	23,579	23,579	23,579	23,579	23,579

Notes: Standard errors in parentheses; $^{***}p<0.01$, $^{**}p<0.05$, $^{*}p<0.1$. Age, education, and the number of children are in level form.
Source: PSID (2015).

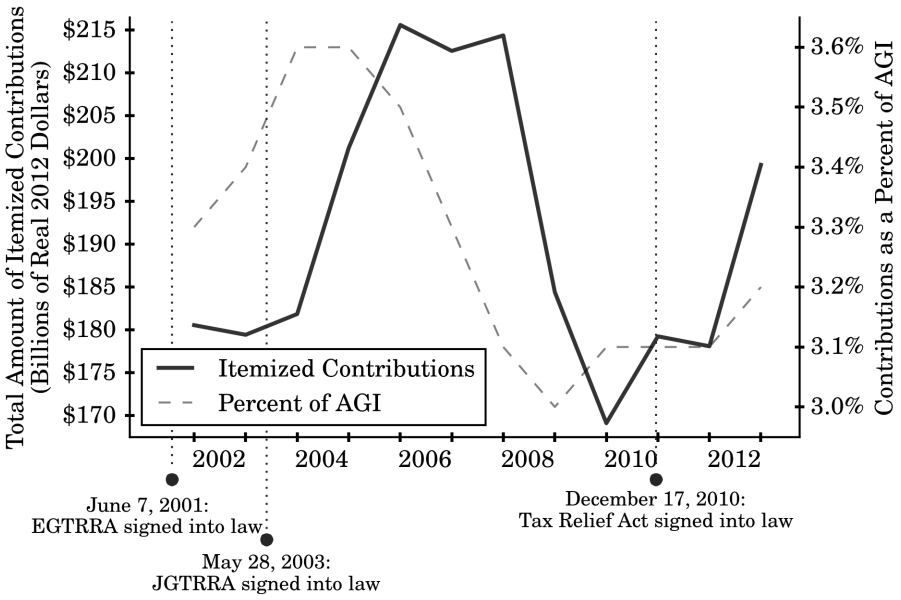

Figure A.1: Itemized contributions and contributions as a percent of AGI
2001-2012

Notes: Dollar figures are in billions of real 2012 dollars. Percent of adjusted gross income (AGI) was calculated by dividing total the total amount of contributions itemized on federal individual tax returns by the total AGI of all itemizers.
Data Source: Internal Revenue Service, Statistics of Income Division (2014).