Who does the tax-incentive for giving incentivise?

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Abstract

The impact of the tax deductibility of charitable donations has received a great deal of attention from researchers over the years. However, nearly all of this work has focused on the effect of policy on the mean donation. While the mean effect is interesting, it reveals little about who is actually taking advantage of the tax break. As Charles Clotfelter noted in 2002 "a few sophisticated taxpayers (and their tax or financial advisors) might be sensitive to variations in tax rates, the average taxpayer is too oblivious or unresponsive to the marginal tax rate for anything like the economic model to be realistic representation of reality." In this paper, I test Clotfelter's claim by examining the effect of the tax-price of giving over the distribution of donations using quantile regression approach which accounts for individual effects. Results indicate that there is variation in the effect of the tax incentive for charitable giving over the donations distribution for secular giving, though not for religious giving.

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1 Introduction

> *People are still going to be able to make charitable contributions. It just means if you give $100 and you're in this tax bracket, at a certain point, instead of being able to write off 36 (per cent) or 39 per cent, you're writing off 28 per cent. Now, if it's really a charitable contribution, I'm assuming that that shouldn't be the determining factor as to whether you're giving that hundred dollars to the homeless shelter down the street.*
>
> President Barack Obama

Tax incentives for charitable giving, particularly in the US, have received a great deal of attention from economists. In the US, taxpayers can deduct their charitable donations from their taxable income if they choose to itemise, or list, their deductible expenditures (e.g. donations, mortgage payments) in their annual filing. Taxpayers choose to subtract the sum of their itemised deductions or the standard deduction amount, whichever is greater. The deductibility of donations has long been recognised as producing a price of giving equal to one minus the marginal tax rate faced by the donor should she itemise her deductible expenditure and equal to one otherwise. This price means that a $1 donation will cost the donor less than $1 in terms of foregone consumption. The main question economists have addressed is one of the efficiency of the tax incentive where a price elasticity in excess of unity has been shown to be indicative of the efficiency, or 'treasury efficiency' of the tax deductibility of giving as the foregone tax revenue, and thus the decrease in the public provision of the public good, is exceeded by the increase in aggregate giving, the private provision of the public good.

In this paper I use recently developed panel data quantile regression methods and exploit exogenous changes to the marginal tax rate schedule to consider possible heterogeneity in the causal effect of the tax incentive for charitable giving over two dimensions. First, the tax inventive may affect giving to different charitable causes in differently. This possibility has been largely ignored by the literature in this area. The motivations for giving are many (Becker, 1967; Andreoni, 1993; Ribar and Wilhelm 2002; Duncan, 2004)) and it is difficult to make a case for any one motivation or combination being the sole determinant of giving to all causes under all circumstances. For example, a donation may be part of tithing as required by one's religion. A donation may be to one's alma mater or to a local homeless shelter. In the former case, the tax deductibility of the donation may play no role in the decision to make it whereas the later it may be a determining factor. Conversely it may be religious giving that is the most sensitive to changes in the

price of giving given the unique treatment of the provision of religious services in US law (discussed below). Failure to consider this sort of heterogeneity amounts to assuming that charitable giving is a homogenous good; donating is donating regardless of to what or whom to donation is made. While this assumption of homogeneity is not necessarily invalid, it should be immediately apparent that it is questionable and, at the very least, should be verified by identifying cause-specific variation in the determinants of charitable giving. If there is cause-specific variation in the price effect then there are efficiency gains to be had from a cause-specific deduction schedule. I focus on variation over donations to secular and religious organisations.

Second, the effect of the tax incentive may vary over the donations distribution. Relaxing the common assumption of a constant 'price' elasticity may provide greater insight into whom exactly is being incentivised by the tax incentive. Bakija and Heim (2011) look for variation in the price effect over the income distribution and find none. I consider variation over donations distribution.

The paper proceeds as follows. Section 2 discusses heterogeneity in the price effect in more detail. Section 3 describes the data and estimation procedure used. Results are presented and discussed in Section 5 and conclusions are drawn in section 6.

2 Heterogeneity in the price effect

Analytical studies of giving by charitable cause are sparse despite there being descriptive evidence in variation in the distribution of one's donations over causes by income (Clotfelter, 2002), gender (Micklewright and Schnepf, 2007) and wealth (Atkinson, Backus and Micklewright, 2009). Estimating cause-specific price effects is also motivated by the structure of the tax incentive and the unique position of religious charities in the US where the government is constitutionally prohibited from funding religious organisations meaning the tax incentive for charitable giving is fundamentally different for religious versus secular giving. A person interested in the output of a religious charity can make a donation to a religious organisation, deduct the donation from her taxable income and see no change in the state provision of the religious service since the state provision is fixed at 0. This is not the case for secular organisations where any reduction in tax revenue stemming from deductions of charitable donations from taxable income will lead to a reduction on the public provision of public goods. At the limit where tax revenues are spent fully on the provision of the secular public good, the price of giving to secular charities is fixed at one whereas the price for giving to religious charities is equal to $1-t$.

[1]

The estimation of cause-specific price effects is also motivated by the theoretical work in Saez (2004) which shows that the rule governing the optimal tax price is function of the degree to which the government provision of a public good crowds out the private provision of that good and the 'redistributive tastes of the government'. In essence, the standard test of the efficiency of the tax incentive for giving provided by price elasticity being greater than 1 (in absolute value) is, in some cases, to restrictive. If there is indeed some crowding out then the tax deductibility of donations can still be efficient even if the elasticity is less than 1 in absolute value. It is conceivable that there are differing degrees of crowd out over charitable causes and in the case of religious giving, crowd out in the US will be close to 0 given the restrictions on the public provision of religious services.

This argument suggests that donations to secular organisations may not respond to changes in the marginal tax rates (and thus price) faced by households while religious giving might. Alternatively, giving to religious organisations may be less responsive to extrinsic incentives like the deduction as a donation made to, say, a church will be motivated differently than a donation to, say, a dog shelter. Many religious require adherents to tithe a proportion of their income to the place of worship. Theories of giving remain agnostic about which causes may benefit most from tax incentives for giving but the empirical question about cause-specific price effects is important also from an efficiency perspective. If there is in fact variation in the price effect over causes then a cause-specifc deducation schedule would produce efficiency gains; i.e. larger increase in donations with a smaller reduction in tax revenues.

Previous estimates of the determinants of cause-specific giving have not been consistent from one study to the next. Table 1 summarises the income and price elasticities in several of these papers all of which use data from the US.

[Table 1 about here.]

None of the cause-specific studies have employed panel data, and controlling for individual effects has generally been found to decrease both the estimated income and price elasticities (in absolute terms).[2]

The estimates reported in 1 are the effect of changes in the price of giving on the mean donation as are each of the estimates obtained from 138 studies in the meta-analysis carried out **?**. While estimation of the mean effect is sufficient to address the classical treasury efficiency question, it neglects possible heterogeneity of the price effect over the

[1] See Appendix A for a fuller development of this issue.

[2] **?** notes this fact. However, **?** find in their meta-analysis that while the point estimates for income and price elasticities of giving from panel data studies are lower than their cross-sectional counterparts, the difference between them are not statistically significant.

donation distribution. As Clotfelter notes "a few sophisticated taxpayers (and their tax or financial advisors) might be sensitive to variations in tax rates, the average taxpayer is too oblivious or unresponsive to the marginal tax rate for anything like the economic model to be realistic representation of reality" (2002, pp. 17). These 'sophisticated' tax payers may include high income earners and/or those making large donations. Despite this intuitive claim by Clotfelter, the evidence is mixed. For example, Bakija and Heim (2011), who focus largely on the the timing of donor's responsiveness to changes in the price of giving, find no evidence that the price effect varies with income. Dwenger et al. (2014) also find no variation over income in the effect of the tax incentive for giving.

A small number of studies have began to consider heterogeneity in the price effect over the conditional donation distribution though results are mixed. Fack and Landais (2010) use data from France and a discontinuity in the French incentive for giving to find evidence that the tax incentive for giving there may affect large donations but not small ones. Lin and Lo (2012) use a cross section of US taxpayers and find that it is small donations which are most responsive to the tax incentive. However, they do not address a number of establish difficulties in the identification of the tax-price of giving (discussed below). Bonke et al (2013) estimate the impact of the tax incentive for giving in Germany using a large pooled cross-section of German tax-payers. Their results suggest the price effect is largest (in absolute value) for small and for large donations with donations in the middle of the distribution relatively less affected by changes in the price of giving.

There are, again, possible efficiencies gains to be had from the identification of any heterogeneity in the price effect over the conditional donations distribution. If it is indeed the case that larger donors are more responsive to the tax incentive then overall provision of the public goods can be increased by strengthening the incentive for large donors and reducing it for small donors.

I address both of these possible heterogeneities by estimating the price effect over the conditional distribution of donations to both secular and religious charities.

3 Data and estimation

In studies of charitable giving, survey data is preferable to data from tax files.[3] An advantage of data from tax records is that long time series are available. Bakija and Heim (2011), for example, have an unbalanced panel of US tax payers running from 1979 to 2006. However, in tax files it is not possible to determine why zero donations is observed. It may be due to the taxpayer not making any charitable donations. Alternatively, they may have made a donation but did not itemise their tax return. The Panel Study of Income Dynamics (PSID) began as an annual survey of a sample of US individuals and the family units in which they live. Since 1997 it has been collected bi-annually. The central focus of the data is economic and demographic, with substantial detail on income sources and amounts, employment, household composition and residential location.

Since 2001, the PSID survey introduced the Center on Philanthropy Panel Study (COPPS) module containing questions on giving and volunteering disaggregated by charitable cause. **?** compares the COPPS data to tax return data in the number of missing values and the amounts being reported and finds that the PSID survey data is of 'high quality' comparable to that obtained from documentary analysis of tax returns.
The COPPS module includes a number of questions about the causes to which contributions were made, the amounts contributed and a series of ranges given should the interviewee not recall the exact amount. In 2000, donations were decomposed into five separately identified causes: religious organisations, combination funds like the United Way (Combination)[4], groups helping the needy, health and medical organisations and educational institutions. From 2002 onward the number of causes asked about expanded to include organisations working with youth, international development organisations, community organisations, organisations promoting the arts and environmental organisaitons.

Donations in the COPPS survey are assigned to one of these causes by the donors. As the interest is in the impact of socio-economic characteristics on donations to different causes, it is not relevant how the recipient organisation defines what it does, nor how the government or researchers define what it does. The definition of interest is that applied

[3] There have been to date a number of studies on giving that have used survey data. Most notable of these surveys is the BLS CEX, used in **?**, **?**, and **?**. Other employed surveys have included the General Social Survey used by **?**, a survey of National Public Radio listeners used in **?**, and a Florida Consumer Attitude Survey used in **?**. Most of the above are, however, one-off surveys except the BLS CEX which is annual but is not a true panel. Questions about charitable behaviour have recently been added to the Panel Study of Income Dynamics (PSID) survey.

[4] The survey question specifies 'any organization that served a combination of purposes. For example, the United Way, the United Jewish Appeal, the Catholic Charities, or your local community foundation.'

by the donor. The cost of using donor-defined causes is that an individual may change how she classifies a charity or, if different people from the same household undertook the survey in different years, then the households classification may not be consistent. For the purposes of this paper I construct a 'secular' giving category which includes all donations not going to the religious organisations as identified by the donor.

I use six waves of the PSID providing 2000-2010. The low income over-sample is dropped leaving a representative sample of 8921 households appearing for an average of 5 (out of 6) years in the data.

Table 2 presents the distribution of the variables used in this study. Panel A presents the regressors and panel B presents the donations by cause.

Table 1: Descriptive Statistics

Variable	**Mean**	**Std. Dev.**
Age of head	46.12	16.86
Married (d)	.56	.5
Male head (d)	.75	.44
Years of education (head)	12.27	4.63
# of children	.75	1.1
White (d)	.73	.44
Black (d)	.08	.27
Other race (d)	.09	.28
Wealth ($'000)	201.02	1248.07
Net taxable income of head+wife ($)	70791.62	117998.1
Transfer income of head+wife ($)	5601.82	18733.34
Secular giving (d)	.57	.50
Secular giving amount|>0 ($)	864.32	2183.42
Religious giving (d)	.42	.49
Religious giving amount|>0 ($)	2265.59	3945.28
mtr	.16	.12
Observations	35236	
Households	8921	

Notes: Variables with (d) are 0/1 dummies.

The unit of analysis is the household and variables are defined at the household level. All monetary figures are in 2014 prices, deflated using the Consumer Price Index.[5]

Household heads are 46 years old on average, just over half are married and heads have, on average slightly more than a hough school education. Total household wealth, including debt and home equity, is about $200,000 per household and taxable household income is just over $70,000. Transfer income is $5601 on average, though only 42 percent of households receive positive transfer income. I include household income decomposed

[5] See: http://www.bls.gov/cpi/

in this way as the existing evidence (Steinberg...) rejects the fungibility hypothesis and suggests that different sources of income affect donations in different ways.

The probability of making a donation of any kind is 0.63 with a mean positive household donation of $2,364.42.[6] Both the participation rates and mean donations vary between secular and religious giving. Nearly 60 percent of households give to a secular charity while 42 percent give to a religious charity (note 36 percent of households give to both in a given year). However, religious donations are, on average, roughly two and a half times as large as the secular donations. In total, two-thirds of every dollar donated in the US goes to a religious organisation.

Revisiting the 'price' of giving

My primary interest is in estimating how the secular and religious donations distributions respond to changes in household income and the marginal tax rate faced by households.

A constructed price variable is essential to studies of the tax incentive for giving in the US. In the simplest terms, the conventionally defined price of giving is one minus the marginal tax rate for those who itemise and one for everyone else.[7] Much of the applied work in this field has focused on addressing potential problems arising from the endogeneity of the price variable

The standard construction of the price creates a number of problems for consistent estimation of the price elasticity of giving. First, the marginal tax rate (and thus price) is a function of taxable income, and therefore of donations, since taxable income can be reduced by the amount donated when donors itemise. This source of endogeneity is generally addressed by using the marginal tax rates calculated with $1 dollar of giving and provides a good proxy for the actual marginal tax rate faced by the household.[8]

A second problem, and one not generally addressed explicitly in the literature, is that the price is also a function of a number of other household characteristics including mortgage interest paid, medical expenses, child care costs, property taxes paid and capital gains. In addition to being correlated with the price, each of these may arguably affect a household's giving behaviour. As such, excluding them from the model will produce an

[6] The survey question in the COPPS module is whether or not a donation in excess of $25 was made in the last year.

[7] The decision to itemise is generally based on a comparison of the appropriate standard deduction (based on filing status) and the total amount of itemised deductions. When itemising, the individual adds up all the allowed-for deductions (e.g. medical costs, charitable donations) and subtracts that from taxable income. If the sum of all itemised deductions is greater than the standard deduction, one would be expected to itemise. In 2004 the standard deduction was $4,850 for individual filers and $9,700 for joint filers (slightly higher for the blind and those aged over 65).

[8] **?** and **?** calculate the price first by computing the marginal rate with donations set to zero and then again using a predicted increment of charitable giving set at 1 per cent of average income.

omitted variable bias in the the estimates of the price effect.

Lastly, a question remains, however, as to the nature of the 'price' to which donors are responding. The standard construction of the price of giving is an artefact of the utility maximisation framework in which economists have tended to study donor behaviour (see Fack and Landais (2010) for a nice exposition of this). Generally, within that framework individuals maximise their utility with respect private consumption and donations subject to a budget constraint. Utility is maximised when the budget constraint holds with equality which occurs when the price of giving is defined as above: 1 for non-itemisers and $1-mtr$ for itemisers.

However, defining the price to which donors are responding as such requires the assumption that donors know their itemisation status, and thus the price they are facing, at the time the donation is made. Such an assumption is common in economic models of consumer behaviour (i.e. perfect information) but it is at least questionable as to whether it holds in practice in the case of giving when donations can be made up to a year before the true price is realised. Itemisation status is a function of other, sometimes unforeseeable, expenditures such as health care costs, unplanned giving, mortgage interest, loss to to theft or damage and personal legal bills making it less likely that donors know their itemisation status ex ante. It is important to note that the 'price of giving' is not a price in the conventional sense. It is not set in a market and, more importantly, it is not realised until sometime after the donation is made (i.e. after the 'good' is consumed) when the donor eventually files her taxes. The issue arrises due to the timings of the donation decision and the realisation of the price of that donation and the degree to which the standard theoretical model of consumer choice in this setting accurately reflects the decision making process of donors. Beyond the concern over the true data generating process, the inclusion of the itemisation status in the definition of the price creates problems for consistent estimation as well.

The decision to itemise can be determined by the level of donations and so introduces endogeneity into the standard constructed price. The conventional approach (e.g. Bakija and Heim, 2011) to dealing with this source of endogeneity is to drop so called 'endogenous itemisers', i.e those tax payers who would not have itemised save for the donations they made. However, this approach results in a selected sample by dropping those households who have made large (e.g. larger than the relevant standard deduction if no other deductions are taken) and perhaps those households who are in fact most responsive to the price of giving as they may be giving such a large amount in order to obtain the $1-mtr$ price. Excluding households with larger donations and which face a price less than 1 (necessarily since they are itemisers) will result in a downward (in absolute terms) bias in the price effect. Indeed it si the case in the PSID data that these 'endogenous itemisers'

donate more on average and face higher 'first dollar' marginal tax rates. While the endogeneity of the conventionally defined price variable can result in biased estimates, it is not clear that the endogeneity bias avoided is smaller than the sample selection bias introduced by excluding the 'endogenous itemisers' from the sample.

A second problem that arrises from the inclusion of the itemisation status in the price variable is that probability of itemising is a function of donations even if the 'endogenous itemisers' are excluded.[9] This suggests that smaller donors are more likely to being assigned a price of 1. This will produce larger (in absolute value) estimates of the price elasticity of giving.

Given these issues, both theoretical and empirical, with the inclusion of the itemisation status in the construction of the price variable, I deviate from the conventional practice and define the price as 1 minus the 'first dollar' marginal tax rate for all households. The last row of Table 2 presents the descriptive statistics for the 'first dollar' marginal tax rate faced by each household. Marginal tax rates are obtained using National Bureau of Economic Research's (NBER) Taxsim programme (**?**) and I define the marginal tax rate faced by each household as

$$mtr_{it} = \left[\frac{mtr_F \chi_C + (1-\chi_C) W_C \omega_C + mtr_S \delta_S - mtr_F mtr_S \delta_F - mtr_F mtr_S \delta_S}{1 - mtr_F mtr_S \delta_F} \right] \quad (1)$$

where mtr_F is the federal marginal tax rate faced by i, χ_C is the proportion of donations that are cash for i's income cohort, W_C is a weighted mean of the long- and short-term federal capital gains tax rates in i's income cohort times the proportion of donations that are non-cash, $(1-\chi_C)$, times the proportion of non-cash donations that are appreciated property in i's income cohort, ω_C, mtr_S is the state marginal tax rate, δ_S is a dummy equal to one if donations can be deducted from state returns, and δ_F is a dummy equal to one if federal taxes can be deducted from state returns.

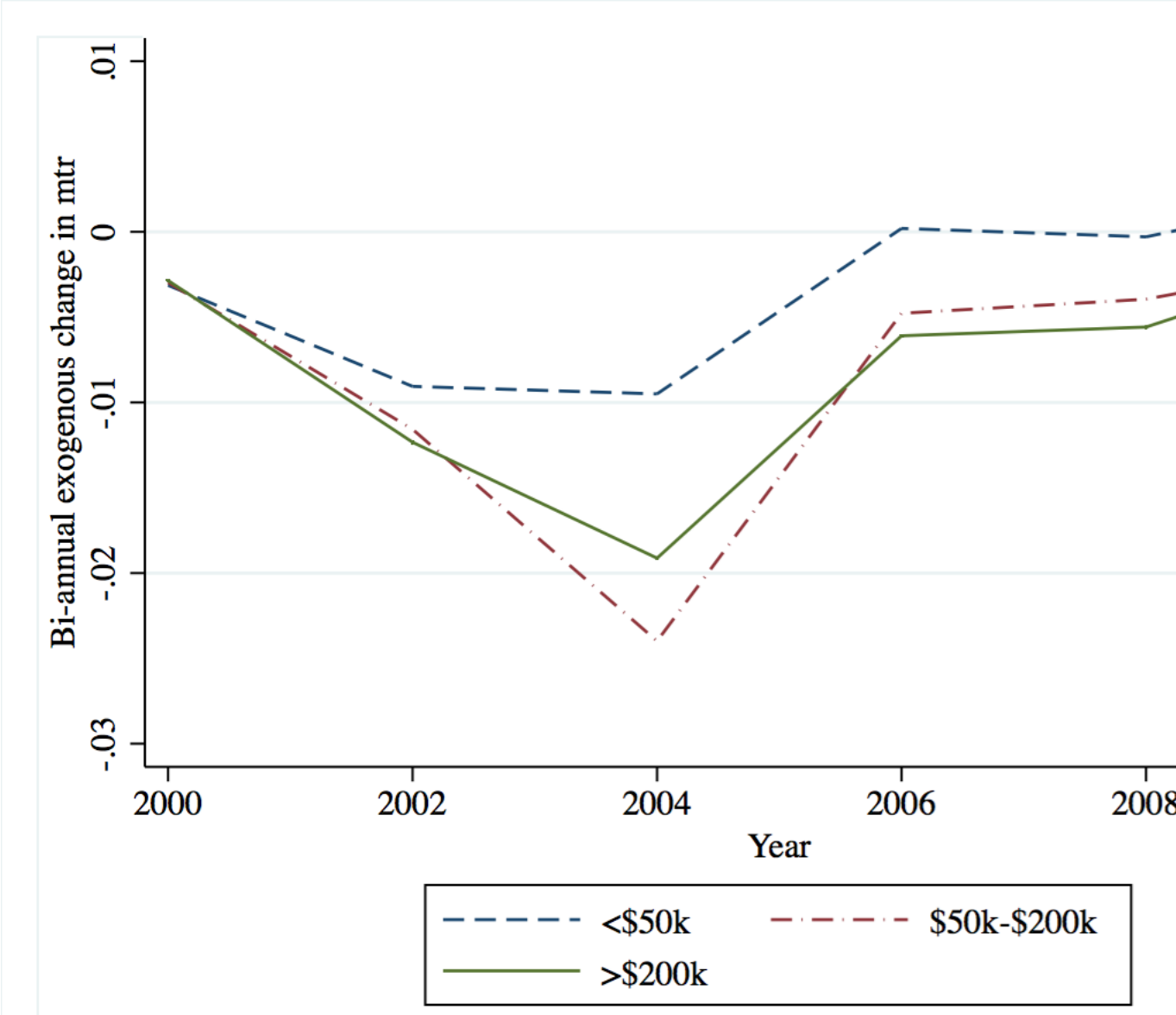
Exogenous change to the price

The key to identifying the price effect is exogenous variation in the marginal tax rates faced by household. A number of papers (**?? ?**, **?**, Bakija and Heim, 2011) use of exogenous changes to the federal or state income schedule during the period of observation and I follow suit. I obtain exogenous variation in the marginal tax rates between 2000

[9] Using a linear probability model I regress itemisation status on log donations, log income and a numebr of other controls including household fixed effects and I estimate this model excluding endogenous itemisers. The coefficient on log donations is positive (0.023) and highly significant (se=0.001).

and 2010 from changes to federal and state income tax rates. The most notable of these are the changes introduce by President Bush that took effect between 2000 and 2004. In Figure 1 I plot the mean bi-annual exogenous changes in the marginal tax rates faced by households in three broad income classes.

Figure 1: Mean bi-annual exogenous changes in the marginal tax rates



Notes; The figure plots the mean bi-annual exogenous changes in the marginal tax rates for households in three broad income classes: less than $\$50,000$, between $\$50,000$and $\$200,00$ and greater than $\$200,000$. Data are only available for 2000, 2002, 2004, 2006, 2008 and 2010 so points of the plots in intervening years have been interpolated.

To consider the extent to which changes in the marginal tax rate faced by households is exogenous I calculate the marginal tax rate for household i using year t characteristics

and the federal and state income tax schedules from year $t-2$ (recall the PSID is collected bi-annually) and then subtracting those rates from the 'first dollar' marginal rates obtained using year t characteristics and the year t tax schedules. This difference will be entirely due to exogenous changes in the tax schedules and will be independent of changes in income or other household characteristics which would determine the marginal tax rate. The mean total bi-annual change in a household's 'first dollar' marginal tax rate is 0.65 percentage points and the mean exogenous bi-annual change in a household's 'first dollar' marginal tax rate is 0.56 percentage points. This means that 86% of the change in a households marginal tax rate, and thus to the price of giving faced by that household is exogenous.

3.1 Censored quantile estimation with individual effects

Estimation

Let y_{it} be the donation by household $i = 1, 2 \ldots, N$ at time $t = 1, 2 \ldots, T$. The model I estimate can then be represented as

$$y_{it} = f(x_{it}, \alpha_i) \tag{2}$$

where x_{it} is a $K \times 1$ vector of household specific characteristics in time t and α_i is an individual effect. Generally, the structure of $f(.)$ is assumed to linear and additively separable, yielding the familiar

$$y_{it} = \alpha_i + x'_{it}\beta_{tau} + e_{it} \tag{3}$$

where unbiased estimates of the parameters β_τ can be obtained if $E[ex] = 0$ and $E[\alpha x] = 0$.

In practice the estimation of Equation 3 is complicated by a number of factors. First, not all households will donate to a given cause in a given year so $y_{it} = 0$ for many observations. It is generally accepted that this censoring of the dependent variable will yield biased OLS estimates of β.

To address the problem of censoring I employ the Chernozhukov and Hong (2002) three-step estimator developed to address censoring in quintile regression as the effects at the quantiles nearest the censoring are otherwise difficult to estimate robustly.[10] While there are methods to address this bias in mean effect estimators, such as the Tobit, but these tend to require restrictive distributional assumptions such as normality and homo-

[10] Quantile regression can still produce consistent estimates at the uncensored quantiles of the distribution (Koenker, 2005, p. 42) the the small smple bias can be large.

skedasticity for consistent estimation. Quantile regression is free of these distributional assumptions and robust to heteroskedasticity.

A second potential problem in estimating Equation 3 is that often $E[\alpha x] \neq 0$, in which case the presence of the individual effect will lead to biased OLS estimates of β. While there are generally robust methods for dealing with the presence of individual effects for estimators of the mean effect, researchers have only recently developed methods for quantile regression with panel data.

Koenker (2004), Abrevaya and Dahl (2008), Harding and Lamarche (2009), Lamarche (2010), Canay (2011), Galvao Jr. (2011), Ponomareva (2011), Rosen (2012), Arellano and Bonhomme (2013) all contribute to the growing literature on quantile regression with panel data. Here I follow Abrevaya and Dahl (2008) and Arellano and Bonhomme (2013) in using a correlated random effects (Mundlak, 1978) approach where the individual effect is assumed to be a liner projection on the within individual means of the observable time-variant variables plus a disturbance. This assumes that the individual effect is equally correlated with all time-period x_{it}'s and is very easy to implement. In practice, the assumption is that

$$\alpha_i = \bar{x}_i'\tau + \nu_i \tag{4}$$

and $E[x\nu] = 0$. In practice, I simply replace α_i with $\bar{x}_i'\tau$. in Equation 3. Canay (2011) notes that this approach may not identify β_τ if ν_i is present 'non-trivially'. However, Bache, Dahl and Tang (2008) perform a Monte Carlo simulation and find that this type of correlated random effects approach actually outperforms Canay's own estimator in terms of bias, the CRE estimates are found to have a very small bias, and root mean squared error even when omitted individual effects have scale effects on the response.

4 Results

I estimate the model for donations to secular organisations and for donations to religious organisations. Estimated price elasticities for each are presented in Figures 2 and 3. In each the x-axis is the percentile of the donation distribution and on the y-axis is the quantile treatment effect (income or price) interpretable as an elasticity. Standard errors are obtained via a bootstrap clustered at the household level with 250 repetitions. The figures show local polynomial smoothers of the estimated coefficients and 95% confidence intervals based on the bootstrapped standard errors at each non-zero percentile.

The evolution of the price elasticity over the secular donations distribution is consistent with the results in Fack and Landais (2010), indicating that the tax incentive has the largest effect for larger donations, though the relationship between the size of the quantile

effect and the size of the donation is not linear. There is instead a marked increase in the size of the effect (in absolute value) that appears to start around donations of about $100. The price effect does not differ from 0 until donations of about $250. The quantile effects then level off for donations in excess of about $500 and generally do not differ from -1 for these larger donations. For secular giving, these results provide evidence that the price elasticity of giving is not constant, as is often assumed in the literature. The assumption is supported for religious giving however.

In Figures 4 and 5 I plot the quintile taxable income elasticities for secular and religious giving, respectively.

The taxable income elasticities of secular giving are inversely related to the price elasticities, being largest for the smaller distributions and falling with the size of the donation. The income elasticities are more precisely estimated, perhaps due to the relative saliency of changes in one's income. The pattern of the income elasticities contrasts with that in Lin and Lo (2012) who find the income elasticity increase over the donations distribution. Again, these results provide strong evidence that the income elasticity of giving is not constant, as is often assumed in the literature.

The pattern for the taxable income elasticity of religious giving is, like the price elasticity, is flat over the donations distribution and sits below that for secular giving over nearly the entire donations distributions. It is significantly different from 0 for all but the largest donations, though only at the 5 percent (not at the 1 percent) level.

I also consider the effect of transfer income separately from taxable income. The elasticities for both secular and religious giving do not differ from 0 at any quantile (Figures 6 and 7). This result is consistent with Steinberg et al (2010) in rejecting the fungibility of income hypothesis.

5 6. Conclusions

TBD

6 Appendix A

The theoretical literature has developed a number of models helping to explain why people give at all. The motivations for giving identified by economists can be divided into three principal theories: Pure Public Goods (**??**), Warm Glow (**??**) and Impact (**??**).[11]

- **Pure Public Goods** The most evident benefit from making a donation to a charity is the effect of that donation on the activity of the charity. One who likes donkeys will contribute to The Donkey Sanctuary in order to sustain or enhance the service provided to the 2,000 donkeys currently cared for by the organisation in the UK.[12] The increase in that care leads to an increase in the donkeys' welfare which, in turn, increases the welfare of all who care for donkeys, donor or otherwise. The same logic is applicable to donations made to organisations working with people, restoring art, or researching a cure for cancer. Thus, the benefit of housing a homeless man or caring for a donkey can be treated as a public good. This Pure Public Goods model, where donors derive utility from the overall provision of the public good, was formalised in **??** and enhanced elsewhere (e.g. **?**)

- **Warm Glow** This second motivation, while recognised as early as **?**, was not formalised until Andreoni's work in the 1980s. The Warm Glow model of giving has donors deriving a utility from the act of giving itself. **?** notes that donors motivated by pure warm glow would be indifferent if their donation got lost in the mail as they derive utility from the size of their sacrifice.

- **Impact ?** introduces the Impact model of giving whereby donors derive utility from the direct impact of their donation on the provision of the public good. This model differs from the Public Goods model in that donors do not consider the government provision of the public good funded by taxes as part of their impact on the provision of the public good. Duncan also introduces a concave production function so that donors are not indifferent to the current provision of the public good.

The Impact model nests both the Warm Glow and the Pure Public Goods models. I amend this model slightly to allow for a proportional tax and two different public goods in the simple presentation that follows. Let there be a representative donor who can give to one of two public goods (charitable causes): Secular (S) and Religious (R). Secular can be provided by donations, d_S, from the philanthropist and by a government which collects

[11] behavioural models of pro-social behaviour also exist (e.g. **?**).
[12] See www.thedonkeysanctuary.org.uk for details.

a share, t where $0 \leq t \leq 1$, of the the donor's net income, $y - d_j$. Religious can only be provided privately (i.e. via donations), d_R. Donations of either type are deductible from the donor's taxable income. Let $Z(h_j)$ be the production function for charitable output where $h_j = \left(e_j + d_j + G_j\right)$, e_j is the endowment charitable good j, d_j is the donation made to j, $G_S = t(y - d_S)$ is the government provision of Secular and $G_R = 0$.

The utility function of a warm glow donor is given by $V((1-t)(y-d_j), (1-t)d_j)$ as she derives utility from the size of her sacrifice. The utility function of the public goods donor is given by $V((1-t)(y-d_j), Z(h_j))$, as she derives utility from the overall provision of the public good. An impact donor's utility function is given by $V((1-t)(y-d_j), Z(h_j) - Z(e_j + G_j))$ as her utility is derived from the increase in the provision of the public good funded directly by her donation. Assume a quasi-linear utility function such that the impact donor's utility can be written as

$$V = U((1-t)(y-d_j)) + \alpha \sum_{j=S,R} \left[\alpha_j Z(h_j) - \alpha_j Z(e_j + G_j)\right] \tag{5}$$

where α is the altruistic parameter from **?**, α_S is equal to 1 if the donor gives to Secular and 0 otherwise and $\alpha_R = 1 - \alpha_S$. The warm glow donor's utility function can be obtained by assuming $Z(h)$ is linear such that $\left(Z(h_j) - Z(e_j + G_j)\right) = \left(\theta(h_j) - \theta(e_j + G_j)\right) = \theta d_j$. Maintaining the simplifying assumption that utility is linear in $Z(h)$ and dropping the last term in equation 5, $\alpha_j Z(e_j + G_j)$, produces the utility function of the pure public goods donor.

It is from the Pure Public Goods approach that the traditionally specified price of $1-t$, and the importance of the unitary price elasticity, originated. This is the price of a donor's contribution towards the public good in terms of forgone consumption. This is different, however, from the price of increasing the public good in terms of foregone consumption as it ignores the change in the government contribution, G_j, to the public good caused by the decrease in tax revenue when a donation is made. This distinction becomes important when considering cause-specific (Secular or Religious) giving. Taking this additional change into consideration when formulating the price means that the price of increasing the provision of Secular and Religious will differ as G_R is fixed at zero. The price of increasing the public good in terms of foregone consumption is therefore given by

$$p_j = -\frac{\partial(1-t)(y-d_j)}{\partial(d_j + G_j + e_j)} = -\frac{\partial(1-t)(y-d_j)}{\partial d_j} \Big/ \frac{\partial(d_j + G_j + e_j)}{\partial d_j} \tag{6}$$

where the numerator equals $-(1-t)$. If the donor gives to Secular then the denominator in equation 6 is

$$\frac{\partial(d_S + G_s + e_S)}{\partial d_S} = 1 - t \tag{7}$$

Therefore, the price of increasing the provision of Secular faced by a public goods donor is $p_S = 1$; a one unit increase in the provision of Secular requires a one unit decrease in non-charitable consumption. For the public goods price of increasing Religious, the denominator in equation 6 is replaced by

$$\frac{\partial(d_R + G_R + e_R)}{\partial d_R} = 1 \tag{8}$$

Therefore, the price of increasing the provision of Religious faced by donors is $p_R = (1-t)$. Note this is the classically conceived of price of giving.

The price of increasing Secular is fixed at one, so a change in giving to Secular in response to a change in the marginal tax rate, and thus the price, will be due to the income effect only. The price of increasing Religious is $1-t$. A change in giving to Religious in response to a change in the marginal tax rate will be due to both the substitution and income effects. In other words, a change in the price will lead to a shift of the budget constraint for Secular donors, but the slope will not change. The same change in the price will mean a change in the slope of the budget constraint for Religious donors. Thus, the estimated price elasticities might vary over secular and religious giving.

Tables

Table 1: Price and income elasticities by cause

	(1)	(2)	(3)	(4)	(5)
	Feldstein (1975b)	Reece (1979)	McClelland & Kokoski (1994)	Bradely et al. (2005)	Yen (2002)
All					
Income	0.82*	0.88*		0.56*	1.16**
Price	-1.24*	-1.19*		-0.78*	
Hospitals					
Income	1.08*				
Price	-2.44*				
Religious					
Income	0.63*	0.4*	1.02*		0.98**
Price	-0.49*	-1.60*	-1.06*		
Education					
Income	1.22*	1.64*			
Price	-2.23*	-0.08			
Welfare					
Income	0.85*	1.67*	0.86*	0.38*	
Price	-1.18*	-0.4	-2.38*	-1.34*	
Estimator	OLS	Tobit	Tobit	Semi-Para	Tobit System

Bootstrapped standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: This table presents estimated cause-specific income and price elasticities from previous studies. The first number in the first column (0.82) means that the estimated income elasticity of total household giving in Feldstein (1975b) is 0.82 and is significant at the 10 per cent level. Causes were not defined in identical fashion across studies but has been grouped to reflect the most similarly defined causes from each study.

Table 2: Wald tests of parameter restrictions and individual effects

(1)	(2)	(3)	(4)
Test of:	χ^2	df	P-value
Parameter Restrictions			
$\beta_t = \beta$	198.71	192	0.35
$\beta_{Incomet} = \beta_{Income}$, $\beta_{Pricet} = \beta_{Price}$	28.32	24	0.25
$\rho_t = \rho$	40.13	30	0.10
Specification of individual effects			
$\theta = 0$	372.61	84	0.00
$\gamma_t = \gamma$	34.72	6	0.00

Notes: This table presents the results from Wald tests of the restrictions necessary to obtain consistent estimates via the Minimum Distance approach outlined in section 4. The first number in the first column (198.71) is the χ^2 test statistic obtained from a Wald test in the restriction that all the parameters presented in Table 4 are time invariant. The Minimum Distance estimator is supported by the failure to reject the null that the parameters are time invariant (the first three rows) and by the rejection of the null that the unobserved individual effects are uncorrelated with the regressors (fourth row) and the rejection of the null that the unobserved individual effects are 'fixed' (i.e. time invariant).

Figure 2: Quantile price elasticities of secular giving

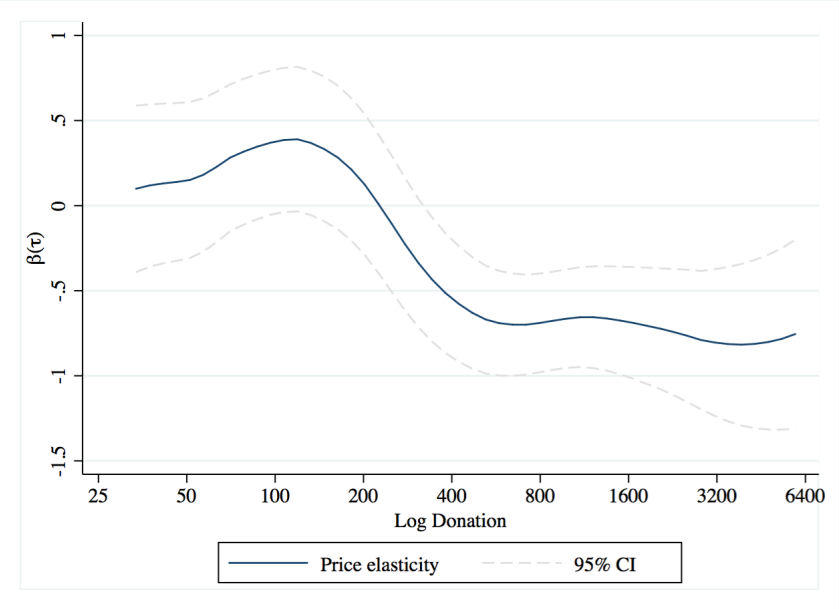


Figure 3: Quantile price elasticities of religious giving

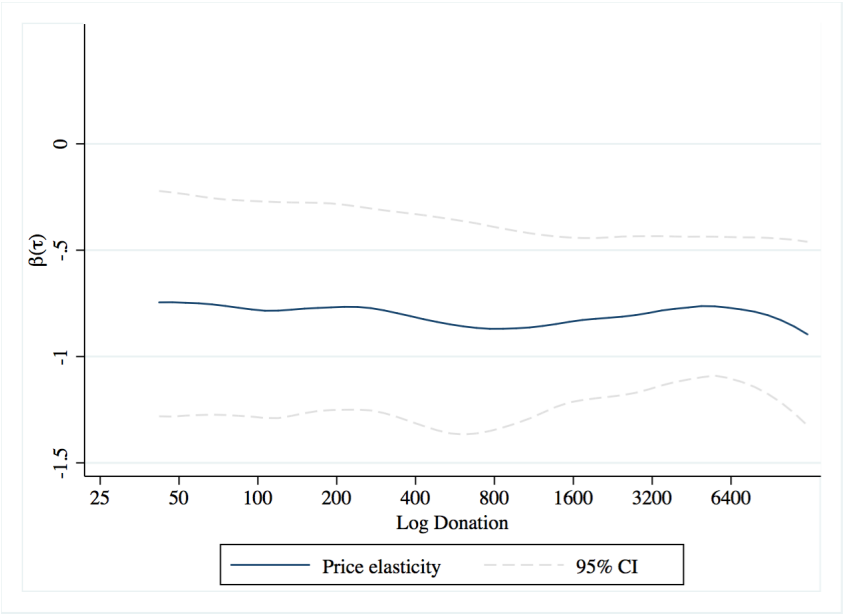


Figure 4: Taxable income elasticities of secular giving

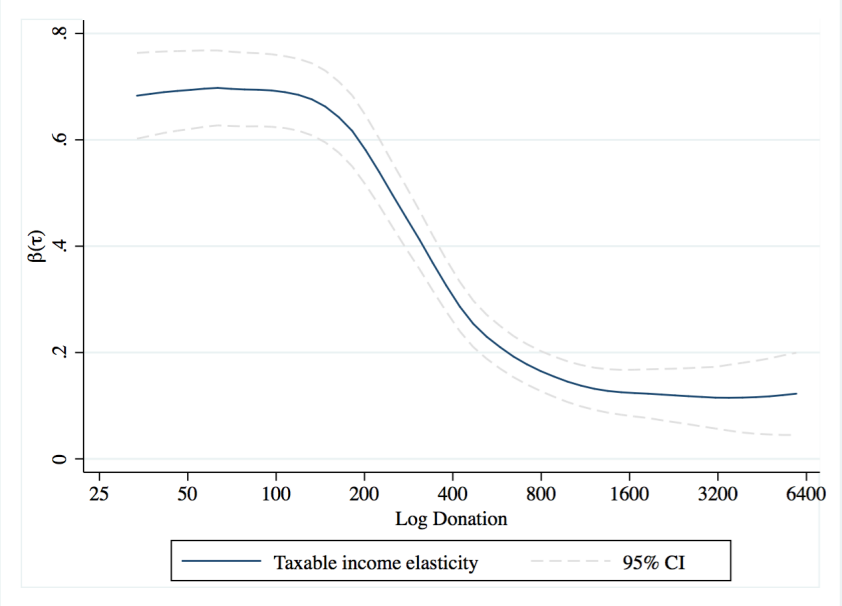


Figure 5: Taxable income elasticities of religious giving

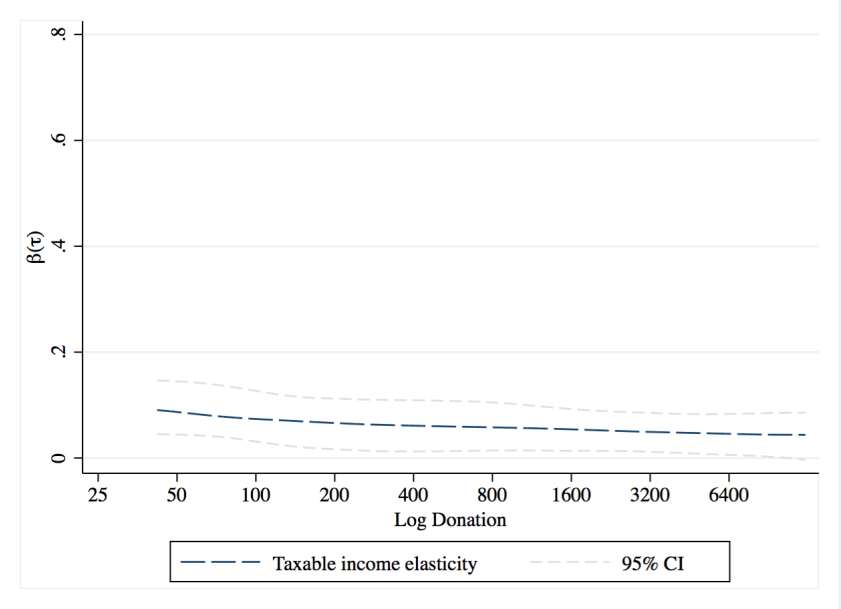


Figure 6: Transfer income elasticities of secular giving

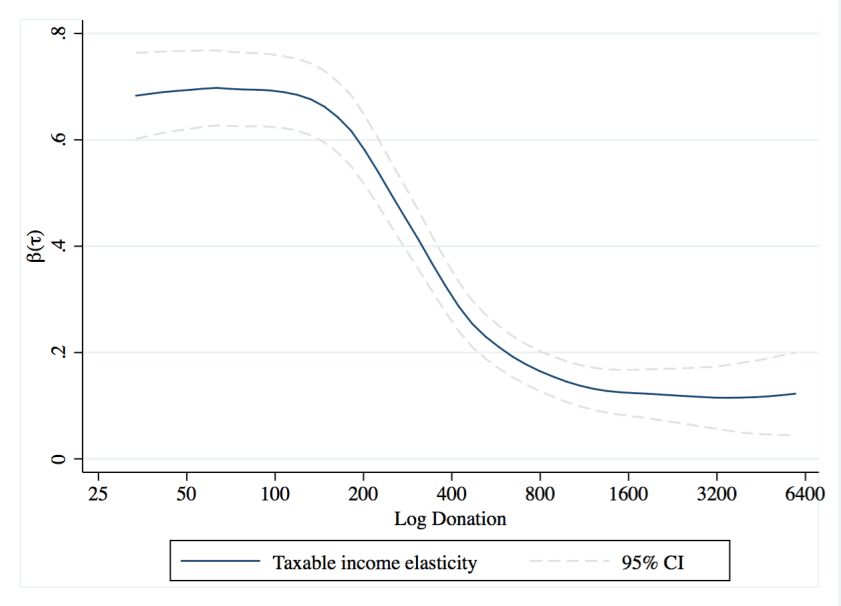


Figure 7: Transfer income elasticities of religious giving