Are generous people more likely to vote?

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Keywords: charitable giving, tax price of giving, voting
JEL classification: H24, H31, L38

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Abstract

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1 Introduction

In the United States and several other countries, charitable contributions are tax deductible. According to the most recent estimate, the federal government is estimated to have 49 billion in foregone revenue in 2010 due to millions of households who will itemize charitable deductions in their federal tax returns (Joint Committee on Taxation, 2008). The economic rationales for providing tax subsidies for charitable gifts are well-known.[1] Furthermore, recent literature also documents that the amount of charitable contributions are very responsive to tax subsidies.[2] However, the indirect effects of charitable subsidies on other types of prosocial behavior remain mostly unknown.[3] Using biennial surveys of charitable giving in the United States conducted from 1992 to 2001, this paper first documents a previously unknown relationship between charitable giving and another type of prosocial behavior, namely voting. Then, it investigates the spillover effects of charitable subsidies on voting behavior.

A large body of literature in economics and political science is dedicated to understanding the determinants of voting behavior. In addition to standard demographic variables such as income, age, and family characteristics, recent literature also shows that political interest and opinions, alternative forms of expressive behavior, ability, and various measures of personality are also significant determinants of voting behavior. For instance, using a bivariate probit model of voter turnout and political interest Denny and Doyle (2008) find that individuals with high comprehension ability and an aggressive personality are more likely to vote and have an interest in politics. Similarly, Copeland and Laband (2002) find evidence that voting is positively associated with other forms of expressive behavior, such as putting a political bumper sticker on one's car. Amaro-de-Matos and Barros (2004) develop a model in which social norms and networks significantly affect the voter turnout rate. People express their opinions about social or political issues not only through voting but also through other forms of prosocial behavior such as donating money and time to charities. Are individuals who are more generous also more likely to vote? High voter turnouts are generally considered desirable in democratic societies. They are regarded as demonstrative that the will of the people is being reflected, of the legitimacy of elected governments and of the democratic health of nations. Recently, concerns have been raised in relation to low electoral turnouts in established democracies. On the one hand, understanding the link between generosity and voting behavior may reveal a previously unknown determinant of voting. On the other hand, a possible link between these two prosocial behaviors may

[1] Andreoni (2006) provides an extensive discussion of the relationship between charitable subsidies and giving.

[2] Recent studies include Clotfelter (1990), Randolph (1995), and Auten, Sieg, and Clotfelter (2002). Most estimates in the literature suggest that a one percent increase in the tax price of giving is associated with more than one percent decrease in the amount of charitable gifts.

[3] Twenge et al. (2007) defines prosocial behavior as actions that benefit other people or society as a whole. These are the acts that demonstrate a sense of empathy, caring, and ethics including sharing, cooperating, helping others, generosity, praising, voting, complying, telling the truth, defending others, supporting others, and risking one's life to warn or aid another.

help policymakers to make informed choices about the indirect effects of charitable subsidies. This is particularly important given the decreasing trend in voter turnout rates in the United States and ongoing debates about designing alternative policies to encourage people to vote and increase voter turnout rates.[4]

Most of the papers that investigate the relationship between charitable giving and other types of prosocial behavior focus on jointly modelling charitable contributions of time and money. Menchik and Weisbrod (1987), Brown and Lankford (1992), and Andreoni, Gale, and Scholz (1996) find that time and money are complements and hence, charitable subsidies should not only increase charitable giving but also volunteering as well.[5] On the other hand, few papers explore the relationship between generosity and religious behavior. For instance, Sullivan (1985) jointly models church attendance and religious contributions whereas Gruber (2004) finds that religious giving and religious attendance are substitutes. Hence, larger subsidies to charitable giving lead to an increase in the amount of charitable gifts, but also decrease religious attendance, with an elasticity of attendance with respect to tax price of giving as much as -1.1. However, the relationship between generosity and other types of prosocial behavior remains unknown. There is also evidence that there is intergenerational spillover in charitable giving. Wilhelm et al. (2008) find the charitable giving behavior of parents and children are strongly correlated.

In this paper, I investigate the causal relationship between generosity and voting behavior. I do so by using four household surveys of charitable giving in the United States, which contain a unique question on whether the respondent voted in presidential elections. I hypothesize that some unobservable variables such as political contributions should jointly affect generosity and the propensity to vote. Therefore, one must address the possible endogeneity of generosity in voting models. I use the tax price of giving as a main identifying instrument for generosity.[6] I expect that the tax price should be negatively correlated with charitable contributions but uncorrelated with political giving since political contributions are not tax deductible. I also consider alternative instruments for robustness

[4]For example, most recent data from Federal Election Commission show that voter turnout rates in presidential elections in the United States dropped almost 10 percentage points within the last four decades. Green and Gerber (2004) provide a comphrensive discussion of policies that are designed to increase voter turnout rates.

[5]In contrast. Feldman (2010) finds that donations of time and money are substitutes. However, a decrease in the tax-price of monetary contributions has a positive effect on contributions of time that acts outside the change in relative prices and more than offsets the substitution effect leading to an overall positive correlation between these two charitable goods.

[6]Gruber (2004) follows a similar approach to identify the effect of tax price of giving on religious attendance.

checks.

The empirical results confirm the hypothesis that generosity is endogenously associated with the probability of voting in presidential elections. Using several techniques borrowed from the program evaluation literature, I find that compared with non-donors, charitable donors' probability of voting in presidential elections is 0.2 point higher. This effect is robust under different specifications and with different sets of instruments, and is also substantially larger than the effect estimated by conventional methods, which take generosity as exogenous. The similar result also prevails for the relationship between the amount of charitable contributions and the propensity to vote.

The results imply that generosity and voting behavior are complements. Increasing the tax price of giving decreases charitable contributions but at the same time, negatively affects the voting decision. The cross-price elasticity of the propensity to vote goes down as the tax price increases. I estimate that at the lowest income tax bracket, the implied cross price elasticity of the probability of voting is -0.4. The predicted propensity to vote decreases even more rapidly if charitable giving is punished. For instance, when the tax price is unity and hence charitable contributions are not tax deductible, a one percent increase in the tax price corresponds to a 0.5 percent decrease in the predicted probability of voting.

The rest of this paper is organized as follows. The next section presents the data and discusses the relationship between generosity and the propensity to vote. Section three sets out the specifications for different empirical models. Section four presents the results, discusses the validity of alternative identifying instruments, and interprets the findings. Section five focuses on the spillover effects of charitable subsidies and provides a discussion of policy implications. Section six concludes.

2 Data

I use a rich data set of charitable giving surveys conducted in 1992, 1994, 1996, and 2001.[7] These four independent cross-sectional surveys obtain information on voting behavior at the individual level as well as on household giving and personal volunteering habits, various indicators of relevant motivations, household social characteristics, selected demographic descriptors, and economic factors.

[7] The 1992, 1994, and 1996 waves of the survey series were conducted by the Gallup Organization whereas the 2001 wave was conducted by Westat Inc. All waves were commissioned by the Independent Sector. The Independent Sector also collected data for 1988, 1990, and 1999. However, respondents of these surveys were not asked questions about their voting behavior.

Weighting procedures are used to ensure that the final sample of respondents is representative of all non-instutionalized adults, 21 years of age and older. These survey series, given their scale, provide the most recent and comprehensive assessment of charitable activity in United States. Pooling the biennial data from 1992 to 2001 and eliminating the observations missing key variables yields a nationally representative sample of 8,940 households for the empirical analysis.

The survey records information on giving for thirteen different charity categories.[8] I identify the respondent as a charitable donor if her household has given to at least one of these categories and calculate the amount of charitable contributions as the sum of money that the respondent has reported giving to each of the specific charity groups. More than 84% of the respondents are donors and on average donate $1,284 (in 1996 dollars) to charities.[9] When giving to religious charities is excluded, the probability of giving and the mean contribution amount considerably decrease. On average, 50% of the respondents give to secular charities with a mean contribution of $663. Appendix C reports the summary statistics and further describes all the variables used in the empirical analysis in detail.

2.1 The relationship between generosity and the probability of voting

A unique feature of the surveys is that they contain information on whether the respondent voted in presidential elections.[10] In Figure 1 panel A, I plot the probability of voting for each survey year. As expected, the probability of voting for 1992 and 1994 survey years are similar since they contain information on the same presidential election year. The voting rate decreases in 1996 followed by a considerable increase in the 2000 elections.[11] Females are more likely to vote compared with males.

[8] These categories are religious organizations, youth development, education, health, human services, environment and animal welfare, adult recreation, arts, culture, and humanities, public or societal benefit, private and community foundations, international or foreign programs, and other unnamed areas. The survey also obtains information on giving to relatives and giving to friends and neighbors. This information is not used, however.

[9] These numbers are slightly higher but in general comparable to giving rates from other sources of charitable giving data such as Panel Study of Income Dynamics (PSID) charitable giving supplements and tax returns from Internal Revenue Service (IRS).

[10] The respondents were asked the following question in each wave of the survey: "Did you vote in the last presidential election?"

[11] Actual voter turnout rates in the 1992, 1996, and 2000 presidential elections (as a percent of registered voters) were 71%, 74%, and 76%, respectively. Voter turnout rates as a percent of total voting age population were much lower. However, total voting age population includes those who are ineligible to vote such as non-citizens and ineligible felons. The voting rates reported in Figure 1 are similar but in general slightly higher than the actual rates. Hence, the self-reported voting behavior may be subject to a measurement error problem. In the next section, I discuss several empirical models which should address this problem as long as the identifying instrumental variables used in estimations are uncorrelated with the measurement error itself.

Singles and those who are widowed, separated or divorced are less likely to vote compared with those who are married. Interestingly, panel B of Figure 1 shows that charitable giving rates during the same time period follow a similar trend. From 1992 to 1996, the probability of giving decreases by 15 percentage points for the whole sample, followed by a considerable increase in the charitable giving rate in 2001.[12]

Table 1 further documents the close relationship between generosity and voting behavior. Panel A shows that compared with non-donors, charitable donors are almost 29 percentage points more likely to vote while the difference in voting rates of donors and non-donors is almost 36 percentage points for males. When only giving to secular charities is considered, a similar pattern emerges. Panel B reports that those who donate to secular charities are 22 percentage points more likely to vote compared with those who do not give to secular charities. Table 2 shows that for donors, the amount of the charitable gift is closely related with the donor's probability of voting. The voting rate of the bottom quintile of charitable donors who donate up to $100 is 56% whereas this rate rises to 90% at the top quintile of donors who give more than $3000. Those who give to secular charities are also more likely to vote. The voting rate among the bottom quintile of donors who give to secular charities is 77%. Again, at the top quintile, this rate increases significantly to 92%. A similar trend is also observed for male, female, and unmarried donors. Therefore, one can confidently conclude that the simple tabulations reveal a positive relationship between generosity and voting behavior.

2.2 The tax price of giving

Since households are allowed to itemize charitable deductions on their federal and most state personal income taxes, each dollar given away costs less than a dollar if the household itemizes deductions. I compute the price of giving as $1 - t$ for those who itemize deductions and 1 for those who do not, where t is the marginal tax rate that the donor faces. Since the surveys do not report marginal tax rates, I calculate this variable for each household using information on itemization status, number of household members, gross income in 1996 dollars, probable filing status, and the federal tax schedules

[12] This finding is consistent with the historical trends in charitable giving reported by Giving USA Foundation (2003). Giving USA Foundation reports that starting from 1986, giving as percent of income had a decreasing trend until 1996, followed by an increasing trend until 2002. Furthermore, from 1989 to 1996, total amount of contributions by individuals were stable (around $110 billion in 2002 dollars). Starting from 1996, individual giving increased tremendously and reached $185 billion in 2001. Andreoni (2006) also discusses the historical trends in individual giving.

for the relevant year. For each household, I determine filing status (married, single, or household head) using the respondent's marital status and the information on the presence of children, whereas I obtain the itemization status of the household from the following question in each survey wave: "For your [survey year] federal tax return, did you, or will you, itemize your deductions?".[13] I calculate the number of dependents using the information on family size and number of children under 18 in the household. For those who itemize deductions, following Andreoni, Gale, and Scholz (1996), I assign the average level of itemized deductions from the IRS tax return data for the relevant survey year, conditioning on filing status and income.[14]

For each household, I calculate the taxable income as the household income less the value of exemptions and less the greater of itemized deductions or the standard deduction. I correct for the fact that individuals who are 65 and older can claim an additional standard deduction, but cannot correct for the fact that blind people are also eligible for an extra deduction since this information is unavailable. This calculation follows the assumptions that are consistent with the common practices in the literature.[15] The resulting variable depends on the household's contribution amount and is referred to as the "last-dollar price" in the literature.

3 Empirical Models

In this section, I consider several limited dependent variable models to investigate the causal relationship between generosity and voting behavior. The empirical models address the endogeneity of charitable behavior since some unobservable factors which may affect generosity may also be correlated with voting behavior. The magnitude and direction of the effect that can be attributed to the endogeneity problem is ambiguous, however. If charitably inclined people are also those who are more likely to vote, then one expects that unobservable factors that affect charitable giving should be positively correlated with unobservables affecting the voting behavior. In this case, not controlling for the endogeneity of generosity in voting models should overestimate the true effect of generosity on the probability of voting. However, if some unobservable factors that may be positively associated with the probability of voting such as the amount of political contributions are negatively associated

[13] I assume that those who are married declare joint filing status.

[14] The relevant IRS data is available at IRS Statistics of Income, Individual Income Tax Returns for year 1996. Some states allow for charitable deductions in state income tax returns. I discuss this possibility in section four.

[15] See, for example, Duncan (1999), Andreoni, Brown, and Rischall (2003), Yörük (2009), and Yörük (2010).

with charitable giving, then not controlling for the endogeneity of generosity in voting models should underestimate the true effect of generosity on the probability of voting. Finally, if unobservable factors that affect voting and giving behavior are uncorrelated, then one should get a consistent estimate of the effect of generosity on voting behavior without controlling for the possible endogeneity problem. The empirical models presented in this section not only provide a direct test of endogeneity of charitable behavior but also reveal the direction of the effect that can be attributed to this possible endogeneity problem.

First, consider a probit model of the probability of voting with an endogenous binary independent variable $give_{i,t}$ which takes the value of unity if individual i donated money to charitable organizations in year t. For the same individual, let $vote^*_{i,t}$ describe the propensity to vote in the presidential election in year t. The propensity to vote can be expressed by the following model:

$$vote^*_{i,t} = \beta_1' X_{i,t} + \gamma give_{i,t} + \delta_1' year_t + u_{1i,t} \tag{1}$$

where $X_{i,t}$ is a covariate vector of income and other observable characteristics of individual i at time t, $year_t$ is a vector of year fixed effects, and $u_{1i,t}$ is a normally distributed random error with zero mean and unit variance. The actual probability of voting is not observed, but one observes whether individual i voted in the presidential election or not, which is given as

$$vote_{i,t} = \mathbf{1}\{\beta_1' X_{i,t} + \gamma give_{i,t} + \delta_1' year_t + u_{1i,t} \geq 0\} \tag{2}$$

where $\mathbf{1}(.)$ denotes the indicator function. If unobservable factors that affect voting and giving behavior are uncorrelated, then, the probability of giving is exogenous and the parameters of equation (2) can be estimated directly by specifying a distribution for $u_{1i,t}$. However, if generosity is an endogenous determinant of voting, failing to take this into account results in biased parameter estimates.

In order to address the endogeneity problem, consider the following reduced form behavioral model:

$$give^*_{i,t} = \beta_2' X_{i,t} + \lambda price_{i,t} + \delta_2' year_t + u_{2i,t} \tag{3}$$

where $price_{i,t}$ is the natural logarithm of the tax price of giving realized by individual i at time t and $u_{2i,t}$ is a normally distributed random error with zero mean and unit variance. Again, one does not observe the actual probability of giving but rather a binary variable $give_{i,t}$, which is given as

$$give_{i,t} = \mathbf{1}\{\beta_2' X_{i,t} + \lambda price_{i,t} + \delta_2' year_t + u_{2i,t} \geq 0\}. \tag{4}$$

Since, both dependent variables are dichotomous, there are four possible states of the world ($give_{i,t} = 1$ or $give_{i,t} = 0$ and $vote_{i,t} = 1$ or $vote_{i,t} = 0$). Assume that the error terms are independently and identically distributed as bivariate normal with $E[u_{1i,t}] = E[u_{2i,t}] = 0$, $var[u_{1i,t}] = var[u_{2i,t}] = 1$, and $cov[u_{1i,t}, u_{2i,t}] = \rho$. Then, following Evans and Schwab (1995) and Wooldridge (2002), the likelihood function corresponding to this set of events can be estimated as a bivariate probit using $price_{i,t}$ as the identifying instrument.[16] If $\rho \neq 0$, then $u_{1i,t}$ and $u_{2i,t}$ are correlated and running separate probit regressions for the equations (2) and (4) yields inconsistent estimates for the parameter vectors. Moreover, the sign of ρ should reveal the direction of the effect that can be attributed to the possible endogeneity problem. A positive and statistically significant value of ρ implies that single equation probit models that assume the exogeneity of generosity overestimates the impact of generosity on the probability of voting whereas a negative estimate of ρ implies the opposite. I further discuss the derivation of the log-likelihood function for this model in Appendix A.

The main parameters of interest in the above model are the average treatment effect (ATE) and average treatment effect on the treated (ATT) of the probability of giving on the probability of voting. Let $vote_{1i,t}$ be the probability of voting for a random person i who is a charitable donor and $vote_{0i,t}$ be the same probability for a non-donor. The ATE corresponds to the average difference between the probability of voting of a randomly chosen donor and non-donor and defined as $ATE = E[vote_{1i,t} - vote_{0i,t}]$. Similarly, the ATT is the average effect of giving on voting for those who actually donated money and is defined as $ATT = E[vote_{1i,t} - vote_{0i,t} | give_{i,t} = 1]$.[17]

If charitable donors are more likely to vote than non-donors, then for donors, it is also worth considering the marginal effect of the amount of charitable contributions on the probability of voting. Suppose that $cont_{i,t}$ denotes the natural logarithm of the amount of contributions given by charitable donor i at time t. The joint system of equations which takes into consideration the possible

[16]Following Maddala (1983), it is widely believed in the literature that in the joint estimation of (2) and (4), parameter vectors are not identified in the absence of exclusionary restrictions. However, Wilde (2000) argues that the joint model is identified as soon as both equations have a varying exogenous regressor. Monfardini and Radice (2008) also state that identification of this model does not require any additional instruments. But note that in the absence of exclusionary restrictions, identification relies heavily on the functional form. Therefore, estimation with additional instruments yields parameter estimates that are more robust to distributional misspecification. Hence, I rely on identifying instruments in the empirical analysis.

[17]I further discuss the estimation of ATE and ATT for probit type models in Appendix B.

endogeneity of the amount of contributions in the probability of voting equations can be written as

$$\begin{aligned} vote_{i,t} &= 1\{\alpha_1' X_{i,t} + \zeta cont_{i,t} + \eta_1' year_t + \varepsilon_{1i,t}\} \\ cont_{i,t} &= \alpha_2' X_{i,t} + \theta price_{i,t} + \eta_2' year_t + \varepsilon_{2i,t} \end{aligned} \tag{5}$$

where $price_{i,t}$ is used as the identifying instrument and the error terms are assumed to be independently and identically distributed with a bivariate normal distribution with $E[\varepsilon_{1i}] = E[\varepsilon_{2i}] = 0$, $var[\varepsilon_{1i}] = 1$ and $var[\varepsilon_{2i}] = \sigma^2$. Suppose that φ denotes the correlation between ε_{1i} and ε_{2i}. If $\varphi \neq 0$, then ε_{1i} and ε_{2i} are correlated and separate probit and ordinary least squares(OLS) estimation of the equations in (5) yields inconsistent estimates for the parameter vectors. I call this model IV-probit and as for the probit model with binary endogenous variable, use the maximum likelihood (ML) methodology for estimation. I present the log-likelihood functions corresponding to this model in Appendix A.

4 Results

In order to investigate the effect of generosity on the probability of voting in presidential elections, I first estimate single equation probit models as a benchmark. Next, I estimate bivariate probit, IV-probit, and two stage least squares (2SLS) models to control for the endogeneity of generosity in voting models. I also run several robustness checks to test whether the results are sensitive to inclusion of extra control variables, state effects, selection of the sample by gender and marital status, and the choice of the instrumental variables.

4.1 Single equation models

The first column of Table 3 reports marginal effects of the various determinants of the probability of voting. Consistent with the earlier literature, well-educated, older people with higher household incomes and females are more likely to vote whereas the effect of marital status and family size on voting behavior is insignificant. Religion is also an important determinant of voting. Those who regularly attend religious services are 5 percentage points more likely to vote.[18] Being a charitable donor is associated with almost 0.1 point increase in the probability of voting in presidential elections. The ATE and ATT of being a donor on the probability of voting are slightly lower, however. On

[18] Gerber, Gruber, and Hungerman (2008) document the positive effect of religion on voting.

the one hand, for a randomly chosen individual, being a donor is associated with almost 0.08 point increase in the probability of voting. On the other hand, the estimated ATT suggests that for charitable donors, this effect is slightly lower.

The first column of Table 4 reports the marginal effects of the determinants of the probability of voting for charitable donors only. Compared with Table 3, age, gender, and education remain significant determinants of voting whereas the effects of income and religion are no longer significant. The marginal effect of the charitable contributions on the probability of voting is positive and significant. For charitable donors, a one unit log increase in the donation amount is associated with 0.03 point increase in the probability of voting.[19]

4.2 Models with endogenous giving behavior

The single equation probit models discussed above treat generosity as an exogenous determinant of voting behavior. This section addresses the possible endogeneity of generosity in the probability of voting models using the tax deductibility rules of charitable contributions in income tax returns for identification. Therefore, these models rely on the assumption that the tax price of giving is correlated with the probability of being a donor and the contribution amount, but it is associated with the propensity to vote only through charitable behavior.[20]

The second and third columns in Table 3 show that the tax price is a significant determinant of the probability of giving. As expected, higher tax price is associated with lower probability of giving. Compared with the benchmark probit model, the effects of income, age,gender, education, and religious attendance on the propensity vote are similar and remain significant in the base bivariate probit model. The correlation coefficient between the error terms of probability of giving and voting equations is negative and statistically significant. This result suggests that some unobserved characteristics of respondents that positively affect their voting behavior should have a negative impact on their propensity to give or vice versa. Therefore, estimating single equation probit models without

[19] A one unit log increase at the mean of the ln (contribution amount) corresponds to a roughly 200% increase in the actual contribution amount in 1996 dollars.

[20] A widely discussed empirical issue in the literature is the endogeneity of the tax price in giving models. However, a possible endogeneity of the tax price should not affect the estimates of the voting models as long as unobserved covariates that are jointly correlated with the tax price and charitable giving are uncorrelated with the propensity to vote in presidential elections. Furthermore, I also use the first-dollar price of giving, a widely-used instrument for the last-dollar price as an instrument for charitable contributions. The results from this alternative specification are very similar compared with those reported in this paper. These results are available upon request.

controlling for the endogeneity of generosity should underestimate the true effect of generosity on voting behavior. As expected, compared with the single equation probit model, the effect of generosity on the probability of voting is much higher in the base bivariate probit model. The estimated ATE suggests that for a randomly chosen individual, being a donor is associated with a 0.33 point increase in the propensity to vote. For charitable donors, this effect is 0.1 point lower. For comparison purposes, the last two columns of Table 3 repeats the same analysis using 2SLS. Although the coefficients in this model mostly have their expected signs and are comparable with those of the bivariate probit model, the effect of giving on the probability of voting is considerably larger.

The second and third columns in Table 4 reports the marginal effects from the base IV-probit model. As in the bivariate probit model, the correlation coefficient between the error terms of the probability of voting and the contribution amount equations is negative and statistically significant at conventional levels. Furthermore, the first stage regression shows that the tax price has a significant effect on the contribution amount[21] Since the sign of the correlation coefficient is negative, estimating a single equation probit model which assumes that the contribution amount is exogenous underestimates the true effect of contribution amount on the propensity to vote. The base IV-probit model shows that for charitable donors, a one point increase in the ln(contribution amount) is associated with 0.2 point increase in the probability of voting which is considerably higher compared with that of the probit model. Interestingly, the 2SLS model reported in the last two columns of Table 4 yields virtually the same effect of the contribution amount on the propensity to vote.[22]

4.3 Robustness checks

Tables 5 and 6 report the results of the sensitivity tests performed to determine whether the estimates of the bivariate probit and IV-probit models are robust to selection of the sample based on survey years, gender, marital status, and type of the charitable contribution, inclusion of alternative control variables, and controlling for the state fixed effects. For all specifications, the null hypothesis that $\rho = 0$ or $\varphi = 0$ is rejected at the conventional significance levels and the coefficient on the tax price is significant which implies that generosity is an endogenous determinant of the propensity to vote.

[21] In this model, the price elasticity of giving is -1.16 which is consistent with the previous literature. See, Andreoni (2006) for further discussion on the price elasticity of giving..

[22] In the first stage, a linear ordinary least squares (OLS) regression of the contribution amount is estimated in both the IV-probit and 2SLS models. Therefore, the first stage results from both models are the same.

Moreover, the estimates generated by the bivariate probit and IV-probit models are positive and substantially larger than the estimates of univariate probit models.[23] The first specification in both tables replicate the results of the base models presented in Tables 3 and 4 for comparison purposes.

Different states may have different treatments for charitable giving. Furthermore, there exists a considerable variation in voter turnout rates at the state level. If charitable donors residing in specific states are systematically more or less likely to vote, then not controlling for the state effects may yield biased parameter estimates. In Tables 5 and 6, the second specification addresses this possibility. Compared with the benchmark specification discussed above, The ATE and ATT of the probability of giving on the propensity to vote decreases by 6 and 4 percentage points respectively once the state effects are accounted for. On the other hand, IV-probit and 2SLS models show that the marginal effect of the contribution amount on the propensity to vote remains virtually the same even after the state effects are controlled for.

The third specification adds two additional control variables to the propensity to vote and the first stage generosity equations. These variables control for the number of years that the respondent lived in her current community and whether she owns her primary residence. I hypothesize that people who own their primary residence are more integrated into their communities and may be more likely to be influenced by the behavior of their neighbors. People may sort themselves to certain communities depending on community characteristics. If community characteristics are associated with prosocial behavior such as giving or voting, then not controlling for these factors may yield biased estimates.[24] Table 5 shows that compared with the base models, controlling for community effects and homeownership decreases the estimated ATE and ATT of being a charitable donor on the probability of voting only slightly. For donors, contributing money to charities is associated with a 0.2 point increase in the propensity to vote. However, as in the second specification, including additional controls does not affect the marginal effect of the contribution amount on voting behavior.[25]

[23] In all specifications, the effect of the tax price of giving on generosity is negative and statistically significant at 1% significance level in the first stage. Detailed estimation results are available from the author upon request.

[24] Homeownership may also be directly associated with giving. Homeowners would be more likely to give since they are more likely to have substantial amounts of mortgage interest, which would make them more likely to be able to take an itemized deduction for their charitable gifts.

[25] I also estimate bivariate probit and IV-probit models which include both the fixed state effects and community characteristics. In these models, the estimates of the ATE and ATT of the probability of giving are similar to the main bivariate probit model (0.22 and 0.17, respectively). The marginal effect of the contribution amount is also comparable to the main IV-probit model (0.23).

Several recent papers argue that the underlying motivations of religious and secular giving might be different.[26] In the fourth specification, I estimate the effect of secular giving on the propensity to vote. For those who donate to secular charities, being a donor is associated with a 0.36 point increase in the probability of voting in presidential elections. However, the marginal effect of the monetary value of a secular contribution on the propensity to vote is similar to the marginal effect of the total contribution amount reported in the first specification.

As mentioned before, until 2001, the Gallup Organization conducted biennial surveys of charitable giving and volunteering for Independent Sector. In 2001 Independent Sector hired Westat Inc. to conduct the same survey. As a result, in the 2001 edition of the survey series, the sample size increased considerably, some questions were dropped from the survey, and the wording of some others changed.[27] In order to check whether these changes affect the estimation results, the fifth specification excludes this year from the sample. Excluding the 2001 subsample does not affect the ATE and ATT of the probability of giving in the bivariate probit model. Furthermore, the marginal effect of the contribution amount remains almost the same in the IV-probit model.

Although the surveys obtain information about giving behavior at the household level, they record the information about voting behavior at the individual level. In order to investigate whether this discrepancy affects the main results, I re-estimate the empirical models using a sub-sample of unmarried respondents.[28] The sixth specification shows that restricting the sample to unmarried respondents do not change the main results significantly. In particular, compared with the main bivariate probit model, the ATE increases by 2 percentage points whereas the ATT increases by only 1 percentage point. On the other hand, for unmarried people, a one unit increase in the ln(contribution amount) is associated with a 0.3 point increase in the propensity to vote.

The last two specifications document the effect of generosity on voting by gender. Table 5 shows that for donors, being a male donor increases the propensity to vote by approximately 0.3 point. However, being a female donor is associated with 0.2 point increase in the propensity to vote. The marginal effect of the donation amount is not significant for males but is associated with almost 0.3 point increase in the probability of voting for females.

[26] See, for example, Hrung (2004) and James and Sharpe (2007).

[27] Westat Inc. conducted the 2001 survey with a sample of 4,216 adults, whereas previous versions were conducted by Gallup Organization on about 2,500 households.

[28] Here, I assume that unmarried respondents who live with a partner or a family member are either the sole decision-maker of the household or make their own decisions about charitable giving.

4.4 The validity of instruments

In order to be a valid instrument, the tax price of giving should satisfy two conditions. First, it must be a determinant of generosity. Second, it must be uncorrelated with the unobservable covariates which might affect voting decision. It is easy to check that the first condition is satisfied. In all the models discussed so far, the coefficient of the tax price in the first stage was negative and significant at conventional significance levels which suggests that people tend to give less to charities as giving becomes more expensive.

Thus, the credibility of parameter estimates depends on whether the second condition is fulfilled. Since several determinants of the tax price such as income, marital status, and number of children are already controlled for, the second condition may be violated if those who are more or less inclined to vote tend to sort themselves to certain tax brackets. Although there is no particular reason to believe that this might be the case, I address such a possibility by investigating some observed characteristics of individuals who belong to different tax brackets. These characteristics are likely to reveal some unobserved aspects of voting decision. For example, if some individuals are more likely to vote, then it is likely that these individuals have confidence in political parties. A unique question in the survey contains information on each respondent's degree of confidence in political parties.[29] Using this information, I find that respondents' confidence in political parties are independent of the tax bracket that they belong to. For example, those who are in 15% tax bracket are almost equally likely to have the same confidence level compared with those who belong to 28%, 31%, and 36% tax brackets (3.3 compared with 3.3, 3.5, and 3.6 respectively).[30] While I recognize that it is not possible to test directly the validity of the tax price as an instrument, I further conduct two sensitivity analyses. First, I estimate the empirical models using an alternative set of instrumental variables and check whether the estimates are robust to the selection of alternative instruments. Second, I test the validity of instruments in 2SLS models using the tests of overidentification.

In order to increase the number of instruments, I consider two approaches. First, instead of using a continuous measure of the tax price of giving, I use a set of dummy variables that correspond

[29] The respondents were asked the following question: "How much confidence you have in political parties?". The answers are coded as follows: "1-Great deal, 2-Quite a lot, 3-Some, 4-Very little".

[30] In the 2001 edition of the survey, respondents were also asked about their confidence in congress. The relationship between this variable and the tax price is comparable to those between confidence in political parties and the tax price.

to different tax brackets as instruments.[31] The second specification in Table 7 shows that using these dummy variables as instruments does not affect the main results. The ATE and ATT of the probability of giving in the bivariate probit model remains the same while the marginal effect of the contribution amount increases by only 1 percentage point in the IV-probit model.

Next, I use the exogenous variation in giving behavior generated by the tax deductibility rules at the state level. I generate a dummy variable which takes the value of unity if the respondent resides in one of the states that do not allow charitable deductions in state tax returns and use it as an instrument (STATE).[32] Using this instrument in the bivariate probit model generates ATE and ATT estimates that are comparable to the base model. However, this instrument does not yield a significant estimate of the marginal effect of the donation amount and the correlation coefficient in the IV-probit model.

The last two specifications in Table 7 report the estimates from the models that use different combinations of the instrumental variables. In general, these specifications yield similar estimates compared with the main bivariate probit and IV-probit models. The impact of generosity on the probability of voting remains significant and considerably larger than the estimates from univariate models.

Although there is no evidence to suggest that the assumptions necessary to perform the test of overidentifying restrictions are satisfied when both the dependent variable and the endogenous variable are binary, Evans and Schwab (1995) suggest that the test of overidentifying restrictions is the best diagnostic available to test the validity of instruments in bivariate probit models. In light of this argument, In panel A of Table 7, I also test the validity of the instruments in linear 2SLS models. Except for the third specification in which the STATE used as an instrument, the F-test of excluded instruments (Bound et al., 1995) is significant at conventional levels in all models, which suggests that the set of identifying instruments from the first stage regression are not 'weak' in the sense of showing enough relationship with generosity. The test of overidentifying restrictions cannot be constructed in exactly identified models, i.e., models estimated with a single instrument. However, for the remaining models, the null hypothesis that the instruments are valid clearly cannot be rejected. Panel B repeats the same exercise for IV-probit models. As in bivariate probit models, except for

[31] These four dummy variables are generated for those who itemize deductions in their federal tax return and correspond to 15%, 28%, 31%, and 36% tax brackets. The excluded category is those who do not itemize deductions.

[32] These states are Illinois, Indiana, Massachusetts, Michigan, New Jersey, Ohio, and West Virginia.

the specification in which the STATE used as an instrument, the F-test of excluded instruments is significant at conventional levels in all models and the J-tests suggest that the null hypothesis that the instruments are valid cannot be rejected in overidentified models.

4.5 Interpretation of results

The results of bivariate probit and IV-probit models show that the estimated effect of generosity on the propensity to vote is much higher once the endogeneity is controlled for. This result is counterintuitive in a sense that if people who are more generous are also those who are more likely to vote, then not controlling for the endogeneity of generosity would lead one to overestimate the true relationship between generosity and voting behavior rather than to underestimate it. How can one justify the fact that some unobservable covariates that have a positive impact on respondents' probability of voting negatively affect their generosity or vice versa?

The empirical models do not control for political contributions which may be positively correlated with the probability of voting. If people have a fixed amount of income to allocate between charitable and political organizations and their charitable contributions tend to decrease as their political giving increases, then this may explain why single equation probit models underestimate the impact of generosity on the propensity to vote. Using the 1990 and 1992 waves of the survey, I find some evidence that this argument may be plausible.[33] In these waves of the survey, respondents were asked about their amount of contributions to political organizations. Estimating a simple probit model, I find that people who are more likely to give to political organizations are also those who are more likely to vote.[34] Moreover, comparing data from 1990 (a non-election year) with 1992 (a presidential election year) provides some evidence that during the presidential election years, people tend to give more to political parties and organizations but are less likely to give to charitable organizations. Compared with 1992, the giving rate in 1990 is higher (75 percent vs. 73 percent). Similarly, in 1990, people donated on average 1.9 percent of their income to charities whereas in 1992, they gave 1.8 percent of their income. However, political giving increases considerably during an election year. In 1990, people gave 0.03 percent of their income to political organizations whereas political giving

[33] Notice that respondents were not asked about their voting behavior in the 1990 wave. Hence, I do not use data from this year in the empirical analysis.

[34] The effect of giving amount to political organizations as a percent of income on the probabiliy of voting is highly significant and positive in a probit model. Yet, I also recognize that political giving may be endogenous in this model and hence, the estimates may be biased

increased to 0.05 percent of income in 1992.

The public agenda changes as public priorities shift. The empirical models do not control for several events that may directly affect the public agenda. For instance, recent literature provides evidence that the media coverage of political organizations may increase voter turnout.[35] As the intensity of news about the political parties and organizations increases during the election years, political activities such as contributions of time and money for political organizations and the propensity to vote are expected to increase whereas people may shy away from other prosocial behaviors such as charitable giving. Similarly, the media has the power to encourage generosity. The media coverage of humanitarian crises or natural disasters is positively associated with charitable giving.[36] As the public priorities tend to shift towards giving aftermath of such events, other prosocial behaviors such as voting may be negatively affected. Yet, I also recognize that none of these hypotheses are testable due to the limitations of the survey data.

Finally, it is also worth noting that another possible reason for the negative correlation between the error terms of the generosity and voting equations might be the attenuation bias caused by the measurement error in different measures of generosity. In particular, the survey literature generally reports that respondents' answers on attitudinal questions are subject to measurement error. However, bivariate probit and IV-probit models estimated by appropriate instruments should correct for the measurement error provided that the instruments are correlated with the true value of generosity and not with the measurement error.

5 The spillover effects of charitable subsidies

The above analysis clearly shows the positive relationship between generosity and voting behavior. Policymakers in the Unites States and many other countries encourage charitable giving through various subsidies. In the United States, for instance, charitable contributions can be deducted from taxable income making the price of giving inversely related to the marginal tax rate. In this section, I investigate the spillover effect of these policies by focusing on the relationship between the tax price of giving and the probability of voting.

[35] See, for example, Gerber, Karlan, and Bergan (2009).

[36] Brown and Minty (2008) document the positive effect of media on charitable giving. Yörük (2009) documents the positive effect of media campaigns on volunteering.

As expected, the second panel in Figure 2 shows that as the tax price of giving increases, the probability of giving decreases significantly. At the highest tax bracket, a charitable contribution of one dollar costs only 64 cents to a donor whose predicted probability of donation is almost 0.9. When the cost of donating a dollar rises to 85 cents, the predicted probability of giving decreases to 0.75. If donors do not itemize their contributions in their tax return, then the effective price of giving is unity. At this price, charitable contributions are not subsidized and the probability of giving decreases to 0.65. The relationship between the probability of giving and tax price is also robust to selection of sample based on gender and marital status.

In Panel A of Figure 2, I use the estimation results from the main bivariate probit model to show that the relationship between the predicted probability of voting and tax price of giving follows a similar trend. For the full sample, as the tax price of giving increases from 0.64 to 0.72, the predicted probability of voting decreases roughly by 5 percentage points. At relatively higher tax prices, the predicted probability of voting decreases even more. For example, an increase in the tax price from 0.72 to 1 corresponds to an approximately 0.2 point decrease in the predicted probability of voting. Again, this effect is robust when the main bivariate probit model is estimated for only males, females, or unmarried respondents.

I also estimate the elasticity of the probability of voting with respect to the tax price in the main bivariate probit model and report the results in Table 8.[37] At the tax price of 0.64, a one percent increase in the tax price of giving decreases the probability of voting by almost 0.2 percent. The cross-price elasticity of the propensity vote goes down as the tax price increases. At the lowest tax bracket (15%), the implied cross price elasticity of the probability of voting is -0.4. The predicted propensity to vote decreases even more rapidly if charitable giving is punished. When the tax price is unity, a one percentage point increase in the tax price corresponds to a 0.5 percent decrease in the predicted probability of voting. The estimated cross-price elasticities for males and females are similar to those of the full sample. However, unmarried people are more responsive to changes in the tax price of giving. For example, at the tax price of 0.85, unmarried people tend to decrease their predicted probability of voting by more than 0.8 percent as a response to a one percent increase in the tax price of giving. When the tax price rises to unity, the cross price elasticity of the probability of voting for unmarried people becomes -1.4. These results highlight the positive externalities created

[37] IV-probit model yields similar elasticity estimates.

by charitable subsidies and may help policymakers to make informed choices about the indirect effects of charitable subsidies.

6 Conclusion

Policymakers promote tax relief for charitable donors who itemize their donations in their federal and state tax returns. However, the existing literature focuses on the immediate effect of such policies on generosity and often ignore their impact on other types of prosocial behavior. In this paper, I explore the relationship between generosity and voting behavior and investigate the spillover effects of charitable subsidies on the propensity to vote in presidential elections using biennial surveys of charitable giving in the United States conducted from 1992 to 2001.

I document that generosity and voting behavior are positively associated. Controlling for the endogeneity of generosity in voting models, I find that for a randomly chosen individual, being a donor is associated with slightly more than 0.3 point increase in the propensity to vote in presidential elections. For charitable donors, this effect is 0.1 point lower. Similarly, a one unit log increase in the contribution amount is associated with approximately 0.2 point increase in the probability of voting. The impact of generosity on voting behavior is robust under different specifications and with different sets of instruments and is much larger than the estimates from univariate probit models which assume that generosity is exogenous.

This result is quite surprising since one might expect to find a positive relationship between the unobserved factors that jointly affect generosity and voting behavior. For instance, if people who are more charitably inclined are also those who are more likely to vote, then not controlling for the endogeneity of generosity would lead one to overestimate the true relationship between generosity and voting behavior rather than to underestimate it. I propose several arguments that may explain the counterintuitive results. In particular, I provide some evidence that political contributions, an unobserved covariate in empirical models, are positively associated with voting decision but have a negative effect on charitable giving.

Generosity and voting behavior are complements. Hence, policies that encourage charitable giving have positive spillover effects on voting behavior. I find that the cross-price elasticity of the probability of voting goes down as the tax price increases. For instance, at the lowest tax bracket, a charitable contribution of one dollar costs 85 cents and the implied cross price elasticity of the probability of voting is -0.4. Furthermore, although the estimated cross-price elasticities for males and females are similar to those of the full sample, the voting behavior of unmarried people are more responsive to changes in the tax price of giving.

This paper documents a previously ignored relationship between generosity and voting behavior. It also highlights the positive externalities created by charitable subsidies and provides insights for alternative theoretical models which may investigate the indirect effects of charitable subsidies on other types of prosocial behavior. However, it cannot explore some related questions mostly due to the limitations of the survey data. For example, Hinich (1981) develops a model to examine choices of voting or contributing to political parties. Although this paper argues that charitable and political giving might be negatively correlated, the evidence that it provides is limited and further research is needed to explore the relationship between charitable and political giving. This calls for detailed surveys and careful experimental designs on charitable contributions and voting behavior.

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A Log-likelihood functions

A.1 Probit model with a binary endogenous variable

The system of interest was

$$\begin{aligned} vote^*_{i,t} &= \beta_1' X_{i,t} + \gamma give_{i,t} + \delta_1' year_t + u_{1i,t} \\ give^*_{i,t} &= \beta_2' X_{i,t} + \lambda price_{i,t} + \delta_2' year_t + u_{2i,t} \end{aligned} \tag{6}$$

where $vote^*_{i,t}$ and $give^*_{i,t}$ are latent variables for the probability of voting and the probability of giving at time t respectively, and $vote_{i,t}$ and $give_{i,t}$ are dichotomous variables observed according to the rule:

$$\begin{aligned} vote_{i,t} &= 1 \text{ if } vote^*_{i,t} > 0 \text{ and } 0 \text{ otherwise,} \\ give_{i,t} &= 1 \text{ if } give^*_{i,t} > 0 \text{ and } 0 \text{ otherwise.} \end{aligned} \tag{7}$$

The error terms are assumed to be independently and identically distributed as bivariate normal with $E[u_{1i,t}] = E[u_{2i,t}] = 0$, $var[u_{1i,t}] = var[u_{2i,t}] = 1$, and $cov[u_{1i,t}, u_{2i,t}] = \rho$. For a single observation, one may drop the subscripts i and t for convenience. The joint density of (u_1, u_2) is:

$$\phi(u_1, u_2) = \frac{1}{2\pi(1-\rho^2)^{1/2}} \exp[-\frac{1}{2}\frac{u_1^2 + u_2^2 - 2\rho u_1 u_2}{(1-\rho^2)}] \tag{8}$$

and the likelihood functions for the joint events are defined as:

$$\begin{aligned}
P(vote=1,give=1) &= \int_{-(\beta_2'X_2+\lambda price+\delta_2'year)}^{\infty}\int_{-(\beta_1'X_1+\gamma+\delta_1'year)}^{\infty}\phi(u_1,u_2)du_1du_2\\
P(vote=1,give=0) &= \int_{-\infty}^{-(\beta_2'X_2+\lambda price+\delta_2'year)}\int_{-(\beta_1'X_1+\delta_1'year)}^{\infty}\phi(u_1,u_2)du_1du_2\\
P(vote=0,give=1) &= \int_{-(\beta_2'X_2+\lambda price+\delta_2'year)}^{\infty}\int_{-\infty}^{-(\beta_1'X_1+\gamma+\delta_1'year)}\phi(u_1,u_2)du_1du_2\\
P(vote=0,give=0) &= \int_{-\infty}^{-(\beta_2'X_2+\lambda price+\delta_2'year)}\int_{-\infty}^{-(\beta_1'X_1+\delta_1'year)}\phi(u_1,u_2)du_1du_2
\end{aligned} \tag{9}$$

where $\boldsymbol{\phi}(.)$ is the evaluation of the normal probability density function.

Combining the four possible outcomes of $(vote_t, give_t)$ and taking the logarithm gives the log-likelihood function. The likelihood corresponding to this set of events is a bivariate probit.

A.2 Probit model with a continuous endogenous variable

The system of interest was

$$\begin{aligned}
vote_{i,t}^* &= \alpha_1'X_{i,t} + \zeta cont_{i,t} + \eta_1'year_t + \varepsilon_{1i,t}\\
cont_{i,t} &= \alpha_2'X_{i,t} + \theta price_{i,t} + \eta_2'year_t + \varepsilon_{2i,t}
\end{aligned} \tag{10}$$

where $vote_{i,t}$ is observed according to the following rule:

$$vote_{i,t} = 1 \text{ if } vote_{i,t}^* > 0 \text{ and } 0 \text{ otherwise.} \tag{11}$$

Suppose that the error terms are assumed to be independently and identically distributed with a joint normal distribution with $E[\varepsilon_{1i}] = E[\varepsilon_{2i}] = 0$, $var[\varepsilon_{1i}] = 1$ and $var[\varepsilon_{2i}] = \sigma^2$. Let φ denote the correlation between ε_{1i} and ε_{2i}. The logarithmic likelihood function for this system of equations can be expressed as

$$\ln L = \sum_i vote_{i,t}(\ln\Phi(\omega_{i,t}) + \ln\phi(\omega_{i,t})) + (1-vote_{i,t})(\ln(1-\Phi(\omega_{i,t})) + \ln\phi(\omega_{i,t})) \tag{12}$$

where $\Phi(.)$ is the evaluation of cumulative normal density function and

$$\omega_{i,t} = \frac{[\alpha_1'X_{i,t} + \eta_1'year_t + \varphi(cont_{i,t} - \alpha_2'X_{i,t} - \theta price_{i,t} - \eta_2'year_t)/\sigma]}{\sqrt{1-\varphi^2}}. \tag{13}$$

The likelihood function for this model corresponds to the IV-probit model discussed in Maddala (1983) and Rivers and Voung (1988).

B Calculation of the ATE and ATT

Let n be the sample size. Following Angrist (2001), the ATE can be estimated for the probit model in equation (2) as

$$\widehat{ATE} \equiv \frac{1}{n}\sum_{i=1}^{n}[\Phi(\widehat{\beta}_1' X_{i,t} + \widehat{\gamma} + \delta_1' year_t) - \Phi(\widehat{\beta}_1' X_{i,t} + \delta_1' year_t)]. \tag{14}$$

Similarly, the ATT can be estimated as

$$\widehat{ATT} \equiv \left(\sum_{i=1}^{n} give_{i,t}\right)^{-1} \sum_{i=1}^{n} give_{i,t}[\Phi(\widehat{\beta}_1' X_{i,t} + \widehat{\gamma} + \delta_1' year_t) - \Phi(\widehat{\beta}_1' X_{i,t} + \delta_1' year_t)]. \tag{15}$$

I use the delta method to approximate standard errors for the ATE and ATT. The variance of $\widehat{ATE}$ can be estimated as:

$$var(\widehat{ATE}) = \left\{ \left(\frac{\partial \widehat{ATE}}{\partial \widehat{\gamma}}\right)' var(\widehat{\gamma}) \left(\frac{\partial \widehat{ATE}}{\partial \widehat{\gamma}}\right) \right. \tag{16}$$

where

$$\frac{\partial \widehat{ATE}}{\partial \widehat{\gamma}} = \frac{1}{n}\sum_{i=1}^{n}\phi(\widehat{\beta}_1' X_{i,t} + \widehat{\gamma} + \delta_1' year_t). \tag{17}$$

The variance of $\widehat{ATT}$ can be approximated similarly, where

$$\frac{\partial \widehat{ATT}}{\partial \widehat{\gamma}} = \left(\sum_{i=1}^{n} give_{i,t}\right)^{-1} \sum_{i=1}^{n} give_{i,t}[\phi(\widehat{\beta}_1' X_{i,t} + \widehat{\gamma} + \delta_1' year_t)]. \tag{18}$$

C Definition of key variables and summary statistics

	Definition	Mean		
		Full Sample	Vote=0	Vote=1
Vote	=1 if the respondent voted in the last presidential election.	0.714 (0.452)	-	-
Give	=1 if the household contributed money to charities during the survey year.	0.842 (0.365)	0.708 (0.455)	0.896 (0.306)
Give (secular)	=1 if the household contributed money to secular charities during the survey year.	0.504 (0.500)	0.310 (0.463)	0.582 (0.493)
Contribution amount	For those whose household contributed money to charities during the survey year, charitable contributions in 1996 dollars including contributions to religious charities.	1284.19 (2473.12)	766.80 (2073.74)	1443.45 (2562.91)
Contribution amount (secular)	For those whose household contributed money to secular charities during the survey year, charitable contributions in 1996 dollars excluding contributions to religious charities.	662.77 (2008.21)	399.74 (1110.07)	721.56 (2154.16)
Price	=1 minus marginal tax rate for itemizers and 1 for non-itemizers. Tax rates are calculated from information on probable filing status, income, itemization status, and other key variables.	0.900 (0.116)	0.943 (0.097)	0.882 (0.119)
Income	Total household income in 1996 dollars. Respondents reported income in one of 15 before-tax income ranges. I use the midpoint of the each range as the actual income measure.	43585 (31372)	34297 (28159)	47301 (31820)
Family size	Number of people in the household including the respondent.	3.059 (1.519)	3.346 (1.607)	2.943 (1.467)

Children	Number of children in the household, 18 years old and younger.	0.955 (1.253)	1.186 (1.312)	0.863 (1.216)
Age	Age of the respondent.	46.136 (17.311)	38.735 (16.729)	49.096 (16.642)
Female	=1 if the respondent is female.	0.555 (0.497)	0.530 (0.499)	0.565 (0.496)
Employed	=1 if the respondent is employed.	0.583 (0.493)	0.556 (0.496)	0.594 (0.491)
Married	=1 if the respondent is married.	0.671 (0.470)	0.566 (0.496)	0.713 (0.452)
Widowed	=1 if the respondent is widowed.	0.089 (0.285)	0.072 (0.259)	0.096 (0.295)
Separated	=1 if the respondent is separated.	0.013 (0.112)	0.018 (0.134)	0.011 (0.102)
Divorced	=1 if the respondent is divorced.	0.059 (0.236)	0.071 (0.257)	0.054 (0.227)
High school	=1 if the highest level of education obtained by the respondent is a high school degree.	0.306 (0.461)	0.309 (0.462)	0.305 (0.460)
Some college	=1 if the respondent attended college but did not receive a four-year degree.	0.270 (0.444)	0.228 (0.420)	0.287 (0.452)
College	=1 if the respondent obtained a four-year college or higher degree.	0.241 (0.428)	0.110 (0.313)	0.293 (0.455)
Black	=1 if the respondent is black.	0.125 (0.331)	0.146 (0.353)	0.116 (0.321)
Hispanic	=1 if the respondent is Hispanic.	0.087 (0.282)	0.193 (0.395)	0.045 (0.206)
Churchgoer	=1 if the respondent reported attending religious services for every week or nearly every week.	0.505 (0.500)	0.416 (0.493)	0.541 (0.498)

Years lived in current community: 2 to 4	=1 if the respondent reported living in her current community 2 to 4 years.	0.137 (0.344)	0.214 (0.410)	0.106 (0.308)
Years lived in current community: 5 to 9	=1 if the respondent reported living in her current community 5 to 9 years.	0.137 (0.344)	0.138 (0.345)	0.137 (0.343)
Years lived in current community: 10+	=1 if the respondent reported living in her current community more than 10 years.	0.496 (0.500)	0.371 (0.483)	0.545 (0.498)
Homeowner	=1 if the respondent owns her current residence.	0.695 (0.460)	0.489 (0.500)	0.778 (0.416)

Notes: Sample weighted means are reported. Standard deviations are reported in parenthesis. Mean "Contribution amount" is calculated using 6641 observations. Mean "Contribution amount (secular)" is calculated using 5371 observations. Mean "Homeowner" is calculated using 8926 observations. Means for the rest of the variables are calculated using 8940 observations.

Tables

Table 1. Probability of voting by decision to give

A. All charities

	Give=1	Give=0	Difference
Full sample	0.760 (0.005)	0.472 (0.012)	0.288 (0.013)
Unmarried	0.680 (0.009)	0.428 (0.016)	0.253 (0.019)
Males	0.755 (0.007)	0.397 (0.017)	0.357 (0.019)
Females	0.764 (0.007)	0.531 (0.017)	0.233 (0.017)

B. Secular charities

	Give=1	Give=0	Difference
Full sample	0.824 (0.006)	0.602 (0.007)	0.222 (0.009)
Unmarried	0.783 (0.010)	0.514 (0.011)	0.269 (0.016)
Males	0.809 (0.009)	0.588 (0.011)	0.221 (0.014)
Females	0.836 (0.007)	0.614 (0.010)	0.222 (0.012)

Notes: Sample weighted means are reported. Standard errors are reported in parenthesis.

Table 2. Probability of voting by contribution amount

A. All charities

	Contribution amount in 1996 dollars				
	up to $100	$101 to $500	$501 to $1500	$1501 to $3000	more than $3001
Full sample	0.564 (0.496)	0.709 (0.454)	0.837 (0.370)	0.911 (0.285)	0.896 (0.305)
Unmarried	0.562 (0.497)	0.656 (0.475)	0.804 (0.398)	0.926 (0.262)	0.734 (0.443)
Males	0.545 (0.499)	0.674 (0.469)	0.853 (0.354)	0.879 (0.327)	0.878 (0.328)
Females	0.577 (0.494)	0.735 (0.441)	0.824 (0.381)	0.945 (0.228)	0.919 (0.274)

B. Secular charities

	Contribution amount in 1996 dollars				
	up to $100	$101 to $250	$251 to $750	$751 to $1500	more than $1501
Full sample	0.769 (0.427)	0.823 (0.381)	0.813 (0.390)	0.380 (0.326)	0.920 (0.272)
Unmarried	0.749 (0.434)	0.772 (0.420)	0.794 (0.405)	0.762 (0.427)	0.849 (0.360)
Males	0.727 (0.446)	0.794 (0.405)	0.793 (0.405)	0.893 (0.310)	0.916 (0.277)
Females	0.778 (0.416)	0.848 (0.359)	0.832 (0.374)	0.867 (0.340)	0.923 (0.267)

Notes: Sample weighted means are reported. Standard deviations are reported in parenthesis. In both tables, each contribution range roughly represents a quintile of charitable donors.

Table 3. The effect of the probability of giving on the probability of voting (base models)

	Probit	Biprobit		2SLS	
	Vote	Vote	Give	Vote	Give
Give	0.096 (0.031)***	0.388 (0.090)***	-	1.224 (0.560)**	-
ln(price)	-	-	-0.300 (0.071)***	-	-0.192 (0.063)***
ln(income)	0.057 (0.018)***	0.044 (0.018)**	0.027 (0.012)**	-0.007 (0.038)	0.032 (0.017)*
Family size	-0.018 (0.013)	-0.018 (0.013)	0.003 (0.009)	-0.023 (0.017)	0.004 (0.011)
Children	0.012 (0.015)	0.013 (0.015)	-0.000 (0.011)	0.019 (0.021)	-0.004 (0.013)
Age	0.019 (0.004)***	0.019 (0.004)***	-0.001 (0.003)	0.020 (0.005)***	-0.002 (0.003)
Age sq. × 100	-0.009 (0.004)**	-0.010 (0.004)**	0.003 (0.003)	-0.015 (0.005)***	0.005 (0.003)
Female	0.043 (0.023)*	0.038 (0.023)*	0.013 (0.016)	0.019 (0.027)	0.018 (0.015)
Employed	0.020 (0.028)	0.010 (0.028)	0.028 (0.019)	-0.015 (0.037)	0.035 (0.020)*
Married	0.029 (0.038)	0.024 (0.037)	-0.001 (0.022)	0.017 (0.046)	0.011 (0.027)
Widowed	-0.062 (0.062)	-0.042 (0.060)	-0.067 (0.044)	0.031 (0.075)	-0.062 (0.042)
Separated	0.032 (0.067)	0.056 (0.071)	-0.089 (0.070)	0.149 (0.153)	-0.112 (0.077)
Divorced	-0.065 (0.060)	-0.053 (0.060)	-0.043 (0.038)	-0.013 (0.073)	-0.040 (0.040)
High school	0.198 (0.027)***	0.158 (0.033)***	0.097 (0.017)***	0.014 (0.105)	0.177 (0.032)***
Some college	0.250 (0.025)***	0.207 (0.033)***	0.119 (0.016)***	0.037 (0.129)	0.217 (0.033)***
College	0.295 (0.023)***	0.259 (0.030)***	0.136 (0.017)***	0.083 (0.138)	0.227 (0.034)***
Black	0.041 (0.032)	0.053 (0.032)*	-0.048 (0.027)*	0.106 (0.060)*	-0.055 (0.030)*
Hispanic	-0.173 (0.037)***	-0.129 (0.039)***	-0.105 (0.033)***	-0.017 (0.090)	-0.129 (0.036)***
Churchgoer	0.052 (0.023)**	0.039 (0.023)*	0.054 (0.015)***	-0.012 (0.039)	0.049 (0.016)***

ρ	-	-0.446 (0.127)***	-
ATE	0.078 (0.026)***	0.330 (0.080)***	-
ATT	0.076 (0.035)***	0.231 (0.062)***	-
Year effects	Yes	Yes	Yes
Log-likelihood	-4154.48	-25096.93	-
Number of Obs.	8940	8940	8940

Notes: Sample weights are used in all regressions. For the probit model, marginal effects calculated at the mean of the independent variables are reported. For the bivariate probit model, marginal effects calculated at the mean of the independent variables for univariate predicted probability of success, i.e., Pr(Vote=1) and Pr(Give=1) are reported. For the 2SLS model, coefficients are reported. Robust standard errors are reported in parenthesis. The signs *, **, *** indicate that the variable is significant at 10%, 5%, and 1% significance levels, respectively.

Table 4. The effect of the contribution amount on the probability of voting for charitable donors (base models)

	Probit	IV-Probit		2SLS	
	Vote	Vote	ln (contribution amount)	Vote	ln (contribution amount)
ln(contribution amount)	0.034 (0.008)***	0.230 (0.047)***	-	0.220 (0.089)**	-
ln(price)	-	-	-1.157 (0.299)***	-	-1.157 (0.299)***
ln(income)	0.028 (0.019)	-0.100 (0.041)**	0.508 (0.066)***	-0.092 (0.061)	0.508 (0.066)***
Family size	-0.018 (0.014)	-0.017 (0.014)	0.021 (0.046)	-0.024 (0.016)	0.021 (0.046)
Children	0.013 (0.016)	-0.006 (0.017)	0.069 (0.052)	0.002 (0.019)	0.069 (0.052)
Age	0.012 (0.004)***	-0.001 (0.006)	0.046 (0.013)***	0.006 (0.006)	0.046 (0.013)***
Age sq. × 100	-0.004 (0.004)	0.003 (0.005)	-0.028 (0.013)**	-0.002 (0.006)	-0.028 (0.013)**
Female	0.039 (0.024)*	0.073 (0.024)***	-0.199 (0.068)***	0.079 (0.030)***	-0.199 (0.068)***
Employed	0.019 (0.029)	0.030 (0.029)	-0.081 (0.087)	0.040 (0.032)	-0.081 (0.087)
Married	0.006 (0.036)	0.001 (0.036)	0.022 (0.110)	0.006 (0.042)	0.022 (0.110)
Widowed	-0.114 (0.072)*	-0.068 (0.065)	-0.078 (0.160)	-0.066 (0.061)	-0.078 (0.160)
Separated	-0.080 (0.087)	0.049 (0.074)	-0.548 (0.263)**	0.005 (0.104)	-0.548 (0.263)**
Divorced	-0.072 (0.066)	-0.011 (0.057)	-0.218 (0.138)	-0.027 (0.066)	-0.218 (0.138)
High school	0.171 (0.028)***	0.134 (0.042)***	0.093 (0.129)	0.195 (0.047)***	0.093 (0.129)
Some college	0.211 (0.027)***	0.114 (0.058)**	0.425 (0.131)***	0.192 (0.057)***	0.425 (0.131)***
College	0.262 (0.025)***	0.155 (0.068)**	0.518 (0.136)***	0.232 (0.067)***	0.518 (0.137)***
Black	0.027 (0.032)	0.075 (0.035)**	-0.262 (0.126)**	0.078 (0.050)	-0.262 (0.126)**
Hispanic	-0.118 (0.042)***	-0.045 (0.043)	-0.174 (0.097)*	-0.100 (0.046)**	-0.174 (0.097)*
Churchgoer	0.008 (0.019)	-0.126 (0.043)***	0.658 (0.067)***	-0.117 (0.067)*	0.658 (0.067)***
φ	-	-0.761 (0.133)***		-	

Year effects	Yes	Yes	Yes
Log-likelihood	-2920.82	-49238.88	
Number of Obs.	6641	6641	6641

Notes: Sample weights are used in all regressions. For the probit model, marginal effects calculated at the mean of the independent variables are reported. For the IV-probit model, marginal effects calculated at the mean of the independent variables and coefficients are reported in the "Vote" and "ln(contribution amount) columns, respectively. For the 2SLS model, coefficients are reported. Robust standard errors are reported in parenthesis. The signs *, **, *** indicate that the variable is significant at 10%, 5%, and 1% significance levels, respectively.

Table 5. The ATE and ATT of the probability of giving on the probability of voting

		Probit		Bivariate Probit			2SLS
	Number of obs.	ATE	ATT	ATE	ATT	ρ	Coefficient
1. Main model	8940	0.078 (0.026)***	0.076 (0.025)***	0.330 (0.080)***	0.231 (0.062)***	-0.446 (0.127)***	1.224 (0.560)**
2. State effects	8940	0.070 (0.024)***	0.068 (0.023)***	0.273 (0.098)***	0.194 (0.075)***	-0.388 (0.161)***	1.222 (0.568)**
3. Additional controls	8926	0.072 (0.026)***	0.070 (0.026)***	0.271 (0.099)***	0.200 (0.080)***	-0.362 (0.162)**	0.950 (0.487)*
4. Secular giving	8940	0.101 (0.020)***	0.096 (0.019)***	0.391 (0.070)***	0.362 (0.054)***	-0.614 (0.159)***	2.202 (2.040)
5. Exclude 2001	4975	0.065 (0.028)***	0.063 (0.027)**	0.336 (0.085)***	0.217 (0.060)***	-0.489 (0.135)***	1.103 (0.574)*
6. Unmarried	3496	0.062 (0.038)*	0.061 (0.037)*	0.351 (0.102)***	0.241 (0.072)***	-0.526 (0.163)***	0.915 (0.422)**
7. Males	4136	0.115 (0.037)***	0.113 (0.036)***	0.400 (0.097)***	0.287 (0.077)***	-0.511 (0.178)***	0.534 (0.550)
8. Females	4804	0.055 (0.033)*	0.054 (0.032)*	0.300 (0.112)***	0.203 (0.084)***	-0.434 (0.161)***	1.682 (0.967)*

Notes: Sample weights are used in all regressions. Robust standard errors are reported in parenthesis. The signs *, **, *** indicate that the variable is significant at 10%, 5%, and 1% significance levels, respectively.

Table 6. The marginal effect of the contribution amount on the probability of voting for charitable donors

		Probit	IV-Probit		2SLS
	Number of obs.	Marginal Effect	Marginal Effect	φ	Coefficient
1. Main model	6641	0.034 (0.008)***	0.230 (0.047)***	-0.761 (0.133)***	0.220 (0.089)**
2. State effects	6641	0.030 (0.008)***	0.228 (0.051)***	-0.762 (0.137)***	0.228 (0.092)**
3. Additional controls	6635	0.030 (0.008)***	0.234 (0.052)***	-0.778 (0.139)***	0.218 (0.102)**
4. Secular giving	5371	0.021 (0.005)***	0.212 (0.052)***	-0.796 (0.126)***	0.218 (0.095)**
5. Exclude 2001	3464	0.035 (0.010)***	0.240 (0.053)***	-0.787 (0.147)***	0.235 (0.114)**
6. Unmarried	2352	0.018 (0.017)	0.290 (0.056)***	-0.899 (0.138)***	0.332 (0.290)
7. Males	3032	0.012 (0.012)	0.121 (0.086)	-0.468 (0.311)	0.086 (0.088)
8. Females	3609	0.051 (0.011)***	0.282 (0.038)***	-0.889 (0.108)***	0.356 (0.191)*

Notes: Sample weights are used in all regressions. Robust standard errors are reported in parenthesis. The signs *, **, *** indicate that the variable is significant at 10%, 5%, and 1% significance levels, respectively.

Table 7. Tests for the validity of instrumental variables

A. The ATE and ATT of the probability of giving on the probability of voting

	Bivariate Probit			2SLS		
Instruments	ATE	ATT	Wald test of ρ=0 (p-value)	Coefficient	F-test of excluded instruments (p-value)	Hansen J-test of overidentification (p-value)
1. Price	0.330 (0.080)***	0.231 (0.062)***	9.15 (0.003)***	1.224 (0.560)**	9.23 (0.002)***	-
2. Price dummies	0.345 (0.076)***	0.236 (0.058)***	11.17 (0.001)***	1.456 (0.516)***	3.20 (0.012)**	1.624 (0.654)
3. STATE	0.291 (0.111)***	0.216 (0.091)***	3.48 (0.062)*	2.051 (3.381)	0.47 (0.493)	-
4. Price, STATE	0.344 (0.076)***	0.235 (0.058)***	11.02 (0.001)***	1.274 (0.563)**	4.94 (0.007)***	0.108 (0.743)
5. Price dummies, STATE	0.356 (0.073)***	0.239 (0.055)***	12.93 (0.000)***	1.479 (0.514)***	2.65 (0.021)***	1.670 (0.796)

B. The marginal effect of the contribution amount on the probability of voting for charitable donors

	IV-Probit		2SLS		
Instruments	Marginal effect	Wald test of $\varphi=0$ (p-value)	Coefficient	F-test of excluded instruments (p-value)	Hansen J-test of overidentification (p-value)
1. Price	0.230 (0.047)***	10.04 (0.002)***	0.220 (0.089)**	14.96 (0.001)***	-
2. Price dummies	0.244 (0.044)***	11.26 (0.001)***	0.238 (0.088)***	4.86 (0.001)***	4.805 (0.187)
3. STATE	-0.104 (0.198)	0.47 (0.491)	-0.079 (0.218)	2.30 (0.129)	-
4. Price, STATE	0.216 (0.055)***	7.14 (0.008)***	0.178 (0.074)**	8.59 (0.000)***	1.393 (0.238)
5. Price dummies, STATE	0.233 (0.051)***	8.63 (0.003)***	0.198 (0.074)***	4.32 (0.001)***	6.697 (0.153)

Notes: Sample weights are used in all regressions. Robust standard errors are reported in parenthesis unless otherwise noted. The signs *, **, *** indicate that the variable is significant at 10%, 5%, and 1% significance levels, respectively. Hansen J-test is reported as a chi-squared statistic with 3 degrees of freedom in model 2, with 1 degree of freedom in model 4, and with 4 degrees of freedom in model 5.

Table 8. Elasticity of the probability of voting with respect to tax price of giving

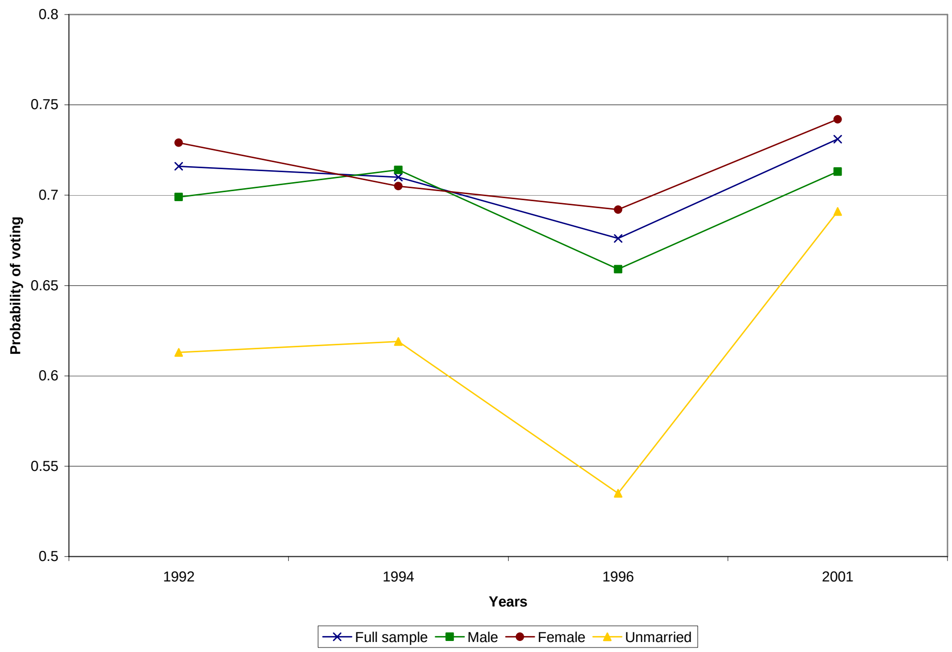
	Tax price of giving				
	0.64	0.69	0.71	0.85	1.00
Full sample	-0.191	-0.234	-0.269	-0.385	-0.540
	(0.018)	(0.027)	(0.036)	(0.088)	(0.165)
Unmarried	-0.265	-0.373	-0.446	-0.829	-1.357
	(0.052)	(0.054)	(0.060)	(0.155)	(0.367)
Males	-0.190	-0.234	-0.238	-0.361	-0.517
	(0.024)	(0.035)	(0.046)	(0.110)	(0.211)
Females	-0.191	-0.233	-0.259	-0.384	-0.538
	(0.025)	(0.038)	(0.050)	(0.126)	(0.238)

Notes: Elasticities are calculated from the bivariate probit models for the joint probability of success, i.e., Pr(Vote=1, Give=1). Sample weights are used in all regressions. Robust standard errors are reported in parenthesis. All estimates are significant at 1% significance level.

Figures

Figure 1. Probability of voting and probability of giving by years

A. Probability of voting



B. Probability of giving

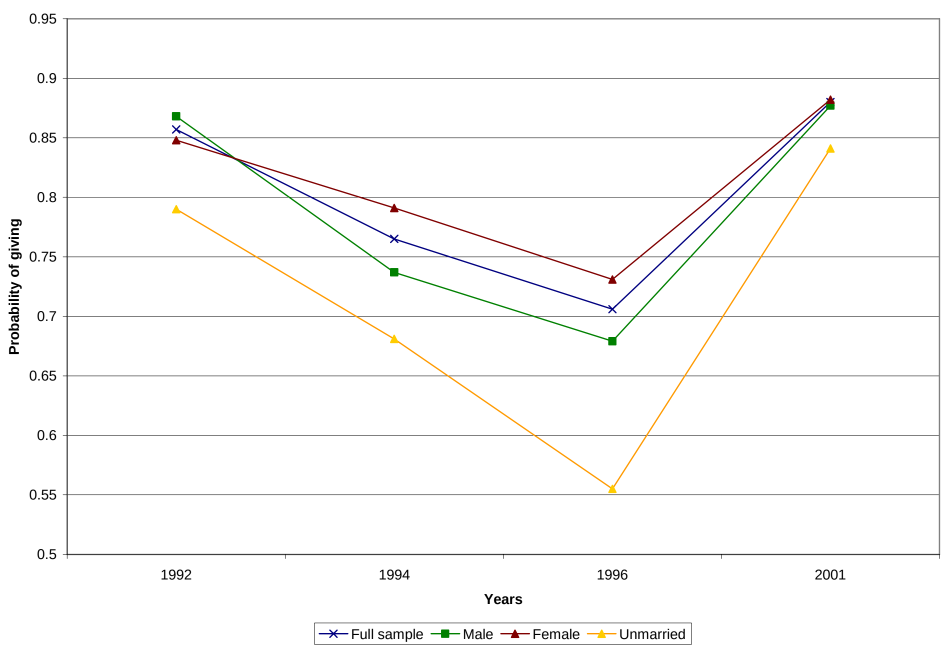
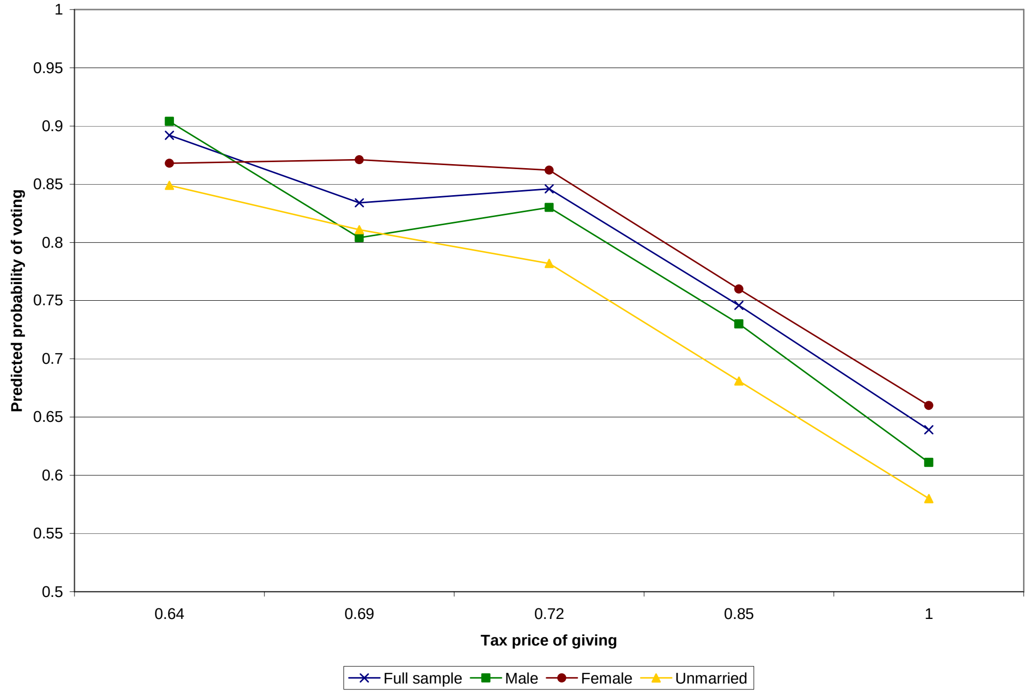
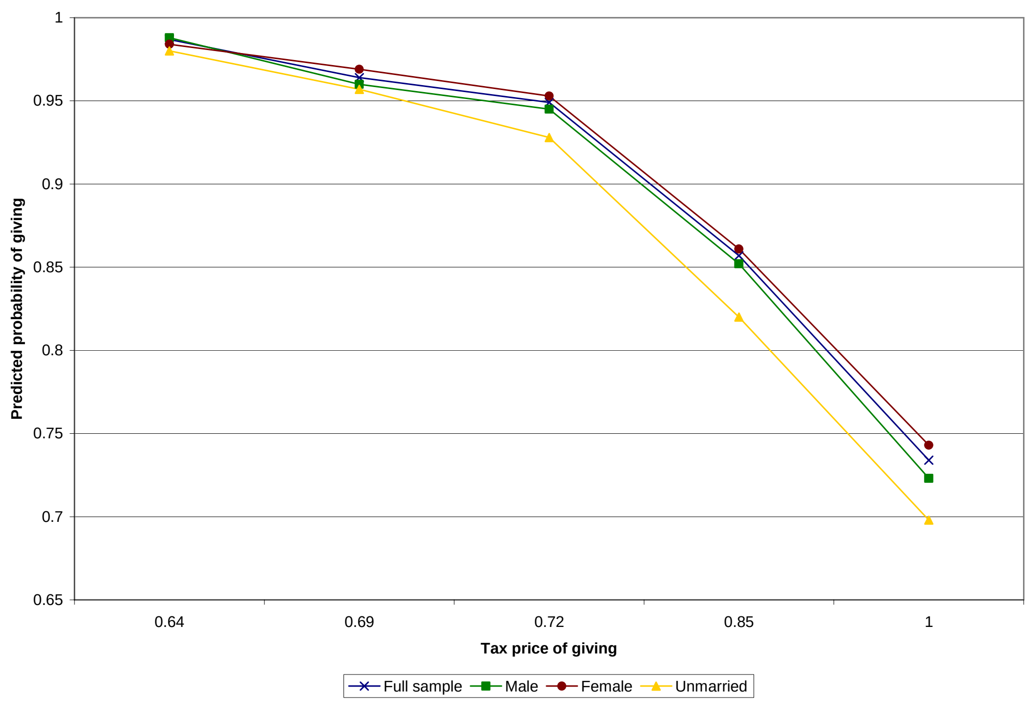


Figure 2. Predicted probability of voting and giving by alternative tax prices of giving

A. Predicted probability of voting



B. Predicted probability of giving



Notes: Predicted probabilities are calculated from bivariate probit models.