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THE EFFECTS OF FEDERAL ESTATE TAX POLICY ON CHARITABLE CONTRIBUTIONS

Abstract

Tax policy encourages charitable contributions during an individual's life through both the personal income tax and the estate tax. The effect of the income tax on contributions is well known. Because annual charitable contributions reduce the size of an estate, and hence the likely estate tax burden, the estate tax should also affect contributions. Recently, Auten and Joulfaian (1996) studied that issue using the tobit method on 1982 Statistics of Income data and found that the estate tax significantly increases charitable contributions. In this study, we estimate a similar model and find similar results when using a tobit. However, our model is estimated using Health and Retirement Study (HRS) data for 1991. With those data, the errors obtained from the tobit violate the censored normal distribution required for consistent estimation, and so we use the more robust symmetrically trimmed least squares technique.

The HRS data also allow us to calculate the individual's subjective life expectancy. Using several scenarios of asset growth and those life expectancies, we estimate the estate tax burden that an individual might expect to face. In addition, our estimation controls for the effect on contributions of behavior such as volunteering and attendance at religious services—behavior that cannot be observed through tax data. We find that the existence of the tax has a small but statistically significant effect on annual charitable contributions regardless of the assumed rate of growth of assets.

1. Introduction

Individuals reported almost $60 billion in charitable contributions on income tax returns in 1990 and another $6 billion in charitable bequests on estate tax returns. In any given year, between 5 percent and 10 percent of charitable donations are bequests, and the remainder are annual charitable contributions.

The estate tax and the income tax can be expected to influence a person's charitable contributions during life by reducing disposable income and wealth and by exerting a price effect. The price effect of the income tax encourages contributions by those who itemize deductions on their income tax returns. Wealthy individuals also face a price effect that induces contributions during their lifetime because, in addition to the income tax benefit, such contributions reduce their anticipated estate tax liability. As Boskin (1976) and Auten and Joulfaian (1996; A&J hereafter) point out, a properly specified demand function for charitable contributions should include both the income tax price and the bequest tax price of that contribution.

While Boskin (1976) focuses solely on charitable bequests, A&J examine both charitable bequests and contributions during life. Using Statistics of Income (SOI) data, which contain 1982 estate tax returns matched with the 1981 federal income tax returns of the decedents and their children, they examine how taxes affect charitable contributions in the year before death. Their results indicate that both bequest taxes and income taxes cause taxpayers to increase annual charitable contributions: the estimated elasticity of the bequest tax price varies between 0.6 and 0.75.

In this analysis, we use data from the 1991 Health and Retirement Study (HRS) to examine the effects of income taxes, estate taxes, and demographic variables on annual charitable contributions. The HRS data allow us to examine several important relationships not captured by SOI data, including information on the characteristics of respondents, such as attendance at religious services, religion, volunteer work, and "connectivity" to neighbors. Those data also allow us to examine the effect of the estate tax for a wide range of years before death. We test the validity of the assumptions underlying different specifications, reestimate when necessary, and include additional relevant demographic variables.

This analysis also illuminates the effect of subjective beliefs about the expected estate tax burden. Unlike the income tax, in which the exact level of the burden can be readily calculated, taxpayers' ultimate estate tax liability depends on their life spans, the growth paths of their assets, and estate tax law at the time of their death. Those factors result in some uncertainty about the ultimate estate tax liability of a given taxpayer. As a result, during their lives, individuals will react not to the actual estate tax but to the tax that they expect to pay on the wealth that they expect to have when they die. We estimate individual life expectancy by using a respondent's subjective probability of surviving to age 75 and to age 85; we then follow different time paths for asset growth for the appropriate number of years. That approach allows us to test the sensitivity of our results to different levels of optimism regarding asset growth rates. Our estimates of the elasticity of the bequest tax price vary from 0.65 to 0.28.

2. Data Used in the Analysis and Construction of the Variables

Data

The Health and Retirement Study is a biennial panel survey of individuals. The first wave of the survey was conducted in 1992 and included 12,654 individuals and their spouses or partners, living in 7,607 households with at least one household member born between 1931 and 1941. The survey placed particular emphasis on a complete, accurate inventory of income and assets in 1991. Information on wealth included housing equity, other real estate, vehicles, business equity, individual retirement accounts (IRAs) or Keogh accounts, 401k-type accounts, stocks and mutual funds, checking and savings accounts, money market funds, certificates of deposit, government savings bonds and treasury bills, other bonds, other assets, and other debt. In addition, the HRS surveyed respondents about their perceptions of their chances of survival and of leaving bequests. Additional waves of the HRS have been conducted, but only the 1991 data from the 1992 survey are used in this research.

Relative to other datasets, the HRS has advantages and disadvantages. One drawback of the data is that there is no oversampling of the wealthy, as in the Survey of Consumer Finances (SCF). Moreover, data on assets are less detailed and of lower quality than those in the SCF and in the Statistics of Income dataset.[1] The HRS has the advantage, however, of collecting a great deal of additional, extensive information about health, economic status, and family relationships that are not available in the other datasets.

In addition, this analysis uses only observations from the primary respondents who participated in the survey. Eliminating primary respondent refusals from the sample reduced it to 12,272 individuals in 7,323 households. Table 1 presents descriptive statistics for several variables used in this study.

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1. Smith (1995) finds that the quality of the asset data in the HRS is above that of the Survey of Income and Program Participation but below that of the SCF. Smith states that "it seems safely within an acceptable quality range."

About 38 percent of households made a charitable contribution of more than $500. For those who made such contributions, mean contributions were $2,020 and median contributions were $1,000. Respondents were not asked about the size of contributions under $500, so the data are censored at that point.

The data show that the surveyed households hold a substantial amount of wealth, with a mean of $206,918 and a median of $90,000. Households contributing over $500 to charity had a mean wealth of $339,221 and a median of $178,190. About 5.8 percent of those with charitable contributions over $500 would face the estate tax, compared with about 3 percent of those contributing less. Contributors of more than $500 had a substantially higher median income ($54,302), compared with those not contributing ($36,800). The descriptive data also indicated that those who contributed more than $500 were more likely to be married (82 percent compared with 67 percent) and to participate in volunteer activities for more than 100 hours a year (32 percent compared with 18 percent). Contributors were also more likely to attend religious services, at least occasionally (86 percent compared with 74 percent).

Variables

Respondents to the HRS were asked the following question: “In 1991, did you [or your (husband/wife/partner)] donate money, property or possessions totaling $500 or more to religious or other charitable organizations?” Their answers, in log form, are used as the dependent variable in the analysis (the level of charitable contributions, or $\mathbf{C_i}$). To assess the accuracy of responses to that question, we compare the distribution of contributions across gross income with the distribution from the 1997 Consumer Expenditure Survey and find that the two distributions are similar for values above $550. For contributions between $500 and $550, the HRS contains fewer records than the Consumer Expenditure Survey, probably due to the anchoring effect noted in Hurd (1998).

A number of variables are used to estimate the demand for charitable giving. The **bequest price** is defined by Boskin (1976) as:

$$\mathbf{P^B_i} = (1 + d_i)[(1 + r_i)(1 - e_i)]^{-1} \qquad (1)$$

where *d* is the discount rate, *r* is the real growth rate of the asset, and *e* is the top marginal estate tax rate faced at death. This analysis also uses that definition for the bequest price and follows A&J in assuming that the real growth of the asset represents the opportunity cost of using it, so that $d_i = r_i$. The bequest price is therefore measured as $1/(1 - e_i)$.

Income is defined as total income minus federal taxes calculated with zero contributions. The income tax price of charitable giving, $\mathbf{P^I_i}$, is defined as one minus the marginal income tax rate for those who itemize; for those who do not, the price is one. Because of potential endogeneity of the income tax rate (since higher contributions are deductible and may change the income tax rate faced by the household), we calculate a proxy for the income tax price by assuming that charitable contributions are zero. The HRS does not collect data on federal income taxes. As a result, we calculate them using the tax calculator of Auerbach and Siegel (2000). (See Appendix A for details of that calculator.)

Wealth is defined, in a manner consistent with the definition used by A&J, as assets minus debts. Total assets include retirement accounts such as 401k plans and IRAs, the market value of farms and small businesses, and other liquid and illiquid assets; they exclude the cash value of pensions and the face value of life insurance policies. Annual charitable contributions are added back to arrive at total assets. For unmarried couples living together, joint assets are evenly divided, and individually owned assets are assigned to the appropriate person. To help ensure that the wealth measure is consistent with the income measure, wealth is reduced by the calculated estate and gift tax liability.

The estate and gift tax calculator developed for this analysis takes into account the marital status of the people in the household. It assumes that married and widowed individuals have engaged in sufficient estate tax planning to take full advantage of the spousal exemption available in 1991. Thus, the analysis assumes that married and widowed households exempt $1.2 million of their estate from the estate and gift tax, while unmarried individuals take advantage of the $600,000 exemption. Inter vivos gifts in the current year are included in the estate and gift tax calculation if the respondent indicated that those gifts were not intended for education expenses and if the gift exceeded the tax-exempt amount of $10,000 for an unmarried household and $20,000 for a married household.

We define the taxable estate variable as assets minus debts, with assets including those in the wealth measure but with a few exceptions. Specifically, the face value of life insurance is included in the taxable estate instead of the cash value, and we use an estimate of the estate-tax valuation of an eligible small business instead of the market value. In addition, we use information from the 1991 Statistics of Income to determine the average amount of charitable bequests left by estates in certain size ranges (by gross estate category), and those average charitable bequests are subtracted from the calculated value of the estate at death to determine the likely taxable estate. We calculate the marginal estate tax rate faced by each taxpayer on the basis of our estimated size of the likely taxable estate and the estate tax rates in 1991. That figure is then used to calculate the bequest price, $\mathbf{P^B_i}$.

Additional variables include dummy variables for **Married** (1 = married), **Race** (1 = nonwhite), **Sex** (1 = male), and several categories for age (**d45** = 1 if age is less than 45; **d54** = 1 if age is between 45 and 54; **d64** = 1 if age is between 55 and 64; and **d74** = 1 if age is between 65 and 74). A separate variable, **Age**, represents the age of the primary respondent, and **Kids** is the number of children living at home, regardless of the children's ages. **Education** measures the years of schooling.

Attendance measures how often the respondents attend religious services; higher numbers indicate *less* frequent attendance (1 = more than once a week, 2 = once a week, 3 = two or three times a month, 4 = one or more times per year, and 5 = not at all). Similarly, **Neighbor** measures how many of the 10 to 15 families living nearby that the respondent would know by name; again, higher numbers indicate *less* familiarity with the neighbors (1 = all of them, 2 = most of them, 3 = some of them, and 5 = none of them). **Volunteer** measures how many hours over 100 the respondent spent volunteering in 1991

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Growth Scenarios and Calculated Life Expectancies

The actual growth of assets determines their ultimate size and therefore the estate tax. That growth involves both the assumed growth rate of the asset, savings and dissavings behavior consistent with the individual's life cycle, and his or her subjective life expectancy. We therefore consider four growth scenarios when determining the terminal value of wealth and the taxable estate.

The "zero-growth" case assumes no real growth in the value of the estate from the time the value was reported for the HRS until the time of death. Further, savings and dissavings are assumed to be equal. Low-, medium-, and high-growth scenarios are also used in figuring wealth, taxable estate, and, hence, the calculated bequest price. Those scenarios are asset growth and accumulation rates calculated by Havens and Schervish (1999) from Survey of Consumer Finances data. Assets are assumed to have a real growth rate of 2 percent, 3 percent, or 4 percent, respectively. Savings and dissavings patterns vary according to the age of the oldest respondent in the household and the growth scenario (see Table 2 for details).

To use the growth scenarios to estimate the estate left by each household at the death of the last surviving member of the household, we first estimate the life expectancy of each individual. We accomplish that by using two questions in the HRS that ask each person to assess the probability of surviving to age 75 and then to age 85.[2] Fitting those subjective probabilities to a Weibull distribution creates a survival function for each individual and therefore an expected life span.

If the probability of living to age 85 equals or exceeds the probability of living to age 75, the respondent is implicitly stating that he or she has an infinite life span. In that case, we assume that the question was misunderstood, and we substitute the probability of living to age 85 conditional on reaching age 75.[3] After testing the sensitivity of our results to that substitution by deleting all problem households, we find that only the coefficient dummy variable for marriage is affected.

3. Model and Estimation

We estimate a model using the following log-linear form:

$$\ln C_i = \beta_0 + \beta_1 \ln P^I_i + \beta_2 \ln Y_i + \beta_3 \ln P^B_i + \beta_4 \ln W_i + \Sigma_i \gamma_i Z + u_i \qquad (2)$$

where C_i is the level of charitable contributions, P^I_i is the tax price of contributions, Y_i is current income, P^B_i is the bequest tax price, W_i is wealth and Z_i is a set of personal and household characteristics. Because we use the log-linear model, the estimates of β_1 through β_4 should be interpreted as elasticities.

As described above, the HRS data censor contributions at $500. With more than 60 percent of the observations censored at that point, ordinary least squares estimates are inconsistent. Tobit is the standard tool for that type of problem, but its consistency relies on assuming a censored-normal likelihood function. In contrast, the symmetrically trimmed least squares technique (STLS) can consistently estimate coefficients without the normality requirement, although at the cost of efficiency if the normality assumption is correct. We use both methods in the analysis but ultimately rely on STLS. Because the marginal tax rate may vary with the level of contributions, the tax price $\mathbf{P^I_i}$ is calculated as the "first-dollar" price of giving: for people who itemize on their federal tax forms, the price is one minus the marginal tax rate that applies with zero contributions.[4] Similarly, income is calculated as net of federal taxes due when contributions are zero.

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2. Hurd and McGarry (1995) find that those subjective probabilities behave similarly to true probabilities, including their covariation with other variables.

3. Those probabilities are taken from Medicaid life expectancy tables published by the Health Care Financing Administration. Life expectancy depends on gender.

4. The preferred method would be to use the first-dollar price as an instrument rather than as a proxy variable. Future work entails adding that step to an STLS estimator.

4. Results

Table 3 lists the results from a tobit procedure under the zero-growth scenario. Most coefficient estimates are significantly different from zero, and all are of the expected sign. In particular, the log of the bequest price has a significant impact on charitable contributions, which provides evidence that the estate tax increases annual charitable contributions. Further, a model using A&J's wealth definition and variables produces an elasticity of 0.72, similar to their elasticities of 0.59 to 0.78.

However, the consistency of estimates using the tobit model requires censored, normally distributed errors. Newey (1987) suggests testing the assumption of censored normality by comparing tobit estimates with STLS estimates through a Hausman-type test. Comparing the estimates from the tobit in Table 3 with those resulting from the use of symmetrically trimmed least squares for the data in this analysis yields a test statistic of 393, where the 5 percent rejection point for a χ^2 distribution with 14 degrees of freedom is about 23.[5] That decisive rejection of censored normality casts strong doubt on the validity of the tobit results. Consequently, for the remainder of this analysis, we rely on the STLS estimator.

Using that estimator produces markedly different results from those achieved with the tobit. For example, Table 4 shows that the bequest price elasticity in the zero-growth scenario using the STLS estimator is about half that found with the tobit. The significance of the STLS estimate still indicates, however, that the bequest price affects charitable contributions. In contrast, the elasticity of wealth estimated by STLS is substantially larger than that estimated by tobit.

Because the estate tax effectively starts at 36 percent, the bequest price jumps from 1.00 for those not subject to the tax to 1.59 or above for the relatively few who are, causing the variable used in the equation, $\ln(P^B_i)$, to jump from zero to 0.46 or above. That discrete difference, combined with the small number of households subject to the tax, suggests that the coefficient on $\ln(P^B_i)$ might best be interpreted as the elasticity for being subject to the estate tax rather than the elasticity for small changes in the estate tax rate.

We examine that possibility by replacing the log of the bequest price with a variable equal to zero for people who are not subject to the estate tax and equal to the average of the log bequest price for those who are. All of the variation now comes solely from being subject to the estate tax or not. After transforming the

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5. Because we are uninterested in the constant, we omit it when applying this test.

coefficient in a manner similar to that of Halvorsen and Palmquist (1980), we arrive at an estimate of 0.48, which is extremely close to 0.50.[6] Therefore, the elasticity estimate should be interpreted as the percentage change in contributions resulting from imposing the estate tax at the existing rates.

We examine that idea further by running the model that produced Table 4 on only those households subject to the estate tax. The coefficient estimate, 0.723, is insignificantly different from 0.50, but it is also insignificantly different from zero.[7] As a result, we have no strong evidence regarding its interpretation as the percentage change in contributions from small changes in tax rates for those subject to the tax.

Using the growth assumptions of Havens and Schervish (1999) also allows us to test the sensitivity of the elasticity estimates to growth patterns of assets. The last three columns in Table 4 list the results from estimating wealth and bequest taxes using the low-growth, medium-growth, and high-growth scenarios. Recall that those growth rates are compounded by the expected number of years remaining in the individual's life, calculated from his or her own subjective probabilities of survival. The resulting coefficients therefore do not reflect our simply increasing or decreasing wealth by a constant. As shown, estimated bequest price elasticities vary between 0.649 and 0.283, and all are significantly different from zero. That range suggests that although individuals adjust their charitable contributions according to an expected estate tax, the adjustment is fairly small.

Several of the remaining coefficient estimates show the expected effect. The coefficient on the variable for religious service attendance is negative and significant, indicating that those who attend services make significantly larger contributions. The large t-statistic indicates that few households violate that rule. Education is significant and positive, consistent with the results of other studies of giving (see, for example, Bradley et al., 2000). Volunteering appears to be a complement to gifts of money, as found in previous work such as Andreoni et al. (1996).

Age and age squared, while traditionally statistically significant, suffer from limited variation within a sample frame in which most heads of household are

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6. Halvorsen and Palmquist show that if the dependent variable is in a log form, then the coefficient β of a dummy variable should be transformed by $\exp(\beta) - 1$. The general transformation when the dummy variable takes on a value of either zero or ξ is $[\exp(\xi \beta) - 1]/\xi$.

7. We believe that this is due to the small sample size (208). To check the possibility that the inefficiency of STLS was responsible, we ran the model using tobit and the admittedly biased OLS. In neither case was P^B_i significantly different from zero.

between 51 and 61. The marginal significance of the neighborhood variable is somewhat surprising, but the feeling of inclusion in an area may already be greatly accounted for in the religious service attendance and volunteering variables.

The marriage dummy variable may also reflect the same phenomena as the neighborhood variable. However, as mentioned earlier, deleting all households in which the probability of reaching age 85 equaled or exceeded the probability of reaching age 75 noticeably changes the coefficient estimate on the marriage variable. In those circumstances, the estimate was insignificantly different from zero. We therefore conclude that its significance is more an artifact of our treatment of these problem households than a reflection of real differences in behavior. The race coefficient was negative and significant.[8]

Our results should be interpreted cautiously for several reasons. First, Pagan and Vella (1989) warn that using STLS residuals for diagnostic testing, as in the specification test discussed in Appendix B, may lack power if the misspecification occurs in observations that are trimmed or deleted by the procedure. However, that is unlikely to affect our results because a high proportion of people who are subject to the estate tax make charitable contributions and therefore are unlikely to be deleted. Second, although the results from a properly specified model can be extended to those outside the sample (such as the extremely wealthy), the results from badly specified models cannot be extended. Our specification tests fail to detect a problem, but it is still possible that households outside the sample differ dramatically from those in the sample. Third, because we are unaware of any theory regarding instrumental variables and STLS, we use the traditional first-dollar tax prices rather than instruments. Finally, we are using only the first wave of the HRS, making our results sensitive to all of the problems inherent in studies of cross-sectional data. Using the longitudinal aspects of the HRS data eliminates that problem but greatly complicates the use of the STLS estimator.

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8. The negative coefficient on race appears because of higher variation in giving among nonwhites. We examine this by replacing the variable measuring attendance at religious services with a dummy variable equal to one for any level of attendance and zero otherwise and an interaction term equal to the product of the race dummy variable and the attendance dummy. The results indicate that although nonwhite service attenders contribute more than either whites who attend services or whites who do not, nonwhite nonattenders contribute far less than either group. Those nonwhite nonattenders, then, are responsible for the overall coefficient on race being negative. To check that finding, we ran the model on the subset of households that had primary respondents who attended religious services. In that case, the coefficient on race was significant and positive. Because of that variation, it is possible that a small difference in the sample surveyed would have led to a significant and positive coefficient on race.

5. Conclusion

This analysis uses data from the Health and Retirement Survey to estimate how bequest taxes and income taxes affect annual charitable contributions. Those data allow us to examine the effect of the estate tax on the contributions of individuals who do not die within one year of making contributions, and to examine the effect of several important demographic characteristics. The estimates we obtained using the tobit method are similar to the estimates that Auten and Joulfaian (1996) achieved using a similarly specified tobit model with tax return data and indicate that the estate tax and the income tax increase charitable contributions during life.

We reestimated the model using a more general specification containing additional demographic characteristics of survey respondents. We tested the assumption, required for the consistency of tobit estimates, that the likelihood function is a censored normal. Decisively rejecting that assumption for our data, we reestimated the model using symmetrically trimmed least squares. By using information on the individual's subjective probability of survival, we tested the sensitivity of our estimates to four growth paths that an individual's assets might take over his or her remaining life span. The bequest price elasticities ranged from 0.303 to 0.685, indicating that while the effect of the estate tax on annual charitable contributions is clearly discernible, contributions are inelastic with respect to the bequest price.

Table 1
Descriptive Statistics

Item	All	Respondents with charitable contributions > $500
Number of Observations	7323	2808
Wealth (zero growth)		
Mean	$206,918	$339,221
25th percentile	$23,100	$86,050
Median	$90,000	$178,190
75th percentile	$224,000	$372,350
Household Income		
Mean	$46,423	$66,385
25th percentile	$19,062	$35,200
median	$36,800	$54,302
75th percentile	$60,144	$81,200
Percentage subject to estate tax (zero growth)		
No estate tax liability	97.0	94.2
Top marginal bracket		
37	0.7	1.1
39	0.7	1.3
41	0.3	0.7
43	0.3	0.6
45	0.3	0.7
49	0.2	0.2
53	0.1	0.2
55	0.4	1.0
Demographic variables		
Average age of primary respondent	56.1	56.3
Percentage in each age group	1.5	1.1
age<45	29.6	28.6
45<=age<54	63.2	63.3
54<=age<64	5.3	6.8
64<=age<74	0.4	0.2
74<=age		
Spouse's age	54.9	54.7
Percentage married	67.3	81.6

Item	All	Respondents with charitable contributions > $500
Percentage with highest education level	28.1	13.3
Less than HS	33.5	30.9
HS diploma	19.0	22.8
Some college	8.5	13.11
Bachelor's degree	10.9	19.94
Graduate education		
Average number of children	0.66	0.70
Percentage with children living at home	42.1	44.7
Percentage non-white	29.8	22.0
Volunteer >100 hours/year		
Percentage	18.0	32.4
Mean hours per year	326	322
Median hours per year	200	200
How many neighbors do you know by name?		
All	20.5%	20.2%
Most	29.4%	33.3%
Some	42.9%	42.5%
None	7.1%	3.9%
Attendance of religious services		
More than once a week	13.9%	23.7%
Once a week	22.6%	28.7%
2-3 times per month	15.6%	15.9%
One or more times per year	22.9%	17.6%
Doesn't attend services	26.0%	14.1%
Charitable Giving > $500		
Percentage	38.3	100
Mean	$2,020	$2,020
Median	$1,000	$1,000

Table 2
Asset growth rates

Age of HH	Gen. growth rate	Saving as % of wealth	Dissaving as % of wealth	Total
Low Growth				
30 Years or	2%	9.1%	0.0%	11.1%
Less	2%	3.2%	0.0%	5.2%
31-40 Years	2%	4.0%	0.0%	6.0%
41-50 Years	2%	0.0%	0.1%	1.9%
51-60 Years	2%	0.0%	2.5%	-0.5%
61-70 Years	2%	0.0%	3.7%	-1.7%
71-80 Years	2%	0.0%	7.6%	-5.6%
81+ Years				
Medium Growth				
30 Years or	3%	10.1%	0.0%	13.1%
Less	3%	4.2%	0.0%	7.2%
31-40 Years	3%	5.0%	0.0%	8.0%
41-50 Years	3%	0.9%	0.0%	3.9%
51-60 Years	3%	0.0%	1.7%	1.3%
61-70 Years	3%	0.0%	2.5%	0.5%
71-80 Years	3%	0.0%	5.1%	-2.1%
81+ Years				
High Growth				
30 Years or	4%	11.1%	0.0%	15.1%
Less	4%	5.2%	0.0%	9.2%
31-40 Years	4%	6.0%	0.0%	10.0%
41-50 Years	4%	1.9%	0.0%	5.9%
51-60 Years	4%	0.0%	0.8%	3.2%
61-70 Years	4%	0.0%	1.2%	2.8%
71-80 Years	4%	0.0%	2.5%	1.5%
81+ Years				

Source: Havens and Schervish (1999)

Table 3
No asset growth, Tobit model

Variable	Coefficient	Asymptotic t-Statistic
Constant	-1.710	*-3.174*
ln P^B_i	0.827	*10.701*
ln Wealth	0.020	*3.349*
ln P^I_i	-0.923	*-14.383*
ln Income	0.073	*5.348*
Attendance	-0.175	*-29.855*
Education	0.025	*8.162*
10^{-2} *Volunteer	0.024	*7.378*
Married	0.079	*3.845*
Neighbor	-0.005	*-0.634*
Kids	-0.012	*-1.308*
Age	0.048	*2.607*
10^{-2} *Age ^{2}	-0.042	*-2.570*
Sex	-0.114	*-6.614*
Race	-0.082	*-4.151*

Table 4
Symmetrically trimmed least squares results

Variable	Zero Asset Growth	Low Asset Growth	Medium Asset Growth	High Asset Growth
Constant	-5.257	-5.937	-5.783	-6.095
	-3.707	*-4.519*	*-4.246*	*-4.331*
ln P^B_i	0.536	0.685	0.421	0.303
	3.301	*4.232*	*4.044*	*4.557*
ln Wealth	0.163	0.115	0.134	0.115
	7.153	*6.180*	*6.137*	*5.034*
ln P^I_i	-1.621	-1.734	-1.679	-1.575
	-10.465	*-11.342*	*-11.071*	*-10.284*
ln Income	0.317	0.352	0.327	0.334
	7.228	*7.675*	*7.556*	7.719
Attendance	-0.519	-0.527	-0.523	-0.521
	-26.411	*-25.822*	*-26.461*	*-25.879*
Education	0.063	0.072	0.067	0.061
	7.237	*8.023*	*7.632*	*7.026*
10^{-2} *Volunteer	0.027	0.026	0.027	0.028
	4.721	*4.848*	*4.896*	*5.112*
Neighbor	-0.037	-0.044	-0.038	-0.042
	-1.859	*-2.155*	*-1.927*	*-2.027*
Married	0.281	0.364	0.310	0.248
	4.961	*6.041*	*5.385*	*4.423*
Kids	-0.087	-0.091	-0.088	-0.096
	-3.728	*-3.814*	*-3.748*	*-4.077*
Age	0.028	0.026	0.030	0.050
	0.607	*0.615*	*0.669*	*1.093*
10^{-2} *Age^2	-0.031	-0.025	-0.027	-0.043
	-0.756	*-0.659*	*-0.685*	*-1.075*
Sex	-0.224	-0.219	-0.205	-0.194
	-5.512	*-5.255*	*-5.017*	*-4.719*
Race	-0.350	-0.381	-0.362	-0.344
	-6.414	*-6.958*	*-6.627*	*-6.326*

Asymptotic t-statistics are shown in italics

Appendix A. Income Tax Calculations

The tax calculator used in this paper is based on that of Auerbach and Siegel (2000). Any income information available only at the household level was evenly divided between both members of a couple if they were unmarried. With the exception of capital gains realizations, information from all major sources of income was used from the survey. Although sales of assets were available, the basis was not, and so we assumed that the basis equaled 50 percent of the value of the asset at the time of sale. Extensive information on contributions to and withdrawals from pension and retirement accounts was incorporated, as was income from salaries, interest, alimony, business and farm income, unemployment and social security income, rents, royalties, self-employment income, and so forth.

In the survey, individuals are asked about their itemization status as well as their medical expenses. To avoid a possible endogeneity problem, taxes were calculated with zero charitable contributions. The mortgage interest deduction was calculated from the years lived in the house, the remaining balance owed on the mortgage, and the lowest mortgage rate from the time the house was purchased. State taxes were estimated from the average taxes in the household's region.

Appendix B. Specification Testing

The model in this paper was tested for possible specification problems. Problems examined include the possible sensitivity of the bequest price to measures of wealth and the correct definition of wealth.

Because the bequest price is a function of deductions and wealth (a variable appearing in log form in the regression equation), the separate identification of the effect of the bequest price and wealth relies strongly on the nonlinearity of that function and independent variation between wealth and the bequest price.[9] This implies that the estimated bequest price elasticity could be relatively sensitive to misspecification of the relationship between wealth and contributions.

That sensitivity was tested by adding the square and cube of ln(wealth) to the model. In that case, the precision and size of the estimated price elasticity dramatically fell as the standard error of the estimate increased by 50 percent and the coefficient estimate was cut in half.

While exposing a potential fragility to the proper specification of wealth, that result does not imply that wealth is improperly defined. To test the definition, we first considered the most logical alternative to the natural log of wealth, namely, the level of wealth itself. One reasonable approach would be to use a J-test by including the predicted contributions when using the natural log of wealth in a regression employing the level of wealth. However, STLS endogenously truncates the data so that each regression has a potentially different number of observations that depends in part on the regressors. As an alternative, we used a non-nested F test in which both forms of wealth were included in the same regression. If only one coefficient is significant, that is more likely to be the proper definition. As is often the case with non-nested tests, the results are ambiguous: the coefficient on the log of wealth is quite significant while the coefficient on the level of wealth is marginally significant.

We did a further test of the definition of wealth. In a correctly specified model, the expected correlation of the regression errors with any function of the right-hand side variables is almost surely zero.[10] A regression of the symmetrically trimmed least squares residuals (as defined in Pagan and Vella, 1989) against the log of wealth raised to the second, third, and fourth powers should have an insignificant R^2.[11] Or, put in the form of a RESET-type test, $N*R^2$ from this regression should have a $\chi^2(3)$ distribution under the null hypothesis of proper

9. This point is discussed in Feenberg (1989) and Steinberg (1990).

10. See, for example, Bierens (1990).

11. The residuals were also regressed against those higher-order terms of ln wealth after the other explanatory variables had been "partially led out" with similar results.

specification but a “high” value for any of a large number of misspecifications. The result fails to reject the null hypothesis of proper specification, and so the log of wealth appears to be the most appropriate measure of wealth.

Finally, we visually inspected the smoothed residuals from the STLS procedure. Although they appeared to be symmetric, the tails of the distribution were fatter than those of a normal distribution. That may be caused by kurtosis or heteroskedasticity. Since both cause inconsistent tobit estimates but do not affect the consistency of STLS, we did not investigate further.

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