Charitable Bequest Giving in the USA[1]

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Introduction

The estate tax plays an important and controversial role in many aspects of our society. This paper focuses on one of the more important and more controversial aspects of the estate tax. Namely, we examine the relationships between changes in the estate tax rate and estate tax exemption levels and aggregate charitable bequest giving using time series data. During life, donors give for many reasons, which may or may not be affected by the tax deductibility (only about one-fourth of US households itemize their taxes, so for three-fourths, the price of giving a dollar is a dollar). Likewise, the decision to give at death is motivated by many factors, including the tax implications for some, but it must be recalled that less than two percent of Americans pay any estate tax, and less than half of them pay anything that would be considered a meaningful tax (Rooney and Tempel, 2001). That said, for very large estates, the exemption levels and the estate tax rates can be a considerable factor in estate planning.

Larger estates are much more likely to include a charitable bequest and to have a much larger bequest value. In 2011, almost 15% of all estates worth $3.5 million or less included a charitable bequest, but estates worth between $10 million and $20 million were twice as likely to include a charitable bequest (30%) and estates worth $20 million or more were almost three times as likely (42%) (IRS data cited by Giving USA 2013). Similarly, estates worth $3.5 million or less include less than 1% of the value of all bequests in 2011. Estates between $5 million and $10 million and $10 million and $20 million each had about 12% of the total value of bequest gifts. More strikingly, those estates worth $20 million or more had 71% of the value of all charitable bequests that year (Giving USA 2013).

According to Giving USA, charitable bequests are the most volatile component of charitable giving**.** The volatility of bequest giving to total giving can be illustrated by looking at the ranges of percentage increase and decrease for both. Over the last 40 years, bequest giving has grown as rapidly as a 37% increase in inflation-adjusted dollars (1982) but has fallen by 38.5% (2009). Total giving's range in percentage changes is less than one-third of that for bequest giving growing from 14% in 1997) to a 8% decline in 2009) (also in inflation-adjusted dollars, Giving USA, 2013). Not only is bequest giving less consistent than other sources of giving or giving overall, Giving USA reports that whether bequest giving increases or decreases in any given year often depends on the size and the generosity of the two to ten largest estates in any given year.

Figure 1 depicts total charitable bequests (in billions of dollars) from 1982 through 2012 and the changes in the key policy variables: the top estate tax rate (as a percentage) and the exemption levels (in units of $100,000). A few key points emerge from this graph, which helps motivate the need for this paper. First, from 1982 to 1984, the top marginal estate tax rate dropped dramatically, 10 percentage points, and the exemption levels were increased dramatically as well, from $225,000 in 1982 to $325,000 in 1984 (nominal dollars). By 2012, the top estate tax rate had decreased to 35%, while the nominal exemption level had increased to $512,000, although it was off from its $1 million dollar high in 2002 and 2003. During this time, there was a drop and then a dramatic increase in charitable bequests. Economic theory would predict that the reduction in the top marginal tax rate and the increase in the exemption levels would both tend to lower the incentives to leave a charitable bequest, which is the initial reaction, but the overall trend is clearly marked by bequests growing rapidly, nearly doubling in real terms over the three decades from 1982 to 2012. Bequests increased from about $12.4 billion (2012 dollars) in 1982 to about $23.4 billion (in 2012 dollars) in 2012.

Second, from 1984 through 2001, the top marginal tax rates were static at 55%, although the nominal value of exemption levels increased from $325,000 to $675,000, yet charitable bequests grew dramatically from start to stop points in real terms. Moreover, there were large swings up and down in the dollars left in charitable bequests during this period. Clearly, the public policy variables may have mattered, but they are not the only forces at work—and may not even be the major drivers of these changes.

Third, in the decade from 2000 until 2010, by 2009, compared to their 2000 values, there was another dramatic reduction in the top marginal tax rate (another 10 percentage points) and an even more dramatic increase in the exemption levels (namely, a 419 percent increase in the exemption levels even before the estate tax was temporarily eliminated in 2010). Again, in theory, both of these trends would drive down bequest giving, yet the historical reality is that while still volatile, the trend was that charitable bequests increased during this period.

Fourth, our political leaders failed to address the estate tax and exemption level questions for the year 2010 in a timely manner. The folklore is as 2010 approached and began, many high net worth households prepared multiple wills to cover various contingencies in case the politicians pursued one or more policy options. The result was that the estate tax became zero in 2010 (so the exemption is irrelevant), but the estate tax rate was re-instated in 2011 at a much lower rate (another ten percentage point drop) and the exemption level was also increased

quite dramatically. Theory would predict that these would both have negative ramifications for charitable bequest giving. Just before these policies become actuality, charitable bequest gifts dropped precipitously (almost 40 percent in real terms, between 2008 and 2009). Ironically, the year the tax rate went to zero (2010), charitable bequests increased in real terms almost 20 percent from 2009 to 2010.

Fifth, in 2011, bequest giving actually increased somewhat, before falling a little in 2012. In 2012, exemption levels increased, but the tax rates stayed the same as in 2011. However, compared to 2010 when there was no tax nor any meaningful exemption level, the tax rates and exemption levels in 2011 and 2012 actually increased exponentially, which theory would predict would increase bequest giving. Given the lead and lag times involved in creating and/or revising wills, and given that it is unclear whether most households viewed this as a reduction in the top marginal tax rate or an increase, it is difficult to discern what is the correct theoretical interpretation for this short period of time.

Over the past thirty years, estate tax rates have trended downwards significantly (65 percent vs 35 percent or a 46 percent reduction) and the nominal values of the exemption levels have grown dramatically too ($225,000 vs. $5.12 million or a 2,176 percent increase!) During these three decades, charitable bequest gifts, have more than doubled in real terms and increased by nearly five times in nominal terms. There have also been tremendous swings up and down on a year to year basis, including a period in which inflation-adjusted bequests were nearly triple what they were at the start of the period and then declines rapidly as well just before the estate tax was eliminated briefly. One can infer that the estate tax rate and the exemption levels may matter, but other factors also seem to be important in affecting how much Americans leave in their wills for charities. This paper will attempt to address these questions using time-series regression models, as well as simple graphs.

Figure 2 delineates the same policy variables from Figure 1, namely the top estate tax rates (in percentages) and the exemption levels (in increments of $100,000). It is different from Figure 1 by focusing on the share of wealth that is in the form of a charitable bequest both among all estates and those estates worth over $10 million in net worth. From this graph, we discern a few conclusions. First, the percentage of all wealth going to bequests is pretty stable year over year with some bumps up and down, and with a slight upward trend from 1982 through 2008. There is a downdraft in 2009 followed by a relatively large spike up in 2010—precisely when there is no estate tax. This suggests that the wealth effect of having more after-tax

estate wealth outweighed the negative price effects of eliminating the estate tax—at least in this one abnormal year.

Similarly, in reviewing the percentage of estate wealth going to charitable bequests among the estates of $10 million or more, we see greater year-to-year volatility, and an even bigger spike in 2010. This volatility in other years seems to be unrelated to changes in tax rates or exemption levels, but in 2010, there appears to be a direct cause and effect. High net worth households are sharing some of their windfall gains from the elimination of the estate tax with the rest of society in the form of charitable bequest gifts.

Figure 3 has the same lines for the estate tax rates and exemption levels for comparison purposes, but it focuses on the share of estates with a charitable bequest among all estates and the share of estates with charitable bequests among estates worth $10 million or more. Inspecting the graph, the percentage of estates with a charitable bequest seems to be largely unrelated to either the estate tax rates or the exemption levels—at least prior to 2000. The estate tax rate dropped dramatically in the early 1980's and the exemption levels increased dramatically then. we would expect both to have a negative effect on charitable bequest giving. However, the share of all estates with a bequest actually gained ground in this period and the share of estates greater than $10 million with a bequest lost ground. From the mid-1980's through the early 200's, both tax rates, exemption levels and the share of all estates and large estates with a bequest stayed pretty static. The share of all estates with a bequest increased pretty dramatically from 2008 through 2012—at exactly the same time that tax rates plummeted and exemptions grew. Among the high net worth households (estates worth $10 million or more), there is simply a mild downward trend in the percentage of these estates with a charitable bequest from 1998 through 2008 . With the re-instatement of the estate tax in 2011, we see a resurgence of the percentage of all estates, including high net worth estates, which have created a charitable bequest.

Literature Review

A growing body of literature exists on the relationship between estate tax and charitable giving. The scholarly interest in the topic might have been fueled by two developments. On the one hand, the charitable bequest deduction does not play as important role as it did in the past, because some developed countries recently significantly reduced (such as the United States) or abolished (such as Australia, Canada, Italy, and New Zealand) bequest taxes (Bertocchi 2011)[1]. On the other

hand, a considerable increase in the amount of charitable bequests may occur in the future as the Baby Boomers continue to age. Havens and Schervish (1999) estimate that $41 trillion will be transferred between 1998 and 2052 in the United States. James, Lauderdal., and Robb (2009)[2] conducted an analysis of nationally representative 1996 and 2006 waves of the Health and Retirement Study using a sample of 41,965 Americans between 55 and 64 years old. They found that charitable estate planning was increasing steadily in this period (in absolute numbers and as a percentage of all planned estates) in large part due to higher levels of wealth, education, and childlessness. They concluded that this trend is likely to continue.

Three strands of literature are relevant to the discussion about the role of estate tax in charitable giving: the studies identifying predictors of bequests in general, the studies examining motivations for charitable bequests, and the studies assessing tax price elasticity and wealth elasticity of charitable giving.

Predictors of bequests in general

A number of studies examined not-tax-related predictors for intergenerational distribution of wealth. For example, Menchik (1980)[3] examined probate records for 1,050 estates in Connecticut from select years between 1931 and 1946. He found that the amount of inheritance is divided equally between children regardless of birth order and gender, although sons are more likely to inherit owner-operated family businesses. Tomes (1981)[4] analyzed a five percent random sample of estates (659 estates) probated in the Cleveland, Ohio, between 1964 and 65 and found that bequests are "compensatory" in that high-income children inherit less than low-income children. Wilhelm (1996)[5] examined a one-percent random sample of 2,348 children's federal estate tax returns from 1982 merged with returns of their own and their beneficiaries from 1980 to 1982. He found that there is little evidence in support of the "compensatory" role of bequests, because children in most cases inherit equal amounts, because there is only a small compensatory effect in case of income inequality between siblings, and because low-income children do not inherit statistically significant higher amounts.

Motivations for charitable bequests

Relatively few studies attempted to identify personal motivations of decedents for charitable bequests. Chang, Okunade, and Kumar (1999)[6] analyzed the data from the 1992 Gallup National Survey of Giving and Volunteering. They found that the predictors of charitable bequests include beliefs and attitudes.

McGranahan (2000)[7] used historical analysis to examine 1,357 charitable bequests from seventeenth century Suffolk (in England) and concluded that individuals who are wealthier or religious or have fewer children are more likely to give to the poor. The results suggest that testators are motivated by the "warm glow" understood as altruism accompanied by the desire for the approval and approbation of others, especially by nonrelatives. James (2009a)[8] examined a sample of 18,469 Americans older than 50 years of age derived from the 1995-2006 Health and Retirement Study and found that there is a positive relationship between charitable estate planning and age, wealth, education, religious attendance, volunteering, charitable giving, and the absence of children or grandchildren. Wiepking, Madden, and McDonald (2010)[9] examined a 2008 survey responses from over a thousand donors to six charitable organizations in Australia (where there is no estate tax). The analyses controlled for educational level, age, the charitable organization, and whether the respondent decided to leave a charitable bequest when preparing a will. The study found that the higher likelihood of leaving a bequest is predicted by a strong belief in the efficacy of charitable organization, by past giving behavior, and by having no children.

Although taxes are not the most important predictor of donations, tax regulations (including tax rates, level of charitable deductions and other tax legislation) seem to be significant factors in determining the size and distribution of charitable giving (Clotfelter 2007)[10]. The National Committee on Planned Giving (2001)[11] examined an initial sample of 170,000 US households and found that in making planned gifts (which include bequests) those with annual incomes of more than $74,000 were motivated by tax considerations as well as the need for longer-range planning.

Tax price elasticity and wealth elasticity of charitable bequests

A growing body of literature exists on the effects of estate taxes on charitable bequests. In general, the literature indicates that higher estate taxes are associated with larger charitable bequests as well as larger inter vivos charitable donations. Peloza and Steel (2005)[12] conducted a meta-analysis using a sample of 69 publications and concluded that giving is highly price elastic and that tax price elasticities for charitable donations in the form of bequests are higher than for donations in other forms. With a few notable exceptions most of current research is based on cross-sectional data and as such does not consider frequent changes in tax policy. McNees (1973)[13] examined individual federal tax returns from 1957 and 1959 and found that for millionaire estates, wealth and tax incentives were significant predictors of charitable bequests. Boskin (1976)[14] examined federal tax estate data for years 1957 to 1959 and 1969. He found that predictors of the

propensity to leave charitable bequests include the donor's labor income, savings, wealth and the tax rules. He estimated tax price elasticity of charitable bequests between -1.8 and -0.94 for years 1957 to 1959 and between -2.53 and -0.2 for 1969. Thus, he concluded that estate tax charitable deduction is treasury efficient.

Barthold and Plotnick, (1984)[15] analyzed probate records of large Connecticut estates from the 1930s and 1940s. Their analysis is the first to consider cross-year variation in tax rules. Their results also constitute an exception because the study did not find significant relationship between estate tax rates and charitable bequests. Clotfelter (1985)[16] examined federal estate tax returns of decedents for 1976 and estimated tax price elasticity of charitable bequests between -2.79 and -1.67. Joulfaian (1991)[17] analyzed federal estate tax records for decedents in 1986 filed during the years 1986 through 1988 and found that charitable bequests are affected by wealth level and composition, marital status, gender, age, and taxes. He created two estimates for the tax price elasticity of charitable bequests at -3.0 and -0.7. Auten and Joulfaian (1996)[18] analyzed matched income tax records from 1981 and 1982 for 5,585 wealthy parents and children. They found that children's income and taxes affect the amount of charitable bequests. They calculated a tax price elasticity of bequests of -2.5.

Joulfaian (2000)[19] examined a dataset from estate tax returns of unmarried decedents in 1992 and assessed a tax price elasticity of bequests of -0.74 and a wealth elasticity of 1.54. Using similar specification, Bakija, Gale, and Slemrod (2003)[20] examined a dataset of federal estate tax returns for deaths in selected years between 1924 and 1998. They calculated a tax price elasticity of bequests between -2.14 and -1.62 and a wealth elasticity of 1.32. Kopczuk and Slemrod (2003) examined estate tax returns from 1921 to 1998 and found that the estate tax has a significant effect on charitable bequests. Joulfaian (2004) [21] examined data for intergenerational gift tax collections made between 1933 and 1998 and found that gifts by the wealthy are highly elastic with respect to taxes. The transitory price elasticity found is about -14, and the permanent elasticity was around -4, although this measurement is not precisely measured. Joulfaian (2005) examined data on the estates of widowed and unmarried decedents from 1976 to 1982. He estimated a tax price elasticity of -1.21 and wealth elasticity of 1.16. Moreover, he predicted that repealing the estate tax would decrease bequests by about 62 percent and predicted that repealing the charitable bequests' deduction would decrease bequests by a third. Brunetti (2005)[22] examined records of 5,650 estates filled in San Francisco County Superior Court between 1980 and 1982. He concluded that estate and inheritance taxes are significantly related to charitable bequests. For fillers of federal tax return, he predicted that a repeal of the federal estate tax would decrease charitable bequests by 1.98 to 7.74 percent of after tax wealth. For non-fillers, the predicted amount would be between 2.09 and 4.38 percent. Hanke et al.

(2012)[23] examined 900 probate records of the most generous decedents from Virginia and Louisiana for the years 2000–2005. They concluded that charitable bequest tax price elasticity of 0.8 or 0.9 thus concluding that charitable bequest deduction is not treasury efficient.

A few studies enrich the discussion about treasury efficiency of charitable bequest deduction by considering compliance costs. For example, Henry Aaron and Alicia Munnell (1992) [24] suggest that the revenues generated by the tax do not exceed total compliance and administration costs. Moreover, some studies consider broader consequences of the repeal of estate tax in the United States (e.g., Rooney and Tempel 2001[25], Joulfaian 2009)[26] and in other countries (e.g., Bellettini and Taddei 2009)[27].

Methodology

We examine the statistical relationships between the key policy variables, relevant economic variables, and charitable bequest giving. We use several different measurements of charitable bequest giving as the dependent variable. First, we examine the total amount of charitable bequests given each year, as reported by Giving USA. For this analysis, our time series data was available from 1954 until 2012. Second, we look at the share of the number of all estates with bequests and then the share of charitable bequests among all estate wealth. For this analysis, the data was available from 1982 until 2011. Finally, we repeat the analysis of the shares of estates and wealth among estates of $10 million or more. The data for the estates with a bequest as a share of all estates and the share of estate wealth going to charitable bequests was provided by David Joulfaian (US Dept of Treasury. It should be noted that neither Dr. Joulfaian nor Treasury commented on this analysis in any capacity. Nor did they try to influence our assessment of the results.

Because there was no estate tax in 2010, there is no meaningful exemption level for this year. To deal with this, we operationalize exemption levels in two distinct manners. First, we treat exemption levels (inflation adjusted) as a continuous variable, excluding 2010, and we first difference this variable. In other specifications, we create a set of dummy variables representing the exemption levels (inflation adjusted), including a dummy variable for no estate tax. In all of the specifications that operationalize exemption levels as continuous, first differenced variables, we excluded data points involving 2010, since there was no estate tax during this year. However, 2010 is included in the analysis when we analyze exemption levels as a set of dummy variables.

For each dependent variable, we conducted several models to examine the incremental effects of several dummies that test whether or not the Great Recession has an independent effect above and beyond the effects of several control variables that in theory would capture the business cycle effects. We also tested all of the relevant policy variables that might affect the share of all estates with a charitable bequest and the share of all estate wealth that went to charitable bequests. These policy variables included the following: changes in the top marginal estate tax rate (and its square), the estate tax exemption level, the absences of an estate tax, changes in the aggregate value of personal consumption in the US (and its square), changes in the S&P 500 Index (and its square), changes in the top marginal personal income tax rate (and its square), changes in GDP (and its lag), changes in aggregate corporate income (and its lag), and changes in corporate tax rate (and its lag). Dummy variables for recessions prior to the Great Recession, the years of the Great Recession, and the years post Great Recession were also included, along with changes in the total number of estates. For each measurement of bequest giving, we start with a base model that includes the key variables that theory and prior research suggests should be included in each model.

It should be noted that all monetary variables have been adjusted for inflation to capture underlying relationships between the variables, rather than the effects of inflation. In addition, all of the variables, with the exception of the dummy variables, have been first-differenced both to isolate further the pure behavioral and structural relationships, but also to avoid the problems of autocorrelation that frequently plague time-series analyses. To ease readability in the tables, we adjusted the following variables for analysis purposes for analysis on the bequest amounts (Table 2) prior to first differencing: S&P 500 and personal consumption (originally in billions of US dollars) were divided by 10, while the estate tax exemption variable (originally in US dollars) was divided by 1,000.

For the analysis on the shares of total estates and total estates wealth (Tables 3, 4, 5, and 6), we adjusted the following variables prior to first differencing: the estate tax exemption variable (originally in US dollars) was divided by 1,000,000, the S&P500 variable was divided by 1000; the number of estates was divided by 10,000, personal consumption (originally in billions of US dollars), GDP, and corporate income (originally in billions of US dollars) were divided by 100.

Summary statistics for the two sets of analyses in this paper, the bequest amount analysis and the share of estates and share of estate wealth analysis, are displayed in Table 1A and Table 1B, respectively, because the years of the time series for

these two analyses are distinct. Of note may be the wide variation in tax rates and exemption levels during these decades!

INSERT TABLES 1A AND 1B ABOUT HERE

Results

We briefly report the results of the significant variables for various measures of charitable bequest giving.

Total Bequest Giving: Table 2 uses total bequest giving as the dependent variable. The first three specifications in Table 1 operationalize exemption levels as a first-differenced continuous variable (excluding 2010). The last three specifications in the table treat the exemption levels as categorical variables. Personal consumption (differenced), which is our proxy for permanent income, and its squared value are always insignificant. Our key measure of wealth, the S&P 500 (differenced) and the square of the first differences of the S&P500 are always insignificant at traditional levels of significance. However, in two of the specifications where exemption levels are operationalized as categorical variables, the first S&P 500 (differenced) is marginally significant ($p < 0.10$). Changes in the top marginal personal income tax rate are insignificant, as is the square of its difference. Other recessions (prior to the Great Recession) are always insignificant. The Great Recession dummy variable is never statistically significant. When exemption levels are treated as dummy variables, the post-Great Recession dummy variable is positively associated with more bequest giving, although the coefficient is insignificant when exemption levels are treated as a continuous variable.

INSERT TABLE 2 ABOUT HERE

We also include variables that we know affect corporate giving in case there were any indirect effects between variables that tend to predict corporate giving and charitable bequest giving. We found that corporate income (differenced) and its square are insignificant, as are changes in the top marginal corporate tax rate (differenced) and its square. Similarly, changes in the overall economy (Gross Domestic Product) (differenced and its square) had no effect on bequest giving.

Not surprisingly, changes in the exemption levels and the tax rates on estates do impact charitable bequest giving. Consistent with the tax-price effect dominating

the wealth effect, an increase in the top marginal tax rate, which lowers the price of giving, is statistically significantly associated with an increase in bequest giving in specifications 4 and 5, when we do not include a binary variable for post-Great Recession and when exemption levels are treated as dummy variables. However, the tax-price effect is insignificant when exemption levels are operationalized as a continuous variable (differenced). The lag of the first differenced estate tax rate were positively associated with giving in specification 4 and 5, although it was only marginally significant in specification 5 ($p < 0.10$). It is worth pointing out that in the one year with no estate tax (2010), bequest giving increased between $32 billion and $34 billion when we did not include a binary variable for post-Great Recession years, which suggests that the wealth effect of eliminating the estate tax dominated the price effect of not having an estate tax in 2010, holding all other variables constant statistically. Including a post Great Recession dummy variable in the model, which is coded as a one for years 2010 and 2011, drastically reduced the size of the effect and removed its significance, however. Granted this was an unusual year, and it demonstrates that elimination of a tax may yield results that are different from years in which there are simply small changes in the top marginal tax rate.

Also consistent with the tax-price effect dominating the wealth effect, as seen in the first three specifications in Table 2, increases in the exemption level, when it is treated as a continuous variable (differenced), are associated with small but significant declines in the amounts of charitable bequests. As the exemption level increases, fewer estates are subject to any estate tax and a smaller share of the estate wealth of those subject to the estate tax is taxable, so we expect this to be negatively related to the amount of money left in charitable bequests. Given the very small effect when measuring the exemption effect as a continuous variable, we also tested the exemption levels as a set of dichotomous variables based upon their inflation-adjusted values. We found that relatively small exemption levels ($500,000-$2,999,999) have no effect (compared to the omitted category of $0-$499,999), but relatively large exemption levels ($3 million or more) are associated with fairly large reductions in charitable bequests. Estimates ranged from $10.3 billion to $25.3 billion depending on the model. Overall, these models in Table 2, explained between 47 and 56 percent of the variation in the data.

Estates with charitable bequests as a share of the number of all estates: Table 3 presents the results of our analysis on the relationship between various economic and policy variables and the share of all estates with a charitable bequest. We tended to find that our policy-relevant variables were statistically significant, but there are mixed results compared to what one would expect based on economic

theory. For example, increases in the top marginal tax rate (differenced) would be expected to increase the share of the number of estates with charitable bequest giving, because the cost of giving would go down. We found that increases in the top marginal tax rate were significantly associated with a very small increase in the share of all estates with charitable bequest giving in the specifications that operationalized exemption levels as binary variables, with the exception of the specification that included a dummy variable for the post-Great Recession. The lag of this first-differenced estate tax variable was also significant or marginally significant in two of these specifications.

INSERT TABLE 3 ABOUT HERE

Conversely, one would expect that increases in the exemption levels would be associated with decreases in the share of estates with charitable bequests, because fewer dollars would be subject to the estate tax, but we found a positive and significant effect, when measured as a continuous variable. However, this effect was no longer statistically significant once we controlled for the effect of the total number of estates (differenced). We also tested the exemption levels as a series of dichotomous variables and found that increases in the exemption levels at the lower end of the spectrum were significantly associated with increases in the share of estates with a charitable bequest (omitted category is exemption level less than $1 million in 2012 dollars). On the other hand, the largest dummy variable for exemption levels ($3 million and more) was always insignificant when we controlled for the total number of estates (differenced). However, when we omitted this variable, a larger exemption level is statistically significant and positively related to the share of all estates with a bequest. This significance, however, was only at the 0.10 level when we included a binary variable for post-Great Recession. However, among all estates, the smaller ones (at least those less than $10 million) may dominate the effects of the smaller number of large estates.

Another policy-relevant variable is the year in which there was no estate tax (2010), which we treated as dummy variable to isolate the effect. Contrary to theory, the share of all estates with charitable bequests significantly increased between 19 percent and 24 percent that year, depending on the specification, although the effect is insignificant when we also controlled for post-Great Recession years. This suggests that the elimination of the estate tax triggered a wealth effect much greater than the tax-price effect—at least in the short run. The other policy variable, changes in the top marginal personal income tax rate (differenced) and its squared value have no significant effect in any of the models.

Personal consumption (differenced), which was our proxy for permanent income, is insignificant at traditional levels in all models. Its squared values is always insignificant. The S&P500 (differenced) is insignificant along with its square. All pre-Great Recession recessions and the Great Recession variables were statistically insignificant.

In the models in which we included the predictors of corporate giving to examine whether there were indirect linkages between corporate giving variables and charitable bequest giving, most of these variables are statistically insignificant: corporate income (differenced) and lagged corporate income (differenced) were always insignificant. GDP (differenced) and lagged GDP (differenced) are usually insignificant, but in one of the models, GDP (differenced) has a very small but marginally significant ($p < 0.10$) and positive effect on the share of estates with a charitable bequest.

We also included a variable as a control variable that simply measures the total number of estates (differenced from year to year). The theoretical motivation for including this variable is the notion that there may be diminishing returns to the share of bequest formation if there were increases in the number of estates in any given year. For example, one would expect that if there were a large increase in the number of estates in any given year that most of them would be smaller estates rather than larger estates. Similarly, one would expect that smaller estates would be less likely to include a charitable bequest. Our results are consistent with this theory: while the coefficient on this variable is quite small, it is consistently negative and statistically significant in the models where exemption levels are operationalized as binary variables. It is negative and marginally significant in the model where exemption levels are a continuous variable (differenced) and that includes a dummy variable for the Great Recession.

While many of the independent variables have little or no statistical significance on their own, collectively they do. These models explain between 79 percent and 98 percent of the variation in the data.

Charitable bequests among estates of $10 million (or more) as a share of the number of estates: The results of our analysis on the share of all wealthy estates with a charitable bequest are in Table 4. Among the estates of $10 million or more, the public policy variables are often statistically significant and of the expected sign. Although the top estate tax rate (differenced) is always insignificant, the lag of this differenced variable is often negative and statistically significant.

INSERT TABLE 4 ABOUT HERE

The estate tax exemption levels when specified as either a set of dichotomous variables or a continuous variable are almost always negative and statistically significant. This is also consistent with theory: increases in exemption levels would decrease the number of estates subject to any estate tax, and would reduce the amount of tax liability for those estates with any tax liability. Therefore, fewer estates would seek charitable bequest gifts as an estate tax minimizing strategy. Of course, that is not the only reason people leave charitable bequests, but the tax consequences do matter to some. We found no statistically significant effect when we controlled for the year in which there was no estate tax (2010).

In addition, changes in the top personal income tax rate (differenced) were positive and statistically significant in several of the models. However, the squared value of this variable was negative and significant, consistent with diminishing returns. This suggests that at least some households are paying careful attention to decisions about current taxes (personal income taxes) and future taxes (estate taxes) in deciding whether or not to create a charitable bequest.

Several of the explanatory variables were insignificant including: personal consumption (differenced), and its square, the S&P500 (differenced) and its square. Corporate Income (differenced) was significant or marginally significant ($p < 0.10$) in two of the models that used dummy variables for exemption levels. However, the lag of differenced Corporate Income was always negative and significant. Increases in the top marginal tax rate for corporations were associated with a significant decline in the share of wealthy estates with charitable bequests in most models. These results tended to be persistent as the lags of these variables were also negative and significant.

Recessions before the Great Recession were always insignificant as well. The Great Recession is associated with a small but negative effect on the likelihood of large estates creating charitable bequests in the models that operationalized exemption levels as a continuous variable. However, this effect only approaches traditional levels of significance ($p<0.1$). The fact that GDP (differenced) and Corporate Income (differenced) tended to be insignificant suggests a weak relationship, if any, between these variables and bequest formations among large estates. The fact that the lagged differences of Corporate Income are negative and quite small suggests that even when Corporate Income is statistically significant, the relationship is curvilinear but quite weak.

The number of total estates (differenced) never attains significance at traditional levels of significance. Intuitively, this makes sense: in the models looking at the share of all estates, the number of estates may matter (likely because of diminishing returns), but in testing only large estates, the number of all estates is not likely to impact the share of large estates, especially those with a bequest gift.

The R-squared values from these models moved in a relatively narrow range from 0.83 to 0.97, which suggests that the models explain the majority of the variation in the data and in most of the specifications, over 90 percent of the variation is captured by the models.

Charitable bequests as share of estate wealth in all estates: The results for the analysis on the share of bequests of all estate wealth are found in Table 5. When examining charitable estates as a share of wealth in the estate, the effect of changes in the top marginal estate tax rate is effectively zero. The coefficient on the variable is quite small and never attains significance, although the lag of this variable attains marginal significance ($p < 0.10$) in two specifications. The year in which there was no estate tax (2010) is also insignificant.

INSERT TABLE 5 ABOUT HERE

On the other hand, for increases in the exemption level, one would expect to have a negative impact on the share of wealth going to charitable bequests, yet we find a small but statistically significant and positive effect in this statistical relationship in some of the specifications, including one specification that treats exemption levels as a continuous (differenced) variable and two specifications when we measured the exemptions as a set of dichotomous variables. Note that when we used the dummy variables, only the largest exemption level attained statistical significance. The other policy-relevant variables are changes in the top marginal rate for personal income taxes as well as corporate income tax rates, but these variables (differenced) and their squares are always insignificant.

Changes in personal consumption (differenced) was only positive and marginally significant ($p < 0.10$) in two specifications, while its square value is always insignificant. Perhaps of interest: recessions before the Great Recession tended to have a small, but positive and significant effect on bequests. Similarly, the Great Recession had a small, but positive and significant effect on the share of wealth going to charitable bequests, although the post-Great Recession effect was insignificant.

Several variables are statistically insignificant a traditional levels of significance including the following: personal consumption (differenced), and its square; the S&P500 (differenced), and its square; GDP (differenced) and its lag; corporate income (differenced) and its lag. The models explain between 51 percent and 93 percent of the variation in the data. The models using dummy variables for the exemption levels were always stronger models than using the continuous variable.

Charitable bequests among estates of $10 million (or more) as a share of wealth: We repeated the analysis of the share of estate wealth that went to charitable bequests among estates of $10 million or more, as seen in Table 6. Perhaps the most fascinating result here is that none of the direct, policy relevant variables are statistically significant. For example, the estate tax rate (differenced) is insignificant, as its lag. Also, the estate tax exemption levels are always insignificant—whether measured as a continuous variable or as a set of dichotomous variables. Even the year in which there was no estate tax had no significant effect on the share of wealth left as charitable bequests by the largest estates (those at $10 million or more). The top marginal personal income tax rate for individuals (differenced) and its square were also insignificant. Ditto for corporate income tax rates and its lag.

INSERT TABLE 6 ABOUT HERE

Among our control variables, increases in personal consumption (differenced), which is our measure of permanent income, is positive and significantly associated with increases in the share of wealth among large estates going to a charitable bequest in two specifications and is marginally significant ($p < 0.10$) in two other specifications. The square of personal consumption (differenced) is negative and marginally significant ($p < 0.10$) in one specification, suggesting that there may be diminishing returns at least with respect to the shares of the estate left for charitable bequests.

The S&P500 (differenced) and its square are always statistically insignificant, as are GDP (differenced) and its square as well as corporate income (differenced) and its square. Recessions prior to the Great Recession are positive and significant in one specification and marginally significant ($p < 0.10$) in three specifications. Similarly, the Great Recession itself is associated with a marginally significant ($p < 0.10$) increase in the share of wealth that is contributed in the form of a charitable bequest among the larger estates ($10 million or more). This suggests that the high net worth households in the US may have been "paying it forward" when it came

time to revise their wills during the Great Recession. Alternatively, they may have reallocated their giving during life to their estate giving.

Based on the R-squared values, our models explained between 40 and 87 percent of the variation in the data. This seems remarkably high given the nature of the data and the complexity in the tax-philanthropy decisions. The models using dichotomous measures of the exemption levels did a better job of explain the variation in the data than did those using a continuous measure of exemption levels.

Conclusions

At a macro level and without using any statistical controls, we have seen that total amount of charitable bequests given has varied quite a bit over the last 30 years. Bequest giving has both increased and decreased during periods of stable marginal tax rates, as well as constant exemption levels. Similarly, the share of wealth in all estates and in large estates ($10 million or more) has trended up slightly over the past three decades, but there has been fairly large year-to-year variation in these measures, especially among the larger estates. Likewise, the total number of estates with bequests seems to vary more with the business cycle than with the top marginal tax rates. The number of large estates with charitable bequests has trended in the same direction as changes in the top marginal tax rate for the last thirty years—except for the abnormalities caused by the repeal of the estate tax in 2010.

On the other hand, once we introduce statistical controls, we find that the policy variables do matter. For example, we find that controlling for other economic factors statistically, increases in the marginal estate tax rate is typically statistically significantly associated with increased dollars amounts bequeathed annually and the share of all estates that have a charitable bequest, when exemption levels are operationalized as dummy variables.. However, changes in the top marginal estate tax rate do not explain the share of wealthy estates with bequests, the share of wealth left in all estates as bequest gifts nor the share of very large estates left as bequests.

In 2010, when there was no estate tax, we might have expected that bequest gifts would plummet because the price of the gift rose dramatically. However, we find evidence that after controlling for other economic variables statistically, the dollars in bequest gifts increased significantly and the percentage of all estates with a

bequest gift increased, when we also did not control for post-Great Recession years.

Estate tax exemptions, which is another key policy variable, seemed not to matter at all when looking at our graphs, yet exemptions were important in many of the time-series regression models, particularly when exemption levels were operationalized as dummy variables. However, it did not matter in explaining the share of wealth left in bequests amongst the largest estates ($10 million or more). Intuitively, that makes sense as these larger estates are much less affected by the exemption levels. That said, the exemption levels affected different dependent variables differently. They had a negative impact on the total dollar amounts bequeathed and on the percentage of large estates with any bequests, but they had a positive effect on the percentage of any estates with a bequest and the share of wealth left as a bequest amongst all estates.

The final public policy variable we tested was the top marginal tax rate on personal income (differenced). The top personal income tax rate had no statistically significant association with either dollars bequeathed or the share of all estates with a charitable bequest. However, we found evidence that changes in the top personal income tax rate were statistically significantly associated with increases in the share of the largest estates ($10 million or more) leaving a charitable bequest, although this effect appears to be non-linear since the square of this differenced variable tended to be negative and significant. This suggests that increases in the top marginal tax rates on households encouraged some households, and especially those with large expected estates, to structure their wills to include a charitable bequest. However, we did not find evidence that the top personal income tax rate significantly affected the share of total wealth left for all estates nor for the largest estates ($10 million or more).

The Great Recession tended not to affect the total amount of charitable bequests, but there are some interesting nuances. There was very limited evidence that it had a negative effect on the share of large estates leaving a bequest. However, we some evidence that the Great Recession is associated with increased shares of estate wealth left as a bequest gift for all estates and for large estates ($10 million or more), although the evidence for large estates is weaker.

Charitable bequest giving occurs for many reasons. Our data show that the public policy variables matter, but they are clearly not the only factors that matter. Contemporaneous measures of income and wealth are not great predictors of charitable bequest giving either. This is likely caused by the fact that the decision

to make a charitable bequest is based on accumulated wealth and not the income or wealth holdings in any one given year. Our data also suggest that public policy makers should carefully consider the interaction effects between personal income tax rates, estate tax rates, estate tax exemption levels, and charitable bequest giving. It is clear that some households carefully balance current and future (estate) tax rates when planning current and future (estate) giving.

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