

BEQUEST AND TAX PLANNING: EVIDENCE FROM ESTATE TAX RETURNS*

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I study bequest and wealth accumulation behavior of the wealthy (subject to the estate tax) shortly before death. The onset of a terminal illness leads to a very significant reduction in the value of estates reported on tax returns—fifteen to twenty percent with illness lasting “months to years” and about five to ten percent in the case of illness reported as lasting “days to weeks.” I provide evidence suggesting that these findings cannot be explained by real shocks to net worth, such as medical expenses or lost income, but instead reflect “deathbed” estate planning. The results suggest that wealthy individuals actively care about disposition of their estates but that this preference is dominated by the desire to hold on to their wealth while alive.

I. INTRODUCTION

This paper provides empirical evidence about the behavior of wealthy individuals following the onset of a terminal illness using (publicly available) individual-level estate tax return data (National Archives and Records Administration 1995) for decedents whose tax returns were filed in 1977. This is the only publicly available data set of this kind and one of very few data sources making it possible to study wealth holdings and behavior of the wealthy.¹ I analyze decisions of estate taxpayers shortly before their deaths. My strategy is to compare estates of individuals who suffered terminal illnesses of different lengths. Approximately twenty percent of taxpayers subject to the estate tax die instantaneously. The central empirical fact established in this paper is that their estates as reported on tax returns are 10%–18% greater than the estates of those who suffered from a lengthy illness. This could be consistent with large medical or long-term

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1. The analysis uses individuals with estates of at least \$120,000 in 1976, corresponding to roughly \$360,000 nowadays. The group considered corresponds to approximately 6% of adult deaths. Information on more than 29,000 high-net-worth tax returns is in the data, vastly exceeding the coverage of this group in any survey dataset. Sampling rates are also higher and the effective exemption level is lower than in any of the more recent IRS samples of estate tax returns (that are not available publicly). I discuss the data in more detail in Section II.A.

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care expenses or with loss of income following the onset of a terminal illness. However, based on other information from tax returns and AHEAD/HRS exit surveys, I show that these are unlikely to be the right explanations. Instead, the empirical findings suggest that this response reflects planning for the disposition of an estate.

While the notion that the wealthy pursue tax avoidance is hardly new or surprising, the results shed a new light on motivations behind wealth accumulation. The presence of significant tax-motivated actions following the onset of a terminal illness reveals a desire to control disposition of assets, but it also implies that more tax planning could have been pursued earlier. Tax avoidance is easier and more effective if pursued early. Furthermore, those who die instantaneously do not get a chance to make such adjustments. This suggests that there are real costs to early planning that result in holding on to wealth while alive and that (rational or irrational) “procrastination” in estate planning is an important phenomena. I present additional findings that are consistent with the notion that the wealthy hold on to their wealth until they die: in cross section, wealth is increasing with age until the maximum observed age of ninety-eight. Because cross-sectional wealth profiles are potentially affected by differential mortality, these findings do not unequivocally prove that wealth increases with age. Still, the sample considered is more uniform than usual, so that selection is less likely to be an issue, and, despite that, the gradient is steeper (estimated at approximately three percent per year) than observed in datasets representative of the full population. Together with bequest-driven adjustments before death, these patterns cast doubt on the life-cycle motive for wealth accumulation as the sole explanation of the behavior of the wealthy.

The results suggest a need for a model that can simultaneously explain wealth accumulation beyond own consumption or precautionary needs, some degree of concern about beneficiaries, and significant delays in planning despite real consequences. Holding on to wealth until one gets terminally ill, despite tax consequences, suggests a “capitalistic spirit” or wealth in utility motive, where wealth accumulation takes place because stock of wealth provides flow of utility. The presence of active though delayed planning suggests, however, that such a framework will not fit all empirical facts. An alternative is for individuals to simultaneously value both wealth and bequests. It is natural to expect that the presence of such a preference that’s ultimately

reflected in tax-motivated actions should affect wealth accumulation prior to the onset of a terminal illness, although results in this paper leave open the possibility of “lexicographic” preferences under which wealth accumulation has nothing to do with beneficiaries, yet transfers to them are preferred to transfers to the IRS. Another important possibility for explaining my findings is behavioral: individuals who have difficulty acknowledging their own mortality may delay planning and oversave.

Other than establishing the drop in net worth, I find that the response is stronger for younger individuals and that administrative expenses associated with the estate fall. I also show direct evidence of increased planning: transfers before death increase, although this response does not reflect simple direct *inter vivos* giving, but rather it reflects more complicated transfers that are prearranged but take effect only at the time of death.² Such transfers are likely to be a fingerprint of more sophisticated avoidance strategies that are not directly observed on the tax return. Consistent with a tax motive, I find that the response for a subset of individuals who died in 1977, following a tax cut that took place on January 1, 1977, is much weaker.

I find no evidence that these wealthy taxpayers experienced any quantitatively important financial hardship due to lost income. I also find no evidence that debts increase, suggesting that taxpayers do not experience difficulties dealing with terminal expenses. I discuss other evidence suggesting that while end-of-life expenditures are important for most of the population, they have very low wealth elasticity and are not of major importance at the top of the distribution. As far as I know, this is the first paper that documents the low wealth elasticity of terminal expenditures. This information is not observed on the tax returns and therefore I rely on AHEAD/HRS surveys to shed some light on this issue. I find that medical, funeral, and related expenditures in the last two years of life for individuals who would meet the estate filing threshold in my data (roughly \$360,000 nowadays) constitute at most four percent of estates (they are on average 45 percent for the full sample) and do not show a strong gradient with respect to the length of illness. In particular, these expenditures are much smaller than the estimated effects and thereby cannot explain the drop in net worth.

2. As an example, an outright transfer of a house would be an *inter vivos* gift, but a transfer of a house with retained right to use it until death is a lifetime transfer and should be included on the estate tax return.

Finally, I document changes in the allocation of assets. Interestingly, I do not find a disproportionate decrease in cash holdings, perhaps reflecting no outright tax evasion, but also consistent with income from sales of other assets offsetting any cash distributions. That cash holdings do not fall disproportionately is another argument against the relevance of any liquidity-related problems. One indication that outright cheating may be facilitated by a longer illness is that the category of "other assets" responds strongly for smaller estates. Items specifically mentioned on the tax return that fall into this category are jewelry, furs, paintings, antiques, rare books, coins and stamps, and household goods: these are, likely, things that can be easily concealed from a tax collector. For those with moderate wealth (who would not be subject to taxation in 2005), I find evidence that farms and business assets disappear or lose (reported) value following the onset of a terminal illness. This is no longer true for higher net worth individuals, but for all categories I find that corporate stock (the category that includes closely held corporations) responds strongly.

The econometric analysis of the data from estate tax returns is complicated due to the presence of truncation: only estates that are larger than the filing threshold are observable by the researcher. To my knowledge, this is the first paper taking this issue seriously, and I find that addressing the fact that the data come from a truncated sample affects the results significantly. I rely on a number of different methods to deal with truncation and find that results are robust to these approaches. I use both parametric and semiparametric methods that require weaker distributional assumptions. I also rely on availability of information a few years before death to define subsamples on which truncation is less severe and verify that the results are robust to this approach as well.

The plan of this paper is as follows. In Section II, I discuss the data and present my econometric strategy. Section III analyzes the response of net worth to the length of illness, and Section IV discusses channels behind this response. Conclusions are in the final section.

II. DATA AND ECONOMETRIC STRATEGY

II.A. Data

I rely on the Decedent Public Use File (DPUS) available from the National Archives and Records Administration (1995). This

data set was constructed by linking information from four sources: the SSA 10% Continuous Work History Sample “decedent” file, which includes deaths that occurred between 1974 and June 1977; the IRS Statistics of Income sample of estate tax returns filed in 1977; and both 1969 and 1974 IRS Individual Master Files composed of income tax returns filed in 1970 and 1975, respectively.³ I limit attention to estate taxpayers (I do not observe estates of others) and use information from their 1977 estate tax returns and income tax returns for 1969 and 1974.

The data set contains information about 40,462 estate tax returns. This is a stratified sample that includes 100% of 1977 returns with gross estates above \$500,000, 20% of returns between \$200,000 and \$500,000, and 12.5% of returns with gross estates below \$200,000. In all reported specifications I weight observations by the inverse of sampling probability. The threshold for estate filing increased in 1977 from \$60,000 (gross estate) to \$120,000.⁴ I use net worth constructed by subtracting debts from gross estate as the criterion for sample selection. Net worth is necessarily smaller than gross estate and therefore all individuals with net worth above the gross estate filing threshold were subject to the filing requirement.⁵ There are 29,407 observations with net worth above \$120,000 drawn from the universe of 112,600 deaths (obtained as the sum of inverse sampling probabilities). The numbers of adult (21 and up) deaths in each of 1976 and 1977 were around 1.8 million, so that the data correspond to about 6% of all adult decedents. Thus, this group includes a fairly broad segment at the top of the wealth distribution. In particular, it is significantly broader than those subject to estate taxation nowadays, or at any period other than the 1970s. I will also show, therefore, results for those with net worth greater than \$500,000 (in 1976 dollars), which corresponds to a little more than the 2005 estate tax threshold of \$1.5 million.⁶

3. The link with the CWHS is not important for this paper. Its main purpose in creating this data set was to identify deaths for nonestate taxpayers. The variables from the CWHS present in the dataset are race, sex, and age (the latter two would be observable for estate taxpayers anyway), but unfortunately earnings information (which is present in the SSA version of the CWHS) is not included.

4. Figures denominated in 1976 dollars should be approximately tripled to obtain 2004 dollars.

5. Less than 0.5% of returns have gross estate above the threshold but net worth below it.

6. The data captures a population that is hard to observe in conventional survey data. The only large survey that oversamples the high-wealth population is the Survey of Consumer Finances, which is a cross-section of the living population, and therefore does not allow studying implications of increased mortality risk

Estate tax return data are very detailed and contain information about the composition of estate, deductions, some additional schedules, tax credits, and so forth as well as age, marital status, and gender. Individual income tax data contain a few basic variables, such as adjusted gross income, wages and salaries, dividends and interest, information about exemptions claimed, and a few additional items. There is no information about the state of residence (other than the community/non-community-property state distinction) and the exact date of death. It is possible to ascertain whether death occurred in 1977 or earlier by comparing the tax liability reported in the data to the size of the taxable estate.⁷

For the most part, the analysis will be limited to married males. In the considered period, married male decedents were subject to heavier taxation than now. The unlimited marital deduction was not introduced until 1981. Up until 1976, 50% of the estate was deductible. Starting in 1977, the marital deduction was increased to the larger of \$250,000 or 50% of the estate. Therefore, married male decedents were subject to taxation in the period covered by the data, but the tax treatment changed between 1976 and 1977.⁸ Responses of different marital and gender groups are likely different because their circumstances are different: for example, any decision of a widow is observed only after her husband died. On the other hand, the response of a married person needs to take into account that there may be additional adjustments by the surviving spouse. As a result, different groups should be considered separately. As will be discussed below, the information about the 1969 income of an individual is important for the analysis. While information about 1969 adjusted gross income (AGI)⁹

(and, despite its oversampling of the wealthy, does not approach the sample size available here).

7. I was able to perform limited tabulations on the same estate tax return data held at the SOI (but without the link to income tax returns) and obtain information about the distribution of dates of deaths for this sample. In these data, 6,169 deaths occurred in 1977, 32,459 in 1976, 1,345 in 1975, 239 in 1974, and 250 prior to that.

8. Two other important tax changes took place in 1977: gift and estate taxation were integrated and rules regarding transfers made within three years of death changed. I make very limited use of the 1976 tax reform, because I observe estates of individuals who died in 1977 only if they filed in 1977, that is, if the tax return was filed relatively quickly. This is then likely to be a selected sample. More details are in Section III.

9. Adjusted gross income (AGI) includes all types of income subject to income tax as reported on the tax return (wages and salaries, interest income, dividends, business income, capital gains, etc.) less a few (usually very small) adjustments to income.

is in the data for 92% of men, it is missing for 48% of women. This is particularly common for married females (most likely because data matching relied on primary filer's SSN only), but even among widows it is still the case for 42% of the sample—possibly because their husbands were still alive in 1969.¹⁰ As a result, incorporating women into the analysis is difficult due both to much smaller sample sizes and to possible selection issues.

II.B. Length of Illness Measure

The key variable for the identification strategy of this study is the length of the terminal illness. This information is available in the dataset as a categorical variable that takes ten values: instantaneous (minutes), hours, 1 to 3 days, 4 to 7 days, 8 days to less than a month, 1 to 3 months, 4 to 6 months, 7 months to less than a year, 1 to 9 years, and more than 10 years. I aggregate these values into three categories—"quick" (instantaneous), "medium" (hours, days, or weeks), and "long" (months or years)¹¹—and study differences in behavior across groups defined by these categories.

Basic summary statistics by the length of terminal illness for the sample of married males are shown in Table I. Some variables vary with the length of the illness. Those dying instantaneously are younger than others. Such deaths are also less common in the 1977 subsample (as discussed below, this may be due to selection on the delay in filing a return). There is also a bit of a difference in income a few years earlier. This issue will be discussed below. A few financial variables appear quite different across categories. There is some difference in the size of net worth, stocks, bonds, real estate and life insurance. Strikingly, there is a major difference in assets reported on the Schedule G—"lifetime transfers."

Length of illness is based on response to item 4, "Length of last illness," in the "General Information" section of the estate tax return. There is no guarantee that this question has always been

10. Information about income tax return for 1974 is missing for 28% of widows.

11. This aggregation helps in reducing the extent of misclassification and keeping the number of reported coefficients manageable. Note that the distinction between immediate deaths and longer term illnesses is likely to be much cleaner than between other categories. This motivates separating the instantaneous category from any longer illness: it is likely to be dominated by unexpected events (ideally, from the identification point of view, it would reflect purely random accidents), while even a short-term terminal illness may be the result of a known preexisting condition. A misclassification error will act against finding an effect. The results are noisier but robust to finer measurement of the length of illness.

TABLE I
SUMMARY STATISTICS FOR MARRIED MALES BY LENGTH OF TERMINAL ILLNESS

	Quick	Medium	Long	Quick	Medium	Long
Net worth	327,926	335,491	330,867	140,463	143,320	138,258
Age	66.72	71.06	69.93	24,949	21,318	21,417
Post 1976	0.190	0.223	0.227	11,861	10,929	11,062
1969 AGI	23,258	24,275	23,945	90,764	94,328	90,521
1974 AGI	29,566	30,091	28,495	22,063	29,075	28,855
1969 wages	9,699	8,597	9,213	45,415	50,148	46,548
1974 wages	11,242	8,824	9,431	101,207	96,017	92,413
1969 divid./interest	5,065	6,702	5,820	12,935	11,740	10,441
1974 divid./interest	8,793	11,477	9,749	36,022	24,705	26,725
Schedule G	14,649	22,206	25,601	2,634	2,509	2,485
Presence of Sch. G	0.100	0.125	0.180	10,230	9,599	9,021
Gift return	0.128	0.145	0.143	15,158	15,127	14,783
Total deductions	183,763	182,022	183,045	8,363	14,177	18,462
Charitable bequests	6,900	6,800	9,165	2,264	3,842	4,780
				Marital deduction		
				Deductible debts		
				Funeral/admin.		
				Stock		
				Bonds		
				Cash		
				Real estate		
				Farm/Non-corp.		
				Life insurance		
				Annuities		
				Other assets		
				Mortgages/notes		
				Sum of weights		
				Observations		

Note. "Quick" category corresponds to instantaneous death, "medium" one includes illness lasting hours, days, or weeks, and "long" category refers to illness lasting months or years.

TABLE II
THE LENGTH OF ILLNESS

Age category	All			Females			Males		
	Quick	Medium	Long	Quick	Medium	Long	Quick	Medium	Long
Total	0.17	0.36	0.47	0.12	0.38	0.50	0.20	0.35	0.45
30	0.34	0.32	0.34	0.24	0.35	0.40	0.35	0.32	0.33
40	0.29	0.27	0.44	0.15	0.20	0.65	0.31	0.28	0.41
50	0.25	0.28	0.47	0.13	0.28	0.59	0.29	0.28	0.43
60	0.19	0.31	0.49	0.13	0.30	0.56	0.21	0.32	0.47
70	0.17	0.36	0.46	0.15	0.35	0.50	0.19	0.37	0.44
80	0.12	0.42	0.46	0.11	0.43	0.46	0.14	0.40	0.46
90	0.10	0.44	0.46	0.09	0.44	0.47	0.11	0.44	0.44

Note. "Quick" category corresponds to instantaneous death, "medium" one includes illness lasting hours, days, or weeks, and "long" category refers to illness lasting months or years.

answered accurately,^{12 13} so that one may worry about the quality of this variable. In Table II, I show how length of illness varies with age and gender. Instantaneous deaths become less common with age and they are more common for men than women, with the difference shrinking with age. This pattern seems reasonable and is consistent with this variable containing information about the actual length of illness.

A more direct test of the informativeness of this variable can be obtained by regressing income a few years before death on the length of illness. Table III shows the results.¹⁴ The simple regression of 1969 AGI on the length of illness produces a perverse positive coefficient on the lengthy illness. Note, though, that this is actually consistent with the effect of truncation (only estates

12. Of the sample, 16.2% do not contain an answer to this question at all. These individuals are more commonly widowed, single, or divorced, and they are younger than average. There seem to be no selection based on net worth or income. Inaccuracy would also likely be an issue in any survey data. HRS/AHEAD includes an exit survey that contains such information, but it has few high-wealth individuals. In either case, it is of course someone else (the executor of the estate in the estate tax case, a family member in surveys) who responded to this question.

13. One reason for misleading answers has to do with tax avoidance: transfers made in "anticipation of death" had to be included in the estate, and this could provide an incentive to hide a lengthy illness. Transfers within three years of death were presumed to be in anticipation of death and the burden of proof that it was otherwise fell on the taxpayer. If such transfers were present, the executor was required to provide information about hospitals in which the taxpayer was confined in the last three years of life. While it is not possible to measure the extent of this problem, it acts against finding an effect of the terminal illness, because it shifts tax avoiders experiencing a large response to the nontreatment group.

14. A third degree polynomial in age is included in all regressions but coefficients are not reported.

TABLE III
AGI AND THE LENGTH OF ILLNESS

	AGI 1969		AGI 1974		Δ AGI
	AGI 1969	('69 > 50 K)	AGI 1974	('69 > 50 K)	
Medium illness	0.034 (0.031)	0.035 (0.036)	0.007 (0.028)	-0.039 (0.086)	-0.016 (0.021)
Long illness	0.053 (0.029)*	-0.009 (0.030)	-0.006 (0.026)	-0.229 (0.082)***	-0.046 (0.021)**
1969 AGI					-0.366 (0.014)***
<i>N</i>	10,887	2,371	10,763	2,538	10,399

Note. Results are from OLS regressions. Medium illness includes illness lasting hours, days, or weeks; long illness refers to illness lasting months or years. The omitted category is instantaneous death. The dependent variables are logarithms of one plus the actual dollar values. All regressions include a third-degree polynomial in age and a dummy for 1977 observations.

***denotes significance at 1% level.

**denotes significance at 5% level.

*denotes significance at 10% level.

greater than \$120,000 are observed) in the presence of an effect of illness on net worth: when those suffering from lengthy illness die with lower net worth, some of them drop out of sample. Because wealth is strongly correlated with AGI, this leads to eliminating from the sample some relatively low-AGI individuals who suffered from a lengthy illness, thereby increasing the truncated sample mean of AGI conditional on long illness. Consistent with this story, the effect disappears when the sample is restricted to those with 1969 AGI greater than \$50,000—a subsample where truncation is less important. When a similar exercise is repeated using 1974 AGI, estimates for the full sample are no longer positive and the effect of lengthy illness for the subsample of those with 1969 AGI greater than \$50,000 is large, negative, and significant. This suggests that individuals who suffered from a long illness already experienced a drop in income as of 1974. Comfortingly, the coefficient on medium illness is very close to zero: such an illness should not yet have had its onset as of 1974. The final column reports the results of regressing the change in AGI between 1969 and 1974 on the length of illness, while rudimentarily controlling for truncation by including 1969 AGI in the regression (this strategy is further discussed below). This specification again suggests that income fell by 1974 for those who suffered from a lengthy illness. Overall, the fact that 1974 AGI responds to lengthy illness but 1969 AGI does not is supportive of the length of illness containing real information. Furthermore, the difference between results

for full and restricted samples is suggestive of the presence of an effect of the length of illness on net worth that leads to selection effect due to truncation.¹⁵

II.C. First Stage—Truncation

The econometric objective is to measure the impact of terminal illness on net worth and other variables reported on tax returns. Denote by W_i the value of net worth of individual i , by D_i the indicator(s) of the length of terminal illness, and by X_i values of any other relevant control variables. I assume the relationship

$$(1) \quad \ln(W_i) = \gamma D_i + \beta X_i + \varepsilon_i,$$

and I am interested in estimating γ . Two econometric concerns need to be addressed. First, W_i is observed only if an estate tax return is filed. I observe (W_i, D_i, X_i) only when¹⁶

$$(2) \quad W_i > T,$$

where T is the threshold for inclusion in the sample (T is \$120,000 for the whole sample, but I will also consider truncating the sample at higher thresholds). As a result, this is an example of a truncated regression (the difference between this setup and a more common censored regression is that here individuals with wealth below the threshold are not observed).

Directly comparing distributions of wealth under truncation is difficult. A simple proportional effect may shift the conditional density at the truncation point up or down. One can also show that it is possible for a factor to reduce wealth and yet for the average wealth above the threshold to increase: some low-wealth individuals then fall below the threshold and are no longer used to construct the average net worth above it.¹⁷ Identification in problems with truncation is harder than in problems with censoring:

15. When AGI was decomposed into available components, similar (albeit usually insignificant) effects of long illness were present for 1974 wages but not for wages in 1969 and not for dividends and interest income.

16. When W_i is below the threshold, only W_i and D_i are not observable. All X_i 's that I rely on are present either on the income tax return or in the CWHS. I do not use this source of information.

17. A simple example illustrates it: consider a threshold of \$120,000 and two individuals with net worth of \$130,000 and \$270,000, respectively. The average net worth above \$120,000 is equal to \$200,000. Consider a ten percent decrease in net worth for both individuals. The first individual falls below the threshold, making the conditional net worth above the threshold equal to the net worth of the second person—\$243,000: the observed average net worth increases by more than twenty percent despite a ten percent drop in net worth for everyone.

the extra information about the number of people who drop below the threshold available under censoring makes it feasible to adjust for this effect (Powell 1994). Such information is not available (at least not directly) here: one does not know how many individuals with given characteristics (critically, with the given length of illness) are located below the threshold.

Second, in general, the distribution of the error term ε_i is not known. If the shape of the distribution were known, the maximum likelihood approach would be straightforward. It is well known that the upper tail of the wealth (and income) distribution has "thick tail" and it is usually well approximated by the Pareto distribution. When the set of regressors (D_i, X_i) includes only variables that are bounded (e.g., categorical variables such as gender or marital status or variables with bounded support such as age), $\gamma D_i + \beta X_i$ must be bounded as well, and therefore thick tails of W_i must correspond to thick tails of ε_i . As a result, standard approaches to Tobit-like models relying on normality or transformations to normality are unlikely to be appropriate. Most of the observables belonging to specification (1) are in fact bounded. All variables with infinite support observable on the estate tax return are potentially related to D_i and therefore should not be included. This is where the link with income tax returns is crucial. I will include income a few years prior to death in specification (1). The idea is that conditional on income (which is known to have a distribution with thick tails as well), estates may be more normally distributed. As a result, it is then possible that the normality assumption is not severely violated; in particular, $\gamma D_i + \beta X_i$ no longer needs to be bounded, because it includes regressors with full support.

This parametric assumption will be investigated further. The Pareto distribution could be an alternative parametric candidate, but despite its being a good approximation for the tails of income and wealth distributions, there is no guarantee that it describes well the overall distribution of the error terms conditional on regressors. In particular its validity for the upper tail does not imply validity at lower wealth levels. Since maximum likelihood estimates from the Tobit-style models are inconsistent when the distribution is mis-specified, I consider semiparametric techniques that impose weaker distributional assumptions.

A number of semiparametric estimators have been proposed in the literature. I apply Powell's (1986) symmetrically censored LAD and symmetrically censored least squares to make sure that

my results are not driven by the parametric assumptions. These estimators assume that the distribution of ε_i is symmetric. This is a weaker assumption than normality although it is not necessarily compatible with “thick tails.”¹⁸ These methods impose artificial truncation from above to make the distribution of error terms in the sample used in estimation symmetric. As a result, they effectively rely only on a subset of observations. The extent of this additional truncation depends on the variance of error terms and, as a result, inclusion of additional regressors increases the number of effectively used observations. Therefore, one should use them even if they can be omitted (i.e., when they are orthogonal to other regressors). Thus, it turns out that inclusion of prior income is critical also for the semiparametric approaches even though it does not appear to be correlated with the length of terminal illness.

Another possible approach is to estimate equation (1) on a subsample for which the condition (2) always holds. In such a subsample, equation (1) could be estimated by ordinary least squares. Clearly, the required condition is the selection of a subsample in a way unrelated to ε . I will rely on subsamples defined using income in 1969. Given that net worth at death is highly correlated with lifetime income, focusing on observations with high enough income reduces (though it does not eliminate) the incidence of truncation. Furthermore, directly controlling for income in equation (1) deals with a concern about the selection bias from this procedure. Results of the robustness analysis are reported in Appendix I.

There are three classes of reasons that net worth may vary with the length of illness. First, there may be factors simultaneously affecting net worth and the length of terminal illness. An example of such a factor is age: net worth is likely a function of age in the sample, due to both cohort and life-cycle effects. Observable factors of this kind can be controlled for. Unobservable factors driving the length of both illness and pre-illness net worth are a caveat to this analysis. The logarithm of 1969 income may be

18. Honore and Powell (1994)'s pairwise differenced LAD and least squares approach does not require symmetry but instead imposes independence of regressors, therefore precluding heteroscedasticity. It is computationally intensive, with a naive algorithm requiring evaluation of the objective function for each pair of observations (i.e., a computation cost of the order of n^2 ; for the more than 10,000 observations used here it requires evaluating 50 million terms). Details of an algorithm with a cost of $n \cdot \log(n)$ are available from the author; however, even with that adjustment the approach turned out too computationally burdensome.

interpreted as a measure of socioeconomic status, thereby addressing the potential bias if the length of illness and wealth were both driven by socioeconomic factors varying within this sample.¹⁹ Second, attrition from the sample may be correlated with the length of illness. As an example, suppose that individuals (or their families) with net worth slightly above the filing threshold do not realize that they are subject to the filing requirement. If those who get sick contact an estate planner, they may become informed and file a return even if they otherwise would not. The differential extent of nonfiling cannot be directly tested, but it should become less of an issue as one moves up in wealth distribution. Third, there may be a direct causal relationship between net worth and the length of illness. The maintained assumption is that it is the length of illness that causes net worth and not the other way around.

II.D. Second Stage—Incidental Truncation

Gaining insights into the nature of responses will involve analyzing information other than net worth that is available on estate tax returns. Denote a particular variable of interest by Y_i . Examples of such variables are charitable contributions, various asset holdings (stocks, bonds, life insurance, cash), and the amount of lifetime transfers. Y_i is potentially affected by the length of terminal illness as well as being affected by other control variables:

$$(3) \quad Y_i = \delta D_i + \psi X_i + \eta_i.$$

The nature of the data again does not lend itself to a simple least squares approach. First, as before, (Y_i, D_i, X_i) is only observed for individuals who file an estate tax return. Therefore, the fully specified econometric framework should involve the three equations: (1), (2), and (3). This setup is different from the common Heckman-style selection problem. What is observed is not just a binary selection indicator but the selection variable (W_i) itself. Such a framework is known as a “Tobit Type-3” or “incidental truncation” model. As pointed out by Wooldridge (2002), observability of the determinant of selection has one crucial advantage relative to the Heckman-style selection framework: identification does not require an exclusion restriction in equation (1). To see why, observe that the selection problem is due to conditioning on

19. Recall, though, that income in 1969 and the length of illness do not appear to be related.

$W > T$. When specification (3) is conditioned on $W > T$, the error term does not disappear but remains as $E[\eta|X, D, W > T]$. The standard two-step selection correction amounts to constructing this nuisance term. In the binary-selection framework, this construction relies on regressors from the first stage, and therefore identification of (δ, ψ) requires that at least one of the second-stage regressors does not underlie the construction of the correction term (unless one is willing to rely on nonlinearity of the correction term). With a Tobit-style selection equation (either censored or truncated), the observable selection indicator provides an extra source of variation that allows an additional degree of freedom in the selection correction procedure, and thus it allows identification of the parameter of interest without an exclusion restriction (see Wooldridge [2002, page 572]). This is very convenient because there is no natural exclusion restriction here.

In the main approach relied on in this paper, it is assumed that $E[\eta|D, X, W] = \alpha\varepsilon$. A sufficient condition is that (ε, η) are jointly normal, but it is a weaker requirement than that. If this is the case, the conditional mean $E[Y|D, X, W]$ is given by $\delta D + \psi X + \alpha\varepsilon$. Although ε is not observed, it can be consistently estimated using the truncated regression approach, and this estimate of the residual can be used in the second stage in place of ε . This estimate varies independent of X and D because of its dependence on W . Note that while the first stage estimation assumes normality, the second stage only requires the assumption that the conditional mean of η on regressors is linear in ε .

I also consider relaxing the parametric assumptions. I rely on three semiparametric methods. Chen (1997) and Honore, Kyriazidou, and Udry (1997) proposed two-stage estimators for Tobit Type-3 models. First, the truncated or censored selection model is estimated. I will rely on the symmetrically censored least squares estimator. In the second stage, one of the Chen (1997) estimators (referred to as “Chen #1”) and the Honore, Kyriazidou, and Udry (1997) estimator use samples restricted so that the selection term is constant.²⁰ The other of the Chen (1997) estimators (“Chen #2”) amounts to a nonparametric construction of the

20. The Chen #1 estimator uses only observations that in the first stage were lying above the regression line and for which the truncation point is below the estimated regression line. If the distribution of error terms conditional on observables is independent of observables, the selection term is then constant in this subset. Honore, Kyriazidou, and Udry (1997) rely on symmetric trimming to guarantee the same condition. Their estimator is consistent in the presence of heteroscedasticity as long as the distribution remains symmetric.

residual term. Its advantage is that it effectively brings into estimation all of the observations.

I construct standard errors by bootstrapping the whole two-step procedure 1,000 times. The final issue concerns the functional form specification. I use logarithms of net worth and AGI. This approach reduces the influence of outliers and makes it easier to assume homoscedasticity, which is implicit in a normal truncated regression. In the second stage, some variables involve a nontrivial number of observations with zero values. To incorporate them, I considered four approaches. First, in my main approach, I use the logarithm of one plus the dollar amount. Second, for variables that have a significant number of observations at zero, I assume normality and run a tobit on the whole sample using logarithms of the dependent variable censored at \$1,000.^{21,22} Third, I take the share in net worth as the dependent variable. Fourth, I run a linear probability model for the presence of the asset.

III. THE EFFECT OF ILLNESS ON NET WORTH

I begin with OLS that ignores truncation. Such results are biased toward the opposite sign and thus provide the lower bound for the extent of decrease in net worth due to longer illness. As shown in the first two columns of Table IVa, the simple regression yields a negative and significant effect of the length of illness on the size of net worth. The estimated effect is a 5%–6.5% decrease in response to a long terminal illness, depending on whether 1969 AGI is controlled for. These and all subsequent specifications include also a third-degree age polynomial and a dummy for dying after 1976.

21. The \$1,000 threshold is chosen arbitrarily. For almost all variables there are very few observations with values between \$0 and \$1,000.

22. The advantage of the first approach is that it makes no additional assumptions about the second stage error terms. In the absence of a response on the extensive margin (the presence of an asset), it has an interpretation similar to that of the standard logarithmic specification. Otherwise, it also accounts for the response on the extensive margin. Given that such a response involves a change from the logarithm of the actual dollar value to zero, while the response on the intensive margin is approximately equal to a percentage change, the extensive margin response can be measured as large even though dollar amounts are small. This potentially large weight put on the extensive response must be taken into account while interpreting these estimates. The results from the Tobit approach have the standard interpretation, but it assumes normality in the second stage. In practice, results are qualitatively and quantitatively similar, suggesting that the response on the extensive margin does not affect the first approach in a major way.

The second approach is a truncated regression model assuming normality and estimated using maximum likelihood. The results with and without controlling for 1969 AGI are shown in the second panel of Table IVa. They show a stronger effect of net worth than in the case of OLS. When previous AGI is controlled for, the estimated effect of the lengthy terminal illness is -0.18 , and it is also negative (-0.11) for the medium-term illness.

The results also show that controlling for 1969 AGI plays a significant role. The effect of a lengthy terminal illness without controlling for the 1969 income is -0.411 , and the effect of the middle-length illness is then -0.219 —these estimates are twice as big as the ones obtained when 1969 AGI is controlled for. What is the explanation of the role that AGI plays? There could be two possible reasons. It is possible that the length of illness is related to income. If that is the case, permanent income would be a joint determinant of net worth and the length of illness. This would be a reason for having 1969 AGI as a control, but it would also be discomfoting, because 1969 AGI is at best a noisy measure of permanent income, making it difficult to argue that all such influences are controlled for. Second, 1969 AGI may be relevant because its inclusion changes the distribution of the error term and the distributional assumption is embedded in the estimation method. As shown in Table IVa, the latter is most likely the case: when the length of illness variables are excluded, the coefficient on the 1969 AGI does not change, suggesting that there is no relationship between the length of illness and prior income. Inclusion of AGI affects estimated coefficients in the truncated regression specification, which indicates that this variable plays an important role in affecting the shape of the distribution of the error term.

Credibility of the truncated regression estimates rests on the credibility of the distributional assumption regarding the error term. As argued before, when net worth is studied, the normality assumption is plausible when one conditions on income but not otherwise. The results based on the truncated regression with 1969 AGI are the preferred specification. Results are robust to other approaches to truncation; details are presented in Appendix I.

Table IVb shows the results using different truncation thresholds for net worth: \$250,000, \$500,000, and \$1 million. The purpose of this exercise is to evaluate the possibility of heterogeneous responses for different net worth categories. These results are

quite stable. In particular, the normality-based truncated regression with either \$250,000 or \$500,000 threshold is only a little bit weaker than the results for everyone above \$120,000. Estimates for those above \$1 million are weaker and insignificant (but the sample is much smaller), although still negative. The last two

TABLE IVa
BASELINE SPECIFICATIONS, CONTROLLING FOR AGI 1969

	OLS		Truncated regression			
Medium illness	-0.026 (0.016)	-0.037 (0.015)**		-0.220 (0.130)*	-0.107 (0.043)**	
Long illness	-0.049 (0.015)***	-0.066 (0.014)***		-0.412 (0.127)***	-0.182 (0.040)***	
1969 AGI		0.315 (0.008)***	0.315 (0.008)***		0.971 (0.025)***	0.973 (0.026)***
<i>N</i>	10,886	10,886	10,886	10,886	10,886	10,886

TABLE IVb
VARYING TRUNCATION THRESHOLDS OF NET WORTH

	Truncated regression				
	>250 K	>500 K	>1,000 K	(120, 500]	(500, 1, 000]
Medium illness	-0.056 (0.070)	-0.050 (0.091)	-0.015 (0.200)	-0.094 (0.055)*	-0.103 (0.118)
Long illness	-0.142 (0.069)**	-0.161 (0.090)*	-0.081 (0.198)	-0.161 (0.053)***	-0.113 (0.112)
1969 AGI	1.236 (0.049)***	1.247 (0.081)***	1.327 (0.213)***	0.570 (0.056)***	0.614 (0.022)***
<i>N</i>	7,020	4,701	1,512	6,185	3,189

TABLE IVc
SPLITTING THE SAMPLE IN 1977

	Before 1977			In 1977		
	>120 K	>250 K	>500 K	>120 K	>250 K	>500 K
Medium illness	-0.120 (-0.049)**	-0.101 (-0.072)	-0.026 (0.096)	-0.058 (0.078)	0.181 (0.171)	-0.212 (0.296)
Long illness	-0.202 (0.047)***	-0.176 (0.070)**	-0.196 (0.094)**	-0.112 (0.075)	0.069 (0.167)	0.109 (0.285)
1969 AGI	1.022 (0.030)***	1.218 (0.053)***	1.188 (0.072)***	0.749 (0.044)***	1.299 (0.134)***	1.601 (0.248)***
<i>N</i>	8,737	5,733	3,922	2,149	1,287	779

TABLE IVd
OTHER DEMOGRAPHIC GROUPS

	Net worth >120 K			Net worth >500 K		
	Widowed males	Married females	Widowed females	Widowed males	Married females	Widowed females
Medium illness	-0.098 (0.082)	-0.884 (0.479)*	-0.041 (0.065)	-0.100 (0.123)	-0.232 (0.471)	0.005 (0.122)
Long illness	-0.225 (0.082)***	-1.534 (0.561)***	-0.110 (0.064)*	-0.213 (0.125)*	-0.866 (0.496)*	0.064 (0.124)
1969 AGI	0.957 (0.037)***	1.078 (0.247)***	0.989 (0.030)***	1.041 (0.081)***	1.000 (0.225)***	1.135 (0.077)***
N	2,392	286	3,399	1,121	122	1,666

Note. Unless indicated otherwise, results are based on a truncated regression model assuming normal distribution of the error terms. The dependent variable is the logarithm of net worth. Medium illness includes illness lasting hours, days, or weeks; long illness refers to illness lasting months or years. The omitted category is instantaneous death. All regressions include a third-degree polynomial in age and a dummy for 1977 observations. Except for Table IVd, the sample consists of married males only. The baseline sample consists of individuals with net worth above \$120,000. The remaining specifications include a subset of individuals with net worth in the indicated range.

*** denotes significance at 1% level.

** denotes significance at 5% level.

* denotes significance at 10% level.

columns are based on a sample artificially truncated from above, while accounting for this second layer of truncation in the likelihood function. The results indeed appear to become weaker as net worth increases, although they remain negative. One interpretation consistent with these results is that individuals with larger net worth have done more planning beforehand, so that less needs to be done shortly before death. Another possibility is that inducing the same proportional change in a large fortune shortly before death is harder than in a small one.

In Table IVc, the sample is split between the pre- and post-1976 data. As mentioned earlier, most of the observations correspond to deaths before 1977, but there are also some observations for 1977. Taxation of estates changed in 1977: the marital deduction was extended to cover at least \$250,000 (or fifty percent of adjusted gross estate, whichever was greater) and the tax-exempt amount was also increased. The extension of marital deduction was particularly important and the number of nontaxable estates among married males with net worth greater than \$120,000 increased from 5.4% among pre-1977 deaths to 72.4% in 1977 (though the marginal tax rate for nonspousal transfers often remained positive). As a result, it is likely that individuals dying post-1976 behave differently than those who died earlier. The

first panel of Table IVc shows results for the pre-1977 population, while the second panel shows results for 1977 decedents. Results prior to 1977 are very consistent with previous conclusions, in fact, they are even somewhat stronger. Estimates for 1977 tend to be more insignificant. The disappearance of response after 1976 is consistent with 1977 decedents pursuing less planning following the onset of a terminal illness due to weaker tax incentives to do so.

The caveat to the interpretation of the difference in results for the pre-1977 and the 1977 data is nonrandom sample selection. Individuals who died in 1977 are in the sample if their tax returns were filed in 1977 and not later. It may be that early filers are simply good planners and therefore there is no response. Alternatively, more complicated estates with higher net worth may be filed late, but this effect might be weaker in situations when death was expected and significant planning has already taken place. In fact, in the pre-1977 population, 21.1% of individuals were reported as having died within hours, while the corresponding number for post-1976 population is 17.8%. The gap increases to 4.9% for those with net worth above \$1 million.²³ Whether this gap is due to selection or whether it reflects a response of estates to the length of terminal illness²⁴ is, however, nontestable. The potential sample selection problem makes it difficult to study the effect of the 1976 tax reform using this dataset, and it is the reason for using the whole sample in the bulk of the analysis here. Because the pre-1977 sample also suffers from the sample selection problem due to underrepresentation of "quick filers," the potential response to the 1976 Act that varied systematically with the length of terminal illness and occurred within a few months of its implementation remains a caveat to the analysis.

Table IVd shows results from a truncated regression specification for groups other than married males. As mentioned before, there are two problems with studying other groups. First, there

23. Estates in 1977 are smaller on average: for married males with net worth above \$120,000, the average estate for those dying prior to 1977 is \$332,465, while for those dying in 1977, it is just \$280,608. Between 1976 and 1977 the inflation rate was 6%, real GDP increased by 4.5%, and the S&P 500 fell by about 4%. The average age of 1977 decedents is 70.9 years, more than two years higher than for the rest of the sample.

24. This gap is of course consistent with a stronger response of estate planning to illness in 1976 than in 1977. This is because individuals suffering from a long terminal illness should then drop out of the pre-1977 sample, thereby increasing the incidence of a short terminal illness.

is selection due to the fact that 1969 AGI is available only for a small number of women—predominantly those who have already been widowed as of 1969. Second, the number of observations is smaller. This is the result of the AGI issue for widowed women, the sheer number being small for widowed males and both reasons for married women. I show results for both the full sample and those with estates over \$500,000. There is evidence of a strong response to the length of terminal illness, with the exception for the wealthy widowed women. First, there is a very strong effect for married females, much stronger than that observed for married males. Despite the small number of observations and large standard errors, it is reaching statistical significance for the lengthy illness and it is also significant in the full sample at 10% level for the medium length illness. The effect for widowed males is very close to that estimated for married males and is again significant for the lengthy illness. There appears to be a smaller but negative effect for widowed females in the full sample but it disappears in the high net worth group.

It was assumed so far that the effect of terminal illness does not vary with age. There are reasons that it could. If the response reflects last-minute planning in reaction to a negative health shock, it should be more important for those who have not undertaken suitable estate planning before—presumably, these are predominantly younger individuals. In order to consider this possibility, I first allow the effect of terminal illness to vary with age. Specifically, I include an interaction of the terminal illness dummies with age *minus* 70 years (roughly the mean age in the sample). As a result, coefficients on illness dummies now reflect the effect for those who are exactly 70 and the interaction coefficient reflects the additional/reduced effect for an extra year of distance from age of 70. These results are presented in Table V, for both wage and AGI controls. The estimated effects at seventy are similar to those when no age-dependent effect was allowed, but there is also evidence that the effect falls with age—both interaction coefficients are significant. The presence of an age-dependent effect can be further investigated by splitting the sample into different age categories (cf. the following columns of Table V). The effects are by far the strongest for those younger than sixty, for both the lengthy and medium-term terminal illnesses. The estimated coefficient on the long illness in this age category is -0.35 , suggesting that about 35% of net worth evaporates following the onset of terminal illness in this younger group. The corresponding estimates

TABLE V
PARAMETRIC SPECIFICATIONS, CONTROLLING FOR AGI 1969 AND INTERACTION
WITH AGE

	All	All	Age \leq 60	Age \in (60,80]	Age $>$ 80
Medium illness	-0.209 (0.132)	-0.100 (0.043)**	-0.224 (0.113)**	-0.070 (0.055)	-0.063 (0.090)
Medium*(Age-70)	0.015 (0.012)	0.008 (0.004)**			
Long illness	-0.409 (0.128)***	-0.174 (0.041)***	-0.353 (0.106)***	-0.133 (0.053)**	-0.140 (0.087)
Long*(Age-70)	0.019 (0.011)*	0.008 (0.003)**			
1969 AGI		0.971 (0.025)***	1.284 (0.111)***	0.949 (0.033)***	0.889 (0.038)***
<i>N</i>	10,886	10,886	2,127	6,505	2,254

Note. The dependent variable is the logarithm of net worth. Medium illness includes illness lasting hours, days, or weeks, long illness refers to illness lasting months or years. The omitted category is instantaneous death. All specifications are estimated using truncated regression under normality assumption. All specifications include a third-degree polynomial in age and a dummy for 1977 observations.

*** denotes significance at 1% level.

** denotes significance at 5% level.

* denotes significance at 10% level.

for the older categories are on the order of -0.13 (although the effect for those over 80 is not significant). Overall these results are supportive of the presence of an effect for all groups, but with its importance falling with age.

In conclusion, results indicate that net worth as reported on tax returns fell in response to a prolonged terminal illness. The effect for illness that lasted months or years is on the order of 10%–20%, and it appears to be fairly robust across different wealth categories. The impact of illness lasting days to weeks was not always significant, but it was very consistently negative and on the order of 5%–10%. This latter category may include individuals who were sickly for much longer, with just the final onset lasting weeks or days. More likely, the response represents tax planning that takes place within a month of death. Results obtained by splitting the sample around the 1976 tax reform provide evidence consistent with tax planning. Results for different age categories are also suggestive of planning, although they do not necessarily require a tax motive. The response being even stronger for married women is suggestive of last-minute planning, given that the wife dying first is likely to be a surprise. There seems to be asymmetry in the response of widowed males and females, possibly representing gender differences in attitudes toward planning.

IV. THE SOURCE OF RESPONSE

In the previous Section, it was demonstrated that net worth at death as reported on estate tax returns responds to the indicator of the length of terminal illness. The next step is to understand the mechanism behind this response. The following discussion will be governed by two objectives. First, we would like to establish to what extent the response reflects planning and to what extent it reflects a real response of net worth. If there is evidence of a real drop in wealth, it is important to understand its source (e.g., medical expenditures, lost income). Second, we would like to discriminate between tax motivations and other reasons for adjustments such as controlling how resources are used after one's death.

A part of my strategy is to see which of the items reported on tax returns do respond. Here again, truncation is a problem. Although variables other than net worth are not directly truncated, they are observed only if net worth is above the threshold. As before, for reference, I will present the results from OLS regressions, followed by a parametric approach for the whole sample and for those with net worth above \$500,000. The parametric approach relies on the truncated regression model discussed earlier and a second stage with the determinant of selection controlled for. Appendix II shows results based on semiparametric methods.²⁵ Finally, I will refer to outside sources of information where relevant.

IV.A. Lost Income

One possible explanation for the drop of wealth following the onset of a terminal illness is lost income. The following back-of-the-envelope calculation suggests that it may be relevant: the average adjusted gross income in 1974 was \$30,000, while the average net worth at death was approximately \$330,000. Thus, disappearance of one year's income could potentially result in a reduction in net worth on the order of ten percent. What would be required for this effect to explain all of the findings is the loss of one year of income in the case of medium-length illness and two years of income for the lengthy illness—given that the medium-length illness category corresponds to illnesses lasting less than

25. Semiparametric results are shown for the full sample only. This is because they effectively rely on a small subset of data and therefore tend to be noisy in smaller samples.

a month, while the long illness category corresponds to illnesses lasting one month or more, it seems that lost income is unlikely to account for the whole effect, but it may still have played a role.

Income reported on the tax return includes not only employment-related income, but also many categories of capital income. Wages and salaries constitute at most 40% of income (depending on whether 1969 or 1974 data are used and depending on the length-of-illness category; see Table I). At least 20% of income is accounted for by dividends and interest. Given that much of the population had already been past the retirement age as of 1969, capital income is likely to constitute much of the remainder.²⁶ In fact, there is indirect evidence that this must be the case: the estimated coefficient on the 1969 AGI in the baseline specification (and many others) is remarkably close to one. This is very suggestive of the AGI simply reflecting the return on accumulated wealth.²⁷ If so, one may expect that the loss of ability to work should result in a drop in wealth much smaller than the corresponding AGI numbers would indicate.

More formal evidence is presented in Table VI. The first column shows that AGI as of 1974 does respond to the long illness. The following columns indicate that wages in 1974 are also potentially responding to the length of illness (coefficients are negative though insignificant) and that income other than wages or dividends and interest is also negatively responding.²⁸ To assess the quantitative impact of such effects, I add the log of 1974 AGI to the baseline regression. By doing so, the coefficients on the length of illness should be reduced by any effect of illness correlated with the 1974 AGI. There is evidence that the effect is somewhat attenuated: the effect of the medium-term illness falls from -0.106 in the baseline specification to -0.078 , while the effect of the long-term illness falls from -0.181 to -0.134 . These changes are not statistically significant, but it suggests that a loss of income might have played a role in the drop in wealth. However, any reason for the negative correlation of the drop in AGI between 1969 and 1974 and the length of illness would reduce these coefficients

26. Neither self-employment income nor the amount of capital gains is available in the data. The indicator for the presence of capital gains is available for 1974; 62% of returns used in the analysis have capital gains.

27. If $AGI = r \cdot \text{Net Worth}$, with r stochastic but independent of net worth, the coefficient from the regression of the logarithm of net worth on the logarithm of AGI should be one.

28. Dividend and interest income is not affected by the length of illness (not reported).

TABLE VI
IMPACT OF LOST INCOME

	AGI, 1974	Wages, 1974	Other income, 1974	Net worth	
Medium illness	-0.042 (0.026)	-0.167 (0.139)	-0.091 (0.087)	-0.107 (0.042)**	-0.185 (0.556)
Long illness	-0.085 (0.026)***	-0.174 (0.127)	-0.160 (0.084)*	-0.183 (0.040)**	-0.627 (0.507)
1969 AGI	0.912 (0.015)***	0.759 (0.060)***	0.949 (0.041)**	0.972 (0.026)***	0.949 (0.044)***
1974 AGI			0.721 (0.026)***		0.991 (0.025)**
1969 wages				-0.055 (0.004)***	-0.046 (0.007)***
1974 wages				-0.022 (0.004)***	
69 AGI*medium					0.008 (0.055)
69 AGI*long					0.044 (0.049)
69 Wage*medium					-0.005 (0.008)
69 Wage*long					0.001 (0.008)
Selection term	0.422 (0.015)***	-0.495 (0.078)***	0.821 (0.047)***		
N	10,404	10,543	8,616	10,543	10,886

Note. The results in the left panel are obtained using OLS while correcting for incidental truncation by using the residual from the first stage truncated regression under normality assumption. The dependent variable is as indicated in the table. Standard errors are based on bootstrapping the two-step procedure 1,000 times. Results in the right panel are based on a truncated regression model assuming normal distribution of the error terms. Medium illness includes illness lasting hours, days, or weeks, long illness refers to illness lasting months or years. The omitted category is instantaneous death. All regressions include a third-degree polynomial in age and a dummy for 1977 observations. The sample consists of married males with net worth above \$120,000.

*** denotes significance at 1% level.

** denotes significance at 5% level.

* denotes significance at 10% level.

when 1974 income was included. One possibility has to do with tax planning. Given the step-up in basis at death, taxpayers have a tax incentive to postpone realization of capital gains until death. In particular, they would have had an incentive not to realize capital gains following the onset of a terminal illness. As a result, this finding is also consistent with the existence of tax planning. To shed a light on this issue, I control for 1974 wages rather than the AGI and I find that there is no longer any evidence of a reduction in estimates. The results are very similar when I additionally control for 1969 wages, thereby effectively allowing a change in wages between 1969 and 1974 to enter the regression. This is inconsistent with the loss-of-income story, because a reduction in wages is the most natural manifestation of such an effect. Therefore, I conclude that the relationship of the length of illness to the drop in AGI in 1974 is most likely due to (tax) planning rather than a real drop in income, and this approach does not support the notion that a loss of income played a quantitatively important role in the drop of net worth.

An alternative approach is to interact prior (i.e., as of 1969) income with the length of illness. If the drop in wealth was really due to income loss, then, *ceteris paribus*, those with higher income should be more affected by a lengthy illness. I first allow the effect of illness to vary with the size of the AGI and find no support for the effect of this kind (penultimate specification in Table IV). Estimates have signs inconsistent with this hypothesis: those with higher AGI experienced a lower drop in net worth (estimates are insignificant, though). Given that AGI includes a large share of capital income that is unlikely to drop following the onset of illness, in the last specification I allow the effect of the length of illness to vary with wages instead and I also find that these interactions are insignificant.

In conclusion, there is no evidence that lost income is a quantitatively important explanation for the drop in net worth documented before.

IV.B. The Relevance of End-of-Life Expenditures

Another possible source of the effect on net worth could be spending that occurs shortly before death. It is possible that medical and other health-related expenses shortly before death increase. The data do not contain direct information about end-of-life expenditures. They do contain information about funeral and administrative expenses as well as information about debts, both

of which may be related to end-of-life spending. These variables will be discussed later. Given no direct information about end-of-life spending, it is informative to consult alternative sources to gauge whether it is likely that the effect on net worth that was identified reflects such spending.

The magnitude of health-related spending will depend on the presence of health insurance. I am not aware of a source of information about health insurance among the wealthy for the mid-1970s. The Survey of Consumer Finances is, however, available for 1983 and it contains the necessary questions. Among households with net worth exceeding \$210,000 of 1983 dollars (which approximately corresponds to \$120,000 in 1976), 95% had health insurance. The corresponding number for those below the age of 65 is 96%, while it is 91% for those 65 or older. Most individuals in the latter group were likely eligible for Medicare. The extent of health coverage among those younger than 65 did not vary much with the type of employment: the self-employed reported an insurance rate of 95%; the lowest rate (of 92%) was for employees of private firms with less than 100 employees. Weighting by 1983 mortality rates to more closely resemble the decedent population makes the likelihood of not having health insurance among the non-Medicare-eligible population even lower. Therefore, the wealthy population does not seem to be particularly vulnerable to high medical costs.

More direct information about end-of-life spending is available from the Health and Retirement Survey (HRS) (as well as AHEAD), which contains an "exit" stage that applies to participants of the prior waves who have died since. The results of the exit survey provide more direct information about the end-of-life expenses, as well as information about the length of terminal illness. The drawback of this data is that they apply to the 1990s (the first exit survey is available in 1995) and that there are relatively few wealthy individuals, thereby making it difficult to study the top of the distribution. Still, these data are informative for understanding how end-of-life expenses change with the length of illness, age, and wealth and for understanding whether their magnitude may explain the results.

I combined the exit surveys (i.e., surveys of families of those who have died between the waves of the survey) from 1995 AHEAD and 1996, 1998, and 2000 waves of HRS. There are 3,612 individuals in this sample, but only 303 of them had estates that exceeded \$120,000 in 1976 dollars. Of this group, 134 individuals

were married males. The end-of-life expenses were defined as the sum of out-of-pocket spending in the last two years of life on hospitals and nursing home stays, hospices, doctor bills, in-home medical care, special facilities or services, prescriptions,²⁹ and other out-of-pocket expenses.³⁰ I defined the value of the estate as the sum of reported estate, life insurance, out-of-pocket expenses, and funeral costs. The intention was to arrive at a number comparable to the estate reported on the tax return, but without a reduction for medical and funeral costs, in order to see the extent to which they matter. I also classified the reported length of terminal illness in the three length categories in the same manner as was done for the estate tax data. I concentrated on the fraction of the end-of-life expenses in the estate in order to make the magnitude of these numbers easily comparable to the estimates from the logarithmic specification.

The average share of end-of-life expenses in the estate for the whole sample was 12.4% without funeral expenses and 45.5% when funeral expenses were included. For those with estates greater than \$120,000 (of 1976 dollars), the corresponding numbers were just 1.3% and 2.8%. The total end-of-life expenses are not very sensitive to wealth: the average for those with estates below \$120,000 is \$4,000, and it is \$6,700 (all numbers in 1976 dollars) among the wealthy group, despite an increase in the average size of the estate by a factor of 35. While these are undoubtedly significant expenses for most of the population (to arrive at the current dollars they need to be multiplied by a factor of about three), they are quite small for the wealthy. These numbers may still mask heterogeneity by length of terminal illness. Indeed (again for those with estates above \$120,000), non-funeral end-of-life medical expenses were 0.2% for those dying immediately, while they were 1.6% and 1.3% for those with illnesses classified as medium or long, respectively. With funeral expenses accounted for, these numbers increase to 1.5%, 3%, and 2.8%, respectively. When the sample is restricted to married males, conclusions are very similar. Medical expenses due to a medium or long illness

29. The question about out-of-pocket prescription costs was asked in terms of the *average monthly* spending of this kind in the last two years of life. Some answers to this question were on the order of a few thousand dollars, possibly reflecting total rather than average spending. Nevertheless, I take them at face value and multiply by 24 to arrive at the final figure. These results are therefore likely to be an overestimate.

30. The wording of the question about other out-of-pocket expenses suggested including anything health-related that was not previously listed.

are 1.3% and 1.2%, respectively (they are slightly lower than the average for the whole group, consistent with the possibility that a lot of care for married males was provided by spouses). The end-of-life expenses with funeral costs accounted for are 1.4% for instantaneous deaths, 2.6% for medium-length, and 3% for lengthy illnesses.

The number of wealthy individuals in AHEAD/HRS is small and these surveys by design did not include young individuals. Hence, the analysis of the wealth gradient with respect to illness by age categories is difficult. To get some idea of the importance of age, I split the sample into two categories: those below the age of 75 (40 married males) and those above that age (86 married males). Medical costs associated with a lengthy illness for the "young" individuals were 1.8% on average and they were 0.9% for the older group. When funeral expenses were accounted for, these costs were 4% for the younger group and 2.6% for the older one. The medical costs for the instantaneous category were zero in all cases and funeral expenses were 1.8% for the younger group and 1.0% for the older one.

Overall, this suggests that a lengthy illness was more costly for younger individuals, but there is no evidence that these costs were even remotely close to the numbers estimated in the estate tax sample. These numbers show a bit of a gradient in medical expenses with respect to the length of illness in the wealthy category, but the effect is on the order of 1%–2%. Even the most generous interpretation, under which funeral expenses are paid out of (and deducted) from the reported estate when illness is instantaneous and they are prepaid when it is not, would not produce numbers greater than 4% as the effect of terminal illness.

Other than the data being from a different period than the estate tax data analyzed in this paper, a few additional caveats apply. First, values of estates reported in the survey data are likely higher than the value of estates reported on the tax returns. By making the denominator larger, this effect reduces the importance of end-of-life expenses. However, the inclusion in the wealthy sample depends on the estate being larger than a threshold, and given low sensitivity of end-of-life expenses to wealth, this effect would offset the former one. In fact, when the same calculations were repeated with all estates reduced by 30%, the average share of end-of-life expenses for those with the *reduced* estate above \$120,000 in 1976 dollars was in each case within 0.2% of the previous results. Second, one may expect that survey

responses to the question about the length of terminal illness may be of higher quality than answers on the estate tax return. If so, end-of-life expenses in AHEAD/HRS should show a steeper gradient by the length of illness than the corresponding effect estimated from the estate tax data. Therefore, the lack of a strong gradient in the survey data makes it unlikely that it drives the estimated drop in estates. Third, survey data contain a noisy measure of the end-of-life expenses, though neither the presence nor the direction of the bias is obvious.

I conclude that it is very unlikely that end-of-life expenditures could explain the drop in net worth, because they are an order of magnitude lower than the estimated effects. Contrary to my estimates, the end-of-life expenditures also don't show a steep age gradient, and their importance appears to be significantly falling with wealth, inconsistent with the stability of estimates by wealth categories.

IV.C. Precautionary Saving

In order to understand the source of responses, I turn next to other information observable on tax returns. Another potential explanation for the drop in wealth can be the presence of a strong precautionary motive. The idea is that individuals do not have a desire to hold on to wealth by itself, and they do not have a strong desire to leave a bequest, but rather they save to insure themselves against adverse income realizations or consequences of health shocks. It is by now well established that the precautionary motive works fairly well as an explanation of wealth holding for most of the population (Hubbard, Skinner, and Zeldes 1995; Dynan, Skinner, and Zeldes 2002; Scholz, Seshadri, and Khitatrakun 2006). This model does not explain well, however, the upper tail of the wealth distribution (De Nardi 2004; Scholz, Seshadri, and Khitatrakun 2006).³¹

Top wealth-holders leave behind fortunes that could not have been consumed in a realistic lifetime and with realistic

31. Scholz, Seshadri, and Khitatrakun (2006) find that the life-cycle model is not able to explain wealth at the top of the distribution, even though it fits the rest of the distribution remarkably well. The extent of the discrepancy seems to be related to subjective bequest probabilities. Kopczuk and Lupton (2007) model wealth distribution as a mixture of life-cycle savers and bequeathers and find support for the presence of a bequest motive. Their estimates imply that the bequest motive accounts for as much as 50% of the ultimately bequeathed wealth, driven by the very top of the distribution. Its quantitative implications at low levels of wealth are negligible though.

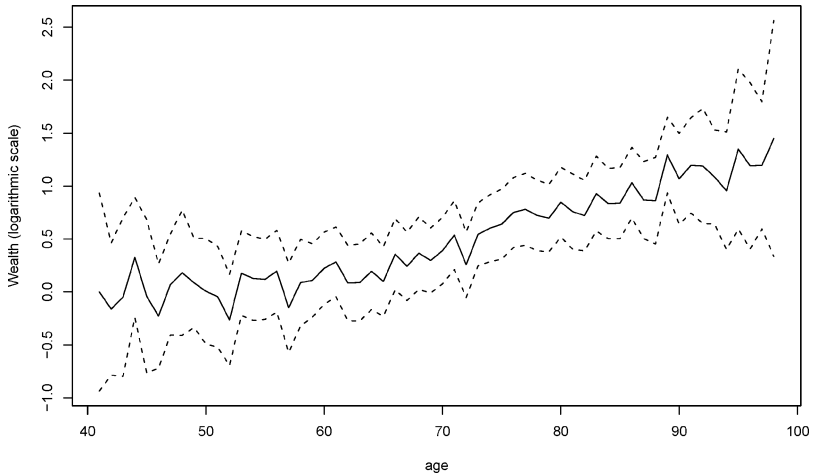


FIGURE I
Estimated Age Profile

consumption patterns (Carroll, 2000). Still, for the sake of argument, suppose that wealth holdings of the rich considered here were in fact driven by precautionary motivations with no independent bequest or wealth motivations. A drop in wealth following the onset of a terminal illness could then correspond to a number of effects. It could reflect medical expenses or it could reflect lost income. As discussed above, these possibilities have little support in the data. Second, it could reflect a reallocation of consumption in response to an increase in the effective discount rate occurring when mortality risk rises. While it may not be easily dismissed using this data, it is hard to believe that people go on spending binges on their deathbeds. As will be discussed in a little bit more detail below, one prediction of such behavior should be an increase in “consumption” goods observed on the estate tax return (such as funeral spending) and also an increase in debts. Previewing this discussion, there is no support in the data for either.

An additional piece of evidence is presented in Figure I that shows the estimated age profile based on the baseline regression presented in Table IVa, but with a single-year age effect rather a polynomial in age (the estimated coefficient on the medium-term illness is -0.10 , and the coefficient on the long-term illness is

-0.17).^{32, 33} The graph shows estimated age coefficients and two-times-standard-error bands. The average value of the age effect for people in their fifties is -0.82, while the average value for people in their nineties is 0.32, corresponding to an increase of 214% or 2.9% per year (over forty years).

It should be stressed that these are cross-sectional results. For one thing, they cannot distinguish between cohort and age effects, but it is natural to expect that the cohort (i.e., year-of-birth) effects were growing over time with economic development and, therefore, that the estimated slope of the age-profile is downward biased. Similarly, tax avoidance is likely to increase with age, hence providing another source of downward bias. If longevity is influenced by wealth or both are influenced by a third factor, this would contribute to the presence of an increasing age profile. For this to be the case, the effect would have to be present *within* the group of the wealthy and the magnitude of such an effect would have to be large to explain the 3% increase in wealth associated with an extra year of life. Furthermore, such selection effects would have to continue (or even strengthen) until very old age to explain the continuing increase in wealth. This is not very likely.³⁴ Also, selection on mortality would have to be present conditional on AGI, which is controlled for here. These cross-sectional patterns suggest that net worth is increasing with age up until the age of 98. Taken at face value, these patterns would be hard to explain using the standard pure life-cycle model, whether it includes significant uncertainty and thereby a precautionary motive or not. A possibility of this kind that cannot be easily dismissed is the “peso” problem, where individuals save for an event that may occur with very low probability (such as financing a “miracle cure”), possibly even never occurring in a finite sample. This kind

32. This truncated regression is conditional on adjusted gross income in 1969, as elsewhere in the paper. The truncated regression without controlling for income shows an even stronger increasing age profile but the assumption of normality of the error terms is unrealistic in that case. One way of interpreting these results is as reflecting pure accumulation of preexisting wealth stock, with any new savings out of income controlled for by the AGI. The upward sloping pattern is also present in the simple OLS (although not as steep).

33. These results are based on the truncated regression specification that assumes normality and homoscedasticity of error terms. The age profiles based on semiparametric specifications that only assume symmetry of the distribution of error terms and allow for heteroskedasticity show a very similar pattern.

34. An appendix to the NBER working paper version of this work contains calculations indicating that even as much as halving the mortality rates in response to doubling wealth *within the sample of the wealthy* would not be enough to produce this pattern.

of motive is hard to distinguish from the utility of holding onto wealth and it is probably better thought of as an example of it rather than a more standard precautionary motive.

Figure I casts doubt on whether consumption considerations are important for wealth accumulation of the rich (with a caveat due to a possible mortality gradient). Instead, what one needs is a framework that allows for the utility from wealth, the utility from bequests, or both. The message of this paper is that both are necessary to make sense of the data.

IV.D. Lifetime Transfers and Taxable Gifts

Lifetime transfers that occurred in anticipation of death or that were incomplete in the sense of decedent retaining some control over assets (such as veto power) are subject to estate taxation and reported on Schedule G—"Transfers During Decedent's Life"—attached to the return. Prior to 1977, transfers of property made within three years of death were assumed to be in contemplation of death and were subject to taxation (McCubbin 1994; Luckey 1995). Schedule G also includes transfers that were not intended to take place until death and those for inadequate consideration.

Schedule G does not by itself represent tax avoidance and assets reported on it are subject to the same tax treatment as assets reported elsewhere on the tax return. While such transfers occur prior to death of the taxpayer, they remain subject to the estate tax as an anti-avoidance measure. Their presence does, however, indicate that active planning for the disposition of estate took place. Furthermore, as discussed in footnote 35, tax motivated adjustments shortly before death are likely to increase the size of Schedule G as a by-product. An estate of an individual who pursues any planning following the onset of a terminal illness would therefore most likely show a response on Schedule G.

Summary statistics reported in Table I are suggestive of the presence of a response: the average size of Schedule G and the fraction of estates with this schedule are approximately 80% larger among those who suffered from a lengthy illness relative to those who died instantaneously. I investigate more formally the effect of illness on transfers reported on Schedule G in Table VII. I analyze the value of Schedule G, its presence, and its share in total net worth. The simple OLS specification reveals a relationship between the size, presence, and share of Schedule G and the length of terminal illness. Controlling for incidental truncation turns out

TABLE VII
SCHEDULE G AND GIFTS

	Value of Schedule G				Presence of Schedule G				Share of Schedule G				Prior gift tax return				
	All				Net wth. > 500 K				All				All				
	OLS	Log	Tobit	Tobit	OLS	Log	Tobit	Tobit	OLS	All	> 500 K	All	OLS	All	> 500 K	All	
Medium illness	0.149 (0.099)	0.093 (0.106)	0.698 (0.275)**	0.501 (0.368)	0.014 (0.010)	0.247 (0.192)	0.501 (0.368)	0.014 (0.010)	0.018 (0.016)	0.010 (0.010)	0.018 (0.016)	0.008 (0.004)*	0.008 (0.004)*	0.006 (0.004)	0.014 (0.009)*	-0.006 (0.010)	-0.017 (0.025)
Long illness	0.745 (0.102)***	0.652 (0.108)***	2.092 (0.257)***	1.107 (0.348)***	0.071 (0.010)***	0.571 (0.186)***	1.107 (0.348)***	0.071 (0.010)***	0.053 (0.016)***	0.064 (0.010)***	0.053 (0.016)***	0.021 (0.004)***	0.021 (0.004)***	0.019 (0.004)***	0.013 (0.008)*	-0.004 (0.010)	-0.021 (0.011)*
1969 AGI	0.478 (0.040)***	1.001 (0.057)***	-1.021 (0.130)***	1.259 (0.286)***	0.040 (0.004)***	0.782 (0.181)***	1.259 (0.286)***	0.040 (0.004)***	0.040 (0.014)***	0.080 (0.005)***	0.040 (0.014)***	0.016 (0.002)***	0.016 (0.002)***	0.030 (0.002)***	0.033 (0.009)***	0.083 (0.004)***	0.176 (0.006)***
Selection term	0.799 (0.067)***	0.799 (0.067)***	-1.499 (0.151)***	0.478 (0.248)***	0.062 (0.006)***	0.478 (0.153)***	0.478 (0.248)***	0.062 (0.006)***	0.021 (0.012)*	0.062 (0.006)***	0.021 (0.012)*	0.022 (0.003)***	0.022 (0.003)***	0.020 (0.008)***	0.020 (0.008)***	0.143 (0.006)***	0.158 (0.013)***
N	10,886	10,886	10,886	4,701	10,886	4,701	4,701	10,886	4,701	10,886	4,701	10,886	10,886	4,701	9,866	9,866	4,310

Note. The dependent variable is either the logarithm of one plus the dollar value of the respective variable, the share of the given variable in net worth, or a dummy for the nonzero value, as indicated. Medium illness includes illness lasting hours, days, or weeks; long illness refers to illness lasting months or years. The omitted category is instantaneous death. The sample consists of married males with net worth above \$120,000. The "Log" specifications correct for incidental truncation by using the residual from the first stage truncated under normality assumption. The "Tobit" specifications introduce artificial censoring at log(1000). Reported standard errors (other than OLS) are based on 1000 bootstrap replications.

*** denotes significance at 1% level.
 ** denotes significance at 5% level.
 * denotes significance at 10% level.

to be important—the selection term (residual from the first stage) is highly significant in each case—but it has little impact on the effect of terminal illness (although it does affect the estimates of the impact of prior income). Estimates are very similar for the full sample and when the sample is limited to those with net worth greater than \$500,000. They are also robust to semiparametric approaches to correcting for the incidental truncation problem presented in Appendix II. The effect of illness on Schedule G is also clear in the linear probability models of the presence of Schedule G and when the share of Schedule G in the total net worth is used as a dependent variable. There is robust evidence of transfers qualifying for Schedule G being extensively made following the onset of terminal illness.

By itself, the presence of this kind of response demonstrates that taxpayers are actively responding to the signal about their mortality. Arguably, evidence of increased sheltering provides support simultaneously for enjoyment of wealth and bequest motivation. The presence of this type of response demonstrates that the planning horizon is in fact longer than the lifetime. There is no reason to engage in these types of transfers if the person was driven by life-cycle considerations only. Similarly, it is also inconsistent with the pure wealth as status model (Carroll 2000), although evidence of a major increase in Schedule G assets is consistent with the possibility that taxpayers have a hard time parting with their assets before death (despite having a longer horizon). Evidence of the presence of this type of response provides a weak indication of the importance of nontax motives. These transfers are still subject to taxation. Therefore, superficially, one may be tempted to conclude that they must be driven by nontax considerations. However, legal tax avoidance that involves transfers to others shortly before or at death in many cases would leave a trace on the Schedule G.³⁵ Furthermore, since the presumption that gifts were made

35. Many trust instruments involve a transfer from the taxpayer to the trust. A popular example is an irrevocable life insurance trust that is intended to exclude the proceeds of a policy from the estate. Private annuities discussed by Cooper (1979) may involve a transfer if not fairly priced. Disposing of stocks by a majority shareholder at or before death, in order to reduce holdings to a minority position and therefore qualify for a minority discount, may involve a direct transfer. A transfer of an asset to a family limited partnership in exchange for a minority interest (with associated minority discount; see Schmalbeck [2001, p. 133] for an example) and retained right to interest or use would be included on Schedule G. Proceeds of buy-out agreements to be executed at death (popular at that time, Kahn [1969]) may also have been reported on Schedule G. A non-estate-tax reason for Schedule-G transfers may be an attempt to avoid probate.

in anticipation of death can be challenged, one might have chosen to make a transfer shortly before death, counting on its exclusion from estate. Given that this strategy may be successful, one would expect that it should be pursued and therefore that Schedule G should respond.³⁶

An obvious place to look for evidence of attempts to exploit differential tax treatment of gifts and estates is taxable gifts. Unfortunately, since gift and estate taxes were operated independently prior to 1977, the data do not contain information on the size of taxable gifts. They do contain, though, an indicator for the presence of a gift tax return. The problem with this variable for the purpose of studying estate tax planning is that it does not respond to giving by individuals who had made taxable gifts in the past. It is, however, the only measure available in the data. In the last panel of Table VII, I regress this indicator on the length of terminal illness. It has been argued (McGarry 1999; Poterba 2001) that potential estate taxpayers do not take advantage of the annual exemptions from gift taxation and tax-preferred treatment of gifts. Joulfaian (2004) has demonstrated, though, that giving is very responsive to tax considerations by showing a very strong increase of taxable gifts in 1976, in response to a gift tax increase embedded in the Tax Reform Act of 1976.

There is no evidence of a response of gifts following the onset of a terminal illness. If anything, estimated coefficients are negative. However, gifts made in anticipation of death are added back to the estate and therefore they lose their advantageous tax status if made shortly before (expected) death. The negative coefficient could be consistent with increased giving by those dying instantaneously, who could have expected to benefit from making gifts prior to 1977: as Joulfaian (2004) documented, there was a surge in gifts in 1976, and, given the three-year rule, these gifts were likely made by people not expecting to die right away. This

36. This presumption could be challenged by showing that the gift was motivated by lifetime considerations, and it was modified by the 1976 Act to automatically include such gifts in the estate unless they were lower than \$3,000. This requirement was in effect since 1916 and was further significantly modified in 1981 (Luckey 1995). Pavenstedt (1944) reported that the government was winning 40% of the challenges. The case of *Estate of Brownell v. Commissioner* (Docket No. 17440-80., United State Tax Court, T.C. Memo 1982-632; 1982 Tax Ct. Memo LEXIS 118; 44 T.C.M. (CCH) 1550; T.C.M. (RIA) 82632, October 27, 1982) is an example of a successful challenge applying to a gift made four months before death by a 97-year-old decedent dying in 1976. This particular finding relied on relatively small size of the gift (1% of estate), established policy of making gifts, and "decedent son's testimony that he believed his mother to be in good health at the time when gifts were made."

effect is, however, very weak and not present for those with higher wealth.

As a result, it seems that, following the onset of a terminal illness, taxpayers did not pursue tax planning by exploiting the difference in the tax treatment of gifts and estates. This would have been a difficult strategy, given that one would have to claim that the estate would have to, *ex post*, challenge the presumption that transfers made shortly before death were not in anticipation of death. Nevertheless one could *a priori* imagine aggressive planning of that nature, especially given the tax advantage of *inter vivos* gifts due to both lower rates and the lack of integration of gift and estate taxation pre-1977. Were the challenge unsuccessful, such gifts would show up on Schedule G, consistent with the observed effect. However, if this strategy was indeed pursued, it should have been successful with some positive probability. The lack of response of *inter vivos* gifts casts doubt on this possibility. Instead, findings regarding the responsiveness of Schedule G and no response of gifts suggest that taxpayers did make transfer decisions following the onset of a terminal illness, but that these decisions did not necessarily involve outright transfer of ownership before death.

IV.E. Administrative and Funeral Expenses

The dataset contains information about administrative and funeral expenses. These two types of expenses are combined in a single category, which is somewhat unfortunate, because each type separately could reveal different reasons for taxpayers' behavior. Tabulations based on the internal IRS data presented in Bentz (1994) do split these two categories for 1983 data. Administrative expenses are four times as big as funeral expenses for the sample as a whole. The filing threshold in that year was \$300,000; adjusting for a 75% inflation factor between 1976 and 1983, it corresponds to \$171,430 in 1976 dollars. The average funeral deduction was \$5,400, while the average administrative expenses were \$19,860. The funeral deduction number is very much in line with funeral costs for wealthy individuals in the AHEAD data. Funeral deduction and administrative expenses are split about equally in the lowest, \$300,000 to \$500,000, category and the relative importance of administrative expenses grows very quickly with net worth.

Funeral expenses are one of very few "consumption" expenditures reported on the tax return. Assuming that this is a normal

good, a negative response of funeral costs would therefore be consistent with a real wealth shock experienced by the individual as a result of the terminal illness. Administrative expenses, on the other hand, include executors' commissions and attorneys' fees: these types of expenses could respond positively if a taxpayer puts in place instructions that increase legal costs during administration. Most likely, however, the extra time available planning allows reducing ambiguity and uncertainty regarding intentions of the decedent. As a result, it would be natural to expect a reduction in expenditures for administering the estate. Table VIII shows that administrative and funeral expenses are significantly and negatively affected by a lengthy terminal illness. The point estimates hover around a 20% drop in such expenses in the case of a lengthy illness when the whole population is considered, with almost the same effect for the medium-length illnesses. The results are weaker for the wealthier individuals—the point estimates are still negative and nontrivial, but much less significant. As explained above, this is consistent both with a real wealth shock if the response is due to funeral costs³⁷ and with more efficient planning.

The extra time for planning should be relevant mostly for individuals who have not prepared plans for distributing their estates. If this is the right explanation for the responsiveness of funeral and administrative expenses, one might expect that the response to the length of terminal illness falls with age. To test it, I present results for different age groups (second part of Table VIII). Indeed, there is a clear pattern that the strength of the response is age-dependent. The response is strongest for individuals younger than 60, for whom terminal illness leads to a drop in administrative expenses by more than 40%. Estimates for other groups are, however, still large and significant. Concluding, the data on administrative and funeral expenses is consistent with terminal illness, providing an opportunity for planning.

IV.F. Debts

Taxpayers experiencing high medical expenses may finance them out of their own wealth or by using debt. It is natural to expect that debt would respond if assets were illiquid. The last panel of Table VIII shows the corresponding results: there is little

37. The response of funeral costs deduction may also reflect prepayment of funeral expenses.

TABLE VIII
FUNERAL EXPENSES AND DEBTS

	Funeral and administrative expenses							Debt deduction		
	OLS	All	> 500 K	Age ≤ 60	(60,80]	Age > 80	OLS	All	> 500 K	
Medium illness	-0.195 (0.045)***	-0.260 (0.059)***	-0.096 (0.091)	-0.230 (0.115)**	-0.245 (0.078)***	-0.289 (0.145)**	-0.065 (0.114)	-0.176 (0.134)	0.145 (0.173)	
Long illness	-0.160 (0.039)**	-0.267 (0.051)***	-0.138 (0.091)	-0.420 (0.106)***	-0.193 (0.068)***	-0.325 (0.140)**	-0.008 (0.108)	-0.192 (0.126)	0.156 (0.165)	
1969 AGI	0.272 (0.017)***	0.878 (0.030)***	0.911 (0.082)***	1.035 (0.104)***	0.892 (0.039)***	0.774 (0.058)***	0.755 (0.043)***	1.799 (0.061)***	1.785 (0.122)***	
Selection term		0.924 (0.024)***	0.774 (0.045)***	0.825 (0.045)***	0.942 (0.032)***	0.954 (0.063)***		1.593 (0.057)***	1.321 (0.069)***	
N	10,886	10,886	4,701	2,127	6,505	2,254	10,886	10,886	4,701	

Note. The dependent variable is the logarithm of one plus the dollar value of the respective variable. Medium illness includes illness lasting hours, days, or weeks; long illness refers to illness lasting months or years. The omitted category is instantaneous death. The sample consists of married males with net worth above \$120,000. Reported standard errors (other than OLS) are based on 1000 bootstrap replications.

*** denotes significance at 1% level.

** denotes significance at 5% level.

* denotes significance at 10% level.

evidence that debts do increase. Estimates are imprecise, and their magnitude is not robust to semiparametric approaches. With no exceptions, they are insignificant. Point estimates are negative for the whole sample and positive for those with net worth greater than \$500,000, even though one would expect that illiquid assets are more of an issue for those with lower net worth. Alternatively, these results are also consistent with binding liquidity constraint.

IV.G. Charitable Bequests

Charity has high wealth elasticity and therefore it is natural to expect that a reduction in real net worth would lead to a decrease in charitable contributions. On the other hand, it is deductible for both income and estate tax purposes. A deduction for income tax purposes provides an incentive to contribute while alive. Some popular tax avoidance schemes (such as charitable lead/remainder trusts) involve charitable contributions, and according to Cooper (1979), they were well-known in the 1970s. The results are reported in Table IX. A few different measures are considered: the presence of charity, its share in net worth, and the total amount. There is no evidence of a response when the full sample is considered, but a different conclusion emerges when one looks at high-net-worth individuals. In the higher wealth group, there is in fact evidence of a significant drop in charity.³⁸ In principle, this is consistent with both tax avoidance and a drop in net worth stories. However, the fact that a stronger response is present for higher-net-worth individuals is suggestive of tax avoidance.

IV.H. Composition of Estates

Further insights can be drawn from the composition of estates. These results are displayed in Table X.³⁹ Assets in most categories fall with the length of a terminal illness at the magnitude comparable to that of net worth drop and the results are fairly similar for both the full sample and higher-net-worth individuals. There are a few notable exceptions though. First, the largest effect in the full sample is observed for farms and non-corporate business assets: the estimated coefficient on a lengthy

38. Charitable transfers are more common among the wealthier individuals. Only 7% of individuals with net worth in the 120,000 to 500,000 range make them, compared to 19% of those with net worth above \$500,000.

39. Three categories of assets, life insurance, annuities, and mortgages/notes, are omitted from the table, but results are available from the author.

TABLE IX
CHARITY

	Presence						Share						Value							
	All		>500 K		OLS		All		>500 K		OLS		All		Tobit		Log		Tobit	
	OLS	All	>500 K	OLS	All	OLS	All	All	>500 K	OLS	All	Log	Tobit	Log	Tobit	Log	Tobit	Log	Tobit	
Medium illness	-0.006 (0.008)	-0.010 (0.009)	-0.027 (0.019)	0.001 (0.002)	0.0007 (0.002)	-0.003 (0.004)	0.0007 (0.002)	-0.066 (0.073)	0.153 (0.268)	-0.019 (0.068)	-0.066 (0.073)	0.153 (0.268)	-0.333 (0.222)	0.153 (0.268)	-0.333 (0.222)	-0.333 (0.222)	0.153 (0.268)	-0.333 (0.222)	0.153 (0.268)	-0.545 (0.381)
Long illness	-0.003 (0.008)	-0.010 (0.008)	-0.031 (0.018)*	0.002 (0.002)	0.001 (0.002)	-0.003 (0.004)	0.001 (0.002)	-0.075 (0.067)	0.386 (0.248)	0.003 (0.064)	-0.075 (0.067)	0.386 (0.248)	-0.405 (0.206)**	0.386 (0.248)	-0.405 (0.206)**	-0.405 (0.206)**	0.386 (0.248)	-0.405 (0.206)**	0.386 (0.248)	-0.602 (0.363)*
1969 AGI	0.032 (0.003)***	0.069 (0.004)**	0.170 (0.017)**	0.003 (0.0006)**	0.007 (0.001)**	0.031 (0.005)**	0.007 (0.001)**	0.792 (0.044)**	-0.420 (0.123)**	0.351 (0.025)**	0.792 (0.044)**	-0.420 (0.123)**	2.234 (0.222)**	-0.420 (0.123)**	2.234 (0.222)**	2.234 (0.222)**	-0.420 (0.123)**	2.234 (0.222)**	2.234 (0.222)**	3.431 (0.284)***
Selection term		0.056 (0.005)**	0.122 (0.012)**		0.006 (0.001)**	0.026 (0.004)**	0.006 (0.001)**	0.672 (0.046)**	-0.878 (0.152)**		0.672 (0.046)**	-0.878 (0.152)**	1.638 (0.140)**	-0.878 (0.152)**	1.638 (0.140)**	1.638 (0.140)**	-0.878 (0.152)**	1.638 (0.140)**	2.440 (0.182)**	2.440 (0.182)**
N	10,886	10,886	4,701	10,886	10,886	4,701	10,886	10,886	10,886	10,886	10,886	10,886	10,886	10,886	10,886	10,886	10,886	10,886	4,701	4,701

Note. The dependent variable is either the logarithm of one plus the dollar value of the respective variable, the share of the given variable in net worth, or a dummy for the non-zero value, as indicated. Medium illness includes illness lasting hours, days, or weeks; long illness refers to illness lasting months or years. The omitted category is instantaneous death. The sample consists of married males with net worth above \$120,000. The "Log" specifications correct for incidental truncation by using the residual from the first stage truncated under normality assumption. The "Tobit" specifications introduce artificial censoring at log(1,000). Reported standard errors (other than OLS) are based on 1,000 bootstrap replications.

*** denotes significance at 1% level.
 ** denotes significance at 5% level.
 * denotes significance at 10% level.

terminal illness is -0.46 in the baseline specification.⁴⁰ This effect is no longer present when one looks at those with estates greater than \$500,000. Results from a linear probability model for the presence of farm or non-corporate business assets show that, again for the full sample only, that there is a response on the extensive margin as well. This suggests that small businesses are sold or transferred *inter vivos* to children following the onset of a terminal illness of the owner. Estates of 3,181 of 10,886 individuals in the sample include farm or noncorporate business assets, but only 75 of them report all or part of it on the Schedule G. This lends little credence to the transfer hypothesis and suggests that small businesses may be in fact sold or scaled down even before death of the principal owner. This effect is no longer present for those with estates over \$500,000, roughly corresponding to the 2005 estate tax threshold, suggesting that while the effect of the estate tax on the survival of businesses might have been an issue in the past, it is much less of a concern at the current estate tax threshold.

Second, there is a strong effect on the “household goods and other assets” category, although it becomes much weaker for larger estates. This asset category is based on the items reported on Schedule F, “Other Miscellaneous Property,” that could not be included in other categories. Specific types of property that are listed on the tax form are jewelry, furs, paintings, antiques, rare books, and coins and stamps. This item also includes household goods. One would expect that such types of assets may be relatively easy to distribute by the taxpayer before his death or by others after taxpayer’s death.

Third, there is no clear evidence that taxpayers tap into liquid sources first: neither cash nor bonds appear to respond disproportionately strongly. The same findings do not indicate that tax evasion was pursued on a major scale: one would expect that it should be very easy to hide cash from tax collectors yet cash does not appear to be responding more strongly than other categories of assets. It is still possible that there is rampant tax evasion with other types of assets exchanged for cash so that, if not for evasion, cash holding would have increased significantly. This possibility is hard to verify using these data.

40. The estimate is -0.27 in the Tobit specification. For the remaining variables in Table X the frequency of zero values is relatively minor, and the results from Tobit specifications are similar to those presented.

TABLE X
COMPOSITION OF NET WORTH

	Farm and noncorporate business assets							Household and other goods	
	Value			Presence					
	All	>500 K	All	>500 K	Real estate	Stocks	Bonds		Cash
Medium illness	-0.127 (0.155)	0.345 (0.240)	-0.014 (0.016)	0.035 (0.022)	-0.096 (0.124)	-0.276 (0.161)*	-0.348 (0.159)**	-0.115 (0.067)*	-0.155 (0.084)*
Long illness	-0.509 (0.142)***	0.113 (0.232)	-0.049 (0.015)***	0.013 (0.020)	-0.165 (0.117)	-0.364 (0.151)**	-0.196 (0.151)	-0.196 (0.066)***	-0.322 (0.083)***
1969 AGI	1.080 (0.072)***	1.258 (0.192)***	0.090 (0.007)***	0.087 (0.016)***	0.370 (0.059)***	2.930 (0.072)***	2.251 (0.071)***	0.601 (0.031)***	0.912 (0.042)***
Selection term	1.933 (0.072)***	1.350 (0.145)***	0.179 (0.007)***	0.102 (0.013)***	1.319 (0.069)***	1.741 (0.079)***	1.247 (0.081)***	0.563 (0.038)***	0.825 (0.046)***
N	10,886	4,701	10,886	4,701	10,886	10,886	10,886	10,886	10,886

Note. The dependent variable is the logarithm of one plus the dollar value of the respective variable or a dummy for the nonzero value, as indicated. Medium illness includes illness lasting hours, days, or weeks; long illness refers to illness lasting months or years. The omitted category is instantaneous death. The sample consists of married males with net worth above \$120,000. Reported standard errors (other than OLS) are based on 1,000 bootstrap replications.

*** denotes significance at 1% level.

** denotes significance at 5% level.

* denotes significance at 10% level.

Corporate stock appears to respond more strongly than other categories of assets. This may seem surprising in light of the presence of a step-up at death for capital gains tax purposes, but the mid-1970s were a period of weak stock market and accumulated capital gains may have been less of a concern.⁴¹ Furthermore, this is the category that includes closely held corporations⁴² that allow for most aggressive tax-motivated adjustments.

V. CONCLUSIONS

The finding of a response of net worth to the lengthy illness is robust to many different specification checks: similar results were obtained using a normal-distribution-based truncated regression, semiparametric approaches, and by restricting the sample to those with high 1969 income so that truncation of the sample is less of an issue (this is discussed in more detail in Appendix I). There is evidence that the effect becomes weaker but does not disappear with age and the size of net worth. The main analysis was performed on the sample of married males, but similar effects are present for widowed males, and the response seems stronger for married females. Results for widowed females are weaker. The effect is also stronger prior to 1977, when effective tax rates were reduced for most of the sample.

A few findings about items reported on the tax return stand out. First, there is a very strong response of lifetime transfers: items that still need to be reported on the tax return but no longer belong to the decedent, either because they were transferred outright shortly before death or because the transfer took effect at death. Second, administrative and funeral expenses fall with a lengthy illness, and while this effect is present for everyone, it is particularly pronounced for younger individuals. Third, debts do not appear to be increasing. Fourth, most categories of assets do fall with a lengthy illness, with the strongest effect for farm and noncorporate business assets (for smaller estates), corporate assets, and the household goods/other goods categories.

41. In fact, subject to the caveats about splitting the dataset in 1976, the response is stronger for 1977, when S&P 500 fell, than in 1976, when it increased.

42. Among those with net worth above \$120,000, estates of 1.5% individuals (accounting for weights) were classified as including a closely held corporation (the value is not available). This is an edited variable and the number is small relative to other data published by SOI. For example, estates of 13.7% dying in 1989 included closely held stock (Johnson 1994). It is also possible that the difference is due to different tax incentives to incorporate in 1976 and 1989.

Fifth, charitable contributions of the wealthy fall (because charity is deductible for income tax purposes, an individual planning ahead is better off by contributing while alive).

These results indicate that there are significant adjustments made to the estate in the period shortly before death. I argued that the large scale of changes in net worth makes it difficult to explain them by medical or funeral expenses. In particular, I relied on the data from AHEAD/HRS exit surveys to show that these types of expenditures are relatively unimportant for the wealthy. I tested whether any loss of income due to terminal illness played a quantitatively important role in reduction of net worth and rejected this hypothesis. No evidence of increased indebtedness further suggests that there are no major liquidity problems and suggests that there is no major real net worth shock. There is some evidence that a lengthy illness caused a decline in taxable income two years before death, but the effect on wages is not particularly strong and other income also responds. One possibility is that taxpayers delay realizing capital gains to benefit from the step-up in basis. Instead, there are a number of findings that are consistent with aggressive tax and estate planning: *post mortem* administrative costs decline and, most importantly, lifetime transfers increase. Changes in the composition of assets on the estate tax return are suggestive of tax planning: business assets and corporate stock both decline, consistent with aggressive use of the discounting technique featured prominently in Cooper (1979); easy-to-conceal assets such as household goods also lose value.

The magnitude of estimated responses and potential tax savings foregone by those who die of instantaneous illness are not trivial. Using 1976 tax rates, a reduction of estates of those who died instantaneously by 18%, the baseline estimate in the paper, would result (if all of it constituted a reduction in taxable estate and did not reduce deductions) in slashing the average tax payments from \$33,000 to \$18,000 (the average size of an estate was \$330,000). Using a different metric, an average increase in after-tax transfers would be 3.2%. The magnitude of savings naturally grows with the size of the estate: average increase in after tax transfers would be 7% for those with net worth of more than \$500,000.

I suggest that the wealthy do care about the ultimate distribution and use of their estates, but they postpone some important decisions until shortly before death. This "procrastination" is consistent with the scarcity of *inter vivos* giving documented in

the literature. Any theory of bequests has to explain why wealthy people need to make any adjustments to their estate plans shortly before death, thereby bearing the risk of not having a chance to do so in the case of accidents or other immediate causes of deaths. It appears that while people do care about bequests, they attach value to holding on to their wealth. In other words, planning *a priori* is costly, either in financial, strategic, or psychological terms. The standard explanation is precautionary saving coupled with a bequest motive. The lack of evidence that end-of-life expenditures are important for this group casts doubt on this possibility, although saving for rare, catastrophic, expenditures cannot be fully excluded. Cross-sectional evidence indicating wealth accumulation that does not weaken by age 98 also suggests that going beyond a life-cycle model may be required to explain patterns of wealth accumulation by the wealthy.

Findings in this paper are consistent with holding onto wealth for the purpose of exerting control. In particular, one possibility is a “strategic” motive where an individual wants to retain wealth in order to extract services from beneficiaries (e.g., regular visits). If, as argued by Schmalbeck (2001), effective tax avoidance requires losing control over wealth, this type of bequest motive could explain retaining wealth until shortly before death despite tax consequences. It could also be consistent with planning shortly before death. The strategic motive does not fit well with the upward-sloping wealth profiles, and focusing on this pattern may provide a test of this hypothesis. Another possibility has to do with saving for low-probability events such as suffering from a rare but treatable disease. While evidence showing low medical expenses of the wealthy shortly before death does not seem to support it, it is based on a relatively small sample that may not include such events. This possibility is an example of a precautionary motive, but it is probably best kept conceptually separate, because it is hard to distinguish in the data from utility-from-wealth or a “capitalistic spirit” motive. All of these arguments could potentially explain the findings if coupled with a bequest motive. Finally, results are also consistent with procrastination in planning for behavioral reasons such as the difficulty of acknowledging own mortality until it no longer can be denied (Kopczuk and Slemrod 2005).

This work also adds to the literature on estate taxation. Opponents of this type of taxation argue that this tax is unfair and particularly burdensome: on top of the payment itself, the estate

tax possibly forces terminally ill taxpayers to spend their last moments on tax planning, while compliance with the tax imposes an additional burden on orphans and widows. This paper documents that some planning activity indeed does take place shortly before death. A popular claim (e.g., Cooper [1979]) is that the estate tax is essentially voluntary; however, Schmalbeck (2001) argued that serious attempts to legally avoid it have the cost of relinquishing control over assets. The presence of deathbed responses supports the latter view because it reveals that early planning must have had a cost. Both the lack of large *inter vivos* giving observed in standard datasets (McGarry 1999; Poterba 2001) and responsiveness of existing gifts to tax considerations (Bernheim, Lemke, and Scholz 2004; Joulfaian 2004) are consistent with the main message of this paper that while individuals are interested in the size of their bequests, they simultaneously place a significant value on holding on to their assets while alive. However, drawing far-reaching conclusions from these results for estate taxation is complicated by the fact that the data used here are thirty years old and many changes in the economic environment have taken place since. One important change was the introduction of an unlimited marital deduction in 1981. The main empirical findings in this paper apply to married males. If the spouse who is first to die wants to transfer the full estate to the surviving one, he may do so tax-free nowadays. Full reliance on the unlimited marital deduction is in fact very common. Hence, for this specific population, tax-motivated responses nowadays are likely to be smaller. I find evidence that similar responses take place for widowed males as well, and therefore the introduction of the unlimited marital deduction is unlikely to have eliminated all responses of this kind. Reliance on the marital deduction implies also that actual taxation takes place nowadays at a more advanced age, and I find that the response during terminal illness weakens with age. On the other hand, responses for widows may now be stronger if adjustments at the death of the first spouse are smaller. Finally, it is possible that the increased sophistication of tax planning reduces the need and scope for terminal responses. It should be pointed out, though, that there was no lack of sophistication in planning thirty years ago: the estate tax had already been dubbed a “voluntary tax” by Cooper (1979) in the 1970s. The results in this paper reveal that planning was not fully pursued even though strategies to reduce taxation were available.

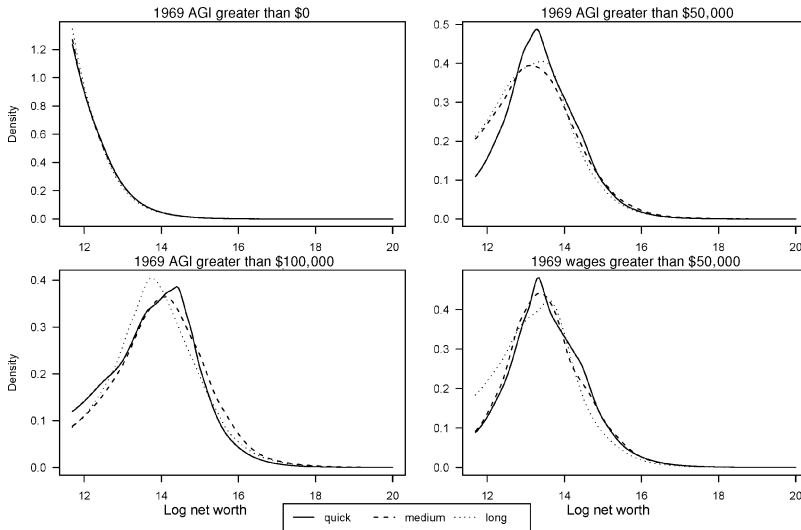


FIGURE A.1
Density of the Logarithm of Net Worth Conditional on 1969 AGI

APPENDIX I: ROBUSTNESS

This section is devoted to analyzing how robust results are to alternative approaches to dealing with truncation.⁴³ While OLS is biased in the presence of truncation, the bias depends on how prevalent truncation is. Its extent varies with right-hand-side variables. Conditioning on their values allows for manipulating the extent of truncation in the subsample. This is illustrated in the first three panels of Figure A.1, which show the distribution of net worth conditional on 1969 AGI being greater than \$0 (full sample), \$50,000, and \$100,000. It is clear that we observe only the far right tail of the overall wealth distribution (first panel). In fact, since the sample represents only a few percent of deaths, more than ninety percent of the data should be considered truncated.

43. Many other specification checks were also performed but are not reported in the tables. The results are robust to replacing the age polynomial by age-specific dummies and exclusion of the post-1976 dummy. As an informal check for the relevance of outliers, I also estimated the model without about 100 observations with net worth exceeding \$5 million and without a similar number of those with 1969 AGI exceeding \$250,000. Using four illness dummies for “days,” “weeks,” “months,” and “years” instead of two categories led to negative coefficients of -0.028 (p -value .539), -0.109 (p -value .051), -0.103 (p -value .014), and -0.193 (p -value less than .001), respectively. They are also virtually unchanged by dropping observations corresponding to the lengthiest (and rare) illness category of “10 years or more.”

As the second panel shows, patterns are very different for those with 1969 incomes exceeding \$50,000: the mode of the distribution is now visible. The \$100,000 panel further strengthens this point. In the extreme, truncation could be negligible, this does not appear to be the case, though, on any of these figures.

Results of the OLS and truncated regressions in a sample with AGI greater than a threshold are shown in Table A.1a. The results for the \$25,000 and \$50,000 groups are consistent with the previous finding of a negative effect of a lengthy terminal illness.⁴⁴ Results for the \$100,000 group are not (but they are nonsignificant). This is so despite the impression from the picture that suggests that the longer illness results in a shift of the distributions to the left. It is possible that the asymmetry of the “quick” distribution is at fault here: it leads to a lower mean of that distribution. Figure A.I suggests that the comparison of the modes of these distributions would lead to a different conclusion.⁴⁵ In the presence of this kind of asymmetry, the truncated regression model is mis-specified. Also, a smaller, wealthier sample may be more affected by outliers.

The AGI includes capital gains realization and may be a noisy measure of income, possibly contributing to the asymmetry in the lower left panel: some individuals with relatively low net worth had high AGI in 1969 due to realized capital gains. Capital gains are not observed in the data, but wage and salary income is. An alternative approach is to condition on wages. The last panel of Figure A.1 shows densities conditional on wages being greater than \$50,000. It shows a more regular distribution than the one based on conditioning on AGI greater than \$100,000 (with a similar sample size), strongly suggestive of the presence of a response. This is supported by formal specifications in Table A.1b. I consider conditioning on wages greater than \$0, \$10,000, \$25,000, and \$50,000 (the levels are lower to include approximately the same number of observations as in the case of AGI specifications). Note, though, that using wages to normalize the distribution is problematic in general because wages are equal to zero for nearly 5,000 of almost 11,000 observations used for estimation.⁴⁶ Consequently,

44. The OLS results for the over \$50,000 and over \$100,000 groups are very close to the truncated regression ones, confirming that truncation is no longer quantitatively important for these groups.

45. Provided that truncation is not too heavy, the conditional mode restriction allows for identification of the parameter of interest; see Powell (1994).

46. By contrast, only 850 otherwise usable observations have AGI missing or equal to zero.

TABLE A.1a
ROBUSTNESS: VARYING THRESHOLD FOR AGI IN 1969

	OLS			Truncated regression		
	>25 K	>50 K	>100 K	>25 K	>50 K	>100 K
Medium	-0.053	-0.169	0.022	-0.082	-0.207	0.025
illness	(0.033)	(0.073)**	(0.181)	(0.050)	(0.089)**	(0.204)
Long	-0.076	-0.164	0.003	-0.115	-0.200	0.003
illness	(0.030)**	(0.067)**	(0.166)	(0.047)**	(0.081)**	(0.190)
1969 AGI	0.773	0.721	0.526	0.989	0.811	0.570
	(0.036)***	(0.084)***	(0.184)***	(0.042)***	(0.087)***	(0.188)***
N	5,090	2,371	739	5,090	2,371	739

TABLE A.1b
ROBUSTNESS: VARYING THRESHOLD FOR WAGES IN 1969

	OLS				Truncated regression			
	All	> 10 K	> 25 K	> 50 K	All	> 10 K	> 25 K	> 50 K
Medium	-0.026	-0.050	-0.088	-0.119	-0.214	-0.210	-0.165	-0.144
illness	(0.016)	(0.025)**	(0.053)*	(0.137)	(0.129)*	(0.092)**	(0.095)*	(0.154)
Long	-0.049	-0.074	-0.122	-0.198	-0.409	-0.281	-0.215	-0.230
illness	(0.015)***	(0.024)***	(0.052)**	(0.135)	(0.127)***	(0.089)***	(0.095)**	(0.154)
1969	0.005	0.636	1.037	1.055	0.042	1.880	1.589	1.169
wages	(0.001)***	(0.020)***	(0.051)***	(0.141)***	(0.011)***	(0.094)***	(0.092)***	(0.161)***
N	10,886	3,995	1,826	594	10,886	3,995	1,826	594

TABLE A.1c
ROBUSTNESS: SEMIPARAMETRIC APPROACHES

	Symmetrically censored LAD			SCLS		
	>120 K	>250 K	>500 K	>120 K	>250 K	>500 K
Medium	-0.117	-0.012	-0.075	-0.059	-0.023	-0.013
illness	(0.075)	(0.134)	(0.136)	(0.055)	(0.142)	(0.141)
Long	-0.149	0.036	-0.329	-0.114	-0.094	-0.189
illness	(0.073)**	(0.151)	(0.168)*	(0.051)**	(0.168)	(0.163)
1969 AGI	0.933	0.878	0.737	0.883	0.878	0.652
	(0.043)***	(0.193)***	(0.142)***	(0.042)***	(0.076)***	(0.193)***
N	10,886	7,020	4,701	10,886	7,020	4,701
Interior obs.	4,516	2,060	910	4,558	2,063	1,241

Note. The dependent variable is the logarithm of net worth. All specifications include a third-degree polynomial in age and a dummy for 1977 observations. Medium illness includes illness lasting hours, days, or weeks; long illness refers to illness lasting months or years. The omitted category is instantaneous death. The sample consists of married males with net worth above \$120,000. The first two panels show OLS estimates and results from a truncated regression under the normality assumption. The specifications marked "All" include married males with net worth above \$120,000. Other specifications include only individuals with either 1969 AGI or 1969 wages and salaries greater than the indicated value. Results in the third panel are estimated using either SCLS or SCLAD, as indicated. The row marked "Interior obs." lists the number of observations that remain uncensored. Standard errors are constructed using 1,000 bootstrap replications.

APPENDIX II: SEMIPARAMETRIC APPROACHES: RESPONSES OF DEDUCTIONS

	Schedule G	Presence of Schedule G	Share of Schedule G	Gift tax return	Funeral expenses	Debt deduction	Presence of charity	Share of charity	Value of charity
				Chen (1997), method #1					
Medium illness	-0.239 (0.184)	-0.025 (0.018)	0.002 (0.007)	-0.033 (0.019)*	-0.126 (0.071)*	0.117 (0.169)	-0.016 (0.015)	-0.002 (0.003)	-0.168 (0.129)
Long illness	0.453 (0.197)**	0.037 (0.019)**	0.021 (0.008)**	-0.021 (0.018)	-0.224 (0.070)**	-0.050 (0.161)	-0.008 (0.015)	-0.0005 (0.003)	-0.094 (0.123)
1969 AGI	0.989 (0.112)***	0.074 (0.010)**	0.029 (0.005)**	0.226 (0.011)**	0.862 (0.046)**	1.801 (0.087)**	0.088 (0.009)**	0.010 (0.002)**	1.069 (0.086)**
N	5,998	5,998	5,998	5,493	5,998	5,998	5,998	5,998	5,998
				Chen (1997), method #2					
Medium illness	0.170 (0.115)	0.017 (0.011)	0.008 (0.004)*	-0.005 (0.013)	-0.223 (0.070)**	-0.086 (0.153)	-0.011 (0.010)	0.0006 (0.002)	-0.049 (0.080)
Long illness	0.767 (0.119)***	0.074 (0.011)**	0.023 (0.005)**	-0.015 (0.012)	-0.238 (0.062)**	-0.213 (0.145)	-0.003 (0.010)	0.003 (0.002)	0.021 (0.079)
1969 AGI	1.185 (0.104)***	0.101 (0.009)**	0.034 (0.004)**	0.173 (0.014)**	0.962 (0.060)**	2.069 (0.119)**	0.065 (0.008)**	0.004 (0.002)**	0.686 (0.076)**
N	10,884	10,884	10,884	9,864	10,884	10,884	10,884	10,884	10,884
				Honore, Kyriazidou, and Udry (1997)					
Medium illness	-0.138 (0.194)	-0.019 (0.019)	0.005 (0.008)	-0.035 (0.021)*	-0.209 (0.087)**	-0.023 (0.193)	0.008 (0.017)	0.005 (0.003)*	0.130 (0.142)
Long illness	0.395 (0.202)*	0.036 (0.019)*	0.012 (0.008)	-0.036 (0.020)*	-0.171 (0.080)**	-0.062 (0.186)	-0.003 (0.015)	0.004 (0.003)*	-0.046 (0.123)
1969 AGI	0.939 (0.112)***	0.075 (0.010)**	0.028 (0.005)**	0.200 (0.013)**	0.786 (0.054)**	1.669 (0.125)**	0.061 (0.010)**	0.008 (0.002)**	0.788 (0.096)**
N	4,558	4,558	4,558	4,204	4,558	4,558	4,558	4,558	4,558

including 1969 wages turns out to make little difference relative to the estimates based on simple least squares when the whole sample is used (compare Table A.1b, column (5), to column (4) in Table IVa).⁴⁷ The corner value of wages is no longer a problem when the sample is restricted to those with wages above some fixed positive threshold, and one can then exploit the potential benefit of the “cleaner” definition of this variable relative to AGI. It turns out that the results are not at all sensitive to the choice of the truncation point for wages in the truncated regression specification. The estimates are a bit higher than 0.2 for the lengthy illness and on the order of 0.15 for the medium-length illness. The comparison of the least-squares estimates and those based on truncated regression reveals that the difference in estimates falls with the level of wage threshold and for those with wages higher than \$25,000 it is almost gone: this is consistent with the severely diminished importance of truncation visible on the last panel of Figure A.I.

The results so far indicate that estates are significantly reduced following the onset of a terminal illness. These estimates have relied, however, on either distributional assumptions or eliminating part of the sample. Table A.1c shows the results using the symmetrically censored least squares (SCLS) and symmetrically censored least absolute deviation (SCLAD) introduced by Powell (1986). All reported standard errors are based on 1,000 bootstrap replications.⁴⁸ These estimators assume a symmetric distribution of errors conditional on regressors rather than a parametric distributional assumption. Under this assumption, given a candidate regression line, symmetric truncation from above restores the zero conditional mean or median in the doubly truncated sample. This observation is relied upon in identification of the coefficients of interest. These approaches have two major advantages: first, they only impose symmetry on the distribution of the error terms conditional on regressors; second, they also allow for heteroscedasticity. The drawback of these procedures is that they effectively rely on only a subset of observations (dubbed “interior observations” in the table) and as such they tend to be much noisier. Almost all coefficients in Table A.1c are negative and in many cases significant.

47. Wages are included as the logarithm of one plus the dollar value.

48. While these estimators have been shown to be asymptotically normal, the asymptotic covariance matrix is not straightforward to compute and the usual practice (see Chay and Powell [2001]) is to bootstrap instead. Furthermore, in our context, observations are weighted using IRS sample weights and the exact formula for the covariance matrix in that case is not known.

They are also quite close to the estimates based on the normality assumption that were presented before, with the sole exception of the symmetrically censored LAD approach for those with net worth over \$250,000.

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