Giving With a Warm Hand: Evidence on Estate Planning and Bequests

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Abstract

In this paper we contribute to the literature by empirically studying the presence of a bequest motive for saving using administrative data for the Netherlands. Building upon and expanding the previous work by Kopczuk (2007), we empirically identify the bequest motive by studying how terminally ill individuals manage their estate in the last instances of their life. We regress net worth at the end of life on length of terminal illness, while controlling for age and lifetime income. We hypothesize that a negative relationship reflects a decrease in net worth due to early bequests resulting from estate planning triggered by the onset of a terminal illness. Employing quantile regression, we find that having a terminal illness of above ten years has a considerable impact on net worth at death, specially for married males who are at the top of the net worth distribution. Among this group, we find that the effect is specially strong for younger individuals (below 65 years), and for individuals with children who are at the bottom quartile of the income distribution. We conclude that the effects we find reflect the presence of an underlying bequest motive for saving.

Keywords: Saving, Estate Planning, Bequest Motive, Intergenerational Transfers.

JEL Codes: D10, D14, D31, D91.

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1 Introduction

It has been widely recognized in the literature on saving behaviour that retired individuals do not decumulate wealth as much as the basic life-cycle model (*i.e.* without uncertainty and without bequest motive) would predict (*e.g.*, see Van Ooijen *et al.*, 2015; and De Nardi *et al.*, 2016). Adding the precautionary motive for saving in the model, De Nardi *et al.* (2010) find that, even though it is able to explain a fair share of the wealth distribution for retirees, it cannot fully account for the savings of the wealthiest among them. This evidence suggest the potential relevance of the bequest motive for saving. Bequests are usually considered in the literature to be a luxury good (*e.g.*, see Kopczuk and Lupton, 2007; and De Nardi and Yang, 2014), thus they have the potential to explain particularly the savings of wealthy retirees, and in that way contribute towards a more complete understanding of the wealth distribution in the last stages of life. Furthermore, investigating and understanding the bequest motive is specially relevant nowadays since, according to Alvaredo *et al.* (2013) and Piketty and Zucman (2014) among others, the contribution of inherited wealth to aggregate wealth has increased considerably in developed countries during the last decades.

In the present paper we contribute to the literature by empirically studying the presence of a bequest motive using administrative data for the Netherlands. To conduct our study, we build upon and expand the previous work by Kopczuk (2007), who attempts to empirically identify the bequest motive by studying how terminally ill individuals manage their estate in the last instances of their life. Employing US data from estate tax returns, Kopczuk analyses the relationship between net worth at time of death and length of terminal illness, the latter being measured as either quick (instantaneous death), medium (hours, days or weeks), or long (months or years). Since Kopczuk uses data from estate tax returns, he has access to individual net worth at the exact time of death. However, for this same reason he only observes individuals above the estate tax threshold, and thus must rely on truncated regression techniques to estimate the effect of interest. The reasoning behind his analysis is that if, after controlling for gender, marital status, age, and lifetime income, length of terminal illness has a negative effect on net worth at death, this is due to individuals transferring part of their estate to their heirs in the expectation of a near death.

The main idea underpinning Kopczuk's study is that transfers resulting from deathbed estate planning can be seen as early bequests, and thus they reflect the presence of an underlying bequest motive for saving. Given the presence of a bequest motive, there are reasons to think why and why not individuals would engage in transferring early bequests at the end of their life. On the one hand, individuals may transfer part of their wealth to avoid estate taxes (Kopczuk, 2010; McGarry, 2013). In the Netherlands there is a rather high progressive tax on inheritances and inter-vivos gifts, which offers the possibility to considerably reduce tax payments if the estate is split and transferred in portions. Additionally, individuals may engage in early bequests to ensure control over the recipiency and the use of the wealth transferred. On the other hand, the main cost of such early bequests is that they imply relinquishing control over assets that individuals may eventually need were they to live longer than expected or encountered unexpected expenditures (McGarry, 2000).

Due to data limitations, Kopczuk focuses his analysis solely on married males and finds that, among this group, there is indeed a negative effect of length of illness on net worth at death. He interprets this finding as evidence of deathbed estate planning, which in turn he assumes responds to and underlying bequest motive. However, his results may have two alternative explanations. First, in the American context any relation between length of terminal illness and net worth at time of death could be explained by medical expenditures at the end of life. Kopczuk attempts to circumvent this problem by resorting to a descriptive analysis using survey data, whereby he finds that medical expenditures are not relevant enough to explain the estimated effect. Second, an alternative explanation for this same relation may by given by the effect of an income shock occasioned by the onset of a terminal illness. Kopczuk attempts to solve this second issue by including income changes in the few years previous to death.

To conduct our study, we employ Dutch administrative data provided by Statistics Netherlands, a Dutch governmental institution that gathers statistical information on the Netherlands. Following Kopczuk (2007), we regress wealth at the end of life on length of terminal illness, while controlling for age and lifetime income. For that purpose, we use about ten thousand randomly selected deaths that took place in the Netherlands between 2006 and 2010. We stratify our sample and run separate regressions for four different demographic groups, *i.e.* single females, single males, married females, and married males. While we base our analysis on Kopczuk (2007), we expand his work in four main directions. Firstly, we observe the whole net worth distribution and thus we do not have to rely on truncated regression techniques. In fact, since we observe the whole distribution we can apply quantile regression, which allows us to estimate the effect of interest at different quantiles of the net worth distribution. This technique arguably has important advantages over OLS when the data are highly skewed, as it is always the case with wealth distributions.

The above-mentioned advantage comes with two limitations. First, our income and wealth data are given at the household level and not at the individual level. Even though it would be optimal to have these data at the individual level, we overcome this issue by stratifying our sample according to gender and marital status, and thus controlling for household structure. Second, our wealth measurement is not given at the exact time of death but on the 31st of December of the year previous to death. However, we know the exact date of death of every individual in our sample, and thus we can measure this delay (in days), which actually amounts to the day in the year in which a particular individual died. As long as deaths are randomly distributed across the year, the delay problem should not imply a bias in our estimates. However, to avoid any possible issue we generate a delay-in-measurement variable and always include in our regressions.

Secondly, we expand Kopczuk's work by using a more refined length of terminal illness measure. To generate our measure we use data provided by Statistics Netherlands coming from the death register and the hospital discharge register. Combining these two sources, we are able to determine the main cause of death of a particular individual, and how many times that individual had a hospital intake related to the same cause of death. With this information at hand, we generate a length of terminal illness measure consisting of the time difference between the 31st of December of the year previous to death (*i.e.* the date of our wealth measurement) and the date of the first hospital intake related to the cause of death. Due to the time delay in our data between wealth measurement and date of death, we are not able to fine-tune as much as Kopczuk does among illnesses with a short span. However, we are able to better classify the span of illnesses deemed as long by Kopczuk, which, according to his own results, are the only ones that actually matter when it comes to triggering estate planning type of behaviour.

Thirdly, the institutional context of our study implies a considerable advantage with respect to Kopczuk's. As above-mentioned, in the American context, any relation between length of terminal illness and net worth at time of death (with age and lifetime income being controlled for) may be explained by medical expenditures at the end of life and/or by an income shock occasioned by the onset of a terminal illness. In the Dutch context, individuals are fully covered against out of pocket medical expenditures and, furthermore, they are also financially covered against disability problems that may cause a reduction in income due to a medical condition.[1] Therefore, if, after controlling for the same factors as Kopczuk does, we observe a negative relationship between length of terminal illness and net worth at the end of life, we can rule out the medical expenditures and income shock explanations, and thus we can more strongly claim that we are capturing early bequests related to deathbed estate planning.

Fourthly, a very interesting feature of our data, and which represents a remarkable extension of Kopczuk's work, is that we can link all of the individuals in our sample with their children, and we have access to the same variables for the children as we do for the parents. This information is relevant, since according to the literature (*e.g.*, see McGarry, 2016) the number and/or the economic situation of children are factors that have the potential to explain deathbed estate planning and bequest savings. Nevertheless, we start out by excluding the children variables from our regressions, and thus we first perform an analysis the most similar to Kopczuk's given the relevant differences in the nature of our data. Subsequently, we add in our regressions variables controlling for the number of children and the economic situation of the latter, and,

[1]For more information on medical expenditures at the end of life in the Netherlands, see Polder *et al.* (2006) and Van Ooijen *et al.* (2016).

in addition, we check for how these variables interact with length of terminal illness. In that way, we can check whether both the presence and the economic situation of children are factors triggering deathbed estate planning and early bequests.

Results show that length of terminal illness has indeed a negative impact on net worth at the end of life. Nevertheless, the effect is only large enough and statistically significant for married males, and it comes almost solely from those with a terminal illness above ten years long. Employing quantile regression, we find among married males a specially strong and significant effect of a long terminal illness (above ten years) for those at the very top of the net worth distribution. Following Kopczuk (2007), we interpret these result as early bequests that result from estate planning triggered by the onset of a terminal illness. Additionally, we find that the effect is specially strong for younger individuals (below 65 years), and for individuals with children who are at the bottom quartile of the lifetime income distribution. However, we do not find that the presence and number of children matters to explain the extent to which individuals engage in early bequests. This last result is in line with the argument by Kopczuk and Lupton (2007), who claim that having children is not necessarily a good predictor of the presence of a bequest motive, since individuals may have a variety of reasons to save for a bequest other than passing it on to their children.

It is reasonable that we only find an effect for married males if we consider that most singles in our sample are females that are either widowed or divorced, implying that they have been through a shock that is likely to have already reduced their wealth considerably. In fact, most individuals dying while married in our sample are males, since they have in general a lower life expectancy than females. In addition, finding only clear evidence at the very top of the net worth distribution coincides with the recurrent view in the literature of bequests as luxury goods. Given these results we conclude that the bequest motive matters in order to explain savings at the end of life. Therefore, any model of retirement savings should always consider the bequest motive as a relevant factor, specially rich married individuals. In addition, given the relevant interaction with the average lifetime income of children, we conclude as well that individuals at the very top of the net worth distribution care about ensuring a certain level of wealth for their descendants. This argument supports the idea of intergenerational transfers as a mechanism through which economic inequality is passed on from one generation to the next.

The rest of the paper is structured as follows. Section 2 describes the data sources and explains how we come up with the sample we employ in our analysis. Section 3 provides descriptive statistics for the most important variables and some preliminary evidence. Section 4 explains the methodology we employ to estimate our regressions. Section 5 provides the results of the analysis. Section 6 rounds up the paper with a conclusion.

2 Data Sources and Sample Selection

To conduct the present study we use Dutch data coming from different administrative sources which we are able to merge into one single dataset. All of the data are provided to us by Statistics Netherlands. We start by using data from the death register to randomly select a sample of 9596 deaths out of all the deaths occurred in the Netherlands between the years 2006 and 2010, both included, which is about 1.5% of all deaths occurred during that period. Through an encrypted social security number, which uniquely identifies each individual in the sample, we are able to merge the data from the death register with individual demographic characteristics available from municipal administration records. Additionally, we are able to merge this sample with household level data on income and wealth available from the tax register, and with data on hospital visits available from the hospital discharge register.

After merging, we are left with a data set of individual deaths containing the following information for each deceased individual: date of death, cause of death, age, gender, marital status, household net worth at the end of life, yearly household disposable income back to 2003, and hospital visits back to 1995. Household net worth is measured on the 31st of December of the year previous to death, and it equals total assets of the household minus total liabilities. Assets can be disaggregated into financial and non-financial assets. In turn, the former can be disaggregated into deposits, saving accounts and other financial assets (stocks and bonds), while the latter can be disaggregated into housing (primary residence) and other non-financial assets (housing wealth other than the primary residence, and business wealth). Liabilities can be disaggregated into mortgage debt and other debt. The data on hospital visits contain date, duration and diagnosis associated to each hospital intake taking place between 1995 and time of death.[2] Due to missing income and wealth data, after merging we go from 9596 to 9529 observations. Since all other variables in our dataset have no missing values, we can see that there are no patterns indicating a selection problem due to missing data.

A very interesting feature of our data is that we can link all individuals in our sample to their children, and we have access to exactly the same variables for the children as we do for their parents. Therefore we can generate variables indicating the number of children at death, as well as age, gender, marital status, household income, and household wealth for each child. For practical reasons, we set the maximum number of children equal to seven, which implies the additional loss of five observations. After this selection, we have a total of 9523 parental observations, and 16189 children observations out of which 876 have missing income and wealth. If all household income and wealth variables perfectly coincide between a particular child and his/her parents for a given year, we assume that the child was living in the parental household

[2] Cause of death and hospital diagnoses are classified according to the 10th revision of the International Statistical Classification of Diseases and Related Health Problems, a medical classification list assembled by the World Health Organization.

in that year. With this information, we can better control for the structure of each particular household.

3 Descriptive Statistics and Preliminary Evidence

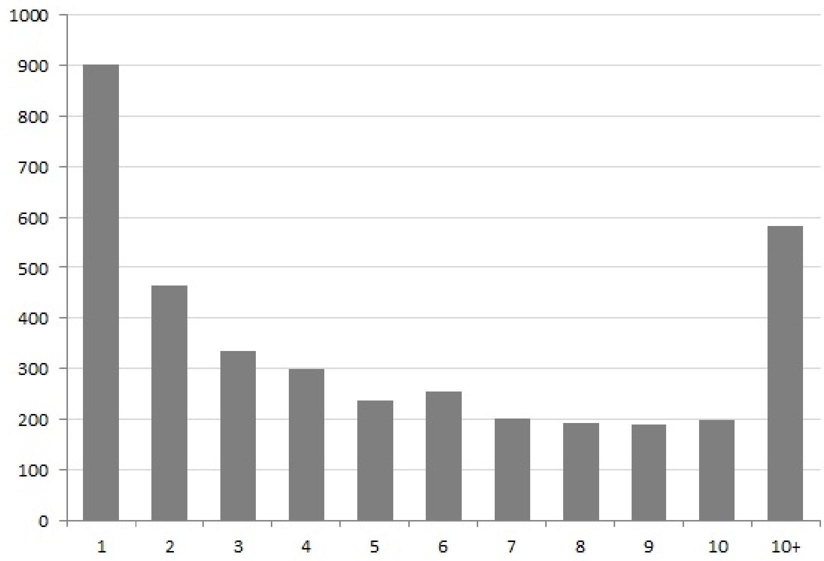
3.1 Length of Terminal Illness

To generate our length of illness measure we combine data from the death register with data from the hospital discharge register. We start by assigning each individual death into one of the 22 general cause of death (COD) categories given in the 10th revision of the International Statistical Classification of Diseases and Related Health Problems. For this purpose, we use the main underlying cause of death, which according to the World Health Organization is defined as the disease or event that triggered the chain of events that lead to death. We then classify in the same way the diagnoses associated to each hospital intake in our sample. We are thus able to know whether someone who died due to a particular COD category previously had a hospital intake for a reason falling within that same category, as long as that intake took place not earlier than the year 1995. With this information at hand, we generate a measure consisting of the difference in days between the 31st of December of the year previous to death and the first hospital intake due to the same reason as COD. We take the 31st of December of the year previous to death, and not the date of death itself, because the former is the date of the household net worth measurement we have available.

We are aware of the fact that our length of illness measure is inaccurate due to the time delay between date of death and wealth measurement. However, since we observe date of death, we are able to generate a delay-in-measurement variable. This variable essentially indicates the day in the year that a particular individual died, and thus takes values between one and 365. By controlling for it in our regressions we make our analysis more meaningful, since then we compare individuals with different length of illness but with the same time gap between wealth measurement and death. There is another matter derived from the delay issue, which is that individuals whose first COD-related hospital intake took place after the wealth measurement are assigned a zero in length of illness. Since the awareness of a disease might start already before the first hospital intake and thus perhaps before the wealth measurement, these individuals may not be comparable with those who never had a COD-related hospital intake. Therefore, we generate a dummy variable indicating this condition and include it as well in our regressions.

As just acknowledged, the awareness of an illness might start before the first hospital intake. As a consequence, our length of illness measure may be systematically understating the actual length of illness. To deal with this issue in some measure, we transform our variable to express it in years, instead of in days. In that way, those whose first COD-related hospital intake took place within a year before the wealth measurement get assigned one year in length

Figure 1 Histogram Length of Terminal Illness in Years



Notes: Observations with a zero in length of terminal illness are excluded from the figure. Their frequency in the sample is 5661.

of illness, those whose first COD-related intake took place between one and two years before the measurement get assigned two years, and so on, until a maximum in our sample of 15 years. The issue then is that for observations with high values of length of illness, namely from 11 to 15 years, it is likely that the first intake took place before 1995. To deal with this inaccuracy, we generate a discrete variable taking values from zero to ten years, to which we add an additional category capturing length of illness above ten years.

Figure 1 shows a histogram of the resulting variable conditional on it being larger than zero. We see a positively skewed distribution, since the number of individuals with a given length of illness steadily declines as the number of years increases. The frequencies go from 903 for one year gradually down to 197 for ten years in length of illness. We see then a spike of 583 observations for the category capturing length of illness above ten years. There are 5661 observations with zero in length of illness, out of which 1546 correspond to individuals who had COD-related intakes only after the wealth measurement we have available. Additionally, out of the remaining 4115 observations with zero in length of illness, there are 1421 observations that correspond to individuals who had at least one non-COD-related hospital intake during the same year of death, or during the year previous to death. We consider these individuals to be potentially frail, and thus we generate for them a frailty dummy that we include as well next to the length of illness variable in our regressions.

In addition to Figure 1, Table 1 shows average length of terminal illness classified by age, gender and marital status. The table shows that most deaths are concentrated in the categories including ages from 70 to 90, and that, indeed, females tend to live longer than males. We see that length of illness is relatively low for individuals in the younger age categories, specially

Table 1 Average Length of Terminal Illness by Age, Gender and Marital Status

	Single				Married			
	Females		Males		Females		Males	
Age Category	Length	Obs.	Length	Obs.	Length	Obs.	Length	Obs.
<50	1.82	1.9%	0.82	5.6%	2.41	5.4%	1.26	2.7%
50-60	2.33	2.6%	1.23	7.9%	2.31	13.9%	1.55	6.9%
60-70	2.63	5.8%	1.84	12.6%	2.53	23.3%	1.88	18.2%
70-80	2.40	13.5%	2.21	22.8%	2.24	26.2%	2.49	33.5%
80-90	1.93	43.4%	2.27	34.6%	2.15	27.7%	2.80	32.4%
>90	1.44	32.8%	1.72	16.5%	2.33	3.5%	1.99	6.3%
All	1.88	2559	1.95	1313	2.30	1759	2.35	3892

Notes: To compute averages, individuals above ten years in length of terminal illness are assigned a value of eleven.

among males, indicating that deaths in this category are more likely to be sudden deaths. Among all groups, length of illness appears to increase with age, and then decline again for the older categories. Additionally, pooling all ages together length of illness appears to be in general higher for married individuals compared to single individuals, which is essentially because there are few married individuals who pass away within the oldest age category.

The patterns in Table 1 seem reasonable and generally in line with those reported by Kopczuk (2007). They are thus consistent with this variable containing information about actual length of illness. Our measure is however rather different from that one used by Kopczuk. He uses a measure that classifies length of illness into three categories: quick (instantaneous), medium (hours, days or weeks), and long (months or years). Due to the time delay in our data between wealth measurement and date of death, we are not able to fine-tune as much as Kopczuk does among illnesses with a short span. However, we are able to better classify the span of illnesses deemed as long by Kopczuk, which, according to his own results, are the only ones that actually matter when it comes to triggering estate planning type of behaviour.

3.2 Net Worth at the End of Life

As mentioned in Section 2, through the tax register we obtain data on assets and liabilities at the household level, which are given on the 31st of December of the year previous to death. By subtracting liabilities from assets, we obtain household net worth at the end of life. Table 2 shows how this variable is distributed by gender and marital status of the deceased individual. The first thing to note is that, as pointed out by the literature on the retirement-savings puzzle, individuals still hold considerable amounts of wealth at the very end of their life (De Nardi *et al.*, 2016). If we look at singles, *i.e.* the first two rows of Table 2, we see that on average both males and females have a net worth position of about 160 thousand Euros at the end of life. If we

Table 2 Net Worth at the End of Life by Gender and Marital Status

	Avg	p10	p25	p50	p75	p90	p99	Obs
Single Females	158147	773	5902	22939	170057	429752	1592482	2559
Single Males	158449	0	4829	24244	215588	455089	1342771	1313
Married Females	241771	2481	19131	130341	325523	579219	1719753	1759
Married Males	282189	3347	20615	142511	349090	590060	2142095	3892
All	224334	1486	11098	64054	288008	543282	1701087	9523

look at married individuals, *i.e.* the third and fourth rows of Table 2, we see that married males have on average about 280 thousand Euros of household net worth at the end of life, a notably higher position in comparison to married females, whose average is about 240 thousand Euros.

The second thing to note about Table 2 is that, as expected, net worth at the end of life shows a high degree of positive skewness for all four groups. However, the singles distributions are more skewed than those for married individuals. For both single females and males, the average is between six and seven times larger than the median, while the p75/p25 ratios are 28.81 and 44.64 for females and males respectively. For married individuals, the average is for both genders a bit less than twice the median, while the p75/p25 ratios are 17.02 and 19.93 for females and males respectively. If we look at the values in the 99th percentile column, we see extremely high values for all demographic groups. The possibility to capture this percentile accurately is a strong advantage of administrative data, since the top 1% is usually underrepresented in survey data. This marked inequality at the end of life suggests the bequest motive as a plausible explanation for why individuals, specially the very rich, hold on to a considerable amount of wealth even during the last years of life.

3.3 Lifetime Income

Following on Kopczuk (2007)'s strategy of regressing net worth at the end of life on length of terminal illness, two crucial variables to control for are age and lifetime income, since both are likely to have an influence on length of illness and on net worth. When it comes to lifetime income, Kopczuk observes personal labour income for only one period which comes seven to eight years previous to death, and uses that as a proxy. In our case, we observe yearly total income at the household level for the period between 2003 and the year previous to death. Furthermore, for every year we know which is the main source of income of the household. With this information at hand, we generate a proxy for lifetime income by applying the following rule: if the main source of income in the year previous to death is not pension income, we take the average of equivalized household income between 2003 and the year previous to death; if the main source of income in the year previous to death is pension income, then we just take the observation equivalized income corresponding to that particular year.[3]

We follow this strategy based on Knoef *et al.* (2013), who using data for the Netherlands find that pension income is a particularly good reflection of the level of income earned throughout the working life.[4] We do know however that by applying this strategy we are probably assigning different values to individuals who have actually the same lifetime income, depending on whether they are working or retired at time of death. Even though controlling for age probably overcomes most of this problem, we add next to our lifetime income proxy a retirement dummy, which takes value one if pension income was the main source of household income on the year previous to death. Table A1 in the appendix shows summary statistics for our lifetime income variable, as well as for all the other variables used in the analysis. There we can see that our retirement dummy takes value one for about 75% of the individuals in our sample.

As acknlowdged by Kopczuk (2007), once controlling for lifetime income and age, there are still two major issues one must consider. The first one is that medical expenditures are likely to explain any relation between length of terminal illness and net worth. While this is likely true for the US, in the Netherlands there is a strong public long-term care system that covers most, if not all, of the medical expenditures that may derive from a lengthy illness.[5] Indeed, Van Ooijen *et al.* (2016) show using survey data that out of pocket medical expenditures are not a relevant issue for Dutch retirees. The second one is that a negative relation between length of illness and net worth could be explained by an income shock caused by the onset of the illness. In the Netherlands, in case an individual is incapacitated to work due to a health shock he/she can have two years of sick leave with full salary. After that, he/she becomes eligible for a disability benefit covering about 75% of the previous salary. Given this institutional context, and the fact that most individuals in our sample are retired, we believe that an income shock explanation is highly unlikely in the Dutch case.

4 Methodology

Following the steps of Kopczuk (2007) we estimate the effect of length of illness on wealth at the end of life by means of a cross-sectional regression analysis. The regression equation we want to

[3]We equivalize household income by dividing yearly income by the square root of the number of members in the household in that particular year. The latter number is available in our data set and comes from the municipal administration records. We apply this transformation mainly because in many cases household structure has experienced changes during the years previous to death.

[4]Knoef *et al.* (2013) find that pension income represents a major share of the income of retirees, that the variance of income shocks is smaller for retirees than for working people, and that income shocks are more persistent for retirees. For all these reasons, they argue that it is a specially good proxy for lifetime income.

[5]Since 1st of January 2015 reforms of the long-term care system have come into place, which change it in the direction of making it less generous. However, these reforms fall well outside of our sample period. For a good review on the extent of health expenditures at the end of life in the Netherlands, and on how they are covered by the private and public insurance system, see Polder *et al.* (2006).

estimate is the following:

$$NW_i = \beta_0 + \boldsymbol{D}_i'\boldsymbol{\beta}_1 + \boldsymbol{X}_{1i}'\boldsymbol{\beta}_2 + \boldsymbol{X}_{2i}'\boldsymbol{\beta}_3 + \boldsymbol{t}_i'\boldsymbol{\beta}_4 + \varepsilon_i, \tag{1}$$

where NW_i is household net worth at the end of life for individual i; $\boldsymbol{D}_i$ is a vector including our length of terminal illness measure and the other related variables described in Section 3.1; $\boldsymbol{X}_{1i}$ is a vector of controls including a third-degree polynomial in age, a proxy for lifetime income, a dummy indicating whether pension income was the main source of household income in the year previous to death, and the delay-in-measurement variable described in Section 3; $\boldsymbol{X}_{2i}$ is a vector containing children variables; $\boldsymbol{t}_i$ is a vector of year dummies indicating the year of death, and ε_i is the individual-specific error term. Since we control both for age and year of death, we are indirectly controlling as well for cohort effects. We estimate (1) for the four different demographic groups classified by gender and marital status depicted in Tables 1 and 2, *i.e.* single females, single males, married females and married males.

The $\boldsymbol{D}_i$ vector is composed of four elements, *i.e.* $\boldsymbol{D}_i = (D_{1i},\ D_{2i},\ D_{3i},\ D_{4i})$, where D_{1i} is a dummy that takes value one for those observations with a zero in length of illness but with at least one COD-related hospital intake after the wealth measurement; D_{2i} is our frailty dummy taking value one for those with both zero years in length of illness and $D_{1i} = 0$, but that had at least one non-COD-related hospital intake during the year of death or the previous one; D_{3i} is our continuous length of illness variable taking values from zero to ten years; and D_{4i} is a dummy taking value one for those observations with more than ten years in length of illness. For observations with $D_{4i} = 1$, we set $D_{3i} = 0$. By including this set of variables in our regression equation we are performing an experiment in which we have three binary treatments, *i.e.* D_{1i}, D_{2i}, and D_{4i}, and a continuous treatment, *i.e.* D_{3i}. The control group is given by those observations with a zero in length of illness and who did not go to the hospital during the year of death or the year previous to death. We are interested in estimating all of the coefficients in $\boldsymbol{\beta}_1$, for which we expect find negative signs indicating the presence of deathbed estate planning triggered by the onset of a terminal illness.

The vector with children variables $\boldsymbol{X}_{2i}$ is one of our main additions with respect to Kopczuk's model. It contains the number of children of the deceased, as well as the average lifetime income of those children, and their average age. To compute the lifetime income of the children we follow the same methodology as we do with their parents explained in Section 3.3. First of all, we estimate (1) assuming $\boldsymbol{\beta}_3 = \boldsymbol{0}$ and thus excluding $\boldsymbol{X}_{2i}$ from the equation. In that way, we start with a model the most similar possible to Kopczuk's, given the relevant differences in the nature of our data compared to his. Afterwards, we include the children variables and observe how the estimates of the coefficients in $\boldsymbol{\beta}_1$ are affected. In principle, we do not expect it to change substantially, since there is no strong reason to think why the number of children and their characteristics would correlate with $\boldsymbol{D}_i$ once $\boldsymbol{X}_{1i}$ is already accounted for. However, the interesting part is to check for interactions between the elements $\boldsymbol{D}_i$ and the elements in $\boldsymbol{X}_{2i}$ to see whether the extent of estate planning is larger for individuals with more children and/or with children who have a low lifetime income relative to their parents.

Given that our sample is composed by random draws from the Dutch population, we are able to assume that the error term ε_i is independent across observations. However, since the net worth distribution is highly skewed, we do not assume homoskedasticity. To deal with this issue, we rely on quantile regression with bootsrapped standard errors to estimate the coefficients in (1). In that aspect, our analysis substantially differs from Kopczuk's. Since he only observes individuals above the minimum estate tax threshold (while we observe the whole net worth distribution) he cannot employ quantile regression, and thus relies on truncated regression techniques to estimate average effects. Compared to OLS, quantile regression has the advantage that is not sensitive to outliers, and it allows to focus on particular segments of the net worth distribution when estimating the effect of interest.[6] This last aspect is specially relevant since, given the skewness of the net worth distribution, we expect to estimate different effects across quantiles. More specifically, we expect estate planning to gain importance as we move up the net worth distribution, and to be particularly relevant among the very rich.

5 Results

5.1 Baseline

Table 3 shows the baseline results of our analysis. The first two rows provide the OLS estimates for variables D_3 and D_4 introduced in Section 4. We do not provide the estimates for D_1 and D_2 because we do not find them to be significantly different from zero. Columns 3 and 6 of Table 3 show that OLS estimates a statistically significant effect of D_4 both for single and married males. In both cases we find that the effect is just above -50 thousand Euros, indicating that a length of terminal illness of more than ten years decreases average net worth at the end of life by that amount. However, as explained in Section 4, due to the skewness of our dependent variable it is much more interesting to look at quantile effects instead of average effects, since we expect to find different results at the different segments of the net worth distribution. As shown in Table 3, for all demographic groups we estimate quantile effects at the 10th, 25th, 50th, 75th, 90th, 95th and 99th percentiles. We estimate the different equations simultaneously and test for the difference in the coefficient estimates across quantiles. We find that both D_3 and D_4 have significantly different impacts across quantiles only for married males, which is the demographic group for which we find the most clearly significant effects.

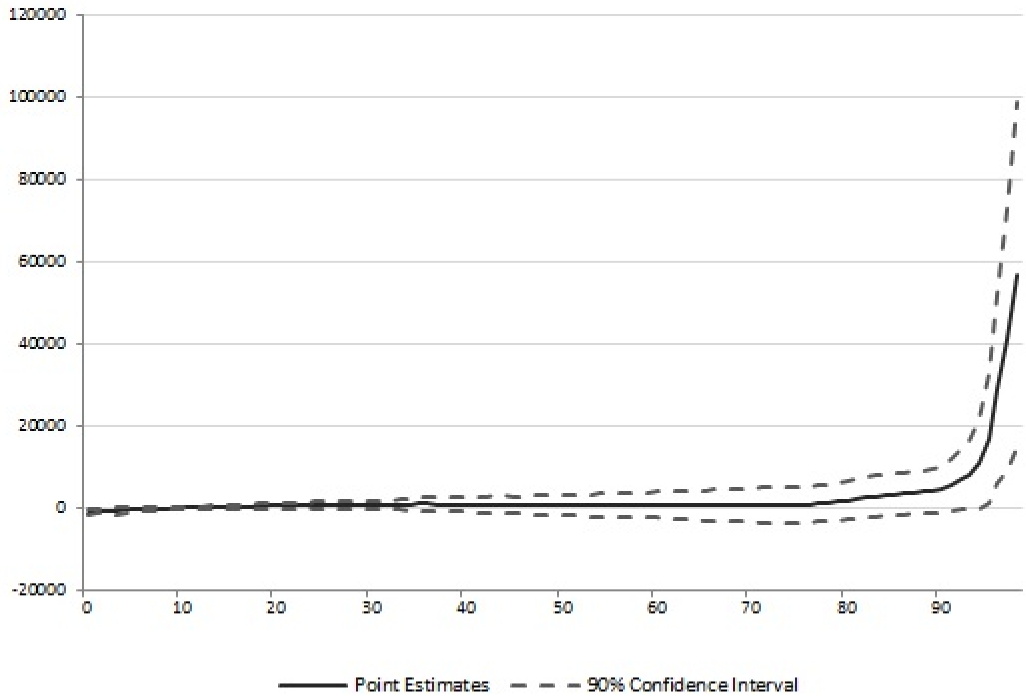
[6]For more on the motivations behind the use of quantile regression in case of skewness and heteroskedasticity, see Koenker (2005) and Angrist and Pischke (2009).

Table 3 Results: Baseline

		Dependent Variable: Net Worth at the End of Life					
		Singles	Single Females	Single Males	Married	Married Females	Married Males
		(1)	(2)	(3)	(4)	(5)	(6)
OLS	D_3	2016.39	2215.12	423.77	-1953.96	699.89	-4126.58
		(1798.60)	(2046.77)	(3083.99)	(2893.47)	(4525.75)	(3909.75)
	D_4	-18610.95	3458.25	-51988.79*	-41485.65*	-14132.06	-55956.27**
		(16581.41)	(19278.76)	(2883.41)	(22055.05)	(32682.92)	(28081.15)
p10	D_3	8.87	-21.22	45.64	60.23	-27.24	57.92
		(71.13)	(99.25)	(127.41)	(175.32)	(294.24)	(221.90)
	D_4	-683.52	200.60	-1249.23	-2357.65	-2239.84	-1973.87
		(961.79)	(1298.88)	(6895.10)	(1431.67)	(3637.62)	(1724.94)
p25	D_3	-7.39	-85.23	212.23	-531.99	-360.55	-744.87
		(120.25)	(177.96)	(272.17)	(402.58)	(969.76)	(470.92)
	D_4	40.13	1387.36	-4658.02	-9900.968***	-9148.98	-10853.07***
		(1690.53)	(1935.01)	(3614.95)	(3592.449)	(7234.22)	(3681.93)
p50	D_3	-202.52	-308.00	-567.11	-849.922	-1559.60	-638.36
		(428.70)	(531.66)	(1096.01)	(1098.09)	(2157.66)	(1522.58)
	D_4	-633.62	2235.45	-13187.11	-33787.04***	-24616.03*	-36990.49***
		(4545.16)	(4783.67)	(11093.22)	(10655.52)	(23061.77)	(9854.50)
p75	D_3	2270.89	-94.93	1679.33	-2298.15	-2181.29	-733.81
		(2092.46)	(1335.59)	(5097.12)	(2296.43)	(3823.65)	(2757.32)
	D_4	-1770.00	-7139.10	18185.10	-43584.05*	8755.48	-46555.12**
		(9417.99)	(9735.51)	(63392.36)	(26734.00)	(53725.97)	(23678.42)
p90	D_3	2937.33	1123.79	1567.12	-4076.15	194.85	-4253.29
		(4247.72)	(4987.33)	(9443.00)	(3534.23)	(7741.08)	(3241.25)
	D_4	-45940.78	-50611.32	-5933.32	6600.99	56132.61	-37776.09
		(35909.33)	(39509.33)	(50548.67)	(41276.33)	(54338.96)	(44508.27)
p95	D_3	2065.99	3103.37	5590.09	-3875.57	-481.75	-10844.61
		(5834.32)	(7206.88)	(12346.67)	(7388.73)	(10102.92)	(6735.48)
	D_4	-55176.79	-21519.76	-103427.00	-27061.75	91331.33	-75445.32
		(45707.09)	(63983.22)	(73737.12)	(53329.91)	(85350.97)	(63666.77)
p99	D_3	19405.00	9646.45	7393.67	-24519.51	20791.26	-56925.28**
		(20469.63)	(16562.10)	(32634.95)	(34182.04)	(46735.05)	(25485.45)
	D_4	-155258.32	32965.22	-413585.33**	-230407.65	-337340.70*	-477485.23***
		(131084.35)	(190544.10)	(164450.13)	(148738)	(187007.91)	(121519.69)
Obs.		3872	2559	1313	5642	1759	3892

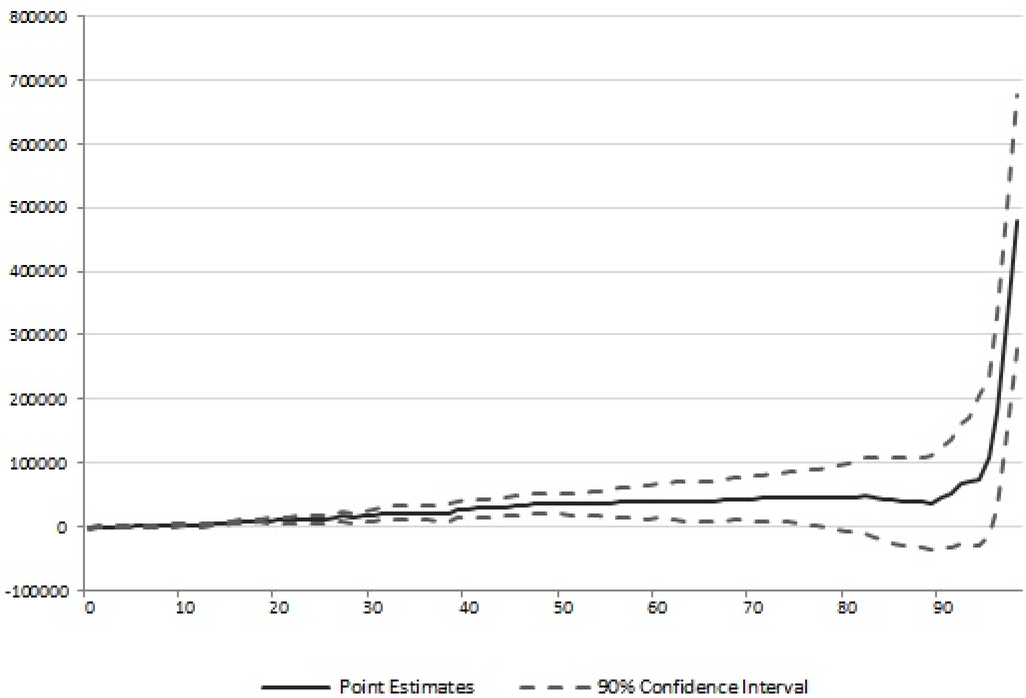
Notes: For the OLS estimates robust standard errors are reported in parenthesis. For the quantile regression estimates, bootsrapped standard errors (with a 100 bootsrap replications) are reported in parenthesis. For each demographic group, all quantile regressions are estimated simultaneously.*Significant at the 10% level, **significant at the 5% level, ***significant at the 1% level.

Figure 2 Quantile Regression Estimates D_3 for Married Males



Notes: The horizontal axis indicates the percentiles of the net worth distribution, while the vertical axis indicates the size of the coefficient estimate. For the sake of clarity and exposition, the sign of the effect is reversed.

Figure 3 Quantile Regression Estimates D_4 for Married Males



Notes: The horizontal axis indicates the percentiles of the net worth distribution, while the vertical axis indicates the size of the coefficient estimate. For the sake of clarity and exposition, the sign of the effect is reversed.

Focusing on the results for married males, the estimates for both D_3 and D_4 increase substantially as we move up the distribution. From the 10th to the 90th percentile the increase is moderate but persistent. We see then a substantial jump from the 90th to the 95th percentile (from -37 thousand to -75 thousand Euros for D_4), and then an even much more substantial jump from the 95th percentile to the 99th (from -75 thousand to -477 thousand Euros for D_4). We only find sufficient significance for the effect of D_4, indicating that length of illness has to be larger than ten years to have a statistically significant impact. In addition, we only find significance around the median and at the very top of the distribution. That is because to precisely estimate a quantile effect we need sufficient observations around the percentile of interest. We easily find significance around the median because there are many observations clustered around those percentiles. As we move towards the top, observations are more dispersed and we thus obtain larger standard errors. That is why at the 90th and 95th percentiles we do not obtain statistical significance even though the point estimates are substantially larger compared to the effects around the median. However, at the very top of the distribution, the effect is so large that even with few observations around those percentiles we get statistical significance.

Figures 2 and 3 show the quantile regression estimates for the impact of D_3 and D_4 for married males across the whole net worth distribution. The point estimates are surrounded by the 90% confidence intervals. We see there very clearly how in both cases the effect is rather close to zero for most of the distribution, but gradually increasing with the level of net worth. Regarding the D_3 estimates, they are mostly not significantly different from zero, except for at the very top of the distribution, where we see a very clear and large increase. At the 99th percentile, the point estimate is about -57 thousand Euros, implying that for the richest 1% an additional year of terminal illness decreases net worth by that quantity, which represents about 2.5% of the 99th percentile value corresponding to the distribution for married males displayed in Table 2. Regarding the estimates for D_4, Figure 3 shows a jump at the top of the distribution of a similar magnitude to the one in Figure 2. In that case, the estimate at the 99th percentile is about -477 thousand, implying that for the richest 1% having a terminal illness longer than 10 years decreases net worth by that quantity, which represents about 22.3% of the 99th percentile corresponding to the married males distribution in Table 2.

Following Kopczuk, we interpret these results as early bequests that result from estate planning triggered by the onset of a terminal illness. Since we expect estate planning to be pursued especially by the very rich, this interpretation of the result is strengthened by the fact that we indeed find the strongest and most clear effect at the top of the distribution. In addition, it is reasonable that we only find an effect for married individuals if we consider that most singles in our sample are females that are either widowed or divorced, implying that they have been through a shock that is likely to have already reduced their wealth considerably. It is reasonable as well that, within the married category, we only find an effect for married males if we consider that most individuals dying while married in our sample are in fact males. Furthermore, when we observe death of married females it is mostly due to rather unexpected deaths since they are not usually preceded by a lengthy illness. These considerations are indeed a reflection of the fact that females have a higher life expectancy than males. These results match with those in Kopczuk's study since he also finds a stronger effect among married males. In fact, the bulk of his analysis is conducted solely on married males due to missing data on income for other demographic categories.

5.2 Age Interaction

Table 4 shows the results we obtain for married males when we interact D_3 and D_4 with age. For that purpose, we generate three age dummies which divide the sample into three groups: those below 65 years, those between 65 and 80, and those above 80. Following Kopczuk (2007), there are two reasons why we would expect an age differential. First, according to Kopczuk individuals tend to procrastinate estate planning until the moment they are struck by an illness that is potentially terminal, or by any other factor that substantially increases their chances of dying. Independently of having a terminal illness, younger individuals have a longer expected remaining lifetime horizon compared to older individuals. They are thus less likely to have engaged in any estate planning, and thus, everything else equal, a terminal illness is likely to have a stronger effect on younger individuals. Second, in our regressions we are always comparing individuals who are treated, *i.e.* individuals with $D_3 > 0$ or $D_4 = 1$, with individuals in the control group while keeping age fixed. Since age correlates with frailty, the control group is always more meaningful for younger individuals in the sense that it is more likely to be composed by healthy individuals not affected by any factor triggering estate planning.

In table 4 we see the same regressions as in Column 6 of Table 3, but decomposed into the three age groups. We have interacted D_3 and D_4 with the three age dummies and computed the corresponding effects for each age group. We estimate all of the quantile regressions simultaneously and test the null hypothesis that all interaction coefficients are equal to zero. We reject the null hypothesis at the 5% level, indicating that it does make sense to interact length of terminal illness with age. Comparing the three columns in Table 3, we see that for the percentiles around the median we find a significant effect only for the middle aged and older groups. However, when we look at the top of the distribution, we see that the effect of both D_3 and D_4 is clearly larger and more significant for the younger group. More specifically, at the top of the distribution we find that, for the younger group, having a terminal illness of more than ten years reduces net worth at death by close to 0.9 million Euros. The effect for the middle aged group appears not to be significant, and for the older group we find a significant effect but substantially smaller compared to the effect estimated for the younger group.

Table 4 Results: Age Interaction for Married Males

		Dependent Variable: Net Worth at the End of Life		
		Age<65	65≤Age<80	Age≥80
		(1)	(2)	(3)
OLS	D_3	-7128.98	-4889.11	-3221.01
		(6899.22)	(5877.78)	(4111.93)
	D_4	-75889.45	-45897.51	-59223.28
		(38456.65)	(40123.27)	(68001.92)
p10	D_3	-1031.20	350.13	-373.53
		(892.75)	(271.15)	(348.65)
	D_4	52.95	-371.50	-5654.56
		(10165.72)	(1913.59)	(3453.76)
p25	D_3	2263.64	136.76	-1532.43***
		(3326.97)	(635.24)	(578.41)
	D_4	15776.93	-2572.52	-17535.42***
		(17202.22)	(4986.18)	(5272.83)
p50	D_3	-4076.08	868.88	-2062.06
		(5048.99)	(1937.90)	1974.34
	D_4	-26503.36	-34700.62***	-35010.94**
		(26638.07)	(12544.37)	(16538.10)
p75	D_3	-1017.27	-513.32	-629.07
		(5178.66)	(3695.32)	(5900.27)
	D_4	-108509.62	-11465.16	-66313.73*
		(77969.99)	(43174.02)	(35936.22)
p90	D_3	-8579.06	-3451.63	-2687.42
		(11728.57)	(7188.28)	(5167.18)
	D_4	16736.22	-40777.02	2676.68
		(339619.10)	(56379.88)	(72353.92)
p95	D_3	3496.19	7525.79	-14824.35*
		(21600.45)	(12972.88)	(8684.73)
	D_4	117079.77	-14164.99	-103888.10
		(294695.93)	(105314.44)	(94428.92)
p99	D_3	-104405.32**	-45774.98	-52073.25**
		(52671.68)	(97822.02)	(25684.74)
	D_4	-895665.69***	-544301.72	-364813.82**
		(355467.58)	(345976.90)	(166222.98)
Obs.		973	1751	1168

Notes: For the OLS estimates robust standard errors are reported in parenthesis. For the quantile regression estimates, bootsrapped standard errors (with a 100 bootsrap replications) are reported in parenthesis. All quantile regressions are estimated simultaneously. Each column reports marginal effects for each subgroup. Number of observations in each subgroup are reported. The total number of observations employed in each regression is still 3892. *Significant at the 10% level, **significant at the 5% level, ***significant at the 1% level.

5.3 Children Interactions

Table 5 shows the results we obtain for married males when including the children variables in the regression, *i.e.* the $\boldsymbol{X}_{2i}$ vector introduced in Section 4, and when we interact length of terminal illness with the number of children. The first row in that table shows that when we introduce the children variables (*i.e.* number of children, average age of children and average lifetime income of children) the results change slightly but not substantially. The coefficient estimates become somewhat smaller and somewhat less statistically significant. This change may be due to the presence of a relation between fertility and health outcomes later in life. However, investigating this issue is beyond the scope of this paper. To interact the number of children we generate three dummies which again divide the sample into three groups: those with no children, those with one child, and those with two or more children. We interact the dummies with both D_3 and D_4 and in Table 5 we report the estimated effects for each subgroup.

Following the same procedure as for the age interaction, we estimate all of the quantile regressions simultaneously and test the null hypothesis that all interaction terms (in all estimated quantile regressions) are equal to zero. In this case, we fail to reject the null hypothesis at the 10% level, indicating that there is no significant interaction between estate planning and the number of children. This outcome can be due to two reasons. First, there are very few married males in our sample who have no children. Therefore, it is difficult to reach a conclusion when comparing individuals with and without children. Second, relevant contributions to the literature on the bequest motive (*e.g.* Kopczuk and Lupton, 2007) suggest that having children is not necessarily a clear indicator of the presence of a bequest motive, which may be because individuals can indeed have motivations to die with positive wealth other than transferring it to their children.

Table 6 shows the results we obtain for married males when interacting length of terminal illness with average lifetime income of children. For that purpose we generate four dummy variables, one for each quartile of the average lifetime income of children distribution. We construct these dummies in such a way that they can only take value one when a deceased individual had at least one child living outside of the household in 2003. We include thus a dummy indicating this condition, and interact it as well with length of terminal illness. With this specification, the coefficients in Table 6 refer to the effects only for the sub-sample of deceased married males who had at least one child living outside of the household in 2003. Just like with the previous interactions, we test the null hypothesis that all of the interaction coefficients (across all quantiles) are equal to zero. In this case we reject the null hypothesis at the 5% level, but only for the effect of D_4.

Table 6 shows that there is a much more clear and stronger effect of D_4 for those married males who die with children whose average lifetime income is at the bottom half of the distribu-

Table 5 Results: Number of Children Interaction for Married Males

		Dependent Variable: Net Worth at the End of Life			
		No Interaction	N. Children=0	N. Children=1	N. Children≥2
		(1)	(2)	(3)	(4)
OLS	D_3	-3897.23	6877.12	4270.57	-6041.98
		(3851.90)	(24417.41)	(14072.08)	(3943.54)
	D_4	-49707.12*	-111259.51	-72987.38	-41446.55
		(29079.57)	(127902.29)	(58653.75)	(31792.54)
p10	D_3	-48.68	185.23	-267.45	-20.35
		(253.72)	(865.37)	(637.52)	(293.50)
	D_4	-2210.66	-366.54	-2075.36	-2303.38
		(2037.69)	(9861.95)	(10132.06)	(2136.08)
p25	D_3	-835.98*	-569.38	-2780.53*	-582.14
		(471.32)	(1338.35)	(1684.16)	(539.23)
	D_4	-8575.192**	-17758.11	2209.033	-8653.256
		(4068.86)	(30894.05)	(14289.13)	(5322.14)
p50	D_3	-211.21	-4372.01	-6825.34**	829.60
		(1563.42)	(3644.34)	(3242.02)	(1877.95)
	D_4	-28836.56***	-60292.10	-19355.49	-28423.99**
		(10606.89)	(83211.38)	(30740.21)	(12288.99)
p75	D_3	-743.20	-19917.32*	-7124.93	-338.20
		(3322.21)	(11791.46)	(9672.91)	(3828.28)
	D_4	-51498.94*	-78031.22	-117066.92**	-40081.17
		(27784.84)	(157781.20)	59377.33	(32652.38)
p90	D_3	-3781.15	-4378.73	-781.81	-4320.98
		(3547.06)	(17435.69)	(33657.18)	(4001.21)
	D_4	-35214.23	232394.88	-101226.59	-38489.01
		(41157.80)	(252195.31)	(122709.41)	(47942.96)
p95	D_3	-4952.69	-13507.03	45959.58	-7824.70
		(8185.23)	(51030.51)	(52780.61)	(8967.48)
	D_4	-59609.24	349593.46	-122388.83	-70201.89
		(6608.21)	(288562.42)	(196787.71)	(68458.89)
p99	D_3	-40241.56**	-175093.00	-39700.31	-42716.74*
		(18071.41)	(1895707.88)	(707654.99)	(25442.71)
	D_4	-395190.00***	-1450934.92	-987394.20***	-259360.71
		(98787.61)	(1000074.01)	(364710.23)	(237235.74)
Obs.		3892	375	921	2596

Notes: For the OLS estimates robust standard errors are reported in parenthesis. For the quantile regression estimates, bootsrapped standard errors (with a 100 bootsrap replications) are reported in parenthesis. All quantile regressions are estimated simultaneously. Each column (except for Column 1) reports marginal effects for each subgroup. Number of observations in each subgroup are reported. The total number of observations employed in each regression is still 3892. *Significant at the 10% level, **significant at the 5% level, ***significant at the 1% level.

Table 6 Results: Lifetime Income of Children Interaction for Married Males

		Dependent Variable: Net Worth at the End of Life			
		1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
		(1)	(2)	(3)	(4)
OLS	D_3	-17400.72	-1496.22	6189.80	-7009.51
		(26481.89)	(7358.71)	(8954.24)	(9205.29)
	D_4	-341395.82**	-5647.17	85604.01	-36003.73
		(147764.41)	(58949.28)	(72946.08)	(62300.81)
p10	D_3	774.96	-175.06	-614.86	118.59
		(3077.57)	(738.30)	(754.85)	(771.05)
	D_4	-19980.64	-31.28	-3891.44	-8182.96
		(12488.41)	(145.25)	(3666.82)	(9852.18)
p25	D_3	-425.95	-560.06	-1150.32	-234.32
		(5996.58)	(1419.99)	(1427.46)	(1782.62)
	D_4	-32881.72	-3192.58	-9556.74	6397.76
		(27796.00)	(2994.12)	(8213.01)	(7894.39)
p50	D_3	3793.78	-2053.22	-1489.82	-2595.67
		(9926.94)	(3683.89)	(3743.26)	(3788.21)
	D_4	-106197.62**	-16631.99**	-19185.66	-36402.27
		(46960.61)	(7855.02)	(20456.82)	(41258.85)
p75	D_3	-10857.56	6558.49	10.03	-8722.31
		(26143.44)	(6707.08)	(8645.44)	(7559.05)
	D_4	-323885.71***	-54107.71***	45271.99	-92411.30
		(93411.53)	(15011.90)	(48222.14)	(91825.11)
p90	D_3	20970.04	-4604.56	-4195.60	-15059.26
		(50543.62)	(13662.97)	(14341.07)	(13740.45)
	D_4	-672073.36**	-2241.59*	32579.00	-114653.91
		(331178.58)	(1252.22)	(38550.89)	(118552.01)
p95	D_3	-50298.72	13781.66	13400.89	-23849.24
		(73748.41)	(18829.39)	(23388.78)	(19239.45)
	D_4	-1327571.03**	-67019.23*	-2370.12	-158234.93
		(590114.41)	(38098.56)	(8523.33)	(169336.12)
p99	D_3	-1131629.41**	-43790.23*	-1315.98	-36809.77
		(489926.55)	(26223.08)	(1558.77)	(33221.78)
	D_4	-1.09e+07***	-201321.22**	-359022.04*	-99850.78
		(3551152.90)	(101715.97)	(185566.23)	(103332.12)
Obs.		973	973	973	973

Notes: For the OLS estimates robust standard errors are reported in parenthesis. For the quantile regression estimates, bootsrapped standard errors (with a 100 bootsrap replications) are reported in parenthesis. All quantile regressions are estimated simultaneously. Each column reports marginal effects for each subgroup. Number of observations in each subgroup are reported. The total number of observations employed in each regression is still 3892. *Significant at the 10% level, **significant at the 5% level, ***significant at the 1% level.

tion. In addition, as Column 1 shows, the effect is specially strong for those with children at the bottom quartile of the distribution. For the latter, we see very large effects, with the estimated effect for D_4 at the median being already just above -100 thousand Euros. At the 95th percentile we find that the effect is already above -1 million Euros, and at the 99th percentile we find an exorbitant estimate which is around -10.9 million Euros. The latter estimate means that for married males around the 99th percentile of the net worth distribution and with children at the bottom quartile of the lifetime income distribution, having a terminal illness above ten years long implies a decrease of -10.9 million Euros in net worth at the time of death. It reasonable to find succh an interaction with average lifetime income of children since the literature suggests (*e.g.*, see McGarry, 2016) that recipiency of parental transfers has a strong negative correlation with income. McGarry (2016) also finds that they correlate with events such as job loss and divorce which usually have a negative impact on income. This last result suggest that individuals do care about the income level of their children in relation to their own when making decisions about estate planning and early bequests.

6 Conclusions

In this paper we have used Dutch administrative data to study the presence of a bequest motive motive for saving. Following the strategy of Kopczuk (2007), we have done so by regressing length of terminal illness on net worth at time of death. Splitting our sample by gender and marital status and employing quantile regression, we do find a significant effect for married males that is specially strong at the top of the net worth distribution. More specifically, we find that for married males around the 99% of the net worth distribution, having a terminal illness of more than ten years decreases net worth at death by about -477 thousand Euros, which is around 22.3% of the 99th percentile corresponding to the distribution of net worth at the end of life for married males. Since we control for age and lifetime income, and the Dutch setting prevents from any role of medical expenditures and income shocks interfering in our analysis, we interpret these result as early bequests that result from estate planning triggered by the onset of a terminal illness. We therefore conclude that bequests represent a relevant motive for saving for Dutch married males.

This is a reasonable result given that Van Ooijen *et al.* (2015) already observed that Dutch individuals hold on to high levels of wealth until the very end of their lives. Since the precautionary motive related with uncertain out of pocket medical expenditures is not really applicable in the Netherlands, it makes sense to find evidence of a bequest motive. However, we should make clear that we only find clear evidence at the very top of the net worth distribution, and only for married males. On the one hand, finding only clear evidence at the very top coincides with the recurrent view in the literature of bequests as luxury goods (*e.g.*, see Kopczuk and Lupton, 2007;

and De Nardi and Yang, 2014). At the same time, we would expect already *a priori* that estate planning is a relevant issue especially among the very rich. On the other hand, it is reasonable that we only find an effect for married individuals if we consider that most singles in our sample are females that are either widowed or divorced, implying that they have been through a shock that is likely to have already reduced their wealth considerably. It is reasonable as well that, within the married category, we only find an effect for married males if we consider that most individuals dying while married in our sample are in fact males, since they have in general a lower life expectancy than females.

We find that most of the effect we estimate at the top of the net worth distribution for married males comes from those who are younger than 65 years at the moment of death. Following Kopczuk's interpretation, since younger individuals have a longer expected remaining lifetime horizon compared to older individuals, they are less likely to have engaged in any previous estate planning, and thus, it makes sense to find a stronger reaction for them in terms of estate planning when incurring a terminal illness. Additionally, we find no significant interaction of length of terminal illness and the presence and number of children. On the one hand, this result might be due to the fact that most married males in our sample have children, thus it is difficult to compare individuals with and without children. On the other hand, this result is in line with the argument by Kopczuk and Lupton (2007), who claim that having children is not necessarily a good predictor of the presence of a bequest motive, since individuals may have a variety of reasons to save for a bequest other than passing it on to their children.

We do find an interesting interaction effect when considering the average lifetime income of children. Conditional on having children living outside of the household, we find that the effect of having more than ten years of terminal illness on net worth at death is much stronger for those with children at the bottom quartile of the lifetime income distribution. This result suggests that individuals do care about the economic situation of their children (relative to their own economic situation) when making decisions about saving and bequests, and it is in line with the work by McGarry (2016), who finds that income negatively correlates with recipiency of parental transfers. Additionally, this last result suggest that individuals at the very top of the net worth distribution care about ensuring a certain level of wealth for their descendants. This argument supports the idea of intergenerational transfers as a mechanism through which economic inequality is passed on from one generation to the next.

Given our results, we conclude that the bequest motive is of importance to understand saving at the end of life, especially among the very rich. Therefore, the bequest motive should be always considered in any model explaining retirement savings, especially if it is to be applied in a context in which precautionary saving due to uncertain medical expenditures is unlikely to play a role. Another issue, is whether the result we find responds to early timing of bequests due to tax incentives. In the Netherlands there is a progressive tax on inheritances and inter-vivos gifts, which offers the possibility to considerably reduce tax payments if the estate is split and transferred in portions. However, investigating whether taxes are the reason why individuals who are terminally ill start transferring their wealth before they die is beyond the scope of this paper. Nevertheless, in the Netherlands there was a substantial change of the inheritance tax schedule in 2010. Therefore, an interesting venue for future research is to expand our dataset beyond 2010 and further investigate the tax motive.

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