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ESTATE TAXATION AND THE INTERGENERATIONAL TRANSMISSION OF WEALTH[‡]

The Role of Bequests in Shaping Wealth Inequality: Evidence from Danish Wealth Records[†]

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Intergenerational transfers are one of the main channels through which economic outcomes of subsequent generations are linked. Influential literature that originated in the 1980s (Kotlikoff and Summers 1981; Modigliani 1988) and is summarized in Davies and Shorrocks (2000) focused on the contribution of bequests to aggregate wealth (or capital stock). Recent work of Piketty (2011, 2014), brought back to the forefront the question of the role of bequests in shaping inequality.

In this paper, we use Danish administrative records that allow us to observe wealth of parents and children and employ an event study design to characterize how the flow of bequests following death of a parent influences the level and distribution of wealth among children age 45–50.[1] In our companion papers (Boserup, Kopczuk, and Kreiner 2015a, b) we study more generally the strength of intergenerational wealth correlation, accounting for the role of human capital transmissions, inter vivos gifts, and bequests.

We find that bequests increase average wealth of recipients by about 36 percent implying that bequests account for 26 percent of average post-bequest wealth.

It is unclear a priori whether bequests are dis-equalizing or equalizing. Bequests may disproportionately benefit poor individuals and reduce inequality, or they may primarily increase wealth of people who are already wealthy and enhance inequality.

We find that bequests increase the variance of wealth (censored at first and ninety-ninth percentiles) by 33 percent and that this level is the same three years after parental death. The percentiles in the wealth distribution increase, and the higher the percentile the larger the absolute increase. Thus, bequests stretch the distribution to the right. This large increase in *absolute* inequality is not reflected in *relative* inequality measures such as top wealth shares. For example, the top 1 percent wealth share decreases by 6 percentage points from a pre-bequest level of 31 percent. Thus, whether bequests are dis-equalizing or equalizing depends on whether inequality is measured in absolute terms or relative terms.

I. Institutional Background

Denmark has forced heir-ship rules implying that one-fourth of the inheritance has to go to the close family of the deceased, with an equal split between the spouse and their children. For close family (other) recipients, bequest is taxed at a flat rate of 15 (36.25) percent above the basic

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[1] In a contemporaneous paper, Elinder, Erixson, and Waldenström (2015) pursue a related analysis using Swedish administrative data.

allowance, which in 2015 equals DKK 272,900 (corresponding to around US$40,000). A spouse may retain undivided possession of the estate, implying that wealth is not transferred to the next generation before death of both parents. Gifts above a small yearly allowance are taxed at the same rates as bequests, and wealth is untaxed in Denmark.

II. Data and Empirical Approach

Our empirical analysis is based on population and wealth registers from Statistics Denmark. Population registers enable us to link individuals born in 1960 and onward to their parents. Wealth registers contain the aggregate value of asset holdings and liabilities of each individual in the population at the end of the year. This information is based mainly on third-party reports from financial institutions to the Danish tax agency about the value of deposits, bonds, listed stocks, and all types of debt carrying an interest rate. In addition, the cash value of property is assessed by the tax agency.[2] The data does not include information on pension wealth. We observe wealth of both parents and children from 2003 to 2013 or until death. More details about the wealth registers may be found in Boserup, Kopczuk, and Kreiner (2015b).

A limitation of our data is that we do not observe inheritances directly. However, we do observe wealth of a parent in years preceding death, so that we effectively observe *potential bequests*. We also observe changes in children's wealth that reflect receipt of the *actual* bequest. Another strength of the data is that the analysis of the consequences for the wealth of the next generation accounts not only for bequests, but also for other wealth transfers taking place shortly before death and expenditures of children related to parental deaths.

The longitudinal nature of our data and large sample size allow us to implement a simple and transparent approach, where we compare the distribution of wealth among those whose parent dies in 2010 (treatment group) to those whose parent remains alive (control group) in the years before and after parental death. We present our results graphically and illustrate that the parallel trends assumption is consistent with the data. We focus on children who are between 45 and 50 years old in 2010, so that parents are observed in the data; and restrict attention to those with a single living biological parent in 2009, so that parental death corresponds to the flow of bequests to children (rather than to a surviving spouse).[3] This yields a sample of 6,252 individuals in the treatment group and 148,166 individuals in the control group.

It is well-known that time of death is related to socioeconomic status implying that wealth of parents (and children) is lower in the treatment group than in the control group. To facilitate comparison of children receiving bequest with those not receiving bequest, we order parents by average wealth in 2003–2009 and reweight the

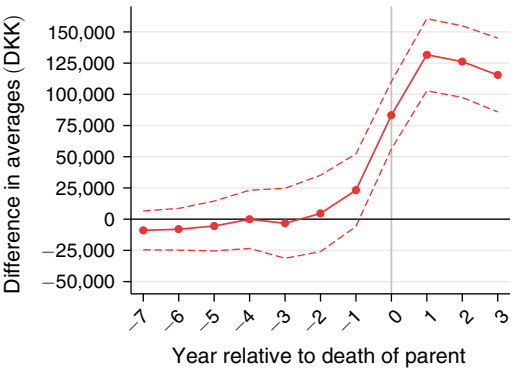

FIGURE 1. EFFECT OF DEATH OF THE PARENT ON WEALTH OF THE CHILD

Notes: The graph shows the difference in the average wealth of children in treatment and control groups. The control group reweighted to match, for each child cohort, the percentile distribution of parental wealth in the treatment group. Percentile ranks of parents are calculated within each child cohort based on average wealth seven years before death. Amounts in 2010 DKK, $1 = DKK5.6. Distributions censored at first and ninety-ninth percentiles. Dashed lines are 95 percent confidence intervals based on standard errors clustered by parents (who may have more than one child).

[2] It is well-known that assessed housing values for tax purposes are often lower than market values. We follow Leth-Petersen (2010) and scale up registered housing values by the average ratio of actual house prices to assessed values for the houses sold in the period 2003–2013, which gives a scaling factor of 1.16.

[3] The parent may have remarried. In this case, spouse and children each inherit half of the estate of the deceased when the parent dies unless stated otherwise in a will. The spouse cannot retain undivided possession of the estate unless children give their consent.

Table 1—Effect of Bequests on the Wealth Distribution

	Control group wealth level 2011	Treatment—control DiD 2011 versus 2008	95% confidence	
Average	352,124	127,130	111,960	172,309
Percentiles				
10	−339,739	26,926	11,230	48,557
25	−101,304	24,592	16,864	29,472
50	81,987	75,175	50,920	96,317
75	568,347	155,534	136,010	197,151
90	1,282,101	330,872	275,594	411,299
95	2,009,479	397,805	259,975	549,765
99	5,284,129	875,789	614,781	1,902,831

Notes: Average and percentiles of the control group distribution (column 1) and the difference-in-differences estimates of the impact of bequests on the average and percentiles using 2008 and 2011 comparison (column 2). 95 percent confidence intervals (columns 3 and 4) based on 1,000 bootstrap replications clustered by parents. Distributions censored at first and ninety-ninth percentiles. All amounts in 2010 DKK. $1 = DKK 5.6.

control group to match the percentile distribution of the treatment group for each child cohort. In the online Appendix, we display average parental wealth in the treatment group compared to the control group before and after reweighting, as well as the difference in average wealth of the children in the two groups before reweighting, which may be compared to the weighted version displayed in Figure 1.

III. Results

Figure 1 shows the average wealth of children in the treatment group relative to the (weighted) control group, with the corresponding 95 percent confidence interval. In years preceding death of the parent, there is almost no difference between the two groups (note that matching is on parental wealth rather than child wealth), supporting the parallel trends assumption. After death of the parent, child wealth increases markedly relative to the level of wealth observed in the control group. Due to the timing of inheritance, this effect is partially visible in the year of death and is fully phased in the year after death of the parent. The increase in the year before death of the parent, although not significant, may reflect pre-death wealth transfers in order to avoid paying the bequest tax (Kopczuk 2007). In the second and third year after parental death, the effect weakens slightly, but this is statistically insignificant.

In Table 1, we report the difference-in-differences estimate of the change in the average wealth level of the treatment group from $t = -2$ to $t = 1$ relative to the (weighted) control group, which is equal to DKK 127,130. Comparing this estimated change to the average wealth level of the control group at $t = 1$, we find that bequests on average increase wealth by 36 percent. Equivalently, bequests account for 26 percent ($=0.36/1.36$) of overall wealth of the treatment group, which is closer to the estimate of Modigliani (1988) than the one by Kotlikoff and Summers (1981).[4]

In the rest of the paper, we analyze the distributional consequences of bequests. Figure 2, panel A, shows the impact on the variance of wealth. Distributions are censored at percentiles 1 and 99 for each group in each year to abstract from very low and very high wealth; we analyze the development of the top 1 percent separately in what follows. The graph shows the difference between the variances of the treatment and control group measured relative to the variance of the control group. There is little difference between the groups before parental death. Following death of a parent, the variance increases by 33 percent relative to the control group. Under the parallel trends assumption, this is the causal estimate of the effect of receipt of

[4] These results and Figure 1 are based on wealth distributions censored at the first and ninety-ninth percentiles. Without censoring, bequests on average increase wealth by 34 percent and bequests account for 25 percent of overall wealth of the treatment group.

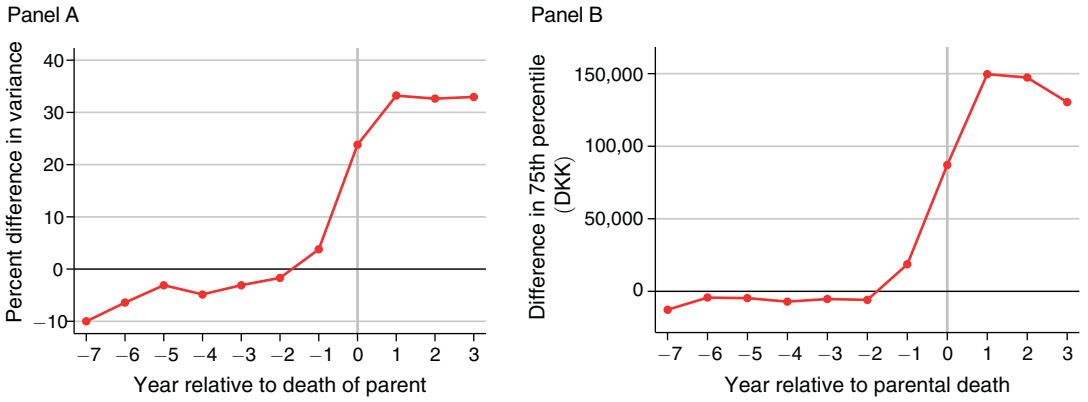

FIGURE 2. EFFECT OF BEQUESTS ON THE VARIANCE AND THE SEVENTY-FIFTH PERCENTILE OF THE WEALTH DISTRIBUTION

Notes: Percentage difference in variance of treatment group relative to control group (panel A), and difference between treatment group and control group in the value of the seventy-fifth percentile (panel B). Variance based on the distributions censored at the first and ninety-ninth percentiles. Weighting as in Figure 1. $1 = DKK5.6 in 2010.

inheritance on the variance of the wealth distribution outside of the top and bottom 1 percent.

Panel B of Figure 2 shows the impact of bequests on the seventy-fifth percentile of the wealth distribution. It is computed by taking the difference between the seventy-fifth percentiles of the treatment group and of the (weighted) control group. In line with the parallel trend assumption, the curve is flat until the year before death of a parent, with almost no difference between treatment and control groups, and then jumps up to a new level of around DKK 150,000. Similar graphs for other percentiles reveal qualitatively the same type of development, but quantitatively we observe that the increase is larger the higher the percentile. This is summarized in Table 1, which also shows the wealth level of each percentile without including bequest, calculated from the control group. All the percentiles increase, but the amounts are small in the lower part of the distribution and increase as we move up in the distribution, implying that the distribution widens everywhere.

Much of recent work on inequality has focused on *relative* rather than *absolute* inequality. While bequests increase variance, they might still equalize relative distribution. For example, a proportional increase in wealth levels of everybody increases variance without affecting top wealth shares and the Gini coefficient. In that respect, notice from Table 1 that

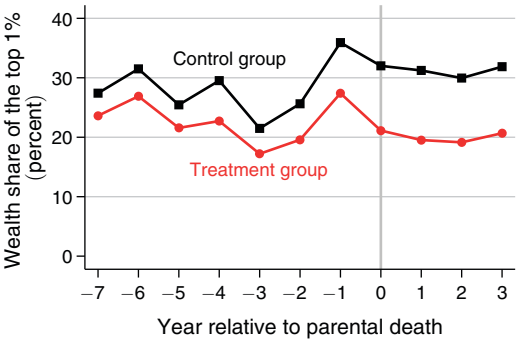

FIGURE 3. EFFECT OF BEQUESTS ON TOP 1 PERCENT SHARE OF WEALTH

Notes: Top 1 percent share in the treatment and control groups. Weighting as in Figure 1.

the median wealth level increases by more than 90 percent, while the wealth level of the ninety-ninth percentile only increases by 17 percent. Thus, although the median increases by a small amount compared to the ninety-ninth percentile, the increase is large relative to the low baseline level of wealth holdings.

Due to negative wealth at the lower part of the distribution and its high concentration, the Gini coefficient is not particularly informative. In the following, we focus on the impact of bequests on wealth shares.

Table 2—Effect of Bequests on Wealth Shares

Wealth group	Control group wealth level 2011 (percent)	Treatment—control DiD 2011 versus 2008 (percentage points)	95% confidence interval	
Top 1 percent	31.2	−5.7	−6.9	−3.9
Top 5 percent	61.4	−8.4	−10.1	−6.9
Top 10 percent	81.4	−9.9	−12.3	−8.7
Top 5–1 percent	30.1	−2.8	−3.9	−1.3
Top 10–5 percent	20.0	−1.5	−2.8	−0.6

Notes: Wealth shares in the control group distribution (column 1) and difference-in-difference estimates of the impact of bequests on top wealth shares using 2008 and 2011 comparison (column 2). 95 percent confidence intervals (columns 3 and 4) based on 1,000 bootstrap replications clustered by parents.

Figure 3 displays the development over time in the share of wealth owned by the top 1 percent richest within the treatment group and within the control group, respectively. Before death of a parent, the top 1 percent wealth share of the treatment group is a little below the level of the control group, but the two curves are reasonably parallel and co-vary around a share of 20–30 percent. Afterwards, the gap between the two curves clearly increases and remains stable in the three years after death of the parent. This implies that bequests decrease the wealth share of the top 1 percent group. We observe the same qualitative pattern if looking at the top 5 percent group or the top 10 percent group.

The results are summarized in Table 2. The first column shows wealth shares without bequests obtained from the control group. We obtain a top 1 percent wealth share of 31 percent and a top 10 percent share of 81 percent. Our main results in column 2 show that bequests reduce the top shares and also decrease the wealth shares of the intermediate groups (top 5–1 percent and top 10–5 percent). For example, the top 10 percent share decreases by 10 percentage points from an original level of around 81 percent (and, correspondingly the share of wealth of the bottom 90 percent increases by the same amount).

The estimated wealth shares are comparable to the US ones (see Kopczuk 2015 for a discussion). The top 1 percent share in the United States is estimated to be between 35 and 40 percent depending on the method and the top 10 percent wealth share is around 80 percent. These US estimates are a mix of before- and after-bequests distributions. Our results suggest that the pre-bequest distribution corresponds to higher wealth shares, while the after-bequest distribution corresponds to lower wealth shares than these estimates indicate.

IV. Conclusions

Comparison of wealth holdings of children whose parents die to those whose parents do not allows for identifying the effect of bequests on the distribution of wealth of the next generation. Our results show that bequests have on impact a large effect throughout the distribution and increase the overall variance of wealth by about 33 percent. This large increase in absolute inequality does not carry over to relative inequality measures such as top wealth shares. On the contrary, top wealth shares decrease. For example, the top 1 percent wealth share decreases by 6 percentage points from the without-bequest level of 31 percent.

Our estimates are by their nature short term effects. We study the effect only three years out and, by construction, over time parents in the control group are beginning to die as well. In the online Appendix, we follow the same cohorts but look instead at deaths in 2007, where children are 42–47 years old, and compare the individuals to a control group where the parent is alive in 2013.[5] The impact on average wealth is DKK 125,000 at $t = 1$ as in Figure 1 and more than 60 percent of this effect is still present

[5] The disadvantage of this strategy is the much larger difference in timing of parental deaths, which makes treatment and control groups less similar.

six years after. The impact on the variance in Figure 2 and on the top 1 percent wealth share in Figure 3 becomes slightly larger for this sample and these effects are almost unchanged up to six years after death of the parent.

Bequests are only one of the channels behind intergenerational transmission of wealth. Our companion papers (Boserup, Kopczuk, and Kreiner 2015a, b) study the role of inter vivos transfers received in childhood and, more generally, the intergenerational correlation of wealth over the life-cycle, which depends in part on wealth transfers, but also on intergenerational dependency in human capital formation and savings patterns.

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