The Role of Bequest 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 the 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 both parents and children and employ an event study design to characterize how the flow of bequests following death of a parent influences the distribution of wealth among children age 45–50.[1] In our companion papers (Boserup, Kopczuk and Kreiner 2015*a*,*b*) we study more generally the strength of intergenerational wealth correlation, accounting for the role of human capital transmissions, inter-vivos gifts, and bequests.

It is unclear per se 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 1st and 99th 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% wealth share decreases by around 5 percentage points from a pre-bequest level of 30 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 $\frac{1}{4}$ 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 allowance, which in 2015 equals DKK 272,900 (corresponding to around USD 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. Bequests are not recorded. The population registers enable us to link individuals born in 1960 and onwards to their

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

parents. The 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 (SKAT) 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 (2015*b*).

A limitation of our data is that we do not observe the size of inheritance directly. However, we do observe wealth of a parent in years preceding death, so that we can effectively observe *potential bequests*. We also observe changes in the wealth of children that reflects the receipt of the *actual* bequest. Moreover, the strength of the data is that the analysis of the consequences for the wealth of the next generation includes not only bequest, but also other wealth transfers taking place before death and expenditures of the children related to the death of the parents.

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. This simple approach lends itself to graphical presentation of the results and allows us to 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, implying that parents are observed in the data, and restrict the sample to those with a single living biological parent in 2009, so that death of the parent corresponds to the flow of bequests to children (rather than to a surviving spouse).[3] This gives a sample of 6,252 individuals in the treatment group and 148,166 individuals in the control group.

It is natural to expect that wealth and time of death are correlated. When dividing parents in the sample into wealth percentiles (computed within each cohort of the children), we find that parents who die are on average at about percentile 47 in the seven years preceding death, with little trend. This should be compared to the average percentile of the control group, which is very close to 50 because the control group is large compared to the treatment group. To facilitate the comparison of children receiving bequest with a counterfactual sample of children not receiving bequest, we order parents by average wealth between 2003 and 2009 and reweight the control group to match the percentile distribution of wealth of the treatment group.[4]

III. Results

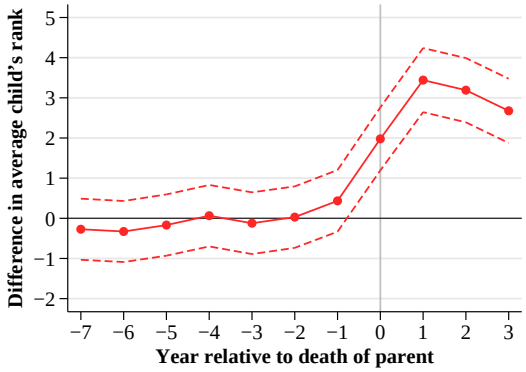
Figure 1 shows the (weighted) rank/percentile of children in the treatment group relative to the control group, with the corresponding 95 percent confidence interval. First, in years preceding death of the parent, the ranks are virtually identical (note that matching is on parental wealth rather than child wealth) with no trend, supporting the parallel trends assumption.

[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.

[4]Figure A.1 in the electronic appendix shows average parental ranking in the treatment group compared to the control group before and after re-weighting. The correlation between parental wealth and time of parental death combined with intergenerational dependency in wealth makes it natural to expect that child wealth differs between treatment and control groups. Indeed, children in the treatment group are on average 1 percentile below those in the control group in the child within cohort wealth distribution before death of the parents. Figure A.2 in the electronic appendix displays the unweighted rank of children in the treatment group compared to the control group, which may be compared to the weighted rank of children displayed in Figure 1.

Figure 1. Effect of Death of the Parent on Rank of the Child



Note: The difference in the average weighted rank of children in control and treatment group matched using parental rank, within each child cohort, based on average wealth in the seven years before death. Dashed lines illustrate 95 percent confidence interval based on standard errors clustered by parents (who may have more than one child).

Table 1—Effects of Bequests on the Wealth Distribution

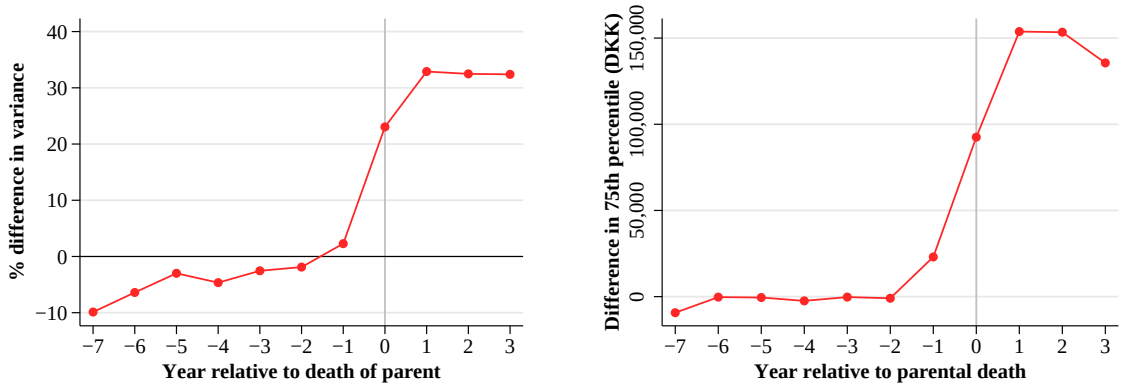
	Control group wealth level 2011	Treatment – control DiD 2011 vs. 2008	95% confidence interval	
Average	386,769	137,841	111,212	170,852
Percentiles				
10	-343,689	27,863	11,972	53,632
25	-104,337	24,820	16,067	29,370
50	76,980	72,367	48,150	93,503
75	564,236	154,703	133,674	196,493
90	1,275,613	331,043	273,180	413,470
95	2,002,400	400,460	277,906	545,415
99	5,300,830	856,483	643,243	1,811,232

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

Death of a parent shifts children up by about 3 percentiles in the counterfactual, without-bequest wealth distribution of 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.

Table 1 reports the difference-in-difference 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 gives DKK 137,841 (all amounts in 2010 DKK, \$1 = DKK5.6). If the estimated change in wealth is compared to the average wealth level of the control group at $t = 1$, we find that bequest on average increases 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).

Figure 2. Effects of Bequests on the Variance and the 75th Percentile of the Wealth Distribution



Note: Percentage difference in variance of treatment group relative to control group (left panel), and difference between treatment group and control group in the value of the 75th percentile (right panel). Variance based on the distributions censored at the 1st and 99th percentiles. Weighting as in Figure 1. \$1 = DKK5.6 in 2010.

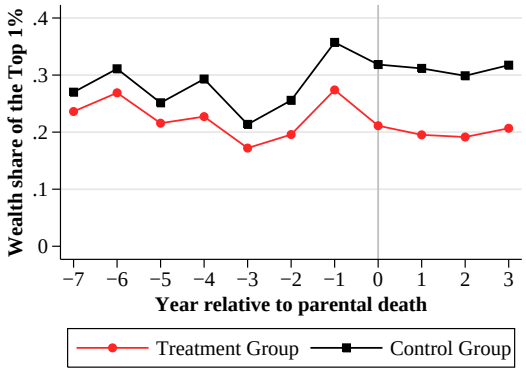
In the rest of the paper, we analyze distributional consequences of bequest. Panel A of Figure 2 shows the impact on the variance of wealth. Distributions are censored at percentiles 1 and 99 for each group in each year to abstract from very low and very high wealth; we analyze the development of the top 1% 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 inheritance on the variance of the wealth distribution outside of the top and bottom 1%.

Panel B of Figure 2 shows the impact of bequests on the 75th percentile of the wealth distribution. It is computed by taking the difference between the 75th 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 close to zero difference between the treatment and control group, and then jumps up to a new level of around DKK 150,000. Similar graphs for other percentiles in the distribution 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 the relevant 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 the 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 the median wealth level increases by more than 90 percent, while the wealth level of the 99th percentile only increases by 16 percent. Thus, although the median increases by a small amount compared to the 99th percentile, the increase is large relative to the low baseline level of wealth holdings.

Because of negative levels of 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.

Figure 3. Effect of Bequests on Top 1% Share of Wealth



Note: Top 1% share in the treatment and control groups. Weighting as in Figure 1.

Figure 3 displays the development over time in the share of wealth owned by the top 1% richest within the treatment group and within the control group, respectively. Before death of a parent, the top 1% wealth share of the treatment group is a little below the level of the control group, but the two curves are reasonably parallel and covary around the share of 30 percent. Afterwards, the gap between the two curves clearly increases to a new level and remains stable in the three years after death of the parent. This implies that bequests decrease the wealth share of the top 1% group. We observe the same qualitative pattern if looking at the top 5% group or the top 10% 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% wealth share of 30 percent and a top 10% share of 80 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% and top 10-5%). For example, the top 10% share decreases by 10 percentage points from an original level of around 80 percent (and, correspondingly the share of wealth of the bottom 90% increases by the same amount).

The estimated wealth shares are not so different from US estimates (see Kopczuk 2015, for a discussion of the U.S. estimates). The top 1% share in the U.S. is estimated to be between 35 and 40 percent depending on the method and the top 10% wealth share is around 80 percent. These U.S. estimates are a mix of before- and after-bequests distributions. Our results suggest that the pre-bequest distribution is likely to correspond 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 27 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% wealth share decreases by around 5 percentage points from the without-bequest level of around 30 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, so that a simple comparison of that kind many years out cannot identify

Table 2—Effects of Bequests on Wealth Shares

Wealth group	Control group wealth share 2011 (percent)	Treatment – control DiD 2011 vs. 2008 (percentage points)	95% confidence interval	
Top 1%	31.2	-5.6	-7.2	-4.1
Top 5%	62.0	-8.8	-10.0	-7.2
Top 10%	82.4	-10.5	-12.8	-8.8
Top 5-1%	30.8	-3.1	-4.3	-1.4
Top 10-5%	20.4	-1.7	-3.1	-0.6
Top 50-10%	51.8	-1.1	-2.9	0.6

Note: 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 3–4) based on 1,000 bootstrap replications clustered by parents.

the effect of bequest in the longer run. Having said that, we found no evidence that the increase in inequality of wealth that follows the receipt of inheritance dissipates within the first three years.

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

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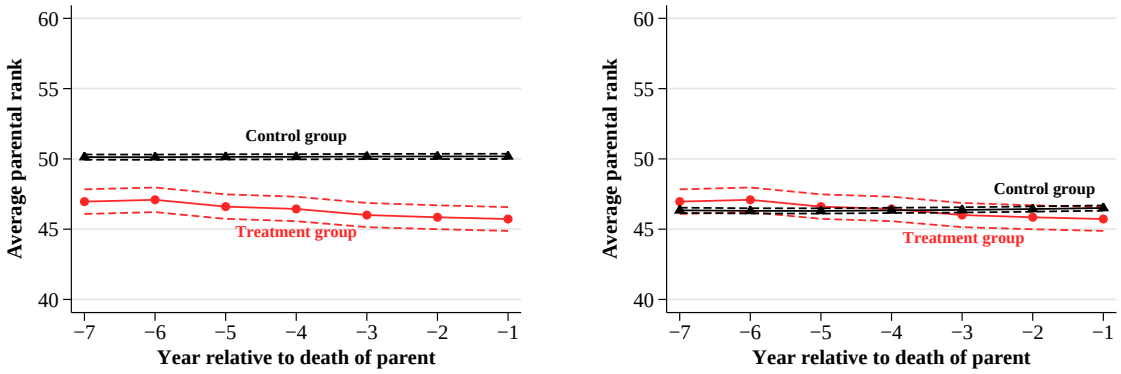
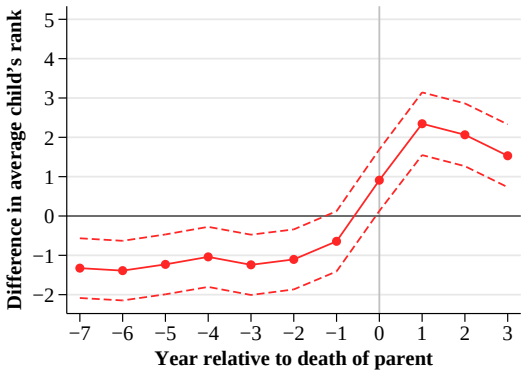
Figure A.1. Position of Parents in the Parental Wealth Distribution



Note: Average percentile rank of T-group parents and C-group parents in the parental wealth distribution computed within each child-cohort. The left panel shows unweighted averages, while the right panel shows the result when reweighting the control group to match the percentile distribution of the treatment group based on the average wealth between 2003 and 2009.

Figure A.2. Position of the Treatment Group Children in the Child Wealth Distribution



Note: Unweighted average percentile rank of children in the T-group relative to the C-group, which may be compared to the weighted rank of children displayed in Figure 1.