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“Parental Allocations to Children:
New Evidence on Bequest Differences Among Siblings”

by

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**Parental Allocations to Children:
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Abstract--We use new survey-based data on siblings to assess the potential role of bequests in either redistributing income among siblings or affecting offspring behavior as implied by prominent models. The data are not focused on the upper tail of the wealth distribution and include both own and sib reports on own bequests and on sib's bequests, enabling the use of a flexible measurement model. Our results indicate that bequests are received by almost two-thirds of eligible decedents, average bequest amounts are a significant fraction of annual earnings, and there are significant differences between siblings with respect to schooling, earnings, and visits with parents. However, there are not significant sib differences in bequests once measurement error is incorporated into the analysis.

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I. Introduction

The family is at the center of critical human capital investment decisions and financial transfers. These, in turn, affect the productivity, labor earnings and income of individuals and the distribution of earnings and income among individuals. For such reasons there have been a number of efforts to model the determination of allocations among children in the family and to provide empirical evidence related to such allocations. Among the most prominent models of such allocations are the “wealth model” of Becker and Tomes (1976) and the “strategic bequest” model of Bernheim, Schleifer and Summers (1985).

The Becker and Tomes wealth model develops and explicates what is now economists' standard model of human capital investment and intrafamily allocation. The efficiency and distributional implications of this model, although distinct, are intimately related. The usual description of the wealth model is straightforward: altruistic parents provide children who have different abilities with different but efficient amounts of human capital, equating the marginal returns to investments in schooling with the return to financial assets; hence, siblings generally receive different earnings. The wealth model implies that parents generally "reinforce" differences in their children's "endowments" by investing more in children with larger endowments and then use transfers (inter-vivos gifts and post-mortem bequests) to achieve their distributional objectives. For example, parents with equal concern for their children distribute transfers so as to equalize their children's wealth.¹

The Bernheim, Schleifer and Summers (1985) “strategic bequest” model implies that parents use bequests strategically to induce contacts with their children. That is, parents induce more contacts with

¹ As Becker (1981) acknowledges, the wealth model's strong conclusions about efficiency and equity hold only if the level of resources devoted to children is sufficiently high: if parents are not sufficiently rich or sufficiently altruistic to provide all of their children with positive transfers, the wealth model does not imply that human capital investments are efficient. Behrman, Pollak and Taubman (1995) elaborate this model in cases in which parents do not devote sufficient resources to the children to equalize their wealth.

their adult children by encouraging sibling competition for parental resources potentially expendable on offspring. Bernheim *et al.* estimate the response of visits and telephone calls from adult children to bequeathable wealth using the Longitudinal Retirement History Survey and find results that they characterize as “extremely favorable” to their model (p. 1067).

A common implication of these two prominent models of intergenerational relations within families is that parental transfers to children should vary among children as long as children differ in either their endowed characteristics or in their behaviors.² The wealth model implies that, if parents have equal concern about their children, they compensate for labor earnings differentials due to ability and human capital differentials by giving greater transfers to the less-endowed children. The strategic bequest model implies that parents give greater transfers to the children who devote greater attention to them. Transfers could be in the form of inter vivos gifts or bequests. However, studies of inter-vivos transfers suggest that these are relatively small in absolute terms (e.g., Cox and Rank, 1992; Rosenzweig and Wolpin, 1994; and Altonji *et al.*, 1996) and that the differences between siblings in reported transfers would not offset much of the difference in earnings between siblings. Behrman, Pollak and Taubman (1995) report that in the PSID sibling differences in “help from relatives” would offset one percent or less of the earnings or income differential.³ It would seem, therefore, that differences in bequests received by siblings must be important if indeed parental transfers are playing the compensating role hypothesized in the wealth model or the compensatory role for contacts hypothesized in the strategic bequest model.

² Not all models of households have this implication. For example, the “Separable-Earnings-Transfers” model of Behrman, Pollak and Taubman (1982) does not.

³As is well known, random measurement error may bias such coefficients towards zero. The use of earnings averaged over six years apparently eliminates much of such measurement error (see Behrman and Taubman 1990, Solon 1992, and Zimmermann 1992). It would require very large measurement error indeed for the true effects to be substantial in the sense of accounting for, say, a fifth of the earnings gap.

There are only a few studies in the literature that provide evidence on the distribution of bequests among siblings. Prominent studies have relied on administrative records. These have the advantage of accuracy in measurement, at least with regard to differences between recipients. They have the disadvantage, however, that the minimal size of estates that require filing is very large. For example, in the mid-1980s, the Federal filing limit was raised to \$300,000 and filings are only 1.5 percent of decedents. Current data using administrative records thus cannot be fully informative about the use of bequests in the general population.

Studies based on administrative records do tend to show equal bequests among those with very large estates. Menchik (1980) studied the division of large estates among siblings using data from Connecticut for the period 1930-45. He found equal sharing predominated, and estate shares were independent of estate size.⁴ Wilhelm (1996) used the Federal Estate Tax Files for 1982 for estates of at least \$300,000. The IRS has matched these files with inheritors' federal income taxes returns for 1981 when they can be found for all inheritors; the resulting matched sample contains 5,777 decedents. For this small segment of the population, Wilhelm finds equal sharing among siblings in about two-thirds of the cases and shares within 5 percent of equal sharing in 90 percent of the cases. Moreover, for children receiving unequal bequests, the difference in transfers is not related to the difference in earnings.

Tomes (1981), in contrast to Menchik and Wilhelm, has used information on bequests from a sample of recipients that is not focused on the upper tail of the distribution. Tomes studied estate shares using a sample of beneficiaries drawn from Cleveland probate records of 1964-65, which covered all estate sizes. In 1970 he collected data on bequests from the recipients in his sample using a combination of mail questionnaires and interviews. Tomes found that less than half of the siblings reported bequest

⁴This conclusion holds even if he included reported inter-vivos gifts and imputed grandparents' bequests to grandchildren to their parents.

amounts that were equal to what their siblings had reported. That there were differences between reported bequests received by different siblings is consistent with the possibility that bequest differences are playing the roles implied by the wealth model or the strategic bequest model. However, Menchik (1988) studied a random sample of wills obtained from the Cleveland probate records for the same time period as Tomes. He found based on the administrative records that about 80 percent of sibships shared the estate equally. Menchik's study suggests that respondent self-reports of bequests may contain considerable measurement error, perhaps arising from the five to six years that elapsed between the bequest and the survey.

The previous studies on bequests thus indicate that bequest differences among siblings in the very top tail of the income distribution are not likely to play the major roles suggested by the wealth model or the strategic bequest model. But there is considerable less certainty about the role of bequests in the general population because of problems in the measurement of bequests from survey data. In this paper we use new survey-based data on siblings (twins) to assess the potential role of bequests in either redistributing income among siblings or affecting offspring behavior. The families from which these data were collected are not concentrated in the upper tail of the wealth distribution. Moreover, the data include both own and sib reports on own bequests and on sib's bequests. Thus, we are able to employ flexible measurement error models of bequest reporting. The data also have some other special features that make them very useful for this exploration. They include information on differences between siblings in schooling, earnings, and visits with parents as well as bequests, so it is possible to examine to what extent differences in bequests are related to other sib-differences, as suggested by the wealth and strategic bequest models.

Our results indicate that bequests are received by almost two-thirds of eligible decedents, and average bequest amounts are a significant fraction of annual earnings. We also find that there are

significant differences between siblings with respect to schooling, earnings, and visits with parents. There also are significant differences in reports of own bequests. But there are not significant sib differences in bequests once measurement error is incorporated into the analysis. Thus the results are not consistent with the implications regarding bequest differentials of either the wealth model or of the strategic bequest model. We also conduct further tests of the latter model – namely, we investigate whether including sib characteristics in the determinants of contacts between adult children and their parents significantly affects those visits, as would be implied if adult children-parental contact were the result of competition. We do not find any significant effects of sib characteristics.

II. Data and Estimates

a. The Minnesota Twins Survey

We use data from a new survey of a subset of twins from the Minnesota Twin Registry (MTR) based on a survey instrument designed by Paul Taubman and us in collaboration with the Temple University Institute of Survey Research. The MTR is the largest birth-record-based twins registry in the United States, assembled over the 1983-90 period starting with birth records on all twins (both monozygotic and dizygotic) born in Minnesota in the period 1936-1955. Details of the MTR are in Lykken, *et al.* (1990).

The survey instrument was mailed out in May 1994 to the 5862 members of same-sex pairs for whom the MTR had current addresses. An additional 776 members of same-sex pairs for whom updated addresses had been located between May and September 1994 were sent questionnaires in November 1994. 3682 twins returned a completed questionnaire, for a response rate of surviving twins of over 60%.⁵ The characteristics of the intact twin pairs, the characteristics of the sample of twins in which only one

⁵ The item response on returned questionnaires is very high, exceeding that on recent Current Population Surveys and the 1990 Census. For example, only 9% of ever employed workers in our sample did not answer the questions on earnings or self employment income; on the CPS more than 20% do not.

twin responded to the survey, and the population of individuals residing in Minnesota in 1990 from the same birth cohorts, as reported in the 5% sample of the U.S. Census, are quite similar (Behrman and Rosenzweig, 1999). Thus, the sample of twins respondents appears to be reasonably representative of all individuals born in Minnesota between 1936 and 1955.

b. The Orphan Sample: Bequests

We use the information on parental bequests from the subsample of twins both of whose parents had died to estimate sibling bequests differentials. There are two key features of the orphan sample of twins for this purpose. First, we have reports of actual bequests for two siblings so that it is possible to see to what extent actual bequests in fact differ across siblings for a sample of respondents without extraordinary family wealth. Second, information is provided by each respondent on his or her own bequest and on his/her twin's bequest. We thus have, for intact twin pairs, two reports on each individual bequest.

820 twins reported that both parents had already died by the time of the survey, with 758 providing information on their inheritance and the dates of death for each parent. In this sample, almost two thirds reported receiving some bequest. In addition, for 265 twin pairs we have both own and cross reports for each twin in the pair. The first column of Table 1 provides information on the inheritances for all orphan twins reporting inheritances (including the 35% who reported receiving no bequest). All bequest amounts were converted to 1993 dollars based on the date of death of the last surviving parent. The data indicate that the average inheritance reported by the orphaned twins was \$17,314 1993 dollars, about one-half of current full-time earnings, and was received on average at age 42 by these twins. Bequests are thus not confined only to a small proportion of the population, nor are bequests on average a trivial resource.

Based on the twins' reports of what they and their twin received as inheritances, it appears,

however, that in fact few siblings received different bequests - 92.1% reported that their sibling received the same amount, and the average reported difference in bequests was less than \$2,000. However, among the 530 (265 pairs) respondents for which we have reports from both twins on their own and their twin's inheritances (column 2), we see that the cross-sibling difference in inheritances based on own reports is over \$9,000. This discrepancy between what the twins say their twin received and what each twin says he or she received suggests that there is considerable measurement error in the reporting of inheritances.⁶

We use the information on own and twins' cross reports on their twin's inheritance from the sample of twins pairs to test the hypothesis that the observed inter-twin differences in reported own inheritances solely reflect measurement error.⁷ We employ the measurement model for twin pairs:

$$\begin{aligned}
 & I_{11} = \mu + \epsilon_1 + e_{11} \\
 (1) \quad & I_{12} = \mu + \epsilon_1 + e_{12} \\
 & I_{22} = \mu + \epsilon_2 + e_{22} \\
 & I_{21} = \mu + \epsilon_2 + e_{21},
 \end{aligned}$$

where I_{ij} , $i, j=1, 2$ and $i=j$, is twin i 's report of his own inheritance, I_{ij} , $i \neq j$, is the report by i 's twin of twin j 's inheritance, e_{ij} , $i=j$, is the measurement error in twin i 's own inheritance report, e_{ij} , $i \neq j$, is the measurement error in twin i 's report on his twin's inheritance, μ is the common component to the twin's true inheritances, and the ϵ_i are the twin-specific components of the twin's inheritances. The hypothesis that we want to test is that $\epsilon_1 = \epsilon_2 = 0$, that the true inheritances are the same. As in the usual measurement error models, we assume that the measurement errors are uncorrelated with both of the

⁶On average for the sample, the inheritance was received 9 years prior to the survey, with half of the sample reporting inheritances received more than 7 years before the survey date.

⁷Comparisons of columns 2 and 3 in Table 1 suggest that the subsample of 265 intact twin-pair twins for which we have both an own report and a report on the inheritance of the twin's twin are not especially different from all twins whose parents had died by the time of the survey.

orthogonal (common and twin-specific) components of the true inheritances. We also assume that the measurement errors in the twin's own reports are uncorrelated and that the variances of the own and cross reports are the same across twins. However, we allow the measurement error in the report of any twin i on his own inheritance to be correlated with his report on his twin's inheritance and the variances in own and cross errors to differ.

The first column of Table 2 reports the estimates of the measurement model applied to inheritances from the 265 twin-pairs whose parents had both died. The estimates of both the measurement error variances and the common components of the twins' inheritances are statistically significantly different from zero. Not surprisingly, measurement error is high, with errors in measurement making up almost 25% of the total variance in inheritances. Moreover, the errors in the twins' own reports and their reports of their twin's inheritance are highly correlated. In contrast to the significance of the measurement error, the sibling-specific component of the total variance in inheritances is not significantly different from zero, with the point estimate indicating that the specific component is an economically trivial 0.6% of the total variance. Almost all of the sib differences in inheritances thus appears to be noise.

For comparison, we estimate the same measurement model for the same sample but applied to the twin's schooling attainment, for which we also have own and cross reports.⁸ Unlike for inheritances, there is little discrepancy between what the twins report to be the within-twin differences in schooling and what the own reports by each twin reveal - the average sib difference in grades of schooling completed reported by each twin is 1.30 years ($sd=1.64$), about 10% of average schooling levels, while the average difference in own reports is 1.28 years ($sd=1.66$). Consistent with this, the estimates from the

⁸ We again allow the error in the own report of a twin and that in his/her cross-twin report to be potentially correlated, as in Ashenfelter and Krueger (1994).

measurement model applied to the schooling reports, provided in the second column of Table 2, indicate that the measurement errors in schooling are relatively low - less than 10% of the total variance in schooling is evidently measurement error.⁹ Moreover, in contrast to the reports of inheritances, there appear to be true differences across twins in schooling, with the statistically significant sib-specific component accounting for more than a third of the total variance in schooling (over 37% of the “true” variance).

c. Couples with Surviving Parents and In-laws: Visits

One possible reason that bequests do not differ significantly across the siblings in our sample is that the siblings, who are twins, behave quite similarly. If all twins visited their parents equally it would not contradict the strategic bequest model that bequests were also allocated equally. We have seen, however, in Table 2 that the twins are not identical with respect to schooling differences. We now examine whether sib differences in schooling and other characteristics affect sib differences in visits with parents. We use a sub-sample of 710 married couples for which each partner had at least one surviving parent at the time of the survey.¹⁰

Key information provided in the data include (i) the numbers of days in the past year each respondent spent at least some time with parents and with in-laws, (ii) the earnings, schooling, and non-earnings income (by source) of individual respondents and spouses, and (iii) characteristics of respondents, their spouses, their parents and their in-laws, including their location (town and state). The location information reported for each parent and in-law and for each couple were used to compute the

⁹ This is consistent with the findings in Bielby, Hauser and Featherman (1977) in their study of measurement error in schooling reports from the 1973 CPS and with the estimates presented in Ashenfelter and Krueger (1994).

¹⁰ We excluded couples in which both in-laws had died so that there are similar alternatives to visiting the twins’ parents across couples.

time-minimizing driving distance between every couple and each of the sets of parents of the two partners using software that provides distances between any two locations in the continental United States based on geo-coded road maps.¹¹

The average number of days in which the respondent visited with either parents or in-laws, excluding those respondents who worked on a regular basis with their parents or in-laws, was 66,¹² with the average couple residing about 280 miles from parents and in-laws. Almost half of the sample respondents lived less than one hour's driving time from parents.¹³ The data also indicate that approximately half of the sample respondents or spouses with at least one surviving parent had already lost a parent.

The first column of Table 3 reports for the orphaned twins sample a regression of the differences in reported bequests across the twins on the differences in their schooling, the highest wage in their family and their number of children. Not surprisingly, given the prior results on the significance of sib-differences in bequests, the differences in sib characteristics account for none of the variation in bequest differences. In contrast, the same specification applied to visits with parents across twins with at least one surviving parent explains a statistically significant proportion of the variance in differences in visits - evidently twins

¹¹Distances between parents and offspring in the data set used by Perozek (1998) to test the Bernheim, *et al.* (1985) model are based on estimates by respondents. It is not known how accurately individuals are able to gauge distances or whether such accuracy depends on the number of visits. The software we used is Street Atlas USA by Delorme, Version 5.0. The program also computes travel time. Distance and travel time are highly correlated ($r > .97$) and our results using distances are not changed when travel times between couples' and parents', or in-laws' residences are used instead.

¹² Only 1.3% of the couples with at least one surviving parent and at least one surviving in-law had zero visits. The distribution of visits is somewhat skewed, with a median of 37 days of visits. For that reason we also have undertaken the estimates with log visits as the dependent variable below. The implications of the estimates are the same as we discuss below.

¹³5.5% of the couples lived in the same town or city as either the parents or in-laws. Few couples lived in the same town with both, however. Five of the couples co-resided with parents or in-laws. They are excluded from the sample.

do not visit with their parents equally, but they receive equal bequests. Threats of disinheritance, if they are ever made, are not credible and are not likely to be the source of any observed relationships between visits with parents.

We can again exploit the sibling-based sampling frame of the survey to test the hypothesis that siblings interact importantly in parental visit decisions. We specify a reduced-form visit equation for a sibling as a function of his/her own household characteristics, his/her parents' household characteristics, and his/her twin's household characteristics. The first column of Table 4 reports estimates of the determinants of visits with parents for all twins in intact twin-pairs with at least one surviving parent based on a specification including household characteristics for the parents and the twin. In this specification, the set of twin-specific characteristics - own schooling, own distance from parents, own number of children, total annual household earnings, and marital status - and the set of parental characteristics - father and mother schooling level, total number of children of the parents, and survival status - are each jointly statistically significant determinants of visits of each twin with parents. In the second column, estimates are reported from the specification that adds the household characteristics of the twin sibling. The set of "cross" effects associated with the sibling's characteristics is not statistically significant, while both the own and parental characteristics retain their statistical significance. There does not appear to be any significant interaction between siblings in observed parental visit behavior as implied by the inter-sibling model of strategic bequests.¹⁴

III. Conclusion

In this paper we have used unique data on twin siblings to assess the importance of bequests in

¹⁴Another way to specify this test is to estimate directly the effects of a twin's sibling's visits with the parents on the amount of his/her own visits using the twin's siblings unique characteristics as instruments. Not surprisingly, given the estimates in Table 4, the two-stage least squares estimate of the cross-sibling visit effect is not statistically significant.

shaping offspring behavior and as a tool for equalizing incomes among offspring. Our findings indicate that most children receive bequests from parents and that on average bequests are a non-trivial addition to income. We also find that parents tend to leave equal bequests among their children within families throughout the income distribution, not just in the top tail on which previous studies have focused. Our results also suggest, however, that surveys eliciting information on bequests are likely to lead to erroneous inferences about intrafamily bequest distributions without attention to measurement error.

Our finding of equality in the intrafamily distribution of bequests is clearly inconsistent with one of the most prominent models of intrahousehold allocations – the wealth model, which has been influential in shaping economists’ understanding of household allocations between generations. These results thus suggest that households pursue their distributional goals among their children primarily through their human capital investments and not through compensatory bequests. In concert with our findings that visits to parents among siblings also differ substantially and that sibling characteristics do not significantly affect an individual’s parental visits, our findings on the equality of bequests also call into question models in which parents use threats of disinheritance to elicit more visits with their children.¹⁵ Our findings thus suggest that alternative explanations may also be needed on why individuals under-annuitize.

¹⁵ The Bernheim *et al.* model implies that in equilibrium disinheritance never occurs. But presumably in equilibrium visits by siblings also do not differ, in contrast to our findings. In addition, their finding that parental visits are positively correlated with parental wealth can be given an alternative explanation based on a household bargaining framework (Behrman and Rosenzweig, 2002).

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Table 1
Means and Standard Deviations: Parental Inheritances of Twins for Orphaned Twins

	All Sample twins	Both Twins Reporting
Average inheritance	\$17,314 (36,125)	\$16,316 (31,278)
Percentage with no inheritance	35.1	35.1
Average age in years at death of last surviving parent	75.5 (10.5)	75.8 (10.6)
Average age in years of twin at death of last surviving parent	42.0 (9.46)	42.2 (9.61)
Average reported difference between twins	\$1,942 (10,623)	\$1,408 (7,883)
Average difference in own reports	-	\$9,204 (20,449)
Number of twins	758	530

Samples include only twins both of whose parents had died by the time of the survey. Standard errors are in parentheses. All dollar amounts are in 1993 \$ with the CPI used for adjustments for amounts reported for earlier years.

Table 2
Variance Estimates: Test of Equality of Sibling Inheritances and Schooling

Variance component	Inheritance ($\times 10^{-8}$)		Schooling	
	Variance Estimate	Percent	Variance Estimate	Percent
Common (μ)	7.31 (3.40)	74.5	2.84 (7.81)	56.6
Sib-specific (ϵ)	.0611 (1.03)	0.62	1.70 (6.50)	33.9
Measurement error - own (e_i)	2.44 (3.56)	24.9	0.48 (4.53)	9.56
Measurement error - twin (e_{ij})	2.83 (3.84)	-	0.53 (4.73)	-
ρ_e	.90 (3.41)	-	.024 (0.36)	-

Number of twins=530. Absolute values of asymptotic t-ratios are in parentheses. Inheritance is measured in 1993 \$. Schooling is completed grades of schooling.

Table 3
Determinants of Inheritances and Parental Visits: Estimates Based on Sib-Differences

Sib characteristics	Reported Amount of Parental Bequest (1993 \$): “Orphan” Sample	Reported Number of Days Visited with Parents in 1993: Sample with at Least One Live Parent
Schooling level (completed grade)	-713 (0.97) ^a	-2.91 (1.91)
Wage of highest earner in sib’s family ($\times 10^{-2}$)	-.0352 (0.89)	-.108 (2.61)
Number of sib’s children	-844 (1.17)	-2.01 (1.23)
F (d.f, d.f.)	0.90 (3, 239)	3.95 (3, 951)
P-level	.443	.0082
Number of siblings	320	1708

a. Absolute values of t-ratios in parentheses.

Table 4
 Are Parental Visits a Game Among Siblings?
 Own, Parental and Twins' Determinants of Days Visiting with Parents

	(1)	(2)
Own schooling level in grades completed	-4.63 (4.33) ^a	-4.22 (3.20)
Own distance from parents in miles	-.0368 (11.7)	-.0358 (10.1)
Total annualized earnings in own family ($\times 10^{-2}$)	-.00644 (1.67)	-.00818 (1.96)
Own number of children	-.680 (0.36)	-1.35 (0.71)
Not married	17.1 (1.83)	13.7 (1.51)
Age of both twins in years	-14.2 (1.62)	-15.7 (1.73)
Age squared	.149 (1.61)	.162 (1.68)
Both twins female	5.51 (1.01)	4.14 (0.75)
Total number of parents' children	-4.65 (3.04)	-4.65 (3.05)
Fathers' schooling level in grades completed	2.62 (2.52)	2.65 (2.49)
Mother's schooling level in grades completed	-.670 (0.52)	-.309 (0.24)
One parent died	13.4 (2.41)	14.1 (2.53)
Twin's schooling level in grades completed	-	.0603 (0.04)
Twin's distance from parents in miles	-	-.00210 (0.44)
Total annualized earnings in twin's family ($\times 10^{-2}$)	-	-.00449 (0.72)
Twin's number of children	-	1.68 (0.90)

Twin not married	-	.132 (0.02)
Constant	412.1 (1.99)	437.8 (2.04)
R ²	.118	.117
F-statistic: own effect (d.f., d.f.)		21.5 (5, 836)
P-value		.0000
F-statistic: parent effect (d.f., d.f.)		3.97 (3, 836)
P-value		.0080
F-statistic: twin (cross) effect (d.f., d.f.)		0.36 (5, 836)
P-value		.877

a. Absolute values of t-ratios are in parentheses. All dollar amounts are in 1993 \$.