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New Evidence on Altruism: A Study of TIAA-CREF Retirees

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ABSTRACT

Economists make extensive use of two separate descriptions of private saving behavior: the life-cycle (or overlapping generations) model, and models with intergenerational altruism. Analysis of the two frameworks is quite different, as are many of the long-run policy implications. This paper looks at evidence, at the microeconomic level, for and against altruism as a principal determinant of private wealth holdings. The database is new: this paper uses a sample of annuitants in the TIAA-CREF retirement system. We employ a combination of qualitative and quantitative information. Results are: (i) one-half or more of the sample appears altruistically motivated. And (ii) saving for intentional bequests—amounting to about $350,000-$400,000 per family (at retirement) for about half the sample—seems to account for about 25 percent of average lifetime net worth for the whole group. If the definition of parental transfers is broadened to include spending on higher education for children and gifts (rather than just estates), the contribution of intentional transfers to lifetime average net worth climbs to 35-40 percent—in our sample.

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In broad terms, models of savings behavior can be thought of as falling into two categories. One consists of life–cycle, or overlapping generations, models (e.g., Modigliani and Brumberg [1954], Modigliani [1986], Diamond [1965], Auerbach and Kotlikoff [1987]). In these, each household's utility depends on its lifetime consumption stream. Saving is part of planning for retirement, a precaution against stochastic fluctuations in earnings, etc. If annuities carry transactions costs, families may also save to self–insure against outliving their resources — with "unintentional" bequests occurring for those who die young (e.g., Davies [1981]). Altruistic models make up the second category. The structure of the analysis is quite different from the life–cycle case because utility maximization covers multiple generations: parents' utility calculations include reference to the well–being of their grown descendants. (The latter is what this paper means by "altruism.") Examples are Becker [1974], Becker and Tomes [1979], Barro [1974], and Laitner [1992]. Parents with high earning abilities may save to build an estate, as well as for life–cycle purposes. Implications of the two frameworks can vary considerably, especially on questions of long–term policy. To take a polar case, compare Barro [1974] and Auerbach and Kotlikoff [1987] on national debt: in the latter case, government debt tends to lower the economy's steady–state capital stock and to raise the real interest rate; in the former, private intergenerational transfers will fully offset government deficits. The interpretation of distributional issues can clearly differ as well — with a systematic role for the financial well–being of one's parents in the altruistic model (e.g., Becker [1980] and Loury [1981]).

While most researchers would acknowledge some validity for both the life–cycle and altruistic models, the quantitative importance of altruism is controversial. For probably the best known line of contention, see Kotlikoff and Summers [1981], Kotlikoff [1988], and Modigliani [1986, 1988]. The most basic issue in this debate is actually the role of intergenerational transfers in general rather than altruism in particular — with Kotlikoff and Summers attributing more than half of U.S. private wealth accumulation to transfers, while Modigliani argues for a smaller share.

Other work also yields mixed results. Tomes [1981] and Menchik and David [1983] find evidence consistent with the altruistic model. In contrast, Hurd [1987] detects no difference in dissaving between elderly families with and without children — seemingly raising doubts about the significance of altruism. And, regressions in Hurd [1989] point to at most a very small role for intentional bequests.

On the other hand, using the same dataset as Hurd, Bernheim [1991] finds evidence that social security benefits and total lifetime resources affect the supply and demand for annuities in a manner which is "at odds with the accidental bequest hypothesis, as well as several other versions of the life cycle hypothesis, but is in harmony with the view that most individuals are motivated in part by the desire to leave bequests" [p.900].

In a recent empirical study, Altonji, Hayashi, and Kotlikoff [1992] investigate family lines for which several generations are represented in the Panel Study of Income Dynamics. Lacking measures of total spending, the authors use food consumption as a proxy. They check whether household income matters as an explanatory variable once family–line resources are taken into account. Their answer is, "yes" — supporting the life–cycle formulation. Turning the test around, dynastic resources appear to matter very little, after taking account of each family's own earnings — seemingly pointing to a small role for intergenerational altruism. In terms of policy implications, Altonji et al conclude [p.1196], "Our findings suggest, however, that very few U.S. households are altruistically linked at the margin in the sense that redistribution between the donor and recipient will be neutralized."

The present paper looks at evidence for and against intergenerational altruism in a new data set, collected by the authors in 1988, and partly designed to deal with such issues. Our goal is to shed additional light on the question of whether the complexities of an altruistic modeling framework are necessary for understanding private saving behavior, or whether a life–cycle formulation alone is sufficient. The sample is moderately high income and elderly. We examine the behavior of potential bequest donors. Employing both qualitative and quantitative information, we investigate the link between parents' goals on leaving estates and their net worth, and we examine the connection between child/parent resource ratios and parental savings.

This paper reports two basic results. First, it finds quite strong and widespread evidence of intergenerational altruism within our data set. Roughly one–half of the sample states that leaving an estate is important, and probit analysis shows that parents who are the most prosperous relative to their children are the best candidates for registering such sentiments. People who view leaving an estate as important carry more net worth into retirement, and their holdings are related to how well they expect their children to do relative to themselves. In the end, pessimism on the extent of altruistic connections may be unwarranted in the case of our sample — though even here linkages seem far from universal.

Second, we attempt to compare the quantitative importance of various motives, especially altruism, for wealth accumulation. Altruistic transfers at death seem to account for about 25% of our sample's net worth, averaged over entire life spans. Adding *inter vivos* gifts and contributions towards childrens' education, the fraction rises to 35–40%. The numbers apply only to our database, which contains households with relatively high lifetime incomes: presumably bequest–related wealth accumulation would be lower for households with lower earnings, and more than proportionately higher for those with greater earnings. Unintentional bequests are difficult to pin down in our data.

The organization of this paper is as follows: Section 1 very briefly surveys theories of saving, Section 2 discusses our dataset, Sections 3–5 present analysis, and Section 6 concludes.

1. Theoretical Models

This section briefly reviews the two classes of models alluded to above.

Begin with the altruistic framework. Consider a simplified version of the model of Becker and Tomes [1979], Menchik and David [1983], Laitner [1992], and others. A parent lives in periods 1 and 2; its grown child lives in 2 and 3. The parent's total earnings, Y^p, arrive in period 1; the child's, Y^c, in period 2. The parent receives inheritance I^p in period 1; the child receives I^c, from its parent, in period 2. The parent cares about its own consumption in period 1, C_1, its own consumption in period 2, C_2, and about its child's total resources, $Y^c + I^c$. Let the parent's preferences be[1]

$$U(C_1) + U(C_2) + V(Y^c + I^c). \tag{1}$$

Assume that $U(.)$ and $V(.)$ are strictly concave and increasing, with $U'(0) = \infty = V'(0)$. The price of consumption is 1, and the interest rate is 0. Treat Y^p, Y^c, and I^p as exogenous. The parent choses C_1, C_2, and I^c. Constraints are

$$C_1 + C_2 + I^c \leq Y^p + I^p, \tag{2}$$

$$C_1 \geq 0, \quad C_2 \geq 0, \quad I^c \geq 0. \tag{3}$$

The parent carries assets A into period 2:

$$A = Y^p + I^p - C_1.$$

Write the parent's utility–maximizing level of A as

$$A = A(Y^p + I^p, Y^c). \tag{4}$$

Let ϕ be the desired bequest in the absence of constraint $I^c \geq 0$ and write

$$\phi = \phi(Y^p + I^p, Y^c) \quad \text{and} \quad I^c = \max\{0, \phi\}.$$

We can see that desired C_1 and C_2, as well as $Y^c + \phi$, are nondecreasing in $Y^p + I^p$ and Y^c. Thus,[2,3,4]

$$I^c \geq 0 \quad \text{binds} \quad \Rightarrow \frac{\partial A(.)}{\partial Y^p + I^p} > 0 \quad \text{and} \quad \frac{\partial A(.)}{\partial Y^c} = 0, \tag{5}$$

$$I^c > 0 \quad \Rightarrow \frac{\partial A(.)}{\partial Y^p + I^p} > 0 \quad \text{and} \quad \frac{\partial A(.)}{\partial Y^c} < 0, \tag{6}$$

$$I^c = 0 \quad \text{or} \quad I^c > 0 \Rightarrow \frac{\partial \phi(.)}{\partial Y^p + I^p} > 0, \quad \text{and} \quad \frac{\partial \phi(.)}{\partial Y^c} < 0. \tag{7}$$

If preferences are homothetic, we have the additional implications

$$\frac{Y^p + I^p}{A} \cdot \frac{\partial A(.)}{\partial Y^p + I^p} + \frac{Y^c}{A} \cdot \frac{\partial A(.)}{\partial Y^c} = 1 \quad \text{and} \quad \frac{Y^p + I^p}{A} \cdot \frac{\partial \phi(.)}{\partial Y^p + I^p} + \frac{Y^c}{A} \cdot \frac{\partial \phi(.)}{\partial Y^c} = 1.$$

[1] See Laitner [1991] for an elaboration of this analysis which incorporates childrens' marriages. Notice also that here parents care about their grown children, but the children take no responsibility for their parents. This may be a legitimate approximation in view of the high resources of our parent sample. See Laitner [1988] for a model with 2–sided altruism.

[2] For (5), $A = C_2(Y^p + I^p, 0)$.

[3] For (6), $A = Y^p + I^p - C_1(Y^p + I^p, Y^c) = C_2(Y^p + I^p, Y^c) + \phi(Y^p + I^p, Y^c)$.

[4] For (7), $\phi = Y^p + I^p - C_1 - C_2$.

Laitner [1992] shows that given homotheticity and a random distribution of earnings in each cohort, the economy as a whole can grow in a steady state, the aggregate propensity to save can remain constant over time, and the aggregate ratio of wealth to GNP can be stationary. He also shows that in the long-term equilibrium, $I^c \geq 0$ does bind for the lowest-resource parents.

We could extend the model to cover *inter vivos* gifts and parental support for higher education (e.g., Menchik and David [1983], Cox [1987], and others). To encompass the former, for example, suppose each generation lives three periods, with parents and their adult children overlapping for two. Then to maximize their transfers' impact, parents who would otherwise make a bequests but who found their children liquidity strapped early in adulthood, would make *inter vivos* gifts in middle age. *Inter vivos* gifts are not the focus of this paper, in part because of their ambiguous role in wealth accumulation (see Section 5).

In the absence of altruism, we can simply drop $V(Y^c + I^c)$ from (1). Assets carried into the second period of life will tend to be reduced, as they need cover C_2 but not I^c. Conditions (5)–(6) collapse to

$$\frac{\partial A(.)}{\partial Y^p + I^p} > 0 \quad \text{and} \quad \frac{\partial A(.)}{\partial Y^c} = 0. \tag{8}$$

Bequests and inheritances need not disappear just because we omit altruism. Suppose, for example, that parents may or may not live a second period and that adverse selection and transactions costs preclude extensive use of annuities (e.g., Davies [1981], Abel [1985], Friedman and Warshawsky [1988], and others). Then even if $V(Y^c + I^c)$ is not part of (1), parents who die young may unintentionally leave large estates. However, (8) remains valid.

Yet another life-cycle variant substitutes for (1) a criterion

$$U(C_1) + U(C_2) + V(I^c). \tag{9}$$

See, for instance, Blinder [1975], Friedman and Warshawsky [1988], and Hurd [1989]. In (9), parents care about the absolute size of their bequest, I^c, but not about whether it makes a great or trivial addition to their child's resources. Neither utility functions nor budget constraints connect parents' optimization problems to other generations; hence, (8) holds, and (9) belongs in the life-cycle model category (as do its policy implications). Although bequests from (9) are not "altruistic" in our terminology, they are intentional — and we should consider such possibilities in interpreting our data.

In the end, an altruistic parent household may leave an intentional bequest, or it may be bound by the constraint $I^c \geq 0$. Life-cycle parents might fully exhaust their resources before death, unintentionally leave an estate, or leave an intentional but non-altruistic bequest. Evidence of bequests at death is not a sufficient basis for choosing between the two modeling frameworks. The contrast between (5)-(6) and (8) does, however, leave an empirical distinction for our analysis: $\partial A(.)/\partial Y^c < 0$ for altruistic parents who avoid a corner solution $I^c = 0$; in non-altruistic cases, $\partial A(.)/\partial Y^c$ is always 0.

2. The Data

Our data come from a sample of 1064 annuitants in the TIAA–CREF (Teachers Insurance and Annuity Association — College Retirement Equities Fund) retirement system, conducted in the Fall of 1988.[5] The data include an earnings history for each respondent, an inventory of the respondent's current family assets, pension flows, amounts of as–yet–unannuitized pension equity, inheritances and gifts, demographic information, and various attitudinal and expectational questions. TIAA–CREF drew a random sample of their retirees and mailed the questionnaire form. The response rate was .649 — see Juster and Laitner [1990]. For each respondent, TIAA–CREF data on pension amounts, age, sex, and chosen pension option were added from administrative files. Certainly the sample is not random: the households are almost all college or university faculty, administrators, or staff; they tend to be very highly educated and financially comfortable. Nevertheless, the sample may be representative of a broad group of professionals and middle managers, our households should be well–informed enough to carry out sophisticated lifetime savings strategies if any can, and they should be able to articulate a description of their behavior. Furthermore, the fact that our households fall mostly in the top 10–20% of the income distribution makes them particularly interesting for a study of altruism: Section 1 suggests that low income families may never escape corner solutions to manifest their altruism; the super rich almost unbdoubtedly leave large estates; but, our sample is in between.

We believe the data to be of high quality — see Juster and Laitner's [1990] comparisons with the Survey of Consumer Finances wealth data, and see the earnings dynamics regressions and comparisons below.

We limit our attention to cases in which the respondent is male and is the TIAA–CREF annuitant. Our reasoning is that we have only respondent earning histories, and given the age of the annuitants, male earnings would be the major component of family resources for most of the households. We end up with 425 cases, all men and non–bachelors.[6] The average age is 70, and about one fifth are past 75.

In terms of demographic characteristics, over 90% of the sample have children, with the great majority having two or more. Almost 90% are currently married (remember that widows of TIAA–CREF retirees have been excluded from the sample because we had no data on their husband's earnings). Respondents are highly educated: Almost three quarters of the sample have an MA or more, and over half the wives have at least a college degree. Table 2.1 provides some details on the age distribution and the distribution of lifetime resources.

The "lifetime resources" of each respondent family is a key variable in our analysis, corresponding to $Y^p + I^p$ above. Its derivation involves a sequence of steps. We outline them here, and provide details in the Appendix. Note that Y^p is lifetime earnings net of Federal income taxes and social security taxes, and gross of social security benefits and employer benefits. The annuitant survey contains no questions on spousal earnings or work

[5] The survey also covered younger people — ie, "participants" — in the same system. The participant data has somewhat different form. See Laitner and Juster [1992] for a preliminary analysis.

[6] The 425 total excludes 63 respondents who failed to provide earnings data.

experience; thus, the regressions below include spousal education as a separate dependent variable, and our Y^p encompasses only male earnings. We treat state and local taxes as user fees (ie, part of C_1 and C_2).

Our construction of Y^p begins with an earnings–dynamic equation. Respondents provide a retrospective earnings history for their full–time jobs. For each job, they identify the starting and ending dates and salaries (separately including outside earnings). There are an average of 7.3 useable salary–date pairs per case. From these we estimate a Mincer–type lifetime earnings equation, using the specification of Johnson and Stafford [1974]. Let xpr be years of work experience before final degree, xpo experience post degree, γ_i an individual–specific random effect, ϵ_{it} the remaining regression error for individual i at date t, $army_{it}$ a dummy which is zero if the participant is in the armed forces, $D_j(it)$ a time dummy,[7] and $ED_j(i)$ an education dummy.[8] Our dependent variable, y_{it}, is the earnings figure from date t normalized by the GNP price deflator. Equation (10a) applies to post–final–degree observations, and (10b) prior to degree:

$$\begin{aligned}\ln y_{is} = &\beta_1 + \beta_2 \cdot xpo_{is} + \beta_3 \cdot (xpo_{is})^2 + \beta_4 \cdot xpr_{is} + \beta_5 \cdot (xpr_{is})^2 + \beta_6 \cdot xpr_{is} \cdot xpo_{is} + \\ &\beta_7 \cdot army_{is} + \sum_{j=0}^{18} \tau_j \cdot D_j(is) + \sum_{j=2}^{5} \xi_j \cdot ED_j(i) + \gamma_i + \epsilon_{is}, \end{aligned} \tag{10a}$$

$$\begin{aligned}\ln y_{is} = &\beta_1 + \beta_8 + \beta_9 \cdot army_{is} + \beta_{10} \cdot xpr_{is} + \beta_{11} \cdot (xpr_{is})^2 + \\ &\sum_{j=0}^{18} \tau_j \cdot D_j(is) + \sum_{j=2}^{5} \xi_j \cdot ED_j(i) + \gamma_i + \epsilon_{is}. \end{aligned} \tag{10b}$$

Table 2.2 presents regression results. They are quite similar to the existing liturature. For example, Johnson and Stafford, using a 1970 cross section of academic economists, find a coefficient on xpo of .0441 (whereas ours is .0451), and on xpo^2 of -.000771 (whereas ours is -.000701). Johnson and Stafford calculate peak earnings within the cross section at 30.07 years of experience ($xpr + xpo$). Our predicted peak is 34.01. Lillard and Weiss [1979] report analogous results for a panel of scientists with doctoral degrees.[9]

We use (10a)–(10b) to construct a vector $\vec{y_i}$ of earnings at each age. An algorithm subtracts Federal taxes. We do take account of possible part–time earnings after retirement. The appendix explains the computations.

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[7] $D_1(it)$ is 0 if the observation falls prior to 1900, 1 if it falls in 1900, 2 if it falls in 1901,..., 5 if it falls 1904 or later; etc.

[8] $ED_2(i)$ is 1 if i has some college or vocational school, and 0 otherwise; ED_3 is the same for a college degree; ED_4 applies to a masters degree; and ED_5 applies to a Ph.D.

[9] Very recent work has tended to favor a random walk error term — e.g., Abowd and Card [1989]. Our coefficient estimates would be consistent even if our ϵ is misspecified in that way.

For the sake of comparison, the average ratio of pre–tax earnings at age 50 to the average for 50–year old white males of the same birth year from Census data is 2.1 — which would place our sample mean roughly in the top 15% of earners.[10] Averaging yearly pre–tax (gross of benefits) earnings (in 1988 dollars) over each respondent's lifetime, the sample mean is $49,715.

Y^p is the present actuarial value of $\vec{y}_i$. We assume a constant interest rate of .03, which should be thought of as the aftertax rate, and employ a standard actuarial table. In terms of 1988 present value, our mean Y^p is $3,330,000, and the median is $2,968,000. The sample is quite homogeneous: the lowest quartile for Y^p is $2,304,000, and the upper quartile is $3,950,000.

I^p, the second component of each family's resources, combines inheritances and gifts. The TIAA–CREF database contains more information than usual about transfers received: the questionnaire has two blanks for amounts of "substantial" inheritances received and their dates, two for amounts of anticipated inheritances and their dates, and one for the amount "altogether" of "substantial gifts from parents or grandparents." 41% of the sample — 174 cases — report at least one such transfer. In terms of raw numbers, the average total from inheritances for families with any amount (159 cases) is $183,000, and the median is $82,000. The average age of receipt is about 58. The mean gift is $69,000 (48 cases), and the median is $25,000. Work on the database of participants in the TIAA–CREF system suggests an average age of receipt for gifts of about 30 (see Laitner and Juster [1992]).

Converting each inheritance to 1988 dollars, the family mean received amount rises to $377,000, and the median to $146,000. The corresponding numbers for gifts, assuming receipt at age 30, are $380,000 and $159,000. The average combined transfer among the 174 reporting at least one is $450,000.

Table 2.1 presents totals for $Y^p + I^p$ discounted to 1988, and discounted to the year the respondent was 50. Comparing Y^p and I^p, both discounted to 1988, average lifetime earnings are $3,330,000, and among the 174 transfer recipients, the mean amount of I^p is $1,012,000. So, the overall ratio of transfer receipts to lifetime earnings is

$$\frac{174}{426} \cdot \frac{1,012,000}{3,330,000} = .12.$$

Table 2.1 also supplies 1988 balance sheet information. The database includes an asset inventory: unannuitized pension rights, life insurance equity, housing assets, financial assets, cars and boats, mortgage balances, and other debt. Our measure of net worth — assets less debts — incorporates the actuarial present value of social security benefits and annuity flows, inheritances anticipated but not yet received, and the actuarial present value of remaining earnings (including part–time earnings). The table details the relative importance of social security and annuities.

In the original database, 72 cases lack a report for one or more asset variables. Most of the missing figures pertain to minor categories and were independently imputed before

[10] This calculation extrapolates from Dooley and Gottschalk's [1984,Table 1] within cohort variance. The Census earnings figure for a 50–year old in 1988 is $31,970.

the present analysis began. The net worth totals in Table 2.1 change only negligibly if we drop the 72 observations (and the same is true for the regressions below). All of the analysis that follows employs the imputed data. 15 cases (of 426) are dropped for all asset calculations because they lacked sufficient information for the imputation process.

3. Qualitative Evidence

This section investigates qualitative evidence from the TIAA–CREF annuitant survey. It first examines peoples' choices of annuity–payment options. Second, it looks at responses to direct questions on preferences about about leaving an estate. Third, it reviews respondents' comparisons of their saving before and after retirement.

Begin with respondents' choices for their annuity payments. The TIAA–CREF pension company provides a code identifying the option each respondent chooses. There are 17 codes. The codes divide into two classes: single–life annuities, and joint–life annuities — for husbands and wives. Within each class, there are annuities with and without "guarantees." Consider a joint annuity. A payment plan specifies a fraction f, with $f = 1, 1/2$, or $2/3$. If the initial annual benefit is x, after the first spouse dies the benefit falls to $f \cdot x$. Provided there is no guarantee, benefits cease when the second spouse dies. In our sample, a guarantee can be 10, 15, or 20 years. With a guarantee of, say, 10 years, payments of $f \cdot x$ continue to heirs for 10 years after the original contract date if both spouses die in the meantime. (For a single–life annuity, benefits of x last through the guarantee period if the annuitant dies in the meantime.) Table 3.1 reports frequencies for the sample.

Joint–life annuities with guarantees are the most interesting for our purposes: a two–life annuity will cover a husband and wife, and any guarantee will only benefit heirs. In contrast, an annuitant with a single life annuity might use a guarantee to protect his spouse.

Table 3.1 strongly supports a model with purposeful bequests: Among families with children, 73% choose joint annuities with guarantees. Even for those without children, 57% select a joint annuity with a guarantee. In fact, the most popular payment option in the sample — by a factor of more than 2 — is a joint annuity with $f = 1$ and a 20–year guarantee. Apparently most of the sample found itself over–annuitized at retirement and consciously took steps to enlarge its bequeathable estate — a finding quite consistent with results in Bernheim [1991]. In most cases the beneficiaries of guarantees will be grown children: The average child for our sample is about 37 years old; the average age of the youngest child per family at the date the family's annuity began is about 29.

In terms of dollar amounts, the actuarial value of Table 3.1's annuity guarantees is rather small: with a 3% real interest rate, the actuarially weighted present value of remaining years of guaranteed payments is only about 10% the value of the non–guaranteed portion of private annuity flows in total. Section 4 focuses on quantitative measurements.

While guarantees are one possible channel for intentional transfers, the following survey question attempts to identify sentiments more broadly:

> **1.7** *Some people think that leaving an estate or inheritance to their children (or to charitable causes) is very important, while others don't. What is your opinion?*
>
> *(i) Leaving an estate very important - almost an obligation*

(ii) Leaving an estate is quite important

(iii) Leaving an estate is not important, but could work out that way

(iv) Leaving an estate is not a good idea.

Table 3.2 presents the distribution of responses.

Strong evidence for intentional bequests emerges: almost one–half of the sample respond that leaving an estate is "quite" or "very important." One might expect families with children to manifest more altruism, and that certainly seems to happen: 23% of households without children think leaving an estate is quite or very important, but 46% with children feel that way. This contrasts to Hurd [1987], where parents with and without children seem indistinguishable.[11]

Equation (7) implies that for a given $Y^p + I^p$, a smaller Y^c should encourage a larger estate. The survey has a direct indicator of heirs' resources:

3.26 *When your children get to the age you are now, do you expect them to be better or worse off financially than you are?*

(i) Much better off

(ii) Better off

(iii) Same

(iv) Worse off

(v) Much worse off.

Column 3 of Table 3.2 gives responses to **1.7** for those designating (i)–(ii) on **3.26**; column 4 for (iv)–(v) on **3.26**. Although we are more likely to find respondents feeling that leaving an estate is important in the group whose children will be worse off than they are, the differences seem fairly small.

The wording of **3.26** is not perfect: we want to know about the ratio $Y^c/(Y^p+I^p)$, yet the question literally asks about $(Y^c+I^c)/(Y^p+I^p)$. Hence, there may be a simultaneity problem: parents expecting to leave generous estates may give optimistic predictions about their childrens' relative financial condition regardless of Y^c. A counterbalancing factor is that we have seen I^p is a small fraction of Y^p+I^p, the same presumably holds for Y^c and I^c, and **3.26** is a category, as opposed to a continuous, variable; thus, Y^c will tend to be the primary determinant of **3.26** in practice.[12]

Tables 3.3a–b turn to a probit. Letting $\phi(.)$ be as in Section 1, suppose

$$\phi = \phi(1, \frac{Y^c}{Y^p + I^p}) \cdot [Y^p + I^p]^\zeta, \quad \zeta > 0, \tag{11a}$$

[11] Differences between annuitants with and without children are also evident in Table 3.1, though there they are somewhat less pronounced. Notice that there are only 35 annuitants without children in sample.

[12] Alternatively, if $I^c = 0$, variable **3.26** equals $Y^c/(Y^p+I^p)$. Otherwise, homotheticity of preferences in Section 1 implies $Y^c + I^c = \xi \cdot (Y^p + I^p + Y^c)$ some $\xi > 0$ depending only on factor prices. Then $(Y^c+I^c)/(Y^p+I^p) = \xi + \xi \cdot Y^c/(Y^p+I^p)$, so that **3.26** is a linear transformation of the variable of interest. This interpretation leaves half of our probits below misspecified, but it creates no such difficulty for the regressions of Section 4.

where $\zeta = 1$ if preferences are homothetic. Question **1.7** provides information on the sign of ϕ, hence about the sign of

$$\phi(1, \frac{Y^c}{Y^p + I^p}). \tag{11b}$$

We use question **3.26** as an indicator of the magnitude of $Y^c/(Y^p + I^p)$.

Our dependent variable, z_i, is equal to 1 if household i feels leaving an estate (question **1.7**) is "very/quite important," and 0 if it is "not important." (The analysis excludes the handful of respondents registering negative feelings about bequests.) The regression equation is

$$z_i = \begin{cases} 1, & \text{if } z_i^* = X_i^T \cdot \alpha + \epsilon_i \geq 0, \\ 0, & \text{if } z_i^* = X_i^T \cdot \alpha + \epsilon_i < 0. \end{cases}$$

The independent variables are: CHDUM — 0 if no children, 1 otherwise; CHNUM — number of children; AGE — respondent's age in 1988; RET EARLY — 1 if retired early for health reasons, 0 otherwise; SURPRISE — 1 if respondent feels his earnings have been higher than he originally expected, -1 if lower, 0 otherwise; WIDOWED — 1 if respondent is widower; DIVORCED — 1 if respondent is currently divorced or separated; PAST DIVORCE — 1 if respondent's current marriage is not his first; AGE HD — respondent's age at receipt of highest degree; and, CHREL — 0 if no children, otherwise 1–5 according to respondent's answer to **3.26**. Table 3.3a provides information about the variables.

Column 1 of Table 3.3b presents estimates of α. The coefficient of CHREL has a sign consistent with the altruistic model: the worse off a respondent expects his children to be relative to himself, the greater the chance that he views leaving an estate as important. However, the coefficient is not significantly different from 0 — its T–ratio being about 1.23 (with a marginal significance of .22). An ordered probit, distinguishing between "very" and "quite important" in question **1.7**, yields the same results (though its interpretation in terms of (11a)–(11b) is more difficult).

Another result is that older people seem more likely to find that leaving an estate is important, a point we return to below. Notice that the interpretation of CHDUM is clouded by the way CHREL is defined.

The survey includes a second question about respondents' goals with regard to helping their grown children:

> **3.23** *People have different ideas about what strategy they should follow by way of helping their children financially. Please indicate how you rate the importance of the following:*
>
> *(i) Helping children when they start their own household*
>
> *(ii) Leaving a significant estate for grown children*
>
> *(iii) Making sure that children get a good education, not worrying about leaving anything else.*

Respondents choose "very important," "fairly important," "of some importance," or "not important at all" separately for (i)–(iii). The question is more tightly focussed than **1.7**: only families with children answer; the wording refers only to transfers to ones' children. Columns 1–3 of Table 3.4 present response percentages.

Not surprisingly, a majority of the sample attaches a high priority to securing a good education for their children.

The other two choices involve direct financial transfers. The table finds a great deal of interest in both: 46% of respondents assign "very/fairly" high importance to helping their children start households, and an additional 30% assign "some" importance; 17% feel that creating an estate to leave to their children is "very/fairly" important, and 38% attach "some" importance to it.[13]

Table 3.4 provides evidence of substantial interest in altruistic, or at least intentional, intergenerational transfers. The last two columns further establish consistency with altruistic, maximizing behavior: Consider an altruistic parent who plans to leave an estate. If the parent observes his children to be liquidity constrained early in their adulthood, he should make his intergenerational transfer earlier, as an *inter vivos* gift, to increase its effectiveness. If altruism is widespread, one would then expect to see those intending to leave a bequests making gifts with an above–average frequency. The last two columns of Table 3.4 clearly bear this out: respondents placing a "very/fairly" high priority on leaving an estate also attach much more importance to helping their grown children start households than do others.[14]

Table 3.3b presents probit estimates. The dependent variable, z_i, equals 1 if leaving an estate is "very/fairly/of some importance" in **3.23**, and 0 if it is "not important at all." The independent variables are the same as above. Only annuitants with children are in the sample at this point.

Results resemble those for **1.7**, but the coefficient of CHREL is almost twice as large and has a marginal significance level of .05. Although age continues to have a positive effect, it is no longer significantly different from 0. An ordered probit produces the same results, with the marginal significance of CHREL being .07 (and AGE .03).

Table 3.5 reports on a direct question about saving before and after retirement (only those retired in 1988 answered). According to the life–cycle model, families should save prior to retirement and dissave after — or liquidity constraints (or generous pension provisions) might drive them to a corner solution of no discretionary saving at all. For a household intending to make a bequest, in contrast, saving might stay the same, rise, or fall moderately during retirement. (The precise wording of the survey question on dissaving is: "Saved before retirement, will use up some savings during retirement.") An advantage of this question is that it registers information at two different points in time for the same people — in effect generating panel data. A disadvantage is that it provides only a subjective report (ie, people may or may not view reinvested capital gains as saving).

In Table 3.5, although 34% of the annuitants claim they save before retirement and dissave after, and another 10% seem to be perpetually at a corner solution, fully 32%

[13] Responses here are roughly, but not precisely, consistent with **1.7**. The question on estates in Table 3.4 adds the moderate category "some importance." A check shows that of those categorizing bequests as "very important" in **1.7**, about equal numbers choose "very," "fairly," and "some importance" in **3.23 (ii)**. Of about 140 choosing "quite important" in **1.7**, about 70 pick "some importance" in **3.23 (ii)**, and about 40 choose "fairly important." Of about 230 selecting "not important" in **1.7**, about 125 choose "not important" in **3.23 (ii)**, and about 80 choose "some importance."

[14] The wording of the last part of **3.23 (iii)** is somewhat awkward for carrying this analysis to spending on education.

continue saving the same amount after retirement, and 15% report that they increase their saving. The last two categories seem most consistent with bequest–motivated behavior. (On the other hand, the breakdown between families with and without children shows only miniscule variation, whereas the altruistic model might suggest that there should be more cases of level or rising saving for those with children.)

Aside from the large fractions of households reporting level or rising saving, perhaps the most notable feature of Table 3.5 is the last two columns, which show a lower degree of dissaving among those who have been retired five years or more. This might follow from unexpected longevity, inflation–ravaged bond investments, growing pessimism about childrens' earnings, attitudes which change with age, or birth–cohort effects. Either of the last two is consistent with the coefficient on AGE in Table 3.3b.

In sum, responses to the qualitative questions on the TIAA–CREF survey are consistent with rather widespread interest in leaving bequests. The bequests involved are "intentional." The probit analysis reported in Table 3.3b goes further: results support the altruistic model — fairly strongly in the case of question **3.23**. The basis for the latter assessment is the test proposed in Section 1: as the altruistic theory predicts, parents' bequest plans are influenced by their childrens' prospects relative to their own — less favorable prospects for children leading to more interest in leaving an estate.

4. Quantitative Evidence

This section turns to quantitative information: Taking as given peoples' attitudes about intergenerational transfers, we examine their 1988 levels of net worth — corresponding to A from (4). We consider two basic questions: Is A sensitive to Y^c in the manner which the altruistic model predicts? And, how does the magnitude of A at, say, age 65, vary with each household's opinion about leaving estates?

We first split our sample using question **1.7**, into those for whom leaving an estate is "very/quite" important and those for whom it is "not" important. (We exclude altogether the very small group who characterize bequests as a bad idea.) We run the same regression equation, separately, for each of the two groups. The dependent variable, y, is the log of the ratio of 1988 net worth to the (1988–dollar) Census earnings of 50–year old white males of the same birth cohort. "Net worth" includes the discounted actuarial value of private annuities and social security, the discounted actuarial value of remaining earnings (less taxes), and the discounted value of anticipated future inheritances. We repeat the process using question **3.23**, dividing the sample into three groups: those for whom leaving an estate is "very/fairly" important, of "some" importance, and "not" important. Following the existing literature, we also consider an alternative y which is the log of the ratio of "bequeathable net worth" to the same Census variable — "bequeathable net worth" consisting of net worth which can fit into an estate (ie, financial assets, real estate, cars, life insurance equity, unannuitized pension balances, and the actuarial present value of the guaranteed portion of annuities).

Our regression equation is

$$\begin{aligned} y = & a_0 + a_1 \cdot CHDUM + a_2 \cdot CHNUM + a_3 \cdot SPED + a_4 \cdot \ln(LTRES) + \\ & a_5 \cdot CHREL + a_6 \cdot REARLY + a_7 \cdot SURPRISE + a_8 \cdot WIDOWED + \end{aligned}$$

$$a_9 \cdot DIVORCE + a_{10} \cdot PDIVORCE + a_{11} \cdot AGEHD + a_{12} \cdot AGE + a_{13} \cdot AGE^2 + \epsilon, \quad (12)$$

where $\ln(LTRES)$ is household lifetime resources — discounted to the year the respondent was 50, and normalized by Census average earnings of 50-year old white males of the same cohort — and the remaining variables are as in Section 3. Table 4.1 gives information on the variables.

We use instruments to correct for errors in variables in the constructed variable $\ln(LTRES)$.[15] We report White [1982] standard errors.

Tables 4.2–4.3 present our estimates. According to Section 1, wealth accumulations for altruistic bequests should vary negatively with Y^c. In the case of equation (12), the relation should show up as $a_5 > 0$ for parents interested in leaving an estate. For those not interested, a_5 should be 0.

Table 4.2 generally supports the key implication of the altruistic model. The agreement is perfect for the detailed question, **3.23**: the subsample of parents who feel strongly about leaving an estate generate a positive coefficient for CHREL, significantly different from 0 at the 1% level; those who attach "some" importance to leaving an estate generate a coefficient which is about two–thirds as large, but still highly significant; and parents who attach no importance to an estate generate a very small coefficient, insignificantly different from 0. The magnitude of the first of these coefficients implies that a shift of one in CHREL corresponds to a 19% change in net worth at retirement.

Support from the first two columns of Table 4.2 is more ambiguous. The coefficient for those who feel strongly about leaving a bequest is positive, and significantly different from 0 at the 1% level. However, while the coefficient for the remainder of the sample is smaller, it is significantly different from 0 at the 5% level.

If the altruistic model is correct, we might expect even more dramatic results in Table 4.3 — changes in CHREL should affect portfolio disposition and size in the same direction, and bequeathable net worth should reflect both. All of the columns of the table do indeed strongly support the altruistic model: the coefficient of CHREL in column 1 is large and highly significantly different from 0, whereas the column 2 outcome is smaller by half and insignificant; columns 3–4 have large and highly significant coefficients, but a_5 for column 5 is tiny and insignificant.

Turning to the magnitude of A, we expect larger values for parents intending to leave estates. Figures 4.1–4.4, derived from fitted values from Tables 4.2–4.3, show that the differences are, in fact, quite large. For the sample split based on question **1.7**, parents who feel that leaving an estate is "very/quite" important tend to have about $350,000 more in net worth at age 65 than those who attach no importance. Figure 4.3 shows that the entire difference is apparent in bequeathable net worth alone.

---

[15] The instruments are the remaining independent variables; 0–1 education dummies for the annuitant (some college, college degree, masters, Ph.d, and degree in medicine; and transfers received (present value at age 50, normalized by the Census earnings for white men of age 50 in the same birth cohort). The R^2 values for the instrumental regressions vary from .45 to .82.

Figure 4.2 shows that parents who feel the strongest about leaving an estate in question **3.23** have about $400,000 more at age 65 than those who attach only "some" importance to a bequest. The second group averages about $220,000 more than those who ascribe no importance to leaving an estate. Again much of the difference appears in bequeathable net worth alone.

Altonji, Hayashi, and Kotlikoff [1992] finds only "modest" effects of intergenerational altruism. (Their data come from the Panel Study of Income Dynamics, their dependent variable is food consumption, and they employ current and lagged earnings and incomes rather than our elaborate lifetime resources variable.) Our results do not dispute roles for factors other than intergenerational altruism in explaining wealth accumulations — indeed, Section 5 attributes the preponderance of our sample's net worth to other explanations. Section 3 implies that about half of our households are at corner solutions with regard to intentional bequests, and theory suggests a greater prevalence of the same for the PSID, where average earnings are much lower. Thus, in an important ways the present paper is highly consistent with Altonji et al.

On the other hand, Section 3 finds evidence that many of our households are interested in leaving an estate, and Figures 4.1–4.4 show that the quantitative effects of the interest are substantial. These results point (i) to the significance of the high income level of our sample and (ii) to the importance of corner solutions and general heterogeneity of behavior. With regard to (ii), results in the columns of Tables 4.2–4.3 vary as the sample is divided according to responses to direct questions on motives. If we failed to split the sample, the coefficient on $CHREL$ would be an average of a positive number and one which theoretically is 0, with weights depending on the frequency of corner solutions in the sample.

Several subsidiary points are as follows.

If preferences are homothetic, the altruistic model can be consistent with a constant aggregate average propensity to save and, simultaneously, higher relative savings for the most prosperous. Since CHREL is a separate variable in (12), homotheticity requires $a_4 = 1$. Thus, Table 4.2 shows that homotheticity is accepted: marginal significance levels for tests of $a_4 = 1$ in the five columns of the table are, respectively, .66, .68, .59, .17, and .62.[16]

The apparent homotheticity in Table 4.2 contrasts to Menchik and David's [1983,Table 8] elasticity of 1.8 for estate size with respect to earnings (for their high earnings group). Part of the difference may be that Menchik and David lack a measure of childrens' earnings — although dropping $CHREL$ does not raise our a_4 very much, Menchik and David's dependent variable, I^c, should be more elastic with respect to Y^c than our combined variable $A = C_2 + I^c$. Notice as well that Menchik and David make no distinction between intentional and unintentional estates. A sample with a mixture of accidental estates and large, purposeful ones — the latter most heavily associated with parents having very high earnings — might yield a high elasticity even if a homothetic specification is correct.

A second point is that the age–profile of net worth rises to a peak around retirement in each case. This is consistent with the life–cycle model, regardless of the additional role

[16] If we fail to use instrumental variables for $\ln(LTRES)$, estimates of a_4 tend to fall to about .7 and are significantly different from 1.

of estates. On the other hand, as Mirer [1979] and others have found, net worth shows no sign of declining all the way to zero — see Figures 4.1–4.4.

Third, aside from the peak in the age–profile of net worth near retirement, the life–cycle model receives only mixed support from our data. The theory implies that people forced to retire early because of health problems should have lower net worth during retirement — yet *REARLY* is significantly negative only in one column; the theory implies that those whose earnings turned out higher than they expected should tend to retire with extra net worth — yet only parents attributing no importance to leaving an estate have a significantly positive coefficient on *SURPRISE* in Table 4.2; and, the life–cycle model would, if young households face liquidity constraints, predict higher retirement net worth for households with steeper earnings profiles — yet assuming that a salary increase follows the attainment of one's highest degree, *AGE HD* seems most important only when leaving an estate is not a high priority.[17]

Summarizing, Tables 4.2–4.3 support the altruistic theory. In particular, the sign, magnitude, and statistic significance of the coefficient on CHREL seem quite consistent with the altruistic framework. And, parents with a high priority for leaving an estate accumulate hundreds of thousands of dollars more net worth by retirement age.

5. Share of Wealth Due to Altruism

This section attempts to assess the amount of net worth in our sample due to estate creation. The computations require extrapolations, and they should be interpreted with caution. All figures are 1988–$.

Suppose that life–cycle net worth accumulation/decumulation on average is as shown by the solid curve in Figure 5.1. The graph reaches its peak at retirement age, about 65 for our sample. (The shape on the left–hand side of the graph receives some support from our preliminary analysis of TIAA–CREF participants — e.g., Laitner and Juster [1992,Table 1.1].) If a period of liquidity constrained years precedes the beginning of wealth accumulation, that will not invalidate the analysis. The relative length of the segments with accumulation and decumulation is important, however, and we assume the ratio is 40:15.

[17] *AGE HD* does play a highly significant role in the instrumental regressions.

For the picture, average net worth is $a^{max}/2$.

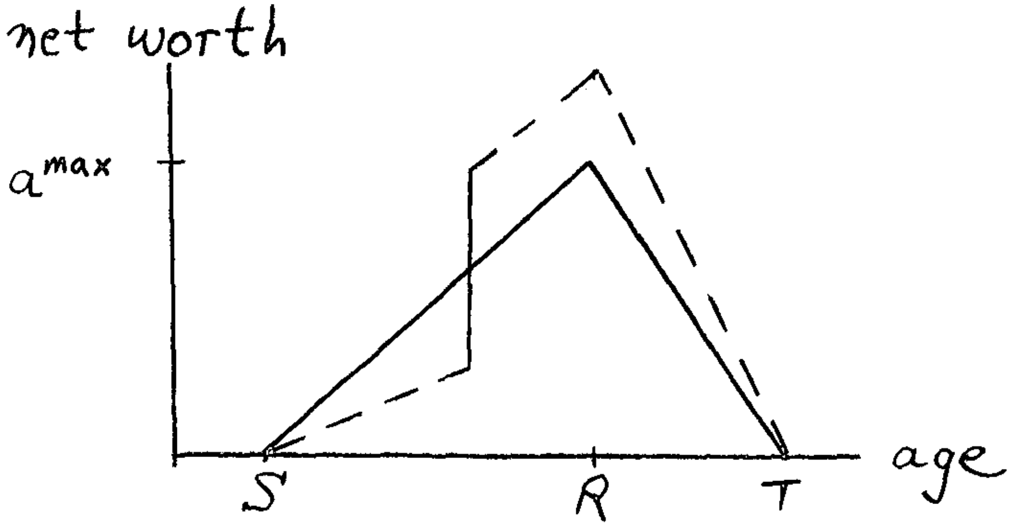

Figure 5.1: Life–cycle pattern of net worth

Inheritances need not affect average net worth. In the life–cycle model, receipts at the start of life tend to increase lifetime–average net worth. The reverse holds for end–of–life timing. Receipts right in the middle need not affect lifetime average net worth at all. For, consider receipt of an anticipated inheritance at midlife. It should cause life–cycle consumption to be higher at all ages; thus, net worth should be reduced before midlife and enhanced afterward — for an average change of roughly 0. The dotted line in Figure 5.1 illustrates this point. (For more detail, see, for example, Lee and Lapkoff [1988].) Although the average age of inheritance in our sample is 58, the average age weighted by the sum received is 53–54 — roughly the middle of adulthood.

Bequests, on the other hand, occur right at the end of life. So their effect on average net worth cannot be ignored, even in approximations. Suppose that a household's bequest is B, and that accumulating this amount reduces consumption at every age. The dotted line in Figure 5.2 shows accumulations for B at each age. The solid lines show life–cycle accumulations, which peak at amount L. The previous paragraph shows that the graphs can safely ignore inheritances received. In Figure 5.2, average bequest–motivated accumulations as a fraction, say, μ, of lifetime average total net worth equal

$$\mu = \frac{B}{B+L}. \tag{13}$$

Net worth at retirement age is

$$L + \frac{40}{55} \cdot B. \tag{14}$$

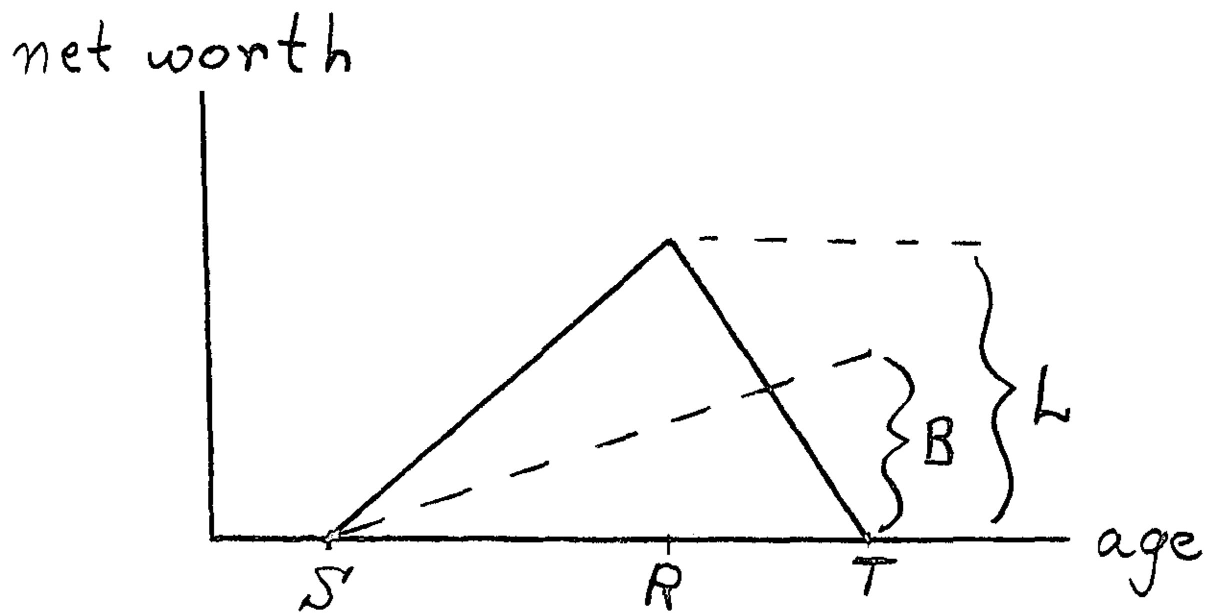

Figure 5.2: Life–cycle and bequest–motivated wealth accumulation

The actual peak net worth in our sample occurs between ages 65–69, and is $707,000. This excludes social security (see Table 2.1): since social security is unfunded and does not finance the economy's physical capital stock, we omit it.[18]

Suppose we first limit B to intentional bequests. Assume retirement age $R = 65$ and life span $T = 80$. (Actual 1988 life expectancies for 65–year–old males and females are 14.9 years and 18.6 years.) In the notation of Section 1, the Table 4.2, column 1 regression predicts, for age 65, $C_2 + I^c = \$1,100,000$. Let C_1^* and C_2^* refer to the case without a bequest. If we apply the coefficients from column 2 to the data for column 1, we obtain $C_2^* = \$833,000$. We could subtract to get $C_2 + I^c - C_2^*$, but that would give an underestimate of I^c, because C_2^* will tend to exceed C_2. If preferences in Section 1 are homothetic and additively separable, a correction is possible. For, then $C_2/C_1 = C_2^*/C_1^*$, implying

$$C_2 = C_2^* \cdot \frac{C_1}{C_1^*}. \tag{15}$$

Subtracting assets from earnings (and adding inheritances arriving before 1988), we generate data sequences for C_1 and C_1^*. Using the same independent variables as in Table 4.2, we develop regression coefficients and use them to predict C_1^* and C_1 at age 65 for each column. Line (15) then yields C_2 for column 1. Subtracting from the fitted value for $A = C_2 + I^c$, we estimate I^c at age 65. (The estimate is $379,000.) Multiplying by 55/40 yields an estimate $B = \$521,000$ for column 1.

Comparing the first two columns of Table 4.2, 43% of the sample lies in column 1. Assume an average altruistic bequest of $521,000 for those in column 1, and 0 for those in

[18] Net Worth in Tables 4.1–4.3 includes remaining earnings. The average amount is less than $6500, however.

column 2. Moving to formula (13),

$$\mu = \frac{.43 \cdot 521,000}{707,000 + \frac{15}{40} \cdot .43 \cdot 521,000} = .28. \tag{16}$$

Repeating the steps for columns 3–5 of Table 4.2, we have a second estimate

$$\mu = .24. \tag{17}$$

Lines (16)–(17) then attribute about one–quarter of average lifetime private net worth in our sample to intentional bequests.

Unintentional bequests could also play a role. Their presence would only affect the analysis above slightly. There are several possible ways to approximate unintentional bequests. Let their magnitude be B'.

One possible estimate comes from inheritances received. We have noted that earning abilities are correlated within family lines; hence, one generation will tend to resemble the next. Multiplying the average of family inheritances the sample receives by the fraction receiving at least one,

$$\$378,00 \times \frac{159}{426} = \$141,000.$$

Assuming wage growth at its recent average rate, lifetime resources would be about 33% higher after one generation. To keep the pattern of inheritances stationary then, \$141,000 received would have to climb to \$188,000 bequeathed.[19] Setting $B + B' = \$188,000$, and continuing to let \$707,000 be average private net worth at age 65, formula (13)'s role for intentional and unintentional bequests together is .25. Then given (16)–(17), the implied contribution of unintentional bequests is neglible.

The preceding calculation receives some support from measurements of gifts: the mean amount received as "substantial" gifts almost exactly matches the mean amount given — so the same may apply to inheritances received and provided.

A second approach imputes estate sizes from Figure 4.3. Suppose parents live on average to age 80. Net worth left over at death would then have a mean of about \$450,000. The latter applies to 1988, whereas our sample reaches age 80, on average, in 1998. Applying our modest growth factor for 10 years to \$450,000, we have $B + B' \approx \$500,000$. Calculations from (13)–(14) then yield a share for bequests of 59%. The shares for altruistic and unintentional bequests would then be about 25% and 35%, respectively. This calculation implies that the sample leaves, on average, almost 3.5 times what it inherits.

One problem with imputing bequests from Figure 4.3 may be that our sample is men — so that almost all households are surviving couples. As first one spouse dies, and then the other, medical and nursing home expenses may well deplete assets. Also, after one death annuity and social security benefits tend to decline — possibly forcing more dissaving. Single survivors may tend to invest more conservatively as well — Hurd's [1987]

[19] The need to cover Federal estate taxes, and state duties, will tend to raise the latter still further. Note, however, that a 1988 estate had to reach \$600,000 to owe any Federal tax at all. The rates then ran 37–50%.

data seem to imply that singles decumulate wealth several times faster than couples. In the end, a share between 0 and one–third for wealth explained by unintentional bequests may be appropriate.

Turning to data on gifts, the mean amount among "substantial gifts" received is about the same as the mean inheritance. Since the number of recipients is only about one–third as great (48 cases), the average amount for the whole sample is

$$\$380,000 \times \frac{48}{426} \approx \$43,000,$$

or 30–31% as large as inheritances. (This calculation tends to understate the importance of gifts in the sense that gifts arrive 25–30 years earlier, on average, than inheritances: at a 3% real interest rate, the present value of gifts per household is 50% of the amount from inheritances.) For "substantial gifts" given, the mean is $117,000. Multiplying by the fraction reporting such a gift,

$$\$117,00 \times .36 \approx \$42,000.$$

Given our growth projection above, and given the well–being of our sample, the equality of the two amounts is somewhat surprising.

Our survey reports on "major outlays" for the education of children or grandchildren. The average amount is $158,000. Surprisingly, only 35% report any such expenditure at all. Presumably many other parents simply counted spending on education as part of their normal budget. We have an average of major outlay amounts over the whole sample of

$$\$158,000 \times .35 = \$55,000.$$

Whether gifts and parental support for education should be part of the explanation of total average net worth is debatable. Although both tend to be disbursed at the middle of life, they tend to be received at the start. If recipients are liquidity constrained, neither augments average net worth; otherwise, both do. Kotlikoff and Summers [1981] treat both exactly as they do bequests; Modigliani [1988] takes the opposite approach. Avoiding any stand on the contribution to observed private wealth, we note that transfers for gifts and education average $97,000 per parent household. This almost certainly represents additional altruistic, or at the very least intentional, transfers, and it is almost one–half as large as our figure for average intentional bequests.

6. Conclusion

This paper looks for signs of altruistic behavior in a sample of parent households. We find in our qualitative data that about one–half of the sample views the leaving of an estate as important. The fraction expands if we include those wanting to help grown children set up housekeeping. Peoples' decisions to sacrifice portions of their annuity payments in order to purchase guaranteed payment streams are consistent with altruistic behavior for about three–fourths of the sample.

Probit equations tend to support the altruistic framework as well: parents who on average will have higher resources than their children, or who say that they have higher resources than they expect for their children, are more likely to answer that leaving an estate is important.

Section 4 turns to quantitative information. Parents' projections of the financial status of their children affect their asset holdings just as the altruistic model predicts. Figures 4.1–4.4 show clearly higher levels of net worth for households who identify themselves as caring about leaving an estate.

Nevertheless, Section 5's speculations attribute only about 25% of lifetime private net worth, for this paper's dataset, to intentional bequests. Our sample falls in the top 10–15% of the earnings distribution. There are great differences within the sample: altruistic bequests appear to be about twice as important as the average for half the group, and not important at all for the other half. Unintentional bequests are difficult to assess.

Given the numbers, the significance of altruistic models in future research may lie in three directions. First, such models have the ability to provide a single, unified explanation of bequests, gifts, and spending on childrens' human capital. (The quantitative role of altruism in our sample expands to 35–40% of average net worth when we include gifts and education.) Second, altruistic models have the potential of explaining differences in saving across the income distribution. This is particularly true at the top, where many parents will expect their children to have lower earnings than they do. The importance of the very rich in total private asset accumulation is evident (e.g., Avery and Kennickell [1991]), and an altruistic model can potentially account for it without sacrificing the underlying homotheticity of preferences which allows a constant aggregate average propensity to consume. Third, from the perspective of neutrality effects for policy, what matters is the fraction of households which are altruistic and which are not at corners for lower bounds on intergenerational transfers. Section 3's tables imply that the fraction in the TIAA–CREF sample is quite high.

Appendix

Section 2 outlines the construction for each family i of the vector $\vec{y}_i$ giving net-of-tax earnings at each age. This appendix provides more details.

Consider (10a)-(10b). Assume γ and ϵ are independent normal with 0 mean. Let e_{is} be the regression residual. The regression program estimates $\sigma_\gamma = .2300$ and $\sigma_\epsilon = .2461$. Letting m_i be the number of earning's observations for family i, our estimate of γ_i is

$$\widehat{\gamma}_i = \frac{\sigma_\gamma^2}{\sigma^2\gamma + \sigma_\epsilon^2/m_i} \cdot \frac{\sum_s e_{is}}{m_i}.$$

The variance is

$$\sigma_{\widehat{\gamma}}^2 = \frac{\sigma_\gamma^2 \cdot \sigma_\epsilon^2/m_i}{\sigma_\gamma^2 + [\sigma_\epsilon^2/m_i]}.$$

For all t, the fitted value from (10a)-(10b) plus $\widehat{\gamma}_i$ yields our estimate of $E[\ln(y_{it})]$. The variance is

$$\sigma_{\ln(y)}^2 = \sigma_{\widehat{\gamma}}^2 + \sigma_\epsilon^2.$$

The lognormal distribution implies a point estimate

$$y_{is} = e^x \quad \text{where} \quad x \equiv E[\ln(y_{it})] + \sigma_{\ln(y)}^2/2.$$

Apart from the earnings history, the database includes information about current earnings and hours. The older part of the sample then yields estimates of the fraction of males working part-time in years after retirement. (About 32% work part-time in the first three years after retirement; about 20% in the fourth through eleventh year.) It also provides estimates of earnings relative to earnings in last year of regular work. (For years 1-3 after retirement, the fraction is about 35%; for years 4-11, it falls to under 30%.) For those working part-time, we add the amount to $\vec{y}_i$; for younger males, we include the expected value of part-time earnings.

We inflate our earnings figures to reflect fringe benefits (including employer social security payments). The AAUP supplies average benefit-to-salary figures for 1960-88 — the 1960 ratio being .0672, and the 1988 number being .2287. We projected figures before 1960 as declining linearly to 0 at 1900; we assume .2287 prevails after 1988.

We assign social security benefits and tax liabilities with the following algorithm. Using the social security tax rate and earnings maximum for 1935, 1945,...,1985, 1990, interpolations in between, and an extrapolation after 1990 which has a constant tax rate but an earnings maximum growing at the rate of wages in general, we remove employer and employee social security taxes in each year. We assume 100% participation in the system. Social security benefits begin at age 65. They follow the 1988 formula, with brackets and maximal amounts growing with average wages. The benefit formula is assumed to depend on average lifetime wages, with wages in year t divided by average wages, and multiplied by average wages in 1988.[20]

[20] Although the survey questionnaire asks about social security benefits, only those receiving benefits in 1988 supply the amount. Similarly, a spouse's benefits might begin at a later date.

Lifetime taxes for family i consist of the present expected value of Federal income taxes on earnings. We use exemption, deduction, and rate schedules for 16 specific years in the era 1920–88 to generate marginal rates in the real–income brackets 0–25,000, 25,000–50,000, 50,000–100,000, 100,000–250,000, and 250,000+. We interpolate rates, deductions, and exemptions for intervening years and assume that brackets, deductions, and exemptions in the 1988 code will shift with nominal income growth in the future. As stated, state and local taxes are considered user fees — part of consumption.

We take itemized deductions into account (after 1948). For five selected years, we use *Statistics of Income* data to derive fractions of itemizers and value of itemized deductions for various income classes. Assigning the remaining fraction of returns the standard deduction, we compute average deductions by class. We employ the latter in our tax analysis — interpolating and extrapolating missing years.

Since earnings are gross of private pension contributions, we do not need pension benefits in $\vec{y}_i$. We do need retirement–period taxes, however. We estimate pension flows using a simple linear model and older households. From the predicted pension, part–time earnings, and one–half of social security, the tax algorithm assigns retirement–period Federal tax liabilities.

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Table 2.1: Lifetime Resources and Wealth by Age							
partic-ipant age	num-ber	$Y^p + I^p$ present value 1988[a]	$Y^p + I^p$ present value age 50[a]	num-ber with asset re-port	net worth[b]	% in pri-vate annu-ities[c]	% in soc-ial sec-urity[d]
55–59	11	$2.69 mil.	$2.22 mil.	11	$.52 mil.	30%	23%
60–64	51	$2.70 mil.	$1.87 mil.	49	$.70 mil.	33%	22%
65–69	150	$3.52 mil.	$2.10 mil.	147	$.87 mil.	27%	18%
70–74	134	$3.79 mil.	$2.00 mil.	126	$.76 mil.	29%	18%
75–79	46	$4.70 mil.	$2.13 mil.	44	$.69 mil.	13%	16%
80–84	20	$6.04 mil.	$2.34 mil.	20	$.62 mil.	10%	14%
85–99	9	$5.32 mil.	$1.77 mil.	9	$.37 mil.	8%	12%

a. 1988 dollars. Interest rate = .03.

b. 1988 dollars.

c. Total present actuarial value (3% interest rate) of private annuity flows plus unannuitized pension balances, divided by total net worth.

d. Total present actuarial value of social security benefits divided by total net worth.

Table 2.2: Random Effects Earnings Dynamics Regression		
Dep. Var.[a]	coef.	T–stat.
constant	8.1199	(23.548)
xpo	.04514	(10.129)
xpo^2	-.0007012	(-8.749)
xpr	.01453	(1.233)
xpr^2	-.0006181	(-1.557)
xpo*pxr	-.0004712	(-1.390)
army	-.1162	(-2.984)
pre–degree constant	-.2294	(-3.850)
pre–degree xpr	.02184	(1.977)
pre–degree xpr^2	.0005508	(1.454)
education dummies: some college	.3315	(2.409)
college degree	.7983	(6.331)
masters degree	.7341	(6.159)
Ph.D.	.8688	(7.564)
time dummies: D20–24	.05921	(.761)
D25–29	.1121	(2.739)
D30–34	-.05255	(-2.129)
D35–39	.03932	(2.498)
D40–44	.04851	(4.158)
D45–49	-.02463	(-2.394)
D50–54	.03375	(3.638)
D55–59	.01926	(1.941)
D60–64	.04335	(3.925)
D65–69	.0028880	(.249)
D70–74	-.01434	(-1.077)
D75–79	-.02880	(-1.819)
D80–84	-.02969	(-1.543)
D85–88	.04388	(1.405)
observations	3116	
$Var(\gamma)$	.2300	
$Var(\epsilon)$	.2461	
R^2	.3596	

a. See text.

Table 3.1: Annuity Payment Choices

	Numbers of Annuitants		Percentages	
description	children=0	children>0	children=0	children>0
joint – no guarantee	1	13	3%	3%
joint – with guarantee	20	284	57%	73%
single – no guarantee	11	34	31%	9%
single – with guarantee	3	57	9%	14%
other[a]	0	3	0%	1%

a. Missing code or installment refund.

Table 3.2: Breakdown of Responses on Sentiments about Leaving an Estate

			Children>0			
			Childrens' Financial Status Relative to their Parents		Parents' Quartile in $Y^p + I^p$ Distribution[c]	
description	chil-dren=0	chil-dren>0	better[a]	worse[b]	low-est	high-est
very important	3%	12%	12%	18%	12%	16%
quite important	20%	34%	30%	31%	34%	34%
not important	74%	53%	57%	51%	51%	50%
bad idea	3%	1%	1%	0%	2%	0%
other[d]	0%	0%	0%	0%	0%	0%

a. Response i–ii to question 3.26.

b. Response iv–v to question 3.26.

c. Present values of Y^p and I^p taken at respondent age 50.

d. No response to question 1.7.

Table 3.3a: Probit Variables

Variable (see text)	Probit for 1.7		Probit for 3.23	
	Mean	St. Dev.	Mean	St. Dev.
dep. var. z	.54	.69	.83	.82
CHDUM	.92	.28	na	na
CHNUM	2.61	1.40	2.85	1.21
AGE	70.05	6.04	69.96	5.98
RET EARLY	.12	.33	.11	.32
SURPRISE	.26	.73	.24	.74
WIDOWED	.06	.24	.05	.23
DIVORCED	.04	.19	.02	.14
PAST DIVORCE	.19	.39	.20	.40
AGE HD	27.33	6.88	27.19	6.83
CHREL	2.46	1.20	2.68	.98
Observations	381		346	

Table 3.3b: Probit Regression Coefficients (Standard Errors)		
	Dependent Variables	
Independent Variables	Question 1.7	Question 3.23
CONSTANT	-2.5339*** (.9077)	-1.3458 (.9444)
CHNUM	-.0267 (.0573)	.0145 (.0590)
AGE	.0262** (.0114)	.0152 (.0122)
CHREL	.0872 (.0705)	.1412** (.0726)
RET EARLY	-.0768 (.2056)	-.5354** (.2207)
EARN SURP	.0240 (.0929)	-.1107 (.0987)
WIDOWED	.3853 (.2836)	.4712 (.3389)
DIVORCED	-.3305 (.4052)	-.3599 (.4905)
PAST DIVOR	-.0534 (.1697)	-.0833 (.1758)
IAGEHD	-.0040 (.00989)	.0084 (.0107)
CHDUM	.5329 (.3622)	na
Obs.	381	346
Log-Likelihood	-251.65	-222.63
Log-Likelihood with slopes=0	-260.66	-231.85
χ^2 significance	.054	.018

* significant at the 10% level; ** 5% level; *** 1% level.

Table 3.4: Breakdown of Responses on Peoples' Strategies for Helping Their Children Financially					
				Help-Children-Start Responses Conditional on Estate Priority	
Response	Provide education	Help children start households	Provide estate	Leaving an Estate Very/Fairly Important	Leaving an Estate Not Important
very important	48%	19%	4%	44%	16%
fairly important	21%	27%	13%	26%	21%
of some importance	7%	30%	38%	17%	36%
not important	13%	14%	36%	12%	26%
other[a]	10%	10%	10%	0%	0%

a. No response to question. Includes all respondents without children.

Table 3.5: Savings Before and After Retirement					
	Whole Sample	Breakdown by Number of Children		Breakdown by Years of Retirement	
Saving after retirement relative to before ret.		chil-dren=0	chil-dren>0	retired <5 yrs.	retired ≥5 yrs.
save before, dissave after	34%	34%	34%	41%	26%
same before and after	32%	26%	32%	28%	36%
save more after retire	15%	17%	14%	10%	20%
never save except pension	10%	14%	9%	8%	12%
other[a]	9%	9%	9%	13%	6%

a. Includes all respondents not yet retired.

Table 4.1: Regression Variables				
	Q 1.7: Estate Very/Quite Important		**Q 1.7:** Estate Not Important	
Variable	Mean	St. Dev.	Mean	St. Dev.
net worth	3.14	.72	2.94	.61
beq. net worth	2.52	1.04	2.22	1.00
CHDUM	.96	.20	.88	.32
CHNUM	2.67	1.38	2.56	1.42
SPED	2.68	1.08	2.57	1.03
Log(LTRES)	4.16	.58	4.13	.43
CHREL	2.63	1.13	2.32	1.24
REARLY	.11	.31	.13	.34
SURPRISE	.25	.75	.26	.73
WIDOWED	.08	.27	.04	.21
DIVORCE	.02	.13	.05	.22
PDIVORCE	.19	.39	.20	.40
AGE HD	27.24	7.42	27.37	6.42
AGE	70.83	6.19	69.47	5.84
AGE*AGE	5054.98	908.95	4860.13	826.13
Observations	165		219	

Table 4.1: Regression Variables (cont.)

	Q 3.23: Estate Very/Fairly Important		**Q 3.23:** Estate of Some Importance		**Q 3.23:** Estate Not Important	
Variable	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
net worth	3.26	.78	3.13	.65	2.82	.57
beq. net worth	2.74	1.10	2.51	.94	1.98	1.01
CHDUM	1.00	.00	1.00	.00	1.00	.00
CHNUM	2.84	1.36	2.85	1.16	2.85	1.21
SPED	2.66	1.12	2.57	1.02	2.68	1.06
Log(LTRES)	4.36	.54	4.16	.53	4.05	.44
CHREL	2.79	1.03	2.75	.98	2.56	.97
REARLY	.08	.27	.07	.26	.17	.38
SURPRISE	.16	.79	.22	.70	.31	.76
WIDOWED	.14	.36	.04	.20	2.94	.17
DIVORCE	.00	.00	.02	.14	2.94	.17
PDIVORCE	.22	.42	.18	.39	.21	.40
AGE HD	26.34	6.80	28.07	7.40	26.62	6.08
AGE	71.81	7.81	69.83	4.80	69.26	6.06
AGE*AGE	5216.16	1146.68	4899.25	691.55	4834.07	855.97
Observations	62		148		136	

Table 4.2: Net Worth Regression Coefficients (St. Errors)					
	Q 1.7:		Q 3.23:		
	Importance of Leaving an Estate				
Indep. Var.s	Very/ Quite	None	Very/ Fairly	Some	None
Constant	-6.4456*	-11.4138***	-10.2066**	-11.0764**	-9.3145**
	(3.3339)	(3.3001)	(4.1320)	(5.8828)	(4.4498)
CHDUM	-.4839*	-.1865	na	na	na
	(.2453)	(.1669)			
CHNUM	-.0409	-.0568*	-.0680	-.0543	-.0205
	(.0331)	(.0290)	(.0557)	(.0347)	(.0334)
SPED	.0731*	.1015***	.0706	.0890**	.0963***
	(.0430)	(.0351)	(.0763)	(.0416)	(.0364)
Log(LTRES)	1.0656***	.9396***	1.1430***	.7984***	1.0787***
	(.1507)	(.1478)	(.2655)	(.1473)	(.1591)
CHREL	.1116***	.0795**	.1770***	.1144***	.0296
	(.0424)	(.0392)	(.0686)	(.0454)	(.0442)
REARLY	-.1774*	.0854	.0718	-.0685	-.0215
	(.1033)	(.1136)	(.2699)	(.1697)	(.0983)
SURPRISE	-.0528	.1159**	.0039	.0030	.1255*
	(.0620)	(.0474)	(.1041)	(.0580)	(.0657)
WIDOWED	-.1197	.0694	.0397	-.1285	-.3045
	(.2228)	(.2197)	(.2786)	(.1913)	(.2683)
DIVORCE	-.0936	-.2346**	na	-.3902**	-.1616
	(.1474)	(.1033)		(.1589)	(.1016)
PDIVORCE	-.0936	.0374	.0993	.1137	-.0304
	(.1157)	(.0867)	(.1750)	(.1301)	(.1028)
AGE HD	.0117*	.0240***	.0049	.0115*	.0326***
	(.0066)	(.0060)	(.0098)	(.0062)	(.0086)
AGE	.1696*	.2907***	.2462**	.3090*	.2075*
	(.0895)	(.0900)	(.1089)	(.1619)	(.1224)
AGE*AGE	-.0014**	-.0022***	-.0019***	-.0023**	-.0016*
	(.0006)	(.007)	(.0007)	(.0011)	(.0009)
OBS.	165	219	62	148	136
Reg.Std. Error	.551	.506	.624	.513	.513
R^2	.46	.30	.51	.38	.33

* significant at 10% level; ** at 5%; *** at 1%.

Table 4.3: Bequeathable Net Worth Regression Coefficients (St. Errors)					
	Q 1.7:		Q 3.23:		
	Importance of Leaving an Estate				
Indep. Var.s	Very/ Quite	None	Very/ Fairly	Some	None
Constant	-7.8466*	-15.4469***	-11.8381**	-17.5608**	-10.1567
	(4.4081)	(5.4349)	(5.6986)	(7.6431)	(6.9642)
CHDUM	-.8071**	.1900	na	na	na
	(.3491)	(.2762)			
CHNUM	-.0742	-.1449***	-.0776	-.1437***	-.0530
	(.0526)	(.0560)	(.0809)	(.0570)	(.0699)
SPED	.1036*	.1265***	.1481	.1161**	.1218**
	(.0642)	(.0483)	(.1038)	(.0661)	(.0622)
Log(LTRES)	1.5391***	1.4502***	1.5519***	1.1071***	1.7068***
	(.2113)	(.2392)	(3.3034)	(.2171)	(.3354)
CHREL	.1806***	.0970	.2589***	.1795**	.0225
	(.0711)	(.0682)	(.0969)	(.0772)	(.0800)
REARLY	-.2500	-.0865	-.0640	-.1879	-.1408
	(.1729)	(.1997)	(.4755)	(.2377)	(.2174)
SURPRISE	-.1056	.1659*	.0021	-.0177	.1911
	(.0907)	(.0867)	(.1403)	(.0852)	(.1299)
WIDOWED	.0064	.3557	.2380	.0928	-.1637)
	(.3468)	(.2850)	(.4211)	(.2417)	(.4667)
DIVORCE	-.2394	-.4312**	na	-.8833***	-.3477*
	(.2657)	(.1885)		(.3070)	(.1914)
PDIVORCE	-.0726	.0716	.0395	.0928	-.0647
	(.1704)	(.1704)	(.2268)	(.1841)	(.2451)
AGE HD	.0217**	.0392***	.0051	.0209**	.0606***
	(.0105)	(.0114)	(.0136)	(.0094)	(.0189)
AGE	.1297	.3113**	.2133	.4204**	.1120
	(.1190)	(.1463)	(.1528)	(.2084)	(.1854)
AGE*AGE	-.0011	-.0023**	-.0016	-.0030**	-.0009
	(.0008)	(.0010)	(.0010)	(.0014)	(.0013)
OBS.	165	219	62	148	136
Reg.Std.Error	.855	.884	.879	.790	.991
R^2	.41	.27	.50	.34	.26

* significant at 10% level; ** at 5%; *** at 1%.

Figure 4.1: Net Worth for Categories from Question 1.7

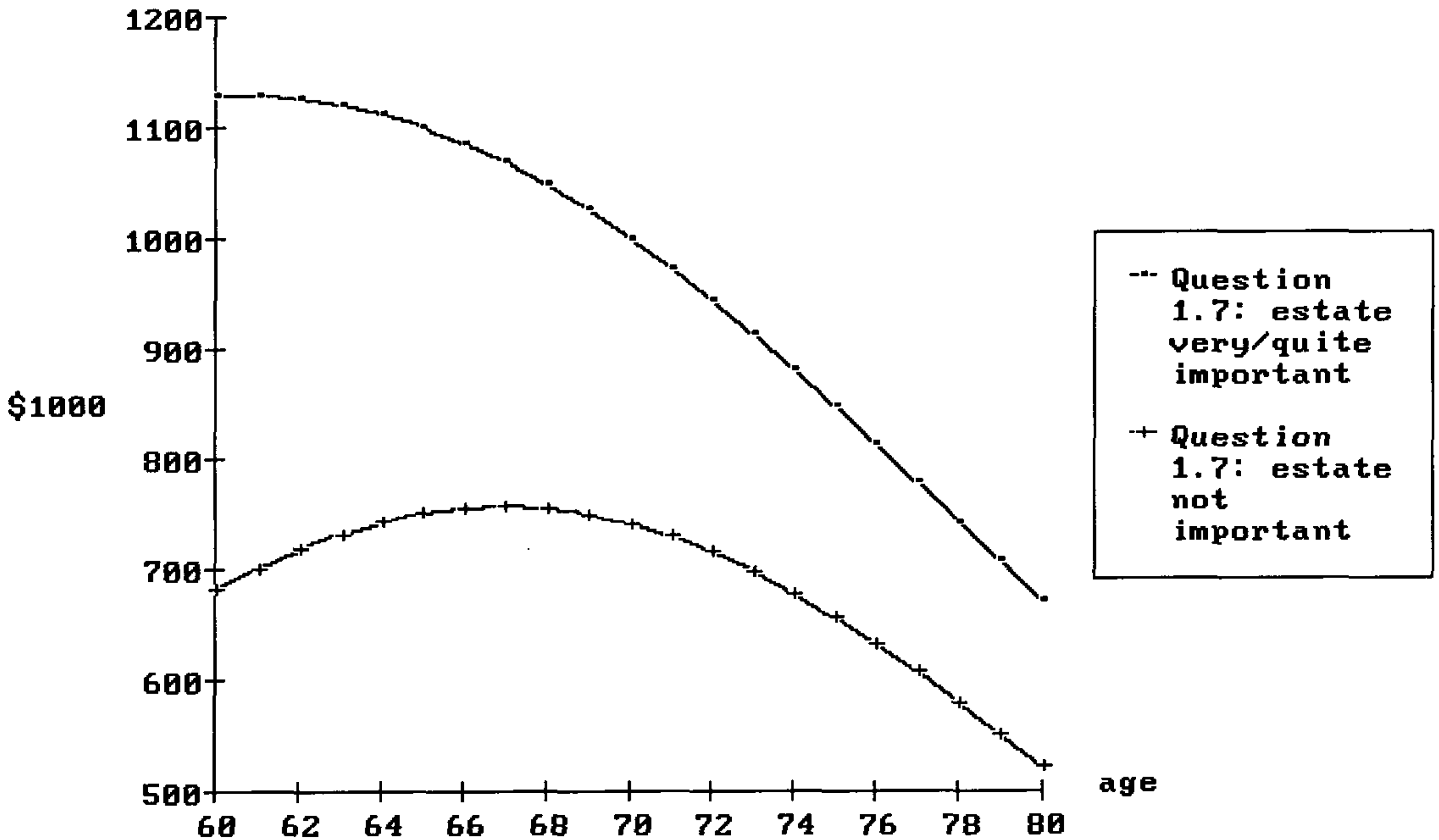

Figure 4.2: Net Worth for Categories from Question 3.23

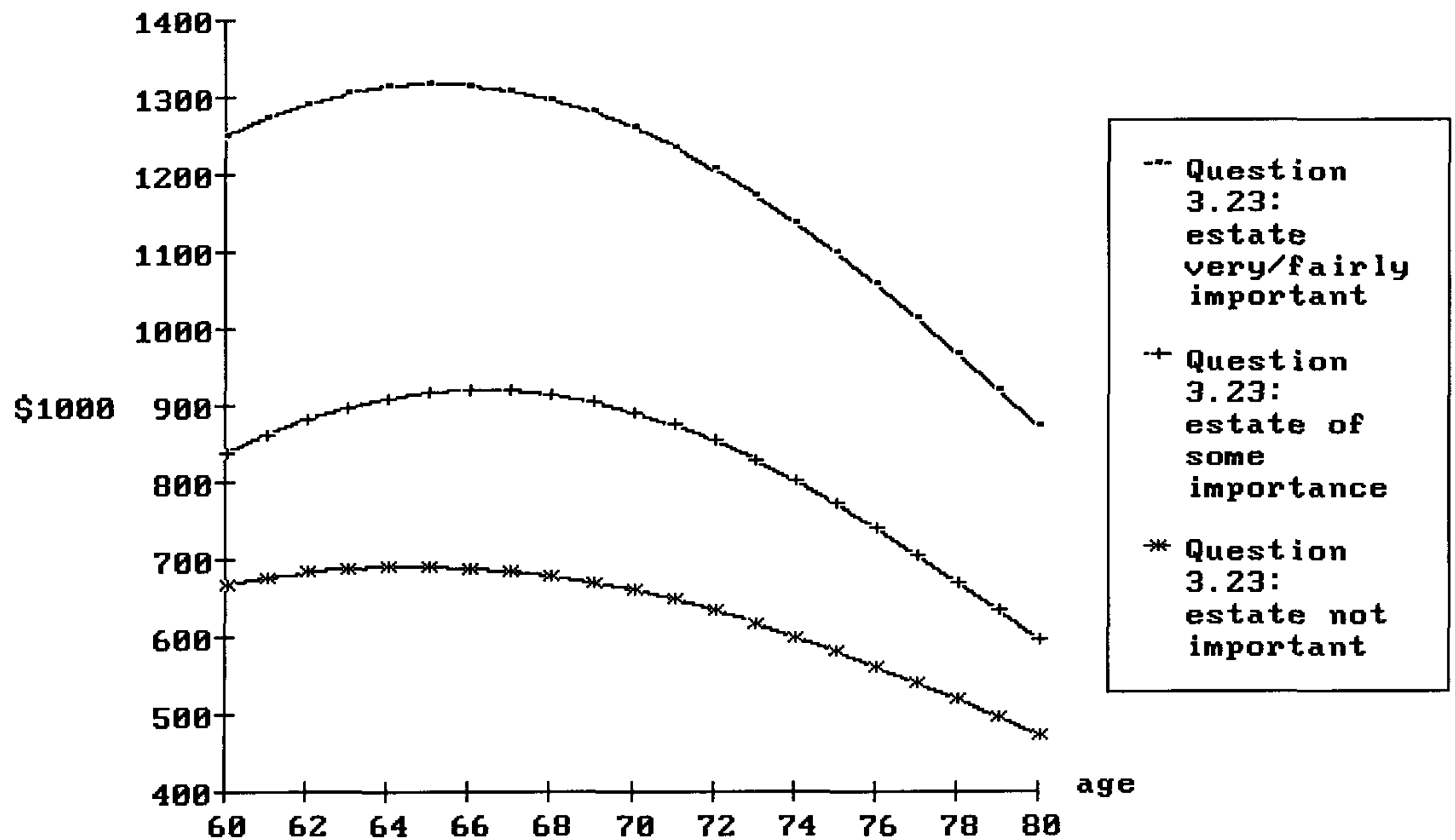

Figure 4.3: Bequeathable Net Worth for Categories from Question 1.7

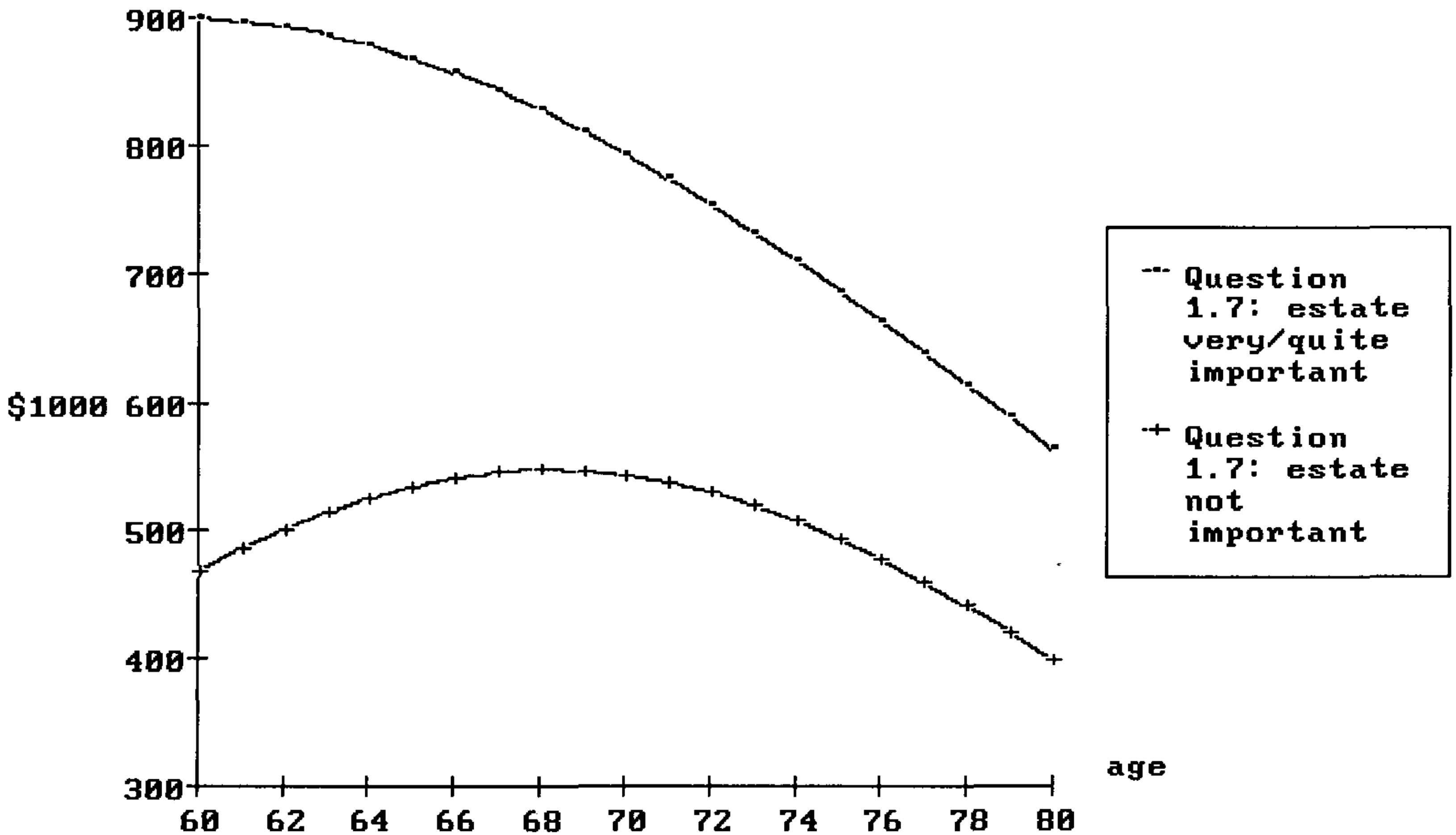

Figure 4.4: Bequeathable Net Worth for Categories from Question 3.23