The Role of Intergenerational Transfers and Life Cycle Saving in the Accumulation of Wealth

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T he purpose of this paper is to review what economists know at present about the following question: How large a portion of the existing wealth is the result of a bequest motive, that is, of accumulation for the specific purpose of leaving bequests? I will also endeavor to clarify why an answer to this question is of interest.

In the early Keynesian period when the study of national saving first attracted wide interest, relatively little attention was paid to what led people to save, though it was generally understood that the main systematic reason was to leave bequests. J. M. Keynes, in the famous chapter 9 of the *General Theory of Employment, Interest and Money* (1936), had listed seven distinct motives for saving besides the leaving of bequests. But five of these, which include "to increase one's future income," or "to insure one's independence and power," implied that all, or nearly all, the accumulation would finally wind up as bequeathed wealth. This, in turn, meant that most private wealth originated through bequests—that is, it either had been received through bequests or was destined to be bequeathed. And, indeed, how else could society accumulate wealth?

However, Keynes (1936, p. 107) also mentioned two further motives: "Precaution," that is, "to build up a reserve against unforeseen contingencies;" and "Foresight," that is, "to provide for an anticipated future relation between the income and the needs of the individual or his family different from that which exists in the present, as, for example, in relation to old age, family education, or the maintenance of dependents." These motives, in contrast to most of the previous ones, have the

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characteristic that the current saving is motivated by and destined to pay for future consumption through later dissaving.

But Keynes himself did not dwell on the implications or importance of this source of saving and wealth. This task was first partially undertaken by Harrod (1948) who referred to the transitory accumulation as "hump saving," although it would be more correct to call it "hump wealth." The Life Cycle Model (Modigliani and Brumberg, 1954; 1980) can be seen as an endeavor to study the magnitude and implications of transitory saving and hump wealth by relating it to the classical theory of consumer choice and more particularly to the hypothesis of optimal allocation over time, elaborated by Irving Fisher (1930). According to this hypothesis, the planned consumption path reflects the allocation of life resources to consumption over the life span. At least in the absence of bequests, this implies that there will tend to be saving resulting in transitory accumulation of wealth when current income is above, and/or current consumption below, average. There will be dissaving, financed from the transitory accumulation, in the opposite case.

One of the most significant early results of the Life Cycle Hypothesis was to establish that, even in the absence of bequests, the mere fact that income dries up with retirement could generate, for the entire economy, an amount of (hump) wealth quite large relative to income. Specifically, assuming a stylized life cycle of income and consumption—to wit, level consumption through life, income constant up to retirement and a stationary economy—it was shown that the ratio of wealth to income would be equal to one-half the length of retirement which (at the time) could be taken as of the order of 5. The wealth estimate of Goldsmith, which became available around that time, showed that for the United States the ratio of private net worth to disposable income was of that magnitude, or, if anything, a little lower. It was thus at least conceivable that the bulk of wealth might be acquired not by intergenerational transfers but instead be accumulated from scratch by each generation, to be consumed eventually by the end of life.

Still, the existence of some role for bequeathed wealth, especially among those in the upper strata of the distribution of wealth (human and nonhuman), was self-evident. For this reason, in the second of the two papers laying the foundation of the LCH (Modigliani and Brumberg, 1980) and several later ones (for example, Modigliani and Ando, 1957; Modigliani, 1975), the question of inheritance was dealt with explicitly. It was shown that bequests could be readily incorporated in the model without changing its basic implications, provided the leaving of bequests satisfied two reasonable assumptions.

First, the share of its resources that a household earmarks, on the average, for bequests is a (non-decreasing) stable function of the size of its life resources *relative* to the average level of resources of its age cohort.

Second, the frequency distribution of the ratio of life resources to mean life resources for each age group is also stable in time.

While the second assumption is hard to test, the first has recently received strong support from a study by Menchik and David (1983) described below. If the bequest

motive satisfies these assumptions then one can readily establish that the ratio of inherited wealth to income will tend to be constant and independent of per capita income (Modigliani, 1975). But in turn, this means that a generalized life cycle model including both hump and inherited wealth will continue to exhibit all the basic macro properties of the elementary model, including 1) the saving rate is independent of per capita income, but rises with its rate of growth, and, 2) aggregate saving is not merely a reflection of individual thriftiness in the sense that a country with higher growth will save more than another, even though individuals in each country have identical life cycle saving behavior.

But acknowledging that aggregate wealth could arise from both transitory hump wealth and from the transfer of wealth through bequests from one generation to the next conveys nothing about the importance of each of these processes in accounting for existing wealth. In particular, is the bequest motive the main source of existing wealth, as supposed by the traditional view, or is it swamped by hump saving?

This question has attracted attention at least since the early 1960s when a number of investigations (reviewed below) were undertaken. The interest was spurred, in part, by scientific curiosity. But the question also has relevance for the design of economic policies because the two sources of wealth may be expected to respond to very different stimuli. According to the Life Cycle Hypothesis, hump wealth should respond to variables or institutions like length of retirement, family size, liquidity constraints, uncertainty of income (at least from labor), private and public pension arrangements, and health insurance. Most of these variables would likely have little effect on bequests, though, admittedly, economists know rather little as to what, other than estate and gift taxation, would have a significant impact on bequests.

Thus, knowledge of the relative contributions is important to assess the effectiveness of measures designed to affect saving and wealth as well as the effects on wealth of measures intended to achieve other goals, such as estate taxation designed to reduce economic inequalities.

Estimates of the Share of Inherited Wealth

From the early studies of the 1960s and until the recent contribution of Kotlikoff and Summers, it has been generally accepted that the importance of the contribution of the bequest process to total wealth could be measured by the ratio of wealth received through inheritance and major gifts by those living to total private (nonhuman) wealth. Though this ratio may not be an altogether appropriate measure of the importance of the bequest motive (as discussed below), I will start by reviewing available estimates of the share, both because most of the existing information relates directly to this variable and because this measure provides a useful building block for alternative measures.

Several methods have been utilized to estimate the share of private wealth accounted for by bequeathed wealth: 1) asking people directly through a survey; 2)

estimating the annual flow of bequests and then using an appropriate "blow up" factor to infer the *stock* of inherited wealth; and 3) inferring inherited wealth indirectly by first estimating life cycle wealth and then subtracting it from an independent estimate of private wealth.

The Survey Method

This was the first method used, in connection with three U.S. studies carried out in the 1960s. In the study by Morgan et al. (1962), respondents were asked "about your own personal reasons for saving," with twelve answers offered. Only 3 percent mentioned "to provide an estate for family"! All the reasons most frequently mentioned are consistent with hump saving, such as "old age" (41 percent), "emergencies" (32 percent), and "children's education" (29 percent). The proportion of people referring to the bequest motive does increase, as one might expect, with wealth, but even in the top wealth class (half a million 1963 dollars and over), only one-third of the respondents mention it. Very similar results were found in the 1964 Brookings Study (Barlow et al., 1966).

The results of the three early surveys are summarized in the first four rows of Table 1. The estimates of the share of presently held wealth resulting from bequests (and possible major gifts) is reported in the last column. In view of the nature of the studies, these estimates are neither very precise, nor entirely comparable; for example, the study in Row 2 covered only people in the top 10 percent of the income distribution. Yet the small scatter of results appears to support the view of a fairly modest ratio of inherited to total wealth, between one-tenth and one-fifth (Modigliani, 1975). All the studies report that the share rises with the income and wealth of the recipient.

However, these figures may incur some suspicion because the respondents' replies were largely undocumented and could suffer from serious recall biases. For instance, it is not inconceivable that respondents would tend to underestimate, systematically and significantly, the extent to which their wealth was bestowed on them by others, rather than representing the fruits of their own efforts. It is therefore useful to compare these direct estimates with those obtained through alternative methods.

The Flow of Bequest Approach

This method starts from an estimate of the flow of bequests, which is then translated into a stock of inherited wealth. Three alternative methods have been employed to estimate this flow.

Estimates Based on Age-Specific Wealth Holding and Mortality. This method, first applied by Kotlikoff and Summers (1981), infers the flow of bequests from the distribution of wealth by age and age-specific mortality rates. They apply this method for the year 1962, relying on the distribution of wealth by age provided in Projector and Weiss (1964). From this source they arrive at an estimate of the transfer flow of $11.9 billion. To this, however, one must add bequests received through life insurance

Table 1
Estimates of the Share of Wealth Resulting from Transfers

Source	Nature of data	Nature of transfers included	Valuation	Share of wealth from transfers (%)
Morgan *et al.*, (1962)	response to survey question on size of transfer received	all(?)	at time of receipt(?)	less than 10
Projector & Weiss (1964)	response to survey question on share of wealth from transfer	inheritance and large gifts from outside family	at time of receipt	[16][a]
Burlow et al., (1966)	response to survey question on fraction of wealth transfers. Limited to income $10,000 and over	inheritance and gifts	at time of receipt	one-seventh
same	same	same	at time of receipt, plus capital appreciation to present	less than one-fifth
Kotlikoff & Summers (1981)	estimated from wealth of those dying: age gap: 25–30 years	intergenerational bequests	at time of receipt, corrected for price level changes	17
Projector & Weiss (1964)	response to question on transfer received during year; age gap: 25–30 years	inheritance and gifts from outside family	same	$15\frac{1}{2}$
Menchik and David (1983)	Probate records; age gap: 25 years	all bequests other than intraspousal	same	$18\frac{1}{2}$

[a]Wealth-weighted average of respondents answering that inherited assets were a "substantial portion" of total assets.

death benefits and newly established trusts (since neither of these items is included in the data), which raises the estimated intergenerational flow to $16 billion.

To transform the flow into a stock of wealth, Kotlikoff and Summers rely on the assumption that beneficiaries, on average, receive a constant fraction of their life labor income in the form of bequests, and that the average gap between the age of the bequeathers and that of the beneficiaries is a constant, say g years. These assumptions insure that, in steady growth, the ratio of inherited to total wealth tends to a constant. Denote by B the current flow of bequests left (and received). Then, if the economy

were stationary, one can readily infer that the aggregate amount of bequests received by those currently living, say T, would come to B for each of g years, or $T = gB$. However, if population and/or productivity increase at a stable rate, say n, then the flow of transfers made and received t years earlier would be smaller than B, amounting to Be^{-nt}. One can then infer that the stock of inherited wealth will be

$$(1) \qquad\qquad T = \frac{(1 - e^{-ng})}{n} B.$$

(Note that this equation is not the one used by Kotlikoff and Summers. The reasons are discussed below.) To arrive at an estimate of the aggregate transfer T received by all those living, one still needs values for the growth rate n and the age gap g. For the growth rate n, one can use the estimate used by Kotlikoff and Summers (1980), namely 3.5 percent. For the age gap, on the other hand, there is very little solid information to rely on. I will follow their choice of 30 years, though 25 years might be a more reasonable guess (as suggested by data for the United Kingdom assembled by the Royal Commission on the Distribution of Income and Wealth).

With these parameters, the stock of inherited wealth T implied by equation (1) is 18.6 times the flow (as compared with 30, in the absence of growth). With the annual flow of bequests B estimated at $16 billion per year, the stock of inherited wealth T comes to just below $300 billion. Now, in 1962 the stock of household net worth, as estimated by the Federal Reserve Board (1981), came to $1.75 trillion. Thus, the flow of bequests is somewhat short of 1 percent of wealth, and the estimated shares of wealth resulting from bequests can be placed at 17 percent (as reported in Table 1, Row 5). This figure is broadly consistent with the various estimates based on the direct survey method summarized in Table 1 (though it should be recognized that the Kotlikoff and Summers measure of transfers is probably somewhat less inclusive than that used in the surveys, since they purport to estimate "distant in age" intergenerational transfers).

Estimates Based on Survey Information.   In the Projector (1968) follow-up study, respondents were asked: "During 1963 did you . . . receive any gifts or inheritances from persons outside the family?" The answer to this question should provide an alternative estimate of the flow of gifts and bequests. A recent unpublished tabulation of this data yields an estimate of the average reported amount received of $205 per household, or a total of $11.6 billion,[1] compared to the Kotlikoff and Summers estimate of $12 billion before corrections. After correcting for trusts, one arrives at a share of inherited wealth for the bench mark year 1962 of some $15\frac{1}{2}$ percent (Table 1, row 6), again well within the range of the earlier estimates.

Estimates Based on Probate Statistics.   The third approach, which is potentially the most promising in terms of the objectivity and quality of the information, is becoming feasible at present through the painstaking efforts of Menchik and David. Their 1983

[1]I wish to express my gratitude to Kim Kowalewski of the Federal Reserve Bank of Cleveland for computing these averages from an edited version of the tape of the "Survey of Changes in Consumer Finances" (Projector, 1968).

paper relying on probate records of people who died in Wisconsin between 1947 and 1978 provides information from which one can estimate that the mean bequest (including life insurance proceeds and reported inter vivos transfers) for all male decedents is $20,000 (in 1967 dollars).[2] Accepting this figure as representative of both sexes (though probably upward-biased), and multiplying by the 1.5 million adults deceased in 1962, the (upper) estimate of the total flow of bequests in that year would be 29\frac{1}{2}$ billion (in 1967 dollars). But one should subtract transfers between husband and wife from this figure.

On the basis of estimates of interspousal transfers provided by David and Menchik (1982, Table 5) and vital statistics, I have concluded that the amount of such transfers can be placed at just above $8 billion (Modigliani, 1984) yielding an estimate for the overall non-intraspousal transfer flow of 19\frac{1}{2}$ billion, in 1962 prices. This estimate is substantially above that of $16 billion arrived at by Kotlikoff and Summers, but this result can be explained at least partly by the consideration that their measure is meant to include only intergenerational transfers.

Data presented by David and Menchik (1982) suggest that intergenerational transfers may account for around 60 percent of the total transfers. If so, the Kotlikoff and Summers estimate of intergenerational transfers would appear larger than that implied by the probate statistics, though the difference does not appear worrisome in view of the many guesses involved in each estimate.

In converting the estimate of the annual flow of total non-intraspousal transfer of 19\frac{1}{2}$ billion into a share of wealth, one must remember that the average age gap between bequeather and beneficiary must presumably be appreciably lower for this flow than for purely intergenerational transfers, though it is hard to say by how much. If the age gap is, say, 15 years, for the roughly one-third of bequests that are not intergenerational, while the average for the remaining two-thirds that are intergenerational stays at 30 years, then the average gap would be 25 years, implying a "blow up" factor of 16.7 and an inherited share of wealth of some 18$\frac{1}{2}$ percent (see Table 1, Row 8).

In summary, direct estimates of the annual flow of bequests based on three different approaches appear broadly consistent, especially if one allows for some differences in the definition of the flow being measured. They all imply a rather small annual *flow compared with total wealth*, around 1 percent, more or less. It is this modest annual flow that insures that the total stock of bequeathed wealth (the sum of the annual flow over the transfer gap, adjusted for the effect of growth), is itself modest, between 15$\frac{1}{2}$ and 18$\frac{1}{2}$ percent, the latter measure corresponding to the broadest definition of the bequest flow. These estimates are clearly not inconsistent with the figures suggested by the three direct surveys.

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[2]This figure, as well as all averages cited below, represents the mean for all persons dying in the course of the three decades spanning the years 1947 to 1978. Presumably, in the course of this span of time, bequests have tended to rise with the rise in per capita income. However, since this discussion is using 1962 as a benchmark, a year which is right in the middle of the period covered, it is reasonable to assume that the mean for the entire period is a fair approximation to the mean for the years of the early 1960s.

Indirect Estimates Based on Life Cycle Saving and Wealth

The essence of this approach is that it endeavors to estimate hump saving and wealth directly, and then derives transfer wealth as a residual. Following this method, Ando and Kennickell (1985) have set out to estimate life cycle wealth by starting from available annual estimates of national saving. For each year, they allocate the aggregate wealth over the age groups present, using the savings-age profiles derived from survey data (in their case, the Bureau of Labor Statistics' Consumer Expenditure Survey for 1972 and 1973) to obtain estimates of saving for individual age group cohorts in any given year. By summing up the saving of any given cohort up to any given year, they can estimate the self-accumulated, or non-inherited, wealth of that cohort in that year (except for capital gains and losses, discussed below). Finally, they arrive at national non-bequeathed wealth in any given year by summing over the cohorts present in that year. The result of this calculation, using both the 1972 and the 1973 age profiles, is reported for every year from 1960 to 1980, and then compared with the actual value of household net worth for the last quarter of each year (Federal Reserve Board, 1984).

The shares of self-accumulated wealth implied by the two profiles are very similar except that the one for 1973 is consistently five percentage points higher. Based on the 1973 profile, one finds that from 1974 to the end of the series in 1980, the share of self-accumulated wealth falls between 80 and 85 percent, a finding remarkably consistent with the consensus of the studies already described. For the earlier years, the share of self-accumulated wealth is smaller, around 60 percent until 1968, then drifting up to over 70 percent by 1973. But the lower figure for the early years may, at least partly, reflect a downward bias in the Ando and Kennickell estimate arising from the fact that their estimate of self-accumulated wealth omits change in real wealth arising from capital gains or losses. In the period before 1974, capital gains were unquestionably significantly positive, and hence self-accumulated wealth is under-estimated. On the other hand, from 1974 to 1980, this effect was, presumably, undone by the depressed state of the stock market, even though this may have been partly offset by rising real estate values.

Thus, this alternative and totally independent method yields results which for the last decade are broadly similar to those produced by all other methods of Table 1.

Estimates from Other Countries

It would be interesting to compare these findings with estimates for other times and countries. The only relevant information of which I am presently aware relates to the United Kingdom and is the result of the work of the above-mentioned Royal Commission on the Distribution of Income and Wealth. Their method relies on an estimate of the age pattern of recipients of bequests left by decedents of different age and sex, and on information on the flow of bequests for a long stretch of years terminating in 1973. From this information, they obtain an estimate of the 1973 stock of inherited wealth. Combining this data with total wealth in that year (based on the estate duty method) they arrive at an estimate that inherited wealth is 20.3 percent of total wealth, a share which rises to 24.7 percent when gifts ("all forms of transmitted

wealth") are included (Report No. 5, Chapt. 9, tables 90 and 91). This figure is of the same order as those found for the United States, but it includes interspousal transfers. Considering that interspousal transfers in the United States seem to represent some-what over one-fourth of the total, the share of total wealth that was inherited in the United Kingdom appears to be, if anything, a little smaller than suggested by U.S. data.

Evidence Suggesting a Major Role for Bequests

The evidence presented in the previous section suggests that the bequest process plays an important, but quantitatively modest, role in the process of accumulation of national wealth. However, this conclusion has been seriously criticized and challenged on the basis of variety of evidence seemingly inconsistent with this conclusion.

The Behavior of Wealth in Old Age

In the stylized, pure life cycle model, wealth must be clearly declining after retirement, and at a sufficiently fast pace to reach exhaustion at the end of life. The actual behavior of wealth by age seems quite different, especially after correcting for the fact that successively older households belong to cohorts which typically enjoyed a smaller life income. Several studies find that dissaving in old age is small at best (Fisher, 1950; Lydall, 1955; Menchik and David, 1983). Some studies (for example, Mirer, 1979) even find that wealth actually continues to rise in retirement. Such a finding, if valid, would certainly be inconsistent with significant smoothing of con-sumption over life; it would mean that as income dries up with retirement, the reduction is entirely absorbed by consumption and accumulation can continue. Thus, even with a bequest motive, smoothing implies that wealth must decline after retirement unless retired consumption can be entirely financed by the return on accumulated wealth (Hurd, 1986), an outcome which would require a ratio of wealth at retirement to per capita consumption far larger than the ratios typically observed.

Actually, most recent analysts have concluded that the wealth of a given cohort tends to decline after reaching its peak in the age range 60–65 or somewhat beyond it, and in any event after retirement, though the extent of the decline depends on the concept of saving and wealth used (Shorrocks, 1975; King and Dicks-Mireaux, 1982; Avery, Elliehausen, Canner and Gustafson, 1984; Bernheim, 1984; Diamond and Hausman, 1985; Ando, 1985; Ando and Kennickell, 1985; Hubbard, 1986; Hurd, 1986). If one makes appropriate allowance for participation in pension funds, then the dissaving (or the decline in wealth) of the old tends to be more apparent, and it becomes quite pronounced if one includes an estimate of social security benefits and wealth,[3] and if one focuses on retired households. Hurd (1986), relying on a large

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[3] Bernheim (1984) finds that including pension and Social Security does not increase the dissaving of the old, but this is only because of his unconventional and questionable valuation of annuities. Given that saving—or income minus consumption—is the change in wealth, the consumption of a pension must reduce wealth.

sample of panel data of retired people over a ten-year span, found that even market wealth declines at appreciable rates of about $1\frac{1}{2}$ percent per year for all marketable wealth, and nearly 3 percent if owner-occupied houses are excluded.[4]

Also, several factors tend to bias the age profile of wealth upward. One source of bias, to which Shorrocks has called attention, arises from the well-known positive association between longevity and (relative) income. This effect means that the average wealth of successively older age classes is the wealth of households with higher and higher life resources, hence the age profile of wealth is upward-biased. In a similar vein, Ando and Kennickell (1985) have found evidence that aged households which are poor tend to double up with younger households and disappear from the sampled population so that the wealth of those remaining independent is again an upward biased estimate of average wealth.

But even allowing for these biases, the rate at which marketable wealth is being drawn down during retirement does not appear consistent with the elementary no-bequest form of the life cycle model. However, this result is not very revealing since the issue is not whether bequests exist, but rather their level of quantitative importance. The evidence on behavior of wealth in old age cannot answer that question. To be sure, the post-retirement (past 65) path, particularly at advanced ages, does tell something about the flow of bequests left. However, the *share* of bequest received in total wealth depends on total wealth and hence also on the path of wealth before retirement. If one fixes the path of per capita wealth from its peak, there will still exist an infinity of possible paths from, say, age 20 to 65, and each of these paths implies a different amount of aggregate wealth. The earlier the average path approaches the peak value, the larger will be aggregate wealth and hence the hump wealth component. So, a slow decline from peak is not inconsistent with inherited wealth being a modest share of total wealth.

Actually, there are good grounds for holding that the observed slowly decreasing path of wealth for the United States is fully consistent with the estimate of a bequest share of roughly one-fifth of total wealth. One of the methods of estimation which yielded the one-fifth figure consisted in using the flow of bequests estimated by Kotlikoff and Summers from age specific wealth holdings and mortality. The wealth holdings by age were those reported by the 1962 Federal Reserve Survey of Consumers' Finances, and that data also exhibits the characteristic of slow decline of wealth in old age. Clearly the one-fifth estimate of the share of wealth from bequests, being derived from such a slowly declining path of wealth, must be fully consistent with that path.

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[4] Bernheim (1984) relies on the same basic data but breaks the period into two five-year periods, 1969–1975, and 1975–1979. He finds that dissaving is fairly sizable for all groups except couples in the second period. But Hurd's data suggest that this result may not be reliable as it reflects an entirely improbable rise of 23 percent between 1977 and 1979 in the wealth of couples. This rise is most unlikely to reflect voluntary accumulation and must be supposed to arise either from noise in the data and/or from unusual capital gains.

Temporal Changes in Retirement Habits and the Saving Rate

Another piece of evidence that has been adduced against a relatively important role for life cycle accumulation is the fact that since the 1930s retirement ages have fallen and life expectancy has risen, spelling a longer average retirement span. This lengthening should have increased the need for accumulation to finance retirement and thus resulted in a higher saving rate. In fact, there is no evidence of a rise in saving. However, the lengthening of retirement was accompanied by another large scale phenomenon: the Social Security revolution. Social Security should tend to reduce saving, offsetting the rise that should result from a longer retirement span induced, at least in part, by the Social Security (Feldstein, 1977; Modigliani & Sterling, 1983). However, the issue of the interaction between Social Security, retirement and saving is a complex one, beyond the scope of this paper.

In addition, the argument of the previous section applies here as well. The importance of inherited wealth cannot be settled by focusing exclusively on retirement behavior, since the rapidity with which hump wealth accumulates during a lifetime is motivated also by considerations other than length of retirement.

Simulation Studies

One method sometimes used to assess the importance of life cycle saving is to rely on simulation techniques: one assumes values for the preference parameters and for the opportunity set and derives life paths of saving and wealth, which are then aggregated to obtain national totals. In fact, this method was used by Modigliani and Brumberg (1954, 1980) to study properties of the life cycle model. But this technique, while useful to suggest possible ranges of outcomes and the responses to changing parameters, cannot settle the empirical issue of the relative importance of hump wealth and bequeathed wealth, because the outcomes are greatly affected by the choice of certain critical parameters which are largely arbitrary. Evans (1984) has demonstrated this point strikingly in his criticism of a frequently cited paper by White (1978). To illustrate, he shows that under plausible assumptions about the economy's growth rate (3.5 percent) and the rate of return (4 percent) by varying the assumed preference parameters, namely the elasticity of temporal substitution and the rate of time preference, between .25 and .5 and 0 and 1 percent respectively, one obtains simulated values of the life cycle rate of saving varying between 2 and up to 11 percent, which is consistent with a lot of room for bequests at one end or very little at the other.

The Kotlikoff and Summers Estimates

In their 1981 paper cited earlier, Kotlikoff and Summers have also reached the conclusion that the share of inheritance and gifts in total nonhuman wealth in the United States is far higher than the one-fifth share indicated by Table 1. In fact, they argue the share may be as high as four-fifths.

This conclusion rests on two alternative estimates of the share of wealth bequeathed or transferred by gifts. The first is based on a variant of the indirect method

later employed in the Ando and Kennickell (1985) study discussed earlier. The difference is that instead of allocating saving among groups of households defined by the age of the household head, they impute to each cohort of each sex, in every year since 1900, an income *from labor only* and a consumption. The difference is labelled the cohort's "life cycle" saving which is capitalized and cumulated in order to arrive at an estimate of the "life cycle" wealth of each age and sex cohort and, finally, of aggregate life cycle wealth in a given year. Aggregate inherited (transfer) wealth is obtained by subtracting this estimate from aggregate wealth.

Although they present and discuss several variants of life cycle wealth based on alternative measures of interest rates and treatment of interspousal transfers, I will concentrate on their figure of $733 billion (from their Table 2, LCW2, series 2). This figure is conceptually the most relevant, as it correctly includes the life cycle accumulation of a deceased spouse into the life cycle accumulation of the survivor, instead of including it in inherited wealth. Also, this variant is the one they tend to stress. That figure implies that life cycle wealth is only about 19 percent of total wealth, and that therefore the share of transfer wealth comes to 81 percent!

Their second approach consists in measuring the stock of bequeathed wealth by the method (described earlier) of "blowing up" an estimate of the annual flow of bequests obtained from age specific wealth and mortality rates. Even though they rely on the same method and basic sources, they arrive at an estimate which, though less extreme than 81 percent, is still a good deal larger than ours, namely 46 percent.[5] Why the large discrepancies? I propose to show that they arise primarily from differences between the definitions of "inherited" and "self-accumulated" wealth used by Kotlikoff and Summers and the definitions underlying the estimates reported in Table 1.

Superficially, their definitions do not seem to differ from the usual ones. In fact, they coincide with them in the elementary kind of Modigliani-Brumberg (1980) streamlined model in which the return on capital is zero, all people begin earning at the same constant rate until retirement and there are no bequests. But once these simplifying assumptions are dropped, significant differences came to light.

According to the definition used in Table 1, self-accumulated wealth for an individual household is the summation of saving from the formation of the household to the present, where saving is defined as income (inclusive of capital gains) minus consumption. In turn, aggregate self-accumulated wealth is the sum of self-accumulated wealth over all households present (families and single individuals). Correspondingly, transfer wealth is the sum over all households of bequests (and major gifts) received (in constant prices). This definition differs from that of Kotlikoff and Summers in two ways: the treatment of return on inheritance and the definition of the transfer flow.

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[5] In their 1981 paper, the figure was actually given as 52 percent, but that was due to an algebraic error in the blow up formula (Modigliani, 1984) which they have since corrected.

First, Kotlikoff and Summers deduct from income and the saving flow, as defined above, the return on inherited wealth, which they add to the flow of bequests. As a result, their inherited wealth is not just the cumulation of bequests received but is instead augmented by the inclusion of the capitalized value of the earnings since receipt of the inheritance. With an average age gap between bequeathers and beneficiary on the order of 25–30 years, this definition adds a great deal to the measure of Table 1.

The second important difference in measuring self-accumulated wealth is that instead of using the household as the basic economic unit responsible for the consumption-saving allocation, Kotlikoff and Summers artificially split the household into individual males and females, to each of whom they impute income and consumption on the basis of their age and family composition. Because of this choice, they are unable to use the formation of the household as the point from which accumulation begins, and are forced instead to pick, more or less arbitrarily, a critical age above which saving is imputed to all members of a cohort, including those still dependent, through an imputation of labor income and consumption. They choose a critical age of 18 for both men and women. This procedure has the implication that the (imputed) consumption of all persons that are above 18 but are still dependent, and hence have no income, is treated implicitly as though it represented a life cycle dissaving; accordingly, it is *subtracted from life cycle saving* and *added to inherited wealth* as those terms were defined in Table 1.

Table 2 provides estimates of the quantitative impact of these definitional differences. I start from the Kotlikoff and Summers measure and show how altering the definitions reduces their estimate until it coincides with the estimates of Table 1.

Effect on the Share Based on the Flow of Bequests. Part A of Table 2 deals with the measure of transfer wealth based on the flow-of-inheritance approach. As already described, their estimate of the share of total wealth that is inherited in this case is 46 percent (see row 1) and mine is 17 percent (see row 4). The adjustment in row 2, amounting to 5 percentage points, is the only one that reflects differences of assumption rather than of definition. Specifically, in reporting the correction for an error in the original "blow up" formula, Kotlikoff (1987) indicates assuming that, on the average, bequests are left by people aged 65, 10 years before death. I believe it is more reasonable to assume that bequests are left at death.

The next adjustment (row 3) subtracts from the stock of inherited wealth as defined by Kotlikoff and Summers that part which represents the capitalized consumption imputed to all dependent persons over 18 years of age. Actually, Kotlikoff and Summers do not have an estimate of that flow but have tried a partial remedy by adding to the estimated flow of inheritance at least one portion of that missing flow that happens to be substantial and is possible to estimate: the flow of expenditure for college education estimated at $4.6 billion (in 1962 dollars) per year. Eliminating this addition, the share of bequests is reduced by another 9 percentage points.

Row 4 corrects for the different treatment of the return on bequests. If the stock of inherited wealth is defined as the sum of inheritances received, then the relation

Table 2

Reconciliation of Kotlikoff and Summers with other estimates

	Correction (percentage points) (1)	Corrected share of wealth (%) (2)
A. Estimates based on flow of bequests		
Kotlikoff & Summers estimate		46
Assuming transfer at death	−4.8	41.2
Elimination of educational expenses	−9.2	32
Elimination of capitalization of inheritance	−15	17

	Correction (percentage points) (1)	Corrected share of wealth (%) (2)
B. Estimates based on cumulation of life cycle saving		
Kotlikoff & Summers estimate		81
Error in treatment of durable goods expenditure	−14	67
Elimination of capitalization of inheritances	−31.5	35.5
Correction for expenditure on dependent over 18 and other unspecified sources	−15.5	20

between the flow and the stock of inherited wealth was shown to be given by equation (1); but when it is defined as the sum of the capitalized value of inheritance received, then the appropriate formula becomes:

$$(2) \qquad\qquad T^* = \frac{e^{(r-n)g} - 1}{r - n} B$$

where T^* is their definition of inherited wealth. For their estimated age gap g of 30 years and interest rate of 4.5 percent, equation (2) yields a "blow-up" factor of 35, very nearly twice as large as the value of 18.6 implied by equation (1). Accordingly, when their measure of the share is recomputed using the definition underlying Table 1, the estimate drops dramatically, by 15 percentage points, to the point when it coincides with the 17 percent figure described earlier and presented in row 5 of Table 1.

Estimates Based on Capitalized Life Cycle Saving. Table 2B presents a similar reconciliation for their alternative procedure in which the share of transfer wealth is derived by cumulating capitalized "life cycle" saving of each cohort present in 1974.

Row 1 reports the share of 81 percent corresponding to their preferred estimate of life cycle wealth of 19 percent. The first correction in row 2 arises from an error in their calculation of consumption and saving. In the figures they present, they measured consumption as inclusive of the purchase of durable goods, instead of treating such goods as a depreciable investment including only current year estimated depreciation in consumption and the excess of purchases over depreciation as a saving to be cumulated into a stock. Their calculations could, therefore, be expected to produce a large downward bias in the estimate of life cycle wealth, especially since in the United States younger age groups will tend to be significant investors in durables, while older people tend to disinvest.

I have tried to estimate the magnitude of this error, as Kotlikoff and Summers have kindly made available their basic data and helped in carrying out the necessary, fairly extensive computations. The correction was found to increase the estimates of life-cycle wealth, as expected, but by an amount so large—26 percentage points—as to raise questions about its plausibility. However, the fact that such a wild estimate could be generated using Kotlikoff and Summers's method and a set of assumptions which they regarded as reasonable in the context of their approach does raise some question about the reliability of their capitalized life cycle saving method.

Kotlikoff and Summers (1986) have subsequently suggested a different correction for the error in the numerator of their share—which arises from omitting the net accumulation of durables—by making the same error in the denominator, that is, not including durables as wealth. With durables representing some 14 percent of the stock of wealth, they arrive at a correction of a mere 3 percentage points. But their suggestion that two wrongs make one right has little merit. Indeed, most of the wealth that is being taken out of the denominator should instead be added to the numerator. In the limit, if all durables belonged in life cycle wealth, the correction would come to an increase in life cycle wealth and corresponding decrease in the inherited share of 14 percentage points. Lacking a more solid base, row 2 reports the correction based on this alternative.

The third row of Table 2B shows the effect of eliminating from their estimate of inheritance the capitalized earnings from bequests. As was shown above, the exclusion of these earnings reduces the value of transfer wealth by 47 percent. Accordingly, in row 3, the share of inherited wealth is reduced to only $35\frac{1}{2}$ percent. As can be seen from row 4, this is still some 16 percent higher than my preferred estimate of the share of inheritance—around 20 percent—based on probate statistics.

The bulk of this difference is probably accounted for by Kotlikoff and Summers' inclusion of the imputed capitalized consumption of all dependent persons 18 years of age and over. There is, unfortunately, no way of estimating directly how much this inclusion adds to the conventional measure of inherited wealth, but several considerations suggest that the addition must be appreciable. To begin with, a large portion of those between 18 and 24 are still dependent, especially at the younger end of that

spectrum. For instance, in 1970 about two-fifths of those aged 18–19 and one-third of those aged 18 to 24 were not in the labor force; the fraction of dependent persons would, presumably, be substantially higher. Another suggestive item is provided by the Kotlikoff and Summers estimate that expenditures for college education, which could hardly be a major component of all expenditure on dependents aged over 18, represents just over 20 percent of the total flow of bequests. In terms of Table 2B, this college adjustment alone would reduce the estimate in row 3 by 7.8 points. The large role of dependent consumption is also supported by two Figures (1 and 2) provided in K & S (1981) which show, for selected cohorts, the life path of income and consumption. According to these graphs, the cohort of 1910 is estimated to have life cycle dissaving for the first 50 years of its life, while the cohort of 1940 saved nothing over a similar span. Similar results are reported for other cohorts in the paper cited.

These results, which provide the foundations for the negligible accumulation of life cycle wealth, are inconsistent with information from many other sources using the household as the basic unit, and the conventional definition of saving. First, available information from many surveys indicates that households have, on average, substantial saving and net worth at least after age 25 (for example, Ando & Kennickell, 1985, Table II.1). Second, such saving is consistent with the fact that wealth rises fairly smoothly between age 25 and age 45 (according to Projector and Weiss, 1964, wealth rose in 1962 by roughly one thousand dollars per year of age; see also Ando & Kennickell, 1985). This rise in wealth cannot be attributed to inheritance to any significant extent, since, as one would expect, the receipt of important inheritance is rare before age 45 (Projector and Weiss, 1964, Table A32). For the same reason, the saving of these younger age groups cannot be reasonably attributed to the return on inherited wealth.

The residual of row 4 and the inconsistencies noted above may, of course, also reflect the entirely different data as well as methodology employed by Kotlikoff and Summers, for it is obvious that each method is affected by the many somewhat arbitrary auxiliary assumptions that need to be made. This problem particularly affects the Kotlikoff and Summers study, considering the large number of imputations and assumptions it involves, from age profiles, to return on capital, to the treatment of interspousal transfers. Their results are particularly sensitive to errors and assumptions affecting saving in the early years, for a difference in early saving affects wealth at every later age, and increasingly so, as the saving gets capitalized. This conjecture is supported by tests on the sensitivity of their results to variations in the auxiliary assumptions, which they report in their 1981 paper.

These considerations lend support to the claim that the bulk of the discrepancy between their estimate of 80 percent and the earlier consensus figure of around 20 percent is attributable to differences in the definitions, with the remainder accounted for by the unavoidable imprecision of all estimates. This inference receives further support from the estimates of Ando and Kennickell (1985) cited earlier. Using the same methodology of estimation as Kotlikoff and Summers but relying on the conventional definition of self-accumulated wealth as household actual income minus consumption, they arrive at a life cycle share much lower than Kotlikoff and Summers and broadly similar to the figures reported in Table 1.

Assessing the Merits and Shortcomings of Alternative Definitions.   There are two basic definitional differences: how to define life cycle (hump) accumulation, and how to treat the return on inherited wealth. With respect to the first issue, the Kotlikoff and Summers redefinition was shown to have the effect of subtracting from the standard measure of hump wealth the capitalized value of all expenditure imputed to dependents age 18 and over (as well as all minor gifts and contributions in support of another household).

This redefinition has little merit, at least when the focus is on the effect of inheritance and gifts on the stock of (nonhuman) wealth. First, the supposed transfers (and contributions) are not in the nature of either bequests or major gifts. Second, they go to pay for current consumption and do not represent an addition to the assets of the recipient or society. Third, the downward adjustment implied by the Kotlikoff and Summers procedure depends on the choice of the critical age of independence, and as a result their share of life cycle wealth in total wealth can be made to rise or shrink by the fairly arbitrary choice of the critical age. Finally, these imputed transfers are quite different in nature from bequests and major gifts because, unlike these transfers, they would be hard to modify through policy actions, and, even if modifications were attainable, the effect on wealth could be very different.

One consideration that may lend some attractiveness to the Kotlikoff and Summers definition is that the expenditure on dependents that they treat as transfers includes the outlays for college education. One may feel that these large outlays are bequests of a sort, since they take the form of an investment in "human capital." But this consideration would be relevant mainly for other issues, such as the hereditary transmission of economic inequality or the contribution of transfers to total capital—nonhuman and human. But in this case the denominator of the ratio should include human capital, too. Furthermore, the numerator should include many other expenditures on human capital, not necessarily only on behalf of dependents 18 years old and over—like all private schooling. And why should the line be drawn at schooling and not include all expenditure on children? But clearly that would be an entirely different story. To answer the question this paper began by posing, I submit that no customary expenditure on dependents should be treated as a transfer.

The next question is whether inherited wealth should be defined to include the capitalized earnings thereon over the lifetime of the recipient. I have chosen to exclude it on two grounds. First, treating earnings on bequests as income conforms to the generally accepted definition of saving as income minus consumption. It also conforms to the usual definition of life accumulation as bequests left, minus bequests received (adjusted for inflation). By contrast, under Kotlikoff and Summers's definition, a person leaving as much as he received would, if the real rate of return were positive, be counted as a dissaver to an extent depending on the rate of return. The second reason is that one can measure directly what bequests have been received, but there is no direct way of telling whether some years later the wealth of the recipient will be larger by the capitalized value of the bequests, or whether instead the recipient will have consumed some or all of the return or even some of the principal.

Kotlikoff and Summers might object to this definition in that life cycle income as I am defining it includes the income from bequests, which makes life cycle saving

depend on bequests received. The measure of life cycle saving they advocate (labor income minus consumption) is, instead, independent of bequests. In addition, this measure, since it requires subtracting the return on bequests from earnings and saving, provides a justification for adding capitalized returns to the stock of bequests received.

At first sight, this may seem like a persuasive argument; yet it suffers from a major flaw. While it is true that the measure I am supporting will generally vary with the size of bequests, theirs is also not independent of bequests received as long as these have effects on consumption (or labor supply). Their measure would be appropriate only in the limiting case in which consumption is absolutely unaffected by bequests received—that is, if all returns were saved. But consider the polar case in which all the returns are consumed; then it is the measure of bequests and hump saving I am advocating that is the appropriate one.

The Contribution of the Bequest Process to Total Wealth

What lesson can be drawn from the above considerations? They clearly suggest that the share of inherited wealth, whether capitalized or not, does not provide a valid answer to the question: *how much does the bequest motive contribute to society's total wealth?* Kotlikoff and Summers have correctly pointed out that this issue is the really interesting one. They have further proposed measuring the impact of bequests on total wealth by the elasticity of total wealth with respect to flow of bequests: that is, by the percentage change in total wealth resulting from a 1 percent change in the bequests' flow. This elasticity, which may be labelled the "true measure of importance of bequests," can be written as

$$(3) \qquad \eta = \frac{\Delta W}{\Delta B} \frac{B}{W} = \frac{\Delta W}{\Delta T} \frac{T}{W}.$$

Here, the second equality follows from the consideration that the stock of inherited wealth T is proportional to the annual flow of bequests B (though the proportionality factor depends on the definition). The first equality, on the other hand, shows that (given the flow of bequests) the true measure of importance is independent of how one chooses to define the share, as must be the case since the elasticity is, in principle, an observable fact. The second equality brings to light a simple relation between the "true" measure of importance and the measures of the share of bequests with which we have been concerned so far. Specifically, let T^j stand for any stated measure of aggregate wealth, such as T^*, the definition used by Kotlikoff and Summers, or T, the definition I am advocating. Then the corresponding measure of the share, T^j/W, will be an upward biased measure of importance if $\Delta W/\Delta T^j$ is less than one; it will be downward biased in the opposite case.

No measure of the aggregate inherited wealth presented thus far is likely to measure the desired elasticity correctly for several reasons. In the first place, when the

economy is growing, the share of wealth received by bequests must tend to under-estimate the contribution of bequests to total wealth by not allowing for the effect of accumulation earmarked for future bequests. Some simulations carried out by Kennickell (1984) suggest that the shortfall of the inherited share as a measure of importance rises quite rapidly as growth increases. Second, there is reason to believe that $\Delta W/\Delta T$ is not unity, however it is defined, simply because beneficiaries of bequests will probably change their consumption by an amount positive, but less than the full return on bequests.

Measuring the Elasticity

Consider first the case where the stock of inherited wealth is T^*, defined in accordance with Kotlikoff and Summers. These authors have endeavored to estimate the value of $\Delta W/\Delta T^*$. Their calculations are based on some very special and rather arbitrary assumptions about preferences (namely that the utility is additive, separable in consumption and leisure and logarithmic) and on the even more questionable assumption that all transfers—be they inheritances or major gifts or family expenditure in support of members over 18—have identical effects on wealth. Nonetheless, the results should provide a general indication of magnitude.

They find that $\Delta W/\Delta T^*$ depends almost exclusively on the difference between the interest rate and the growth rate $(r - n)$, decreasing as that figure increases for reasons that will be discussed presently. For a value of $(r - n)$ consistent with their estimates of r and n, namely .01, they find that $\Delta W/\Delta T^* = .7$. This result, together with equation (3), means that the share of bequeathed wealth, measured according to Kotlikoff and Summers definition, T^*/W, greatly *overstates* η, the true effect of bequests on total wealth, to wit, by $1/.7$, or over 40 percent.

I have endeavored also to estimate $\Delta W/\Delta T$, but by an alternative procedure which is less dependent on specific assumptions about preferences, and was initially inspired by Darby (1979). He proposed identifying the "true" life cycle component of wealth as the amount of wealth that would be in existence in society if households accumulated just enough assets to enable them to finance their observed (average) retirement consumption --- with accumulation up to retirement, and decumulation thereafter, occurring at a constant rate.

Darby has applied this method to U.S. data around 1966. The rate of consumption to be financed during retirement was estimated using data from the 1967 Survey of Economic Opportunities and the portion of this to be financed through "life cycle accumulation" was obtained by subtracting, from consumption other sources of income, such as labor income and Social Security. The retirement fund was assumed to earn the rate of return of 4.5 percent which was adopted in our previous calculations. This method estimates the share of "life cycle wealth" at only 23 percent, implying that over three-fourths of wealth is bequest-related.

But Darby's approach, for all its ingenuity, cannot provide much useful information because of the entirely arbitrary nature of the underlying assumptions. His assumption that accumulation for retirement occurs smoothly while accumulation for bequests is the jagged residual (see Darby's figure 12, p. 37) is a caricature of

consumption smoothing based on life cycle utility maximization, which implicitly treats most hump wealth as bequest-related wealth.

This consideration suggests modifying his approach by replacing the ad hoc assumption that consumers smooth the accumulation of retirement provisions with the "rational" assumption of consumption smoothing. Specifically, given the amount to be bequeathed, how would that amount be accumulated by a person choosing an optimal life consumption path, subject to the constraint imposed by available lifetime resources? For the representative household, these resources consist of lifetime earnings plus bequests received, less the amount the household intends to bequeath. Steady state considerations imply that, on the average, bequests left will exceed those received by the growth factor e^{ng}, where n is the rate of growth and g the age gap between donor and recipient. Wealth holding due to bequests can then be computed as the difference between the path of wealth with and without bequests.

As long as the optimal consumption follows a smooth path (a constant rate of growth) which is consistent with commonly assumed additive utility functions, one can readily show that accumulated wealth due to bequests will rise smoothly to an amount equal to the difference between the bequests left at death and those received, capitalized from the date of receipts.

If the preferred consumption path grows at the rate c, the annual increment to wealth due to bequests in the year τ can be shown to be:

$$(4) \qquad \Delta s_{\tau} = \frac{Ae^{c\tau}(r - c)}{1 - e^{-(r-c)L}}$$

where L is length of life and A is the present value, at the beginning of life, of the difference between the bequest received and left. The path of wealth is the cumulant of Δs_{τ} plus the amount of the bequests once received (capitalized).

Equation 4 describes the path for a single household. To obtain the aggregate amount of bequests-related wealth at a given point of time, we must sum over the wealth of each cohort present, allowing for the fact that, because of growth, the cohorts of age τ can expect to receive and leave bequests which are larger than those left by the one currently deceased by the factor $e^{(L-\tau)n}$. National wealth is the summation of wealth over the cohorts adjusted for mortality. Finally, taking into account that the steady state bequests must grow at the rate n, bequests received will be Be^{-ng}. This formulation permits us to derive an expression for aggregate bequests-related wealth, ΔW, in terms of the current flow of bequests left, B, and the parameters c, n, r, g, p_t and L, where p_t is the force of mortality at age t. Taking as an illustration the case in which mortality is zero until age L and 1 at L, the result can be written as

$$(5) \qquad \Delta W = \Delta T^*(1 - D)$$

where T^* is the stock of bequeathed wealth according to K & S's definition as given by

equation (2), and D takes the somewhat lengthy expression:

$$(6) \qquad D = \frac{e^{-(r-n)L}}{1 - e^{-(r-c)L}} \left[e^{(r-n)L} - 1 - \left(1 - e^{-(n-c)L}\right) \frac{r-n}{n-c} \right].$$

Equations (5) and (6) have a number of plausible and interesting implications. Consider first the case where the economy is stationary: r is zero and so is n. In this case, since bequests are passed on unchanged, they have no effect on income, consumption, or life cycle earnings. Thus, $T^* = T$, and $D = 0$, and by (5), $\Delta W / \Delta T^* = \Delta W / \Delta T = 1$. In this case, the two definitions of the share of inherited wealth coincide and correctly measure "importance."

Consider next the case of a stationary economy, but in which $r > 0$. Here the receipt of inheritance has, on average, a favorable income effect, as it earns interest but requires no additional accumulation; one can show that, for this reason, my definition of the share, T/W, has an upward bias in measuring η, but using Kotlikoff and Summers' measure, the upward bias is clearly even greater. On the other hand, a positive growth tends, through the "accumulation" effect, to impart a downward bias to either measure of the share. Thus, r and n work in opposite and, in fact, offsetting ways, as is apparent from the fact that in equation (6), r and n often appear in the form $(r - n)$. So, the Kotlikoff and Summers measure of the share is upward biased as long as $r - n > 0$, and their parameter choices imply that $r - n$ is 0.01. This is sufficient to impart a strong upward bias to T^*/W as a measure of η. Indeed, assuming again for g and L the values of 25 and 55 respectively, one finds from (6) that $D = 0.3$, and hence, from (5), $\Delta W / \Delta T^* = 1 - D = 0.7$. (Note that this corresponds with the estimate of dW/dT^* reported by Kotlikoff and Summers.) Then, from (3)

$$(7a) \qquad\qquad \eta = .7 \frac{T^*}{W}$$

confirming that the Kotlikoff and Summers share overestimates the true measure of importance by over 40 percent. On the other hand, for the alternative measure of the importance of inherited wealth that I am advocating, equation (5) implies

$$\frac{\Delta W}{\Delta T} = \frac{\Delta W}{\Delta T^*} \frac{\Delta T^*}{\Delta T} = \frac{\Delta W}{\Delta T^*} \frac{T^*}{T} = (.7)(1.7) = 1.19$$

where T is computed from equation (1) and T^* from (2). Hence:

$$(7b) \qquad\qquad \eta = 1.19 \frac{T}{W}.$$

Thus, as expected our share underestimates "importance" (because it neglects the accumulation effect due to growth), but the bias is fairly small (in the relevant range of parameters).[6]

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[6] The calculations reported above assume a zero value for the rate of growth of consumption c. But the value of $\Delta W / \Delta T^*$ is not significantly affected by variations in c in the relevant range. Thus, for $c = .02$, $\Delta W / \Delta T^* = .723$, and $\Delta W / \Delta T = .723 \times 1.7 = 1.23$.

Estimates of the Elasticity. As for the actual value of the elasticity η, it can be computed either starting from our definition of the share T/W and using (7b) or from Kotlikoff and Summers T^*/W and using (7a)—and the result should coincide, at least as long as the shares are based on the same definition of bequests. As shown in Table 2A, my estimate of T/W is 17 percent (line 4) implying $\eta = .17 \times 1.19 = 20$ percent. The Kotlikoff and Summers estimate of T^*/W is .46 percent (Table 2A, line 1) which, however, falls by 41 percent if one accepts the hypothesis that bequests are typically left at death. Using (7a), this would imply an elasticity of .29. However, the estimates are still comparable because Kotlikoff and Summers are including in their flow of bequests and gifts the imputed consumption of dependents over 18 years of age.

As argued earlier, this expenditure should not be included in the bequest flow. With respect to the present problem, there is one further reason for exclusion, namely that no allowance was made for such flows in our (or as far as I can see, in Kotlikoff and Summers's) calculation of $\Delta W/\Delta T$.

If we accordingly eliminate from T^*/W the component of line 3, which reflects this expenditure, the share falls to 32 percent, implying η around .22, pretty close to our .2. But both estimates may tend to underestimate η because the Kotlikoff and Summers measure of the flow of bequests, which ignores nonintergenerational transfers, is presumably too narrow. Probate data and the results of Ando and Kennickell (1985) suggest a larger value for T/W, say between 1/5 and 1/4. Using (7b), this would imply an elasticity of between .25 and .30.

There remains to consider Kotlikoff and Summers's alternative estimate of T^*/W, based on the capitalization of life cycle saving, which is analyzed in Table 2B. If we correct as well as we can for the treatment of durable goods, as described earlier, line 2 shows that T^*/W would come to .67, which, together with (7a), implies $\eta = .47$. But, the above value of T^*/W is greatly biased upward by the inclusion of the consumption of family members over 18. Unfortunately, there is no way to measure that bias at present. Correcting for only a portion of the above expenditure—namely expenditure on college education—would lower T^*/W from .67 to .57 (cf. Table 2A) and bring η down to .4. One can conjecture that the full correction would bring η pretty close to the upper range of .3.

We can, therefore, conclude that when we focus on the "importance" of bequests as measured by the elasticity, all results point to a value of η of up to 30 percent, give or take a few points.

The Precautionary Motive and the Importance of Bequested Motivated Wealth

However, this value of .3 overestimates the contribution to wealth of inheritances and gifts related to the bequest motive because a substantial portion of the observed bequest flow undoubtedly reflects the precautionary motive arising from the uncertainty of the time of death. Indeed, in view of the institutional obstacles of dying with negative net worth, people tend to die with some wealth, unless they can manage to put all their retirement reserves into life annuities. In the absence of annuities, the wealth left behind will reflect risk aversion and the cost of running out of wealth (besides the possible utility of bequests).

This point has been elaborated in particular by Davies (1981) (see also Hubbard, 1984) who has shown that, for plausible parameters of the utility function including a low intertemporal elasticity of substitution, the extent to which uncertainty of life depresses the propensity to consume increases with age. As a result "uncertain life time could provide the major element in a complete explanation of the slow decumulation of the retired," relative to what would be implied by a standard Life Cycle Hypothesis model.

Clearly, bequests originating from the precautionary motive are quite different by nature from those dictated by the bequest motive. Indeed, they belong with pure life cycle accumulation since they are determined by the utility of consumption, and furthermore, the surviving wealth must tend, on the average, to be proportional to life resources.

However, using the precautionary motive as an explanation for life cycle wealth does run into some problems. If the purpose of the wealth accumulated at retirement was really to support consumption, then given uncertainty of life, risk aversion and the availability of annuity contracts, why don't more households use most of their wealth to buy annuities?

This criticism is important, but a number of counterarguments have been proposed. First, a fair amount of consumer wealth at retirement is, in fact, in the form of annuities: namely, all that is accumulated in the form of claims on pension funds and Social Security. Indeed, one might turn the above question around and ask: if households accumulate primarily to leave bequests, why have pensions and Social Security met with so much success and growth? Second, as has been pointed out in particular by Friedman and Warshawsky (1985a, 1985b), one important factor discouraging the purchases of annuities is the very unfavorable rates which are currently offered on such contracts (estimated by these authors at 4 to 6 percent below market rates of return). Of this "load," only one portion (around 1.5 percent) can be attributed to adverse selection (the fact that those who chose to buy annuities tend to have above average life).

Friedman and Warshawsky have shown that this unfavorable load factor is probably not large enough to lead a person to choose self-insurance if that person derived no utility whatever from bequest. However, the actual situation is different since, as a rule, households do derive some utility also from bequests (Masson, 1986). Friedman and Warshawsky have shown that, in this case, under plausible assumptions, the extra load factor can account for the rarity of private annuities. They also report that under the same conditions, the household would tend to leave an amount of bequest relative to terminal consumption that appears broadly consistent with the observed behavior of wealth as a function of age, indictating that this behavior might be accounted for even in the absence of a pure bequest motive.

The Importance of the Pure Bequest Motive

It would be interesting to obtain some estimate of the importance of purely bequest-motivated transfers. A certain amount of evidence suggests that the pure bequest motive—the accumulation of wealth entirely for the purpose of being

distributed to heirs and not be used for own consumption—affects a rather small number of households, mostly located in the highest income and wealth brackets.

First, the recent study of Hurd (1986) supports the hypothesis that the bequest motive is not important for a broad cross section of households. He starts from the reasonable hypothesis that if the true bequest motive is an important source of terminal wealth, then retired households with living children should have more wealth and should save more (dissave less) than childless ones. It is found that, in fact, those with children have less wealth and, by and large, dissave the same fraction of (marketable) wealth. The first result is fully consistent with the standard no-bequest life cycle consumption smoothing because for given life resources the "cost" of raising children reduces the retired consumption of parents. But the second result is indeed hard to reconcile with a significant pure bequest motive. It is, however, consistent with the finding of Projector and Weiss (1964) that only 3 percent indicated they were saving "to provide an estate for the family." At the same time, the proportion rose with wealth, reaching one-third for the top class (over half a million 1963 dollars). Thus, the bequest motive seems to be concentrated in the highest economic classes.

This hypothesis is supported by the finding of Menchik and David that for (and only for) the top 20 percent of the distribution of estimated life resources bequests rise proportionately faster than total resources.

This result suggests that the share of bequests due to the pure bequest motive is likely to be well below one, even allowing for the fact that the wealth of those with pure bequest motives may be a sizable part of the total. Recalling that our estimate of elasticity of wealth with respect to the entire flow of bequests came to somewhere around .3, it would seem safe to conclude that the importance of pure bequest motivated transfers, as measured by the elasticity of wealth with respect to that flow, is very unlikely to exceed one-fifth or so.

Summary and Conclusions

Clearly, part of the private wealth held at any time reflects hump or life cycle wealth and part reflects wealth transmitted through inheritances and major gifts. The interesting question is: how large is each component? The available evidence, reported in seven studies largely relying on independent methods but using broadly similar, customary definitions, consistently indicates that the share of wealth received by transfer does not exceed one-fourth. One recent contribution, that of Kotlikoff and Summers (1981), based on different definitions and partly on a different methodology, has arrived at a much larger share of 45 to 80 percent.

It has been shown that the differences between these and the other estimates reflect mainly definitional differences which have the effect of substantially increasing K & S's measure of the share. These differences consist in adding to the bequests and major gifts received: 1) the capitalized value of the earning on the inheritance since the time of receipt, and 2) the capitalized value of the expenditure on family members over 18 years in age.

But these definitional differences lose relevance when we focus on the elasticity of wealth with respect to the flow of bequests. It is first argued that, with respect to this issue, Kotlikoff and Summers's treatment of expenditures on family members over 18 years of age as bequests is not appropriate. Once that component is eliminated, the two measures of the share are shown to give rise to roughly similar values of the elasticity; a 10 percent decline in the flow of bequests might result in a decline in wealth of the order of 3 percent, more or less.

Even this figure overestimates the role of bequest motivated transfers, which seem to play an important role only in the very highest income and wealth brackets. Some portion of bequests, especially in lower income brackets, is not due to a pure bequest motive but rather to a precautionary motive reflecting uncertainty about the length of life, although it is not possible at present to pinpoint the size of this component.

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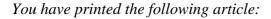
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