The Effect of Parental Income on Wealth and Bequests.*

Joseph G. Altonji† Ernesto Villanueva‡

February 5, 2002

Abstract

We examine how much of an extra dollar of parental permanent income will ultimately be passed on to the children in the form of bequests. We use two complimentary datasets to address the question. The first is a matched sample on parents and their adult children from the Panel Study of Income Dynamics. The second is a sample from the Asset and Health Dynamics among the Oldest Old. Our strategy is to estimate models of the age profile of wealth as a function of permanent income of the parents and children, allowing the link between wealth and the income measures to depend on parents' age.We find that the wealth at age 70 of white married couples rises about $6.00 dollars for each additional dollar of permanent annual income. Our estimates imply that about between parents pass on between 2 and 3 cents out of an extra dollar of expected lifetime resources in bequests. The estimates increase with parental income and are smaller for nonwhites. We compare our estimates to the implications of alternative computable benchmark models of savings behavior in order to assess the likely importance of intended bequests in the wealth/income relationship.

1. Introduction

How much of an extra dollar of parental resources does a child get? From the child's point of view, what are the terms of trade between another dollar for the

*Preliminary and incomplete.

†Institute for Policy Research and Department of Economics, Northwestern University

‡Department of Economics, Universitat Pompeu Fabra.

parents and another dollar for the child, once discounting is properly accounted for? To answer these questions one needs to know the relationship between parental income and (1) earnings of the child, (2) intervivos transfers, and (3) bequests.

Knowledge about the three channels is uneven. Solon (1999) surveys a rich literature on the intergeneration correlation in earnings. The results suggest that an extra dollar of permanent earnings of the parent is associated with an increase of about .3 or .4 in the child's earnings. Less is known about two other key deteminants of the distribution of resources across households and across generations —the responsiveness of intervivos gifts and of planned bequests to the incomes of parent and their descendants. Studies of intervivos transfers generally show that the probability and the amount of parental transfers rise with the income of the parent and fall with the income of the child.[1] However, the magnitude of these responses is quite modest. For example, Altonji, Hayashi and Kotlikoff (1997) estimate that among 20% of children receiving transfers the transfer amount rises by about 5 cents for each extra dollar of parental income and falls by about 8 cents for each extra dollar of the child's income. These results suggest that such gifts have only a modest effect on the income distribution.

Only a few studies have examined the effects of parental and child incomes on bequests.[2] A big obstacle to research on the parental income—bequest relationship, at least for the U.S., is a lack of data. One requires information on parental wealth and/or bequests and income of both the parents and children over the lifecycle.[3] Data sets containing information about bequests received by children

[1] For example, see Dunn (1993), Cox and Rank, Shoeni and McGarry (1995), Altonji, Hayashi and Kotlikoff (1995, 1997). In some cases, the estimate of the effect of the child's income on the parental transfer amount is positive. (e.g., Cox (1987).

[2] Menchik (1980), Wilhelm (1996), and McGarry (1998) are part of an interesting literature that shows that bequests in the U.S. are typically evenly divided among children and are not very responsive to the relative incomes of children. There is also a substantial literature on the relationship between wealth and age that is relevant for an assessment of whether planned bequests are an important determinant of the relationship between income and wealth. However, this literature does not address directly the issue of how much an extra dollar that a parent obtains at age 50, say, will ultimately be passed on to the children.

[3] Adams (1981) investigates the relationship between parental income and wealth. However, he did not have income data on the parents. He computed estimates of the permanent income of the children based on a regression of income on human capital variables. He then used the average across siblings as a proxy for parental income in Tobit models. An interesting paper by Kotlikoff (1981) used information on the present value of lifetime earnings and the expected bequest in the event of death at the time of the survey to estimate the response of bequests

typically lack information about the income of the parents and often lack panel data on the incomes of the children. The U.S. tax records exclude cases of 0 bequests as well the vast majority of positive bequests, which are smaller than the threshold above which an state tax return must be filed.

In this paper, we use two complementary data sets to measure the response of bequests to parental resources. The first is matched data on parents and their adult children from the Panel Study of Income Dynamics (PSID). The second is the first wave of the Asset and Health Dynamics Among the Oldest Old (AHEAD) panel survey of adults, which samples persons aged 70 or older and their spouses, if married, regardless of age. AHEAD also includes a supplemental sample of respondents aged 80 or over who were drawn from the Medicare Master enrollment file. It also contains information about deceased spouses. The sample of children in the PSID who receive bequests and for whom we have matching data on the permanent incomes of parents is not sufficient to support a study based on actual bequests. Consequently, our strategy is to estimate models of the age profile of bequeathable wealth as a function of permanent income of the parents and children, health status and other relevant variables. We allow the link between wealth and permanent income to depend on the parents' age. In conjunction with mortality tables, we are then able to infer the response of the eventual bequest to the permanent income of the parents, assuming that the entire bequest goes to the children. The PSID has excellent data on income and wealth holding for a fairly large sample of matched parents and children. Its main disadvantage is that it contains relatively few observations on parents who are over age 75. As a result, when using the PSID we have to extrapolate outside of the range of our sample to forecast wealth for parents who live to very old ages. For this reason, we also use the AHEAD sample. We make up for the lack of data with which to directly estimate permanent income in AHEAD by using an imputation process that relies on income related variables that are common to both the PSID and AHEAD.

The results from both AHEAD and the PSID suggest that at the sample mean parental wealth at age 70 rises by between \$4.33 and \$7.00 for every additional dollar of permanent annual earnings and declines slightly with the child's permanent earnings. However, the relationship is less steep for widows and widowers.

---

to parental earnings. He shows that under certain assumptions the expected bequest at each point in the parent's life is equal to the sum of bequeathable wealth plus the benefit from life insurance. He lacked data on the circumstances of children. His empirical strategy is quite different from ours, and we hope to explore it the future.

Using the mortality tables for the U.S. and estimates of the wealth derivative at each age based on the PSID, we find that an increase in the flow of permanent earnings leads to an increase in the expected bequest equal to \$2.78 for a white couple who are the same age, survive to at least age 60 and have average earnings. The corresponding estimate based upon AHEAD is \$4.00.

This estimated link between permanent earnings and wealth at age 70 picks up not only the effect of permanent earnings but also the effects the parents' initial wealth and retirement income that are correlated with career earnings. In the appendix to the paper, we estimate a regression model relating wealth at young ages to permanent earning and nonasset income at each age after 60 to permanent earnings. We use these models to compute the derivative with respect to permanent earnings of the expected lifetime resources of the parent (discounted to age 70) with mortality probabilities taken into account. With this estimate we are able to translate our estimates of the response of the expected bequest to permanent earnings into an estimate of the response of the expected bequest to parental lifetime resources. We find that parents at the sample mean of permanent earnings pass on between 2 and 3 cents of every extra dollar of lifetime resources to their children through a bequest. The estimate increases with income and depends on assumptions about the interest rate. When combined with evidence that the response of intervivos transfers to parental income is also small, our estimates suggest that most of the link between parental resources and the resources that child enjoys as an adult is through intergenerational links in human capital.

While the main focus of the paper is on the simply measuring the relationship between parental resources and bequests, we also investigate the mechanism that underlies that relationship. The nature of the bequest function is important for determining the distributional effects of changes in tax and transfer policies that effect the generations differently. Suppose one finds that on the margin an extra dollar of parental permanent income raises wealth holding at age 70 by 5 dollars. Can this relationship easily be accounted for by the effect of income on precautionary and lifecycle savings, or does it indicate that intended bequests rise sharply with permanent income? The analysis of this issue requires a theoretical model of life cycle savings behavior that incorporates a motive for intended bequests as well as uncertain lifetimes and uncertain income. The latter variables drive precautionary savings and unintended bequests. Since analytic models do not deliver sharp quantitative predictions about the link between income and bequests (in contrast to the case of intervivos transfers) we use computable models to provide a sense of the magnitudes. One is a very simple lifecyle model in which parents smooth consumption over their lifetimes. The second are two versions of DeNardi's (2001) intergenerational model of income, savings, and wealth. In one version there is a bequest motive and in the other there is not. Overall, our results suggest that life cycle savings in the presence of uncertainty about income and lifetimes can account for most of the relationship between income and expected bequests. Our findings are broadly in keeping with evidence suggesting that the income sensitivity of inter vivos transfers is smaller than predicted by an altruism model.

The paper is organized as follows. In section 2 we provide a simple model of transfers and bequests and define the parameters of interest. In Section 3 we discuss the data and the methods used to estimate permanent earnings. In section 4 we present estimates of effects of parental income and children's income on wealth late in life and compare the estimates for parents with children and parents without children. In section 4 we use mortality probabilities and our estimates of the age specific response of wealth to permanent income to estimate the effect of an extra dollar of permanent income on the expected bequest. In Section 5 we translate that estimate into an estimate of the effect of an extra dollar of parental lifetime resources on the bequest. In section 6 we compare the estimates to the predictions of models of savings behavior. iIn section 7 we summarize the paper and provide a research agenda.

2. The Derivative of Expected Transfers and Bequests with Respect to Permanent Income

We divide parental spending on children into three categories. The first is expenditures on food, clothing, medical care, education investments, etc. while the child is a dependent. The second is intervivos tranfers after the child has formed his own household. The third is a bequest to the child. We focus on transfers and bequests. In particular, much of the paper is devoted to estimating the effect of a one dollar increase in parental lifetime resources on bequests. In future work, we plan to estimate of the effect of an increase in parental resources on the present value of income available to the child by combining our estimate for bequests with estimates from other studies of the responses of intervivos transfers and the child's earnings to parental earnings.

Because of data considerations, we estimate the response of bequests to income by estimating the response of wealth at late ages to the parents' initial wealth and lifetime income rather than by directly studying bequests. The relationship between wealth and income is determined as follows. Parents form their own households at age a_1 in year $t(a_1)$. At that time they receive an initial stock of wealth W_1 from their parents and other sources. They receive an exogenous stream of earnings y_{ia} from a_1 to retirement age a_r. They both survive until at least 60. After retirement they receive a flow of social security income, pension income, and labor earnings, which we call y_{ia}^r. The flow is a stochastic function of earnings over their careers and is not subject to choice. The flow depends on the life status of the parents and terminates when both parents are dead.

From age a_1 on, the parents choose how much to spend from income and wealth and how much to save. They maximize expected lifetime utility, which depends on their own consumption, the utility of their children, and perhaps directly on transfers or a bequest through a "warm glow" motive. Let x_a denote the consumption expenditure of the parents at age a. It includes child expenditures in the years before the child leaves the home. Let R_k denote intervivos transfers to the child after the child has left the home. As specified below, x_a and R_a depend on W_1,and $(y_{i1},...,y_{ia})$. They also depend on a, a vector of characteristics of parents and the child, Z, and the vector D_a of dummy variables (D_{ma}, D_{fa}) indicating if the father and/or the mother are still alive (respectively) at age a. The consumption and transfer functions are

$$x_a = x(W_1, y_{i1}, ..., y_{ia}; a, Z, D_a)$$

$$R_a = R(W_1, y_{i1}, ..., y_{ia}; a, Z, D_a) \tag{2.1}$$

Wealth evolves according to

$$W_a = (1 + r)W_{a-1} + (y_{ia} - x_a - R_a) \tag{2.2}$$

Consequently, wealth at age a may be expressed as

$$W_a = W(W_1, y_{i1}, ...y_{ia}; a, Z, S_{ma}, S_{fa}) \tag{2.3}$$

We wish to measure how much of each additional dollar of lifetime resources parents pass on to their children. The derivatives of the functions $x(.)$, $R(.)$ and thus W_a with respect to $y_{i1},...,y_{ia}$ capture both the direct effect of these variables and the effect that they have by influencing expectations future labor earnings and retirement income. The derivatives also depend on age a in a complicated way. If W_1 is not held fixed and W_1 is correlated with $y_{i1},...,y_{ia}$, then the derivatives will pick up part of the effect of W_1 as well. Consequently, one will not capture the parameter of interest by simply estimating the relationship between W_a and income in a given year. In principle, with complete data on the incomes of the parents, one could estimate the relationship between W_a and past, current, and future income. The estimated relationship at each age a would capture the influence of credit constraints as well as uncertainty about future income conditional on past income, the life span, and the future needs of children.[4] However, while the PSID provides a relatively long panel on income for most parents, the data are not rich enough to support such estimation. Furthermore, information about income histories in the AHEAD data is very limited. In the case of the PSID we do experiment with estimation of wealth models as a function of the vector of income in all periods after imputing missing values for passed and future income, (not available for this draft) but we use a simpler approach in most of our analysis.

Our main approach involves using the permanent component of annual earning,y_i, prior to retirement to summarize differences across households in lifetime resources. The variable y_i can be accurately estimated for most members of the sample and explains most of the variance across households in the lifetime earnings. We estimate the function

$W(y_i, a, Z, D_a)$

relating between W_a and an estimate of Y_i using a flexible functional form. We also estimate the functions

$$W_1 = W_1(y_i, Z) \tag{2.4}$$

and

$$y_a^r = y_a^r(y_i, D_a, a) \tag{2.5}$$

relating initial wealth W_1, and post retirement nonasset income to y_i. The specification for y_a^r allows the relationship between retirement income y_a^r and y_i to depend the survival of the husband and the wife.

With this information in hand we proceed by imposing appriori restrictions on the form of the wealth function **??** so that with information about $W_a, y_i, W_1(y_i)$, and $y_a^r(y_i, D_a, a)$ one can estimate the response of W_{ia} at each age to a shift in

[4]Throughout the paper, we treat earnings as exogenous. Even with complete data, regression of wealth on income may be biased as estimates of the response of weatlh to an exogenous change in parental resources if consumption preferences are correlated with income.

the discounted present value of lifetime resources of the parent. Essentially, we assume that wealth at age a depends on Y^* where Y^* is the expected discounted value of initial wealth plus income in each period, with survival probabilities taken into account. We discount to age 70. We also assume that the distribution of past income and expected future income is dominated by y_i. Let Y_i^* equal the expected discounted value of lifetime resources conditional on y_i. Y_i^* is given by

$$Y_i^* = W_1(y_i) \cdot (1+r)^{70-24} + (\sum_{j=24}^{a_r} (1+r)^{70-j} y_i + E \sum_{j=a_r}^{100} (1+r)^{70-j} y_j^r(y_i, D_j, j) \quad (2.6)$$

where the expectation is over the joint distribution of the survival dummies for the husband and wife and we assume that both die before reaching 101 years of age.

One could directly estimate the wealth function

$$W_a(Y_i^*, Z, D_a, a)$$

and estimate the derivative

$$dW_a(Y_i^*, Z, D_a, a)/dY_i^*$$

This derivative is the fraction of an extra dollar of expected lifetime wealth parents that pass on to their children if the second parent were to die at age a. Instead, we first estimate the derivative

$$\beta_a(y_i, Z, D_a, a) \equiv dW_a(y_i, Z, a)/dy_i = dW_a(Y_i^*, Z, a)/dY_i^* \cdot dY_i^*/dy_i$$

using a flexible regression of W_a on y_i, Z, and a and then estimate $dW_a(Y_i^*, Z, a)/dY_i^*$ as $(d\hat{W}_a(y_i, Z, a)/dy_i)/(dY_i^*/dy_i)$.

To put the magnitude of the estimate in theoretical perspective, we use a computable structural intergenerational model of wealth and the income process developed by DeNardi (2001) to simulate data on $W_a, W_1, y_{i1}, ...y_{ia}$, and Z_{ic} and then use the simulated data to estimate $W(y_i, Z, a)$ and $W(Y_i^*, Z, a)$. We compare simulation based estimates under different assumptions about the degree of parental altruism. In addition, we also examine our estimates in light of the prediction of a simple certainty equivalence model in which there is no bequest motive, credit markets are perfect, there is no uncertainty about income or life span (although life spans vary across people), and parents strongly prefer a smooth consumption path.

2.1. The Derivative of Expected Bequests with Respect to Lifetime Resources

The bequest B is equal to W_a in the year when the second parent dies. For simplicity consider the case in which the husband and wife are the same age and suppose that conditional on having had children the husband and wife survive to 60 with probability 1. Let S_{ma} be the probability that a man who is age 60 survives to age a. Let H_{ma} be the probability that the man dies at a conditional on survival to age $a-1$. Let S_{fa} and H_{fa} be the corresponding probabilities for the woman. Assume that the bequest to the children occurs when both parents are dead. Then the probability that the bequest occurs at age a is

$$P_{ba} = (1-S_{fa-1})*S_{ma-1}*H_{ma}+(1-S_{ma-1})*S_{fa-1}*H_{fa}+S_{fa-1}*S_{ma-1}*H_{ma}H_{fa}$$

The first term is the probability that the wife dies prior to age $a-1$ and the husband dies at age a. The second term is the probability that the husband dies prior to age a and the wife dies at age a. The third term is the probability that the husband and wife both die at age a.

Assume that H_{ma} and H_{fa} are 1 at age 100. Then the expected value of the response to the bequest to a dollar increase in y_i discounted to the year in which the parent is 70 is

$$EB_{y_i} = E\sum_{a=60}^{100}(1+r)^{70-a}\beta_a(y_i, Z, D_a, a)P_{ba} \tag{2.7}$$

The response of the bequest to a dollar increase in lifetime resources is estimated as

$EB_{y_i}/(dY_i^*/dy_i)$.
[5]

[5] Similarly, the expected discounted value of the intervivos transfers to the child are

$$\begin{aligned} ER_{Y^*} &= \sum_{a=45}^{100}(1+r)^{70)-a}[R_{Y^*}(W_1, Y^*, a, 1, 1)[(S_{ma}*S_{fa}) + R_{Y^*}(W_1, Y^*, a, 1, 0) \\ &\quad [(S_{ma}*(1-S_{fa})] + R_{Y^*}(W_1, Y^*, a, 0, 1)[(S_{fa}*(1-S_{ma})] \end{aligned}$$

The sum $EB_{Y^*} + ER_{Y^*}$ is the parent's marginal propensity to spend on the child out of an extra dollar of lifetime resources. Here we focus on EB_{Y^*}.

3. Data:

We estimate wealth models using two different data sets. The first is the PSID. The second is AHEAD. The AHEAD data are used in combination with imputations for parental and child income based on regressions from the PSID. In this section we discuss the two data sets and the construction of key variables.

3.1. The PSID Sample

The Panel Study of Income Dynamics began with an initial survey in 1968 of more than 5,000 U.S. households. The households have been surveyed annually through 1997, and again in 1999. We use data through 1999.[6] We constructed a matched data set containing information on parents and their adult children as follows. We selected parent households in which either the father or the mother (in two-parent households in the 1968 base year sample of the PSID) or the father or the mother in single parent households reached the aged of 60 between 1984 and 1999, the first and last years in which wealth data were collected. We also include parents whose spouses died after 1968. Fathers are defined as the male head of the 1968 household, and mothers as the female head or the WIFE/"WIFE" of the 1968 household. The children born into the PSID sample households are interviewed separately after they form independent households.We matched the records of the parents to the records of persons who were sons/daughters or stepsons/stepdaughters in the 1968 PSID sample or who were born into PSID households between 1969 and 1974.[7] Much of the analysis is restricted to parents who have children who are PSID sample members.[8] We refer to this sample as the "matched" PSID sample.[9] If the parents have more than one child who becomes

[6]A substantial number of households from the SEO low income sample of the PSID were not interviewed in 1999.

[7]We matched parents and children using the the identification number of the original 1968 household.

[8]Children who do not leave their parents to form their own household by 1997 are not included. Children who form independent households and later co-reside with their parents continue to be followed as independent households and are included. Parents and children for whom annual earnings are never observed, and parents for whom wealth is never observed are excluded from the analysis.

[9]In an earlier draft we also experiment with an "extended PSID sample". This sample combines the matched PSID sample with an additional 435 households containing older parents whose children had all left home prior to 1968. We imputed the permanent incomes of these children, who are not PSID sample members, by using the results of a multivariate regression

a head or wife, we average the permanent income data across the children. We control for the total number of children (including those we do not observe as heads or wives) and also experiment with a control for the variance in permanent income across children. If the mother and father are married and respond to the 1984, 1989, 1994, and 1999 surveys, then they contribute 4 wealth observations to our analysis. If the father and mother are both PSID sample members and are divorced or separated at the time of a wealth survey, then each contributes a wealth observation. If they are divorced prior to 1984, they may contribute up to 8 observations depending on whether both are in the sample in 1984, 1989, 1994 and 1999. The number of parental wealth observations corresponding to an original 1968 household ranges from 1 to 8.[10]

We also analyze the wealth behavior of a sample of older men and women who have no children, which we determined using the child birth and adoption file of the PSID.

3.1.1. Calculation of permanent earnings:

We used the panel data on all individuals from the PSID who were either a head or a wife in a particular year to construct the measures of permanent earnings. In constructing the permanent income measures we make use of the regression model

$$\ln y_{it} = \gamma_0 + X_{1it}\gamma_1 + X_{2i}\gamma_2 + D_t\gamma_t + f(age_{it})\gamma_4 + v_i + u_{it}, \qquad (3.1)$$

where $\ln y_{it}$ is the logarithm of the sum of real labor earnings of the head and wife in the family that person i belonged to in year t and the vector X_{1it} consists of a set of marital status dummies, an indicator for children, and the number of children, X_{2i} consists of a vector of dummies for educational attainment and race, D_t is a vector of dummies for the years 1968 to 1997 with 1993 as the omitted

of the child's permanent income on the characteristics of the parents (including permanent income). The regressions are estimated using the sample of parents for whom we have data on the children. Only parents who are the head or wife of a household are included. The advantage of this extended sample is that we obtain additional observations on adults who are over 70. The estimates were quite similar to those for the matched sample.

[10] 1093 of the 1968 households contribute one parental wealth observation and 102 contribute two parental wealth observations in 1984. The corresponding numbes are 1063 and 104 in 1989, 1025 and 104 in 1994 and 655 and 69 in 1999. Combining the four years, the number of 1968 households who contribute one observation is 78, two observations is 116, three observations is 396, four observations is 604, five observations is 17, six observations is 27, seven observations is 13, and eight observations is 30.

category, $f(age_{it})$ is a vector of the first 4 powers of age (centered at 40), v_i is a time invariant person specific component, and u_{it} is transitory component. We estimate **??** by OLS using observations for a particular year if labor earnings exceeded \$900 in 1993 dollars and the household head was between the ages of 18 and 61. Separate models were estimated for men and women. We then estimate v_i as the average of the OLS residuals for person i.

Our estimate y_i of permanent earnings is the arithmetic average

$$y_i = \sum_{age=-20}^{20} [\exp\{\hat{\gamma}_0 + X_{2i}\hat{\gamma}_2 + \hat{v}_i + D_{c+age+40}\hat{\gamma}_c]/41$$

where we have removed the effects of $f(age_{it})$ by setting age to 40 in all years.[11] Below use y_{pi} and y_{ki} and to denote y_i for the parents and the kids, respectively. By using the above adjusted average of past, current, and future family earnings adjusted for demographic variables to construct permanent income, we are implicitly assuming that the variance and degree of serial correlation in u_{it} is sufficiently weak that the variance across households in lifetime earnings contributed by $v_i + u_{it}$ is dominated by the permanent component v_i.[12],[13] Note that we include marital

[11] Using the geometric average

$$y_i = \exp[\sum_{age=-20}^{20} \{\hat{\gamma}_0 + X_{2i}\hat{\gamma}_2 + \hat{v}_i + D_{c+age+40}\hat{\gamma}_3\}/41]$$

made little difference in the results. Allowing age to vary when computing permanent income also made little difference also made little difference.

[12] Suppose that $u_{it} = \rho u_{it-1} + \xi_{it}$ where ξ_{it} is iid with variance σ_ξ^2. If $u_{i1} = \xi_{i1}$ then using the moving average representation of u_{it} one may show that the contribution of u_{i1} to u_{i42} to the variance across households of the sum of Y_{it} from age 18 to 60 is $\sigma_\xi^2 \sum_{k=1}^{42} [(1-\rho^{t+1})/(1-\rho)]^2)$

If ρ is .65, then this expression equals $318.5\sigma_\xi^2$. The contribution of v_i is $42^2\sigma_v^2 = 1764\sigma_v^2$, where σ_v^2 is $var(v_i)$. Consequently, if $var(\xi_{it}) = .5var(v_i)$, then variation in v_i would account for 92.7% of the variance in accumulated earnings or in average earnings per year over the lifecycle, after abstracting from the contribution of the age earnings profile. If $\rho = .85$ the corresponding variance percentage is 71.5% . Note that some of the variation in the u_{it} are captured by our $\hat{v}_i$ because the estimate $\widehat{v}_i$ is basically v_i + the average of the u_{it} for the part of the work life that we observe.. The problem, however, is that since we are assuming that the average of the u_{it} don't persist to other periods, we are misestimating the average income in the years that we do not directly observe.

[13] Altonji et al (1997) use a similar approach to construct permanent income measures in their study of family transfers. However, they do not include the effects of economy wide changes in wages in their measure. They also experiment with an alternative approach in which they

status among the controls in the wealth regressions, and in some specifications interact marital status and permanent labor income.[14]

Note that the estimates of the age profile and the coefficients on the year dummies will pick up the effects of variation across birth cohorts in the mean of v_i, because the effects of age, cohort, and time are not seperately identified. We assume that v_i is orthogonal to birth cohort conditional on education and race. Under this assumption, the age profile $f(.)$ and the year dummy coefficients γ_3 are identified. Since the PSID starts in 1967, we estimate year effects by linking the year effect estimates for the years 1967-1997 based on the PSID to aggregate time series data on annual earnings of full time employees in the private sector, using a ratio link based on the average from 1967-1969 of the aggregate wage series and corresponding elements of γ_3 for the years 1967-1969. We use a labor force quality index constructed by Denison (1974, page 32, Table 4-1) to account for the effects of shifts in the age-sex composition of hours as well as intragroup changes, intergroup shifts, and changes in the amount of education on the efficiency of an hour of work.[15] We strongly suspect that the effect of any remaining errors in accounting for trends in cohort quality and in aggregate labor market factors will have only a small effect our estimates of the effect of the response of wealth to permanent income given the huge within cohort variance in permanent income and the fact that we control for age, time, and the interaction between age and time in the wealth models.[16]

---

model e_{it} as a third order autoregressive process with coefficients that depend on a third order polynomial in age. They then use the chain rule of forecasting to forecast future values of e_{it} and combine the forecasts into an index.

[14] We have also constructed permanent income with the effects of demographic variables included for the years that we observe them. This had little effect on our estimates of the wealth/parental income derivative. Accounting for effects of variance in u_{it} when going from logs to levels when constructing for permanent income would imply multiplying our estimates of y_i by the factor 1.20 for men and 1.23 for women. This would have the effect of reducing our estimates of the response of wealth to permanent income by about 20%.

[15] We use nominal average annual earnings of full time employees, Series D 722 from the HIstorical Statistics of the U.S., Colonial Times to 1970, page 164 divided by the CPI. Denison does not report values for years prior to 1929, 1930-1939, or 1942-1946. We assigned the 1929 value for the small number cases earlier than 1929. We filled in missing values for 1930-1939 and 1942-1946 by linear interpolation of the log of the index.

[16] The wealth models control for a fourth order polynomial in the age of the oldest parent and dummy variables for the year of the wealth observation, which will absorb some of the effects of any unobserved differences across cohorts. The estimates of the response of wealth to income are reduced by about 20% of the baseline estimate of $5.29 when one fails to account for economy wide time trends in earnings when constructing Y_{pi}. The main reason is that the

Note that the value of y_{it} is identical for a man and a woman who were husband and wife in year t. The basic assumption is that married couples pool income, and that if a divorce or death of a spouse occurs the influence on future wealth of the stream of earnings during the years the individuals were married does not depend on who earned the money. We conducted some experiments in which added control for number of years since death of a spouse and its interaction with the permanent income measure to the wealth equation, without much effect on the results.

The quality of the permanent income measures depends in part on the number of observations per individual on which we average. The number ranges from 1 to 30 . For the sample of parents, the 5th percentile of the number of observations used in the computation of the permanent income measure is 3, the median is 17, and the 95th percentile is 29. Given the long span of observations for most parents, our measure of permanent income will be an accurate measure of earnings in a typical year. (The corresponding numbers for kids are 3, 15 and 27, respectively). The fact that these measures are averaged from several years of data suggests that transitory income and measurement error will have only a minor effect on them. Eliminating cases in which 3 or fewer observations were used to create permanent income made little difference.

There are at least two disadvantages to our income measure. First, it does not account for uncertainty about future income, which plays an important role in the precautionary demand for savings. Uncertainty about income also plays a role in the decision to defer transfers to the future until uncertainty about the child's needs relative to the parents is resolved. A related disadvantage is that the index depends upon future realizations of the transitory income component. To the extent that stochastic variation in earnings is important and persistent, future shocks to income may have an important influence on the permanent income index, particularly when we use wealth in 1984. This might lead to a downward bias in estimates of the relationship between wealth and permanent income. The reasons is that wealth at age a should depend on past income realizations and the conditional distribution of future realizations but not on future income surprises. It also might bias the interaction term between age and wealth in the positive direction, because wealth after age 60 is determined after the income realizations that go into our permanent income measure. Consequently, we experiment below with permanent income measures that are based only on y_{it} observations collected

trend in the log of income effects the variance of the level of permanent income implied by a given variance in v_i.

prior to the year of the wealth measure.

Note that the relationship between wealth at a given age and income in a prior year may depend the specific year in which it is received. This is because the timing may influence expectations about future income, the extent to which liquidity constraints constrain consumption in early years, and precautionary savings.

Wealth Outliers The wealth data are available in 1984, 1989, 1994, and 1999. Our measure includes home equity. The wealth distribution is heavily skewed to the right, with several very large outliers. In most of our analysis we have eliminated extreme values of the wealth distribution as follows. First, we estimated a median regression model relating the wealth level to the level of permanent income, a quartic in age, dummies for 1989, 1994, and 1999, and a set of demographic variables, including race.[17] We then eliminated the cases corresponding to the bottom 0.5% and top 0.5% of the residuals from the median regression. Eliminating the outliers leads to a dramatic reduction in the standard errors of our wealth model parameters. It also leads to a reduction in point estimates of the effect of the effect of permanent earnings on wealth.

Table 1 provides variable definitions and summary statistics (mean, stand dev., minimum and maximum) for the matched sample of parents and children. This sample contains 4,377 observations on 1,389 parents from 1,281 1968 households. We have matching data on 3,521 children. The number of child observations matched to a parent observation ranges from 1 to 20, with an average of 3.48.

3.2. The AHEAD Sample

A disadvantage of the PSID is that the sample of parents who are over 70 years old is relatively small.[18] This makes it difficult to estimate the effect of permanent income on wealth late in life. Consequently, we also use the first two waves of a second data set—the AHEAD cohort of the Health and Retirement Study (Institute for Social Research, University of Michigan). This cohort consists of

[17] We include the same set of demographics that we use in our wealth regressions -see Table 3.1

[18] Of the 4,377 observations used in the wealth regression, 1,060 observations belong to households in which the oldest member is between 65 and 70 years of age. 646 observations belong to households in which the oldest member is between 70 and 75 years of age. Households in which the oldest member is between 75 and 80 years old contribute 321 observations, and the corresponding numbers for households between 80 and 85, 85 and 90 and 95 to 100 years of age are 115, 32 and 2, respectively.

men and women who were born prior to 1924. This group was aged 70 or older in 1993. There is only one respondent per household, but information is collected about both the husband and wife if both are present. In the case of sample members who are widowed or divorced/separated information is collected about the late spouse or about ex-spouses. We construct the parent record by combining the information on the respondent and his or her spouse or ex spouse. The data set contains information on assets as well as information on demographic variables and health. It also contains a limited amount of information on past earnings and labor market history. Each respondent is asked about his/her descendents and the spouses of their descendents and provides information on education, family income, and labor market participation. We analyze persons with children and persons without children separately.

For the computation of the permanent income of the parent and the children we selected AHEAD variables that were collected or could be constructed for the PSID sample. The key variables for the AHEAD cohort are education and a measure of the occupation the person held the longest.[19] The key variables for the children are family income (in 4 income brackets), age of the head of the household, education of head and wife and labor market status of the head and wife (namely, whether they work full time, part time or are unemployed). We then estimated multivariate regression models of the log child's permanent income as a function of the characteristics of children and the labor market variables of the parents. We estimated similar regressions for the permanent income of the AHEAD cohort. We used the coefficients from these regressions to compute permanent income of the child and the permanent income of the members of the AHEAD cohort.[20]

[19] AHEAD respondents are asked about their labor market experience and about that of their spouses. In particular, they are asked if they worked for the same employer for more than 10 years. If they did, they are asked about the maximum earnings at that job, and about their occupation in that year. If they did not work for more than 10 years for the same employer, they are asked about their occupation in the job they held longest. We built similar measures for the PSID, where we can track the tenure and occupation of the head of the household for up to 17 years.

[20] AHEAD and the PSID contain a common set of variables for the parents and descendents. The common parental variables are education of the father and mother and the occupation in the longest held job. The common variables of descendents include family income (in 4 income brackets), age of the head of the household,education of head and wife and labor market status of the head and wife (namely, whether they work full time, part time or are unemployed). We predicted permanent income of the parent and mean permanent income of the descendents as follows. The logarithm of permanent income was regressed on education of the father and the mother, education squared, occupation indicators, dummies for educational attainment of the

Variable definitions and summary statistics for the wealth measure, parental and child income measures, and key control variables used in the AHEAD wealth regressions are in Table 2.2.

4. Results

4.1. Results for the PSID data

We begin by estimating variants of the model

$$\begin{aligned} W_{it} &= a_0 + a_1 y_{pi} + a_2 y_{pi}^2 + a_3 y_{pi}^3 + a_4 y_{p_i}(age_{it} - 70) + a_5 y_p^2(age_{it} - 70) + \\ &\quad + a_6 \overline{y}_{ki} + f(age_{it} - 70) + b' X_{it} + e_{it}, \end{aligned} \tag{4.1}$$

where i is the subscript for a parent household and t is a particular year (1984, 1989, 1994 and 1999). In most of what follows we suppress the subscripts.

The function $f(.)$ of $age - 70$ is a 4th degree polynomial. The vector X_{it} consists of dummies for whether the parent household corresponds to a divorced parent, father is divorced and remarried, mother is divorced and remarried, father is widowed and remarried, and mother is widowed and remarried. It also contains interactions between $age - 70$ and parental income, number of siblings, race, whether the offspring is a female, and whether the offspring is a female head. Throughout the paper we normalize y_p by subtracting off the sample mean. Consequently, even in the cubic specifications the estimate of a_1 is the average derivative of wealth with respect to parental income evaluated at age 70.

As we noted above, $\overline{y}_k$ and other data on the children are averages of observations on independent children for whom we have data. The age measure in the interaction with y_p is the maximum of the age of the husband or wife when both are present[21] or the age of the individual for persons who are widowed or divorced.

head and wife in the kid household, income brackets and interactions with age and, finally, labor market status dummies and interactions with age. A set of demographics subsequently included in the wealth regression were also used. The imputation regressions also include dummies for whether we have information about the father and information the mother. The sample size and the adjusted R^2 of the model for Y_p are 16,200 and 0.42. The corresponding values of the model for Y_k are 16,742 and 0.50. Note that the AHEAD respondents they worked for the same employer for more than 10 years. If they did, they are asked about the maximum earnings at that job. It is possible to construct comparable measures in the PSID, but we decided not to use it because it is missing for a large part of the AHEAD sample.

[21]We obtain very similar results if we replace this variable with a minimum of the age of a husband or wife.

As we have already noted, divorced parents who are both in the PSID contribute separate observations to the regression for the years following the divorce. The standard errors in the table allow for arbitrary correlation and heteroscedasticity among the error terms for persons from the same 1968 household.

The results are in Table 3.1. Model I excludes the quadratic and cubic terms in y_p. The coefficient (standard error) on y_p is 5.24 (0.43). This says that a one dollar increase in permanent earnings (earnings per year) leads to a 5.24 dollar increase in wealth at age 70. The interaction term a_3 is small and positive: -0.02 (.036). The wealth derivative with respect to the parents' permanent income is *3.44 (0.53) at age 60, 3.24 (0.54) at age 80, and 3.19 (0.73) at age 85.*

In Model 4 in Table 3.1, we add interactions between y_p and dummies for widowed parent and for divorced/separated (All of our models include widowed and divorced/separated dummies.) The sensitivity of wealth to permanent income is much lower for widows. The coefficient on the interaction term is -2.44 (0.72), and the average derivative at age 70 for widows is 2.80 (evaluated at the sample mean of income). We're not entirely sure how to interpret this. It may reflect the fact that premature death of a spouse alters the relationship between our measure of permanent income and the present discounted value of lifetime resources. We have estimated specifications in which we include interactions between income, whether the parent is a widow/er and the number of years since the surviving parent became a widow/er (an additional regressor measuring the number of years since the parent became a widow/er is also included in these specifications). The coefficient of the interaction between income and the dummy for widowed parent is still -1.97 in the new specification. We will investigate this in future work by modifying our measure of permanent income to adjust for death of a spouse prior to age 65 or so. We also estimated specifications in which we interact y_p with the marital status of the parent. Divorce status also has a substantial negative precisely estimated effect on the income derivative.

4.1.1. Comparison to Older Adults without Children

To provide a possible benchmark with which to assess the importance of altruism toward children in the wealth/income relationship, we estimate the model II using 327 wealth observations from a sample of 112 older men and women who had no children. (Table 3.2). Variables corresponding to children, such as $\overline{y}_k$ are of course excluded. We use the mean for the matched sample of parents and children to standardize y_p for the older people who do not have children. (This makes it easier to compare the coefficients across the samples.). In the cubic case the coefficient on y_p is 2.37 (1.04) which is smaller than the value of 6.09 (0.61) obtained for persons with children. Thus, we find the relationship between wealth and parental income is a bit stronger for parents with children but the difference is small and not statistically significant. The coefficient on the age interaction is basically zero (0.10). In Model IV of Table 3.2 the coefficient on $y_p * Widowed$ is 1.4 (2.01), and the sum of the coefficients on y_p and $y_p * Widowed$ is 3.77. This estimate, while imprecisely estimated, is smaller than the value for widows and widowers with children (Table 3.1., model IV). Furthermore, in the AHEAD sample the coefficient on y_p does not depend very much upon whether or not the parents had children. (Table 3.5) Overall, our results on this important issue are somewhat mixed but for the most part suggest that the relationship between wealth and income does not depend that much on children. We should emphasize, however, that this result is potentially consistent with a substantial bequest motive if persons without children develop stronger attachments to other relatives, friends, or organizations and leave bequests to them. We do not have evidence on this. Furthermore, the simulation results presented below suggest that wealth—income derivative is not that sensitive to the presence of a bequest motive.

4.1.2. Results for Nonwhites

A striking fact about the wealth distribution in the United States is that on a per household basis African American households posess only about 1/5 of the wealth of white households.[22] The race gap in wealth is much larger than the corresponding gap in income. We have estimated models in which we interact y_p with a race indicator that equals 1 for nonwhites. (Almost all of the nonwhites in the PSID sample are African-American.)[23] The coefficient on the interaction term is -2.20 (0.69), and the point estimate of the derivative of wealth at age 70 with respect to y_p at the mean of income for the full sample is 3.89. When the interaction between y_p and widowed is taken into account, the estimates imply that the wealth derivative of a widow or widower is only 1.60 for non-whites. (This model assumes that the quadratic and cubic term and the age interactions

[22] See for example, Blau and Graham (1990), Avery and Rendall (1997), Menchik (1980), and Altonji et al (1999).

[23] The race indicator is included as a separate control in all of the models in the table. It is not included in the permanent income regressions, so the estimates of permanent income reflect race differences in the distribution of income.

are the same for whites and nonwhites.) We do not have an explanation for this large race difference in the income sensitivity of wealth.

4.1.3. Other Results

The coefficient on the sibling average of permanent income $\overline{y}_k$ is also reported in the table. There are a few econometric issues that deserve discussion. First, $\overline{y}_k$ may be correlated with the error term in the wealth model. On one hand, if parental wealth helps to finance human capital investments in children, then one would expect a positive correlation. On the other hand, such investments are costly and may lead to lower wealth late in life. Consequently, it is not clear which way the bias in the coefficient on $\overline{y}_k$ goes. In any event, for model V the coefficient on this variable is 0.26 (.33) While the specific point estimates vary a bit, we consistently find that the effect of child's permanent income is small and always obtain positive signs. There is little evidence that parents respond to $\overline{y}_k$ by saving less for a bequest.

There are a few other results that deserve mention. We included the standard deviation of the income of the descendents in the model II.[24] The coefficient is negative and statistically significant.

All the regressions control for 1/(number of children). If altruism based bequest motive plays a role in the accumulation of wealth, the coefficient on this variable should be negative, since the smaller is 1/(number of children), the more descendents. In contrast, we find that it is positive with a t-value of about 1. The point estimate suggests that the bequest is reduced by \$12,747 as the number of children rises from 1 to 3. The positive coefficient could reflect a negative relationship between initial parental wealth and fertility, the fact that parents with few kids have fewer child related expenses, leading to greater savings and wealth, or a positive effect of number of children on total inter vivos transfer to adult children.

[24] If parents are constrained to divide bequests equally, then greater dispersion of their incomes might reduce the parents' incentive to provide a bequest, since part of it will be "wasted" on rich children who don't need it. On the other hand, this implicit tax on bequests could work in the opposite direction, leading parents to leave a larger total bequest than they would choose if they could channel the entire bequest to the needy children.

4.2. Basic Results for the AHEAD sample

In table 2.3.4.A we report estimates of variants of (2.1) based on the AHEAD sample. The standard errors are robust with respect to heteroscedasticity but have not been corrected for the fact that we use a 2-step estimator. They are probably understated. For the linear specification we obtain a coefficient of 7.05 (.51) on y_p and a coefficient of -.11 on $y_p(age-70)$. In column 3 we add y_p squared and $y_p^2 * (age-70)$. The income terms are deviations from the sample mean, and so the coefficient on the linear term (5.64) is the average derivative of wealth with respect to income. This estimate is slightly above the value of 4.29 we obtained using the PSID sample. However, part of this difference may be accounted for by the fact that average income in the AHEAD sample is substantially higher than the PSID sample. The quadratic term in wealth is similar to that in the PSID.[25] The interaction terms show a modest decline in the income derivative with age. The Model I estimates imply that at the mean of y_p the derivative declines by 1.1 over 10 years.

In keeping with the PSID results, the income derivative is substantially lower for widows. Being divorced or separated reduces the derivative by -2.35 (1.83) in the AHEAD sample. This is close to the value of -2.25 (.87) in the PSID sample, but the AHEAD estimate is not very precise.[26]

The coefficient on $y_p * Nonwhite$ is -1.30 (0.71), which is substantial but smaller in absolute magnitude than the race differential of -2.20 we obtained in the PSID.

We obtain a small, positive, and statistically insignificant coefficient on the child's income. As we argue below, the presence of altruism implies a negative coefficient on the child's income term. The coefficient should be zero if parents are indifferent to the financial situation of their children. As we noted earlier, the positive coefficient could reflect reverse causality from parental wealth to the child's income. It could also arise because our measure of the parents' permanent income is imperfect, and the permanent incomes of parents and children are correlated.

[25] One possibility is related to the fact that the PSID analysis pools wealth observations from 1984, 1989, 1994 and 1999. The substantial increase in stock prices between 1984 and 1989 may have lead to stronger relationship between income and wealth in the 90s, when the AHEAD data are collected.

[26] The imputation of permanent income of AHEAD respondents contains a dummy variable for widows and other for widowers.

5. Estimates of the Derivative of Expected Bequests with Respect to Permanent Income and Lifetime Resources

We now use the estimates of the wealth model to compute an estimate of the derivative of expected bequests with respect to permanent income using 2.7. The calculations are for husband and wife who are the same age and survive to age 60. We use data from the U.S. life tables for 1998 to construct race specific estimates of S_{ft}, H_{ft}, S_{mt}, and H_{mt}. We assume that H_{mt} and H_{ft} are 1 at age 100.

Let β_t be the income derivative of wealth in year t. We compute the derivative of wealth by setting the age term in the interactions that appear in Model V to the age of the surviving spouse in the year of his or her death. (In our example, both husband and wife are the same age.) If both spouses die in the same year we set $widowed * y_p$ to 0. Table 4 displays values of $S_{ft}, S_{mt}, H_{mt}, H_{ft}, P_{bt}$, and $\beta(t)$. We report values of $\beta(t)$ for the 10th percentile value, mean, and 90th percentile value of income for the combined sample of whites and nonwhites, which correspond to \$15.82, \$42.96, and \$74.05 thousand. [These values are not weighted.] At the bottom of the table we report the derivative of expected bequests with respect to income. This is the sum of the derivatives for each value of t weighted by the probability that the second parent dies in year t.

The estimates based the income coefficients and mortality probabilities for a white couple are in Table 4. Using the coefficients from the PSID matched sample (Table 3.1, Model V), We find that a dollar increase in y_p raises the expected bequest by 1.69, 2.78, and 3.42 dollars respectively at the 10th percentile, sample mean, and 90th percentile value of income. As one can see in the last two columns of the table, the derivative of wealth with respect y_p increases slowly with age. We have performed a similar calculation using the AHEAD parameter estimates in Table 3.4, Model IV. For this sample the income derivative of expected bequests at the 10th percentile, sample mean, and 90th percentile values of y_p are 3.59, 4.04, and 4.38 respectively in the case of whites.

In Table 5. we present a corresponding set values for blacks based on the PSID. The expected derivatives are -1.25, 0.13, and 1.31 are the 10th percentile, mean, and 90th percentile of the income distribution for the combined sample. The values are -0.03, 0.83, and 1.39 respectively, which are far below the corresponding values for whites. The values based on the AHEAD sample are also substantially below the corresponding values for whites.

In the appendix we report regression estimates of 2.2and2.5. We use these estimates to construct Y^*_{pi} and dY^*_{pi}/dy_{pi} assuming an interest rate of 4%. At the 10th percentile, sample mean, and 90th percentiles of y_{pi}, the estimates of $EB_{yp_i}/(dY^*_{pi}/dy_{pi})$ are equal to 0.013, 0.021 and 0.026 in the case of the PSID. The values based on AHEAD are 0.027, 0.031 and 0.033. The estimates are substantially lower for nonwhites.

6. Putting the Results in Theoretical Perspective

Is the relationship between expected bequests and income largely the result of precautionary savings and savings for retirement in the presence of uncertainty about life span? Or does it arise from a bequest motive, perhaps driven by altruism? To address this issue,we compare our estimates to the values implied by models of the relationship between expected bequests and the income of parents and children.

6.1. A Back of the Envelope Calculation

We begin with a simple calculation based upon a model in which parents face no income uncertainty, wish to smooth consumption over the lifetime, and do not have access to an annuities market. The idea of the calculation is to compare the fraction of an extra dollar of resources of lifetime resources that is held as wealth at age 70 or will acrue after age 70 to the fraction of lifetime consumption needs after age 70. First consider the coefficient relating permanent income to wealth. Suppose that parents work from age 20 to age 62 and that both survive till at least age 70 and the after tax real interest rate is 4%. The sum of dW/dy_i and the derivative of post age 70 earnings discounted to age 70 $dE\sum_{j=70}^{100}(1+r)^{70-j}y_j^r(y_i, D_j, j)/dy_i$ is 5.24 + 1.45=6.69. Dividing this value by the estimate 130.48 of the derivative with respect to y_{pi} of lifetime resources $Y^*(y_{pi})$ yields an estimate 0.05 of the fraction of each dollar of lifetime resources that is available for consumption in the years after age 70 or for a bequest. Assuming that parents want a constant consumption stream per person and discounting the years back to age 70 while taking account of the likelihood that one or both will be alive, and discounting consumption in earlier years forward yields the fraction of the lifetime consumption of the husband and wife that must be provided for. That fraction is 0.049=16.49/(317.55+16.49). If one assumes instead that the interest rate to 0 when discounting income and consumption streams, then .16= 6.88/43.89 each extra dollar of lifetime resources remains at age 70 or will acrue in future years, while the expected fraction of consumption expenditures after age 70 is

.23= 29.8/(50+50+29.8). For both interest rates the fraction of an extra dollar of lifetime resources that remains at age 70 thus appears to be small relative to the fraction of lifetime consumption remaining. This suggests that only a small portion of the response of wealth at age 70 to income is intended for a bequest. We have repeated the calculations using the six percent interest rate and assuming that desired consumption/year after retirement at age 62 is only 3/4 of pre-retirement consumption. In this case, the expected fraction of consumption expenditures after age 70 is 0.01.

The calculation has the advantage of transparency, but one must be very cautious in drawing conclusions from these calculations for a number of reasons, including the primitive nature of the underlying assumptions about consumption preferences, the fact that we have made only crude adjustment for changes in consumption preferences with age, and the likely dependence of preferences (and scale economies in consumption) on whether one or two members of the family are living. [27] But taken at face value the calculation suggests that the fraction of resources saved that is intended for bequests is small.

6.2. Comparison to DeNardi (2001)

It is highly desirable to compare our estimates to a fully dynamic intergenerational model of income and wealth. DeNardi (2001) has recently developed such a model. The basic outline of her model is as follows. There are overlapping generations of people and heterogeneity in productivity. The income of individual at age 20 is influenced in part by the income of their parent at age 45. Subsequently, income evolves according to a discrete markov process until retirement at age 60. After retirement people receive lump sum benefits that cannot depend upon prior earnings. Parents have an additively separable power utility function. In some

[27] We wish to know how much of an additional dollar of compensation is passed on to children. If the division of compensation between earnings and social security and contributions to defined benefit plans is a choice, then social security/pension contributions should be included in our permanent earnings measure. Parents could choose smaller pensions and more bequeathable wealth. Of course, social security is not a choice, and given the fact that compensation packages are bundles, pension choice is also somewhat restricted. We have ignored tax considerations, which complicate matters further. We are not sure what the best way to treat pension contributions is. The value of defined benefit pensions and social security are not bequeathable and so are excluded from our measure of bequeathable wealth measure. A simple extension of our calculation would be to estimate the relationship between Y_p and the flow of non-asset income (including pensions) at each age after 62. One could use the relationship to adjust downward the part of post 70 consumption that must be covered by wealth at age 70.

versions of the model the get utility from bequests. In other versions of the model there is no bequests motive. Bequests occur at the time of death. The probability of death is 0 prior to age 60 and is set to accord with conditional survival probabilities for the U.S. economy for the years after age 60. The utility from the bequest does not depend directly upon the income of the children but it is calibrated so that the marginal utility from the bequest is comparable to the marginal utility that the child receives. Income taxes, taxes on asset income, and taxes on bequests are all accounted for in the analysis. The economy is closed with a standard neoclassical production function. Retirement benefits are not stochastic and do not depend upon career earnings.

Inevitably, there are some discrepancies between the model and reality, especially given that the purpose of DeNardi's model is to examine the role of intergenerational links through income and through a bequest motive in explaining wealth inequality.[28] The model has a few limitations for the purpose of evaluating the income wealth derivative that should be mentioned. The first is that since the model assumes only one parent, the mortality rates differ from those for married couples. This will affect both the precautionary and lifecycle savings motive as well as the age at which bequests are made. Also, there are no inter vivos transfers in the model, and children do not receive wealth prior to entering the labor market. Finally, retirement benefits are lump sum in form.. This might raise the derivative of wealth with respect to permanent income for persons in the low income quantiles, although we are not clear on this.

DeNardi graciously provide us with simulated data consisting of the earnings histories, asset histories, and year of death for a set of parents, along with the earnings histories of their children for several specifications of her model. For each specification, we have information on 10,000 artificial individuals, observed for at most 14 periods. (Each period in her model represents 5 years.) For each individual, we know the age, the income earned during the period, the amount of wealth holding and the income of his children. We constructed the equivalent of our permanent income measure by regressing the logarithm of yearly household earnings on an age polynomial of order 4 in deviations form 40. The sample for the regressions was restricted to individuals between 25 and 60 years of age. Seperate regressions were run for parents and children. We then averaged the prediction errors of each individuals and took antilogs. To obtain the derivative

[28] DeNardi's main finding is that voluntary bequests are the key to explaining very large estates. Unintended bequests of wealth that was accumulated for lifecycle and precautionary reasons are not enough to explain concentration at the high end of the wealth distribution.

of wealth with respect to income, we regressed wealth holdings of each individual on his permanent income, the permanent income of his child, and a fourth order polynomial in age in deviations from 70. Only individuals whose age was above 40 were included in the analysis. Finally, to be consistent with our empirical strategy, we eliminated top and bottom 0.5 percent of the wealth distribution conditional on income and age, using the median regression method detailed in Section 3.

In table 6 we present estimates of the derivative of wealth at age 70 with respect to parental income based upon the simulated data and compare them to estimates from the PSID. We evaluated the derivatives at different points in the income distribution.

Experiment two corresponds to the case in which the incomes of parents and children are linked, but there is no bequest motive. In this case the derivative of wealth with respect to income rises gradually from 5.72 at the fifth quantile of income to 9.13 in the 75th quantile. It then declines to 7.84 at the 90th quantile and 4.22 at the 95th. When the incomes of parents and children are linked and there is a bequest motive (experiment three), the income derivatives are similar below the 75th quantile to the case of no bequest motive. However, the values are much higher at the 90th and especially the 95th quantile. The results for the PSID show a smaller derivative at the fifth quantile (2.90) and increase monotonically. We suspect that modifying the model to incorporate survival probabilities of a husband-wife pair would lead to additional precautionary savings as a hedge against longetivitiy and increase the derivative of wealth with respect to income at the 95th quantile. However, we are surprised by the fact that the wealth income derivatives declines at high income levels, especially in the no bequest case. A possible explanation is that the precautionary motive to save as a hedge against future income risk and longetivity risk declines at high income and wealth levels.

The fourth column presents estimates based upon the PSID for a white couple with both the husband and wife alive at age 70. the values of the derivative rise monotonically in income. The estimates are below the values from the simulations through the 75th quantile. The PSID value of 8.21 that the 90th quantile is between the corresponding values for the experiments with an without a bequest motive. However, the derivative at the 95th quantile is more than double the value for the experiment without a bequest motive.

Overall, the results suggest three conclusions. First, although the income derivatives are larger in the model with a bequest motive than without one, the difference is not dramatic. Second, the derivatives based upon the PSID tend to be somewhat smaller than those based upon the simulated data, especially for income levels below the median. Given the differences between the PSID data and the data concepts implicit in DeNardi's model, the fact that she did not make any use of the derivative of wealth with respect to income in calibrating her model, and the inevitable simplifications in her model, we believe that the correspondence between the estimates and the model simulations is very encouraging. Third, the pattern of the PSID coefficients is more in line with the pattern in the simulated data for the model incorporating a bequest motive.

7. Conclusion

In this paper, we use matched data on parents and their adult children from the PSID as well as the AHEAD survey of the elderly to examine the effects of parental and child permanent incomes on bequests. In the absence of sufficient direct information about bequests, our strategy is to estimate models of the age profile of bequeathable wealth as a function of permanent income of the parents and children, health status and other relevant variables. We allow the link between wealth and permanent income to depend on the parents' age. In conjunction with mortality tables, we are then able to infer the response of the eventual bequest to the permanent income of the parents, assuming that the entire bequest goes to the children.

Our results are still somewhat preliminary. However, estimates from both AHEAD and the PSID suggest that at the sample mean parental wealth at age 70 rises by between \$4.33 and \$7.00 for every additional dollar of permanent annual earnings and declines slightly with the child's permanent earnings. The relationship is less steep for widows and widowers. Using the mortality tables for the U.S. and estimates of the wealth derivative at each age based on the PSID, we find that an increase in the flow of permanent earnings leads to an increase in the expected bequest equal to \$2.75 for a white couple who are the same age, survive to at least age 60 and have average earnings. The corresponding estimate based upon AHEAD is \$4.04. Back of the envelope calculations based on these results suggest that a only small fraction of the increase in lifetime resources associated with a permanent shift in annual earnings is passed on to children through a bequest.

Under some circumstance, if altruism toward children plays an important role in the bequest motive, one might expect the relationship between bequests and income to be stronger for parents with children. Our AHEAD results indicate that the relationship between income and wealth does not depend much on whether or not the older adults have children. Our PSID results addressing this question are similar to the AHEAD results, but less precise. However, simulations based on using DeNardi's (2001) model suggest that the difference in sensitivity of bequests to income is not that sensitive to whether or not there is an altruism motive. This suggests that comparing adults with children to those without may not be very decisive on the issue of how important altruism is in bequests, especially given that childless couples may have altruistic links to other relatives.

Overall, our results suggest that life cycle savings in the presence of uncertainty about income and lifetimes can account for most of the relationship between income and expected bequests. Our findings are broadly in keeping with the evidence suggesting that the income sensitivity of inter vivos transfers is small.

A considerable amount of work remains to be done. On the empirical side, we need to account for interdependence between income and mortality. We also plan to examine the relationship between permanent income of the parent and the flow of non-asset income during the retirement years, since this relationship is important for determining how much of the relationship between permanent income and wealth late of in life could be due to lifecycle and precautionary savings.

8. References (incomplete)

Adams J. (1980) "Personal Wealth Transfers" *Quarterly Journal of Economics* vol 95 no 1.

Altonji J., Doraszelski U. and Segal L. "The Gap Between Blacks and Whites in Asset Holding" mimeo Northwestern University.

Altonji J., Hayashi F. and Kotlikoff (1995): " The Effects of Income and Wealth on Time and Money Transfers Between Parents and Children". NBER working paper 5522.

Altonji J., Hayashi F. and Kotlikoff L.(1997): "Parental Altruism and Inter Vivos Transfers: Theory and Evidence". *Journal of Political Economy*, vol. 105, no 6.

Avery R. and Rendall M. "The Contribution of Inheritances to Black-White Wealth Disparities in the United States" mimeo Cornell University.

Blau F. and Graham J. (1990) "Black-White Differences in Wealth and Asset Composition" *Quarterly Journal of Economics* vol 105 no 2.

Cox D. (1987) "Motives for Private Income Transfers" *Journal of Political Economy*, vol 95 no 3.

Cox D. and Rank M. (1992) "Inter-vivos Transfers and Intergenerational Exchange" *Review of Economics and Statistics*, vol 74, no 2.

Dunn T. (1992) "The Distribution of Intergenerational Income Transfers between and within Families" Northwestern University Ph.D. Dissertation, Chapter 4.

Kotlikoff L. (1981) "Estimating the Wealth Elasticity of Bequests from a Sample of Potential Decedents" in What Determines Savings?

Mc Garry (1999) "Inter vivos Transfers and Intended Bequests" *Journal of Public Economics* 73

Mc Garry K. and Schoeni R. (1995) "Transfer Behavior: Measurement and the Redistribution of Resources Within the Family". *Journal of Human Resources.*

Menchik P. "Primogeniture, Equal Sharing and the U.S. Distribution of Wealth". *Quarterly Journal of Economics*, vol 94 no 2.

Wilhelm, M.O. (1996) "Bequest Behavior and the Effect of Heir's Earnings: Testing the Altruistic Model of Bequests" *American Economic Review* Vol 86 no 4.

8.1. Permanent Income and Initial Wealth:

A relationship between the wealth of individuals early in adulthood and permanent income that arises from monetary transfers from parents or grandparents will influence our estimates of the relationship between permanent income and wealth late in life. Such a relationship would have to be taken into account when computing the fraction of the income response of wealth at age 70 that represents intended savings toward a bequest. To get some evidence on this issue, we have used the children who are under 35 in our matched sample to estimate models of the response of initial wealth to permanent income of the child. These are reported in Table 8. The specification in model IV -Table 8 includes a cubic in y_k as well as the interaction between y_k and Age-22. The results imply that at age 22 and the mean of y_k, a 1 dollar increase in y_k is associated with a \$0.17 increase in initial wealth.

Table 1 Summary Statistics of the Matched PSID Sample

Variable	Mean (sd)	Minimum	Maximum
PARENTAL VARIABLES (N=4377)			
Wealth holding, all years	184.811	-195.07	3,010.50
	(296.95)		
Wealth holding in 1984	153.917	-15.372	2,733.05
	(278.018)		
Wealth holding in 1989	178.522	-36.857	2,827.27
	(288.489)		
Wealth holding in 1994	188.231	-33.162	3,010.49
	(300.625)		
Wealth holding in 1999	243.304	-25.544	2,997.20
	(326.673)		
Permanent earnings, father	43.558	1.01	308.07
	(27.234)		
# observations of income, father	15.57	1	30
	(7.44)		
Permanent earnings, mother	42.948	1.015	362.66
	(27.234)		
# observations of income, mother	17	1	30
	(7.99)		
Nonwhite	0.31	0	1
Education of the father (years)	11.44	0	24
	(3.66)		
Education of the mother (years)	11.68	0	18
	(2.65)		
Only father present in 1968 hh	0.01	0	1
Only mother present in 1968 hh	0.11	0	1
Father and mother present in 1968	0.88	0	1
Age of the father	63.08	37	88
	(8.09)		
Age of the mother	61.28	35	86
	(8.66)		
Number of children	3.48	1	20
	(2.52)		
Parents divorced	0.2	0	1
Parents divorced, father remarried	0.07	0	1
Parents divorced, mother remarried	0.05	0	1
Father is a widower	0.06	0	1
Mother is a widow	0.19	0	1
Parent widow, father remarried	0.02	0	1
Parent widow, mother remarried	0.02	0	1
VARIABLES OF THE CHILD (Nobs=12861)			
Wealth holding (includes housing)	99.8	-918	16,458
	(437.08)		
Permanent income	52.95	3.36	237.89
	(26.27)		
Education (years)	13.28	6	17
	(2.11)		
Age of the kid	33.82	21	60
	(6.84)		

Table 1 Summary Statistics of the Matched PSID Sample (cont.)

Variable	Mean (sd)	Minimum	Maximum
Kid is a female	0.49		
Kid is a female head	0.17		
Kid is not married	0.29		

All magnitudes are in thousands of 1993 dollars
The parental sample is an unbalanced panel of 1,281 original households.
We observe at most four observations per household. Divorced couples contribute two Observations.
The definition of wealth is the one provided by the PSID. It includes the following items: Value of real estate (including own home) cars, trucks motor home, business owned, shares of stock, or investment trusts (including Individual Retirement Accounts), checking and savings accounts, rights in trusts or state, life insurance policy and pension from previous jobs. Debts are substracted from the former , as well as student loans or bills of any member of the household.

The distribution of wealth is truncated. We dropped the top and bottom 0.5 percentiles of the prediction errors in a median regression of wealth on parental income and demographics.
The sample of kids is an unbalanced panel of 4,211 splitoffs from the original 1,281 households.

~/inheritance.dir/1stproject.dir/wealth8499coh.dir/wealthmn12.log

Table 2 Summary Statistics of the Sample of Parents in AHEAD

Variable	Mean (sd)	Minimum	Maximum
PARENTAL VARIABLES (N=5,134)			
Wealth holdings of the parent	189.872	-87	2,651
	(259.39)		
Parental permanent earnings, imputed	44.197	7.523	129.362
	(15.254)		
Nonwhite	0.09	0	1
Education of the father (years)	10.61	0	17
	(3.27)		
Education of the mother (years)	11.84	6	17
	(2.52)		
Age of the father	76.89	48	89
	(5.27)		
Age of the mother	75.91	43	101
	(6.68)		
Father is a widow	0.09		
Mother is a widow	0.44		
Father and mother are alive and together	0.41		
No father found	0.01		
No mother found	0		
Parent alone, divorced	0.03		
Variables used for the imputation			
Parental Occupation			
Managers and professionals	0.31		
Clerical	0.05		
Sales	0.06		
Craftsmen	0.26		
Operatives	0.19		
Laborers	0.04		
Service	0.04		
Farmers	0.03		

Table 3.1 Results of the Matched Sample (PSID)

Dependent variable: wealth holdings of a household (1,000s of 1993 $)

	Model I	Model II	Model III	Model IV	Model V
Yp	5.24	4.29	4.38	5.617	6.090
	(.431)	(.47)	(.44)	(.575)	(.610)
Yp * Yp		0.055	0.047	0.041	0.037
		(.010)	(.011)	(.011)	(.011)
Yp * Yp * Yp		-0.0002	-0.0002	-1.80E-04	-.0002
		(.00004)	(.00005)	(.00006)	(.00005)
Yp * (Age - 70)	0.02	0.04	0.06	0.07	0.069
	(.036)	(.038)	(.03)	(.035)	(.034)
(Yp * Yp)*(Age - 70)			0.0006	0.0006	-0.0006
			(.0009)	(.0009)	(0.0008)
Yp * (Widowed)				-2.44	-2.3
				(.72)	(.70)
Yp * (Divorced/Sep)				-2.25	-2.02
				(.87)	(.92)
Yp * Nonwhite					-2.20
					(.69)
Average Income, kids	0.14	0.28	0.29	0.247	0.26
	(.34)	(.33)	(0.33)	(.33)	(.33)
Control Variables in All Models: (Coefficients displayed for Model 5 only.)					
1/(number of children)					19.12
					(21.34)
Mother not present in 1968 hh					-31.46
					(41.11)
Father not present in 1968 hh					-44.42
					(16.05)
age minus 70					0.55
					(1.27)
age minus 70 squared					-0.185
					(.066)
age minus 70 cubic					0.0009
					(.004)
age minus 70 quartic					8.00E-05
					(.0001)
Parents divorced, father rem.					31.03
					(28.16)
Parents divorced, mother rem.					93.26
					(39.46)
Parents divorced					-86.45
					(16.29)
Widower					-63.15
					(17.39)
Widow					-80.25
					(13.01)
Widower, remarried					131.72
					(59.89)
Widow, remarried					219.65
					(65.67)
Nonwhite					-102.46
					(13.44)

Table 3.1 Results of the Matched Sample (PSID) -cont.

Dependent variable: wealth holdings of a household (1,000s of 1993 $)

	Model I	Model II	Model III	Model IV	Model V
Second record, divorced					-36.52
					(26.75)
Number of kids who are female					-4.83
					(4.08)
Number of kids who are female heads					2.12
					(4.26)
Wave 84					-17.74
					(11.14)
Wave 89					-4.21
					(8.40)
Wave 99					14.09
					(9.83)
Constant					240.79
					(18.71)

Sample size: 4,377
Outliers trimmed
Standard errors in parentheses account for unbalanced panel structure
and heteroscedasticity.
Parental permanent earnings Yp is the deviation from the sample mean.
(1,000s of 1993 $)
permanent income of the children is the mean across siblings

~/inheritance.dir/1stproject.dir/wealth8499coh.dir/wealthmn14.log

Table 3.2 Results for Elderly Adults Without Children (PSID)

Dependent variable: wealth holdings of a household (1,000s of 1993$)

	Model I	Model II	Model III	Model IV	Model V
Yp	4.339	3.135	3.069	2.312	2.37
	(1.356)	(.946)	(.89)	(.877)	(1.04)
Yp * Yp		0.051	0.050	0.058	0.057
		(.031)	(.029)	(.032)	(0.034)
Yp * (Age - 70)	-0.0008	0.054	0.085	0.088	0.0886
	(.107)	(.068)	(.057)	(.054)	(.055)
(Yp * Yp)*(Age - 70)			-0.001	-1.60E-03	-1.60E-03
			(0.002)	(0.002)	(.0025)
Yp * (Widowed)				1.365	1.4
				(1.923)	(2.019)
Yp * (Divorced/Sep)				3.087	3.24
				(2.30)	(2.51)
Yp * Nonwhite					-0.312
					(1.81)
Parents divorced, father remarried					214.82
					(283.7)
Parents divorced, mother remarried					-1185.8
					(944.25)
Widower					261.63
					(354.57)
Widow					62.88
					(39.23)
Age of the oldest member-70					1.65
					(4.705)
Age of the oldest member-70 squared					-0.399
					(.348)
Age of the oldest member -70 cubic					-0.003
					(.0089)
Age of the oldest member -70, quartic					0.00017
					(.0007)
Nonwhite					-57.269
					(41.64)
No mother in 1968 household					-41.45
					(68.31)
No father in 1968 household					-184.71
					(58.98)
Second record, divorced household					1004.54
					(762.06)
Wave 84					-3.504
					(37.508)
Wave 89					59.326
					(41.581)
Wave 99					23.053
					(98.562)
Constant					222.711
					(47.818)

Sample size: 327

The permanent income Yp of the household is the deviation from the sample mean (1,000s of 1993 $).

inheritance.dir/1stproject.dir/waves8499coh.dir/nokids.dir/wealthmn10.log

Table 3.3 Results of the AHEAD sample of parents

Dependent variable: wealth holdings of a household (1,000s of 1993 $)

	Model I	Model II	Model III	Model IV
Yp	7.05	5.64	6.65	6.78
	(0.51)	(.566)	(.63)	(.65)
Yp * Yp		0.059	0.048	0.044
		(0.018)	(.018)	(.019)
Yp * (Age - 70)	-0.115	0.19	0.15	0.1418
	(.04)	(.135)	(.14)	(.14)
(Yp * Yp)*(Age - 70)		-0.003	-0.002	-0.002
		(.001)	(.001)	(.001)
Yp * (Widowed)			-1.51	-1.68
			(.565)	(.588)
Yp * (Divorced/Sep)			-2.347	-3.186
			(1.85)	(1.59)
Yp * Nonwhite				-1.295
				(.712)
Yp*Single (IMPRECISE)			6.99	7.55
			(4)	(4.08)
Average Income, kids	0.27	0.401	0.37	0.39
	(.25)	(.26)	(.26)	(.26)
Control Variables in All Models: (Coefficients displayed for Model 4 only.)				
1/(number of children)				27.45
				(10.5)
Mother not found				-
Father not found				149
				(61.54)
age minus 70				-2.006
				(3.998)
age minus 70 squared				0.0759
				(0.192)
age minus 70 cubic				-0.0091
				(0.016)
age minus 70 quartic				0.0001
				(.0005)
Parents divorced				6.039
				(25.17)
Widower				-57.14
				(11.33)
Widow				3.575
				(22.46)
Nonwhite				-42.94
				(11.12)
Average number of kids who are married females				-6.501
				(10.41)
Mean number of kids who are single females				-12.67
				(13.32)
Wave 93				-57.91
				(6.767)
Constant				237.306
				(13.9)

Sample size: 5134

~/inheritance.dir/2ndproject.dir/ahead.dir/waves9395/stata/wealthag5.log

Table 3.4 Results of the AHEAD sample of elderly without children

Dependent variable: wealth holdings of a household (1,000s of 1993 $)	Model I	Model II	Model III	Model IV
Yp	9.405	9.677	10.104	10.17
	(1.210)	(1.371)	(1.731)	(1.792)
Yp * Yp		-0.02	-0.021	-0.022
		(.014)	(.015)	(.016)
Yp * (Age - 70)	-0.351	-0.38	-0.37	0.1418
	(.0542)	(.091)	(.093)	(.269)
(Yp * Yp)*(Age - 70)		0.0007	0.001	0.001
		(.0004)	(.004)	(.001)
Yp * (Widowed)			-1.51	-1.10
			(1.44)	(1.44)
Yp * (Divorced/Sep)			-0.14	-0.14
			(1.85)	(1.86)
Yp * Nonwhite				-0.10
				(.27)
Yp*Single (IMPRECISE)			2.6	2.59
			(2.84)	(2.84)
Control Variables in All Models: (Coefficients displayed for Model 4 only.)				
age minus 70				35.31
				(18.22)
age minus 70 squared				-3.02
				(2.88)
age minus 70 cubic				0.132
				(.189)
age minus 70 quartic				-0.002
				(.0004)
Parents divorced				16.09
				(56.98)
Widower				-31.09
				(29.33)
Widow				-94.36
				(25.09)
Nonwhite				-30.34
				(16.34)
Wave 93				-76.73
				(22.22)
Constant				218.65
				(38.80)

Observations: 816
inheritance.dir/2ndproject.dir/ahead.dir/waves9395/stata/nokids.dir/wealthagnok.log

Table 4 Response of Expected Bequests to Permanent Income, Whites (PSID)

	White couple, both of age 60						10th percentile of incor	
Age	Smt	Sft	Hmt	Hft	Beta(t)	Beta(t) widow	Pbt	Pbequwid
60	1.000	1			2.624		0.000	
61	0.986	0.992	0.01503	0.008	2.726	0.729	0.000	0.001
62	0.972	0.984	0.01641	0.009	2.827	0.830	0.000	0.001
63	0.956	0.975	0.01788	0.010	2.929	0.932	0.000	0.002
64	0.938	0.965	0.01947	0.011	3.030	1.033	0.000	0.002
65	0.920	0.955	0.02118	0.012	3.132	1.135	0.000	0.003
66	0.901	0.944	0.02297	0.013	3.233	1.237	0.000	0.004
67	0.880	0.932	0.02483	0.014	3.335	1.338	0.000	0.004
68	0.858	0.919	0.02689	0.015	3.437	1.440	0.000	0.006
69	0.835	0.905	0.02926	0.016	3.538	1.541	0.000	0.007
70	0.811	0.890	0.032	0.018	3.640	1.643	0.001	0.008
71	0.785	0.874	0.03509	0.020	3.741	1.744	0.001	0.010
72	0.757	0.857	0.03848	0.022	3.843	1.846	0.001	0.012
73	0.728	0.838	0.04215	0.024	3.944	1.948	0.001	0.014
74	0.697	0.818	0.04598	0.026	4.046	2.049	0.001	0.016
75	0.665	0.797	0.04993	0.029	4.148	2.151	0.001	0.018
76	0.632	0.774	0.05414	0.031	4.249	2.252	0.001	0.021
77	0.598	0.750	0.05875	0.034	4.351	2.354	0.001	0.024
78	0.563	0.725	0.06372	0.037	4.452	2.455	0.001	0.027
79	0.527	0.698	0.0692	0.041	4.554	2.557	0.001	0.031
80	0.490	0.669	0.07533	0.045	4.655	2.659	0.001	0.035
81	0.453	0.639	0.08246	0.051	4.757	2.760	0.001	0.038
82	0.416	0.607	0.09049	0.056	4.859	2.862	0.001	0.042
83	0.378	0.573	0.09891	0.062	4.960	2.963	0.001	0.045
84	0.341	0.537	0.10715	0.069	5.062	3.065	0.001	0.048
85	0.304	0.500	0.11519	0.076	5.163	3.166	0.001	0.050
86	0.269	0.462	0.12436	0.084	5.265	3.268	0.001	0.052
87	0.236	0.423	0.13522	0.094	5.366	3.369	0.001	0.054
88	0.204	0.383	0.14695	0.104	5.468	3.471	0.001	0.054
89	0.174	0.343	0.15927	0.115	5.569	3.573	0.001	0.053
90	0.146	0.304	0.17219	0.127	5.671	3.674	0.001	0.052
91	0.121	0.265	0.18617	0.140	5.773	3.776	0.001	0.049
92	0.099	0.228	0.20159	0.155	5.874	3.877	0.001	0.045
93	0.079	0.193	0.21773	0.171	5.976	3.979	0.000	0.041
94	0.062	0.160	0.23376	0.186	6.077	4.080	0.000	0.035
95	0.047	0.130	0.24893	0.201	6.179	4.182	0.000	0.030
96	0.035	0.104	0.26329	0.217	6.280	4.284	0.000	0.025
97	0.026	0.081	0.27914	0.234	6.382	4.385	0.000	0.020
98	0.019	0.062	0.29399	0.251	6.484	4.487	0.000	0.047
99	0.013	0.047	0.30869	0.267	6.585	-2.200	0.000	0.000
100	0.000	0.000	1	1.000	6.687	4.487		
		10th perc. (Y=15.82)			Mean (Y=42.96)		90th perc. (Y=74.05)	
Expected derivative:		1.690			2.779		3.423	

Pbt: Probability of observing a bequest in period t. A bequest occurs once both members are dead
Beta(t): Effect of lifetime resources on wealth holdings of a couple at age t
Beta(t) widow : Effect of lifetime resources on wealth holdings of a widow(er) at age t
Expected derivative: sum of Beta(t) weighted by the probability of observing the bequest.

Table 5 Response of Expected Bequests to Permanent Income, Nonwhites (PSID)

		White couple, both of age 60					10th percentile	
Age	Smt	Sft	Hmt	Hft	dWdY	dWdYw	Pbeq	Pbequwid
60	1.000	1.000	X	X	0.204		0.000	
61	0.979	0.988	0.024	0.014	0.306	-1.894	0.000	0.000
62	0.956	0.976	0.026	0.015	0.407	-1.793	0.000	0.001
63	0.933	0.962	0.028	0.016	0.509	-1.691	0.000	0.001
64	0.909	0.948	0.030	0.017	0.610	-1.590	0.000	0.002
65	0.883	0.933	0.033	0.019	0.712	-1.488	0.001	0.003
66	0.856	0.916	0.035	0.020	0.813	-1.387	0.001	0.004
67	0.829	0.899	0.037	0.022	0.915	-1.285	0.001	0.006
68	0.800	0.881	0.040	0.023	1.017	-1.183	0.001	0.007
69	0.770	0.862	0.042	0.025	1.118	-1.082	0.001	0.008
70	0.740	0.842	0.045	0.027	1.220	-0.980	0.001	0.010
71	0.708	0.821	0.049	0.029	1.321	-0.879	0.001	0.012
72	0.676	0.799	0.052	0.031	1.423	-0.777	0.001	0.014
73	0.644	0.777	0.056	0.033	1.524	-0.676	0.001	0.016
74	0.610	0.753	0.059	0.036	1.626	-0.574	0.001	0.018
75	0.576	0.728	0.063	0.038	1.728	-0.472	0.001	0.021
76	0.542	0.702	0.066	0.041	1.829	-0.371	0.001	0.023
77	0.508	0.675	0.070	0.044	1.931	-0.269	0.001	0.025
78	0.474	0.647	0.074	0.047	2.032	-0.168	0.001	0.028
79	0.441	0.619	0.080	0.051	2.134	-0.066	0.001	0.031
80	0.408	0.590	0.086	0.056	2.235	0.035	0.001	0.034
81	0.376	0.560	0.094	0.062	2.337	0.137	0.001	0.037
82	0.343	0.528	0.101	0.068	2.439	0.239	0.001	0.040
83	0.311	0.495	0.107	0.074	2.540	0.340	0.001	0.043
84	0.280	0.461	0.113	0.079	2.642	0.442	0.001	0.045
85	0.250	0.427	0.118	0.085	2.743	0.543	0.001	0.046
86	0.221	0.394	0.125	0.091	2.845	0.645	0.001	0.047
87	0.195	0.360	0.133	0.098	2.946	0.746	0.001	0.048
88	0.171	0.328	0.143	0.107	3.048	0.848	0.001	0.049
89	0.148	0.295	0.156	0.116	3.149	0.949	0.001	0.049
90	0.127	0.264	0.170	0.128	3.251	1.051	0.001	0.050
91	0.107	0.233	0.185	0.140	3.353	1.153	0.001	0.049
92	0.089	0.203	0.200	0.152	3.454	1.254	0.001	0.048
93	0.072	0.175	0.212	0.163	3.556	1.356	0.001	0.045
94	0.058	0.148	0.221	0.172	3.657	1.457	0.000	0.041
95	0.046	0.124	0.229	0.183	3.759	1.559	0.000	0.037
96	0.036	0.103	0.240	0.197	3.860	1.660	0.000	0.033
97	0.027	0.084	0.253	0.211	3.962	1.762	0.000	0.029
98	0.021	0.067	0.265	0.226	4.064	1.864	0.000	0.025
99	0.016	0.053	0.278	0.239	4.165	1.965	0.000	0.021
100	0.011	0.041	0.292	0.253	4.267	2.067	0.000	0.018

	10th perc. (Y=15.82)	Mean (Y=42.96)	90th perc. (Y=74.05)
Expected derivative:	-0.03	0.83	1.39

Table 6: Derivative of wealth with respect to income, age 70

	Yp	Experiment 2	New Experiment	Experiment 4	Our data (white couple)
5th quantile	13,740	4.509	5.72	5.404	2.905
		(0.351)	(0.336)	(0.944)	(0.92)
10th quantile	17,488	5.337	6.382	6.0226	3.42
		(0.284)	(0.268)	(0.759)	(0.84)
25th quantile	22,292	6.279	7.132	6.748	4.35
		(0.210)	(0.193)	(0.554)	(0.71)
50th quantile	36,342	8.263	8.681	8.436	5.7
		(0.084)	(0.086)	(0.257)	(0.61)
75th quantile	59,426	9.028	9.131	9.812	7.050
		(0.125)	(0.132)	(0.355)	(0.67)
90th quantile	76,048	7.657	7.844	9.726	8.210
		(0.105)	(0.116)	(0.339)	(0.80)
95th quantile	97,353	3.548	4.22	8.298	8.820
		(0.260)	(0.351)	(1.018)	(0.88)

Table 7 Summary Statistics for Childless Adults (PSID)

Variable	Mean (sd)	Minimum	Maximum
PARENTAL VARIABLES (N=327)			
Wealth holdings of the parent	184.87	-15.54	5,339
	(409)		
Permanent earnings, father	44.536	3.096	126.546
	(27.417)		
Permanent earnings, mother	47.731	3.775	139.59
	(31.122)		
Nonwhite	0.262	0	1
Education of the father (years)	11.5	3	17
	(3.91)		
Education of the mother (years)	12.02	3	17
	(3.52)		
Father in 1968 hh was not found	0.49		
Mother in 1968 hh was not found	0.16		
Father and mother found in 1968	0.35		
Age of the father	67.13	42	90
	(9.63)		
Age of the mother	69.24	41	90
	(9.92)		
Parents divorced	0.18		
Parents divorced, father rem.	0.01		
Parents divorced, mother rem.	0.01		
Father is a widow	0.02		
Mother is a widow	0.19		
Parent widow, father remarried	0		
Parent widow, mother remarried	0.02		

All magnitudes are in thousands of 1993 dollars
The parental sample is an unbalanced panel of 112 original households.
We observe at most four observations per household. Divorced couples contribute two observations
The definition of wealth is the one provided by the PSID. It includes the following items:
Value of real estate (including own home) cars, trucks motor home, business owned, shares of stock, or investment trusts (including Individual Retirement Accounts), checking and savings accounts rights in trusts or state and life insurance policy

Debts are substracted from the former , as well as student loans

Table 9 Regression of Initial Wealth Holding on Permanent Income

Dependent variable: first observation of wealth holding of a child

	Model. I	Model II	Model III	Model IV
Yc	0.32	0.15	0.14	0.17
	(0.04)	(0.055)	(0.06)	(0.07)
Yc * Yc			2.50E-04	1.50E-03
			(0.001)	(0.001)
Yc*Yc*Yc				-1.50E-05
				(1e-5)
Yc * (Age - 22)		0.05	0.05	0.05
		(0.02)	(0.02)	(0.02)
age-22				-0.38
				(1.38)
(age-22) squared				1.04
				(0.55)
(age-22) cubic				-0.1
				(0.06)
Nonwhite				-14.87
				(1.86)
Child is a female				3.03
				(1.67)
Child not married				-16.13
				(1.91)
Wealth observed in 84				-19.41
				(8.73)
Wealth observed in 89				-17.24
				(8.7)
Constant				23.02
				(2.06)

Sample size 1,874

The standard errors (in parentheses) allow for arbitrary correlation and heteroscedasticity within the family.

Yc (income of children) is in deviation from sample means.