DO CHILDREN LEARN TO SAVE FROM THEIR PARENTS?*

PRELIMINARY AND INCOMPLETE

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Abstract It is well-known that small differences in discount rates, persisting over generations, make it much easier to explain US wealth inequality across households as an equilibrium outcome. At the individual level, recent micro studies suggest that variations in preferences or in planning behaviour are plausible candidates to explain inequality in pre-retirement savings among households in similar circumstances. In this paper, we argue that if such differences in behavior are really a function of an agent's basic personality, then we would expect parents and children to share such traits, and so parental savings behavior should predict both savings and other investment decisions of the children such as education. We formalize this argument using a simple life-cycle model and estimate family savings effects on household data in the PSID. In our model such family effects can be interpreted as arising from either patience or self control.We find that family effects are significant both statistically and economically; parental savings behavior explains both education and savings choices of childrens' households. We also find that these effects are linked to self reports about attitudes toward planning for the future, but not to reported willingness to defer consumption.

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1 Introduction

Economics typically takes agents' preferences as given. Before making the decisions that economists typically analyze, however, individuals have typically spent nearly two decades in a family environment that has presumably influenced their preferences Indeed, parents invest substantial amounts of time, effort and money during this period in an attempt to shape their childrens' preferences. People that seem to be in identical, or at least similar, circumstances make very different decisions, and an important question is whether the differences are, at least partially, a result of parental influence, be it genetic or cultural, over their childrens' preferences.

Many other papers have observed that family background is related to childrens' decisions and outcomes, but such work has focused on the relation between family and endowments rather than on the childrens' preferences. The difficulty is that preferences are unobserved, and so it is difficult to identify heterogeneity in preferences. In addition, people differ along other dimensions that may be unobservable, such as skill or ability to borrow, so the problem of identification of preferences becomes particularly difficult when these other dimensions are plausibly linked to the behavior in question.

In this paper, we use data on savings behavior of families – children and their parents – to examine the link between childrens' preferences and the family environment. We use a simple lifecycle savings model to show that, under reasonable assumptions about ability and measurement error, intergenerational savings correlations can be interpreted as evidence of discount-factor correlation between parents and children. This in turn implies that the size of the family effects put a lower bound on discount-factor variation. In addition, the model implies that family effects should be related to education outcomes. This provides a disciplined approach to the examination of preference heterogeneity that ameliorates the difficulties described above by providing a measure of preferences based on observed behavior.

In addition to allowing us to measure family savings effects and their relation to education, our data include answers to questions regarding patience and planning by both parents.The relationship of these answers to the savings behavior of the parents and children allows us to address questions of interpretation of our measures of preferences, and to disentangle the paternal and maternal effects on the childrens' attitudes and savings behavior. There are two main issues of the interpretation of our empirical measures. First, in the context of the model, the family savings effect may reflect either differences in the magnitude of a constant discount rate, or differnces in the degree to which preferences are biased towards current-period utility. Second, a number of recent empirical papers suggest that savings differences may arise from certain types of personality variation that are not so easily interpreted as preferences in the strict sense of our model, such as the ability or tendency to plan for the future.[1] We deal with these issues by examining the correlations between our savings-based measures of preferences, and the responses of householder to such statements as "Life will work out," "I

[1]See, e.g., Lusardi (2000) orAmeriks, Caplin, and Leahy (2002), which we discuss in the next section.

tend to plan ahead," "I think about the future," and "I'd rather spend now than save for the future." In addition, we compare husbands' and wives' responses to these statements to examine whose attitudes are more important in determining the couple's own savings behavior.

Our main results with respect to observed behavior are that there is indeed a statistically significant correlation in savings behavior between parents and children that is not explained by observable variables, and that this correlation appears much stronger for married sons than for married daughters. We also find that the family savings effect is economically significant, in the sense that a increase of one half of a standard deviation in the family effect would increase college attendance by 20% on average. We find that the attitude variables that are most strongly correlated with savings behavior are those associated with planning, rather than the question regarding tendency to save for the future, and that it the husband's attitude variables are better predictors savings than those of the wife. However mothers's attitudes better predict the savings of the children. Taken all together, these results suggest that (1) our savings-based measure of preferences has probably more to do with present-bias or planning than with the rate of geometric discounting as conventionally understood, (2) mothers have a stronger influence than fathers over children's formation of attitudes, and (3) in married couples husbands have more influence over savings decisions than wives.

The share of the variation that is explained by parental variables is however quite small. Two possible interpretations are that (1) preference heterogeneity is in fact relatively unimportant relative to our ignorance about determinants of savings decisions, and (2) the intergenerational compoent of preferences is small relative to other determinants. In addition, it may be that our method is too conservative; according to our model, we should really be using an instrument for wages, rather than allowing actual wages to enter into the regression.

Following a summary of related work, we present our formal model, and our empirical analysis in the following section. In section 4 we analyze the relationship between parental attitudes and the savings behavior of both parents and children. We close with a discussion section.

1.1 Related Work

The degree to which savings behavior is determined within families is central to a number of important economic questions. Disparities in household wealth are much larger than standard economic theory predicts, and empirical work has shown that standard economic variables leave much of the variation in wealth unaccounted for. Castaneda, Diaz-Gimenez, and Rios-Rull (2001) summarize recent work in macroeconomics that attempts to account for the distribution of wealth through a variety of savings motives, shocks, and constraints. They argue that work by Aiyagari (1994), Castaneda, Diaz-Gimenez, and Rios-Rull (1998), and Quadrini (1999) shows that standard purely dynastic representative agent models that rely on uninsurable idiosyncratic risks to household earnings do not account well for the upper tail of the wealth distribution: calibrated models typically generate less concentration of wealth in the richest households than is observed in the data. Krusell and Smith (1998) depart from the assumption in these models that agents have identical preferences, and add shocks to the discount rate. The incorporation of discount-rate heterogeneity markedly decreases the gap between model predictions and the observed wealth distribution. As Krusell and Smith point out, a difficulty with this approach is that discount rates are not directly observable.

Understanding why households differ in wealth accumulation is essential to evaluate policies whose aim is to affect that distribution. Obviously, part of the difference in wealth accumulation is due to differences in households' income, both labor and non-labor income. But a household's wealth at any given point in time reflects not just its income, but also its willingness or ability to reserve part of that income for the future. Solon (1992), Zimmerman (1992) and Behrman and Taubman (1990) find intergenerational transmission of economic status, both in wages and income.[2]

In addition to the work done at the macro level on the determinants of the wealth distribution, there has been substantial empirical work that aims at identifying the determinants of savings at the individual level. According to Venti and Wise (2000), very little of the wealth variation among households with similar income can be accounted for by differences in portfolio choices or by chance events; the bulk of the wealth dispersion, they conclude, is due to differences in the income fraction that households choose to save.

Bernheim, Skinner, and Weinberg (2001) also find that standard life cycle variables do not explain wealth variation. They argue that "rules of thumb" or other less than fully rational decision processes, including behavioral rules, are more consistent with their findings. Lusardi (2000) finds that households differ in the degree to which they have thought about retirement, and that those households that think more about retirement have substantially higher wealth than those that have given less thought.

Ameriks, Caplin, and Leahy (2002) confirm and expand on Lusardi's findings. They use survey information from TIAA-CREF participant households that includes questions intended to measure individual and household behavioral and psychological characteristics to construct a measure of "propensity to save." They show that differences in planning are related to this propensity to save, and are associated with different savings patterns. The survey Ameriks, *et al.* use for their analysis has questions aimed at uncovering discount rates, and they use the answers to these questions to construct a measure of individuals' discount rates. There is no positive correlation between their measure of propensity to save and the measure of the discount rate, from which Ameriks *et al.* argue that there is an "attitude" toward saving that is not captured by standard decision models, and that is important in understanding wealth accumulation.

[2] Grawe and Mulligan (2002) review theories of this linkage across generations.

2 Model[3]

Agents live for three periods and discount future utility at rate β. Agents differ in their ability, a, and their initial resources, A_1. We assume that in the first period agents choose an amount of human capital but do not work. The cost to an agent of ability α of acquiring education level e net of first-period earnings is given by $\phi(e;\alpha) = e/\alpha$. The education level e that is chosen affects the agent's wage in periods 2 and 3: $w_2 = w \cdot e$ and $w_3 = g \cdot w_2$, where g is the wage growth from the second period to the third. Agents can borrow and lend freely at rate R, but we assume that there are no first-period savings. The agent's optimal decision rules solve the following problem:

$$
\begin{aligned}
& \max_{h,c_2,c_3} u(c_1) + \beta u(c_2) + \beta^2 u(c_3) \\
s.t. \quad c_1 &= A_1 - \frac{e}{a} \\
c_2 + \frac{1}{R} c_3 &\leq we + \frac{1}{R} weg.
\end{aligned}
$$

Individuals in our model work for the last two periods and can transfer a portion of their second period income into the last period. If we denote by A_3 an agent's wealth at the beginning of period 3, the proportion of his second period income that is saved is A_3/ew_2. Solving for the proportion saved, we get

$$\frac{A_3}{ew_2} = \frac{\beta}{1+\beta} R - \frac{g}{1+\beta}.$$

This implies that if rates of return do not vary across agents, and if growth rates of income are properly accounted for, then residual variation in the savings ratio reflects variation in discount factors.

The optimal education decision is given by

$$\ln e = \ln aA_1 + \ln \frac{\beta(1+\beta)}{1+\beta+\beta^2}.$$

Hence the optimal education choice is an increasing, separable function of initial resources and the discount factor. Note that to identify the effect of discount-factor variation on education, it is essential to account for both initial resources and ability.

2.1 Parents and the savings residuals

The results of the model suggest that the main difficulty with interpreting the results of regression equations based on the above decision rules is properly accounting for heterogeneity in income growth rates, rates of return, ability, initial resources and discount factors. Furthermore, measurement error is known to be a major problem with the wealth variables in survey data. In this section we develop conditions under which the effect of discount factor

[3] A more detailed description of the model is given in Appendix A1**??**.

variation can be identified from the savings behavior of parents and children and the children's education.

For individual i of family j we write ability as:

$$\ln a_{ij} = \overline{a} + \overline{a}_j + \xi_j + \zeta_{ij}.$$

In this equation, the family component of ability contains an observed component $\overline{a_j}$, an unobserved family component ξ_j, and an individual idioyncratic component ζ_{ij}. Initial resources A_1 may also be observed with error, so we write this as:

$$\ln A_{1ij} = \overline{A}_{1ij} + \chi_{ij}$$

where $\overline{A}_{1ij}$ represents the observed component, and χ_{ij} the residual.

We write the discount factor terms that appear in the decision rules as coefficients $\delta(\beta)$, such that the decision rules for savings and education, respectively are:

$$\begin{aligned} \frac{A_{3ij}}{e_{ij}w_2} &= \delta_{1ij}R + g\delta_{2ij}. \\ \ln e_{ij} &= \ln aA_{1ij} + \ln \delta_{3ij} \end{aligned}$$

For coefficient h of individual i of family j, we assume that there is a society-wide component $\overline{\delta}_h$ and a family effect δ_{hj}, as well as an individual idiosyncratic component:

$$\delta_{hij} = \overline{\delta}_h + \delta_{hj} + \upsilon_{hij}.$$

We can now define the residuals $\left(u_{ij}^s, u_{ij}^e\right)$ for savings and education, respectively, using the decision rules from the model:

$$\frac{A_3}{ew_2} = \left[\overline{\delta}_1 + \overline{\delta}_2 g_{ij}\right] + u_{ij}^s \qquad (1)$$

$$\ln e_{ij} = \left[\overline{a} + \overline{a_j} + \overline{\delta}_3 + \overline{A_{1ij}}\right] + u_{ij}^e. \qquad (2)$$

Under our assumptions,

$$\begin{aligned} u_{ij}^s &= [\delta_{1j} + \delta_{2j}g_{ij}] + [\upsilon_{2ij}g_{ij} + \upsilon_{1ij} + \varepsilon_{ij}] \\ &\quad \text{and} \\ u_{ij}^e &= \left[\xi_j + \delta_{3j}\right] + \left[\chi_{ij} + \zeta_{ij} + \upsilon_{3ij}\right]. \end{aligned}$$

We assume that $E\left[\chi_{ij}\varepsilon_{ij}\right] = E\left[\zeta_{ij}\varepsilon_{ij}\right] = 0$; in other words, the unobserved components of ability and initial resources are uncorrelated with the measurement error in the wealth-income ratio. Under this assumption, one can show[4] that, conditional on the growth rate of income, the covariance between education and the savings residual is driven by the covariance of both the family and the idiosyncratic components of the discount-factor terms in the decision rules:

$$cov\left(u_{ij}^e, u_{ij}^s\right) = \left(\sigma_{13} + \sigma_{13}^{\nu}\right) + \left(\sigma_{23} + \sigma_{23}^{\nu}\right) g_{ij},$$

[4] See appendix A1 for details.

where $\sigma_{hj} = cov(\delta_h, \delta_j)$ and $\sigma^{\nu}_{hj} = cov(v_h, v_j)$ for $h, j \in \{1,2,3\}, h \neq j$. This means that the covariance between the wealth-ratio residual and education indicates heterogeneity in discount factors.

We now make two additional assumptions: that measurement errors are uncorrelated across generations, and that they are uncorrelated with the idiosyncratic components of parental ability or discount factors. We can then write the covariances of the wealth-ratio residuals of the parent p with the savings and the education residuals of the child k of family j as:

$$\begin{aligned} cov\left[u^s_{jk}, u^s_{jp}\right] &= \sigma_1^2 + \sigma_{12}\left[g_{jp} + g_{jk}\right] + \sigma_2^2 g_{jk} g_{jp} \\ cov\left[u^e_{jk}, u^s_{jp}\right] &= \sigma_{13} + \sigma_{23} g_{jp}. \end{aligned}$$

Hence, correlation in the residuals is driven by correlation in the discount factors and correlation in growth rates of income.

To summarize, the model implies a simple and coherent interpretation of variation in wealth/income ratios and in education levels. Under plausible assumptions, evidence of discount factor heterogeneity follows from two statistics: the correlation between savings residuals and education residuals and and the intergenerational correlations in savings residuals. An important corollary is that controlling for education when estimating savings equations will tend to mask the role of preference heterogeneity.

3 Estimation

The model described in the previous section links the wealth-income ratio to the growth rate of income in the future, and education to ability and parental resources. We first describe the sample and variables that we use to estimate this model for US households. We then estimate the model in two different ways; first as a standard OLS, in order to estimate the intergenerational correlation of savings rates, and then as least-squares dummy-variable model, in order to estimate the individual family effects on the savings rate. These family effects are then used to estimate the relationship between education and savings propensities.

The first specification we estimate can be written in two stages as:

$$\begin{aligned} \frac{A_{it}}{Y_{it}} &= \alpha_0 + \alpha_1 g_{ij} + \alpha_2 X_{ijt} + u^s_{ijt} \\ \frac{1}{n_{ik}} \sum_{t=1}^{n_{ik}} \widehat{u}^s_{ikt} &= \rho_0 + \rho_1 \left[\frac{1}{n_{ip}} \sum_{t=1}^{n_{ip}} \widehat{u}^s_{ipt}\right] + \rho_2 \left[W_i, X_{ik}\right] \left[\frac{1}{n_{ip}} \sum_{t=1}^{n_{ip}} \widehat{u}^s_{ipt}\right] + \rho_3 W_i + \varepsilon_i \end{aligned}$$

where the family is indexed by i, the individual by j, the year of the observation by t, and k and p refer to the child and parent, respectively. The first equation is estimated on all respondents for whom there is wealth information, while the second is estimated on the subsample of this sample that consists of parent-child pairs. In the second equation $\widehat{u}$ refers to the residual generated by estimating the first equation.

The variables in X_{ijt} include household-level variables that are not in the model but are empirically linked to savings. The variables in W_i and X_{ik} refer to family-level and child variables, respectively. Levels of X_{ik} are excluded from the second equation because they are included in the first specification as part of X_{ijt}. The estimated parent-child correlation of savings residuals is given by combining the estimated effects ρ_1 and ρ_2.

The second specification, which gives the relation between the family savings effect residuals and education, is also estimated in two stages: the first stage generates the family savings effects α_i, the second a probit specification of the relation between the estimated family effect $\widehat{\alpha_i}$ and education:

$$\begin{aligned} \frac{A_{it}}{Y_{it}} &= \alpha_i + \alpha_1 g_{ij} + \alpha_2 X_{ijt} + u^s_{ijt} \\ \Pr(e_{ik} = h) &= \delta_0 + \delta_1 \widehat{\alpha_i} + \delta_2 W_i + u^e_{ik}. \end{aligned}$$

The first equation is estimated on the pooled sample of parents and children, after adjusting the wealth-income ratio for age effects, and restricting the sample to families with more than 3 observations. The second equation is estimated on the children of this sample. In this specification, X_{ijt} only contains time-varying characteristics of the family, as constant characteristics are reflected in the family effect. The family characteristics do appear in the second equation via W_i, which includes family income and estimates of the unobserved ability of the parents. The coefficient of interest here is δ_1.

Since some of the variables that play a key role in the model, such as income in the future or the ability of the child, are not directly observable, we impute these using auxiliary regressions. The method and results for these auxiliary regressions are described in the appendices.

3.1 Data and Variables

The data is drawn from the Panel Study of Income Dynamics, from the first wave in 1968 to the 2001 wave. The wealth variables are taken from the PSID Wealth Supplement, which covers 1984, 1989, 1994, 1999 and 2001; this supplement consists of an additional set of questions asked of the entire sample for the years in question. We include in our samples both the representative cross-section and non-representative sections of the sample, such as the survey of economic opportunity and the Hispanic sample.[5]

Throughout the main analysis we use three different samples. The "Wealth" sample includes all household heads or spouses, for whom we have wealth, income and education variables for at least one wave after 1984. Our "Family" sample is a sub-sample of the wealth sample that consists of all parent-child pairs in which the child was born by 1967, listed as children in the 1968 wave, and were present as head or spouse in at least one wave of the wealth supplement, and for whom at least one parent was present in the wealth sample. The age restriction on children is chosen to ensure that the children, having reached at least age 32 by 2001, are more likely to have begun

[5] Since we are not restricting our sample to the cross-sectional survey sample, our sample over-represents the poor; to make the PSID representative of US families that satisfy these age criteria, we use the family or individual weights for each year.

non-trivial accumulation of wealth by the time of the last observation. Finally, the "Wage" sample consists of all years for household heads or spouses where we can compute wages and have education and location data. The sample size is 44917 observations for men and 42154 for women.

The main wealth variable we use is household net worth, which includes real estate equity, business equity, financial assets and the value of automobiles, net of mortgages and other debt. As with most measures used in the previous literature, our measure excludes wealth in the form of pensions and social security, which, according to Gustman, Mitchell, Samwick, and Steinmeier (1997) is as large on average as all other wealth combined. Since it is reasonable to expect that an increase in this type of wealth will reduce the marginal gain from savings for retirement, it may be important in our analysis to attempt to take into account pensions and social security wealth, an issue we deal with by predicting income in retirement.[6]

Under the assumption of positive optimal savings, wealth in our model reflects both income from previous years, and anticipated future income. To estimate our model, the ideal variable to represent period-2 income would be cumulative income to the date of wealth measurement, compounded at an interest rate equal to the rate of return on household savings. To approximate this variable, let y_t represent non-asset income in each year t and Y_t represent the asset value of income to date, from age t_1. Assuming a constant real interest rate over time, Y_t can be written as the present value of income from t_1 to the date t at which wealth is measured, compounded annually at interest rate r, which we set at 4%, to match the average rate of return on corporate equity[7]:

$$Y_t = \sum_{j=0}^{t-t_1} y_{t-j} \left(1+r\right)^{t-j} .$$

Income measurements are taken from the annual household money income variables.[8] [9] Two caveats should be noted: first, this measure omits income of the parents when younger, and second, the PSID income variables omit capital gains, whether realized or not.

The anticipated growth rate of income g_{ij} is taken to be the average non-asset income after age 55 divided by the average prior to that time. To make the specification more flexible, we divide this time period in two and compute two growth rates: growth rate 1 is average income over the period 55-70 divided by average income up to the time of measurement, and growth rate 2 is average income over the period 70-90 divided by average income up to the time of measurement. To estimate these growth rates we impute future income on the basis of observed income plus other variables,

[6]It is interesting to note, however, that empirical research finds very little, or no, effect of pension wealth on the type of wealth represented here. In fact, empirical studies (see Dynan, Skinner, and Zeldes (2000) for a recent example) tend to find participation in pension plans *raises* other retirement savings.

[7]Poterba (1998) finds that the average rate of return on corporate equity over the time period 1950-1990 is about 4% after taxes.

[8]These and other money quantities in our paper are deflated to 1997 values using the CPI.

[9]Appendix A4 provides a detailed description of the estimation of future income.

such as education, age and occupation. Our method is to use the entire wage sample to estimate the mean and variance of non-asset income for a given age interval as a function of variables observable earlier in the lifecycle, and then use the estimated coefficients to predict income for the younger members of the wealth sample for whom this age interval occurs later than the last year of data collection.

We use dummy variables for educational attainment, classifying people according to whether they completed high school, and whether they attended college or received a bachelor's degree. These variables are set to 1 for all education levels up to the highest attained by the individual, so that estimated coefficients will reflect marginal effects.

With these variables in hand, it is possible to estimate a literal version of our simple model. However, to deal with questions of robustness of our results, we include in our specification some additional variables that could plausibly be related to correlation across generations, such as family structure and business ownership.

The family structure variables we include include the number of years the person has been married, and whether the person is currently divorced, as well as the number of people in the family.

We define business ownership as holding an average direct stake of at least $10,000 over the period 1989-1999.Of course if it is wealth that causes families to buy or launch a business, then including this variable may bias downwards the role of unobservables such as family effects.

We classify respondents as married if they are listed as spouses or heads of a family with spouse present. Thus we make no distinction between legally married and domestic partners. We include in the specification the number of years the household head has been married. Other demographic variables we use include sex, race and family size in the current year.

The possibility that people differ in the extent to which they receive or anticipate bequests is another issue for our overall strategy. Fortunately, the PSID wealth survey includes inheritances received since the last wealth survey; we include total bequests received as a separate regressor, and deal with the possibility of anticipated bequests in the second stage by including controls for parental wealth, and for whether parents are alive.

Summary statistics for these variables for the Wealth and the Family samples and a more detailed discussion of the data are reported in Appendix A2.

3.2 The Inter-generational Savings Correlation

This section presents the empirical results from the two-stage estimation of our theoretical model. We are interested in determining whether the savings behavior of children is similar to that of their parents, controlling for income, age and other demographic variables. In order to examine this question, we set out a standard econometric model that specifies wealth accumulation as a function of income, age, marital status and other variables. Business-ownership and other variables that are not directly related to our theoretical model are included to capture the effects on savings of systematic differences in age-income profiles or uncertainty that are not explicitly modelled.[10]

The first-stage regression uses the wealth sample, which we partition into sub-samples of parents and children, and then partition again by age tercile, and finally by sex. Because the regressions are estimated on people who are at similar points in their life cycles, the explanatory variables are more likely to have the same interpretation within a regression. For example, the role of retirement income for people who are relatively young is quite different than for people actually at retirement ages. This partitioning results in 24 regression estimations for the parents and 24 for the children.

Since our aim is not to make inferences from the coefficient estimates, but rather to account for as much of the variation as possible with economic and demographic variables that, according to our model, would be expected to affect wealth accumulation, we ignore problems of multi-collinearity that may arise from including closely related variables.[11] We do not include education variables, as the model implies education does not enter the savings equation, and that inclusion could cause a serious bias if wealth variation were related to discount-factor heterogeneity.

In this first estimation, we assume that the effect of unobserved ability is summarized by the first-period income realization of the agent. That is, we assume that the shock process for income, conditional on initial realizations, is independent of ability. This implies that ability only affects wealth via initial labor income. We also assume that the conditional distribution of income shocks is independent across generations.

Tables A2.c and A2.d appendix 2 show the results of this basic wealth specification.[12] For mothers and fathers, the empirical model explains anywhere from 20% to 90% of the variance in the wealth-income ratio. For sons and daughters, the range is 20-40% except for the observations on the sons for 1999 and 2001, where the R-squared drops down to 10 and 5%, respectively. The most important variables, in the sense that they are more likely to be significant at the 0.05 level, are business ownership, cumulative income, the growth rate of income before retirement and some measure of marital status or family size. The coefficients for business ownership are in a class by themselves, as they are often significant at the 0.0001 level. Race variables are included but in general do not appear especially significant. Because of the problem of multi-collinearity, we do not take very seriously the significance of individual variables; the important feature is that the regressions reflect the standard variables that are usually taken to influence wealth accumulation. Our interest is in the deviations from the predicted wealth accumulation, as those deviations will reflect differences in discount rates or discipline in saving. If there is heterogeneity in discount rates, the residuals of these regressions will be correlated with the discount rate. We

[10] We could for consistency include such variables in the prediction of future income only; however our basic results do not change. The advantage of allowing this more flexible approach is that it emphasizes the robustness of the inter-generational links in savings.

[11] For example, we include variables that represent whether the person has had multiple marriages, as well as whether the person is divorced and the number of years spent in marriage.

[12] Wealth and income are divided by 10,000 in the regression.

next test for intergenerational correlation of discount factors by regressing childrens' wealth residuals on their parents' wealth residual.

Table 1 gives the estimated regression coefficients for 5 specifications of the model of children's wealth residuals. Here, we restrict attention to the family sample, which consists of those children for whom we have both their own individual effect and that of their parents. Since there is a significant probability that the parents are no longer together, and children are far more likely to remain with their mother, we take the mother's household savings residual as the parental effect if the parents separate.[13]

In all cases the dependent variable is the residual component of the wealth-income ratio. All include an intercept and controls for the ages of parents and kids (now shown). In Model 1, which controls only for age, the coefficient on the parental wealth residual is 0.11, and is statistically significant at the 0.05 level. Model 2 controls for parental wealth, and shows that the effect of the parental wealth residual can not be attributed to parental wealth effects. Model 3 shows that the effect of parental wealth on residuals is not concentrated at the top or bottom of the distribution; indeed, replacing the wealth controls of Model 2 with indicators for whether the parent was in the top or bottom quintiles for 1984 shows that the effect for the middle wealth parents is twice that of the entire populations.

Figure 1 illustrates the relationship between parental wealth and predicted savings behavior of children. This figure plots the predicted residual as a function of parent's wealth. This figure shows that while the relationship is positive over the observed range of parental wealth, the effect is not large. The average mother's wealth in 1984 was about \$270,000; the predicted wealth residual for children with this average parental wealth is about 0.015 greater than that of children whose parents have zero wealth. The maximum effect is about 0.04, when the parents have net worth of \$1.25 million. According to the coefficients estimated in Models 2 or 4, the difference in wealth residual between a child whose parents have the median wealth and one whose parents have twice the median wealth is about 0.007, conditional on other variables being the same. This limits the extent to which the wealth residual correlation reflects some direct effect of parental wealth on that of the child, as would be the case if parents transferred some proportion of their own wealth to their children, or helped the children by using their wealth to guarantee mortgage or business loans. In this case, the wealth residual would be increasing in parental wealth. It is clear from this that parental wealth is not an important determinate of children's wealth residual.

So far the model has not taken demographics into account. Model 4 shows that, conditional on marital status, the residual correlations are higher for men than for women, and higher for unmarried men than for married men.

Model 5 adds variables that might serve to indicate some other channel

[13] For every child household, we observe the composition of the last household in which the child was listed as child of head or spouse. The probability of this being the mother's household is substantially greater than that of the father.

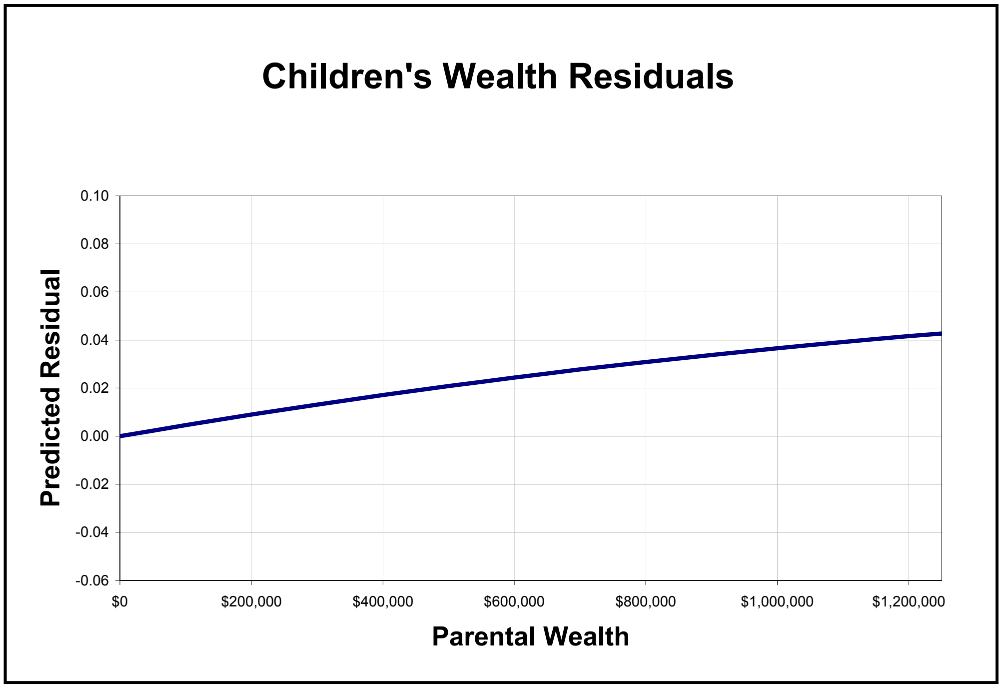

Figure 1:

for the wealth residual correlation. The main positive result here is that the variable Family Business is associated with higher residuals, having a coefficient of 0.08. This variable differs from the business variable used in the specification of the wealth regression in that it indicates whether both parent and child own a family business. While this effect is quite large (?? of a standard deviation), note that the interaction with parental wealth is not statistically significant; thus the residual correlation is not explained by the Family Business variable. Although parents may transmit their wealth residual to their kids via bequests, Model 5 suggests that bequests are not central to the intergenerational correlation of wealth residuals. We test for this by including a variable Both Parents Dead that we set equal to 1 if both parents have died by 1999. As observed above, most bequests occur after the death of the second parent. The level effect of dead parents and the interaction term are both consistent with bequests affecting kids' savings residual. Nevertheless, even controlling for this, the coefficient on the parental wealth residual is large and highly significant.

To summarize, our findings suggest a significant effect of parents' saving on that of the children. We emphasize again that we control for income in these regressions. Intergenerational correlation in attitudes to the future is likely to result in correlated incomes, and consequently intergenerational correlations in wealth beyond those described here. One obvious way in which intergenerational correlation in attitudes to the future lead to correlations in income is through education, to which we turn next.

3.3 Parental Saving and Children's Human Capital

In this section, we examine the determinants of the education of the child. As seen in our model, the family savings effect should be correlated with the educational attainment level, after controlling for ability and parental resources. We first construct measures of each of these three variables.

The average parental savings residual as measured in the previous section is not an ideal measure of the family savings effect because the model implies that it also reflects measurement error and the effects of luck.[14] Therefore we re-estimate the first-stage wealth regressions, this time including a dummy variable that identifies which 1968 family the respondent is associated with. Under our assumptions that luck and measurement error are uncorrelated across generations, the estimated coefficient on this dummy variable will be a much cleaner measure of the family's saving behavior.

The major difference between intergenerational effects in education and wealth is that education depends directly on ability: for a given level of investment, those who are more able will on average attain higher levels of education, and in addition, more able students will optimally invest more in education. If ability is transmitted across generations, then education correlations are likely to reflect such transmission, as well as the savings effects on education. To control for this ability transmission, we take from the labor economics literature a standard measure of unobserved ability, the residual from the Mincer equation, in which log wages are regressed on years of schooling and on experience. Our specification also includes controls for marital status and region. This regression, which we estimate on our Wage sample, is reported in Appendix A3. We then use the resulting wage residuals for the parents as a proxy for transmission of unobserved ability to the child.

The family-effects model of the wealth-income ratio is estimated in two stages. The wealth-income ratio is estimated as a function of age only for the same age-sex groups used above. The resulting residuals are then normalized by dividing by the standard deviation for each group; this defines an adjusted wealth-income ratio. These are then pooled into one data set, and regressed on the same variables used in the previous section, plus the family dummy variable. The results are shown in Table 2. The resulting family effects average -0.08 and have a standard deviation of 0.76. When the top and bottom one percent are excluded, the standard deviation is 0.36. The estimated coefficients for the variable effects are reported in the appendix.

We use the family savings effect to estimate two sets of regressions, the first for whether the child had attended college, and the second for whether the child attained an undergraduate degree by 1999. Since the dependent variables are binary, we don't have residuals that can be related to parental saving residuals. Instead, we estimate these as probit models; this does not allow us to estimate unobservable parental effects, so we include the family wealth effect and the parental wage residuals, as estimated previously,

[14] We assumed that luck and measurement error was uncorrelated across generations. This meant that the correlation we observed was an estimate of the correlation in savings tendencies across generations, biased downwards by the presence of these forms of noise.

directly in the models. [15]

The estimation results for the college attendance equation are given in Table 3 and the results for the college degree are given in Table 4. In each table, Model 1 contains only standard explanatory variables for education: parental income and education, race, etc. The effects of these controls are as expected. Higher attainment by the parents is strongly associated with higher attainment by the child, and the effect of father's education is stronger than that of mother's. Conditional on parental education and income, African-American children are more likely to attend college or obtain a bachelor's degree, while women and older children are less likely.

The key result from our point of view, is the strong and significant relation between the family savings effect and college attendance of the kids. Model 2 shows the estimate of the family effect to be .52 for college attendance. Model 3 shows that the college attendance effect increases substantially when parental wage residuals are controlled for. Thus while the effect of the parental savings measure is correlated with the effect of unobserved ability, this interaction does not explain away the impact of the family savings effect on college attendance. Model 4 includes demographic variables. From this model, we see that parental wealth residual has a negative effect for blacks. It is interesting to note that in all models, the coefficient on black is positive and usually significant. It is possible that this is beacuse, correcting for observable family characteristics associated with greater college attendance, unobservable characteristics for blacks that lead to greater attendance are higher.

Table 4 shows the analogous results for attaining a college degree. As was the case with college attendance, Model 2 shows that the family savings effect is strong and significant. When parental wage residuals are added, the coefficient drops but is still significant. Nonlinearities in family savings effects are significant (Model 5).

To aid in interpretation of these estimates, we consider the impact on the education distribution of a shift to the right of the distribution of family savings effects by one half of a standard deviation. Using estimates from Model 5 (controlling for ability and allowing nonliearities), our results imply that the proportion of those attending college would increase by 0.088. Thus the prediction is that the fraction of people who attend college would increase by 13% if there were such an increase in the parental savings effect.[16] The predicted effect on the share of people with BA degrees is an increase of .074, implying an increase of about 25%. Therefore we conclude that the relation between the parental savings effects and education is indeed economically significant.

In addition, it is clear that the size of the effect on educational attainment

[15] This strategy is less conservative than our approach in the previous exercises, in that explanatory power of variables that are correlated with the residuals will be shared rather than assigned exlcusively to the observable variables. We do this because residuals are not available in a probit model.

[16] An increase in a family's wealth residual would lead to an increase in their wealth, which in turn could lead to an increase in the probability that children in the family attend college. Any such increase would be in addition to the 20% estimate.

is such that our procedure of conditioning savings on income will result in significant underestimation of the magnitude of the parental effect. This is because income depends on wages, which are a function of education; since people from high-savings families are more likely to choose higher education, then our procedure will map as much as possible of the savings effect on to the effect of having higher wages.

We take these results to be supportive of the main hypothesis of our model, which is that variations in the family savings effect across households reflect variations in the rate of time discounting. Nevertheless, it would be premature to rule out alternative interpretations, such as correlation in the unobserved component of wage growth, in expected longevity or in spending patterns driven by medical conditions that are correlated across generations. And while we rule out by assumption intergenerational correlation in expectational errors, it is not implausible that families share their opinions of the likelihood of events in the uncertain future. Note however that these alternative explanations are unlikely to generate the correlation between the wealth residual and education that we have documented in this section.[17]

4 Attitudes Towards the Future

In this section, we propose a more direct approach to examine two important questions regarding the interpretation of the family savings effect. The first is whether this effect can be interpreted as reflecting variation in attitudes toward the future. The second is whether variation in attitudes toward the future reflects differences in geometric discounting, or more general differences in taking into account the future such as differences in self control or the ability to carry through plans. We indirectly addressed the first question above. In this section we address both questions directly by using subjective responses to survey questions regarding attitudes to the future.

In the PSID, questions concerning "efficacy and planning" of the household head were asked from 1968 through 1972. These questions, which are listed in Appendix A6, were also asked of wives in 1975 and 1976. The responses are coded as five-point Likert scales, which reflect degrees of agreement with one or the other of two alternatives. The exact wording of the questions is given in the appendix. Most responses are at the extremes, one or five.

We classify the members of our wealth sample who were heads or spouses in 1968-76 according to the latest response available to these questions. We treat intermediate values as missing values, and so convert each response to a binary variable equal to one for strong agreement with the first option, and zero for agreement with the second.[18]

[17] This would be plausible if the savings residual were correlated with ability in school. However by construction, any component of the savings residual that is linked to wages is excluded from the residual, because we conditioned it on non-asset income, both current and future. Hence it would have to be a component of ability that is not reflected in previous wages that drives both education and wage growth and, hence, the savings residual.

[18] We have computed some results with an index based on OLS estimation of the weights

At least some of these questions relate directly to the two issues above. First, most questions reflect intertemporal behavior. We think it is safe to label as 'impatient' those people who report that they would prefer to spend now rather than save to consume more in the future. Similarly we are comfortable labelling as 'self-controlled' those who report that they always carry out the plans they make. People who say they 'plan ahead' or 'think a lot about the future', would seem to be future-oriented in a third, more general way, perhaps in the sense of a 'propensity to plan', as in Ameriks, Caplin, and Leahy (2002).

Two useful features of this data for our purposes are: 1) the data predates the first wealth report by 8-12 years, and 2) the reports for spouses are usually 4 years apart. The first feature means these attitudes are not shaped by the wealth accumulation experience of the household after 1976, and the second that we are more likely to have two independent signals of the attitudes of married couples, rather than a repetition of the same responses for each spouse.

The size of the subset of the wealth sample that reports attitudes is 1896 men and 2298 women. Men are much more likely than women to report that they plan ahead, that they finish things, that they carry out plans and that they think about the future. The gap ranges from "Thinks about the Future", where 41% of men agree strongly, compared to 34% of women, to "Plans Ahead", where 51% of men agree strongly, compared to 36% of women. "Prefers Spending" is distinguished by two features: the male and female rate of agreeing strongly are about equal (42-43%) and there is a large fraction (16% of men and 21% of women) who report that they neither agree nor disagree. About 82% of men believe they tend to finish things, 70% that they carry out their plans. However only 41% of men and 34% of women claim to think a lot about the future.

4.1 The Savings of Married Couples

In Table 5 we show the results of estimating the family savings effect as a function of the reported attitudes for married couples (we require that they be together in 1994, which implies their marriage lasted at least 19 years).[19] Note that we do not require them to be together until the last wealth measurement, which might increase the estimated effects at the price of a reduction in sample size. Model 1 consists of all the husband attitude variables, and model 2 of all the wife's variables. For the husband, the variable "Carries out Plans" is significant at the 0.05 level. For wives, the variable 'Plans Ahead' is significant at the 0.05 level. The variable 'Prefers Spending to Saving' is also significant at the 0.05 level for men, but not for women.

that should be placed on each response to maximise the ability of each question to explain the family savings effect. Since this detracts from the transparency of our results without changing their qualitative nature, we do not report them here.

[19] For the household to be in the attitude sample, the head must have been in the PSID as household head no later than 1975, and the spouse must have been in the PSID in 1976 at latest. The likelihood of both head and spouse being in the PSID before living together is nil.

Since we have separate responses of the husband and wife to the attitude questions, we can ask whose attitudes have a greater impact on savings. The R-squared of the husband model is twice as large as that of the wife's model. Furthermore, Models 4 and 5 tell us that if we restrict the model to just "Carries out Plans" or "Prefers Spending to Saving", the husband's variables are signigicant while the wife's are not.

In Table 6 we explore the possibility that the attitude-savings relation varies across the distribution of family effects. We use quantile regression to compute the effects of attitude on savings at different percentiles of the distribution of family savings effects. When only husband variables are included, the effects of the indicator variable 'Carries out Plans' is statistically significant at the 0.05 level everywhere except at the top and bottom percentiles. When both husband and wife variables are included, the husband's variable 'Carries out Plans' continues to be statistically significant at the 0.05 level, while the wife's variable 'Carries out Plans' is significant at the 0.05 level only below the median. The variable 'Prefers Spending to Saving' has the expected negative effect and is significant for wives, but only at the very top and bottom percentiles, and never for heads.

We conclude first that the savings effect is about equally related to 'Carries out Plans' and 'Prefers Spending to Saving', and second, that the husband appears to have more influence on the family savings decisions than the wife. This is consistent with the interpretation that husbands have a greater influence over family saving than do wives.

To summarize, the direct evidence of the link between family savings effects and attitudes is statistically significant, though the effects are not very large relative to the variation in family effects.

4.2 Savings and Parental Influence

If the parents' responses to these questions are truly related to parental savings, and childrens' savings behavior is related to that of their parents, the parental responses should be related to childrens' wealth residuals. Table 7a shows the results of estimating childrens' wealth residuals as a function of the parents' reported attitudes. Models 1 and 2 include only the father's attitude variables and only the mother's variables respectively. The "Prefers Spending" variable is not significant for either husband or wife, and the father's variables explain much more than mother's variables. Models 3 and 4 regress the child's wealth residual on the planning variables for the both father and mother. When both parents' variables are included, only the father's variables are significant. Model 5 shows that 'Prefers Spending to Saving' is not significant in explaining childrens' behavior. This result reinforces the notion that fathers' attitudes are more important for determining children's savings behavior.

Some of the children in the PSID were old enough to be heads of household when the attitude questions were asked in 1976. Since there are some families in which both parents and children responded to the attitude questions, we can investigate the relationship between parents' and childrens' attitudes. Table 7b shows the results of estimating childrens' responses to the 'Carries Out Plans' variable on parental attitudes. The results differ from those in the previous table. The variable 'Prefers Spending to Saving' is not significant for fathers but it is for mothers, while the variables and 'Finishes Things' and 'Carries out Plans' are significant for both. We note that the R-squared for the mother's variables is three times that of father's variables. Hence,while it was father's variables that were more important in determining childrens' savings residuals, mother's variables are more important in determining childrens' attitudes. This is reinforced by Models 3 and 4 which shows that when both mothers' and fathers' responses to "Plans Ahead' and Carries Out Plans' are included, the mother's variable is both larger and more significant than the husband's. Model 5 shows that the variable 'Prefers Spending to Saving' explains very little.

Childrens' savings behavior might be related to parents' savings behavior either because the children are influenced by what they observe about their parents behavior or by what their parents tell them. "Do as I say, not as I do" may be the credo for some parents, and it is interesting to understand whether it is parents' attitudes or parents' own savings behavior that affects childrens' savings behavior. Table 7c estimates childrens' wealth residuals on parents attitudes and the parental wealth residual.[20] All models include the parents' wealth residual, and various sets of attitudes for the parents are included in the models. Comparing to table 7a in which did not control for parents' wealth residual, we see that adding parental wealth residual to the variables shown in Table 7a increases R-squared by very little.

In summary, parental attitudes are related to both childrens' attitudes and childrens' behavior. The effect of the wife's attitudes are usually less important than the husband's, suggesting that mothers have less influence on children than fathers. The relationship between parental attitudes and childrens' behavior is important in that it demonstrates that the similarity in the savings behavior of parents and children is related to attitudes that plausibly affect savings behavior.[21]

4.3 Risk Aversion

There is no heterogeneity in risk aversion in our model. If agents were, in fact, differentially risk averse, they might make different savings decisions which are being attributed to differential discount rates in our regressions. More risk averse people may save more than less risk averse people as a buffer against unforeseen events. If risk attitudes were correlated across generations, this could lead to correlation of wealth residuals across generations. Furthermore, wealth residuals could be related to attitude variables such as Plans Ahead if a more risk averse person was more likely to plan, as seems plausible.

We can address this possibility, as the PSID asked respondents in 1996 questions aimed at determining their risk tolerance. The questions asked the

[20] Where parents have split, we take that of the mothers' household

[21] In principle, there could be unobserved heterogeneity that is correlated across generations that might account for the family effects. However many examples of such unobserved heterogeneity would not likely result in family effects that are related to attitudes.

extent of the respondent's willingness to take a job with different prospects. All choices were 50-50 chances to double income or to cut income by a specific proportion. Respondents were divided into separate groups based on their answers. The interpretation of the answers to these questions is somewhat problematic. The answers could reflect an exogenous characteristic of the respondent or the answers could reflect the circumstances of the respondent at the time they answered the questions. If the answers capture some innate willingness to accept risk, we might expect a more risk tolerant individual to save less than another individual who differed only in being less risk tolerant. On the other hand, if the answers to these questions reflect current circumstances rather than an innate characteristic of the individual, we might expect that those who have saved more to be more tolerant of risk.

Table 8a provides some insight into the appropriate interpretation. This table shows the results of estimating parents' wealth residuals on their risk tolerance and their attitudes toward saving. Model 1 shows that risk tolerance does not have a statistically significant positive effect on the wealth residual. Models 3 and 4 add separately the mothers' and the fathers' attitude variables to the risk tolerance measure. When the fathers' variables are inclulded, the risk tolerance measure is marginally significant at the 0.10 level, and the R-squared goes up considerably. This suggests that the wealth residual is more closely related to fathers' attitudes toward the future than fathers' attitude toward risk. When mothers' attitudes are added (Model 4), the R-squared is little more than half that in Model 3 and none of the attitude variables is significant, suggesting again that fathers' attitudes are more important than mothers' in explaining savings behavior. Model 5 supports this view: when only the responses to 'Carries out Plans' are added to the risk tolerance measure, onlly the fathers' attitude is significant.

Thus, higher risk tolerance is associated with higher wealth residuals, suggesting that the risk tolerance measures are more likely associated with favorable circumstances than with an exogenous characteristic. Comparing models 1 and 3, we see that when risk tolerance is included, both the magnitude and the significance of both head and spouse responses are essentially unchanged. Thus, whatever the risk tolerance measure reflects, it affects the savings behavior separately from attitudes.

Table 8b shows the effects of parents' risk tolerance on childrens' savings behavior. The models here estimate childrens' wealth residuals on parents' risk tolerance and parents' attitudes. Models 2, 4 and 5 show that parents' risk tolerance is not statistically significant when added to the attitudes of either the fathers' or mothers' attitudes, or to the combination. What is interesting, however, is that the R^2 increases sharply when risk tolerance is added to either the fathers' attitudes or the mothers' attitudes.

In summary, it does not seem that risk aversion accounts for the parental effect on childrens' savings behavior.

5 Summary and Discussion

We set out a simple model of education and savings decisions to explore the relations between discount-factor heterogeneity and observed behavior. The main predictions of the model were that 1) intergenerational correlations in wealth income ratios are related to intergenerational correlations in discount factors, and 2) that there should a positive correlation between unexplained variations in education attainment and the wealth-income ratio.

Using PSID wealth supplement data, we estimated a reduced-form version of this model on a sample of about 5,000 U.S. households in each of the 4 years for which the supplements were available after 1984. We found a significant positive correlation in wealth-income ratio residuals across generations, suggesting that unexplained variation in preferences rather than of income growth rates or other variables is responsible for a significant, albeit small, portion of the variation in discount factors.

To examine whether the unexplained component of savings is correlated with education, we estimated probit models of college attendance and college completion on the wealth residual and other variables that are usually considered determinants of education, such as ability or parental resources. We found significant effects of the wealth residual; according to our estimates, a half-standard deviation increase in the wealth residual would increase college attendance by 20%. Thus the empirical results suggest that variations in the discount factor are indeed significant, although we are only able to measure what is almost certainly a relatively minor portion of such variation that is inherited and is independent of income.

This suggests that any transmission from one generation to the next in income is amplified by intergenerational transmission of preferences. When there are family effects that link parents' attitude to the future to that of their children, it is not only the childrens' savings behavior that is affected. Individuals with greater concern about the future will invest more in human capital. Economists have long been aware that parents affect children's well-being by investment in children's human capital.[22] Our results suggest that in addition to parents' direct investment, the intergenerational link in preferences is an important factor in children's acquisition of human capital.

We used the answers to attitude questions to aid in interpreting the wealth residual. We found that some of the attitudes are indeed significantly correlated with the wealth residual, and the effect of attitudes that seemed to self-control was as important as attitudes that reflect patience.

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[22] See, e.g., Becker and Tomes (1979) and Loury (1981).

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Appendix A1: Model of Family Savings Effects

We discuss in greater detail the model presented above and to formalize our understanding of two types of relations in the data, the correlation in savings between parents and children, and the correlation between education and parental savings. The main issues we want to clarify are how ability affects the savings residual, and to what extent parents' savings decisions are informative about children's choices. We first present the theoretical model, then discuss the interpretation of the data.

Our model allows for correlations in ability and patience across generations. We analyze first individuals' savings decisions, and then explore how they are related to those of their parents.

Basic Framework

Agents live for three periods. At the beginning of the first period, they differ in their ability, a, their initial resources, A_1, and their discount factor β. In the first period, agents acquire education e; in the second and third periods, they receive non-asset income $y_t = w_t e$. The cost to an agent of ability α of acquiring education level e net of first-period earnings is given by $\phi(e;\alpha) = e/\alpha$.

Agents in the second period can borrow and lend freely at rate R, but we assume that in the first period, agents consume all of their resources, so there are no first-period savings. The utility of the agent in each period is given by a concave function of current consumption, $u(c_t)$. Preferences over consumption streams $\{c_1, c_2, c_3\}$ are given by the sum of each period's utility, discounted by the agent's discount factor β.

Decisions

We assume that the growth rate of income from period 2 to period 3 is given by g. Since there is no uncertainty in the model, the agent's problem can be characterized as the choice in period 1 of education e and consumption $\{c_2, c_3\}$ in the future periods:

$$\max_{e,c_2,c_3} u(c_1) + \beta u(c_2) + \beta^2 u(c_3)$$

$$\begin{aligned} s.t. \quad c_1 &= A_1 - \frac{e}{a} \\ c_2 + \frac{1}{R}c_3 &\leq w \cdot e + \frac{1}{R} w \cdot e \cdot g \end{aligned}$$

It is easy to show that savings in the second period, if positive, are given by

$$A_3 = \frac{\beta}{1+\beta}\left[A_2 + ew\right]R - \frac{1}{1+\beta}ewg.$$

Hence, the amount saved in period two is a linear function of human capital

(earnings) and initial wealth. Note that ability, conditional on income and the growth rate g, plays no role in the savings-rate decision.

We can think of the resources available at in the first period of life, A_1, as an allowance from the parents to pay for consumption and education**.** The savings in the first period are in this case zero. If there are no first-period savings ($A_2 = 0$), then the previous expression simplifies to:

$$A_3 = we\frac{\beta R - g}{1+\beta}$$

We can then write indirect utility from period 2 on as:

$$V_2(e) = (1+\beta g)\ln we + (1+\beta)\ln\frac{\beta R - g}{1+\beta}.$$

The optimal level of education is the solution to

$$\max_e \{u(A_1 - e/a) + \beta V_2(A_2, e)\}.$$

The solution is

$$e = A_1 a \frac{\beta(1+\beta g)}{1+\beta(1+\beta g)}$$

In log form, the education decision is linear in ability and in the discount-factor term:

$$\ln e = \ln A_1 a + \ln\left[\frac{\beta(1+\beta g)}{1+\beta(1+\beta g)}\right]$$

In the case where income is constant in the two periods, this can be written:

$$\ln e = \ln aA_1 + \ln\left[\frac{\beta(1+\beta)}{1+\beta+\beta^2}\right].$$

The growth rate terms that are ignored above are on the order of $\beta^2 g$. If β is the discount factor between rather long periods, say 25 years, and $g < 1$ tends to be the case where the third period is retirement, then these terms will be quite small. Hence the optimal education choice is approximately an increasing, separable function of both initial resources and the discount factor. It is easy to generalize this to the case where education affects the growth rate of income.[23]

Discount Factors and the Savings Residual

Define the following functions of the discount factor:

$$\begin{aligned}
\frac{\beta}{1+\beta} &= D_1(Z_i, \delta_{1i}); \\
\frac{-1}{1+\beta} &= D_2(Z_i, \delta_{2i}); \\
\frac{\beta(1+\beta)}{1+\beta+\beta^2} &= D_3(Z_i, \delta_{3i}).
\end{aligned}$$

[23] It is easy to generalize to cases for which the growth rate is a funciton of educaiton. For example, suppose that $g(e) = e^{\gamma}$. Then

$$\ln e = \ln\left(\frac{(1+\beta)(1+\gamma)}{1+(1+\beta)(1+\gamma)}\right) + \ln\alpha + \ln A_1.$$

Ability is still separable in the education decision.

For example, let $D_j(Z_i, \delta_{ji}) = \alpha_j Z_i + \delta_{ji}, \quad j = \{1, 2\}$, and $\ln D_3(Z_i, \delta_{3i}) = \alpha_j Z_i + \delta_{3i}$. Assuming that $A_2 = 0$ and that R is a constant, and that $w_3 = gw_2$, the optimal rules for wealth and education can be written in terms of these functions:

$$\begin{aligned} A_{3i} &= D_1(Z_i, \delta_{1i}) ew_2 + D_2(Z_i, \delta_{1i}) egw_2 \\ \ln e_i &= \ln aA_1 + D_3(Z_i, \delta_{3i}). \end{aligned}$$

As in Attanasio, Banks, Meghir, and Weber (1999), we can interpret the effects of the $Z_i's$, as influencing discount factors directly, or as affecting the marginal utility of consumption.

Let the variance of β be denoted by σ_β^2. The covariances in large samples are given by

$$cov(\delta_j, \delta_h) = E[\varepsilon_h \varepsilon_j] = \frac{\partial D_h}{\partial \beta} \frac{\partial D_j}{\partial \beta} \sigma_\beta^2, \; j \in \{1, 2, 3\}$$

and the derivatives are given by:

$$\frac{\partial D_i}{\partial \beta} = \begin{cases} \frac{1}{(1+\beta)^2} > 0 & i = 1 \\ \frac{1}{(1+\beta)^2} > 0 & i = 2 \\ \frac{1+2\beta}{\left(1+\beta+\beta^2\right)^2} > 0 & i = 3 \end{cases}. \tag{3}$$

Consequently, the covariances of all the error terms are positive; positive correlations between the wealth and education shocks are implied by the model, because both are monotonic in the discount factor. Since the D's are monotonic in β, an increase in β will give rise to an increase in the savings ratio for two reasons: the positive effect in the interest-rate term is larger, and the negative effect in the growth term is smaller.

Savings and Family Effects

When initial wealth (after education expenses) is zero, the wealth equation can be written as:

$$\ln A_3 = \ln \frac{\beta R - g}{1 + \beta} + \ln ew_2.$$

Note that it is impossible to cleanly disentangle the effect of the income growth rate from preferences, even when controlling for current income. However if the wealth equation is instead written in terms of the wealth income ratio, then this problem dissappears:

$$\frac{A_3}{ew} = \frac{\beta}{1 + \beta} R - \frac{g}{1 + \beta}. \tag{4}$$

Thus an implication of the theory is that if the wealth variable is specified as a fraction of income to date, the effect of income growth is separable from that of preferences, as represented by the discount factor.

Variation in savings and education across individuals can generally be attributed to differences in ability, discount factors, initial wealth or measurement error. With respect to the wealth equation, we are particularly concerned with measurement error, as the model implies ability plays no role, and wealth variables in the PSID are commonly thought to be imprecisely measured. With respect to the education equation on the other hand, we are especially concerned about the role of ability.

We model these sources of heterogeneity as random variation around some society-wide average that is the same across generations. Ability is assumed to contain a family component. For individual i of family j we write ability as:

$$\ln a_{ij} = \overline{a} + \overline{a_j} + \xi_j + \zeta_{ij}.$$

In this equation, the family component of ability contains an observed component $\overline{a_j}$ and an unobserved component ξ_j.Finally there is an idoscyncratic component ζ_{ij}. Initial resources A_1 may also be observed with error, so we write this as :

$$\ln A_1 = \overline{A_1} + \chi_{ij}$$

where $\overline{A_1}$ represents the observed component, and χ_{ij} the residual. With respect to the discount factor, we assume that the functions $D_h(\beta)$ defined above can be written so that for coefficient h of individual i of family j, we can write:

$$\delta_{hij} = \overline{\delta}_h + \delta_{hj} + \upsilon_{hij}.$$

It is likely that wealth measurements in the PSID contain substantial measurement error; we include this as a new term ε that appears in equation (4). Since we assume everyone faces the same constant interest rate, we drop the term R from the equation. We can now rewrite this equation as **John: I changed the first term below; please check to see if it's correct.**

$$\begin{aligned} \frac{A_{3ij}}{e_{ij}w} &= \delta_{1ij} + \delta_{2ij} g_{ij} + \varepsilon_{ij} \\ &= \left[\overline{\delta}_1 + \overline{\delta}_2 g_{ij}\right] + \left[\delta_{1j} + \delta_{2j} g_{ij}\right] + \left[\upsilon_{2ij} g_{ij} + \upsilon_{1ij} + \varepsilon_{ij}\right] \qquad (5) \\ & \left[\overline{\delta}_1 + \overline{\delta}_2 g_{ij}\right] + u^s_{ij}. \qquad (6) \end{aligned}$$

The first bracket contains those terms that are predictable in a regression equation; the rest the residual terms. The second bracket contains the component of the residual that is due to the family effect, and the final term the component that is idiosyncratic.

In a similar spirit, the education decision rule can be rewritten as:

$$\begin{aligned} \ln e_{ij} &= \ln a_{ij} + \ln A_{1ij} + \ln \delta_{3ij}. \\ &= \left[\overline{a} + \overline{a_j} + \overline{\delta}_3 + \overline{A_{1ij}}\right] + \left[\xi_j + \delta_{3j}\right] + \left[\chi_{ij} + \zeta_{ij} + \upsilon_{3ij}\right] \qquad (7) \\ &= \left[\overline{a} + \overline{a_j} + \overline{\delta}_3 + \overline{A_{1ij}}\right] + u^e_{ij}. \qquad (8) \end{aligned}$$

Again, the first term represents the predictable portion of the variation, including the observable components of ability and family resources, the second term the family component of the residual, and the third the idiosyncratic component.

The residuals of these equations are therefore:

$$\begin{aligned} u^s_{ij} &= \left[\delta_{1j} + \delta_{2j} g_{ij}\right] + \left[\upsilon_{2ij} g_{ij} + \upsilon_{1ij} + \varepsilon_{ij}\right] \\ u^e_{ij} &= \left[\xi_j + \delta_{3j}\right] + \left[\chi_{ij} + \zeta_{ij} + \upsilon_{3ij}\right] \end{aligned}$$

In the previous section we showed that education and wealth residuals would be correlated because they were both functions of the discount factor. We now ask what assumptions must be made for such correlation to be interpreted as arising from discount factor variation. Combining the two equations, (5) and (7), we can solve for the covariance:

$$cov\left(u_{ij}^{e}, u_{ij}^{s}\right) = E\left[\left(\left[\xi_{j} + \delta_{3j}\right] + \left[\chi_{ij} + \zeta_{ij} + \upsilon_{3ij}\right]\right)\left(\left[\delta_{1j} + \delta_{2j} g_{ij}\right] + \left[\upsilon_{2ij} g_{ij} + \upsilon_{1ij} + \varepsilon_{ij}\right]\right)\right].$$

Our concern is with terms unrelated to discount factor variation that are non-zero. Thus we need to assume that $E\left[\chi_{ij}\varepsilon_{ij}\right] = E\left[\zeta_{ij}\varepsilon_{ij}\right] = 0$; in other words, the unobserved components of ability and initial resources are uncorrelated with the measurement error in the wealth-income ratio. Under this assumption, covariance between the wealth-ratio residual and the education residual indicate heterogeneity in discount factors.

Define $\sigma_{h}^{2} = var\left(\delta_{h}\right), h = 1, 2, 3,$ and $\sigma_{hj} = cov\left(\delta_{hj}\right), h, j = 1, 2, 3, h \neq j$. Let σ_{hj}^{ν} indicate the covariance between the idiosyncratic components. Explicit expressions for both types of covariance can be derived from equation (3) above. If the discount factor is defined so as to be orthogonal to ability, then under the above assumptions, since the individual discount-factor components ν_{hij} are uncorrelated with the family effects δ_{hj}, the covariance between education and own wealth residual is given by:

$$cov\left(u_{ij}^{e}, u_{ij}^{s}\right) = E\left[\left(\delta_{3j}\right)\left(\left[\delta_{1j} + \delta_{2j} g_{ij}\right]\right)\right] = \left(\sigma_{13} + \sigma_{13}^{\nu}\right) + \left(\sigma_{23} + \sigma_{23}^{\nu}\right) g_{ij}.$$

A direct implication of this equation is that education will predict savings. Hence it is important not to control for education when constructing measures of the wealth residual.

Identifying Parent-Child Correlation in Discount Factors

Since the error terms in equations (5) and (7) are likely to be significant relative to the effect of variations in β, it would be naive to interpret all variation in the above wealth or education residuals as due to variations in β and g. However, if the measurement error ε is uncorrelated across generations, we can take advantage of the presence of parents in the data to identify the portion of the residual that is due to the family component of the discount factor. Since this method fails to distinguish idiosyncratic discount-factor variation from noise, the variation identified here is a lower bound on the actual discount-factor heterogeneity.

Note that by definition of the family effects δ_{hj}, the following restriction holds for child k and parent p of family j:

$$E\left[\upsilon_{hjk}\ \upsilon_{hjp}\right] = 0 \quad h \in \{1, 2, 3\}.$$

To interpret correlation of the residuals of the wealth correlation as an indicator of preference correlation, we need to assume that measurement error is uncorrelated across generations, and uncorrelated with the idiosyncratic component of preferences. The identifying restrictions we impose are:

$$
\begin{aligned}
E\left[\varepsilon_{jk}\varepsilon_{jp}\right] &= 0 \\
E\left[\delta_{hj}\varepsilon_{ji}\right] &= 0 \quad h,j=1,2,3, i\in\{k,p\} \\
E\left[\upsilon_{hji}\delta_{fj}\right] &= 0 \quad h,f=1,2,3, i\in\{k,p\}.
\end{aligned}
$$

The first restriction says that measurement errors are uncorrelated across generations. The second that measurement errors are uncorrelated with the family effects δ, and the third that they are uncorrelated with the idiosyncratic components of the discount factor.The latter two restrictions are necessary to ensure that the residuals are monotonic in the discount factor.

The covariance of the wealth-ratio residuals of the parent p and the child k of family j is given by:

$$
\begin{aligned}
cov\left[u_{jk}^{s}, u_{jp}^{s}\right] &= E\left\{\left[\left(\delta_{1j}+\upsilon_{1jk}\right)+\left(\delta_{2j}+\upsilon_{2jk}\right)g_{jk}+\varepsilon_{jk}\right]\right. \\
&\qquad \left.\times\left[\left(\delta_{1j}+\upsilon_{1jp}\right)+\left(\delta_{2j}+\upsilon_{2jp}\right)g_{jp}+\varepsilon_{jp}\right]\right\} \\
&= \sigma_1^2+\sigma_{12}\left[g_{jp}+g_{jk}\right]+\sigma_2^2 g_{jk}g_{jp}.
\end{aligned}
$$

Hence correlation in the residuals is driven by correlation in the discount factors and correlation in growth rates of income.

To the extent that discount factors enter the residual, the parent's savings residual should also play a role in explaining the child's educational choice. We assume that the unobserved portion of child's ability is uncorrelated with the family effects or idiosyncratic components of the discount factor functions δ. The covariance with the parent's wealth residual is then given by

$$
\begin{aligned}
cov\left[u_{jk}^{e}, u_{jp}^{s}\right] &= E\left\{\left[\xi_j+\delta_{3j}\right]+\left[\chi_{ij}+\zeta_{ij}+\upsilon_{3ij}\right]\right. \\
&\qquad \left.\times\left[\left(\delta_{1j}+\upsilon_{1jp}\right)+\left(\delta_{2j}+\upsilon_{2jp}\right)g_{jp}+\varepsilon_{jp}\right]\right\} \\
&= \sigma_{13}+\sigma_{23}g_{jp}.
\end{aligned}
$$

Parent's wealth is less strongly related to children's education than the child's own wealth residual, but the covariance is still positive. Hence parental wealth residuals will predict children's education.

Appendix A2: Data and Variables (Incomplete)

Table A2 shows the means and medians for each year of the variables used in the first-stage estimations of the wealth-income ratio specifications. The table has two parts, one for men, one for women, each subdivided in turn into those who were classed as household head or spouse in 1968, and those who were classed as children of a household head or spouse. The wealth-income ratio has a mean of 0.32 for fathers in 1989, but the median is much lower, about 0.23. In the other years, both mean and median are substantially lower, around 0.2 and 0.14, respectively. For the children, the ratio is also higher in 1989, 0.28 on average, but drops to an average of about 0.2 and a median of 0.1. Overall, it appears that while most children appear to have savings rates lower than those of most parents, the two generations are, on average, remarkably similar.

About 82-85% of the father's sample is married at any point in time, while in the son's sample, the married fraction grows from 0.75 to 0.82. For women, the fraction of married mothers declines slightly over time, from 0.64 to 0.61, while the fraction of daughters married remains level at 0.74. Marriage is here taken to include cohabitation without legal marriage.

The value of cumulative household income, compounded at 4% per year, is reported in units of 100,000 1997 dollars. As should be expected, this variable is much higher for parents than children, as the children's income only begins during the survey period, while the adults all report income from the beginning of the period. Thus in 1989, the value of cumulative income for fathers is $876,000, $753,000 for mothers, $406,000 for sons and $407,000 for daughters. By 2001, these numbers have risen respectively to approximately $2.4 million, $2.1 million, $1.4 million and $1.4 million. Non-asset income is predicted to grow quite strongly until retirement; about 30% higher than average family income for the median parents in 1989, and more than double for the median son's household, while the growth rates are more modest for the women's households. Retirement income (also measured in units of 100,000 1997 dollars) is also predicted to be much higher for men ($32,000 for the average father, compared to $23,000 for the average woman in 2001). Women's lower income, whether expressed in levels or growth rates, reflects both the economic success of single male households relative to single female households, and the lower fraction of married among the women.

About 21% of the mothers and 30% of the fathers attended college, but these fractions rise with attrition of the less educated as the sample ages. The fraction of the children that attended college is about 55-60%, and does not appear to differ significantly by sex.[24]

Table A2 breaks out related statistics for the family sample, which is partitioned by sex of the child and according to whether the child was older than 15 years in 1968. An important statistic that we use is the standard

[24] The disparities in the parental patterns of business ownership between sons and daughters suggests that attrition from the family sample may be non-random. The alternative hypothesis, that the business ownership decisions depends on the sex-mix of one's children, seems far less plausible.

deviation of the wealth residual, which is on the order of 0.15 for both the parents and the children. The fraction of children who were married in both 1994 and 1999 is 0.62 and 0.69 for the sons, and 0.50 and 0.59 for the daughters; this is lower than the averages of 0.77 and 0.74 reported for 1994 in Table 1, reflecting the instability of marriages in the US.

Business ownership rates were between 10% and 20% for the mothers, 5% for the younger kids and 7-8% for the older kids. About 5-6% of the sons were African-American, compared to about 16% of the daughters, suggesting that the attrition rate by race differs strongly across sexes. The mothers were about 36 years old on average in 1968 in the case of the younger children and about 44 years old in the case of the older children; the children were age 9 and 18 years on average, respectively. About 90% of the mothers were married continuously over the period 1984-1994, compared to only about 60% of the children over the period 1989-2001.

Mean wealth for mothers is much higher for the sons than for the daughters in the sample. Assuming that the population sex ratios are independent of parental wealth, this suggests that attrition among males is more closely associated with poor parents than is the case for women. Mean wealth of the parents of younger sons in the sample is \$273,219, compared to \$210,992 for daughters. Median wealth of the parents in 1984 is of course much lower; \$32,510 for the younger sons, and \$19,351 for the younger daughters.

The parent's marriage variable in Table ?? **Table number to be added** is set equal to 1 if the parents of the child were still head and spouse of the household the year before the child ceased to be listed as a child in the PSID, i.e. the year before the child left home. The motivation is that the effect of parents on child behavior may be weakened if the family splits up before the child leaves home. Table **to be added** shows that 86% to 92% of the children in the sample left home while their parents were married and living together.

Since the conditions for appearing in this sample are quite stringent, it is useful to know in which ways this sample differs with respect to those statistics reported in Table 1. It is reassuring to see that the fraction of college educated is about the same in both tables, and that the business ownership rates of the mother's household average to the same rate as observed in Table **to be added**.

The sample size shrinks over time, from a total of 2905 in 1989 to 1907 in 2001; the size of the parents sample in 2001 is only 53% of the original sample size, while that of the children is 76%. If this shrinkage were due to people opting out of the survey, then we would be concerned that the attrition was systematically related to the variables that play a key role in our analysis. However most of the attrition of parents does not involve choices by the householders or other selection on model variables. Approximately 300 fathers and 200 mothers have died, and many families were dropped when the PSID discontinued over-sampling of the Hispanic population. Finally, we also report whether the parents are dead by the end of the survey period. Fathers of about 15% of the younger children have died, and 36% of the fathers of older children are dead, compared to only 10% and 20% of mothers respectively. What matters most for tracking the flow of unmeasured bequests is knowing whether both parents are dead, as bequests typically only reach the child after the second parent, usually the mother, has died. Of the younger children, only 6% have both parents dead, compared to 11% of the older children.

In Appendix 3, we explore the issue of sample attrition over the period 1968-2001. It is well-known that there has been substantial attrition, and for our family sample, we find attrition rates around 50% for both parents and children. While the most important source of attrition is the decision by the survey administrators to drop the Hispanic sample in 1997, other sources of attrition are death of the parents and the PSID losing track of children who move out from their parent's households. These latter two sources are cause for concern because they may be related to the degree to which parents influence their children's behavior. When we test for the effects of sample attrition on our main result, however, we find the attrition effect to be insignificant.

TO BE REPLACED

Table A2.a: Men's Wealth Regression Samples

Year	Variable	Fathers Mean	Fathers Std. Dev.	Fathers Median	Sons Mean	Sons Std. Dev.	Sons Median
1989	Wealth Ratio	0.32	(2.30)	0.23	0.28	(2.87)	0.15
	Wealth Level ($100,000)	3.55	(51.81)	1.7	1.15	(20.27)	0.43
	Family Size	2.5	(6.09)	2	3.07	(7.89)	3
	Married	0.85	(1.99)	1	0.75	(2.26)	1
	Cumulative Value of Previous Income	8.76	(33.61)	7.75	4.06	(16.09)	3.54
	Growth Rate of Pre-Retirement Income	0.57	(5.36)	0.31	1.35	(5.45)	1.16
	Growth Rate of Post-Retirement Income	-0.05	(5.76)	-0.24	0.13	(3.33)	-0.01
	Owns Business	0.18	(2.15)	0	0.13	(1.79)	0
	Average Annual Retirement Income	0.26	(1.82)	0.18	0.31	(1.33)	0.26
	Age	60.53	(65.28)	60	33.99	(30.51)	34
	Attended College	0.32	(2.59)	0	0.56	(2.60)	1
	Black	0.07	(1.40)	0	0.08	(1.42)	0
	N	1337	1337	1337	1448	1448	1448
1994	Wealth Ratio	0.21	(1.19)	0.15	0.23	(2.52)	0.12
	Wealth Level ($100,000)	3.76	(42.48)	1.85	1.55	(18.24)	0.69
	Family Size	2.28	(5.00)	2	3.17	(7.83)	3
	Married	0.84	(1.94)	1	0.77	(2.21)	1
	Cumulative Value of Previous Income	14.28	(50.62)	12.31	7.4	(29.53)	6.4
	Growth Rate of Pre-Retirement Income	0.45	(3.93)	0.32	0.77	(2.89)	0.69
	Growth Rate of Post-Retirement Income	-0.13	(5.02)	-0.29	-0.17	(1.66)	-0.22
	Owns Business	0.17	(1.97)	0	0.15	(1.87)	0
	Average Annual Retirement Income	0.29	(1.83)	0.2	0.32	(1.43)	0.26
	Age	62.79	(53.68)	63	38.07	(32.16)	38
	Attended College	0.38	(2.55)	0	0.61	(2.57)	1
	Black	0.06	(1.21)	0	0.08	(1.41)	0
	N	1172	1172	1172	1541	1541	1541
1999	Wealth Ratio	0.22	(2.33)	0.13	0.18	(2.07)	0.1
	Wealth Level ($100,000)	5.34	(87.47)	2.19	2.55	(43.65)	1.01
	Family Size	2.08	(3.74)	2	3.07	(7.81)	3
	Married	0.83	(1.98)	1	0.8	(2.18)	1
	Cumulative Value of Previous Income	20.77	(77.57)	17.91	12.45	(49.68)	11.08
	Growth Rate of Pre-Retirement Income	0.36	(3.02)	0.3	0.49	(2.17)	0.45
	Growth Rate of Post-Retirement Income	-0.22	(3.52)	-0.35	-0.3	(1.11)	-0.32
	Owns Business	0.14	(1.85)	0	0.15	(1.97)	0
	Average Annual Retirement Income	0.32	(2.07)	0.22	0.34	(1.50)	0.28
	Age	66.19	(48.35)	66	43.84	(33.89)	44
	Attended College	0.41	(2.58)	0	0.63	(2.64)	1
	Black	0.05	(1.12)	0	0.08	(1.49)	0
	N	729	729	729	921	921	921
2001	Wealth Ratio	0.22	(1.75)	0.12	0.2	(3.19)	0.11
	Wealth Level ($100,000)	6.15	(90.98)	2.48	3.01	(80.56)	1.27
	Family Size	2.07	(3.77)	2	3.09	(7.79)	3
	Married	0.83	(1.96)	1	0.82	(2.12)	1
	Cumulative Value of Previous Income	23.89	(92.43)	20.78	13.84	(55.16)	12.05
	Growth Rate of Pre-Retirement Income	0.35	(2.78)	0.32	0.43	(2.12)	0.4
	Growth Rate of Post-Retirement Income	-0.27	(2.79)	-0.4	-0.32	(1.06)	-0.35
	Owns Business	0.16	(1.91)	0	0.14	(1.89)	0
	Average Annual Retirement Income	0.32	(2.03)	0.23	0.35	(1.56)	0.28
	Age	66.84	(44.24)	67	45.1	(34.62)	45
	Attended College	0.44	(2.57)	0	0.64	(2.65)	1
	Black	0.05	(1.11)	0	0.08	(1.48)	0
	N	692	692	692	1051	1051	1051

Table A2.b: Women's Wealth Regression Samples

Year	Variable	Mothers Mean	Mothers Std. Dev.	Mothers Median	Daughters Mean	Daughters Std. Dev.	Daughters Median
1989	Wealth Ratio	0.3	(2.18)	0.21	0.28	(2.42)	0.14
	Wealth Level ($100,000)	2.86	(44.79)	1.24	1.22	(13.05)	0.41
	Family Size	2.26	(6.35)	2	3.21	(6.92)	3
	Married	0.64	(2.62)	1	0.73	(2.26)	1
	Cumulative Value of Previous Income	7.53	(31.49)	6.62	4.07	(15.66)	3.35
	Growth Rate of Pre-Retirement Income	0.49	(5.12)	0.29	0.94	(4.65)	0.74
	Growth Rate of Post-Retirement Income	-0.1	(4.07)	-0.27	-0.04	(2.63)	-0.15
	Owns Business	0.14	(1.90)	0	0.16	(1.84)	0
	Average Annual Retirement Income	0.2	(1.14)	0.14	0.26	(1.18)	0.21
	Age	60.61	(70.68)	60	32.79	(27.55)	33
	Attended College	0.21	(2.21)	0	0.54	(2.53)	1
	Black	0.09	(1.56)	0	0.12	(1.63)	0
	N	1914	1914	1914	1530	1530	1530
1994	Wealth Ratio	0.2	(1.23)	0.14	0.25	(6.61)	0.1
	Wealth Level ($100,000)	3.01	(37.06)	1.39	1.58	(22.89)	0.58
	Family Size	2.02	(5.05)	2	3.3	(6.97)	3
	Married	0.61	(2.58)	1	0.74	(2.24)	1
	Cumulative Value of Previous Income	12.34	(50.15)	10.71	7.44	(28.22)	6.16
	Growth Rate of Pre-Retirement Income	0.35	(4.04)	0.22	0.48	(2.47)	0.4
	Growth Rate of Post-Retirement Income	-0.18	(3.64)	-0.35	-0.27	(1.37)	-0.3
	Owns Business	0.13	(1.78)	0	0.15	(1.82)	0
	Average Annual Retirement Income	0.21	(1.18)	0.16	0.26	(1.20)	0.21
	Age	63.44	(61.43)	63	37.21	(28.97)	37
	Attended College	0.25	(2.28)	0	0.57	(2.52)	1
	Black	0.08	(1.47)	0	0.12	(1.63)	0
	N	1678	1678	1678	1718	1718	1718
1999	Wealth Ratio	0.2	(2.62)	0.11	0.16	(1.59)	0.09
	Wealth Level ($100,000)	4.26	(81.89)	1.71	2.15	(21.60)	0.85
	Family Size	1.82	(3.99)	2	3.15	(7.28)	3
	Married	0.61	(2.67)	1	0.74	(2.27)	1
	Cumulative Value of Previous Income	18.06	(72.30)	15.6	12.59	(48.93)	10.42
	Growth Rate of Pre-Retirement Income	0.26	(3.36)	0.18	0.28	(1.78)	0.23
	Growth Rate of Post-Retirement Income	-0.27	(2.66)	-0.4	-0.37	(0.87)	-0.4
	Owns Business	0.11	(1.73)	0	0.14	(1.79)	0
	Average Annual Retirement Income	0.23	(1.27)	0.17	0.28	(1.30)	0.22
	Age	66.77	(56.53)	67	42.59	(29.06)	43
	Attended College	0.26	(2.40)	0	0.62	(2.52)	1
	Black	0.07	(1.40)	0	0.11	(1.64)	0
	N	1013	1013	1013	1006	1006	1006
2001	Wealth Ratio	0.19	(1.52)	0.11	0.19	(2.42)	0.09
	Wealth Level ($100,000)	4.39	(49.13)	1.91	2.71	(38.97)	0.98
	Family Size	1.84	(4.26)	2	3.2	(7.57)	3
	Married	0.61	(2.62)	1	0.74	(2.31)	1
	Cumulative Value of Previous Income	20.91	(85.04)	17.78	13.74	(54.30)	11.38
	Growth Rate of Pre-Retirement Income	0.24	(3.01)	0.18	0.22	(1.62)	0.19
	Growth Rate of Post-Retirement Income	-0.31	(2.50)	-0.44	-0.4	(0.84)	-0.41
	Owns Business	0.11	(1.66)	0	0.13	(1.79)	0
	Average Annual Retirement Income	0.23	(1.31)	0.17	0.27	(1.26)	0.21
	Age	67.54	(53.32)	67	44.01	(29.97)	44
	Attended College	0.27	(2.37)	0	0.62	(2.56)	1
	Black	0.08	(1.42)	0	0.11	(1.65)	0
	N	954	954	954	1165	1165	1165

Appendix A3: Measuring Unobserved Ability

Our proxy variable for unobserved ability is the residual of a standard wage equation, estimated by least-squares. The equation we estimate is

$$\log(w_{it}) = \alpha_0 + \alpha_1 X_{it} + \sum_{j=1}^{N_e} \alpha_{2j} E_{ij} + \alpha_3 T_t + \varepsilon_{it}.$$

We include in X_{it} the years of potential experience, which we set equal to age minus years of education minus six. The variable E_i refers to the education level of person, which we represent a set of dummy variables for high-school diploma and beyond. The N_e education variables are set to one for each level the respondent has completed, thus the interpretation of the coefficient α_2 is the additional wage for completing this level, given completion of previous levels. Other variables are controls for region, race, rural or urban status, and marital status. We also included dummy variable for the year of the observation.

This differs from a standard Mincer wage equation only in that we do not model education as number of years. This is appropriate because we are not interested in estimating rate of return of education but rather in measuring the component of wages that is orthogonal to education.

The urban location is categorized by the size of the largest city in the MSA; if the population exceeds 500,000 the respondent is then classed as living in a large city. People are assigned to regions according to the state in which they live:

NORTHEAST	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont
NORTH CENTRAL	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin
SOUTH	Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina Oklahoma, South Carolina, Tennessee,Texas,Virginia, Washington DC, West Virginia
WEST:	Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

We run the regressions separately for men and women. The sample includes everyone in the PSID for each year they are between 25 and 65 years old and report earnings and hours that result in an hourly wage between \$5 and \$100 per hour. This results in 44917 observation for men and 42154 for women.

The results are reported in Table A3.1. All of the variables discussed above turn out to have effects on predicted wages that are statistically significant, usually at the 0.0001 level, although the effects are often quite different for men than for women. Wages are 12-13% higher for high-school graduates, 8-9% higher for people who attended college,26-28% higher for college graduates. In addition, women's wages are 18% higher than those of college grads if they complete a master degree, and an additional 25% higher if they have a professional degree. For men these latter two effects are much smaller. Being black results in a wage penalty for men of 16%, twice as high as for women, while being married raises men's wages and lowers those of women. People in the northeast have wages that are 8-9% higher than in the North-Central region, while in the South, wages are 2-4% lower. Living in a rural area is associated with wages 11-13% lower than in small to medium towns, while living in a big city raises men's wages by 9% but women's by only 6%.

The residual is defined as the reported wage minus the predicted wage. Since the estimates on which it is based seem generally consistent with known patterns of inequality, we think of this as a non-controversial measure of unobservable heterogeneity, though not all researchers will agree on what it measures. Nevertheless the interpretation of unobserved ability is quite standard.

Table A3.1: Mincer Regression Estimates

Variable	Statistic	Men	Women
Years of Potential Experience	Parameter Estimate	0.0392 ***	0.0422 ***
	Standard Error	(0.003)	(0.003)
Experience Squared	Parameter Estimate	-0.0007 ***	-0.0015 ***
	Standard Error	(0.000)	(0.000)
Experience Cubed	Parameter Estimate	0 *	0 ***
	Standard Error	(0.000)	(0.000)
High-School Graduate	Parameter Estimate	0.1226 ***	0.1277 ***
	Standard Error	(0.006)	(0.006)
Attended College	Parameter Estimate	0.0897 ***	0.0818 ***
	Standard Error	(0.006)	(0.007)
College Graduate	Parameter Estimate	0.2766 ***	0.2578 ***
	Standard Error	(0.007)	(0.009)
Master's Degree	Parameter Estimate	0.0198	0.1801 ***
	Standard Error	(0.013)	(0.015)
Professional degree or Doctorate	Parameter Estimate	0.1166 ***	0.2541 ***
	Standard Error	(0.021)	(0.033)
Black	Parameter Estimate	-0.1587 ***	-0.0847 ***
	Standard Error	(0.012)	(0.012)
White	Parameter Estimate	-0.014	0.0082
	Standard Error	(0.010)	(0.011)
Married	Parameter Estimate	0.1121 ***	-0.0387 ***
	Standard Error	(0.006)	(0.005)
Lives in North East	Parameter Estimate	0.0758 ***	0.0905 ***
	Standard Error	(0.007)	(0.007)
Lives in South	Parameter Estimate	-0.0391 ***	-0.022 ***
	Standard Error	(0.006)	(0.007)
Lives in West	Parameter Estimate	0.0326 ***	0.0435 ***
	Standard Error	(0.007)	(0.008)
Lives in Rural Area	Parameter Estimate	-0.1209 ***	-0.1076 ***
	Standard Error	(0.005)	(0.006)
Lives in Big City	Parameter Estimate	0.0913 ***	0.0572 ***
	Standard Error	(0.007)	(0.007)

Appendix A4: Prediction of Income

Income in the future is imputed on the basis of observed income plus other variables, such as education, age and occupation. For this purpose we partition later life into two periods: 56-70 and 71-90, and estimate non-asset income equations separately by sex and age interval on the wage sample. Since the sample also includes some children who were aged 1 in 1968 and hence 33 in 2001, we also predict income for ages 45-55 on the basis of age 30-44 information.

The data set for the income estimation consists of all members of the PSID sample who were household head or spouse and reported receiving income during the age intervals required for each estimation. An observation is an individual in a given year. The total number of observations is 10,111.

We estimate 6 income-prediction equations for each late-life non-asset income variable:

Model	Dependent Age Interval	Explanatory Age Interval
1	45-55	30-44
2	56-70	46-55
3	70-90	56-70
4	55-70	30-44
5	70-90	30-44
6	70-90	46-55

The dependent variables are the means and variances of non-asset household income over the age interval.

In addition to income, the explanatory variables include the occupation and industry of the household head at the start of the explanatory age interval. Occupation and industry were initially reported in the PSID in a variety of formats, from 1 to 3 digits. In the regression they are aggregated to one-digit codes 0 - 9. The regression excludes two categories; one because it is too rare, and causes some zero cells, the other as an intercept term.

The regressions are estimated by sex of the respondent. The variances are transformed into coefficients of variation, the means into logs, in order to minimize heteroscedasticity.

Descriptive statistics of these variables are given in Table A4.1. The estimation results for the means are given in Table A4.2. The predictive power of the equations is quite good; the R-squared ranging from 25% to 57%. Current income has a positive effect on future income, though this is hard to see from the table because the specification is quadratic.

Table A4.1 Income Prediction Variables

Variable	N	Mean	Std Dev
ind1	12032	0.055	0.228
ind2	12032	0.025	0.155
ind3	12032	0.131	0.337
ind4	12032	0.072	0.258
ind5	12032	0.069	0.253
ind6	12032	0.139	0.346
ind7	12032	0.061	0.239
ind8	12032	0.084	0.277
ind9	12032	0.199	0.399
ind10	12032	0.007	0.086
occ1	12032	0.116	0.320
occ2	12032	0.134	0.341
occ3	12032	0.052	0.221
occ4	12032	0.093	0.291
occ5	12032	0.144	0.351
occ6	12032	0.108	0.310
occ7	12032	0.104	0.305
occ8	12032	0.049	0.217
occ9	12032	0.035	0.184
occ10	12032	0.011	0.103
inc0	12023	9.937	0.834
inc0_sqr	12023	99.432	16.456
cv_inc0	11760	950.643	1375.790
cv_inc0_sqr	11760	2796370.870	30051701.400
hours0	12018	1461.090	878.056
hours0_sqr	12018	2905702.970	2478394.930
cv_hours0	10823	0.557	0.708
cv_hours0_sqr	10823	0.811	1.980
hs_grad	11908	0.604	0.489
coll	11908	0.280	0.449
coll_ba	11908	0.144	0.351
AGE68	11477	33.281	10.468

Table A4.2: Estimated Coefficients for Prediction of Future Income

		Men						Women					
		1	2	3	4	5	6	1	2	3	4	5	6
Intercept		-0.367	-2.231	4.311	-5.800	7.780	0.027	0.573	7.882	6.268	4.695	-50.435	1.295
Industry:	1	-0.076	0.026	0.180	-0.086	0.103	-0.630	0.055	-0.205	-0.035	0.322	0.338	-0.374
	3	0.069	-0.113	-0.024	0.036	0.533	-0.106	0.013	-0.096	0.256	0.297	0.553	0.033
	4	-0.040	0.032	-0.015	0.063	0.378	-0.485	0.029	0.133	-0.057	0.208	0.221	-0.051
	5	-0.182	-0.105	0.152	0.055	0.635	-0.255	0.130	-0.026	0.104	0.297	0.432	-0.046
	6	-0.096	-0.093	0.064	0.071	0.479	-0.113	0.043	-0.017	0.107	0.394	0.417	-0.084
	7	0.060	-0.048	-0.018	-0.079	-0.244	-0.623	-0.159	-0.059	0.082	0.264	0.377	0.028
	8	-0.063	-0.216	0.318	0.149	0.165	-0.365	0.003	-0.004	0.045	0.321	0.242	0.040
	9	0.055	0.005	0.143	0.036	0.503	-0.116	0.102	0.151	0.170	0.394	0.478	0.043
Occupation	1	0.141	0.170	0.022	-0.115	-0.642	0.183	0.137	0.082	0.067	0.121	0.067	0.155
	2	0.157	0.089	0.183	-0.150	-0.797	-0.016	0.140	0.154	0.041	-0.074	0.234	-0.091
	3	0.116	0.148	0.086	-0.321	-0.188	0.169	0.059	-0.172	0.242	-0.210	0.152	-0.131
	4	0.090	0.087	-0.127	-0.161	-0.352	0.089	0.202	-0.037	0.074	-0.172	-0.042	-0.110
	5	0.091	0.096	-0.105	-0.239	-0.426	-0.131	0.104	-0.112	-0.099	-0.300	-0.153	-0.094
	6	0.033	0.000	0.012	-0.219	-0.455	-0.055	0.093	-0.091	-0.224	-0.283	0.239	-0.273
	7	0.002	0.002	-0.363	-0.325	-0.708	-0.179	0.036	-0.103	0.016	-0.248	0.210	-0.049
	8	0.001	0.022	-0.042	-0.050	-0.307	0.286	0.077	-0.044	-0.265	-0.243	-0.069	0.272
Household Income		1.425	1.649	0.026	2.439	-2.005	-0.266	0.973	-0.382	-0.478	-0.129	-0.754	-0.812
Household Income Squared		-0.030	-0.046	0.036	-0.095	0.146	0.052	-0.003	0.056	0.058	0.044	0.072	0.076
CV of Income		0.653	-0.204	-0.269	0.823	-0.843	1.818	0.499	-0.512	-0.710	0.214	-1.661	-0.330
CV of Income Squared		-0.673	-0.074	-0.097	-0.555	0.639	-3.162	-0.387	0.173	0.421	-0.444	1.227	0.076
Hours		-0.001	0.000	-0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000
Hours Squared		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CV of Hours		-1.085	-0.047	0.157	-0.299	0.047	0.255	-0.143	-0.310	-0.219	0.009	-0.266	-0.200
CV of Hours Squared		0.259	-0.017	-0.108	0.024	0.220	-0.136	0.002	0.095	0.048	0.003	0.118	0.062
High-School Graduate		0.033	0.096	-0.017	0.181	-0.144	-0.053	0.120	0.086	-0.050	0.134	0.119	0.034
College		-0.023	0.159	-0.127	0.129	0.018	-0.024	0.093	-0.056	0.091	-0.084	-0.278	0.078
Bach. Degree		0.117	0.134	0.349	0.222	0.884	0.319	0.133	-0.012	0.073	0.044	0.476	0.095
Age in 1968		0.003	0.030	0.074	0.089	0.323	0.301	0.024	0.041	0.104	0.154	3.025	0.406
Age Squared		0.001	0.000	0.000	-0.001	-0.003	-0.003	0.000	-0.001	-0.001	-0.002	-0.038	-0.004
R-Squared		0.485	0.489	0.456	0.429	0.361	0.414	0.574	0.553	0.422	0.442	0.251	0.339

A5. Attrition from the PSID

In this appendix, we document the extent of sample attrition, and for those who drop out after 1989, its relation to household wealth in 1984 and 1989.[25]

The PSID was designed as a representative survey with additional sample supplements to cover minorities of special interest, such as the poor or Hispanics. The theoretical sample in any given year consists of all people who were members of the original 1968 sample households, and those who joined households formed by those members over time. As is well-known however, there has been considerable attrition over time. To cope with this and other issues, the PSID supplies each year a set of weighting variables that ensure that the re-weighted sample is representative of the US population originally surveyed in 1968. These weights are used to compute all the results in the paper. Nevertheless, if there is significant sample attrition and if this is related to the unobservable savings tendencies that are the subject of our paper, the possibility of strong biases would remain.

Our "Family" subsample of the PSID consists of those survey respondents who were classified in 1968 as heads, spouse or children in 1968, and satisfy minimum age requirement: over 20 years old and less than 75 years for parents, and over 1 year old and less than 25 for children.

Table A5.1 shows that of the 10,244 people this sample theoretically included, 5855 dropped out by 2001. The rates of attrition by 2001 were 62% for fathers, 58% for mothers, 60% for sons and 51% for daughters. This could be a concern for us if the attrition were related to the phenomena we are trying to measure, especially the similarity in savings behavior between parents and children. Since the decision to participate in the PSID was made by the parents, it may be that those children who drop out of the survey are less like their parents than those who remain. More generally, it may be that whether parents or children, those who drop out have less stable families such that parental values are less likely to be transmitted to the children.

Table A5.1 also shows the average net worth of households in 1984, according to whether they subsequently dropped out of the survey. While the average wealth levels for parents appear independent of whether they remained in the survey; that is not the case for children. Sons who remained in the survey had an average net worth of $84,300 by 1984, compared to $41,255 for those who had left by 2001. Daughters who remained had $60,737, compared to $47,434 for those who left.

[25] 1984 is the first year in which wealth is measured.

Table A5.1 Attrition Rates by Relationship

Relation to 1968 Family Sample	Number in Original Survey	Attrition Rate	Number of Dropouts	Wealth in 1984*	
				Stayed	Left
Father	1637	0.62309	1020	$318,158	$318,078
Son	3259	0.59865	1951	$84,300	$41,255
Daughter	3148	0.51429	1619	$60,737	$47,434
Mother	2200	0.575	1265	$264,829	$262,050
Sum	10244		5855		

Averaged over those who remained in survey in 1984.

Table A5.2 shows that the attrition rates are not concentrated in any particular period. For all categories – fathers, mothers, sons and daughters, the attrition rates are higher in the 1994-2001 period than in earlier periods, but this is because of the decision of the PSID to drop the Latino sub-sample.

Table A5.2: Share of Attrition by Time Interval

relationship in 1968 family	Year	Attrition by Year	
		Count	Percent
Father	1968-83	256	26.89
	1984-93	265	27.84
	1994-2001	431	45.27
Mother	1968-83	181	17.59
	1984-93	191	18.56
	1994-2001	657	63.85
Son	1968-83	447	25.53
	1984-93	477	27.24
	1994-2001	827	47.23
Daughter	1968-83	281	20.14
	1984-93	293	21.00
	1994-2001	821	58.85

A small number of observations could not be assigned attrition dates, due to intermittent appearance in the survey

Table A5.3 shows that before 1993 that the main reason for attrition is death in the case of parents, and moving out or non-response in the case of the children. Since 1993 the main reason non-response has been the decision of the PSID to drop the Latino sub-sample; this accounts for about 40% of the sample attrition of women, 30% of sons and 20% of fathers. This rule is unrelated to unobservables, so we need be concerned only about the attrition that is due to drop-outs and death. Furthermore, if young Hispanics accumulate less wealth when young, this may explain the higher wealth of children who remained in the PSID.

Table A5.3: Reasons for Attrition

Relation to 1968 Family Sample	Before 1984		1984-1993		After 1993			Total
	Died	Moved Out/Non Response	Died	Moved Out/Non Response	Died	Moved Out/Non Response	Latino	
Father	0.30	0.07	0.30	0.07	0.19	0.04	0.20	1.18
Son	0.05	0.21	0.05	0.22	0.02	0.12	0.29	0.96
Daughter	0.02	0.22	0.03	0.22	0.01	0.15	0.39	1.04
Mother	0.29	0.03	0.29	0.03	0.18	0.08	0.37	1.25

To ensure that attrition is not biasing upwards the residual savings correlations between parents and children, we need to compare these correlations for stayers and leavers. Table A5.4 compares wealth residual correlations between parents and children , according to whether the child became non-response between 1989 and 2001. To ensure that the same measure of the savings residuals are used for movers vs. stayers, the residual is computed over 1984-89 only, not 1989-2001 as in the main body of the paper. This results in a more noisy measure of savings tendencies for two reasons: most of the children are too young to have accumulated significant savings, or even to have started households, and there are fewer observations of any given household. Nevertheless, Table A5.4 shows that as in the main body of the paper, there is a strongly significant correlation in wealth residuals between parents and children; the OLS coefficient on parent's wealth residual is 0.08, which is significant at the 0.002 level.

Table A5.4 Child's Wealth Residual and Attrition

Variable*	Model 1	2	3	4	5
momwlthresid	0.080** 3.068	0.080** 3.014	**0.351**** 3.859	**0.080**** 3.014	**0.149**** 3.427
Left survey by 2001		0.010 1.037	0.012 1.323	0.010 1.037	
Left x Parental Wealth Residual		0.001 0.361	0.001 0.227	0.001 0.361	
R-Squared	0.0136	0.0154	0.031	0.0154	0.0215

Intercept and Age variables included but not reported. Dependent variable is Children's wealth residual.
T-statistics are in parentheses.
** indicates means are statistically significant at the 5% level.
* indicates means are statistically significant at the 10% level.

The variable 'Left' indicates whether a child left the survey by 2001. Specification 2 shows that neither this variable, nor its interaction with the parental wealth enter significantly into the model of children's wealth ratio residual. In fact, the coefficient on the parental wealth residual is unchanged by adding these two variables.

These results show that

1. There is substantial attrition from our sample, over 50% to 2001;

2. The attrition is distributed fairly evenly throughout the sample period;

3. Overall the most important single source of attrition is the decision to cut the Latino sample in 1997;

4. For parents, particularly fathers, the other main source of attrition is death;

5. For children, the main source of attrition is moving out followed by non-response;

6. There is no significant difference in wealth residual correlation with parents, computed over 1984-89, between children who became non-response after 1989 and those who stayed to 2001.

Appendix A6: PSID Questions Regarding Attitudes

1. Have you usually felt pretty sure your life would work out the way you want it to, or have there been more times when you haven't been very sure about it?

2. Are you the kind of person that plans his life ahead all the time, or do you live more from day to day?

3. When you make plans ahead, do you usually get to carry out things the way you expected, or do things usually come up to make you change your plans?

4. Would you say you nearly always finish things once you start them, or do you sometimes have to give up before they are finished?

5. Would you rather spend your money and enjoy life today, or save more for the future?

6. Do you think a lot about things that might happen in the future, or do you usually just take things as they come?

Table 1: Estimation of Children's Wealth Residuals Regression Model*

Variable*	Model 1	Model 2	Model 3	Model 4	Model 5
Parental Wealth Residual	0.1126 **	0.1137 **	0.2248 **	0.2036 **	0.1297 **
	(0.023)	(0.025)	(0.044)	(0.057)	(0.030)
Woman x Parental Wealth Residual				-0.0451	
				(0.074)	
Married Daughter x Parental Wealth Residual				-0.1676 **	
				(0.068)	
Married Son x Parental Wealth Residual				-0.0837	
				(0.068)	
Both Parents Dead by 1999					0.0293 **
					(0.014)
DeadParents x Parental Residual					-0.1463
					(0.130)
Older Child x Parental Wealth Residual					-0.0209
					(0.052)
Family Business					0.0819 **
					(0.019)
Family Business x Parental Wealth Residual					0.0215
					(0.108)
Parents in Top Wealth Quintile x Parental Wealth Residual			-0.1053		
			(0.059)		
Parents in Bottom Wealth Quintile x Parental Wealth Residual			-0.0614		
			(0.103)		
Parent's Wealth in 1984 (per 100K$)		0.0016		0.0018	0.0006
		(0.001)		(0.001)	(0.001)
Parent's Wealth Squared (per 100K$^2)		-8.21E-06		-9.63E-06	5.75E-06
		2.27E-05		2.27E-05	2.29E-05
Parent's Wealth Cubed (per 100K$^3)		2.17E-08		2.45E-08	-2.68E-08
		1.02E-07		1.02E-07	1.02E-07
R-Squared	0.02	0.02	0.03	0.03	0.04

Standard Errors are in parentheses. .
** indicates means are statistically significant at the 5% level.
* indicates means are statistically significant at the 10% level.

Table 2: Family Sample

Variable	Statistic	Men Age in 1968 1-15	Men Age in 1968 >15	Women Age in 1968 1-15	Women Age in 1968 >15
Family Savings Effect	Mean	0.621	0.675	0.616	0.684
	Std. Dev.	(0.139)	(0.117)	(0.140)	(0.132)
	Median	0.620	0.660	0.623	0.673
Child's Wealth-Ratio Residual	Mean	-0.002	0.000	-0.002	0.006
	Std. Dev.	(0.160)	(0.146)	(0.156)	(0.147)
	Median	-0.028	-0.011	-0.019	-0.014
Age of Child in 1968	Mean	8.960	18.535	9.637	17.971
	Std. Dev.	(3.867)	(1.961)	(3.525)	(1.746)
	Median	9.000	18.000	10.000	18.000
Child Married 1984-89	Mean	0.608	0.689	0.487	0.567
	Std. Dev.	(0.488)	(0.463)	(0.500)	(0.496)
	Median	0.000	0.000	0.000	0.000
Child owned Business 1984-1999	Mean	0.076	0.107	0.076	0.092
	Std. Dev.	(0.264)	(0.309)	(0.266)	(0.290)
	Median	0.000	0.000	0.000	0.000
Child is African-American	Mean	0.080	0.099	0.142	0.154
	Std. Dev.	(0.276)	(0.307)	(0.358)	(0.375)
	Median	0.000	0.000	0.000	0.000
Child has High-School Diploma	Mean	0.840	0.860	0.862	0.886
	Std. Dev.	(0.367)	(0.347)	(0.345)	(0.318)
	Median	1.000	1.000	1.000	1.000
Child Attended College	Mean	0.578	0.698	0.595	0.525
	Std. Dev.	(0.494)	(0.460)	(0.491)	(0.500)
	Median	0.000	1.000	1.000	0.000
Child Has College Degree	Mean	0.278	0.380	0.256	0.311
	Std. Dev.	(0.448)	(0.486)	(0.436)	(0.464)
	Median	0.000	0.000	0.000	0.000
Mother's Wealth-Ratio Residual	Mean	-0.018	-0.008	-0.006	0.000
	Std. Dev.	(0.148)	(0.174)	(0.153)	(0.158)
	Median	-0.034	-0.037	-0.027	-0.027
Age of Mother in 1968	Mean	35.798	44.542	36.374	44.507
	Std. Dev.	(7.776)	(7.813)	(8.022)	(6.971)
	Median	36.000	44.000	36.000	43.000
Parents Still Married When Child Left Home	Mean	0.788	0.782	0.793	0.745
	Std. Dev.	(0.411)	(0.414)	(0.406)	(0.437)
	Median	1.000	1.000	1.000	1.000
Mother owned Business 1989-1999	Mean	0.187	0.072	0.136	0.095
	Std. Dev.	(0.390)	(0.260)	(0.343)	(0.293)
	Median	0.000	0.000	0.000	0.000
Mother's Wealth in 1984	Mean	$235,907	$239,477	$169,842	$128,429
	Std. Dev.	$1,129,366	$1,429,160	$778,850	$245,717
	Median	$24,769	$26,704	$14,707	$15,481

Table 3: Probit Estimates for Probability of Attending College

Variable*	Model 1	Model 2	Model 3	Model 4	Model 5
Family Savings-Rate Effect		0.5213 *	0.8929 **	0.7928	-42.4795 **
		(0.275)	(0.362)	(0.492)	(16.575)
Family Savings-Rate Effect Squared					59.5046 **
					(24.101)
Family Savings-Rate Effect Cubed					-26.2088 **
					(11.348)
Father's Wage Residual			0.1118	0.1046	0.1456
			(0.127)	(0.127)	(0.129)
Mother's Wage Residual			0.2256 *	0.2272 *	0.2666 **
			(0.125)	(0.125)	(0.128)
Father's Wage Residual Squared					0.5499 **
					(0.210)
Mother's Wage Residual Squared					-0.1421
					(0.232)
Woman x Parent's Wealth Residual				0.0703	0.1853
				(0.687)	(0.693)
Black x Parent's Wealth Residual				-2.5315 *	-3.0491 **
				(1.521)	(1.517)
Older than 14 years in 1968 x Parental Wealth Residual				1.3983	0.7954
				(1.012)	(1.060)
Woman	-0.1379 **	-0.1327	-0.1237	-0.1749	-0.2383
	(0.061)	(0.061)	(0.080)	(0.433)	(0.437)
Black	0.4604 **	0.4138	0.281 *	1.992 *	2.3782 **
	(0.111)	(0.114)	(0.162)	(1.052)	(1.048)
Older than 14 years in 1968	0.0827	0.0729	0.0958	-0.8067	-0.3958
	(0.074)	(0.074)	(0.107)	(0.662)	(0.694)
Mother is High-School Graduate	0.1936 **	0.196 **	0.1907 *	0.1955 **	0.1987 **
	(0.069)	(0.069)	(0.098)	(0.098)	(0.099)
Mom Attended College	0.4242 **	0.4233 **	0.4609 **	0.4758 **	0.4462 **
	(0.098)	(0.098)	(0.115)	(0.116)	(0.120)
Father is High-School Graduate	0.2533 **	0.2561 **	0.1791 *	0.1612 *	0.1579 *
	(0.073)	(0.073)	(0.094)	(0.095)	(0.095)
Father Attended College	0.4916 **	0.4913 **	0.5341 **	0.5467 **	0.5738 **
	(0.095)	(0.095)	(0.112)	(0.112)	(0.114)
Log of Family Income	-87.8254 **	-86.1735 **	-98.4481	-97.6044	-102.71
	(26.969)	(27.033)	(72.678)	(73.038)	(74.456)
Log of Family Income Squared	8.2524 **	8.1017 **	9.1573	9.0875	9.6605
	(2.493)	(2.500)	(6.632)	(6.664)	(6.794)
Log of Family Income Cubed	-0.2559 **	-0.2514 **	-0.2818	-0.2799	-0.3005
	(0.077)	(0.077)	(0.202)	(0.203)	(0.206)
Fathers Age	0.0149 **	0.0138 **	-0.0089	-0.0089	-0.0086
	(0.005)	(0.005)	(0.009)	(0.009)	(0.010)
Mothers Age	0.0002	-0.0006	0.0069	0.0084	0.0123
	(0.004)	(0.004)	(0.008)	(0.008)	(0.009)

Standard errors are in parentheses.
** indicates means are statistically significant at the 5% level.
* indicates means are statistically significant at the 10% level.

Table 4: Probit Estimates for Probability of Receiving BA

Variable*	Model 1	Model 2	Model 3	Model 4	Model 5
Family Savings-Rate Effect		0.9173 **	0.7645 **	0.4193	-39.216 **
		(0.291)	(0.377)	(0.500)	(17.821)
Family Savings-Rate Effect Squared					53.8326 **
					(25.574)
Family Savings-Rate Effect Cubed					-23.443 **
					(11.895)
Father's Wage Residual			0.1683	0.1694	0.2081
			(0.132)	(0.132)	(0.134)
Mother's Wage Residual			0.0254 *	0.0341 *	0.0792 **
			(0.132)	(0.133)	(0.137)
Father's Wage Residual Squared					0.3967 *
					(0.213)
Mother's Wage Residual Squared					-0.3671
					(0.244)
Woman x Parent's Wealth Residual				0.7021	0.8076
				(0.729)	(0.728)
Black x Parent's Wealth Residual				-0.137	-0.7063
				(2.241)	(2.181)
Older than 14 years in 1968 x Parental Wealth Residual				0.4573	-0.0479
				(1.060)	(1.106)
Woman	-0.1755 **	-0.1664	-0.2559 **	-0.6971	-0.7601
	(0.069)	(0.069)	(0.088)	(0.466)	(0.466)
Black	-0.0016	-0.0756	-0.3555	-0.26	0.1721
	(0.147)	(0.148)	(0.221)	(1.563)	(1.521)
Older than 14 years in 1968	0.1587 *	0.1432 *	0.1361	-0.1588	0.1948
	(0.082)	(0.082)	(0.116)	(0.701)	(0.730)
Mother is High-School Graduate	0.2733 **	0.2748 **	0.159	0.1666	0.1746
	(0.079)	(0.079)	(0.112)	(0.113)	(0.114)
Mom Attended College	0.1702 *	0.1662 *	0.0461	0.0527	0.0448
	(0.093)	(0.093)	(0.110)	(0.110)	(0.115)
Father is High-School Graduate	0.1409 *	0.1497 **	0.2774 **	0.2735 **	0.2844 **
	(0.082)	(0.083)	(0.106)	(0.106)	(0.107)
Father Attended College	0.6229 **	0.6186 **	0.5583 **	0.5604 **	0.6043 **
	(0.094)	(0.094)	(0.110)	(0.110)	(0.113)
Log of Family Income	-54.493 *	-52.756 *	-75.238	-70.609	-63.836
	(31.312)	(31.385)	(82.268)	(82.921)	(86.543)
Log of Family Income Squared	5.1418 *	4.9819 *	6.7996	6.3837	5.8544
	(2.874)	(2.881)	(7.451)	(7.509)	(7.833)
Log of Family Income Cubed	-0.1598	-0.155	-0.2029	-0.1905	-0.1771
	(0.088)	(0.088)	(0.225)	(0.226)	(0.236)
Fathers Age	-0.002	-0.0038	-0.0121	-0.0116	-0.0105
	(0.007)	(0.007)	(0.012)	(0.012)	(0.012)
Mothers Age	0.027 **	0.0252 **	0.0219 *	0.0215 *	0.0271 *
	(0.007)	(0.007)	(0.012)	(0.012)	(0.013)

Standard errors are in parentheses.
** indicates means are statistically significant at the 5% level.
* indicates means are statistically significant at the 10% level.

	Variable	Husband Plans Ahead	Husband Finishes Things	Husband Prefers Spending to Saving	Husband Carries out Plans	Husband Thinks About Future	Wife Plans Ahead	Wife Finishes Things	Wife Prefers Spending to Saving	Wife Carries out Plans	Wife Thinks About Future
Husband	Plans Ahead	1	0.12274	-0.12523	0.10736	0.22227	0.23162	0.03359	-0.12089	0.13852	0.09079
	Finishes Things	0.12274	1	0.00681	0.19201	0.03877	0.05805	0.05157	-0.0201	0.15669	0.00517
	Prefers Spending to Saving	-0.12523	0.00681	1	0.01676	-0.08951	-0.06033	-0.0193	0.19877	0.00111	-0.08037
	Carries out Plans	0.10736	0.19201	0.01676	1	0.04103	0.06875	0.04328	-0.00261	0.26767	-0.04646
	Thinks About Future	0.22227	0.03877	-0.08951	0.04103	1	0.09244	-0.02575	-0.05796	0.04728	0.08446
Wife	Plans Ahead	0.23162	0.05805	-0.06033	0.06875	0.09244	1	0.11587	-0.11993	0.18672	0.19967
	Finishes Things	0.03359	0.05157	-0.0193	0.04328	-0.02575	0.11587	1	0.00115	0.15017	-0.03072
	Prefers Spending to Saving	-0.12089	-0.0201	0.19877	-0.00261	-0.05796	-0.11993	0.00115	1	0.00581	-0.12703
	Carries out Plans	0.13852	0.15669	0.00111	0.26767	0.04728	0.18672	0.15017	0.00581	1	-0.01234
	Thinks About Future	0.09079	0.00517	-0.08037	-0.04646	0.08446	0.19967	-0.03072	-0.12703	-0.01234	1

Table 5: Estimated Coefficients of Attitude = 1 on Family Savings Effect

Respondent	Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Husband	Plans Ahead	0.0104		0.0085		
		(1.11)		(0.89)		
	Finishes Things	0.0175		0.0206 *		
		(1.42)		(1.70)		
	Prefers Spending to Saving	-0.0249 **				-0.0231 **
		-(2.58)				-(2.36)
	Carries out Plans	0.0234 **			0.0257 **	
		(2.32)			(2.52)	
	Thinks About Future	0.0024				
		(0.25)				
Wife	Plans Ahead		0.025 **	0.0235 **		
			(2.48)	(2.37)		
	Finishes Things		-0.0001	0.0003		
			-(0.01)	(0.03)		
	Prefers Spending to Saving		-0.0094			-0.0097
			-(0.99)			-(1.02)
	Carries out Plans		0.0014		0.0008 .	
			(0.14)		(0.08) .	
	Thinks About Future		0.0009			
			(0.09)			
	R-Squared	0.022	0.0114	0.0149	0.0084	0.0096

T-statistics are in parentheses.
** indicates means are statistically significant at the 5% level.
* indicates means are statistically significant at the 10% level.

Table 6: Married Couple Quantile Regression Estimates for Wealth Residual

Percentile	Variable	Husband Only			Husband and Wife		
		Coef.	Std. Err.	t	Coef.	Std. Err.	t
1	Wife Carries Out Plans				0.021	(0.004)	5.300
	Wife Prefers Spending to Saving				-0.011	(0.005)	-2.280
	Head Carries Out Plans	0.002	(0.005)	0.440	0.002	(0.003)	0.650
	Head Prefers Spending to Saving	0.001	(0.004)	0.200	-0.009	(0.005)	-1.780
	Constant	-0.004	(0.005)	-0.770	-0.004	(0.002)	-2.090
10	Wife Carries Out Plans				0.009	(0.004)	2.060
	Wife Prefers Spending to Saving				-0.003	(0.005)	-0.510
	Head Carries Out Plans	0.017	(0.005)	3.410	0.013	(0.005)	2.700
	Head Prefers Spending to Saving	-0.004	(0.005)	-0.820	-0.005	(0.005)	-1.080
	Constant	0.018	(0.004)	4.120	0.018	(0.005)	3.310
25	Wife Carries Out Plans				0.009	(0.004)	2.140
	Wife Prefers Spending to Saving				-0.002	(0.004)	-0.460
	Head Carries Out Plans	0.013	(0.004)	3.710	0.009	(0.004)	2.170
	Head Prefers Spending to Saving	-0.002	(0.003)	-0.570	-0.002	(0.004)	-0.420
	Constant	0.041	(0.003)	12.330	0.040	(0.005)	8.750
50	Wife Carries Out Plans				0.011	(0.004)	2.540
	Wife Prefers Spending to Saving				-0.004	(0.004)	-0.980
	Head Carries Out Plans	0.014	(0.005)	2.870	0.013	(0.005)	2.770
	Head Prefers Spending to Saving	-0.003	(0.005)	-0.720	-0.002	(0.004)	-0.470
	Constant	0.067	(0.005)	14.350	0.062	(0.005)	12.890
75	Wife Carries Out Plans				0.009	(0.008)	1.050
	Wife Prefers Spending to Saving				-0.007	(0.008)	-0.860
	Head Carries Out Plans	0.027	(0.006)	4.330	0.023	(0.009)	2.610
	Head Prefers Spending to Saving	-0.006	(0.006)	-1.040	-0.002	(0.008)	-0.220
	Constant	0.094	(0.006)	16.370	0.091	(0.009)	9.870
90	Wife Carries Out Plans				0.044	(0.017)	2.640
	Wife Prefers Spending to Saving				0.000	(0.018)	0.030
	Head Carries Out Plans	0.045	(0.021)	2.130	0.033	(0.019)	1.760
	Head Prefers Spending to Saving	-0.025	(0.020)	-1.280	-0.021	(0.018)	-1.180
	Constant	0.145	(0.019)	7.630	0.137	(0.021)	6.680
99	Wife Carries Out Plans				-0.048	(0.032)	-1.490
	Wife Prefers Spending to Saving				-0.049	(0.031)	-1.580
	Head Carries Out Plans	0.068	(0.043)	1.560	0.068	(0.027)	2.470
	Head Prefers Spending to Saving	0.010	(0.044)	0.240	0.074	(0.031)	2.370
	Constant	0.312	(0.045)	6.970	0.346	(0.040)	8.650

Table 7a: Estimated Coefficients of Parents' Attitude on Kid's Wealth Residual

Respondent	Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Father	Plans Ahead	-0.0086 -(0.81)	. .	-0.00292 -(0.28)	. .	. .
	Finishes Things	0.02509 * (1.85)	. .	. .	. .	. .
	Prefers Spending to Saving	-0.012 -(1.14)	. .	. .	. .	-0.01556 -(1.48)
	Carries out Plans	0.02577 ** (2.36)	. .	0.03154 ** (2.89)	0.03185 ** (2.93)	. .
	Thinks About Future	0.00636 (0.58)	. .	. .	. .	. .
Mother	Plans Ahead	. .	0.01419 (1.23)	0.00868 (0.78)	. .	. .
	Finishes Things	. .	-0.0093 -(0.78)	. .	. .	. .
	Prefers Spending to Saving	. .	0.00281 (0.27)	. .	. .	0.00482 (0.46)
	Carries out Plans	. .	-0.0084 -(0.79)	-0.01361 -(1.28)	-0.01263 -(1.22)	. .
	Thinks About Future	. .	-0.011 -(0.95)	. .	. .	. .
R-Squared		0.0185	0.0044	0.0137	0.0128	0.0031

T-statistics are in parentheses.

** indicates means are statistically significant at the 5% level.

* indicates means are statistically significant at the 10% level.

Table 7b: Estimated Coefficients of Parents' Attitude on Kid's Attitude

Respondent	Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Father	Plans Ahead	-0.01567 -(0.45)		-0.0217 -(0.63)		
	Finishes Things	0.08439 ** (1.94)				
	Prefers Spending to Saving	-0.01741 -(0.50)				-0.0415 -(1.19)
	Carries out Plans	0.06219 ** (1.71)		0.0592 * (1.65)	0.0597 * (1.67)	
	Thinks About Future	0.03835 (1.05)				
Mother	Plans Ahead		0.05317 (1.40)	0.054 (1.47)		
	Finishes Things		0.11079 ** (2.89)			
	Prefers Spending to Saving		0.0673 ** (1.94)			0.0768 ** (2.21)
	Carries out Plans		0.09656 ** (2.78)	0.1093 ** (3.11)	0.1158 ** (3.37)	
	Thinks About Future		-0.03264 -(0.85)			
R-Squared		0.0119	0.0338	0.0215	0.0187	0.0066

T-statistics are in parentheses.
** indicates means are statistically significant at the 5% level.
* indicates means are statistically significant at the 10% level.

Table 7c: Estimated Coefficients of Parents' Attitude and Wealth Residual on Kid's Wealth Residual

Respondent		Model 1	Model 2	Model 3	Model 4	Model 5
	Mother's Wealth Residual	0.0258 (0.88)	0.05437 * (1.66)	0.03787 (1.22)	0.06919 ** (2.01)	0.06916 ** (2.01)
Father	Plans Ahead	. .	0.00692 (0.67)	. .	0.01078 (1.03)	. .
	Finishes Things	. .	0.00143 (0.11)	. .	. .	. .
	Prefers Spending to Saving	. .	0.0052 (0.50)	. .	. .	0.00563 (0.53)
	Carries out Plans	. .	0.00718 (0.66)	. .	0.00997 (0.91)	. .
	Thinks About Future	. .	0.02324 ** (2.17)	. .	. .	. .
Mother	Plans Ahead	. .	. .	0.01001 (0.99)	0.01233 (1.11)	. .
	Finishes Things	. .	. .	0.00506 (0.47)	. .	. .
	Prefers Spending to Saving	. .	. .	0.00106 (0.11)	. .	-0.00086 -(0.08)
	Carries out Plans	. .	. .	-0.00553 -(0.58)	-0.0062 -(0.59)	. .
	Thinks About Future	. .	. .	-0.01091 -(1.09)	. .	. .
R-Squared		0.0014	0.0198	0.0074	0.0176	0.0095

T-statistics are in parentheses.

** indicates means are statistically significant at the 5% level.

* indicates means are statistically significant at the 10% level.

Table 8a: Parents' Savings Residual as function of Dad's Risk Aversion and Parental Attitudes

Respondent		Model 1	Model 2	Model 3	Model 4	Model 5
Head	Risk Tolerance	-0.0052 -(1.45)		-0.006 * -(1.65)	-0.0055 -(1.54)	-0.0053 -(1.47)
	Plans Ahead			0.0298 ** (2.20)		
	Finishes Things			0.0073 (0.45)		
	Prefers Spending to Saving			-0.026 * -(1.78)		
	Carries out Plans			0.0248 * (1.81)		0.0251 * (1.80)
	Thinks About Future			0.0013 (0.10)		
Spouse	Plans Ahead		0.0191 (1.35)		0.0199 (1.41)	
	Finishes Things		-0.0073 -(0.50)		-0.0072 -(0.49)	
	Prefers Spending to Saving		-0.0204 -(1.51)		-0.0207 -(1.54)	
	Carries out Plans		0.0059 (0.44)		0.0056 (0.42)	0.0047 (0.36)
	Thinks About Future		0.0036 (0.26)		0.0034 (0.25)	
R-Squared		0.0048	0.0137	0.0348	0.0191	0.0133

T-statistics are in parentheses.

** indicates means are statistically significant at the 5% level.

* indicates means are statistically significant at the 10% level.

Table 8b: Estimated Coefficients of Parents' Attitude and Father's Risk Aversion on Kid's Wealth Residu

Respondent		Model 1	Model 2	Model 3	Model 4	Model 5
Father	Father's Risk Tolerance	.	-0.01008	.	-0.01034	-0.00993
		.	-(0.66)	.	-(0.66)	-(0.62)
	Plans Ahead	-0.00774	-0.05294	.	.	-0.069
		-(0.56)	-(1.20)	.	.	-(1.33)
	Finishes Things	0.04887	0.03331	.	.	0.02547
		(2.40)	(0.55)	.	.	(0.40)
	Prefers Spending to Saving	-0.00285	0.0109	.	.	-0.02077
		-(0.21)	(0.24)	.	.	-(0.37)
	Carries out Plans	0.03367 **	0.05632	.	.	0.06944
		(2.32)	(1.21)	.	.	(1.38)
	Thinks About Future	0.00573	0.09069 *	.	.	0.09305 *
		(0.41)	(1.84)	.	.	(1.70)
Mother	Plans Ahead	.	.	0.02081	-0.03438	-0.00279
		.	.	(1.44)	-(0.76)	-(0.05)
	Finishes Things	.	.	-0.00491	-0.03544	-0.05646
		.	.	-(0.32)	-(0.72)	-(0.97)
	Prefers Spending to Saving	.	.	0.00235	0.00787	0.01085
		.	.	(0.17)	(0.16)	(0.20)
	Carries out Plans	.	.	-0.01214	-0.01149	-0.04363
		.	.	-(0.88)	-(0.21)	-(0.80)
	Thinks About Future	.	.	-0.01176	-0.01708	-0.0039
		.	.	-(0.76)	-(0.33)	-(0.07)
R-Squared		0.0338	0.1369	0.0078	0.0355	0.1771

T-statistics are in parentheses.

** indicates means are statistically significant at the 5% level.

* indicates means are statistically significant at the 10% level.