Internet Appendix to "Income Risk and Portfolio Choice: An Empirical Study" *

A. Selection of the Sample from the Base NLSY79 Sample

While the base sample contains 12,687 respondents, we use 1,909 of them to conduct our empirical analysis. Table IA.I describes the selection procedure and its rationale. Table IA.II compares the demographic characteristics of the base NLSY79 sample and the selected sample. Table IA.III presents the means and standard deviations of the variables used in the risky asset share estimations.

B. Demographic Profile of Labor Income

Table IA.IV presents the estimated demographic profile of labor income based on the CPS data. All the coefficients but one are statistically significant, and the signs are consistent with economic theory and intuition. The coefficients on the age polynomial show that the age-income relationship is hump-shaped, which is consistent with previous findings. Married couples generally have higher combined income than a single individual. African Americans and Hispanics tend to have lower income than other ethnic groups. Females tend to have lower income than males. The income of a married couple tends to increase with the age of the spouse. Educational attainment is represented by five dummy variables constructed based on the highest grade completed. The coefficients on the dummy variables imply that income is increasing in the educational attainment of both the respondent and the spouse. The coefficients on the gender-education interaction terms are all negative, indicating that the income differences caused by education attainment are greater for women than for men. The coefficients on the gender-age interaction terms imply that, relative to the profile of a male respondent, the age-income profile of a female respondent rises more steeply before reaching its peak, and declines less drastically afterward. Also, the effect of the spouse's age on income is small compared to the respondent's age, especially when the respondent is male.

C. Complete Results on the Risky Asset Share Estimation

The results on the risky asset share estimation are presented in Tables IV and V. Demographic characteristics and covariance measures are included in the estimation as control variables. To preserve the clarity of presentation, the estimated coefficients on the control variables are not reported in those tables. Tables IA.V and IA.VI are the complete versions of Tables IV and V.

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D. Sensitivity Analysis

To investigate the robustness of our findings, we estimate six alternative versions of the equation of risky asset share relative to total net wealth. We include demographic income variation, permanent and transitory labor income risks, and two covariance measures in the estimation, so that the results are comparable to those of Column 3 of Table IA.VI.

First, we consider an alternative method to estimate the group risk ratios. Our results are based on the group ratios derived from the slope estimate of the variance ratio regression in equation (7). In that equation, however, the intercept also contains information about the risk ratio. The advantage of using only the slope estimate is that the inference is less susceptible to the bias associated with departures from the model concerning the short horizons – such as a low-order moving average transitory income process instead of a white noise. If the assumed income process is true, however, it is more efficient to use information on both the intercept and the slope. To exploit the information from both the slope and the intercept, we estimate the group risk ratios using (7), imposing the restriction that the slope and the intercept sum to unity. The estimated slopes tend to increase, and, as a result, the estimated group risk ratios become larger, and the estimated income risks increase relative to the estimated transitory income risks. When these risks are used to estimate the risky asset share equation, we find a smaller effect of the permanent income risk. However, almost 90% of the effect survives this change. Transitory income risk has a positive effect, contrary to theory, but the effect is very small and is far from statistically significant.

Second, we include a measure of risk aversion in the risky asset share equation. Theoretical work shows that risk aversion affects portfolio shares as well as the relationship between income risks and portfolio selection. As we have not directly accounted for cross-sectional variation in risk aversion, our result is potentially subject to omitted variable bias. We use a measure of risk aversion constructed from the data set to address this concern. In 1993, the survey solicited responses to hypothetical gambles. In the first gamble, income is doubled or cut by a third, with equal chances. A respondent accepting the first gamble is asked to respond to the second gamble, which is doubling income or cutting it by one half, with equal chances. A respondent refusing the first gamble is asked to respond to the third gamble, which is doubling income or cutting it by 20%, with equal chances. We classify respondents into four categories of risk aversion according to their responses to the two questions: "no" and "no;" "no" and "yes;" "yes" and "no;" and "yes" and "yes." We include three dummies representing the four categories into the risky asset share equation. These dummies should be considered extremely crude measures of risk aversion, as they are based on only two hypothetical questions and the respondents might not have taken the questions seriously. The coefficients on the three dummies turn out to be insignificant, and the coefficients on the income risks are virtually unaffected.

Third, we consider a less refined grouping scheme in estimating the ratio of permanent to transitory labor income risks. Instead of interspersing occupational and educational grouping schemes, classifying respondents into 30 groups, we consider only occupation and classify respondents into 12 occupational groups. This change improves the precision in estimating the risk ratio, provided the assumption of a homogeneous risk ratio within each group is valid, but at the same time stretches the plausibility of the homogeneity assumption. The result is similar. The effect of permanent labor income risk increases, but its statistical significance declines slightly. The effect of transitory labor income risk is now positive, contrary to theory. However, it is extremely small, and it is far from statistically significant.

Fourth, we examine whether our estimates are significantly distorted by changes in the income process associated with educational attainment. In estimating the income risks, we use income data dating back to 1983. The respondents were in their early twenties in 1983, with an average age of 22.11. Our sample excludes full-time students, but a nontrivial portion of the respondents were part-time students during the early part of the sample. As these respondents attained higher levels of education, their incomes increased. While we have accounted for these income increases using the demographic income variation, some of the increases have likely found their way into the estimated stochastic incomes. For part-time students, the volatility of stochastic income tends to be high in the beginning, and decreases after they complete their schooling; intuitively, the income process displays declining volatility. To assess the impact of this fact, we consider a sample of relatively stable educational attainment. In this sample, those whose highest grade completed changed by more than two between 1983 and 1988 are excluded. This sample is about 10% smaller, with 1,726 respondents. We repeat the entire estimation with this sample. In particular, to estimate the group risk ratios, we classify the respondents into groups, using our occupation-education grouping scheme. As the sample has fewer respondents, particularly in the case of those with high educational attainment, we merge several small groups into larger groups. Whenever an occupation-education group has fewer than 10 respondents, we merge it with the group of the same occupation but lower educational attainment. We thus have 26 instead of 30 groups. The new risk measures are used to estimate the risky asset share equation. The results are very similar to those in Table IA.VI. The estimated effect of the permanent income risk is slightly smaller, and its statistical significance is slightly lower.

Fifth, we consider the potential peculiarity of portfolio behavior during the early part of the life cycle. Many investors hold few or no financial assets until many years into their working life. Investors with few financial assets may specialize in safe investments to economize on transaction costs. If income risks are correlated with size of financial assets, using data from young respondents leads to biased inference of the effects of income risks. To evaluate the severity of this problem, we drop the first two years of asset data from estimation. We use the asset data collected for 1992, 1993, 1994, 1996, and 1998 – five years of asset data instead of seven – to estimate the risky asset share equation. The resulting number of respondent-years is 7,621, which is 70.36% of the number in our base sample. In 1992, the average age of the respondents was 31.11, and most respondents were in their early thirties, having worked for close to a decade. The estimated effect of permanent risk becomes smaller, but it still represents more than 85% of the effect estimated in Table IA.VI. The effect of transitory income risk increases substantially. However, it is less than 20% of the effect of the permanent income risk, and statistically insignificant at the 5% level.

Finally, we consider a higher discount rate in calculating human wealth. The evaluation of human wealth uses an annual discount rate of 4%. We increase the rate to 6%. Because future incomes are more heavily discounted, human wealth is smaller and the risky asset share relative to total net wealth is larger. As a result, the absolute values of the estimates and standard errors tend to increase. However, the changes are small, and none of the substantive results are affected.

Table IA.VII presents the coefficients on demographic income variation, permanent and transitory labor income risks, and the two covariance measures in the estimations. The corresponding result from Column 3 of Table IA.VI is reproduced for comparison. Table IA.VII shows that our main findings are robust to all of the following: using both the intercept and the slope of the variance ratio regression to estimate the group risk ratio, using survey responses to control for risk aversion, using a less refined grouping scheme to estimate group risk ratios, deleting from the sample the respondents who went through large changes in educational attainment, using only the asset data of the later years, and using a higher discount rate to compute human wealth. The effect of permanent income risk is between -0.096 and -0.127 in Table IA.VII. Considering the fact that total liquid assets are 2.4% of total net wealth, Table IA.VII implies that the effect of permanent income risk on the risky asset share relative to liquid financial assets is between -3.9 and -4.8.

E. Estimating Human Wealth

Human wealth is evaluated as the expected present value of a household's labor incomes in the remaining lifetime. We make three assumptions in this evaluation. First, the survival probability becomes zero when age reaches 90, but otherwise it is the same as the age-and-gender-specific probability in the Life Tables (National Center of Health Statistics (1997)). Second, future labor incomes are discounted at 4% per year. Third, households ignore possible marital status change in evaluating the present value.

We assume that a household applies the signal extraction technique to labor income history in forecasting future labor incomes. We use these forecasts and their forecast variance to estimate the conditional means and variances of future labor incomes. These conditional moments are used to evaluate the present value.

Let $I_{i,t}$ represent the survival status of the respondent, so that $I_{i,t} = 1$ means respondent i is alive at time t. Similarly, let $I_{i,t}^S$ represent the survival status of the respondent's spouse. Let $W_{i,t}$, $A_{i,t}$, and $A_{i,t}^S$ be household human wealth, the respondent's age, and the spouse's age, respectively, at time t. The demographic profile of income, $Z_{i,t+k}\,\gamma$, is constructed using the estimates of income regression based on CPS data.

E.1. Estimating Household Human Wealth for a Single Respondent

Household human wealth is evaluated as

$$W_{i,t} = \sum_{k=1}^{90-A_{i,t}} \frac{1}{(1+r)^k} \Pr(I_{i,t+k} = 1 / I_{i,t} = 1)\, e^{\{Z_{i,t+k}\,\gamma + E_t(v_{i,t+k}) + \frac{Var_t(v_{i,t+k})}{2}\}},$$

where $E_t(v_{i,t+k}) + \frac{Var_t(v_{i,t+k})}{2}$ is the result of signal extraction.

E.2. Estimating Household Human Wealth for a Married Respondent

The demographic profile of household income is a linear function of three types of variables: those concerning the respondent (Z_i^R); those concerning the spouse (Z_i^S); and those concerning the family (Z_i^f). In our empirical model, Z_i^f consists of a constant, marital status, race dummies, and a time trend, Z_i^R consists of gender, age variables, education dummies, and gender-marital status, gender-race, gender-age, and gender-education interactions for the respondent, and Z_i^S consists of age variables, education dummies, and gender-education and gender-age interactions for the spouse. Therefore, we can also write the profile $Z_{i,t}\,\gamma$ as $Z_{i,t}^f\,\gamma_f + Z_{i,t}^R\,\gamma_R + Z_{i,t}^S\,\gamma_S$.

Household human wealth is evaluated as

$$W_{i,t} = \sum_{k=1}^{Max[90-A_{i,t},\, 90-A_{i,t}^S]} \frac{1}{(1+r)^k} [\sum_{j_1=0}^{1} \sum_{j_2=0}^{1} E[Y_{i,t+k} / I_{i,t+k} = j_1, I_{i,t+k}^S = j_2]$$
$$\Pr[I_{i,t+k} = j_1, I_{i,t+k}^S = j_2 / I_{i,t} = 1, I_{i,t}^S = 1]].$$

For each respondent, we calculate $\Pr[I_{i,t+k} = j_1, I_{i,t+k}^S = j_2 / I_{i,t} = 1, I_{i,t}^S = 1]$, assuming that survivals of respondent and spouse are independent. To evaluate $E[Y_{i,t+k} / I_{i,t+k} = j_1, I_{i,t+k}^S = j_2]$, we use

$$E[Y_{i,t'} / I_{i,t'} = 1, I_{i,t'}^S = 1] = e^{\{Z_{i,t'}^f \gamma_f + Z_{i,t'}^R \gamma_R + Z_{i,t'}^S \gamma_S + E_t(v_{i,t'}) + \frac{Var_t(v_{i,t'})}{2}\}},$$

$$E[Y_{i,t'} / I_{i,t'} = 1, I_{i,t'}^S = 0] = \exp\{Z_{i,t'}^f\,\gamma_f + Z_{i,t'}^R\,\gamma_R + E_t(v_{i,t'}) + \frac{Var_t(v_{i,t'})}{2}\},$$

$$E[Y_{i,t'} / I_{i,t'} = 0, I_{i,t'}^S = 1] = \exp\{Z_{i,t'}^f\,\gamma_f + Z_{i,t'}^S\,\gamma_R + E_t(v_{i,t'}) + \frac{Var_t(v_{i,t'})}{2}\},$$

$$E[Y_{i,t'} / I_{i,t'} = 0, I_{i,t'}^S = 0] = 0,$$

where $E_t(v_{i,t'}) + \frac{Var_t(v_{i,t'})}{2}$ is the result of signal extraction.

E.3. Signal Extraction—Forecasting Future Stochastic Labor Incomes

The respondent knows the stochastic labor income process and its parameters, $\sigma_{i,\varepsilon}^2$ and $\sigma_{i,\eta}^2$. She observes the stochastic labor income, but not the permanent and transitory components individually. She uses the observations on current and past incomes to forecast future incomes. Formally, we assume that, at time t, she forms a forecast of the labor income at time $t+k$, using a linear function of current and past stochastic labor incomes ($v_{i,j}$, $j = 1, 2, \ldots, t$):

$$E_t(v_{i,t+k}) = \lambda_{i,1} v_{i,t} + \lambda_{i,2} v_{i,t-1} + \lambda_{i,3} v_{i,3} + \ldots + \lambda_{i,t} v_{i,1},$$

with $\lambda_{i,1}, \lambda_{i,2}, \lambda_{i,3}, \ldots, \lambda_{i,t}$ chosen to minimize the forecast variance,

$$Var_t(v_{i,t+k}) = E(v_{i,t+k} - E_t(v_{i,t+k}))^2.$$

The optimal forecast for a future stochastic income is the estimate of the permanent component. To forecast the future, the respondent extracts the permanent component from the income history. To simplify the solution, we assume the permanent component is zero in the year before the initial observation, $u_{i,0} = 0$. Under this assumption,

$$Var_t(v_{i,t+k}) = k\,\sigma_{i,\varepsilon}^2 + \sigma_{i,\eta}^2 + \sigma_{i,\varepsilon}^2 \sum_{j=1}^{t} (1 - \sum_{g=1}^{t+1-j} \lambda_{i,g})^2 + \sigma_{i,\eta}^2 \sum_{j=1}^{t} \lambda_{i,t+1-j}{}^2 .$$

The minimization problem implies the following first-order conditions:

$$\begin{cases} \left(\dfrac{\sigma_{i,\eta}^2}{\sigma_{i,\varepsilon}^2} + 1\right)\lambda_{i,1} - \dfrac{\sigma_{i,\eta}^2}{\sigma_{i,\varepsilon}^2}\lambda_{i,2} = 1 \\[2ex] \lambda_{i,j+1} - \left(2 + \dfrac{\sigma_{i,\varepsilon}^2}{\sigma_{i,\eta}^2}\right)\lambda_{i,j} + \lambda_{i,j-1} = 0,\ j = 2, 3, \ldots, t-1 \\[2ex] \displaystyle\sum_{g=1}^{t-1} \lambda_{i,g} + \lambda_{i,t}\left(1 + \dfrac{\sigma_{i,\eta}^2}{\sigma_{i,\varepsilon}^2}\right) = 1 . \end{cases}$$

The optimal weights $\lambda_{i,j}$, $j = 1, 2, \ldots, t$ depend on the signal to noise ratio, $\sigma_{i,\varepsilon}^2 / \sigma_{i,\eta}^2$. We substitute the estimated signal to noise ratio into the first-order conditions, and solve for $\lambda_{i,j}$, $j = 1, 2, \ldots, t$. These optimal weights are independent of k.

We use the optimal weights to evaluate $E_t(v_{i,t+k})$. The evaluation uses the stochastic labor incomes, $v_{i,j}$, $j = 1, 2, \ldots, t$, which we estimate by subtracting the predicted values of the estimated demographic profile of income from the observed incomes. We also use the estimated $\sigma_{i,\varepsilon}^2$ and $\sigma_{i,\eta}^2$ to evaluate $Var_t(v_{i,t+k})$.

Note that 1983 was the first year in which respondents were asked about incomes in the previous year. Thus, year 1 corresponds to 1982. We calculate human wealth for the following years: 1989, 1990, 1992, 1993, 1994, 1996, and 1998. The method described here assumes that data are available annually since survey year 1983. However, after 1994, the NLSY79 respondents were interviewed every other year. We modify the formulas accordingly to account for this data limitation.

REFERENCES

National Center for Health Statistics, 1997, U.S. Decennial Life Tables for 1989-1991, Volume 1, No. 1, Hyattsville, MD.

Table IA.I
Sample Construction from NLSY79 Base Sample

"Valid income" means non-missing income data. "Respondents with Predicted Income" are those that have non-missing values for the variables used in income regression and whose reported spouse is older than 14.

Interview Year	Number of Respondents: Interviewed	With Valid Income	With Predicted Income	With Valid Income & Predicted Income
1983	12221	11766	12029	11593
1984	12069	11588	11892	11426
1985	10894	10428	10789	10334
1986	10655	10167	10424	9965
1987	10485	9891	10308	9736
1988	10465	9911	10206	9683
1989	10605	9947	10434	9800
1990	10436	9763	10198	9562
1991	9018	8558	8874	8427
1992	9016	8502	8869	8370
1993	9011	8242	8916	8161
1994	8891	7962	8770	7850
1996	8936	7717	8517	7613
1998	8399	7335	8216	7183
With valid income residuals in all 14 years				3593
After deleting those with income less than $100				3022
After deleting those with standard deviation of income growth exceeding 3				2830
After deleting those who spend more than 40 weeks out of labor force in any of the survey years 1983-1998				1909
After deleting those who do not have valid data for the construction of risky asset share relative to liquid asset over all survey years, 1989-1998				1894 (10,844 person-years)
After deleting those who do not have valid data for the construction of risky asset share relative to total net wealth over all survey years, 1989-1998				1894 (11,831 person-years)

Table IA.II
Comparison between Our Samples and NLSY79 Base Sample:
Sample Statistics of Demographic Variables

Standard deviations are in parentheses.

Variables	Base NLSY79 Sample	Sample for Income Risk Estimation	Sample for Risky Asset Share Estimation
Respondent's Age in 1979	17.898	18.112	18.110
	(2.306)	(2.177)	(2.178)
Female	0.495	0.425	0.425
Hispanic	0.158	0.151	0.151
Black	0.250	0.193	0.193
Respondent's Highest Grade Completed in 1998	12.905	13.785	13.785
	(2.457)	(2.392)	(2.390)
No. of Individuals	12686	1909	1894

Table IA.III
Sample Statistics of the Asset and Demographic Variables Used in the Risky Asset Share Estimations

In NLSY79, after year 1993, when an opposite sex partner is reported in the household roster, the partner is treated in the same way as a spouse. Poor health means that the respondent reports that his (her) health limits the kind or amount of work he (she) can do. The descriptive statistics for spouse-related variables are calculated based on the person-year observations with Married = 1.

	Risky Asset Share Relative to Liquid Assets Model Estimation		Risky Asset Share Relative to Total Net Wealth Model Estimation	
Variable	Mean	Standard Deviation	Mean	Standard Deviation
Liquid Risky Assets $>$ 0	0.362		0.361	
Risky Asset Share Relative to Liquid Assets	0.206	0.335		
Risky Asset Share Relative to Total Net Wealth			0.009	0.029
Married	0.622		0.622	
Family Size	2.992	1.490	2.992	1.490
Poor Health	0.027		0.027	
Respondent's Highest Grade Completed (HGC) $\leq$ 8	0.014		0.014	
Respondent's HGC >8 and <12	0.050		0.050	
Respondent's HGC $=12$	0.401		0.401	
Respondent's HGC >12 and <16	0.244		0.244	
Spouse's Age	32.493	5.363	32.501	5.362
Spouse's HGC $\leq$ 8	0.010		0.010	
Spouse's HGC >8 and <12	0.066		0.066	
Spouse's HGC $=12$	0.418		0.418	
Spouse's HGC >12 and <16	0.246		0.246	
Income in the Previous Calendar Year	36492.18	25081.90	36468.71	25075.12
Financial Net Wealth (from the Last Survey)	50695.09	189935.18	50738.56	190038.94
Survey Year = 1989	0.149		0.148	
Survey Year = 1990	0.148		0.148	
Survey Year = 1992	0.151		0.151	
Survey Year = 1993	0.147		0.148	

Survey Year = 1994	0.139	0.139
Survey Year = 1996	0.136	0.137
No. of Person-year Observations	10844	10831
No. of Person-year Observations with Married = 1	6744	6733

Table IA.IV
Estimates of the Income Profile Using CPS Sample

The model is estimated with the observations from the CPS, using the Tobit method. The dependent variable is log-income. Out of 309,582 observations, 7,966 are left-censored and 301,616 observations are uncensored.

Variables	Estimates	Standard Errors
Married	3.521	0.333
Householder's HGC ≤ 8	-0.600	0.017
Householder's HGC >8 and <12	-0.563	0.016
Householder's HGC =12	-0.373	0.011
Householder's HGC >12 and <16	-0.264	0.012
Householder's Age	0.583	0.025
Householder's Age Squared	-0.015	7.91×10^{-4}
Householder's Age Cubed	1.52×10^{-4}	1.04×10^{-5}
Householder's Age to the 4^{th} Power	-5.430×10^{-7}	4.88×10^{-8}
African American	-0.226	0.016
Hispanic	-0.193	0.013
Female	-3.889	0.397
No. of Years from 1983	-0.006	0.001
Spouse's HGC ≤8	-0.373	0.050
Spouse's HGC >8 and <12	-0.310	0.047
Spouse's HGC =12	-0.193	0.033
Spouse's HGC >12 and <16	-0.134	0.036
Spouse's Age	-0.657	0.075
Spouse's Age Squared	0.021	0.002
Spouse's Age Cubed	-2.78×10^{-4}	3.08×10^{-5}
Spouse's Age to the 4^{th} Power	1.29×10^{-6}	1.45×10^{-7}
Female × Married	4.997	0.921
Female × (Householder's HGC ≤8)	-0.334	0.028
Female × (Householder's HGC >8 and <12)	-0.383	0.026
Female × (Householder's HGC =12)	-0.184	0.019
Female × (Householder's HGC >12 and <16)	-0.050	0.020
Female × Householder's Age	0.354	0.035
Female × Householder's Age Squared	-0.012	0.001
Female × Householder's Age Cubed	1.60×10^{-4}	1.43×10^{-5}
Female × Householder's Age to the 4^{th} Power	-7.65×10^{-7}	6.64×10^{-8}
Female × African American	-0.081	0.022
Female × Hispanic	-0.125	0.022
(1-Female) × (Spouse's HGC ≤8)	-0.136	0.055

(1-Female) × (Spouse's HGC >8 and <12)	-0.150	0.051
(1-Female) × (Spouse's HGC =12)	-0.060	0.036
(1-Female) × (Spouse's HGC >12 and <16)	-0.010	0.040
(1-Female) × (Spouse's Age)	0.377	0.081
(1-Female) × (Spouse's Age Squared)	-0.011	0.003
(1-Female) × (Spouse's Age Cubed)	1.24×10^{-4}	3.36×10^{-5}
(1-Female) × (Spouse's Age to the 4^{th} Power)	-5.18×10^{-7}	1.59×10^{-7}
Constant	2.113	0.285

Table IA.V
Risky Asset Share Relative to Liquid Financial Wealth and Income Risk

The dependent variable is risky asset share relative to liquid financial assets. The numbers in parentheses are standard errors. The estimations are based on NLSY79 asset data from 1989, 1990, 1992, 1993, 1994, 1996, and 1998. The number of uncensored, left-censored, and right-censored observations is 3,732, 6,922, and 190, respectively. In NLSY79, after 1993, when an opposite sex partner is reported in the household roster, the partner is treated in the same way as a spouse. Poor health means that the respondent reports that his (her) health limits the kind or amount of work he (she) can do.

Explanatory Variables	Total Income Risk (1)	Demographic Income and Stochastic Income Risks (2)	Permanent and Transitory Income Risks (3)
Married	3.033	3.150	3.006
	(2.330)	(2.341)	(2.343)
Respondent's Age	-2.748	-2.675	-2.704
	(2.798)	(2.793)	(2.794)
Respondent's Age Squared	0.121	0.118	0.119
	(0.130)	(0.130)	(0.130)
Respondent's Age Cubed	-2.32×10^{-3}	-2.27×10^{-3}	-2.30×10^{-3}
	(2.66×10^{-3})	(2.66×10^{-3})	(2.66×10^{-3})
Respondent's Age to the 4^{th} power	1.66×10^{-5}	1.62×10^{-5}	1.64×10^{-5}
	(2.03×10^{-5})	(2.03×10^{-5})	(2.03×10^{-5})
Female	0.018	-0.001	-0.003
	(0.020)	(0.021)	(0.021)
Hispanic	-0.133	-0.138	-0.137
	(0.028)	(0.028)	(0.028)
African American	-0.162	-0.161	-0.163
	(0.026)	(0.026)	(0.026)
Family Size	-0.019	-0.017	-0.018
	(0.007)	(0.007)	(0.007)
Poor Health	-0.043	-0.043	-0.043
	(0.045)	(0.045)	(0.045)
Respondent's HGC ≤ 8	-0.662	-0.662	-0.678
	(0.107)	(0.107)	(0.109)
Respondent's HGC >8 and <12	-0.245	-0.242	-0.242
	(0.051)	(0.051)	(0.051)
Respondent's HGC =12	-0.216	-0.217	-0.212
	(0.025)	(0.025)	(0.026)
Respondent's HGC >12 and <16	-0.107	-0.111	-0.100
	(0.025)	(0.025)	(0.027)

Spouse's Age	-0.344	-0.358	-0.343
	(0.262)	(0.264)	(0.264)
Spouse's Age Squared	0.014	0.015	0.014
	(0.011)	(0.011)	(0.011)
Spouse's Age Cubed	-2.54×10^{-4}	-2.64×10^{-4}	-2.54×10^{-4}
	(1.93×10^{-4})	(1.94×10^{-4})	(1.94×10^{-4})
Spouse's Age to the 4th power	1.58×10^{-6}	1.65×10^{-6}	1.59×10^{-6}
	(1.26×10^{-6})	(1.26×10^{-6})	(1.26×10^{-6})
Spouse's HGC ≤ 8	-0.272	-0.264	-0.248
	(0.131)	(0.133)	(0.131)
Spouse's HGC >8 and <12	-0.135	-0.116	-0.115
	(0.054)	(0.054)	(0.054)
Spouse's HGC =12	-0.041	-0.032	-0.034
	(0.028)	(0.028)	(0.028)
Spouse's HGC >12 and <16	0.023	0.027	0.030
	(0.029)	(0.029)	(0.029)
Income in the Previous Calendar Year	6.27×10^{-6}	6.16×10^{-6}	6.12×10^{-6}
	(5.78×10^{-7})	(5.78×10^{-7})	(5.78×10^{-7})
Income Squared	-1.40×10^{-11}	-1.38×10^{-11}	-1.37×10^{-11}
	(1.87×10^{-12})	(1.87×10^{-12})	(1.87×10^{-12})
Financial Net Wealth Reported in the Last Interview	9.73×10^{-8}	1.00×10^{-7}	1.00×10^{-7}
	(4.18×10^{-8})	(4.18×10^{-8})	(4.09×10^{-8})
Financial Net Wealth Squared	6.12×10^{-15}	6.39×10^{-15}	7.79×10^{-15}
	(1.35×10^{-14})	(1.34×10^{-14})	(1.29×10^{-14})
$\sqrt{Var(\Delta \log Y_{i,t})}$	-0.347		
	(0.049)		
$\sqrt{Var(\Delta Z_{i,t}\ \gamma)}$		0.125	0.134
		(0.070)	(0.070)
$\sqrt{Var(\Delta \nu_{i,t})}$		-0.377	
		(0.049)	
$\sigma_{i,\varepsilon}$			-1.084
			(0.267)
$\sigma_{i,\eta}$			-0.184
			(0.111)
$Cov_i(\Delta \log Y_{i,t}, eq_t)$	0.234		
	(0.705)		
$Cov(\Delta Z_{i,t}\ \gamma, eq_t)$		-0.535	-0.692
		(1.214)	(1.214)
$Cov(\Delta \nu_{i,t}, eq_t)$		0.677	0.810
		(0.733)	(0.738)
Survey Year =1989	-0.793	-0.771	-0.781
	(0.046)	(0.046)	(0.046)
Survey Year =1990	-0.785	-0.765	-0.774
	(0.042)	(0.042)	(0.042)
Survey Year =1992	-0.7767	-0.762	-0.769
	(0.035)	(0.035)	(0.035)

Survey Year =1993	-0.776	-0.764	-0.770
	(0.032)	(0.0323)	(0.0324)
Survey Year =1994	-0.183	-0.172	-0.177
	(0.027)	(0.027)	(0.027)
Survey Year =1996	-0.111	-0.106	-0.108
	(0.022)	(0.022)	(0.022)
Constant	23.606	22.865	23.147
	(24.436)	(22.394)	(22.403)

Table IA.VI
Risky Asset Share Relative to Total Net Wealth and Income Risk

The dependent variable is risky asset share relative to total net wealth. The numbers in parentheses are standard errors. The estimations are based on NLSY79 asset data from 1989, 1990, 1992, 1993, 1994, 1996, and 1998. The number of uncensored and left-censored observations is 3,915 and 6,916, respectively. In the NLSY79, after 1993, when an opposite sex partner is reported in the household roster, the partner is treated in the same way as a spouse. Poor health means that the respondent reports that his (her) health limits the kind or amount of work he (she) can do.

Explanatory Variables	Total Income Risk (1)	Demographic Income and Stochastic Income Risks (2)	Permanent and Transitory Income Risks (3)
Married	0.591	0.609	0.591
	(0.204)	(0.204)	(0.204)
Respondent's Age	0.198	0.207	0.205
	(0.242)	(0.242)	(0.242)
Respondent's Age Squared	-0.010	-0.010	-0.010
	(0.011)	(0.011)	(0.011)
Respondent's Age Cubed	2.08×10^{-4}	2.15×10^{-4}	2.14×10^{-4}
	(2.30×10^{-4})	(2.30×10^{-4})	(2.30×10^{-4})
Respondent's Age to the 4th power	-1.63×10^{-6}	-1.68×10^{-6}	-1.68×10^{-6}
	(1.75×10^{-6})	(1.75×10^{-6})	(1.75×10^{-6})
Female	-1.52×10^{-4}	-2.41×10^{-3}	-2.30×10^{-3}
	(1.87×10^{-3})	(1.95×10^{-3})	(1.96×10^{-3})
Hispanic	-0.013	-0.014	-0.014
	(0.003)	(0.003)	(0.003)
African American	-0.017	-0.016	-0.017
	(0.003)	(0.003)	(0.003)
Family Size	-1.13×10^{-3}	-9.61×10^{-4}	-9.46×10^{-4}
	(5.94×10^{-4})	(5.95×10^{-4})	(5.97×10^{-4})
Poor Health	-2.59×10^{-3}	-2.52×10^{-3}	-2.40×10^{-3}
	(3.92×10^{-3})	(3.92×10^{-3})	(3.92×10^{-3})
Respondent's HGC ≤ 8	-0.047	-0.047	-0.047
	(0.010)	(0.010)	(0.010)
Respondent's HGC >8 and <12	-0.023	-0.022	-0.022
	(0.005)	(0.005)	(0.005)
Respondent's HGC =12	-0.019	-0.019	-0.018
	(0.002)	(0.002)	(0.002)

Respondent's HGC >12 and <16	-8.87×10^{-3}	-9.33×10^{-3}	-7.11×10^{-3}
	(2.32×10^{-3})	(2.33×10^{-3})	(2.48×10^{-3})
Spouse's Age	-0.069	-0.071	-0.069
	(0.023)	(0.023)	(0.023)
Spouse's Age Squared	2.89×10^{-3}	2.98×10^{-3}	2.90×10^{-3}
	(9.40×10^{-4})	(9.41×10^{-4})	(9.43×10^{-4})
Spouse's Age Cubed	-5.31×10^{-5}	-5.47×10^{-5}	-5.34×10^{-5}
	(1.67×10^{-5})	(1.68×10^{-5})	(1.68×10^{-5})
Spouse's Age to the 4^{th} power	3.60×10^{-7}	3.70×10^{-7}	3.62×10^{-7}
	(1.08×10^{-7})	(1.09×10^{-7})	(1.09×10^{-7})
Spouse's HGC ≤ 8	-0.026	-0.025	-0.024
	(0.012)	(0.012)	(0.013)
Spouse's HGC >8 and <12	-0.008	-0.006	-0.006
	(0.005)	(0.005)	(0.005)
Spouse's HGC =12	-3.41×10^{-3}	-2.65×10^{-3}	-2.72×10^{-3}
	(2.57×10^{-3})	(2.57×10^{-3})	(2.57×10^{-3})
Spouse's HGC >12 and <16	1.50×10^{-3}	1.95×10^{-3}	2.19×10^{-3}
	(2.58×10^{-3})	(2.58×10^{-3})	(2.59×10^{-3})
Income in the Previous Calendar Year	6.76×10^{-7}	6.63×10^{-7}	6.63×10^{-7}
	(4.99×10^{-8})	(5.00×10^{-8})	(5.00×10^{-8})
Income Squared	-1.34×10^{-12}	-1.31×10^{-12}	-1.31×10^{-12}
	(1.58×10^{-13})	(1.59×10^{-13})	(1.59×10^{-13})
Financial Net Wealth Reported in the Last Interview	3.45×10^{-8}	3.48×10^{-8}	3.46×10^{-8}
	(4.11×10^{-9})	(4.11×10^{-9})	(4.11×10^{-9})
Financial Net Wealth Squared	-3.88×10^{-15}	-3.81×10^{-15}	-3.68×10^{-15}
	(1.36×10^{-15})	(1.35×10^{-15})	(1.35×10^{-15})
$\sqrt{Var(\Delta \log Y_{i,t})}$	-0.028		
	(0.005)		
$\sqrt{Var(\Delta Z_{i,t}\ \gamma)}$		0.017	0.017
		(0.007)	(0.007)
$\sqrt{Var(\nu_{i,t})}$		-0.034	
		(0.005)	
$\sigma_{i,\varepsilon}$			-0.115
			(0.026)
$\sigma_{i,\eta}$			-0.002
			(0.011)
$Cov(\Delta \log Y_{i,t}, eq_t)$	-0.025		
	(0.066)		
$Cov(\Delta Z_{i,t}\ \gamma, eq_t)$		0.016	0.004
		(0.112)	(0.112)
$Cov(\Delta v_{i,t}, eq_t)$		-0.025	-0.010
		(0.071)	(0.071)
Survey Year =1989	-0.053	-0.051	-0.051
	(0.004)	(0.004)	(0.004)

Survey Year =1990	-0.055	-0.053	-0.053
	(0.004)	(0.004)	(0.004)
Survey Year =1992	-0.053	-0.051	-0.051
	(0.003)	(0.003)	(0.003)
Survey Year =1993	-0.052	-0.051	-0.051
	(0.003)	(0.003)	(0.003)
Survey Year =1994	-0.020	-0.019	-0.019
	(0.002)	(0.002)	(0.002)
Survey Year =1996	-0.013	-0.012	-0.012
	(0.002)	(0.002)	(0.002)
Constant	-1.464	-1.549	-1.539
	(1.942)	(1.940)	(1.943)

Table IA.VII
Effects of Income Risks Under Alternative Specifications

The dependent variable is risky asset share relative to total net wealth, and the rest of the independent variables are the same as those in Table IA.VI. Standard errors are in parentheses. "Benchmark" refers to the third model of risky asset share relative to total net wealth in Subsection B.2, Section IV. The estimates are taken from Column 3 of Table IA.VI.

	Estimates				
Specification	$Var(\Delta Z_{i,t}\ \gamma)$	$\sigma_{i,\varepsilon}$	$\sigma_{i,\eta}$	$Cov(\Delta Z_{i,t}\gamma, eq_t)$	$Cov(v_{i,t}, eq_t)$
1. Benchmark	0.017 (0.007)	-0.115 (0.026)	-0.002 (0.011)	0.004 (0.112)	-0.010 (0.071)
2. Identification by Slope & Intercept	0.016 (0.006)	-0.096 (0.020)	0.003 (0.014)	0.018 (0.101)	-0.129 (0.064)
3. Control for Risk Aversion	0.018 (0.007)	-0.115 (0.026)	-0.001 (0.011)	0.007 (0.112)	-0.008 (0.071)
4. Less Refined Grouping Scheme	0.017 (0.006)	-0.120 (0.030)	0.002 (0.013)	0.006 (0.110)	-0.010 (0.069)
5. Stable Educational Attainment	0.017 (0.007)	-0.109 (0.027)	-0.006 (0.011)	-0.041 (0.125)	-0.046 (0.080)
6. Excluding Early Years	0.017 (0.007)	-0.097 (0.027)	-0.019 (0.011)	-0.007 (0.115)	-0.028 (0.072)
7. High Discounting	0.020 (0.008)	-0.127 (0.030)	-0.004 (0.012)	0.005 (0.129)	-0.004 (0.082)