TABLE I

Risk Preference Survey Design

	Gamble[a]	Relative risk aversion (1/θ) Upper bound	Relative risk aversion (1/θ) Lower bound	Relative risk aversion (1/θ) Mean[b]	Relative Risk Tolerance (θ) Lower bound	Relative Risk Tolerance (θ) Upper bound	Relative Risk Tolerance (θ) Mean[b]	Expectation conditional on survey response[c] 1/θ	Expectation conditional on survey response[c] θ
I.	Reject both one-third and one-fifth	∞	3.76	15.8	0	0.27	0.11	15.7	0.15
II.	Reject one-third but accept one-fifth	3.76	2	2.9	0.27	0.5	0.36	7.2	0.28
III.	Accept one-third but reject one-half	2	1	1.5	0.5	1	0.68	5.7	0.35
IV.	Accept both one-third and one-half	1	0	0.7	1	∞	1.61	3.8	0.57

a. Gambles all have a 50 percent probability of doubling lifetime income and a 50 percent probability of losing half, one-third, or one-fifth of lifetime income.

b. These columns report the mean if the true value is between the lower and upper bounds.

c. These columns give the expected value of relative risk tolerance and relative risk aversion conditional on observing response I, II, III, or IV. This conditional expectation takes into account measurement error in the survey response. This baseline case assumes lognormality, no status quo bias, and no persistent measurement error. (See text for details and Appendix Table III for other cases.)

TABLE IIa

Risk Tolerance by Primary and Secondary Respondents

Respondent	Percent choosing response				Number of responses	Mean risk tolerance[a]
	I	II	III	IV		
All respondents	64.6	11.6	10.9	12.8	11707	0.2412
Primary respondent	64.8	11.4	10.7	13.0	7278	0.2413
Secondary respondent	64.3	11.8	11.2	12.5	4429	0.2410

The p-value for the hypothesis that the mean risk tolerance is equal across primary and secondary respondents is 0.92.

a. The mean risk tolerance is computed using the baseline parametric model.

TABLE IIb

Primary versus Secondary Respondents

	Percent choosing response (column percent)				
	Primary respondent				
Secondary respondent	I	II	III	IV	Number of responses
I	68.8	57.4	56.3	55.1	2692
II	10.8	17.5	11.6	11.8	494
III	9.4	12.4	18.7	12.8	466
IV	10.9	12.6	13.2	20.1	521
Number of responses	2721	508	438	506	4173

Sample limited to households with both a primary and secondary respondent. Columns give secondary respondent's risk tolerance conditional on primary respondent's risk tolerance.

TABLE III

Risk Tolerance by Demographic Groups

Demographic group	Percent choosing response				Number of responses	Mean risk tolerance[a]
	I	II	III	IV		
Age under 50 years	58.5	14.4	13.8	13.1	1147	0.2542
50 to 54 years	61.9	12.0	12.2	13.7	3800	0.2486
55 to 59 years	66.0	11.5	9.8	12.5	4061	0.2372
60 to 64 years	69.3	9.5	9.4	11.6	2170	0.2301
65 to 69 years	66.6	12.0	9.2	12.0	390	0.2331
Over 70 years	68.3	6.4	9.3	15.8	139	0.2432
Female	65.1	11.8	11.0	11.9	6448	0.2383
Male	64.0	11.2	10.7	13.9	5259	0.2448
White	64.9	12.5	10.7	11.8	8508	0.2377
Black	66.7	9.1	10.6	13.3	1884	0.2402
Other	62.3	10.0	13.7	13.7	109	0.2462
Asian	57.9	10.3	11.1	20.6	126	0.2762
Hispanic	59.3	9.2	12.6	18.7	1054	0.2666
Protestant	66.2	11.5	10.8	11.4	7404	0.2350
Catholic	62.3	10.8	11.4	15.3	3185	0.2514
Jewish	56.3	13.2	11.1	19.2	197	0.2683
Other	61.6	14.3	9.6	14.3	900	0.2498

The p-value for the hypothesis that the mean risk tolerance is equal across age groups is 0.0001, that it is equal across sexes is 0.015, that it is equal across races is 0.0001, and that it is equal across religions is 0.0001.

a. The mean risk tolerance is computed using the baseline parametric model.

TABLE IV
Risk Tolerance by Behaviors

Behavior	Percent choosing response				Number of responses	Mean risk tolerance[a]
	I	II	III	IV		
Never smokes	66.3	11.2	10.9	11.4	4276	0.2353
Quit smoking	63.9	11.9	11.2	12.9	4276	0.2425
Smokes now	63.3	11.6	10.4	14.5	3155	0.2474
Does not drink	68.0	9.4	10.2	12.1	4584	0.2344
Drinks	62.4	12.9	11.3	13.2	7123	0.2456
Zero drinks per day	68.0	9.4	10.2	12.1	4584	0.2344
Between zero and one	63.2	12.9	11.5	12.2	5317	0.2418
Between one and two	59.5	13.4	11.5	15.4	1187	0.2549
Between two and five	61.9	11.7	9.0	17.2	441	0.2573
More than five	57.3	12.3	10.1	20.2	178	0.2689
Less than 12 years of education	65.7	8.9	10.8	14.4	3320	0.2448
12 years	67.7	11.4	10.5	10.2	4130	0.2294
13 to 16 years	61.9	13.4	11.2	13.3	3158	0.2463
Over 16 years	57.6	14.6	11.7	15.9	1099	0.2598
Self employed	63.9	10.4	11.1	14.4	1374	0.2461
Employee	66.0	12.0	10.5	11.3	6397	0.2349
Not working	62.5	11.2	11.4	14.7	3936	0.2497
Nonwesterner	65.5	11.2	10.7	12.4	9811	0.2388
Westerner	59.8	13.1	11.9	14.9	1896	0.2538
Nonimmigrant	65.0	11.9	10.8	12.2	10568	0.2389
Immigrant	61.2	8.2	11.7	18.7	1139	0.2630

The p-value for the hypothesis that mean risk tolerance is equal among smokers, quitters, and those who never smoked is 0.0017. The p-values for the hypothesis of no difference in risk tolerance according to the other behaviors (drinks, drinks per day, years of education, employment status, region, or immigrant status) are each less than 0.0001.

a. The mean risk tolerance is computed using the baseline parametric model.

TABLE V

Does Measured Risk Tolerance Predict Behavior?
Regressions of Behaviors on Risk Tolerance and Demographic Variables

Dependent variable	Mean of dependent variable	Regression coefficient of risk tolerance	Standard error of estimate	R^2
Ever smoke	0.635	0.092 (0.030)	0.469	0.054
Smoke now	0.269	0.068 (0.028)	0.441	0.011
Drinks	0.608	0.099 (0.030)	0.472	0.065
Drinks per day	0.831	0.256 (0.053)	0.835	0.073
Education (years)	12.083	0.265 (0.184)	2.920	0.172
Self-employed	0.117	0.021 (0.020)	0.318	0.024
Immigrant	0.097	0.027 (0.016)	0.248	0.303
No health insurance	0.272	0.196 (0.031)	0.422	0.100
No life insurance	0.294	0.155 (0.028)	0.439	0.073
Owns home	0.805	-0.153 (0.024)	0.383	0.066

The dependent variables are (0,1) except for drinks per day and years of education. The estimated regressions include the following covariates whose estimated coefficients are not reported: constant, age, sex, religion (Catholic, Jewish, other), and race (black, hispanic, Asian, other). The mean of the dependent variables are given in the second column. The regression coefficient of relative risk tolerance θ is reported in the third column (with standard errors in parentheses). Relative risk tolerance conditional on the survey responses is assigned to each respondent using the baseline statistical model. The last two columns give the standard error and R^2 of the regressions. The regressions are based on 11,707 individuals' responses with two exceptions. For health insurance, the sample is the 8,642 households not eligible for Medicare. For life insurance, the sample is only 11,561 households owing to missing data.

TABLE VI

Risk Tolerance by Health Insurance Coverage and Employment Status

Employment status	Health insurance	Percent choosing response I	II	III	IV	Number of responses	Mean risk tolerance[a]
Self-employed	Yes	63.5	10.0	12.3	14.0	763	0.2459
	No	63.0	10.3	10.0	16.6	319	0.2529
Employee	Yes	66.9	11.8	10.5	10.6	4186	0.2317
	No	58.4	11.4	13.4	16.6	638	0.2643
Not employed	Yes	63.8	11.9	10.9	13.2	1343	0.2424
	No	59.8	10.1	12.0	18.0	1393	0.2647

Tabulation for health insurance excludes Medicare-eligible individuals. The p-value for the hypothesis that mean risk tolerance does not differ according to whether or not the respondent has health insurance is 0.4953 for the self-employed, 0.0001 for employees, and 0.0002 for those not employed.

a. The mean risk tolerance is computed using the baseline parametric model.

TABLE VII

Risk Tolerance by Life Insurance Coverage

Life insurance	Percent choosing response I	II	III	IV	Number of responses	Mean risk tolerance[a]
Yes	66.1	11.6	10.5	11.6	8162	0.2353
No	61.0	11.5	11.7	15.7	3399	0.2548

The p-value for the hypothesis that mean risk tolerance does not differ according to whether or not the respondent has life insurance is 0.0001.

a. The mean risk tolerance is computed using the baseline parametric model.

TABLE VIII

Risk Tolerance by Family Income

	Percent choosing response					
Income quintile	I	II	III	IV	Number of responses	Mean risk tolerance[a]
1st	62.2	9.3	12.3	16.1	2415	0.2556
2nd	66.7	10.5	10.5	12.1	2321	0.2366
3rd	66.9	11.6	10.5	10.8	2289	0.2310
4th	67.2	12.3	9.1	11.2	2356	0.2312
5th	59.9	14.4	12.1	13.7	2326	0.2511

Cut-offs for the income quintiles are $18,980, $33,200, $49,000, and $72,200. The p-value for the hypothesis that mean risk tolerance does not differ according to income quintile is 0.0001.

a. The mean risk tolerance is computed using the baseline parametric model.

TABLE IX
Risk Tolerance by Family Wealth

	Percent choosing response					
Wealth quintile	I	II	III	IV	Number of responses	Mean risk tolerance[a]
1st	61.5	9.1	12.0	17.2	2402	0.2601
2nd	65.0	12.0	10.7	12.1	2320	0.2381
3rd	67.4	11.5	10.2	11.2	2335	0.2318
4th	65.7	12.7	11.4	10.0	2319	0.2319
5th	63.4	13.1	10.0	13.3	2331	0.2435

Cut-offs for the wealth quintiles are $21,000, $70,000, $139,000, and $285,000. Net worth includes housing wealth. The p-value for the hypothesis that mean risk tolerance does not differ according to wealth quintile is 0.0001.

a. The mean risk tolerance is computed using the baseline parametric model.

TABLE X

Does Measured Risk Tolerance Predict Portfolio Shares?
Regressions of Portfolio Shares on Risk Tolerance and Demographic Variables

Dependent variable: Portfolio share	Mean of dependent variable	Regression coefficients of risk tolerance: Primary (R1)	Regression coefficients of risk tolerance: Primary minus secondary (R1-R2)	Standard error of estimate	R^2
Stocks	0.140	0.097 (0.029)	-0.023 (0.027)	0.244	0.060
Bonds	0.014	0.015 (0.008)	-0.010 (0.008)	0.068	0.040
Saving and checking	0.416	-0.128 (0.041)	0.018 (0.039)	0.348	0.153
Treasury bills	0.095	-0.055 (0.024)	0.050 (0.022)	0.201	0.013
IRA and Keogh	0.248	-0.006 (0.037)	0.020 (0.035)	0.312	0.033
Other assets	0.086	0.076 (0.025)	-0.056 (0.024)	0.215	0.017

The dependent variables are shares of assets in total financial wealth. The estimated regressions include demographic covariates (see note to Table 7) plus the logarithms of income and wealth. The third column reports the estimated coefficient of the primary respondent's (R1) relative risk tolerance. The fourth column gives that of the difference between the primary and secondary respondents' (R1-R2) relative risk tolerance. Relative risk tolerance conditional on the survey responses is assigned to each respondent using the baseline statistical model. The regressions are based on 5012 households' responses.

TABLE XI

Mean Risk Preference and Stock Ownership

Respondents	Weighting	Relative risk tolerance	Relative risk aversion
All	Unweighted	0.2391	12.1193
	Income-weighted	0.2417	11.9928
	Wealth-weighted	0.2441	11.9781
All, with nonstockholders getting zero risk tolerance	Unweighted	0.0738	...
	Income-weighted	0.1079	...
	Wealth-weighted	0.1418	...
Stockholders only	Unweighted	0.2435	11.8904
	Income-weighted	0.2480	11.7279
	Wealth-weighted	0.2485	11.8346

11,136 observations (3,377 observations for stockholders only). Relative risk tolerance and aversion conditional on the survey responses is assigned to each respondent using the baseline statistical model.

TABLE XII

Preference Parameters for Consumption Paths
(Experimental Module)

Parameter	Lower Bound	Upper Bound	Midpoint
Intertemporal substitution elasticity	0.007	0.36	0.18
Consumption growth at zero interest rate (percent per year)	0.28	1.28	0.78

116 observations.

TABLE XIII

Consumption Path Preference Parameters and Risk Tolerance Responses

	Response to Risk Tolerance Question				
Midpoint Parameter	I	II	III	IV	p-value
Intertemporal substitution elasticity	0.18	0.21	0.15	0.20	0.28
Consumption growth at zero interest rate (percent per year)	0.80	1.10	0.53	0.53	0.87

116 observations. The p-value is for the null hypothesis of no correlation with relative risk tolerance assigned to each respondent using the baseline statistical model.

TABLE XIV

Expected Value of Relative Risk Tolerance (θ)

Conditional on Survey Responses for Alternative Parametric Models

Statistical Model				Expectation conditional on response[c]				
Status quo bias, ϕ[a]	Fraction of true parameter in persistent variance, τ[b]	Mean[c]	Standard Deviation[c]	I	II	III	IV	Adjustment to regression coefficients[d]
1.0	1.0	0.241	0.334	0.150	0.279	0.353	0.569	1.0
1.05	1.0	0.299	0.426	0.184	0.347	0.442	0.729	0.77
1.1	1.0	0.396	0.667	0.221	0.455	0.729	1.087	0.48
1.0	0.5	0.185	0.155	0.150	0.208	0.234	0.294	2.91
1.05	0.5	0.227	0.195	0.184	0.257	0.290	0.369	2.27
1.1	0.5	0.283	0.277	0.220	0.324	0.494	1.540	1.54

This table reports statistics relating to the estimated distribution of relative risk tolerance under different assumptions about status quo bias and the presence of permanent measurement error. The case in the first row (no status quo bias, no permanent measurement error) provides the basis for the results in the main tables of the paper. The other cases are discussed in Section VI. (See text for details.)

a. This column gives different cases of the utility premium, ϕ, that the respondent places on the current job relative to the expected utility of the job in the gamble. ϕ equal 1.0 is no status quo bias. (See equation 5.)

b. This column gives different cases of the fraction τ of the persistent variance of y owing to the true preference parameter.

c. These columns give the estimated mean and standard deviation of the unconditional distribution of relative risk tolerance and the expectation of relative risk tolerance conditional on the four possible responses to the survey.

d. This column gives the multiplicative adjustment to the regression coefficients in Tables V and X warranted by the various cases of the statistical model.

APPENDIX

[LAYOUT OF APPENDIX:

Appendix Tables I and II first.

Then "Module K" with Appendix Figues I and II.]

APPENDIX TABLE I

Summary Demographic Characteristics, HRS Wave I Respondents

Characteristic	All respondents	Primary respondents	Secondary respondents
Average age (years)	55.6	56.1	54.7
Average education (years)	12.1	12.2	11.9
Fraction male (percent)	44.9	51.7	33.8
Fraction black (percent)	16.1	18.4	12.2
Fraction Asian (percent)	1.1	1.0	1.1
Fraction Hispanic (percent)	9.0	9.2	8.7
Number of respondents	11707	7278	4429

For couples, the primary respondent is the one reported to be most knowledgeable about family finances.

APPENDIX TABLE II

Distribution of Responses to Risk Preference Question

Across Waves

	Percent choosing response (column percent)				
	Wave I				
Wave II	I	II	III	IV	Number of responses
I	68.4	57.3	48.2	36.8	436
II	12.7	18.0	10.6	14.9	96
III	11.8	18.0	21.2	19.5	105
IV	7.0	6.7	20.0	28.7	80
Number of Observations	456	89	85	87	717

Distribution of reposes for the subset of individuals who answered risk tolerance questions on both waves of the HRS.

MODULE K: SPENDING AND SAVING PREFERENCES

Module K is a set of questions asked of a small subset of HRS Wave I respondents designed by us to elicit preferences about the path of consumption. The interviewer began the module by reading the following introduction to the respondents:

> Now I have a few questions about your preferences for spending and saving as you get older. To make the questions comparable for all respondents in the survey, let's suppose that you are now 50 years old, that you [and your (husband/wife)] will live to be 80. Further suppose that future health care costs are fully covered by insurance, that there will be no inflation, and the income after taxes is guaranteed to be $3000 each month from age 50 to age 80.

The interviewer then gives a card showing two equal present value consumption profiles with different slopes to the respondent. The interviewer describes the card as follows:

> [The card] contains several possible patterns of monthly spending before retirement, the striped bars, and after retirement, the solid black bars. By saving part of your income before retirement, you can have more to spend after retirement, as in choice E. Or you could borrow and spend more before retirement, spending less and repaying the loan after retirement, as in choice A. Or you could just spend your income each month, as in choice C. Thus you can afford <u>any</u> of the spending patterns shown on [the card]. Which pattern do you like the most?

[APPENDIX FIGURE I here]

The interviewer first presents the respondent card I (not reproduced). It is the same as card II (reproduced as Appendix Figure I), except it presents only options A, C, and E. (We meant this first card to acquaint the respondents with the format of the questions.) The interviewer then gives card II to the respondent and states, "Here are the same patterns as before, with two additional choices. Which do you prefer?" (If the respondent chooses choice C (flat consumption path), the interviewer offers the choices on card III (not reproduced), with slopes of the consumption path between those represented by choice B and D.)

To this point in the module, the consumption paths have a zero interest rate. To estimate the elasticity of intertemporal substitution, we then offer the respondents choices with a non-zero interest rate. That the interest rate is positive is not stated explicitly. The interviewer instead gives the respondent card IV (reproduced as Appendix Figure II) and reads the following:

> Here is another card with 5 more spending patterns for before and after retirement. As before, by saving part of your income before retirement, you can have more to spend after retirement. Assuming that you can afford <u>any</u> of the spending patterns on Card IV, which pattern do you like the most?

[APPENDIX FIGURE II here]

Finally, the interviewer asks the respondent to choose among paths on card V (not reproduced), which are constructed using a negative interest rate.