NORTH-HOLLAND

Financial Services Review 9 (2000) 159–170

FINANCIAL SERVICES REVIEW

Risk tolerance and asset allocation for investors nearing retirement

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Received 17 May 1999; received in revised form 6 March 2000; accepted 6 March 2000

Abstract

This paper uses a large individual-level data set to isolate the effects of risk tolerance on portfolio composition. We test and confirm two predictions of the Capital Asset Pricing Model: (1) increased risk tolerance reduces an individual's propensity to purchase risk-free assets; and (2) higher risk tolerance does not affect the composition of an individual's portfolio of risky assets. More specifically, we find that risk tolerant investors nearing retirement do not reduce their bond allocations in order to buy more stock. © 2000 Elsevier Science Inc. All rights reserved.

JEL classification: G11; D12

Keywords: Portfolio choice; Asset allocation; Risk aversion

1. Introduction

Canner, Mankiw and Weil (1997) suggest that Wall Street financial planners often recommend a different mix of financial assets for highly risk tolerant clients than for more risk averse individuals. Risk tolerant investors should buy more high risk, high expected return assets such as stocks, than low risk, low expected return assets such as bonds. As plausible as this advice may sound, it differs markedly from the behavior of the rational expected-utility-maximizing investors inhabiting the Capital Asset Pricing Model (CAPM)

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PII: S1057-0810(00)00063-9

used in most finance and economics research. All risky assets–including both stocks and bonds–are part of the "market portfolio" in the CAPM. Increased tolerance for risk causes CAPM investors to alter the percentage of assets held in the risky portfolio as opposed to the risk-free asset, but the composition of stocks and bonds held in the risky portfolio is not changed.

This paper investigates the behavior of investors nearing retirement. More specifically, we focus on two hypotheses implicit in the CAPM: (1) risk tolerant individuals hold a smaller proportion of risk-free assets, and (2) the composition of an individual's portfolio of risky assets will not change as he/she becomes more risk tolerant. We examine survey data reported in the 1992 *Health and Retirement Survey,* concerning individuals' asset allocations and willingness to take risk as they approach retirement. Each person's portfolio is decomposed into assets held as stock, bonds and Treasury Bills. Assuming that Treasury Bills are "risk-free assets" while stocks and bonds are "risky," the CAPM's predictions become (1) the proportion of all assets allocated to Treasury Bills should fall as risk tolerance increases, and (2) the proportion of risky assets allocated to stocks is independent of risk tolerance. Wall Street seems to be comfortable with the first of these predictions, but not the second. We find support for both predictions.

2. Literature review

In recent years, both individual and institutional investors have become increasingly aware of the importance of asset allocation. Brinson, Hood and Beebower (1986) show that over 90% of the variability in portfolio returns can be explained by asset allocation. Other studies focus on decisions during particular stages of investors' life cycles. Butler and Domian (1993) present asset returns over long holding periods in a form useful for preretirement planning. Ho, Milevsky and Robinson (1994) examine how to maximize the probability of a secure and sufficient income during postretirement years.

Friend and Blume (1975) observe that an individual's risk tolerance can be inferred from the asset allocation decision by calculating the percentage of a person's assets invested in risky securities. This approach was extended by Siegel and Hoban (1982, 1991), Morin and Suarez (1983), Bellante and Saba (1986), Riley and Chow (1992) and others. In a recent variant of this approach, Bajtelsmit, Bernasek and Jianakoplos (1999) presents a version of the Capital Asset Pricing Model that allows individuals to allocate their funds between risky assets, a risk-free asset and human capital. The proportion of assets investor i devotes to risky securities, α_i is determined by the following equation:

$$\alpha_i = \left(\frac{E(r_m - r_f)}{\sigma_m^2}\right)\left(\frac{1}{C_i}\right)\left(\frac{1}{1 - h_i}\right). \tag{1}$$

The first bracketed term is the same for all individuals and consists of the expected difference in the rate of return between the market portfolio and the risk-free asset, $E(r_m - r_f)$, divided by the variance of the market portfolio, σ_m^2. The second term suggests that α_i is larger for risk tolerant investors since C_i is person i's relative risk aversion. In the final term, h_i is the ratio of human wealth to net wealth. Consequently investors with high human capital investments hold larger fractions of their wealth in risky assets. Bajtelsmit et al. use information on α_i and h_i to infer a value for risk tolerance multiplied by a constant that is the same for all investors.

While the studies described above provide useful insights, they do not test the CAPM's asset allocation predictions because they have already assumed the result. One reason why these CAPM predictions are seldom tested is that there are very few direct measures of risk tolerance available. A few empirical studies have uncovered more direct information. Viscusi (1992), for example, infers risk tolerance from a willingness to undertake risky endeavors in other areas of life. It would seem to follow that an individual choosing to race automobiles for a living is relatively tolerant of risk. If so, his/her portfolio should contain a small proportion of risk-free assets, perhaps even a negative proportion (e.g., buying stocks on margin). If the CAPM is correct, it is also true that the portion of the racing enthusiast's portfolio allocated to risky securities will have the same composition as that of your average professor. Of course, many characteristics differentiate our putative race car driver from others in the population. Perhaps the fact that he/she isn't likely to live as long makes him/her less likely to value stocks with large future, but uncertain current, expected returns. All of this makes the approach interesting, but not ideal. Many things other than financial risk tolerance affect willingness to engage in other sorts of risky behavior.

LeBaron, Farrelly and Guha (1989) and Schooley and Worden (1996) obtain a measure of risk tolerance by survey. While LeBaron et al. have only a small sample and little information other than the risk tolerance, the 1989 Survey of Consumer Finance (SCF) used by Schooley and Worden is more complete. The SCF asked participants

> "Which of the following statements comes closest to the amount of financial risk that you (and your husband/wife) are willing to take when you save or make investments?
> 1. Take substantial financial risks expecting to earn substantial returns
> 2. Take above average financial risks expecting to earn above average returns
> 3. Take average financial risks expecting to earn average returns
> 4. Not willing to take any financial risks."

Schooley and Worden regress the share of risky assets on dummy variables for the answers to this SCF question. As the CAPM predicts, risk tolerant investors hold a smaller proportion of risk-free assets and more of the risky portfolio. Our paper substantially replicates their result with a new data set and a different measure of risk tolerance. Unlike Schooley and Worden, our paper tests the CAPM notion that the composition of the risky portfolio does not change as risk tolerance increases.

3. Data and methods

The data for our study come from the first wave of the Health and Retirement Survey (HRS) conducted by the University of Michigan's Survey Research Center in 1992. More information on this data set is available at *http://www.umich.edu/~hrswww/center/center.html*. The HRS is a nationally representative sample of 15,000 individuals aged 51–61. The primary objective of this data set was to collect longitudinal information on the health, financial well being and labor market decisions of people approaching retirement. To this end, the HRS will track the same individuals every two years over a prolonged period stretching at least into the first decade of the 21st century. Such a longitudinal data set, it is expected, will provide a wealth of information that can track changes in health status, financial status and labor market status of these individuals and the reasons for such a change. The first wave of data, which is the one used in this paper, was collected in 1992. For the first wave, in addition to the core set of questions on health, wealth and employment characteristics, a set of ten experimental modules collected information on key topics of interest including parents' wealth, and spending and saving preferences.

Our interest in the HRS stems from three pieces of information contained in it: (1) information on assets broken down into stocks, bonds, and so forth, (2) information on expectations regarding inflation, economic depression and bequest motives, and (3) information on risk tolerance of the respondents. The core data provide information on the amount of the respondents' nonhousing wealth invested in stocks of publicly held companies, mutual funds or investment trusts, bonds including corporate, government, and foreign bonds, as well as money in certificates of deposit, government savings bonds and Treasury Bills. One shortcoming of the information on the asset variables is that finer distinctions, for instance the type of bonds, are not available in this data set. The HRS also provides responses to questions about respondents' expectations on inflation and depression in the economy, the length of their planning horizon, and the strength of their bequest motives.

The inclusion of a survey question intended to assess risk tolerance was of particular interest to us in examining the role of risk tolerance on asset allocation decisions. Respondents were asked to suppose that they were the only income earner in the family with a good job guaranteed to provide their current family income for life. They were then asked if they would accept an opportunity to take a new and equally good job with a 50–50 chance of doubling family income and a 50–50 chance that family income would be reduced by a third. Depending on their response, individuals were next asked about their willingness to take a job that had a 50–50 chance of doubling their income and a 50–50 chance of either halving or reducing their income by 20%. From the two questions, we can obtain an index of risk tolerance with four values that range from zero (least risk-tolerant/most risk-averse) to three (most risk-tolerant/least risk-averse). We label this variable RISK.

We use linear regression techniques to relate risk tolerance to an individual's (1) share of risk-free assets among all assets and (2) share of bonds among risky assets. The HRS data allow us to divide a person's assets into stocks, bonds and Treasury Bills. We treat stocks and bonds as risky prospects with different properties, and Treasury Bills as risk-free assets. As mentioned in the previous section, Eq. (1) describing the asset allocation rule from the Capital Asset Pricing Model is the basis for the regressions we employ in this paper. Eq. (1) suggests that the proportion of all assets held in risky securities is a function of a person's risk tolerance, his/her relative investment human capital and factors that are common to everybody in the market. Common factors include the difference in expected return between risky and risk-free assets as well as variance of the risky assets. Life cycle concerns may cause these common factors to be perceived differently by individuals. For example, people nearing death may not be concerned by the long-term expected return and variance of their portfolio, and may focus only on the next few years. For this reason, we specify the following regression:

Table 1
Variable definitions, means, and standard deviations

Variable Name	Variable Definition	Mean	Standard Deviation
EXINFL	Perceived probability of double-digit inflation during the next ten years	5.644	2.303
EXDEPR	Perceived probability of a major depression during the next ten years	5.185	2.477
AGE	Respondent's age	55.903	3.138
MALE	Dummy variable, equals one if respondent is male	0.662	0.473
EDUC	Years of education completed	13.367	2.386
RISK	Index of risk tolerance with four values that range from zero (least risk-tolerant) to three (most risk-tolerant)	.711	1.071
PLAN10	Dummy variable, equals one if the planning period for spending and saving decisions is ten years or more	0.106	0.308
NOPLDAT	Dummy variable, equals one if respondent did not answer the planning question	0.009	0.092
MARRIED	Dummy variable, equals one if respondent is married	0.829	0.376
INHERIT	Expectation of leaving a sizable inheritance to respondent's heirs, five values ranging from one ("yes, definitely") to five ("no, definitely")	3.102	1.402
NOINHDAT	Dummy variable, equals one if respondent did not answer the inheritance question	0.007	0.086
NETWORTH	Total household net worth including financial assets and home equity	333998.1	618652.2
TBILL1	Proportion of financial assets invested in risk-free securities	0.424	0.452
STOCK1	Proportion of financial assets invested in stock	0.522	0.446
BOND1	Proportion of financial assets invested in bonds	0.054	0.181
BOND2	Proportion of risky assets invested in bonds	0.093	0.242

$$TBILL1 = \beta_0 + \beta_1 RISK + \beta_2 EDUC + \sum_{i=3}^{I} \beta_i X_i + \epsilon. \qquad (2)$$

The dependent variable TBILL1 is the proportion of all assets invested in risk-free securities. Further details on this variable are presented following our discussion of the independent variables. Means and standard deviations of all variables are shown in Table 1.

The right side of Eq. (2) includes RISK, our risk tolerance variable, and EDUC which crudely measures human capital accumulation as the number of years of education completed by the individual. Through Eq. (1) the CAPM predicts $\beta_1 < 0$, and $\beta_2 < 0$. Additional independent variables $X_3, \ldots, X_I$ are described below. Strictly speaking, Eq. (1) predicts that $\beta_3, \ldots, \beta_I$ are all zero. We have included these variables to control for idiosyncratic beliefs and lifecycle considerations that might cause people to have different perceptions of $\frac{E(r_m - r_f)}{\sigma_m^2}$.

Variables focusing on the individual's expectations are intended to identify reasons why individuals might differ in their personal assessment of the risk-return tradeoff among stocks, bonds and T-Bills. EXINFL contains an individual's assessment of the probability that the

U.S. economy will experience double-digit inflation sometime during the next 10 years. While nominal interest rates are likely to be higher when average economy-wide expectations of inflation are higher, an individual whose expectations of inflation are unusually high may be inclined to avoid the fixed nominal returns of bonds. EXDEPR is the individual's assessment of the chances that the U.S. economy will experience a major depression during the next ten years. Presumably those that think a depression is likely will be less interested in stocks and more in fixed nominal assets.

In many of the studies (for instance, Riley and Chow, 1992), wealth has been argued to be an important determinant of risk aversion and asset allocation. Our measure of wealth is NETWORTH, which is the sum of the value of housing paid for, other real estate holdings paid for, value of automobile paid for, value of business(es) owned, amount in individual retirement accounts, amount in savings and other financial securities, and net of any debts owed.

PLAN10 is a dummy variable identifying households who believe that the most relevant planning period for spending and saving decisions is 10 years or more. According to Butler and Domian (1993) and Gunthorpe and Levy (1994), households with long planning horizons should use greater stock allocations. Since many households didn't answer the planning question, we have also included a dummy variable called NOPLDAT which identifies them. INHERIT identifies households that plan to leave an inheritance, using the following survey question,

"Do you [and your (husband/wife/partner)] expect to leave a sizable inheritance to your heirs?

1. Yes, definitely,
2. Yes, probably,
3. Yes, possibly,
4. Probably not,
5. No, definitely."

INHERIT is important because our data focuses on people shortly before retirement. People who don't plan to leave an inheritance may have a considerably shorter planning horizon making them less likely to purchase stocks. NOINHDAT is a dummy variable denoting respondents who didn't answer the inheritance question. NOINHDAT includes both those with response to the INHERIT question, who receive a value of zero for the NOINHDAT, and those who did not respond to it, who receive a value of 1 for NOINHDAT.

The remaining variables in our regressions describe demographic and lifecycle differences among respondents. We have included information on the person's age (AGE), a dummy for people who are married with spouse present (MARRIED), and a dummy variable identifying the person's gender (MALE). Since the individuals in our data set are near retirement, older people may prefer assets that are predictable in the short term (such as Treasury Bills and bonds). The gender and marital status dummies should pick up taste differences (other than tolerance for risk) that affect asset allocation.

We now return to our discussion of the dependent variable TBILL1. Since our primary emphasis is on the relationship between portfolio choice and risk tolerance, we have chosen to focus on purely financial assets with values related to their risk and expected return properties. Similarly, we have ignored money kept in savings accounts because the demand for savings accounts may be linked to liquidity concerns. This leaves us with three categories of financial assets, which we have labeled TBILLS, BONDS, and STOCKS. TBILLS actually includes money in certificates of deposit, government savings bonds and Treasury Bills, while BONDS includes corporate, municipal, government, foreign bonds and bond funds. The STOCKS category includes all shares of stock in publicly held corporations, mutual funds or investment trusts.

From these three categories, we created the dependent variable TBILL1, as well as two other variables STOCK1 and BOND1 for additional regressions. Each variable is the ratio of the amount an individual investor holds of that asset type to an individual's total of the three asset groups. More specifically, if T_i denotes the wealth person i has invested in Treasury Bills while S_i is wealth in stock and B_i is wealth in bonds, then TBILL1 = $T_i/(S_i + B_i + T_i)$. Similarly, STOCK1 = $S_i/(S_i + B_i + T_i)$ and BOND1 = $B_i/(S_i + B_i + T_i)$. The dependent variable, TBILL1, in Eq. (2) can be replaced by either STOCK1 or BOND1 to explore the determinants of these ratios.

While the regression described in Eq. (2) allows us to test the CAPM's predictions concerning allocation of assets between risky and risk-free assets, we also wish to investigate the effect of risk tolerance on the composition of the risky portfolio. Broadly, the CAPM suggests that risk tolerance will not have any effect on the percentage of risky assets allocated to stocks as opposed to bonds. The informal Wall Street wisdom cited in the paper's introduction suggests that risk tolerant people should select more stock relative to bonds than their risk averse brethren. To test this, we specify a linear regression similar to Eq. (2) with the fraction of risky assets devoted to bonds, BOND2 = $B_i/(S_i + B_i)$, as the dependent variable:

$$BOND2 = \gamma_0 + \gamma_1 RISK + \gamma_2 EDUC + \sum_{i=3}^{I} \gamma_i X_i + u. \tag{3}$$

Wall Street predicts $\gamma_1 < 0$ while the CAPM predicts $\gamma_1 = 0$. If the determinants of high risk versus low risk allocations within the risky portfolio are similar to the determinants of risky versus risk-free assets, then the estimated Eq. (3) should look very much like Eq. (2).

4. Results

The regression results reported in Table 2 are broadly consistent with the predictions of the CAPM that (1) increased tolerance for risk causes CAPM investors to alter the percentage of assets held in the risky portfolio as opposed to the risk-free asset, and (2) the composition of stocks and bonds held in the risky portfolio should not change as risk tolerance changes. Regression (I) in Table 2 estimates Eq. (2), while regressions (II) and (III) replace the TBILL1 dependent variable with STOCK1 and BOND1, respectively, to show the effect of our regressors on these other assets. The coefficient for RISK in regression (I) is negative and highly significant whereas it is positive and highly significant in regression (II). This result

Table 2
Regression results

	(I) TBILL1	(II) STOCK1	(III) BOND1	(IV) BOND2
RISK	−0.0202822*	0.0176538*	0.0026284	0.0006723
	0.0081	0.0080	0.0033	0.0053
	0.012	0.028	0.431	0.899
EXINFL	0.0010041	−0.0018642	0.0008601	0.0019292
	0.0042	0.0042	0.0018	0.0028
	0.813	0.659	0.624	0.496
EXDEPR	0.0101191*	−0.0083302*	−0.0017888	−0.0000649
	0.0040	0.0039	0.0016	0.0026
	0.011	0.035	0.275	0.980
AGE	0.0010009	−0.0026679	0.001667	0.0044584*
	0.0028	0.0027	0.0011	0.0018
	0.716	0.331	0.144	0.014
MALE	−0.0642129*	0.0718902*	−0.0076773	−0.0212092
	0.0190	0.0189	0.0079	0.0129
	0.001	<0.001	0.329	0.100
EDUC	−0.033231*	0.0282265*	0.0050045*	0.0022464
	0.0037	0.0037	0.0015	0.0026
	<0.001	<0.001	0.001	0.384
MARRIED	−0.0225661	0.0204705	0.0020956	−0.021743
	0.0237	0.0236	0.0098	0.0162
	0.342	0.387	0.831	0.181
PLAN10	−0.0151819	0.019999	−0.0048171	−0.0051516
	0.0283	0.0282	0.0117	0.0179
	0.591	0.478	0.681	0.774
NOPLDAT	0.0298024	−0.0418523	0.0120499	0.0041397
	0.0933	0.0929	0.0386	0.0608
	0.749	0.652	0.755	0.946
INHERIT	0.0128339*	−0.0118426	−0.0009914	−0.0001546
	0.0066	0.0065	0.0027	0.0044
	0.050	0.070	0.715	0.972
NOINHDAT	−0.1567533	0.1056201	0.0511332	0.0328997
	0.1022	0.1019	0.0423	0.0604
	0.125	0.300	0.227	0.586
NETWORTH	−8.50E-08*	6.32E-08*	2.17E-08*	1.85E-08*
	1.47E-08	1.47E-08	6.10E-09	8.38E-09
	<0.001	<0.001	<0.001	0.027
CONSTANT	0.8209468*	0.2838376	−0.1047844	−0.1721026
	0.1720	0.1714	0.0712	0.1150
	<0.001	0.098	0.141	0.135
Number of Observations	2577	2577	2577	1812
R-Squared	0.0785	0.0601	0.0141	0.0102

Each table entry contains the coefficient, standard error, and p-value for the associated regressor. The top row lists the dependent variable and a regression number. Independent variables are listed in the first column.

* Significant at the 95% level.

confirms the work of Schooley and Worden (1996) that, as the CAPM predicts, risk-tolerant individuals are more likely to choose a smaller proportion of risk-free assets.

The expectation variables perform broadly as anticipated. Individuals expecting a major depression are significantly more inclined to invest in Treasury Bills; the EXDEPR coefficients are positive in regression (I), and negative in regression (II). Consistent with Schooley and Worden, individuals who were less likely to leave an inheritance (i.e., higher values of INHERIT) used less stock and more T-Bills. Individuals whose planning horizon was 10 years or more did tend to use more stock; the coefficients on the PLAN10 dummy variable are positive in regression (II), negative in regression (I), although they are not statistically significant. The probability of high inflation, EXINFL, is the least significant among the expectation variables. This implies that people who expected double-digit inflation did not alter their portfolio composition. This last result may merely reflect the fact that when inflationary expectations are high generally nominal interest rates rise leaving individual investors with no strong preference between stocks and bonds.

Demographic variables other than AGE are highly significant. EDUC is highly significant suggesting that educated people allocate more of their wealth to the risky assets, perhaps because they are better at understanding the risks associated with these assets (Tversky & Kahneman, 1986). Married males are much less likely to invest in risk-free Treasury Bills than are their single-female counterparts. The gender difference is especially interesting in light of the work by Bajtelsmit et al. (1999) which suggests women accumulate fewer assets in retirement due to lower risk tolerance than males. According to our regression (I), even after controlling for differences in a person's tolerance for risk, women are more likely to invest in risk-free securities, such as Treasury Bills, than males. Apparently there are taste and/or opportunity differences between the genders beyond risk tolerance that are important determinants of portfolio composition.

Our measure of wealth, NETWORTH, is highly significant in all the regressions. However, the magnitude of the coefficients on NETWORTH is very small. It is possible that much of the effect of NETWORTH is actually captured by other variables, particularly RISK and EDUC. When NETWORTH is excluded from these regressions none of the other coefficients is changed indicating perhaps that the above statement has some validity. In addition, some of the components of NETWORTH such as the value of physical property, cars and business may be corrupting the results, because they are not truly exogenous.

Our somewhat short list of explanatory variables and our inability to measure accurately taste and time preference differences may explain the small values for R^2 in our regressions. The focus for our study, however, is the role of differences in risk tolerance and our results do validate our hypothesis. Perhaps utilizing the later waves of data and their longitudinal nature will improve the explanatory power of these regressions and is a topic for future study.

Regression (IV) in Table 2 presents our estimates of Eq. (3) and the hypothesis that the composition of stocks and bonds held in the risky portfolio should not change as risk tolerance changes. The pattern of variables determining the portion of risky assets devoted to low-risk low-return vehicles is very different from the determinants of their zero-risk counterparts. Risk-tolerant investors are no less likely to choose bonds than stocks. This refutes the Wall Street intuition and supports the CAPM. In fact, the only highly significant right side variables in regression (IV) are AGE and NETWORTH. This suggests that casual intuition linking low-risk and no-risk securities may be inappropriate.

Table 3 presents a correlation matrix in order to address concerns about multicollinearity. We calculated variance inflation factors (VIFs) for all regressions reported. A VIF is the ratio of the actual variance of a coefficient β_i to what the variance would have been if x_i was

Table 3
Correlation matrix of right side variables

	RISK	EXINFL	EXDEPR	AGE	MALE	EDUC	MARRIED	PLAN10	NOPLDAT	INHERIT	NOINHDAT	NETWORTH
RISK	1.0000											
EXINFL	0.0191	1.0000										
EXDEPR	−0.0059	0.5291	1.0000									
AGE	−0.0603	−0.0210	−0.0142	1.0000								
MALE	0.0240	−0.0229	−0.0664	−0.0296	1.0000							
EDUC	0.0132	−0.0531	−0.1040	−0.0599	0.0953	1.0000						
MARRIED	−0.0306	−0.0574	−0.0901	−0.0023	0.2622	−0.0492	1.0000					
PLAN10	0.0123	−0.0189	−0.0318	−0.0108	0.0259	0.0629	0.0162	1.0000				
NOPLDAT	−0.0151	0.0308	0.0189	0.0378	−0.0107	−0.0610	−0.0375	−0.0412	1.0000			
INHERIT	0.0055	0.0499	0.0571	0.0009	−0.1338	−0.1327	−0.1199	−0.0643	0.0229	1.0000		
NOINHDAT	−0.0012	0.0011	0.0046	0.0138	0.0504	−0.0232	0.0318	0.0155	0.0203	−0.3135	1.0000	
NETWORTH	0.0028	−0.0517	−0.0704	0.0323	0.1136	0.1920	0.1322	0.0836	−0.0097	−0.2433	−0.0223	1.000

uncorrelated with the other x's (Judge, Hill, Griffiths, Lutkepohl & Lee, 1988). A value of 5.0 is quite often used as an indication of severe multicollinearity (Marquardt & Snee, 1975). In our case, the VIFs ranged from a minimum 1.01 to a maximum of 1.41, indicating that multicollinearity among the right-side variables in Table 2 is not a significant problem.

5. Conclusions and future research

Our regression evidence suggests that risk-tolerant individuals invest lesser amounts in Treasury Bills. To the extent that T-Bills are a reasonable approximation to the Capital Asset Pricing Model's risk-free asset, this tends to confirm the CAPM prediction that risk-tolerant investors will hold a smaller fraction of their investments in the risk-free asset. In addition, we found that the division of individual portfolios between stocks and bonds was not systematically related to our measure of risk tolerance. This is broadly consistent with the CAPM notion that risk tolerance plays no role in the composition of the risky portfolio.

Several authors, including Bajtelsmit et al. (1999), Reichenstein (1999), and Yuh, Hanna and Montalto (1999), have noted that attitude toward risk is an important determinant of asset accumulation for retirement. Increasingly, individuals are able to allocate their pension assets between stocks and bonds or are making all of the decisions on their own. If many individuals differ significantly in risk tolerance from the fund managers that traditionally performed this task, retirement preparedness will become much more variable in years to come. Our data confirm the work of Bajtelsmit et al. (1999), for example, that among people nearing retirement risk tolerance is greater for men than for women. This suggests that women will likely accumulate substantially less wealth due to a taste for low-risk, low-return assets. Research linking measures of risk-tolerance available in the *Health and Retirement Survey* and *Survey of Consumer Finances* to more generally available data such as race, gender and occupation may help predict future preparedness for retirement.

Acknowledgments

We are grateful for helpful comments from Robert Hagerman, Joseph Ogden, David Weil, two anonymous referees, and the editor, Karen Eilers Lahey. We also acknowledge summer research support for Govind Hariharan from the School of Management of the University at Buffalo.

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