Factors Related to Risk Tolerance: A Further Examination

This paper reports the findings from regression models that were developed to predict financial risk tolerance using demographic and socioeconomic factors. Using a sample of white-collar clerical workers (N = 220), it was determined that financial knowledge, income, education, ethnic background, financial solvency, number of dependents, and homeownership can be used to predict a person's financial risk tolerance.

John E. Grable, Kansas State University[1]
So-hyun Joo, Texas Tech University[2]

Financial risk tolerance, which is defined as the maximum amount of uncertainty that an individual is willing to accept when making a financial decision, impacts almost every part of economic and social life. For example, answering questions that explain consumer behavior in relation to earnings, expenditures, and savings can be enhanced by understanding and predicting individual financial risk tolerance.

Although the importance of accurately assessing financial risk tolerance is well documented, the actual practice of assessment tends to be very difficult due to the subjective nature of risk taking. However, over the past ten years several consumer and family financial economists have taken steps to better understand financial risk tolerance by building upon previous financial risk taking models. The purpose of this paper is to present research findings that expand upon recent attempts to explain and predict financial risk tolerance. Specifically, this paper reports the findings from Ordinary Least Squares regression analyses that were developed to predict financial risk tolerance using demographic and socioeconomic factors as explanatory variables.

Review of Recent Literature

Risk-tolerance literature suggests that several factors have an impact on a personal risk-taking propensities. By far, the most commonly assumed predictors of financial risk tolerance tend to be demographic in nature. For example, gender, age, marital status, income, ethnicity, and education have been hypothesized to influence financial risk tolerance (Bajtelsmit & Bernasek, 1996; Grable, in press; Grable & Joo, 1997; Grable & Lytton, 1998; Haliassos & Bertaut, 1995; Lee & Hanna, 1995; Masters, 1989; Palsson, 1996; Quattlebaum, 1988; Shaw, 1996; Sung & Hanna, 1996; Wang & Hanna, 1997; Zhong & Xiao, 1995). Socioeconomic factors, such as housing ownership, the number of dependents within a home, financial knowledge, and financial solvency also have been shown to influence financial risk tolerance (e.g., Sung & Hanna).

In general, it has been argued that (a) females are less risk tolerant than males; (b) married individuals are less risk tolerant than singles; (c) older persons are less risk tolerant than younger persons; (d) non-Whites are less risk tolerant than Whites; (e) those with low levels of income and education are less risk tolerant than others; (f) persons who rent are less risk tolerant than those who own their own home; (g) as the number of dependents increases risk tolerance decreases; (h) individuals with low levels of financial knowledge are less risk tolerant; and (i) persons with low solvency ratios tend to be less risk tolerant than those with high solvency ratios. Others have suggested that marital status combined with gender (e.g., single females, single males, and married couples) plays a role in shaping risk tolerance attitudes, with single females having lower risk tolerances than either single males or married couples (e.g., Sung & Hanna, 1996).

Although there are data to support the continued use of demographic and socioeconomic factors as predictors of financial risk tolerance, researchers have not yet obtained general consensus regarding the strength of relationships or the causal effects of relationships. The purpose of this study is to add to the growing body of knowledge regarding financial risk tolerance by testing the factors described above in regression models of risk-taking attitudes.

Methodology

Data for this study were obtained from a random sample of white-collar clerical workers from a large southwestern university in 1998 (N = 220). Survey respondents received an assessment instrument which inquired

about respondent's financial risk tolerance and other issues (e.g., financial satisfaction, financial behaviors, financial stress levels, financial knowledge, solvency levels, and demographic characteristics). The survey design, and selection of participants, was treated in accordance with the "Ethical Principles of Psychologists and Code of Conduct" (American Psychological Association, 1992).

A respondent's financial risk tolerance was determined by combining responses to four financial risk questions into a risk-tolerance index. The four questions (Table 1) were developed and adapted from previous studies (e.g., Grable, in press). Specifically, respondents answered the questions using a four point Likert-type scale, with the following options: (a) strongly agree, (b) tend to agree, (c) tend to disagree, and (d) strongly disagree. Possible risk tolerance scores ranged from 4 to 16, with higher scores representing higher levels of financial risk tolerance. The average risk-tolerance score was 8.87. The index was found to be reliable with a Cronbach's alpha of .71, which was above acceptable levels as outlined by Pedhazur and Schmelkin (1991) for attitudinal measures.

Table 1
Financial Risk-Tolerance Assessment Items

In terms of investing, safety is more important than returns.	SA 1	TA 2	TD 3	SD 4
I am more comfortable putting my money in a bank account than in the stock market.	SA 1	TA 2	TD 3	SD 4
When I think of the word "risk" the term "loss" comes to mind immediately.	SA 1	TA 2	TD 3	SD 4
Making money in stocks and bonds is based on luck.	SA 1	TA 2	TD 3	SD 4

Data Analysis

Ordinary Least Squares regression was used as the method of analysis. This method differs from previous research within the domain of financial risk tolerance which has tended to rely on statistical analysis methods that are designed to handle dependent variables that are measured at the nominal or ordinal level. For example, Grable and Lytton (1998), Sung and Hanna (1996), and Wang and Hanna (1997) used discriminant analysis, logit, and tobit, respectively, to assess financial risk tolerance using a single question, measured at the ordinal level, from the Survey of Consumer Finances. The use of ordinary least squares techniques has not been widely used because a financial risk tolerance measure that is reliable, valid, and continuous in measurement has not been widely available or utilized.

This analysis of the predictors of financial risk tolerance applied the risk-tolerance scale described above as the dependent variable. Again, the index provided a useful continuous financial risk tolerance assessment with a minimum possible score of four and a maximum possible score of 16. In order to examine the effects of demographics and socioeconomic characteristics on financial risk tolerance ordinary least squares regression models were developed. The models included respondents' gender, age, marital status, education, income, ethnic background, financial knowledge, housing ownership, number of dependents, and financial solvency. These variables were included because they represented similar types of variables found in the literature (e.g., Grable, in press; Sung & Hanna, 1996; Wang & Hanna, 1997). A description of the independent variables is presented in Table 2.

Table 2
Variable Definitions

Gender	Female = 1; Male = 0
Age	Actual Age
Marital Status	Married =1; Single = 0
Income	Ten Levels: Less Than $20,000 to Above $100,000
Education	Above College Degree =1, Otherwise =0
Ethnic Background	White = 1; Non-White = 0
Home Ownership	Yes = 1; No = 0
Number of Dependents	Actual Number
Financial Knowledge	Ten Levels: Lowest to Highest
Solvency Ratio	Five Levels: Would Be In Serious Debt to Would Have Money Left Over

Respondents Demographic Characteristics

The majority of respondents were female (87%). The average age of respondents was 43 years, with the largest group (31%) being in their 40s. The majority of respondents (84%) had above high school (e.g., trade, vocational training, some college, college, or graduate degree). Sixty-nine percent of respondents had household income less than $50,000, with an average income of $34,000. Approximately 64% of respondents were married. Seventy-seven percent of respondents reported being White, with the remainder (22%) indicating being either Hispanic or African American. Thirty-seven percent of respondents reported having an average level of financial knowledge, while 37% reported having above-average knowledge. Only 26% indicated that their financial knowledge was below average. Respondents also reported an average of 2.65 dependents. Finally, 66% of respondents owned their own home.

Results and Discussion

Collinearity diagnostics (not shown) were used to examine possible multicollinearity problems among the independent variables. No problems were discovered. The regression model was designed to determine which factors could be used as predictors of financial risk tolerance, holding other factors constant. Ten independent variables were included (gender, age, marital status, income, education, ethnicity, home ownership, financial knowledge, number of dependents, and financial solvency). The full model explained 24% ($F = 5.98$, $p < .001$) of the variance in financial risk tolerance. As shown in Table 3, education, income, ethnic background, financial knowledge, home ownership, the number of dependents, and financial solvency were significant predictor variables at the .05 level.

Table 3
Factors Related to Risk Tolerance: Regression Results (N=202)

Variable	b	Beta	t
Constant	6.37		6.55
Gender	-.40	-.06	-.93
Age	.02	.11	1.48
Marital Status	.47	.10	1.12
Education	1.13	.24	3.35**
Income	.21	.21	2.75**
Ethnicity	-1.20	-.22	-3.04**
Financial Knowledge	.24	.21	3.26**
Home Ownership	-.81	-.17	-2.08*
Number of Dependents	-.24	-.17	-2.11*
Financial Solvency	.34	.18	2.45*

$R^2 = .24$ $F = 5.98$**
** $p < .01$ * $p < .05$

It was determined that, holding all factors constant, important predictors of financial risk tolerance were education, a person's financial knowledge, and income. Specifically, the greater a respondent's attained education, financial knowledge, and income the greater their financial risk tolerance. It was also determined that non-White respondents tended to be more risk tolerant. A respondent's home ownership and number of dependents were found to have a negative relationship with a person's risk tolerance. Also, a respondent's solvency level was important in predicting risk tolerance, with those having higher solvency ratios being more risk tolerant.

The positive relationship between education, financial knowledge, and financial risk tolerance found in this study generally supports similar conclusions presented by Cutler (1995), Grable (in press), Grable and Joo (1997), and Haliassos and Bertaut (1995). These researchers suggested that individuals who have more knowledge of risk and risky situations tend to have a common psychological profile that allows them to undertake greater financial risks (Sung & Hanna, 1996).

Findings related to income being a good predictor of financial risk tolerance supports previous research findings. For example, Cicchetti and Dubin (1994), Lee and Hanna (1991), Riley and Chow (1992), Schooley and Worden (1996), Shaw (1996), and Sung and Hanna (1996) determined that risk tolerance varies systematically with levels of income, and that individuals with higher incomes tend to have greater financial risk tolerances. A similar

pattern involving financial solvency supports a research conclusion presented by Sung and Hanna who determined that individuals with higher levels of financial solvency, as measured by liquid assets being greater than non-investment income, were more risk tolerant than those with low levels of financial solvency.

Findings from this research varied from previous research conclusions in four significant ways. First, in this analysis respondents' number of dependents was statistically negatively significant, indicating that the more dependents a person had, the less risk tolerant that person tended to be. This contradicts a conclusion developed by Sung and Hanna (1996) who found no relationship between household size and risk tolerance. The second significant finding from this research involves age as a predictor of financial risk tolerance. Practitioners and researchers have long believed that age was negatively related to risk tolerance (e.g., Morin & Suarez, 1983; Wallach & Kogan, 1961). The results of this study suggest this assumption is not necessarily true. Holding all other factors constant, age was not a significant predictor of financial risk tolerance. This finding, while contradicting a long held belief, supports findings from other research (e.g., Grable & Joo, 1997; Grable & Lytton, 1998; Wang & Hanna, 1997). Third, findings indicating that homeowners were less risk tolerant than others was unique to this research. Fourth, the finding that suggested non-Whites were more risk tolerant than Whites contradicts findings by Haliassos and Bertaut (1995), Sung and Hanna (1996), and Zhong and Xiao (1995) who concluded that non-Whites may not be encouraged to invest in more risky investments due to cultural values, preferences, and tastes. However, this finding supports Leigh (1986) who used econometric models to conclude that non-Whites were more likely to prefer more risk than Whites.

Finally, it is interesting to note the other independent variables which were not statistically significant in predicting financial risk tolerance. For example, it was also determined that marital status and gender were not significant predictors of financial risk tolerance. These findings are important because they contradict much of the previous literature (e.g., Grable, in press; Masters, 1989; Sung & Hanna, 1996; Zhong & Xiao, 1995), suggesting that the importance of these demographic and socioeconomic characteristics as predictors of risk tolerance diminishes when factors such as financial knowledge and income are accounted for.

Due to the potential controversy surrounding the gender finding, additional analyses were conducted to further test whether gender could be used as a predictor of financial risk tolerance. Three additional regressions (not shown) were undertaken to test a conclusion presented by Sung and Hanna (1996) who determined that single women are less risk tolerant than single men. The first regression model was developed to test the combined relationship between gender and marital status on financial risk tolerance (i.e., married couples, single males, and single females). In this case, there were no differences in risk tolerance scores between and among these groups. Further, the sample was divided into two groups to examine the combined relationship between gender and marital status. In the second regression model the sample was delimited by including only single respondents. Thus, the marital status variable was removed. Again, gender was not found to be a significant predictor of financial risk tolerance when other factors were accounted for. The third regression model was delimited to include only married respondents. Yet again, gender was not found to be a significant predictor.

Implications

Three important implications are worth noting for those who are interested in the assessment and prediction of financial risk tolerance. The first important implication from this research is the impact that financial knowledge has on risk tolerance. In each regression model financial knowledge was one of the most important factors in determining a respondent's financial risk tolerance. This is good news for financial planners, counselors, educators, and consumer specialists because it indicates that financial risk tolerance may not be a fixed psychological trait. Instead, risk tolerance appears to be somewhat elastic. A study conducted by Grable and Joo (1998) who used data from a quasi-experiment designed to assess financial knowledge, attitudes, and behaviors, indicated that financial education provides an effective method for changing attitudes, especially risk tolerance. Thus, it may be possible to positively affect a person's quality of life by providing financial education, which will increase financial knowledge and risk tolerance, which, in turn, may lead to different financial and consumer choices being made.

The second important implication from this research involves the realization that not all demographics can be used to predict financial risk tolerance. For example, age was an insignificant predictor variable. In general, practitioners, educators, and researchers should consider the words of Grable and Lytton (1998) who pointed out that "instead of relying on statistically insignificant demographic factors, such as age, to differentiate among levels of risk tolerance and to classify individuals into risk-tolerance categories, financial planners, counselors, and investment managers would be better advised to use demographic variables which optimize the separation of risk tolerance" (p. 69).

The third implication to emerge from this study involves the use of demographic and socioeconomic factors

as determinants of financial risk tolerance. It is important to note that these factors only explain a small amount of variance in a person's financial risk-tolerance profile. Findings from this study are in line with reported coefficients of determinants in the literature which suggest that demographics and socioeconomic characteristic explain less than 30% of a person's risk taking propensities. However, industry has typically used these type of factors as critical predictors of risk tolerance. Further, financial services practitioners often assume that one factor alone (e.g., age or gender) can be used as a reliable predictor. This assumption is based on a bivariate relationship between risk tolerance and demographic predictors. Findings from this research suggest that when other factors such as financial knowledge, financial solvency, and number of dependents are included in a model to predict financial risk tolerance, factors such as age and gender become less effective predictors.

As is the case with most research that attempts to test relationships between and among financial risk tolerance and determining variables, such as demographic and socioeconomic factors, this research presents additional questions that still need to be addressed. For example, are there other theoretically plausible determinants of financial risk tolerance that should be included in a comprehensive model of risk-taking attitudes? Are results based on this sample (i.e., racially diverse but homogeneous in occupation) representative of results that would be obtained from a different population? These, and other, questions can only be answered through additional research endeavors. It is recommended and hoped that researchers and educators who are interested in this vital topic will continue to push the envelope of knowledge wider so that a comprehensive understanding of the determinants of financial risk tolerance can one day be obtained.

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Endnotes

[1] Assistant Professor, College of Human Ecology

[2] Visiting Assistant Professor, Department of Merchandising, Environmental Design, and Consumer Economics