A Cross-Disciplinary Examination of Financial Risk Tolerance

This study, among the first to combine demographic, socioeconomic, and psychological factors into a single model of financial risk tolerance, indicated that many assumed relationships between predicting factors and financial risk tolerance may not be as strong as previously thought. Using a sample of 242 college-aged students it was determined that, holding other factors constant, locus of control, financial knowledge, and gender were significant predictors of risk tolerance.

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What accounts for an individual's choice of action when faced with a risky financial situation? According to Roszkowski (1996) and others (e.g., Goodall & Corney, 1990), various factors contribute to one's attitude towards risk-taking choices. The literature suggests that a person's biological makeup, demographic and socioeconomic profile, and psychological constructs are of primary importance when answering this question (Horvath & Zuckerman, 1993).

Until quite recently the study and assessment of financial risk tolerance was fragmented according to the professional discipline conducting the research. For example, financial services researchers and family and consumer economists tended to rely on socioeconomic and demographic factors as predictors of financial risk tolerance, while psychologists tended to rely on psychologically based predictors (e.g., locus of control and personality type). This fragmentation of research strategies resulted in different academic professions studying the same phenomenon using different methodologies and predictors (e.g., Breivik, 1996; Carducci & Wong, 1998). The research presented in this paper was designed to bridge this fragmentation. Thus, the purpose of the research presented in this paper was to examine financial risk tolerance using a combination of demographic, socioeconomic, and psychological factors. Results from this study add to the existing body of knowledge by clarifying assumed relationships between the construct of financial risk tolerance and predisposing risk-tolerance factors.

Previous Studies

Grable and Joo (1999) presented a comprehensive overview of common demographic and socioeconomic factors that are currently used by practitioners and researchers when assessing and predicting individual financial risk tolerance. According to Grable and Joo, the following conclusions have generally been put forth as true in relation to factors that have a predisposing influence of a person's financial risk tolerance: (a) Females are less risk tolerant than males; (b) Younger persons are more risk tolerant than older persons; (c) Singles are more risk tolerant than married persons; (d) Higher income is associated with higher risk tolerance; (e) Non-Caucasian/Whites are less risk tolerant than Caucasians/Whites; (f) Greater economic expectations are associated with higher risk tolerance; (g) Increased personal finance knowledge is associated with higher risk tolerance.

Grable and Joo (1999) used the findings presented above as the basis for research questions in their exploratory risk-assessment study. They concluded that, holding all other factors constant, (a) financial knowledge and education were positively associated with risk tolerance; (b) the greater a respondent's financial knowledge and income, the greater their financial risk tolerance; and (c) non-Caucasian/Whites tended to be more risk tolerant than others. Findings presented by Grable and Joo confirmed what others have generally reported (e.g., Haliassos & Bertaut, 1995; Powell & Ansic, 1997; Sung & Hanna, 1996; Cicchetti & Dubin, 1994).

Outside the domain of financial services and family and consumer economics research, the psychology profession has attempted to predict financial risk tolerance using factors such as a person's attitudes about money, locus of control, and birth order. The following briefly describes these types of previous studies.

Beginning in the 1960s personality psychologists began to examine relationships between and among self-esteem, sensation seeking, locus of control, and financial risk tolerance (Liverant & Scodel, 1960). For example, it has been hypothesized that (a) individuals with low levels of self-esteem are more risk averse than others, and (b) individuals with a predominately high external locus of control are more aggressive when making risky financial

choices. According to Liverant and Scodel, externally controlled persons are conceptualized as making risk choices based on previous experiences and hunches, whereas an internally controlled person makes risk choices through cautious and planned strategies. Carducci and Wong (1991, 1998) exemplify research conducted in the personality psychology profession. In general, Carducci and Wong and others (e.g., Zuckerman, 1983) have concluded that significant differences in risk-taking attitudes and behaviors can be attributed, at least in part, to psychological factors.

Birth order is another psychology-based factor associated with financial risk tolerance. Roszkowski (1996) noted that birth order appears to be related to risk taking. Firstborn and only children tend to be less willing to take risks than later born children in the same family. Roszkowski explained the phenomena as follows: "Parents exert greater control over the early life of the firstborn child and instill in him or her the need to be dependable and act responsibly. To the child, this means not taking unnecessary chances" (p. 167). Sulloway (1997) also found that older children are less willing to accept high risks compared to younger siblings.

In summary, few studies have combined demographic, socioeconomic, and psychological variables when testing financial risk-tolerance heuristics. This fragmented approach to the measurement, assessment, and testing of financial risk tolerance has often led to inconsistent and controversial findings, both in the family and consumer economics profession and in the psychology profession. As this brief review of previous studies suggests, more multidimensional and cross-disciplinary research is needed to fully understand and predict financial risk tolerance.

Methodology

A convenience sample of 250 college students from a large university in the southwest United States was chosen to receive a survey of financial attitudes and behaviors. Questionnaires were distributed to classes offered in the College of Human Sciences. Classes were selected randomly. From the total of 250 questionnaires that were distributed during March and April of 1999, 242 were returned. The survey instrument included risk tolerance, locus of control, money ethics, and financial knowledge assessments, as well as queries regarding demographic and socioeconomic characteristics, other personal finance attitudes, and financial behaviors.

Dependent Variable

Financial risk tolerance scores, from a risk-tolerance measure, were used as the dependent variable in this research. The development of the measure was based on an agreement scale design process as described by Henerson, Morris, and Fitz-Gibbon (1987). The process began by accumulating a large number of statements and assessment items related to financial risk taking (e.g., Bernstein, 1993; Epstein & Garfield, 1992; Goldberg, 1995; Grable & Joo, 1999; Mellan, 1994; Pring, 1993; Rowland, 1996). Items that were multiple choice response questions were converted to Likert-type agreement scale items. A pilot study using these items was conducted using undergraduate and graduate students at a university. Based on the pilot study, scores for each respondent were developed by totaling the points corresponding to response choices. The sample was then split into high and low scorers. An item analysis was conducted to ensure that respondents who generally scored highly or lowly on one question did so on others. Items that had weak consistency or great variability were removed.

A survey, using items from the first pilot study, was then administered to 500 staff members from a university. Results were used to conduct a further item analysis. It was determined that several items worked to measure the attitude of financial risk tolerance, which is defined as the maximum amount of uncertainty someone is willing to take when making a risky choice. Based on feedback from several item judges, including financial planning and counseling practitioners and personal finance instructors, and a reliability analysis, items that did not add to the statistical integrity of the instrument were removed.

The measurement, consisting of five items, as shown in Table 1, was scored using a four-point Likert-type scale with the possible choices of: Strongly agree, tend to agree, tend to disagree, and strongly disagree. Strongly agree items indicated a strong aversion to risk and were therefore coded as 1; the other choices were scored as 2, 3, or 4, respectively, with higher scores indicating greater risk tolerance. The dependent variable was calculated by summing respondent choice scores for the five items. Higher scores were interpreted to indicate a higher financial risk tolerance, while lower scores were interpreted to mean a lower risk tolerance. The average score was 12.93, with a standard deviation of 2.71. The items, when combined into a risk-tolerance assessment index, were reliable, with a Cronbach's alpha of .77.

Independent Variables

Eleven independent variables were used as possible predictors of financial risk tolerance. A respondent's actual age, measured as a continuous variable, was used. Respondents were coded as 1 if male and 0 if female. Marital status was dummy coded. Those who were not married, including never married respondents and those living with a significant other, were coded as 1; married individuals, were coded as 0. Income was dummy coded; those who had personal annual gross income more than $4,000 was coded 1, otherwise 0. Racial and ethnic background was dummy coded due to insufficient numbers of non-Caucasian/Whites. Caucasian/Whites were coded as 1, while non-Caucasians/Whites were coded as 0; this later category included African Americans, Hispanics, Native Americans, and Asian and Pacific Islanders.

Table 1
Risk-Tolerance Assessment Items (N = 242).

Item	Mean	SD
Investing is too difficult to understand.	2.36	.84
I am more comfortable putting my money in a bank account than in the stock market.	2.39	.65
When I think of the word "risk" the term "loss" comes to mind immediately.	2.47	.73
Making money in stocks and bonds is based on luck.	2.81	.83
In terms of investing, safety is more important than returns.	2.92	.72
INDEX	12.93	2.71

Economic expectations were measured by asking respondents if they thought the economy would perform (1) better, (2) about the same, or (3) worse over the next five years. Financial knowledge was assessed using the ten true or false items presented in Table 2. Respondent scores were summed, and the resulting index was used as a continuous variable in the analysis. Birth order was measured by asking respondents if they had siblings, and depending on the answer, if they were the first child or a younger sibling in the same family. First children (including only children) were coded as 1; others were coded as 0.

The Money Ethic Scale used in this study consisted of 10 items as originally developed by Tang (1995). The scale was used to assess a respondent's psychological relationship with money. Examples of items included: (a) "Money is a symbol of success," (b) "Money represents one's achievement," and (c) "I value money very highly." Money ethic scores were developed from respondent choices to four-point Likert-type choices, ranging from strongly agree – coded as 1, to strongly disagree – coded as 4. After reverse coding procedures, high scores indicated that a respondent had a high level of appreciation and desire for money. A low score represented someone with a repressed or disdainful feeling towards money.

Table 2
Financial Knowledge Assessment Items.

1. If you thought someone who loaned you money was not fair, you would ask the credit union for help.
2. Both employees and employers pay into Social Security.
3. Higher insurance deductibles lead to lower insurance costs.
4. The best way to reduce financial risk is to diversify.
5. The interest rate charged on major credit cards, like Visa, is set by state governments.
6. It would take about 3 years to repay a $2,000 balance on a credit card charging 18% interest, if only the minimum monthly payment is made.
7. A stock is an interest bearing security that pays interest at the discretion of a board of directors.
8. A mutual fund is an investment company that raises money from shareholders and invests in securities.
9. Over 20 years, you are more likely to make money than lose money in the stock market.
10. During times of inflation it is more expensive to borrow money.
Financial Knowledge Index: $\underline{X}$ = 6.89, SD = 1.63

Locus of control questions used in the analysis were ones originally proposed by Lavenson (1973). Although the origin of these items is relatively non-recent, the historical reliability and validity of the items made their use particularly attractive in this study. Respondents were asked to respond to internal and external locus of control items using four-point Likert-type response choices, ranging strongly agree (assigned 4) to strongly disagree

(assigned 1). The locus of control index was created by summing responses to each item. Thus, the locus of control variable was considered continuous. Examples of locus of control items included: (a) "I am unusually able to protect my personal interests;" (b) "When I make plans, I am almost certain to make them work;" and (c) "When I get what I want, it's usually because I worked hard for it."

Data Analysis

An ordinary least squares regression analysis was used to test the statistical significance of each of the independent variables, holding other factors constant, as factors affecting financial risk tolerance, and to determine the amount of explained variance in the model. Note that preliminary tests showed no age curvilinear effects or interaction effects of gender on the psychological constructs (i.e., locus of control and money ethics). Other data analysis procedures included calculating descriptive statistics and alpha index scores.

Findings

The demographic profile of the sample was similar to that of samples used throughout the psychological and sociological literature that rely on student populations (e.g., Carducci & Wong, 1998). Table 3 summarizes the demographic characteristics of the sample. Table 4 summarizes findings from the regression analysis. Overall, the model explained approximately 24% of respondents' financial risk tolerance. Three variables were found to be significant at the .05 or less level. These significant predictors of financial risk tolerance included gender, financial knowledge, and locus of control. In terms of importance, the variables were ordered as follows: (1) locus of control, (2) financial knowledge, and (3) gender. Specifically, respondents with an internal locus of control (i.e., those who felt as if they controlled events in their lives) were more risk tolerant than others. Individuals who scored higher on the financial knowledge quiz also had higher risk-tolerance scores than those who scored lower on the quiz, and men tended to be more risk tolerant than women.

Table 3
Demographic and Attitudinal Profile of Sample (N = 242).

Characteristic	Number or Mean	Percent
Age	21.42 Years	n.a.
Gender		
Male	104	43%
Female	138	57%
Marital Status		
Married	32	13%
Single or Other	210	87%
Income	$4,920	n.a.
Ethnic or Racial Background		
Caucasian/White	210	87%
Non-Caucasian/White	32	13%
Housing Status		
On Campus Student	51	21%
Off Campus Student	191	79%
Economic Expectations		
Better Over Next 5 Years	72	30%
About the Same or Worse	170	70%
Birth Order		
First, Oldest, or Only Child	89	37%
Second or Later Born	153	63%

Almost of equal importance in this study was the identification of variables that were not significant predictors of financial risk tolerance. Other than gender, none of the demographic or socioeconomic variables were effective predictors of financial risk tolerance in this study. Economic expectations, although hypothesized to have a positive relationship with risk tolerance, also was found to be not significant. Although Tang's (1995) short money ethic scale showed theoretical potential as a possible predictor of financial risk tolerance, this psychologically based factor was not significant. Birth order was also not significant.

Discussion

When making specific suggestions for further study, Grable and Joo (1999) recommended that researchers include multiple theoretically and empirically based factors in predictive models of financial risk tolerance. They noted that in studies that have found statistically significant relationships between demographic and socioeconomic factors and financial risk tolerance the amount of explained variance is usually relatively low. They concluded that other factors might play an important role in predicting a person's financial risk tolerance; they hypothesized that if other factors, such as psychological constructs, were combined with traditional predictor factors (e.g., gender and age) into a prediction model, the effect of demographic and socioeconomic factors may diminish. The results of this exploratory study tend to confirm their assertion.

Gender was the only statistically significant demographic variable in the regression model. Men tended to be more risk tolerant than women. Other commonly assumed demographic and socioeconomic variables were not statistically significant predictors. For example, age, the most widely used predictor of financial risk tolerance among practitioners (Roszkowski, 1996), was not an effective predictor in this study. One might assume that this was the result of using a homogenous sample; however, this assumption is not totally accurate. The age of respondents in the sample ranged from 18 to 47 years, with a standard deviation of 3.57 years. In fact, the findings from this study generally confirm what others have recently reported in the literature, namely, that there is little statistical significance in the relationship between age and risk tolerance (Cutler, 1995; Grable & Joo, 1999; Wang & Hanna, 1997).

Table 4
Regression Results for Financial Risk Tolerance.

Variable	b	Beta	T	Sig.
Age	.050	.067	.927	.355
Gender	1.165	.212	3.463	.000
Marital Status	.715	.089	1.206	.229
Income	.509	.089	1.360	.175
Racial/Ethnic	.369	.048	.760	.448
Housing	-.642	-.098	-1.432	.154
Financial Knowledge	.479	.277	4.341	.000
Economic Expectations	.017	.003	.049	.961
Money Ethics	.034	.059	.927	.355
Locus of Control	.180	.282	4.412	.000
Birth Order	.176	.032	.507	.613
Constant	-1.460		-.539	.590

$F = 5.937$ $p < .000$ $R^2 = .24$

The finding that showed locus of control being the most significant predictor of financial risk tolerance generally supports conclusions presented in the psychological literature (e.g., Carducci & Wong, 1991, 1998). In other words, there appears to be a general psychological profile of persons willing to take financial risks as compared to persons less willing to take financial risks. In this study, individuals who felt that they possessed the skills and attributes to control their own destiny tended to be more risk tolerant than others.

The finding related to financial knowledge may be surprising to some practitioners and researchers. In the past, financial knowledge has been found to be a reliable and statistically significant predictor of risk tolerance; however, one criticism of these previous studies was their reliance on a single self-assessment item of financial knowledge. Critics argued that a self-assessment measure could not be used reliably as a valid measure of personal finance knowledge. Results from this study help address this criticism. Just as in early studies, respondents who scored highly (i.e., more knowledgeable about basic personal finance issues) tended to be more risk tolerant.

Limitations and Recommendations

One potential limitation of this study involves the sample. Readers are cautioned to note that the lack of statistical significance of many demographic and socioeconomic variables in this study may be the result of small variations in the categorical nature of the variables. A more heterogeneous sample may produce different results.

Ideally, when conducting experiments or surveys in the assessment of risk-tolerance attitudes it is best to use a demographically diverse sample that is likely to make risky financial decisions. Although the sample used in this analysis is acknowledged to be potentially limiting when making generalizations, the sample is, on the other hand, useful in several respects. First, because of the exploratory nature of this study, the sample provides a good starting point in the multidimensional and cross-disciplinary examination of financial risk tolerance. Second, the sample offers enough demographic diversity to draw general conclusions, and third, because the sample is similar to ones used in other studies published in the psychology and social sciences literature, comparisons to this literature are more easily made.

Researchers are encouraged to expand on the methodologies, theoretical constructs, and empirical rationale presented in this paper. Specifically, additional surveys, which include demographic, socioeconomic, and psychological factors, should be developed based on different sample frames. Future research must take steps to combine different theoretically based predictors of financial risk tolerance into models. Factors that should be included, based on the results of this study, include locus of control, financial knowledge, and gender. Other constructs, such as money ethics, sensation seeking, self-esteem, and other psychologically based measures should be included in future research. Only be expanding current investigative strategies and approaches, and by continually questioning and testing commonly used heuristics, can the accurate assessment of financial risk tolerance move forward.

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Endnotes

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