AN EMPIRICAL INVESTIGATION FOR DETERMINING OF THE RELATION BETWEEN PERSONAL FINANCIAL RISK TOLERANCE AND DEMOGRAPHIC CHARACTERISTIC

Assist. Prof. Dr. Adem ANBAR, Uludag University Faculty of Economics and Administrative Sciences, Departman of Business Administration, Accounting and Finance, aadem@uludag.edu.tr

Yrd. Doç. Dr. Melek EKER, Uludag University Faculty of Economics and Administrative Sciences, Departman of Business Administration, Accounting and Finance, melekeker@uludag.edu.tr

ABSTRACT

Financial risk tolerance is one of the key elements that should be considered in making investment decisions for both investment managers and investors. According to its importance, understanding and measuring of financial risk tolerance is not a simple topic. Therefore measuring of financial risk tolerance and determining of the factors that affect financial risk perceptions of individual investors have been interest of research and discussion for long yerars. The purpose of this study was to investigate the relationship between financial risk tolerance and demographic characteristics such as age, gender, marital status, number of children, income and total net assets. In the analysis of data from nearly 1,100 university students, logistic regression analysis, and t-test and ANOVA analysis were used. Logistic regression analysis indicated that gender, department and working in a job were significant predictors of financial risk tolerance. Results of t-test and ANOVA analysis indicated that gender, department, working in a job, monthly personal income, monthly family's total income and total net assets were significant in differentiating individuals into risk tolerance levels, although age, marital status and number of children had no significant effect on financial risk tolerance.

Keywords: Financial risk, Risk aversion, Financial risk tolerance, Demographic characterictics.

1. INTRODUCTION

An individual's financial risk tolerance is playing an important role in making financial decisions and in achieving financial goals. Therefore, individual financial risk tolerance is assumed to be a primary determinant of choice behavior in an investment situation such as asset allocation, retirement plans, insurance and wealth accumulation (Bailey and Kinerson, 2005: 26; Grable and Lytton, 2001: 43; Hanna et al., 2001: 53). A modern investment decision making model has four fundemantal inputs for developing of financial and investment plans. These inputs are (a) goals, (b), time horizon, (c) financial stability and (d) financial risk tolerance (Grable and Lytton, 1998: 61). The first three inputs tend to be objective and relatively easy to measure. However risk tolerance is one of the more misunderstood principles of investing and it is a complex psychological concept. Each investor has his or her own tolerance of and attitude toward risk, so that an investment considered "high risk" by one investor may be considered "low risk" by another investor. Assigning investors to their appropriate risk tolerance category and thereby suggesting the most suitable investment portfolios to them is an essential task of investment managers and advisors. If an investment manager is aware of their clients risk tolerance level, she/he can be incorporated this information in to the selection of the right portfolio (Hanna and Lindamood, 2004: 27; Roszkowski and Grable, 2005a: 181). Investment manager who ignores risk tolerance is unlikely to implement plans or meet objectives. Hence, measurement and understanding of financial risk tolerance has been of interest to investment managers and researchers in recent years.

Financial risk tolerance (FRT) refers to an investor's attitude towards risk and it can be defined as the amount of uncertainty or investment return volatility that an investor is willing to accept when making a financial decision (Faff, 2008: 2; Grable, 2000:25; Grable and Lytton, 1999b: 1; Hallahan et al., 2003: 483). Financial risk tolerance shows the willingness to take financial risk. Mathematically, financial risk tolerance is the reciprocal of risk aversion. Risk aversion can be defined as a preference for maintaining a certain level of consumption over uncertain consumption even if the expected value of the uncertain consumption exceeds that of the level of certain wealth (Finke and Huston, 2003: 234). Risk aversion shows the unwillingness to incur risk. Investors who are more (less) risk averse will have a lower (higher) financial risk tolerance. There is a positive relationship between expected return and risk aversion, because investors expect higher return for taking risk. Therefore, risk aversion is reflected on a risk premium, which consists of an expected extra return that investors require to be compensated for the risk of holding financial assets. There is an assumption that people are generally risk-averse, but it is also clear that individuals vary considerably in the degree of financial risk that they are willing to incur (Corter and Chen, 2006: 369).

Although the importance of financial risk tolerance, measuring someone's level of risk tolerance is a difficult process, because financial risk tolerance is a complex attitude. In other words, risk tolerance is an attitude that is made up of

a balance of different components (Callan and Johnson, 1999: 3). Financial risk tolerance can be measured using several techniques. There are three main methods for measuring/assessing financial risk tolerance or risk aversion in literature: (a) assessing actual behavior (for example, portfolio allocations may be used to infer attitudes to risk), (b) asking about investment choices, (c) asking a combination of investment and subjective questions, and (d) asking hypothetical questions with carefully specified scenarios (Faff et al., 2008: 1; Hallahan et al., 2004: 59; Hanna et al., 2001: 53; Roszkowski and Grable, 2005b: 30; Wang and Hanna, 2007: 3). The commonly-used technique is experimental questionnaire which consists of questions about hypothetical scenarios and/or investment choices. In this method, investors are asked to complete a questionnaire for gathering information about risk attitude and perception of investors through a series of questions. Answers to each question have different weights or points, which is then summed and a financial risk score is obtained. This score can be used to assign investors to their specific risk tolerance category ranging from conservative (low risk) to aggressive (high risk) (Venter, 2006: 2). An investor's financial risk tolerance can be measured accurately by a questionnaire, but the questionnaire should be developed in accordance with psychometric principles (Roszkowski et al., 2005: 66).

An investor's risk tolerance is not static and it can change over time. When demographic and economic factors related to investor change, the investor's position on the risk-reward spectrum will also change (Bertaut, 1998: 263; Grable et al., 2006: 72; Yao et al., 2004: 249). For this reason investment managers should periodically reassess their clients' risk tolerance.

As noted before, financial risk tolerance is a complex attitude. A lot of factors can contribute to one's attitude towards risk-taking choices. Investment managers and researchers have long been interested in answering the question "what factors influence the financial risk perception of individuals?". The literature suggests that a person's biological makeup, demographic and socioeconomic profile, personality type and psychological constructs are of primary importance when answering this question (Cesarini et al., 2008: 2; Filbeck et al., 2005: 177; Grable and Joo, 2000; Mayfield et al., 2008: 231; Schooley and Worden, 1996: 87). The demographic characterictics are the most widely investigated determinant of financial risk tolerance. Also there is general consensus among investment managers and researchers that demographics can be used to both differentiate among levels of investor risk tolerance and classify investors into risk-tolerance categories. But, there are still some unresolved questions with respect to the determinants of risk tolerance. The purpose of this study is to investigate the relationship between demographic characteristics and financial risk tolerance. Results from this study can extend the existing literature by clarifying relationship between financial risk tolerance and the demographic variables such as gender, age, marital status, children number, income and total net asset.

The remainder of this study is structured as follows. First, it reviews the extant literature relevant to financial risk tolerance and demographic characterictics. This is followed by a description of the research methodology. Next, the findings are presented. Finally, the paper concludes with a summary of the study, limitations and directions for future research.

2. LITERATURE REVIEW

A number of studies have been conducted to investigate how financial risk tolerance is affected by the individual demographics, such as, gender, age, marital status, education, income, etc. One of the demographic characteristics which is widely used demographic factor for differentiation and classification purposes is age. It is generally assumed that individuals prefer to take fewer financial risks as they age. The belief behind this view is that older investors have less time to recover from potential losses incurred with risky investments (Grable and Lytton, 1998: 64; Jianakoplos and Bernasek, 2006: 981). There is also some suggestion that biological changes in enzymes due to the aging process may be responsible (Hallahan et al., 2004: 58). However, the results of empirical studies examining the relationship between risk tolerance and age are inconclusive. Finke and Huston (2003: 234) and Jianakoplos and Bernasek (2006: 981) found that financial risk tolerance decreased with age (negative relationship)[1]. Wang and Hanna (1997: 27) and Grable (2000: 61) found that risk tolerance increased with age (positive relationship). The relationship between age and risk tolerance may not be linear. Hallahan, Faff and McKenzie (2003: 499), Grable et al. (2006: 72) and Faff et al. (2008: 21) found that there was a negative but non-linear relationship between age and risk tolerance. In other words, risk tolerance declines with age until a certain point and then risk tolerance begins to rise again with age. Additionally, there are several studies that have found no relationship between age and risk tolerance (Grable and Lytton, 1998: 69; Grable and Lytton, 1999b: 3).

A second demographic factor that is frequently argued to determine risk tolerance is gender. In general, it is assumed that women tend to appear to be more conservative and more risk averse than men. One explanation for gender differences in risk taking is based on biological and evolutionary factors. Because of women's unique role as child bearers and mothers and having higher levels of the enzyme monoamine oxidase which retards sensation seeking, women are less sensation seeking and more averse to ambiguous situations. Other explanations have focused on economic and social factors such as income, working career, wealth and level of financial knowledge (Bajtelsmit and Bernasek, 1996: 5; Chaulk et al., 2003: 259; Jianakoplos and Bernasek, 1998: 630; Lugovskyy and Grossman, 2007: 2; Olsen and Cox, 2001: 29; Venter, 2006: 13). The majority of the studies[2] examining the relationship between gender and risk tolerance such as Bajtelsmit and Bernasek (1996: 4), Faff (2008: 21), Grable (2000: 61), Grable and Lytton (1998: 68), and Yao and Hanna (2004: 123) have found that women are more risk averse than men, however, some studies such as Embrey and Fox (1997: 33), Grable and Lytton

(1999b: 7), and Sundén and Surette (1998: 207) have indicated that gender is not a significant determinant of financial risk tolerance.

Another factor that seems to influence risk tolerance is an individual's marital status. It is assumed that single individuals are more risk tolerant than married individuals, because they have less responsibilities than married people, particularly in respect to dependents, and face less social risk, which is defined as the potential loss of esteem in the eyes of colleagues and peers, when undertaking risky investments (Grable and Lytton, 1998: 65). Hallahan et al., (2004: 71), Grable and Joo (2004: 78), and Yao and Hanna (2004: 123) found support for the notion that single individuals are more risk tolerant than married individuals2. On the other hand, it has also been suggested that married individuals have greater risk taking propensities, because shared income and double human capital of married individuals may encourage them to invest in riskier assets. Grable (2000: 61), Hallahan et al., (2003: 485), Venter (2006: 16) and Watson and McNaughton (2007: 54) found that married investors were more risk tolerant than singles. In a number of studies, marital status was not found to be significant determinants of an individual's attitude towards risk (Grable et. al., 2006: 72; Grable and Lytton, 1999b: 7; Hallahan et al., 2003: 499; Masters, 1989: 151; Sundén and Surette, 1998: 207).

Number of children has also been postulated to impact on financial risk tolerance, like marital status. In discussing the effects of children on risk tolerance, the general belief is that individuals with children are less risk tolerant than childless individuals, because individuals with children need more resources for meeting basic "survival needs" and they reduce resources available for risky investments (Chaulk et al., 2003: 260). Also, individuals who have children require certainty in their returns on investments, so the need for financial security through lower risk investments increases with family size (Venter, 2006: 17). Riley and Russon (1995: 69), Jianakoplos and Bernasek (1998: 629) and Chaulk et al. (2003: 275) found that financial risk tolerance decreased as the number of children in their household increased. Faff (2008: 21) found that financial risk tolerance increased with the number of dependents, however Hallahan et al., (2003: 499) and Bellante and Gren (2004: 277) found that there was not a significant relationship between risk tolerance and number of children or dependents.

Income and wealth are important factors that impacts on the level of risk tolerance. It is assumed that financial risk tolerance increases with income and wealth. Because upper income and/or wealthy individuals can more easily afford to incur the losses resulting from a risky investment (Grable and Lytton, 1998: 65; Hallahan et al., 2004: 58; Watson and McNaughton, 2007: 54). Most of the research findings in relation to income and wealth support this hypothesis[3]. On the other hand, there may be a negative relationship between financial risk tolerance and wealth and/or income. Because individuals with lower income and wealth may willing to take more risk for becoming wealthier.

Faff (2008: 21) found that there was a negative relationship between risk tolerance and income and wealth.

The level of education is another factor that influences an individual's willingness to take financial risk. It is assumed that higher levels of attained education are associated with increased levels of risk tolerance, because education plays an important role in the level of understanding of risks inherent to the financial investment and therefore higher education encourages taking more financial risk (Grable and Lytton, 1998: 65; Venter, 2006: 20). Grable and Lytton (1999b: 7), Grable (2000: 61), Grable and Joo (2004: 78), Qui (2002: 5), Christiansen et al., (2006: 10) and Al-Ajmi (2008: 15) found that individuals with higher attained education were more risk tolerant than individuals with lower attained educational levels, although Hallahan et al. (2003: 499) found that education was not a significant determinant of an individual's attitude towards risk.

As seen in "literature review", there are research data to support that demographic factors can be used to differentiate individuals into risk tolerance, but there is still a need to examine the relationships between demographics and risk tolerance, because the findings of research reveal different results.

3. METHODOLOGY
3.1. Population of the Study and Sample

The population of the study comprised students that have been studying at Faculty of Economic and Administrative Sciences of the Uludağ University in Turkey. The survey form was directed to 1,097 students which constitute the universe of the study between the dates of 01 September-15 September 2008.

3.2. Data Collection Tools

The survey form, which was developed to collect research data, was comprised of two parts. In the first part, sociodemographic data form which was consisted of 10 questions, was designed to gather information regarding gender, age, marital status, number of children, department, working in a job except of being a student, monthly personal income, monthly family's total income (household income), and total net assets (total net assets of household). In the second part, financial risk tolerance was evaluated by thirteen items, developed by Grable and Lytton (1999a) for measuring financial risk tolerance. All respondents were asked to indicate extent of their risk tolerance by circling a number on the scale for each of the items. Thus, responses to the financial risk assessment questions were combined into a risk-tolerance index. Answers to each question were given a weight according to the riskiness of the response. Higher weightings indicated a riskier choice, while lower weighting indicated a less risky choice. This data shows that the students' risk-tolerance index scores changed between 3 and 44 and the mean was 28 (standard deviation: 6.3633). According

to mean score of financial risk tolerance variable, those scoring 28 or above on the index coded as 1, and those scoring below 28 coded as 0. Using this method, 48.2% of respondents were classified as having below-average risk tolerance, and 51.8% of respondents were classified as having above-average risk tolerance.

3.3. Analysis of Data

In the analysis of data[4], logistic regression was used to determine the influence of the sociodemographic variables on financial risk tolerance. However, T-test and one-way analyses of variance (ANOVA) were used to explore whether sociodemographic variables vary between low and high financial risk tolerance. In this analysis, Tukey's HSD test was used for post hoc comparisons of ANOVA. For validity and reliability of financial risk tolerance which was used in this study, Cronbach's alpha was used. Cronbach's alpha coefficinet was 0.61.

4. FINDINGS

The findings of the study were examined in two sections. In the first section, the sociodemographic characteristics of the respondents were presented and in the second section, the results of the analysis were presented.

4.1. Sociodemographic Characteristics of the Respondents

Sociodemographic characteristics of the sample are shown in Table 1. The table presents the distribution of respondents by gender, age, marital status, children number, department, class, working in a job, monthly personal income, monthly family's total income, and total net assets.

As seen Table 1, 38.9% of the respondents were female and 61.1% of the respondents were male. As to the age of students, 91.2% of the respondents were between 21-30 years and 8.7% of the respondents were 20 or below years. Most of the students were single (98.5%). While 98.9% of the students had no any children, 8% of the students had one. According to the department, 45% of the students had been studying at business administration, 14.3% of the students had been studying at public administration and 13.8% of the students had been studying at international relations department. According to the level of class, 72.2% of the students read in third class and 19.6% of students read in fourth class. In respect of working in a job, 75.6% of the students had not a work and 24.4% of the students had a work. As to the monthly personal income, 49.8% of the students had incomes between 501-1,000 TL, 41.8% of the students had incomes between 500 TL and below. While 36.3% of the students had monthly family's total incomes between 1,001 and 2,000 TL, 24.2% of the students had monthly family's total incomes between 2,001 and 3,500 TL. According to the total net assets, 21.3% of students had assets between

100,001-200,000 TL, 20.3% of students had assets between 50,001-100,000 TL and 19.4% of students had assets between 50,000 TL and below.

Table 1: Sociodemographic Characteristics

Variables	N	%	Variables	N	%
Age 20 or below 21-30 31-40	95 1,001 1	8.7 91.2 .1	Gender Female Male	424 666	38.9 61.1
Marital Status Single Married Divorced	1,080 46 1	98.5 1.5 .1	Working in a Job Yes No	267 829	24.4 75.6
Class 1 2 3 4 5 and above	1 21 792 215 68	.1 1.9 72.2 19.6 6.2	Number of Children No 1 2 3 4 or more	1085 9 2 1 -	98.9 .8 .2 .2 -
Department Economics Public Finance Labor Economics Business Administration Public Administration Econometrics International Relations	60 82 20 493 157 133 151	5.5 7.5 1.8 45.0 14.3 12.1 13.8	Monthly Personal Income 500 TL and below 501-1,000 1,001-2,000 2,001-3,500 3,501-5,000 5,001 and above	453 540 76 10 2 4	41.8 49.8 7.0 .9 .2 .4
Monthly Family's Total Income 500 TL and below 501-1,000 1,001-2,000 2,001-3,500 3,501-5,000 5,001 TL and above	27 167 395 263 140 95	2.5 15.2 36.3 24.2 12.9 8.7	Total Net Assets 50,000 TL and below 50,001-100,000 100,001-200,000 200,001-350,000 350,001-500,000 500,001 and above	202 211 221 148 134 124	19.4 20.3 21.3 14.2 12.9 11.9
Total		100.00	Total		100.00

4.2. Results of the Logistic Regression Analysis

In this section, the effects of sociodemographic variables upon financial risk tolerance levels of students were investigated by using a logistic regression

analysis. Logistic regression was preferred instead of other similar methods such as regression analysis and discriminant analysis because of its less stringent assumptions. Logistic regression does not assume linearity of relationship between the dependent and the independent variables, does not require normally distributed variables, and does not assume homoscedasticity. For selecting variables in the logistic regression the stepwise forward selection method was used. In the logistic regression analysis, for determining the impact of independent variables on dependent variables, the students who had low scores of financial risk tolerance were coded with the reference category "0" and the students who had high scores of financial risk tolerance were coded with the reference category "1".

In the logistic regression model which was constituted for determining the effect of sociodemographic variables on financial risk tolerance levels of students, Hosmer-Lemeshow statistic was 11.929, -2 log likelihood statistic (LL) was 1341.72 and significant level (p) was 0.154 (p>.05) with 8 degrees of freedom. The results of goodness-of-fit test which are shown in Table 2 indicated that the logistic regression model was not a good fit. The Cox and Snell R^2 was found to be 6.8% in the fourth step and this statistic indicated that there was an approximately 7% relationship between financial risk tolerance and sociodemographic variables. Also, Nagelkerke R^2 indicated that there was a 9% relationship between financial risk tolerance and predictor variables. In other words it showed that 9% of the variation in the dependent variable was explained by sociodemographic variables in the model.

Table 2. Goodness-of-fit Test of Model for Financial Risk Tolerance

Step	-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2	Chi-square	Df	Sig.
1	1380.217(a)	.032	.042	.000	0	.
2	1359.934(a)	.051	.068	6.443	5	.265
3	1355.253(a)	055	.074	8.273	6	.219
4	1341.722(a)	.068	.090	11.929	8	.154

a: Estimation terminated at iteration number 3 because parameter estimates changed by less than 0.001.

Table 3 shows the results of the regression model which was constituted for determining the predictors of financial risk tolerance. In Table 3, "B" column shows the coefficients (called Beta Coefficients) associated with each predictor, "sig." column shows the significant levels and "Exp(B)" column shows the odds ratios. The *odds* ratio is defined as the probability of the outcome event occurring divided by the probability of the event not occurring and the odds ratio for a predictor tells the relative amount by which the odds of the outcome increase (odds ratio greater than 1.0) or decrease (odds ratio less than 1.0) when the value of the predictor value is increased by 1.0 units. The table's left column shows that stepwise model-building process included four steps. In the first step, a constant as well as woman predictor variable was entered into the model, at the second step, monthly personal income predictor variable was

added to the model and at the third step, having any work except of being a student variables was added to the model and at the fourth step, department variable was added to the model.

Table 3. Results of Logistic Regression for Financial Risk Tolerance

		B	S.E.	Wald	Df	Sig.	Exp(B)	95,0% C.I.for EXP(B) Lower	Upper
Step 1(a)	Woman	-.749	.131	32.444	1	.000	.473	.366	.612
	Constant	.375	.081	21.638	1	.000	1.456		
Step 2(b)	Woman	-.695	.134	26.771	1	.000	.499	.383	.649
	Monthly Personal Income			20.137	5	.001			
	500 TL and below	.024	1.007	.001	1	.981	1.025	.142	7.369
	501-1,000 TL	.612	1.005	.371	1	.542	1.845	.257	13.236
	1,001-2,000 TL	.570	1.028	.308	1	.579	1.769	.236	13.267
	2,001-3,500 TL	.000	1.183	.000	1	1.000	1.000	.098	10.166
	3,501-5,000 TL	.000	1.732	.000	1	1.000	1.000	.034	29.807
	Constant	.000	1.000	.000	1	1.000	1.000		
Step 3(c)	Woman	-.670	.135	24.619	1	.000	.512	.393	.667
	Working in a Job	.335	.155	4.645	1	.031	1.398	1.031	1.896
	Monthly Personal Income			18.758	5	.002			
	500 TL and below	.289	1.014	.081	1	.776	1.334	.183	9.740
	501-1,000 TL	.854	1.012	.712	1	.399	2.349	.323	17.065
	1,001-2,000 TL	.732	1.031	.504	1	.478	2.080	.276	15.697
	2,001-3,500 TL	.067	1.184	.003	1	.955	1.069	.105	10.892
	3,501-5,000 TL	.168	1.738	.009	1	.923	1.182	.039	35.647
	Constant	-.335	1.012	.110	1	.741	.715		
Step 4(d)	Woman	-.680	.137	24.694	1	.000	.506	.387	.662
	Department			13.418	6	.037			
	Economics	.007	.325	.000	1	.983	1.007	.533	1.902
	Public Finance	.222	.296	.565	1	.452	1.249	.700	2.229
	Labor Economics	-.109	.501	.047	1	.828	.897	.336	2.393
	Business administration	.433	.202	4.588	1	.032	1.542	1.037	2.292
	Public Administration	-.119	.246	.233	1	.630	.888	.548	1.439
	Econometrics	.505	.255	3.906	1	.048	1.656	1.004	2.732
	Working in a Job	.368	.158	5.428	1	.020	1.445	1.060	1.970
	Monthly Personal Income			16.407	5	.006			
	500 TL and below	.286	1.025	.078	1	.780	1.332	.179	9.931
	501-1,000 TL	.823	1.023	.647	1	.421	2.277	.307	16.899
	1,001-2,000 TL	.698	1.042	.448	1	.503	2.009	.261	15.483
	2,001-3,500 TL	.038	1.197	.001	1	.974	1.039	.100	10.843
	3,501-5,000 TL	,274	1.751	.025	1	.876	1.316	.042	40.732
	Constant	-.573	1.033	.308	1	.579	.564		

a Variable(s) entered on step 1: Woman.
b Variable(s) entered on step 2: Monthly personal income
c Variable(s) entered on step 3: Working in a job
d Variable(s) entered on step 4: Department

The beta coefficient (B) of woman was –0.680, p value was 0.00 and the model was statistically significant (p<.05). The odds ratio of woman predictor was 0.506 and this statistic indicated that one unit increase in woman variable increases 0.506 times the odds of decreasing financial risk tolerance. The beta coefficients for business administration and econometrics department were 0.433 and 0.505 and p values were 0.032 and .048 (p<.05). The odds ratios of business administration and econometrics department were 1.542 and 1.656 indicated that one unit increase in these independent variables increases 1.542 and 1.656 times the odds of increasing financial risk tolerance, respectively. The beta coefficient for having any work except of being a student was 0.368 and p value was 0.020 (p<.05). The odds ratio of having any work except of being a student was 1.445 and indicated that one unit increase in having any work except of being a student predictor variable increases 1.445 times the odds of increasing financial risk tolerance, when other variables are controlled. When Table 3 is examined, it can be seen that the beta coefficient for monthly personal income are not statistically meaningful.

The success of the logistic regression can be assessed by looking at the classification table. Table 4 shows correct and incorrect estimates. The columns are the two predicted values of the dependent, while the rows are the two observed (actual) values of the dependent. As to this table, when decreasing of financial risk tolerance level was 50.7%, increasing of financial risk tolerance level was 73.0%. The overall correct classification percentage of the model was 62.4%.

Table 4. Classification Table of Logistic Regression for Financial Risk Tolerance

		Predicted		Percentage Correct
		FRT		
		0	1	
Observed	0	247	240	50.7
FRT	1	144	390	73.0
Overall Percentage				62.4

The cut value is .500

4.3. Results of the t-Test and ANOVA

To determine whether there were differences between sociodemographic variables (gender, age, marital status, number of children, department, working in a job, monthly personal income, monthly family's total income, and total net assets) and financial risk tolerance levels, t-test and ANOVA analysis were used and results of the analysis were presented in Table 5.

As to the gender of students, t-test results in Table 5 showed that there was a significant difference between financial risk tolerance levels of female and male. The financial risk tolerance level of male students was higher than female ones.

Table 5: Results of t-test and ANOVA

Variables	Financial Risk Tolerance					
Gender	N	M	SD	T	F	Sig.
Female	423	26.8652	6.3195	-4.884	0.055	0.000
Male	663	28.7783	6.2781	-4.877		
Age						
20 and below	95	26.9158	6.5520		1.582	0.206
21-30	997	28.1254	6.3415			
31-40	1	27.0000				
Marital Status						
Single	1076	27.9805	6.3687		2.241	0.107
Married	16	29.9375	5.3724			
Divorced	1	39.0000				
Number of Children						
No	1081	27.9963	6.3676		1.999	0.112
1	9	32.3333	4.7958			
2	2	24.5000	0.7071			
3	1	21.0000				
Department						
Economics	60	27,7167	6,5305		3.709	0.001
Public Finance	81	27,3951	6,6796			
Labor Economics	20	29,3000	5,7225			
Business Administration	492	28,6118	5,9651			
Public Administration	157	26,3567	6,6091			
Econometrics	133	28,9549	6,2047			
International Relations	149	27,2215	6,9776			
Workin in a Job						
Yes	267	28.8951	6.3663	2.614	0.008	0.009
No	825	27.7273	6.3391	2.608		
Monthly Personal Income						
500 TL and below	450	26.9333	6.2212		5.588	0.000
501-1,000	539	28.7978	6.2123			
1,001-2,000	76	29.4211	6.3984			
2,001-3,500	10	26.2000	8.6513			
3,501-5,000	2	31.5000	4.9495			
5,001 TL and above	4	24.7500	14.930			
Monthly Family's Total Income						
500 TL and below	27	27.1111	7.5617		3.041	0.006
501-1,000	165	26.8061	6.3293			
1,001-2,000	394	28.1294	6.1620			
2,001-3,500	263	27.6274	6.5058			
3,501-5,000	140	29.6000	5.6946			
5,001 TL and above	95	28.7263	7.0897			
Total Net Asset						
50,000 TL and below	201	27.1642	6.5458		4.732	0.000
50,001-100,000	210	27.3286	6.3224			
100,001-200,000	221	27.5204	6.0981			
200,001-350,000	148	29.3311	5.9663			
350,001-500,000	134	28.9179	6.7591			
500,001 and above	124	29.5403	6.2902			

ANOVA results in Table 5 showed that while there were no significant differences in financial risk tolerance levels as to age, marital status, number of

children, there was a significant difference in the level of financial risk tolerance according to the department.

Tukey test showed that financial risk tolerance levels of students who had been studying in public administration were lower than students who had been studying in econometrics and business administration.

According to working in a job, there was meaningful difference in financial risk tolerance level. T-test showed that financial risk tolerance scores of students who had any work were higher than students who hadn't any work.

In respect of the monthly personal income, there was a meaningful difference in financial risk tolerance level. Tukey test showed that financial risk tolerance scores of students who had incomes between 500 TL and below were lower than students who had between 501 and 1,000 and between 1,001 and 2,000 TL.

As to the monthly family's total income and total net assets, there was a meaningful difference in financial risk tolerance level. Tukey test showed that financial risk tolerance scores of students who had total assets between 50,000 and below were lower than students who had total assets between 200,001 and 350,000 and between 500,000 and above. However, financial risk tolerance scores of students who had total assets between 50,001 and 100,000 were lower than students who had total assets between 200,001 and 350,000 and between 500,000 and above.

As a consequence, the results of ANOVA showed that there were significant difference in financial risk tolerance levels according to the gender, department, working in a job, monthly personal income, monthly family's total income and total net assets. However, as to the age, marital status, and number of children, there were not meaningful differences in financial risk tolerance levels.

5. DISCUSSION AND CONCLUSION

This study aims to examine the relationship between sociodemographic characteristics and financial risk tolerance level. The population of the study comprised students that have been studying at Faculties of Economic and Administrative Sciences of the Uludağ University in Turkey. For the aim of the study, two questionnaires were performed (sociodemographic data form and financial risk tolerance scale) and these questionnaires was directed to 1,097 students which constitute the universe of the study. In the analysis of data, logistic regression analysis, t-test and ANOVA were used.

This study is expected to contribute to the current behavioral finance literature. Firstly, logistic regression analysis is employed to test the effects of sociodemographic variables (gender, age, marital status, number of children, department, working in a job, monthly personal income, monthly family's total

income, and total net assets) on financial risk tolerance levels of students. The results of this analysis supported that the proposition about being effect of sociodemographic variables on financial risk tolerance levels. Three variables were found to be significant at the .05 or less level. These significant predictors of financial risk tolerance included gender, department, and working in a job. Accordingly, logistic regression analysis' results display that one unit increase in woman variable increases 1.7857 times the odds of decreasing financial risk tolerance level. However, this analysis indicated that while one unit increase in business administration and econometrics variables increases 1.542 and 1.656 times the odds of increasing financial risk tolerance level, respectively, one unit increase in having any work except of being a student variable increases 1.445 times the odds of increasing financial risk tolerance level.

Secondly, the effects of sociodemographic variables on low and high financial risk tolerance levels are explained through t-test and ANOVA analysis. The results of these analyses indicated that while there were significant difference in financial risk tolerance levels according to the gender, department, working in a job, monthly personal income, monthly family's total income and total net assets, there were not meaningful different in financial risk tolerance levels as to the age, marital status, and number of children. It was concluded that (a) female students were less risk tolerant than males, (b) students who had been studying in public administration were less risk tolerant than students who had been studying in econometrics and business administration, (c) students who had been working in a job were more risk tolerant than students who had been not working in any job, (d) students with higher monthly income were more risk tolerant than those with lower incomes, (e) students whose family's monthly income were higher were more risk tolerant than others, and (f) students whose family's total net assets were higher were more risk tolerant than students whose family had less total net assets. Other sociodemographic variables were not statistically significant predictors. For example, there was not a significant difference in the level of financial risk tolerance according to the age. Reason of this result may be the result of using a sample which constitutes universty students. 91% of respondents in the sample ranged from 21 to 30 years. Similarly, marital status and the number of children were not found to be significant determinants of an individual's attitude towards risk. In our sample, only 1.6% of the respondents were married and divorced, and 99% of the respondents had no children.

There are a number of cases in which the evidence in this study provides a powerful confirmation of previous findings, but others in which the findings contrast strongly with previous results. In general, many previous studies found that (a) females have a lower financial risk tolerance than males, (b) financial risk tolerance decreases with age, (c) single individuals are more risk tolerant than marrieds, and (d) individuals with greater income and wealth have greater risk tolerance than lower income and wealth. Our analysis of the relationship between participant demographics and financial risk tolerance reveals that gender, income and wealth are significantly associated with financial risk

tolerance. However, age, marital status and number of children, which have been found to be significant in previous studies, were not found to be significant determinants of an individual's attitude towards risk in this study.

The findings of the study would be useful to investment managers and financial advisors. They can use some demographic characterictics for differentiating and classifying investors into different risk-tolerance categories. This study would also contribute to the general knowledge in the field of behavioral finance by providing some results about relations between demographics and financial risk tolerance.

Several limitations may be noted in this study. First, the sample was composed of only students that have been studying at Faculty of Economic and Administrative Sciences of the Uludağ University in Turkey. A more heterogeneous sample may produce different results. Therefore, more comprehensive and different sample may be useful for future studies. However the sample used in this study provides a good starting point in the investigation of relationships between financial risk tolerance and demographic characteristics. This study has only investigated the relationship between sociodemographic characteristics and level of financial risk tolerance. Other factors might play an important role in predicting a person's financial risk tolerance. Therefore, another limitation of this study is scope of research. Future researchers may investigate the relationships between financial risk tolerance and a person's biological makeup and psychological construct, and other factors such as level of financial knowledge, economic expectations, previous experiences, family background, social group, and culture. These factors may be combined with traditional demographic factors such as age, gender, education and marital status. Because understanding financial risk tolerance is a complex process that goes beyond the use of some demographic characteristics and it is a multidimensional attitude.

ENDNOTES

[1] Similar findings have been reported by Dohmen et al. (2005: 1), Harrison, Lau and Rutström (2005: 24), Bellante and Gren (2004: 277), Watson and McNaughton (2007: 60) and Al-Ajmi (2008: 15).

[2] Similarly, Al-Ajmi (2008: 15), Bajtelsmit et al. (1999: 1), Charness and Gneezy (2007: 1), Christiansen et al. (2006: 11), Coleman (2003: 99), Dohmen et al. (2005: 3), Dwyer et al. (2002: 151), Faff et al. (2008: 21), Grable and Joo (2000: 4), Grable et al. (2006: 72), Halek and Eisenhauer (2001: 21), Hawley and Fujii (1994: 202), Jianakoplos and Bernasek (1998: 620), Lugovskyy and Grossman (2007: 15), Martenson (2008: 72), Olsen and Cox (2001: 29), Sung and Hanna (1996: 11), Yao and Hanna (2005: 66), and Watson and McNaughton (2007: 52) found that women are more risk averse than men.

[3] For example, Cohn, Lewellen et al., (1975: 618), Morin and Suarez (1983: 1213), Hawley and Fujii (1994: 199), Grable (2000: 61), Qui (2002: 5), Finke

517

and Huston (2003: 234), Hallahan et al., (2004: 75), Grable and Joo (2004: 78), Brown and Taylor (2005: 686), Christiansen et al., (2006: 10), Grable et al. (2006: 72), Watson and McNaughton (2007: 60), Mittal and Vyas (2007: 58), Al-Ajmi (2008: 15), and Fessler and Schürz (2008: 97) found that individuals with higher levels of income and/or wealth were more risk tolerant than those with lower incomes and/or wealth.

[4] SPSS 13 (The Statistical Package for Social Sciences) is used in the analysis.

REFERENCES

Al-Ajmi, J.Y. (2008): "Risk Tolerance of Individual Investors in an Emerging Market", International Research Journal of Finance and Economics, 17, 15-26.

Ardehali, P.H., Paradi, J.C. and Asmild, M. (2005): "Assessing Financial Risk Tolerance of Portfolio Investors Using Data Envelopment Analysis", International Journal of Information Technology & Decision Making, 4(3), 491-519.

Bajtelsmit, V.L. and Bernasek, A. (1996): "Why Do Women Invest Differently Than Men?", Financial Counseling and Planning, 7, 1-10.

Bajtelsmit, V.L., Bernasek, A. and Jianakoplos, N.A. (1999): "Gender Differences in Defined Contribution Pension Decisions", Financial Services Review, 8(1), 1-10.

Bailey, J.J. and Kinerson, C. (2005): "Regret Avoidance and Risk Tolerance", Financial Counseling and Planning, 16(1), 23-28.

Bellante, D. and Gren, C.A., (2004): "Relative Risk Aversion among the Elderly", Review of Financial Economics, 13, 269-281.

Bertaut, C.C. (1998): "Stockholding Behavior of U.S. Households: Evidence from the 1983-1989 Survey of Consumer Finances", The Review of Economics and Statistics, MIT Press, 80(2), 263-275.

Brown, S. and Taylor, K. (2005): "Wage Growth, Human Capital and Financial Investment", The Manchester School, 73(6), December, 686-708.

Callan, V.J. and Johnson, M. (1999): "Measuring Risk Tolerance: A Psychological Perspective", The University of Queensland, August, 1-25.

Cesarini, D., Johannesson, M., Lichtenstein, P., Sandewall, O. and Wallace, B. (2008): "Is Financial Risk-Taking Behavior Genetically Transmitted?", Research Institute of Industrial Economics, Working Paper Series, No.765.

Charness, G. and Gneezy, U. (2007): "Strong Evidence for Gender Differences in Investment", September 18, 1-21, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=648735, (Erişim Tarihi: 16.08.2008).

Chaulk, B., Johnson, P.J. and Bulcroft, R. (2003): "Effects of Marriage and Children on Financial Risk Tolerance: A Synthesis of Family Development and Prospect Theory", Journal of Family and Economic Issues, 24(3), Fall, 257-279.

Christiansen, C., Joensen, J.S. and Rangvid, J. (2006): "Gender, Marriage, and the Decision to Invest in Stocks and Bonds: Do Single Women Invest More in Less Risky Assets?", November 29, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=948164

Cohn, R.A., Lewellen, W.G., Lease, R.C. and Schlarbaum, G.G. (1975): "Individual Investor Risk Aversion and Investment Portfolio Composition", The Journal of Finance, 30(2), 605-620.

Coleman, S. (2003): "Women and Risk: An Analysis of Attitudes and Investment Behavior", Ed.: Janet L. Dye ve Denise Woodbury, Academy of Accounting and Financial Studies Journal, 7(2), 99-115.

Corter, J.E. and Chen, Y.J. (2006): "Do Investment Risk Tolerance Attitudes Predict Portfolio Risk?", Journal of Business and Psychology, 20(3), Spring, 369-381.

Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J. and Wagner, G.G. (2005): "Individual Risk Attitudes: New Evidence from a Large, Representative, Experimentally-Validated Survey", IZA Discussion Paper, No. 1730, September.

Dwyer, P.D. Gilkeson, J.H. and List, J.A. (2002): "Gender Differences in Revealed Risk Taking: Evidence from Mutual Fund Investors", Economics Letters, 76(2), July, 151-158.

Embrey, L.L. and Fox, J.J. (1997): "Gender Differences in the Investment Decision-Making Process", Financial Counseling and Planning, 8(2), 33-40.

Faff, R. (2008): "On the Linkage between Financial Risk Tolerance and Risk Aversion", The Journal of Financial Research, XXXI(1), Spring, 1-23.

Faff, R., Mulino, D. and Chai, D. (2008): "On the Linkage between Financial Risk Tolerance and Risk Aversion", The Journal of Financial Research, 31(1), 1-23.

Fesler, P. and Schürz, M. (2008): "Stock Holdings in Austria", Monetary Policy & the Economy, Q2/08, 83-100.

Filbeck, G., Hatfield, P. and Horvath, P. (2005): "Risk Aversion and Personality Type", The Journal of Behavioral Finance, 6(4), 170-180.

Finke, M.S. and Huston, S.J. (2003): "The Brighter Side of Financial Risk: Financial Risk Tolerance and Wealth", Journal of Family and Economic Issues, 24(3), Fall, 233-256.

Grable, J.E. and Lytton, R.H. (1998): "Investor Risk Tolerance: Testing the Efficacy of Demographics as Differentiating and Classifying Factors", Financial Counseling and Planning, 9(1), 61-73.

Grable, J. and Lytton, R.H. (1999a): "Financial Risk Tolerance Revisited: The Development of a Risk Assessment Instrument", Financial Services Review, 8, 163-181.

Grable, J.E. and Lytton, R.H. (1999b): "Assessing Financial Risk Tolerance: Do Demographic, Socioeconomic and Attitudinal Factors Work?", Family Relations and Human Development /Family Economics and Resource Management Biennial, 1-9.

Grable, J.E. (2000): "Financial Risk Tolerance and Additional Factors that Affect Risk Taking in Everyday Money Matters", Journal Of Business and Psychology, 14(4), 25-63.

Grable, J.E. and Joo, S.H. (2000): "A Cross-Disciplinary Examination of Financial Risk Tolerance", Consumer Interests Annual, 46, 1-7.

Grable, J.E. and Lytton, R.H. (2001): "Assessing the Concurrent Validity of the SCF Risk Tolerance Question", Financial Counseling and Planning, 12(2), 43-53.

Grable, J.E. and Joo, S.H. (2004): "Environmental and Biopsychosocial Factors Associated with Financial Risk Tolerance", Financial Counseling and Planning, 15(1), 73-82.

Grable, J., Lytton, R.H., O'neill, B., Joo, S.H. and Klock, D. (2006): "Risk Tolerance, Projection Bias, Vividness and Equity Prices", The Journal of Investing, Summer, 68-74.

Halek, M. and Eisenhauer, J.G. (2001): "Demography of Risk Aversion", The Journal of Risk and Insurance, 68(1), 1-24.

Hallahan, T. Faff, R. and McKenzie, M. (2003): "An Exploratory Investigation of the Relation between Risk Tolerance Scores and Demographic Characteristics", Journal of Multinational Financial Management, 13(4-5), December, 483-502.

Hallahan, T.A., Faff, R.W. and McKenzie, M.D. (2004): "An Empirical Investigation of Personal Financial Risk Tolerance", Financial Services Review, 13, 57-78.

Hanna, S.D., Gutter, M.S. and Fan, J.X. (2001): "A Measure of Risk Tolerance Based On Economic Theory", Financial Counseling and Planning, 12(2), 53-60.

Hanna, S.D. and Lindamood, S. (2004): "An Improved Measure of Risk Aversion", Financial Counseling and Planning, 15(2), 27-38.

Harrison, G.W., Lau, M.I. and Rutström, E.E. (2005): "Estimating Risk Attitudes in Denmark: A Field Experiment", Working Paper in Economics and Finance, No. 05/07, December.

Hawley, C.B. and Fujii, E.T. (1993-1994): "An Empirical Analysis of Preferences for Financial Risk: Further Evidence on The Friedman-Savage Model", Journal of Post Keynesian Economics, 16(2), 197-204

Jianakoplos, N.A. and Bernasek, A. (1998): "Are Women More Risk Averse?", Economic Inquiry, 36, October, 620-630.

Jianakoplos, N.A. and Bernasek, A. (2006): "Financial Risk Taking by Age and Birth Cohort", Southern Economic Journal, 72(4), 981-1001.

Lugovskyy, O. and Grossman, P.J. (2007): "Forecasting the Risk Attitudes of Women and Men: An Experimental Test of the Strength of Gender Stereotypes", Saint Cloud State University, Department of Economics, Working Papers, Number 2008-07, October.

Martenson, R. (2008): "Are Men Better Investors than Women? Gender Differences in Mutual Fund and Pension Investments", Journal of Financial Services Marketing, 13, 72 – 81.

Masters, R. (1989): "Study Examines Investors' Risk Taking Propensities", Journal of Financial Planning, 2, July, 151-155.

Mayfield, C., Perdue, G. and Wooten, K. (2008): "Investment Management and Personality Type", Financial Services Review, 17, 219-236.

Mittal, M. and Vyas, R.K. (2007): "Demographics and Investment Choice among Indian Investors", The Icfai Journal of Behavioral Finance, IV, 52(4), 51-65.

Morin, R.A. and Suarez, A.F. (1983): "Risk Aversion Revisited", The Journal of Finance, 38(4), 1201-1216.

Olsen, R.A. and Cox, C.M. (2001): "The Influence of Gender on the Perception and Response to Investment Risk: The Case of Professional Investors", The Journal of Psychology and Financial Markets, 2(1), 29-36.

Qiu, J. (2002): "The Determinants of Households' Direct and Indirect Stock Holding Behavior", April.

Riley, N.F. and Russon, M.G. (1995): "Individual Asset Allocation and Indicators of Perceived Client Risk Tolerance", Journal of Financial and Strategic Decisions, Volume 8(1), 65-70.

Roszkowski, M.J. and Grable, J. (2005a): "Gender Stereotypes in Advisors' Clinical Judgments of Financial Risk Tolerance: Objects in the Mirror are Closer than They Appear", The Journal of Behavioral Finance, 6(4), 181-191.

Roszkowski, M.J. and Grable, J. (2005b): "Estimating Risk Tolerance: The Degree of Accuracy and the Paramorphic Representations of the Estimate", Financial Counseling and Planning, 16 (2), 29-47.

Roszkowski, M.J., Davey, G. and Grable, J.E. (2005): "Insights from Psychology and Psychometrics on Measuring Risk Tolerance", Journal of Financial Planning, April, 66-77.

Schooley, D.K. and Worden, D.D. (1996): "Risk Aversion Measures: Comparing Attitudes and Asset Allocation", Financial Services Review, 5(2), 87-99.

Sunden, A.E. and Surette, B.J. (1998): "Gender Differences in the Allocation of Assets in Retirement Savings Plans", The American Economic Review, 88(2), 207-211.

Sung, J. and Hana, S. (1996): "Factors Related to Risk Tolerance", Financial Counseling and Planning, 7, 11-20.

Venter, G.V. (2006): "Financial Planners' Perceptions of Risk Tolerance", The 2006 Financial Management Association's (FMA) Annual Conference, Salt Lake City, Utah, USA, 11 – 14, October, 1-31.

Wang, C. and Hanna, S.D. (2007): "The Risk Tolerance and Stock Ownership of Business Owning Households", Financial Counseling and Planning, 18(2), 3-18.

Wang, H. and Hanna, S. (1997): "Does Risk Tolerance Decrease with Age?", Financial Counseling and Planning, 8(2), 27-31.

Watson, J. and McNaughton, M. (2007): "Gender Differences in Risk Aversion and Expected Retirement Benefits", Financial Analysts Journal, 63(4), 52-62.

Yao, R. and Hanna, S.D. (2004): "The Effect of Gender and Marital Status on Financial Risk Tolerance", Consumer Interests Annual, 50, 123-124.

Yao, R. and Hanna, S.D. (2005): "The Effect of Gender and Marital Status on Financial Risk Tolerance", Journal of Personal Finance, 4 (1), 66-85.

Yao, R., Hanna, S.D. and Lindamood, S. (2004): "Changes in Financial Risk Tolerance, 1983-2001", Financial Services Review, 13, 249-266.