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EFFECT OF FINANCIAL LITERACY AND RISK PERCEPTION ON INDIVIDUAL INVESTORS' INVESTMENT CHOICES

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Abstract

With the importance of behavioral perspective, various irrational variables were begun to include in financial analyses. Previous studies determine that related variables are effective in either individual or institutional investors –accepted as rational- decision making process. This study investigates whether investment choices of investors differentiate according to variables as personality, financial literacy level and risk perception. In this framework, discriminant analysis was run and it was determined that investment choices differentiate by risk perception and financial literacy level. Furthermore, we found evidence that risk perception can be explained by personality and advanced financial literacy. It has also found that investment choices differentiated by demographics as gender and education level. Simple and advanced financial literacy and risk perception are distinctive criterion on investment choices of individuals. However, there was no evidence regard to investment choices differentiates by marital status and age. Effective factors on risk perception of individuals were questioned with similar variables. It has also found that advanced financial literacy and personality are important factors on development of risk perception.

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1. Introduction

Nowadays, similar to other markets, there is an intense competition in financial markets, as well. Either developers of new financial instruments and marketers of these instruments or consultants of potential buyers are in an endeavour to bring together these financial products with proper customer.

In this point, predicting investment choices of individual investors and underlying thoughts and reasons of these preferences are important for those counterparts emphasized above. Prior researches show that individuals do not behave just rational while financial decision making process. Moreover, even as trying to be rational, they are under the effect of some cognitive and emotional biases. For this reason, either international or national studies emphasize behavioral dimension.

With the importance of behavioral perspective, various irrational variables were began to include in financial analyses. Previous studies determine that related variables are effective in either individual or institutional investors –accepted as rational- decision making process. Related studies have potential to determine why individuals -who are in decision making process- make related decision in spite of the rational finances' suggestions. These studies present beneficial evidences for various stakeholders in financial markets.

In this study, the role of demographics, financial literacy, risk perception and personality on investment choices was determined. Effects of same variables on risk perception were also investigated. It has been found that financial literacy and risk perception are distinctive variables on investment choices. We also found evidence that personality and advanced financial literacy construct risk perceptions of individuals.

2. Literature Review and Theoretical Framework

It is an expected circumstance that individual risk behavior has a relation with investment choices. However, it is not an absolutely validated assumption. Individuals, who do not accept a little amount of risk on their financial investment choices, can accept high risk surgeries while they face serious health problems. In addition, individuals who do not take risk in occupational life can prefer risky financial investments for their wealth. Examples like these indicate that risk perception and investment choices do not move together always. Prior studies state that risk perception has a relationship with behavioral variables. Sitkin & Weingart (1995) emphasize that "risk perception of individuals" changes according to present of decision problem with referring to relationship between risk perception and framing effect. McCarty (2000) states that "individual risk taking" can be a result of character and changes according to situations. Weber, Blais, & Betz, (2002) supports the thoughts of McCarty (2000), and indicates that individuals neither avoid nor prefer risk, risk perception differs by circumstances. Filbeck, Hatfield & Horvath, (2005) and Nicholson, Soane, O'Creevy & Willman (2005) also emphasize the importance of individual preferences on investment choices.

As mentioned above it is an expected manner individuals who have risk appetite, prefer riskier investment instruments. However, personality, circumstances and offering of instruments can change this judgement.

Financial literacy in an important issue that considered by society in recent years. On one hand, public and private sector make effort to raise the awareness of society on financial issues; on the other hand,

researchers investigate the relationship between financial literacy and financial decision making. Financial literacy is different from education level. Various objective and subjective measures are utilized on measurement of financial literacy. Previous research determines whether financial literacy level has an impact on financial decisions and generally remains those two variables (Perry & Morris, 2005; Dhar & Zhu 2006; Rooij, Kool & Prast, 2007; Guiso & Jappelli, 2008; Müller & Weber, 2010; Rooij, Lusardi, & Alessi, 2011; Cole, Sampson, & Zia, 2011; Robb, 2011; Lachanse & Tang, 2012). Another important research area is intended to examine financial literacy level differentiates according to demographic factors (Lusardi & Mitchell, 2008; Rooij, Lusardi & Alessi, 2011). However, there is a lack of studies related to impact of financial literacy on investment choices and which variables are interacting with. Guiso and Jappelli (2008) and Wang, Keller & Siegrist, (2011) indicated that individuals with low financial literacy find unknown, unfamiliar financial instruments riskier. Furthermore, they evaluate acquaintant and familiar instruments less risky. Rooij, Kool ,& Prast, (2007); Guiso and Jappeli (2008) and Rooij, Lusardi & Alessi, (2011) stated that low financial literacy avoids investors from stock investments. Similar to others, Diacon (2004) also denoted a relation between financial literacy and risk appetite; and stated that individuals who have lower levels of financial literacy avoid risk than others. Guiso and Jappelli (2008) determined that individuals with low financial literacy level do not manage portfolio diversification with a lack of information.

A related variable with investment choice and risk perception is demographics which comprised of gender, age, education, marital status, income etc. Among these, the most focused one is gender. Many prior researches emphasize that men have more appetite for risk than women (Grable & Roszkowski, 2007; Watson & McNaughton, 2007; Clark & Strauss 2008). Arano, Parker & Terry, (2010) also state that men are willing to take risk than women through evaluating prior studies which investigate the relationship between risk and gender. However, they found different evidence in their study and they determined women prefer more stocks in their pension funds than men do. General opinion regard to subject is men are willing to take more risk than women except this evidence. Dwyer, Gilkeson, & List, (2002), Adhikari and O'leary (2011) and Gibson et al., (2013) evaluated this situation in frame of financial literacy and knowledge regard markets. They state that risk-taking attitude of men can be explained by higher financial literacy level and market knowledge than women. Similar analyses regarding gender provide similar results in different countries. Halko, Kaustia & Alanko, (2012) have investigated this issue in Finland where there is no gender segregation. Lai and Tam (2012) have searched in China at almost same time with Halko, Kaustia & Alanko, (2012). Both studies state that women are more prudential than men about risk-taking. Kamas and Preston (2012) relates this notion with overconfidence tendency. Men tend to risk-taking than women because of overconfidence. In spite of these evidences, Nekby, Thoursie, & Vahtrik, (2007) and Crosan and Gneezy (2009) could not confirm a relationship between gender and risk taking and investment choice.

There are many studies focus on another demographic factor "age", as well. People become more conservative while getting older. The reasons for this circumstance can be listed as; disappear the look for an adventure by investing new financial instruments, preferring riskless but low and fixed-return investments rather than getting wealth with very risky investments, decreasing of concentration and cognitive abilities related to analysis. In this frame, Dulebohn (2002), get evidence that older individuals take less risk than younger ones. Interesting evidence was reported by Clark and Strauss (2008). According to authors there are three groups of individuals and the less risk-taking group is middle aged investors.

Clark and Strauss (2008) and Gibson, Michayluk, & Venter, (2013) could not determine a significant relation between risk-taking and marital status. Gibson, Michayluk & Venter, (2013) also could not get an evidence of education level has a relation with risk-taking.

Carducci and Wang (1998) state that personality is an important variable on risk-taking behavior. According to mostly utilized personality scales, individuals are classified to Type A and Type B. Mudrack (1999) states that Type A individual lives with time pressure, moves fast, likes competition and greed. There are many researches indicate Type A has more tendency of risk-taking (Wong & Carducci, 1991).

3. Research Method

The aim of this study is to attain new evidences on understanding financial instrument choices of individual investors. In this point, selected variables which were estimated to be related in behavioral finance literature were utilized. Discriminant Analyse was selected as empirical research method due to investment choice is a categorical variable and independent variables are metric. Regression analysis was also utilized while estimating individual investors' risk manner according to main purpose of the study. SPSS software program was used for the analyses. In the study, personality scale, financial literacy, risk perception and demographic variables were also utilized.

- To measure personality, ten-point one-dimensional 5 point-Likert scale which is developed by Mudrack (1999) was utilized.

- To measure risk perception, Pasework and Riley's (2010) 14 questioned and one-dimensional scale and 5 point-Likert scale was used.

- Financial literacy was measured with Rooij and Lusordi's (2011) two-dimensional scale.

- Investment choice, as dependent variable, was measured with one question that was asked participants regarding portfolio, deposits, foreign currency and stocks. Besides these variables, demographic questions composed by gender, age, education and marital status were also asked.

3.1. Sample and Data Collection

Data was collected with convenience sampling, by survey method (via e-mail or in person) from 92 respondents who are living in Istanbul and participate as volunteers. 52% of participants are male and 48% are female. 46% are married and 54% are single. 80% of participants are under their 40s. All of the participants have undergraduate, graduate and PhD degrees. It can be said that sample is consists of educated and young population. Gender and marital status distributed as equal.

3.2. Scale Validity and Reliability

Financial literacy was measured with number of correct answers responded to related questions. Questions regarding personality and risk perception have all tested with Factor Analysıs. Following this, we have run reliability test and both test results are given below

Table 01. Factor and Reliability Analyses

	Risk Perception	**Personality**
	I1	K3
	I3	K7
	I5	K8
	I6	K9
	I7	K10
	I8	
	I9	
	I10	
	I11	
	I13	
	I14	
Variance (%)	39,471	16,859
Cronbach's Alpha	0,903	0,825
Kaiser Meyer Olkin (KMO)	0,810	
Bartlett's Test of Sphericity	778,345***	

*** statistically significant with p-value = 0,000 (<0,05)

As seen from table, Barlett's test value –congruity indicator of sample for variables- is statistically significant (p-value<0,000). Similar to Barlett's test, sample sufficiency test KMO value is above the acceptable level 0,60. From this point forth, it can be said that factor analysis can be run for variables and the sample is sufficient. Following the factor analysis, reliability test was run and factors which composed of 11 items for risk perception and 5 items for personality were gained. Cronbach's Alpha values of both tests are above 0,80.

4. Findings

With the aim of predicting investment choices of individual investors, discriminant analysis was run. The variable that investment choice will be grouped, designed as basic and advanced financial literacy and personality. Besides this, independent variable is risk perception in analysis.

First analysis indicates whether group means are equal for related variables. It was determined that variables were not differentiating among groups except personality, in fact, analysis was remade without personality. This second test which shows whether means of independent variables are equal for subgroups, is reported below.

Table 02. Mean Equality of Subgroups Test Results

	Wilks' Lambda	**F-value**	**p-value**
Basic Financial Literacy	0,893***	3,532	0,018
Advanced Financial Literacy	0,704***	12,322	0,000
Risk Perception	0,883***	3,901	0,011

* value is statistically significant with p-value<0,05

As seen from Table 2, it can be said that all three variables are statistically significant while determining investment choices. Following, we controlled if there is a relationship among independent variables in group with correlation test and report is given in Table 3. Results show that there is not an existing relationship between variables with a significant level and this is a desirable situation for a reliable analysis.

Table 03. Correlation Matrix for Independent Variables

	Basic Financial Literacy	**Advanced Financial Literacy**	**Risk Perception**
Basic Financial Literacy	1	0,275	-0,186
Advanced Financial	0,275	1	-0,288
Risk Perception	-0,186	-0,288	1

Investment choice is composed of four subgroups, so three different separation function occur. At least one of these functions has to be statistically significant. In our analysis we determined that, the first function is significant with p-value <0,05 and variance explanation ratio is 0,900. Coefficients of function were placed in the model as;

$$Investment\ Choice = -1,787 + 0,182\ BFL + 0,378\ AFL - 0,307\ RiskPerception$$

In this context, structure matrix indicates the success of every variable on the separation of subgroups.

Table 04. Structure Matrix

	Function 1
Basic Financial Literacy	0,486
Advanced Financial Literacy	0,953
Risk Perception	-0,486

According to Table 4, variables which have value above 0,300 are important during the classification process. It can be easily said that three variables which were used this analysis meet the criteria. Advanced financial literacy becomes prominent among other variables.

Finally, by looking the success of classification it can be stated that correct classification rate does not correspond to a very succeed classification rate with 39,1%. However, while investigating the table it can be found out that stock classification has a high rate with 83%, besides this, mis-classification is regarding portfolio. As a reason of this deviation, the opinion of "portfolio investors are also stock investors" can be accepted. With the purpose of examining this prediction a second discriminant analysis has been run by excluding portfolio choice. New correct classification rate is at acceptable value for social science, 60%. For deposit and currency, correct classification value is 50% and mis-classification for both is arises from each other.

Table 05. Correlation Analysis for Independent Variables

%	Portfolio	Deposit	Currency	Stocks	Total
Portfolio	26,5	20,4	14,3	38,8	100
Deposit	17,2	48,3	31,0	3,4	100
Currency	12,5	25,0	50,0	12,5	100
Stocks	16,7	0,0	0,0	83,3	100
Total			39,1		

Discriminant analysis results state that, basic and advanced financial literacy level and lower risk perception are important on investment choice of individual investors. However, there is no result claims personality is a distinctive variable on this choice. The most important distinctive variable on investor choice is advanced financial literacy level of individuals. Increased financial literacy leads investors to stock investments. As compatible with theory and expectance, individuals with low risk perception prefer stock investments.

In this study, regression analysis was run using metric variables following discriminant analysis in order to forecast risk perception as a metric variable.

Table 06. Regression Analysis Results Regarding Risk Perception

Independent Variables	B	Sig.(p-value)
Constant		0,000
Financial Literacy (Basic Level)	-0,166	0,104
Financial Literacy (Advanced Level)	-0,274	0,009
Personality	0,268	0,006
R^2 = 0,237		0,000

In order to estimate risk perception of individuals, it was found that advanced financial literacy level and personality are significance variables under p-value 0,05. An increase on financial literacy level causes increase on risk appetite. Results show that risk appetite decreases while getting further away from Type A.

Those findings are consistent with literature. While individuals are getting further away from greedy, aggressive and adventurer personality (Type A), risk averseness increases. On the other hand, low advanced financial literacy level causes low risk appetite. Hence, individuals who do not look for adventure and do not have enough information about finance do not prefer to take risk.

Addition to those analyses, we searched relationship of investment choice and risk perception with demographics. Table 7 indicates the results of chi-square tests.

Table 07. Relation Tests of Risk Perception and Investment Choices with Demographic Variables

Variables	Risk Perception		Investment Choice	
	Chi-Square	Sig. (p-value)	Chi-Square	Sig. (p-value)
Gender	17,2	48,3	31,0	3,4
Age	12,5	25,0	50,0	12,5
Marital Status	16,7	0,0	0,0	83,3
Educational Level			39,1	

* value is statistically significant with p-value<0,05

As seen from table, risk perception is related to marital status and investment choice is related to gender and education level with a statistically significant value. With regard to risk perception, by looking to averages of married and single individuals, it can be said that married ones are more willing to avoid risk than singles. If we talk about investment choices, by looking to gender and educational level it can be stated that 10% of men prefer stock investment while women percentage is 2%. On the contrary, 50% of women prefer deposit investment while percentage of men is 15%. On portfolio preference, percentage of men is 60% while women's is 40%.

In order to determine whether financial literacy level is a reason for this situation, independent sample t-test was run. For basic financial literacy, there is no significant difference found between men and women. There is a statistically significance difference between these groups for advanced financial literacy under p-value 0,05 and financial literacy level of men is higher than women.

With the aim of determining financial literacy's role on educational level effect on investment choice, One Way Anova and Duncan Tests were applied. On the perspective of basic financial literacy, investors who have master and PhD degree differ from graduates. Advanced level financial level categorizes according to bachelor, master and PhD degree.

5. Conclusion and Discussions

It is also an important issue why individuals take financial investment decisions this way as well as how they do. According as determining cognitive and emotional variables lying under investment choices, it will be easier for parties who issue/market financial instruments and serve as investment consultant. Many people –regardless their educational level- do financial decision making according to either suggestions or popularity of financial instruments. However, when this choice is not consistent with their risk perception or structure, they can be unhappy and blame financial instrument or recommender.

In this study, some variables which can be a distinctive criterion on investment choices of individuals have been analysed. Personality, simple and advanced financial literacy and risk perception's role on investment choice had been evaluated. As analyse method discriminant analysis was specified according to existence of qualitative and quantitative independent variables. Results indicate that simple and advanced financial literacy and risk perception are distinctive criterion on investment choices of individuals.

Besides these, effective factors on risk perception of individuals were questioned with similar variables. It has found that advanced financial literacy and personality are important factors on development of risk perception.

Finally, relationship between investment choice and demographics has been examined. Whilst investment choice does not differ according to age and marital status, differs according to gender and educational status. Men prefer stock investment while women prefer deposits. As a reason, difference of advanced financial literacy has been determined. Advanced financial literacy of men is higher than women. Similar, educational status affects investment choice, as well. According to bachelor, master and PhD degree, investment choice differentiates.

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