

## **Risk Tolerance and Investment Preferences in Bosnia and Herzegovina**

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### **Abstract**

Risk tolerance is considered as an important factor in making financial decisions, saving and investment choices. This paper has examined level of investment risk tolerance and investment preferences of B&H's population and it had explored whether demographic and socioeconomic factors to risk tolerance and investment preferences. Using a randomly chosen sample of 200 individuals above the age of 20, empirical analysis has shown that above independent variables that are significantly affecting individual's risk tolerance are income level, education level and gender. Regression analysis has proven that above average risk tolerance is associated with higher income level and higher education level. Moreover, analysis has supported the assumption that males are more risk tolerant than females.

Regarding the investment preferences, obtained results show that the out of eight independent variables, only variable measuring whether an individual has a financial commitment is significantly negatively related to the investment.

**Keywords:** Risk tolerance, Risk aversion, Investment preferences, demographic and socioeconomic factors, regression model, level of significance.

## 1. INTRODUCTION

Risk tolerance is being defined as degree to which an investor is willing and able to accept the possibility of an uncertain outcome to an economic decision. This means that risk tolerance is maximum amount of uncertainty one is willing to accept when making a decision, in this case financial decision (Holton, 2004). Due to the fact that risk tolerance is major factor affecting financial decisions, numerous researches have been done to explore and define what are the factors affecting risk tolerance. These researches have been considering demographic, socioeconomic and attitudinal factors as factors affecting risk tolerance and have examined factors such as gender, age, marital status, income level, education, occupation and others as determinants of individuals risk tolerance. (MacCrimmon & Wehrung, 1986; Grable & Lytton, 1998; Hallahana et al., 2004).

The primary goal of the research is to analyze how risk tolerant or risk adverse are people in Bosnia and Herzegovina, to examine their investment preferences and to test what demographic and socioeconomic factors are significantly affecting level of risk tolerance and investment preferences.

The paper is organized as follows. In the next section, sample of data is being introduced and described and independent and dependent variables are being shortly described and analyzed. The same section also explains the methodology of the research. Section 3 presents and discusses results of the empirical analysis. Finally, Section 4 summarizes the research and presents key conclusions of the research.

## 2. DATA, VARIABLES AND STATISTICAL ANALYSIS

### 2.1. Data

The research is based on the data gathered from the survey. 200 individual have been asked to complete 10 question survey and survey instrument contained information about respondents' demographic and socioeconomic characteristics. Two hundred respondents were randomly chosen and survey was performed by phone and this is why there are no missing values for any question.

### 2.2. Variables

In the first analysis risk tolerance variable is taken as dependent variable. It represents the self-assessed level of risk tolerance each respondent has determined for himself. In the second analysis investment type is defined as dependent variable and it is taking following values for different types of investment: 1=deposit, 2=lend to someone, 3=stocks, 4=real estate, 5=mutual funds, 6=gold and silver and 7=collectibles.

When considering independent variables, based on the previous research performed by Demirel and Gunay (2011) and Al-Ajmi (2008), age, marital status, education level, number of dependents, stability of income source, and whether individual has financial commitments are chosen as variables that are expected to be significantly affecting risk tolerance and

investment preferences. Independent variables and their values are being summarized in the table below.

<u>Variable</u>	<u>Measurement</u>	<u>Variable</u>	<u>Measurement</u>
Gender	1= male 2= female	Number of dependents	Respondents' number of dependents
Age	Respondents' age (20 – 60)	Stability of income source	1 = unpredictable 2= somewhat predictable 3= reasonably predictable 4= predictable 5= very predictable
Marital Status	1= married 2= not married	Income	1= <300 KM 2= 300 – 700 3= 700 – 1000 4= 1000 – 1500 5= 1500 – 2000 6= 2000 – 2500 7= >2500
Education	1= secondary 2= postsecondary 3= Bachelor 4= Master 5= PhD	Financial commitments	0= no loan 1= having loan

Table 1. Independent variable definitions

### 2.3. Statistical Analysis

The model used for the empirical analysis is multiple regression model that permits estimating effect on  $Y_i$  of changing one variable  $X_{1i}$  while holding the other regressors constant (Stock & Watson, 2006). Multiple regression models that are going to be estimated is as following:

$$Y_i = \beta_0 + \beta_1 \text{Age} + \beta_2 \text{Gender} + \beta_3 \text{Status} + \beta_4 \text{Educ} + \beta_5 \text{Dep} + \beta_6 \text{FreqY} + \beta_7 \text{IncLev} + \beta_8 \text{Loan} \quad (1)$$

Model developed is used for both analyses, for testing significance of independent variables in relation to either risk tolerance in first case and investment preferences in the second analysis.

### 3. RESULTS AND DISCUSSION

#### 3.1. Sample characteristics

Regarding the sample characteristics, out of 200 respondents 58.5% were male and 41.5% were female. Respondents have ranged from 22 to 59 years old and approximately 70% of all respondent are in the age range from 25 to 46. Furthermore, 60.5% of respondents are married and 39.5% are not married. For the simplification of the analysis “not married” are considered all who are either single, divorced, separated, widowed, etc. (Grable & Lytton, 1999). Most of the respondents are having either secondary or bachelor degree, 45% and 39% respectively, while all other education level account only for 16%. When it comes to the number of dependent, response have ranged from 1 to 5 members and most of the respondents, about 37% of them have 4 family members. Considering income aspect, most of the respondents have either predictable or at least reasonably predictable (stable) income source, accounting for approximately 65% of all response. Data on the income level match the data provided by Federal Office of Statistics that the average salary is approximately 800 KM and survey has shown that most of the people are in the income group from 700 – 1000 KM (Federal Office of statistics)

When considering dependent variables, it is evident that people in Bosnia and Herzegovina are below average risk tolerant given the fact that approximately 70% of respondent have rated their risk tolerance 5 or less then 5, on the scale from 0 to 10.

The unwritten rule states that people in B&H only believe in investment in real estate and this research has proven so, 57% of all respondents have stated that they would invest in real estate, while all other six types of investment account for the 43% (deposits 20%, lending to someone 0.5%, stocks 9%, mutual fund 4.5%, gold and silver 8% and collectibles 1%).

#### 3.1. Risk tolerance estimated model

##### Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	2.274	.354		6.425	.000	1.576	2.972

	IncLev	.669	.096	.443	6.949	.000	.479	.859
2	(Constant)	1.733	.385		4.499	.000	.973	2.492
	IncLev	.540	.102	.357	5.265	.000	.338	.742
	Education	.476	.149	.217	3.203	.002	.183	.770
3	(Constant)	1.389	.399		3.481	.001	.602	2.176
	IncLev	.478	.103	.316	4.627	.000	.274	.682
	Education	.519	.147	.236	3.525	.001	.228	.809
	Gender	.793	.289	.172	2.746	.007	.223	1.363

a. Dependent Variable: RiskTol

Table 2.I Multiple regression; coefficients

Based on the stepwise multiple regression, the final estimated model for the risk tolerance is as follows:

$$Y = + 1.389 + 0.478\text{IncLev} + 0.519\text{Educ} + 0.793\text{Gender} \quad (2)$$

$\beta_0$  represents the intercept and the its value in the final model is 1.389 meaning that if all independent variables are zero value of an individual's risk tolerance will be 1.389. This can further be explained as human nature of being resistant to risk. Furthermore, although gender variable is statistically insignificant ( $0.07 > 0.05$ ) model includes it because of significant bivariate correlation with risk tolerance. In such a situation, researcher can decide whether to include given variable in the model or not.

R<sup>2</sup> and adjusted R<sup>2</sup> are measures that quantify the extent to which the regressors account for the variation in the dependent variable. Since R square is increasing when every next variable is added to the model, adjusted R<sup>2</sup> is better measurement of the mode fit (Stock & Watson, 2006). The estimated model has adjusted R<sup>2</sup> value of 0.253 meaning that 25.3% of the variations in the dependent variable are explained by income level, education level and gender variables. This indicates that research should be revised and improved by adding new independent variables that are potentially affecting risk tolerance and better predicting variations. Variables that could be considered for the future research could be: current economic situation in the county, economic expectations, interest rates and financial knowledge (Ribeiro, 2001; Grable & Lytton, 1999).

### 3.2. Investment preferences estimated model

All the independent variables have been introduced in the model and by performing stepwise multiple regression the following coefficient were estimated:

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant )	3.833	.158		24.213	.000	3.521	4.146
	Loan	-.514	.208	-.173	-2.474	.014	-.924	-.104

a. Dependent Variable: Investment

Table 3. II Multiple regression; coefficients

As shown in the table above out of eight independent variables, only variable measuring whether an individual has a financial commitment proved to be significantly affecting investment type.

$$Y = 3.833 - 0.514\text{Loan} \quad (3)$$

Equation (3) shows that if all independent variables are exactly zero, value of dependent variable (investment type) will be approximately 3.833, approaching value of investment in real estate. Moreover, adjusted R2 has a value of 0.025 meaning that produced equation provides explanation for only 2.5% of variations in investment type preferred by respondents.

The graph shows that most of the respondents (57%) have answered that they would invest in the real estate. 20% would make deposit in the bank, while other four investment types all together account for 30%. As in the case of risk tolerance, insignificance of independent variables suggests that further research should be performed by introducing new variables mentioned in the previous section. Conventional wisdom claims that people in B&H only believe in investment in real estate and consider it the least risky. This explains the outcome of the survey.

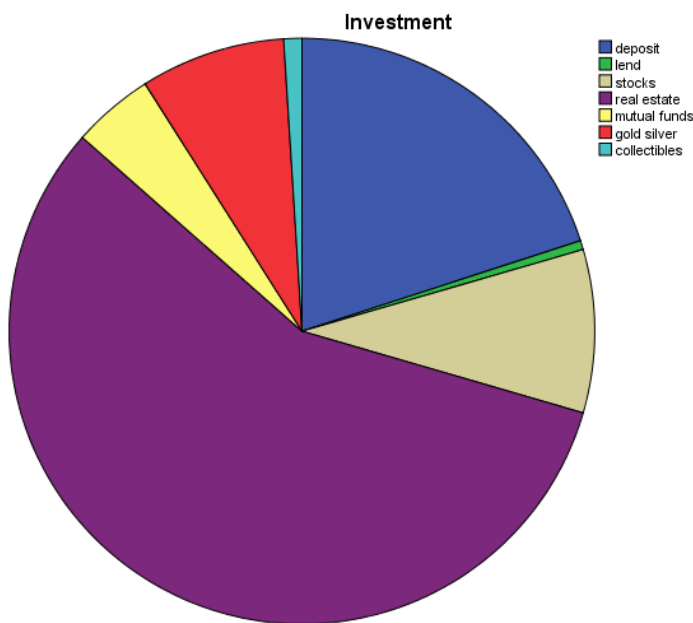


Figure 1 Graphical representation of investment types

#### 4. CONCLUSION

In this study, model for testing significance of demographic and socioeconomic factors in determining risk tolerance and investment preferences was developed. Firstly, income level, education level and gender were proven to be significant and positively related to risk tolerance. As each of these variables increase, risk tolerance is increasing. Secondly, multiple

regression models has identified that only financial commitments are significant for determination of investment and this relation is negative, showing that if an individual has a financial commitment its investment will decrease or it will choose less risky investment. Due to the fact that both estimated models are having low adjusted R<sup>2</sup>, they are not a very good explanation of variations in dependent variables; in the future of the research new variables should be included. Until now research was mostly focused on demographic characteristics of each survey respondent, but in the future more of the socioeconomic factors characteristic for Bosnia and Herzegovina are going to be considered. In this way, current economic situation, macroeconomic data, interest rates, economic expectations and individual's financial knowledge are going to be used as predictors of risk tolerance and investment preferences. This will improve the model, it will provide more complex and accurate explanation of what are the possible reasons why risk tolerance and investment preferences vary. However research needs improvements in the future, the overall conclusion of the is that demographic and socioeconomic factors are affecting risk tolerance and investment preference.

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