FINANCIAL KNOWLEDGE AND SUBJECTIVE FINANCIAL RISK TOLERANCE AMONG STUDENTS AT A SOUTH AFRICAN UNIVERSITY

Pfano Michael Ramudzuli, Paul-Francois Muzindutsi**

Abstract

This study used a self-administered questionnaire to determine the effect of financial knowledge and other demographic variables on Financial Risk Tolerance (FRT) among South African University students. Descriptive statistics and a binary logistic regression model were used to analyse information from 330 participants selected from a South African University in the Gauteng province. The results indicated that the probability of being risk tolerant was high among students with financial knowledge compared to those without financial knowledge. Among demographic variables, monthly expenditure and religion were found to have a significant effect on Financial Risk Tolerance. The results of the study thus draw attention to a number of factors that can help investment managers in finding suitable financial products for their clientele.

Keywords: Risk Tolerance, Subjective Risk, Risk Aversion, Financial Knowledge, University Students

**School of Economic Sciences, North-West University, South Africa, PO Box 1174, Vanderbijlpark, 1900*

1 Introduction

In financial planning and investment processes, education plays a very important role in determining an individuals' level of financial risk tolerance (FRT) (Ryack, 2011:181). The role of education in this regard has however received limited attention especially on the concept of type of education (field of study) as opposed to level of education as a demographic factor affecting FRT (Ryack, 2011). FRT refers to the extent to which an individual is willing and able to accept a relatively high level of uncertainty in anticipation of possible higher returns (Sulaiman, 2012). In financial planning and investment processes, FRT is given a considerable amount of attention as it can be used to predict investment and savings behaviour (Yao et al., 2005). A number of demographic factors including education, age, gender, race and income have emerged as possible drivers and determinants of FRT (Grable and Lytton, 1999). Various researchers have reached different conclusions on the link between FRT and these demographics. For example, Barsky et al. (1997) and Gilliam et al. (2010) found a positive relationship between an individual's level of education and FRT; while Gumede (2009) found no significant relationship between level of education and FRT. Bajtelsmit and Bernasek (1996), Harlow and Brown (1990) and Hallahan et al. (2004) found a negative relationship between age and FRT while Bommier and Rochet (2006) and Wang and Hanna (1997) concluded that older individuals tend to hold riskier assets compared to younger individuals. Grable and Joo (1997) and (Ryack, 2011) indicated that high levels of FRT can be attributed to high levels of financial education as opposed to non-financial education.

The research interest in FRT and its determinants arose because financial companies and investment managers felt that it could help them find suitable financial products for their clientele (Roszkowski and Snelbecker, 1989). This helps them develop and market relevant products to a relevant group of customers. Furthermore, risk tolerance is not static, but a continuously moving target; thus requiring regular valuation (Larkin et al., 2013). In addition, Riley & Russon (1995) have also demonstrated that recommendations by financial advisors are influenced by their perceptions of FRT which are related to an individual's demographic factors. Although these demographic variables have shown a significant impact on FRT, they only provide a partial explanation of the variance in FRT. There are still a number of variables that may be important determinants of FRT, but have not received equal attention. The role played by financial education/knowledge on FRT is one area that has received relatively limited attention. This paper thus aims to investigate the extent to which financial education and other demographic variables influence an individual's willingness to take on financial risk in a South African context. The specific objectives of the study are to:

- Determine whether students in finance related careers tolerate more financial risk than those in non-finance related careers;

- Examine whether postgraduate students tolerate more financial risk that undergraduate students; and
- Determine whether some demographic variables have an effect on subjective FRT.

2 Literature review

The study of FRT has been of interest to investors and academics for hundreds of years and tended to revolve around methodologies such as choice dilemmas, utility theory, objective measures, subjective assessment and heuristic judgements (Grable and Lytton, 1999). Whether measured for the purpose of self-assessment or for documentation of investment suitability, FRT is assumed to be a fundamental issue underlying a number of financial decisions (Sung and Hanna, 1996). Formally, Harlow and Brown (1990) define personal FRT as the extent to which an individual is personally capable and willing to accept the likelihood of an uncertain financial outcome in exchange for the possibility of a higher financial return. This risk tolerance is concerned with personal attitudes, opinions and beliefs towards accepting financial risk (Chaulk et al., 2003). Furthermore, subjective FRT is referred to as an indication of an individual's attitude towards accepting risk (Hallahan et al., 2004). When dealing with subjective FRT, one is essentially looking at the attitudes that people hold towards financial uncertainty (Faff et al., 2006). The notion of FRT is inversely related to the concept of risk aversion which refers to the unwillingness of an investor to accept a bargain which has an uncertain outcome rather than one with high levels of certainty, but lower expected outcome (Faff et al., 2006). Therefore, individuals who are more risk averse will have lower tolerance for financial risk and those who are less risk averse will have higher level of FRT (Faff et al., 2006).

There are two common measures of FRT in subjective measures and objective measures (Hanna and Chen, 1997). Objective measures determine risk preferences by examining revealed behaviour (Hanna et al., 2001), whilst subjective measures generally assess an individual's self-perceived risk tolerance level (Chang et al., 2004). Since this study focuses on university students, subjective measures will be utilised. This is because the participants, being students, are not likely to have accumulated some sort of risky investments or assets for objective measures to work.

Measured by calculating the total number of schooling years or by qualifications obtained, level of education usually has a positive effect on FRT levels (Sung and Hanna, 1996). Hence, higher levels of education are associated with higher FRT levels (Barsky et al., 1997). Financial education on the other hand refers to the possession and understanding of financial matters and is mainly used in connection with personal finance matters (Starcek and Trunk, 2013). This branch of education often entails the ability to properly make decisions pertaining to certain personal finance areas such as real estate, insurance, investing and savings (Starcek and Trunk, 2013). Financial education can include self-taught education through years of experience or taught in school when pursuing a certain financial related career. As a dynamic concept, financial education is very difficult to measure; however, in this study it is measured according to a career an individual is pursuing with commerce students assumed to acquire some financial knowledge from their curriculum. For most of humanity students, their curriculum may not necessary involve financial knowledge; thus, they are assumed not to have financial education. Although it has not been examined to the same extent as other variables, some studies (Grable, 2000; Ryack, 2011) found a strong association between financial education and FRT. The results of these studies suggest that FRT increases for higher levels of financial education.

3 Methodology

3.1 Sampling and description of participants

A self-administered questionnaire was used to collect data, during July and August 2014, from a sample of 350 randomly selected undergraduate final year and post graduate students at a South African university in the Gauteng province. The initial sampling stage involved a purposive sampling where participants where controlled for field of study and year of study. Random sampling which ensures that each element in the population has an equal chance of being included in the sample (Brown et al., 2011), was then used to recruit particpants in each group. As such, participants were divided into two groups depending on their field of study and questionnaires were apportioned evenly. From the 350 administered questionnaires, a total of 330 (94%) usable questionnaires were returned with 51% of the questionnaires completed by commerce students and 49% by Humanity students.

3.2 Research instruments and procedure

A quantitative research approach was adopted for the purpose of this study. Arising from a comprehensive literature study, a questionnaire was developed mainly by revising and combining the Grable and Lytton (1999) questionnaire and the Hanna and Lindamood (2004) questionnaire. The developed questionnaire addressed a major problem of understand-ability encountered in previous questionnaires that were difficult to understand for people without financial based education or exposure to financial knowledge. With two major sections, the first section of the questionnaire captured basic demographics of the students; while the second section captured risk tolerance levels of the students. The second section

was divided into three subsections covering income risk, investment risk and speculative risk.

The questions in the second section of the questionnaire were structured in the form of a multiple choice, with options ranging from 3-6 options in each question. In identifying FRT levels, each option in the multiple-choice questions was assigned a score ranging from 1-6 depending on the number of options in each specific question. A low score of 1 was assigned to the least risky option in each question; while risky options were assigned a higher score. This meant that a multiple-choice question with three options would have a minimum score of 1 for the least risky option and a maximum score of 3 for the most risky option. This is the same system used by both Grable and Lytton (1999) and Hanna and Lindamood (2004) in their questionnaires. The total score for each sub-section was added together and using the Grable risk tolerance scoring method, individuals were classified accordingly. This risk tolerance scoring method calls for participants with an FRT score below the average recorded score to be classified as not risk tolerant and for participants with an FRT score above the total recorded score to be classified as risk tolerant individuals (Grable and Lytton, 1999).

3.3 Model specification

In addition to descriptive analysis, this study employed a binary logistic regression model which has a dependent variable of a dichotomous nature. Five independent variables in financial education, level of education, gender, religion and expenditure were considered. The participants were ultimately classified as either risk tolerant or not-risk tolerant depending on their FRT score. The dependent variable was assigned a value of 1 for a risk tolerant participant and a value of 0 for a not-risk tolerant participant. The binary FRT status is therefore expressed by a linear variable $Y^{\wedge *}$ as follows:

$$Y_i^* = \Sigma\beta X_i + u_i \quad (1)$$

Where X_i represents a set of independent demographic variables that determine an individual's FRT status, β on the other hand represents coefficients $(\beta_1, \beta_2, \ldots \beta_n)$, while u_i represents the error term. Since Y^* is a latent variable and thus not observable, we thus observe an event represented by a dummy variable Y defined as follows:

$$Y = 1 \; if \; Y^* > 0 \; and \; Y = 0 \; otherwise. \quad (2)$$

Therefore, from equation one and two, the probability of being financial risk tolerant can be represented as follows:

$$\begin{aligned} Prob\,(Y_i = 1) &= F(\beta Xi) \\ Prob\,(Y_i = 0) &= 1 - F(\beta Xi) \end{aligned} \quad (3)$$

Ultimately, the binary logistic model with the assumption of normal distribution is as follows:

$$FRT_i = \beta_0 + \beta_1 FE_i + \beta_2 LoE_i + \beta_3 G_i + \beta_4 EX_i + \beta_5 RE_i + e_i \quad (4)$$

Where: FRT_i = the financial risk tolerance status, β_0 = the intercept, $\beta_1, \beta_2, \beta_3, \beta_4 \; and \; \beta_5$ = the coefficients, FE_i = exposure to financial education (1 for exposure to financial education and 0 otherwise), LoE_i= level of education of participants (1 representing postgraduate and 0 undergraduate), G_i = gender of participants (1 for male and 0 for female), EX_i = expenditure of participants (continuous values), RE_i = religion of participants (1 for Christian participants and o for non-Christian participants), and e_i = the error term.

4 Empirical results

4.1 Demographic information of participants

When analysing the observations according to financial education, participants that have been exposed to financial education were separated from those who are not exposed to financial education as measured by the qualification one is studying towards (Field of study). These demographics and their respective descriptive statistics are represented in Table 1. The observed results indicate a total of 330 participants where 168 (51%) have been exposed to financial education in their field of study and 162 (49%) are not exposed to financial education. On average, participants with financial education appear to be just a year younger than participants that do not have financial education. The unemployment rate for finance students is 70%, slightly less than that of non-finance students of 75%. The average expenditure of finance participants was observed at R 1 638 per month compared to R 1 532 per month for no finance students.

Off the 208 Christian participants, 71% (148) were students exposed to financial education, while the remaining 29% (60) were from non-finance background. The descriptive statistics also show that there were 180 postgraduate participants compared to 150 undergraduate participants. Among postgraduate students 59% (107) were from humanity studies, while 41% (73) were from commerce studies. For undergraduate students, 63% (95) and 37% (55) of participants were from commerce and humanity studies, respectively. It was also observed that there were more female participants (94 or 59%) with exposure to financial education compared to 66 (41%) non-finance female participants. Table 1 also shows that the proportion of male participants with exposure to financial education to male participants with no exposure to financial education is less by 22.

Expenditure is a continuous variable with a minimum of R 200, average of R 1 586 and a maximum of R 19 000.

Table 1. Descriptive statistics of the participants according to field of study

Description		*With financial education*	*Without financial education*	*Total*
Count		168	162	330
Gender	Male	74	96	170
	Female	94	66	160
Level of education	Postgraduates	73	107	180
	Undergraduates	95	55	150
Population group	African	121	81	202
	Non-African	47	81	128
Religion	Christian	148	60	208
	Non-Christian	20	102	122
Age (Avg)		23	24	23
Employment rate		30%	25%	27%
Income (Avg)		R 2008	R 1880	R 1946
Expenditure (Avg)		R 1638	R 1532	R 1586

4.2 Distribution of FRT within the status of financial education

The distribution of the FRT between participants with financial education and those without financial education is summarised in Table 2. This table 2 shows that there were 55 (34%) financial risk tolerant participants without financial education as opposed to the 145 (86.3%) from the participants with financial education. Similarly, there were 107 (66%) participants without financial education who are not tolerant of financial risk as opposed to the 23 (13.7%) participants with financial education who are not tolerant of financial risk. It can thus be seen that majority of participants with financial education are tolerant of financial risk; while majority of participants without financial education are not tolerant of financial risk. These results clearly show that being exposed to financial education increases the level of financial risk tolerance. Thus, participants with a superior level of financial knowledge seem to understand and relate better to risk, hence they are able to assume more financial risk than those with lower levels of financial knowledge. These findings are also in line with those from other studies (Barsky et al., 1997; Chang et al., 2004) which found that FRT is influenced by financial knowledge.

Table 2. Financial risk tolerance within the status of financial education

	Subjective financial risk		*Total*
	Not Risk tolerant	*Risk tolerant*	
Participants without financial education	107	55	162
	66.0%	34.0%	100.0%
Participants with financial education	23	145	168
	13.7%	86.3%	100.0%
Total	130	200	330
	39.4%	60.6%	100.0%

4.3 Analysis of determinants of FRT

Table 3 summarises the logistic regression results estimated from Equation (4). The level of education has a positive coefficient, suggesting that the probability of being risk tolerant increases with level of education. This means that postgraduate participants will tend to tolerate more financial risk compared to undergraduate participants. However, a low z-statistic of 0.61859 (with a p-value = 0.5362), implies that level of education is not a significant predictor of FRT. Exposure to financial education (field of study) has a z-statistic of 6.662 (with a p-value = 0.00); implying that it is statically significant at the 1% level of significance. This coefficient is also positive indicating that having financial knowledge increases the probability of being financial risk tolerant. Students with exposure on financial education tend to tolerate more risk than those without exposure on financial education. The coefficient for student's expenditure is also positive and has a z-statistic of 2.248, (with a p-value = 0.0246 meaning

that it is statically significant at the 5% level of significance. Thus, increases in student expenditure increases the probability of being risk tolerant. With male coded as 1 and female 0, a positive beta means that being male increases the probability of being risk tolerant. However, a z-statistic of 0.853 with (a p-value = 0.3938) means that gender was not a significant determinant of FRT. The last examined variable was religion with 1 for Christian participants and 0 for non-Christian participants. The results with a positive beta indicated that being Christian increases the probability of being risk tolerant. A z-statistic of 4.442 (with a p-value = 0.000) was recorded for this variable indicating that it was significant at the 1% level of significance.

Table 3. Regression results

Variable	*Coefficient*	*Std. Error*	*z-Statistic*	*Prob.*	*Odd ratios*
C	-4.80221	0.64372	-7.46008	0.0000*	---
Level of education	0.17706	0.28624	0.61859	0.5362	1.193703
Financial education	1.97268	0.29609	6.66244	0.0000*	7.18992
Expenditure	0.00034	0.00015	2.24791	0.0246**	1.00034
Gender	0.24297	0.28491	0.85279	0.3938	1.27503
Religion	1.53259	0.34501	4.44215	0.0000*	4.630153

Note: *Significant at 1% level, **Significant at 5% level

In summary, the probability of being risk tolerant increases for Christian participants and participants with exposure to financial education and those with higher level of monthly expenditure. The odd ratios for exposure to financial education is about 7.19 meaning that participants with exposure to financial education are 7.19 times more likely to be risk tolerant as those without exposure to financial education. For participants' expenditure, an increase of 1 unit (rand in case) in student expenditure increases the odds of being risk tolerant by 1.00. As for religion, Christians are 4.63 times more likely to be risk tolerant as non-Christians.

Findings of this study are in line with previous studies (Bommier and Rochet, 2006; Charyton et al. 2013; Grable and Joo, 1997; Ryack, 2011; Strydom and Metherell, 2012; Wang and Hanna, 1997) which found that the FRT is explained by demographic variables such as gender, religion, income or expenditure and exposure to financial education. Furthermore, findings of this study are inline with those of Cooper et al. (2013) who found that individuals' level of education has not effect on risk tolerance. Contrary to prior research (Grable and Lytton, 1999; Strydom and Metherell, 2012) this study found non-significant relationship between FRT and both level of education and gender. This may therefore suggest that gender is not a key determinant of FRT among young participants such as students but it may be a significant determinant among older (non-students) participants.

5 Summary and conclusion

With a variety of studies having demonstrated a strong association between FRT and demographic factors such as education, gender, age and income, this paper built upon existing research by examining how financial education and level of education affect FRT in a sample of students at a South African university in the Gauteng province. Consistent with most past researches, this study found that expenditure, religion and type of education are important determinants of FRT. Contrary to prior research, this study found non-significant relationship between FRT and both level of education and gender. This study proves that in line with international findings, there exist a very important relationship between FRT and demographic variables. The implications of this study for financial companies is that they may need to spend more time with effective measures to market risky products to individuals without financial education. These findings can also help improve and lead to direct marketing strategies thus saving financial companies a lot of money. Investment managers and advisors can also take from this study an estimate of risk appetite that their clients may have given their various demographic factors and as such manage their funds better by keeping their investments within limits and buying financial products that are within their desired risk limits.

This study also provide a basis for individuals to understand their own financial drive and risk appetite before making any financial decisions, be it investments or savings decisions. The various limitations encountered during this research include the limited number of field of studies (humanities and commerce studies were investigated); and the gap in level of education as it was not broad enough (it was only limited to final year undergraduate and postgraduate students). Over and above the findings and limitations of this study, various opportunities for

further research in this field can be identified. More fields of study can be introduced such as Engineering, Medicine, Information Technology and Law so that the results can be more specific as to which group of students tolerate more financial risk.

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