



Individual investor's financial risk tolerance in Nepal

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Abstract

This research paper employs a quantitative approach with a descriptive and causal comparative research design to examine the intricate relationship between risk tolerance and various demographic variables, including age, gender, marital status, occupation, educational qualifications, investment knowledge, and personality traits. A structured questionnaire was utilized for data collection, with a sample size of 395 participants. Reliability of the questionnaire was determined after ensuring reliability and consistency through Cronbach's Alpha testing. Purposive sampling was employed, and statistical analyses, including descriptive statistics, Kruskal-Wallis test, Mann-Whitney U test, pair wise comparison method, correlation analysis, cross-tabulation method, and regression models, were applied to interpret and analysis of data. Risk tolerance levels were categorized as higher, moderate, and low, revealing differences across age, marital status, occupation, and educational qualification categories. However, gender was not found to significantly impact risk tolerance distribution. The study further identifies a positive correlation between personality traits and risk tolerance, as well as a positive association between risk tolerance and investment knowledge. Notably, the research indicates that males, single and business man tend to exhibit higher risk tolerance levels, while young, educated, single individuals, particularly students, demonstrate a proclivity for risk-taking behavior.

Keywords: Investment knowledge, personality traits, risk tolerance

Introduction

Risk tolerance refers to the level of loss that an investor can handle without feeling uncomfortable. It has been found out that the individuals with greater risk tolerant can earn more money (Cramer *et al.*, 2002) [5]. Complex financial instruments, lack of financial expertise, higher return expectations, volatile markets, and time constraints have given rise to professional financial planning services (Safari *et al.*, 2017) [29]. Evaluating how much risk a client can handle and creating an investment plan based on this is an important part of investing in share market and financial planning. The superior ability of financial planners to estimate their clients' financial risk tolerance and also design a rewarding portfolio based on his/her risk-return spectrum is the key to success in stock market. Hence, the factors that can precisely determine investors' risk tolerance are always a significant concern for financial planners. However, the irony is that risk tolerance is a qualitative phenomenon that can diverge from person to person based on the individual's genetic makeup, demographics, personality type, cultural setting, and psychological variables or constructs. The subjective nature of risk makes it more challenging to measure as well. It plays a fundamental role in each household's optimal portfolio decisions. It is also considered a key factor in regulating various government policies linked to consumer risks concerning financial decisions. A financial planner's capability to knob risks may be generally associated with investor demographic features *viz.* gender, age, income, time horizon, investment knowledge, education level, liquidity needs, location, portfolio size, and attitude towards price fluctuations (Shah *et al.*, 2020) [30].

The research paper focuses on the issue of any difference in risk tolerance among age, gender, marital status, occupation, educational qualifications, and personality traits and also any effect of investment knowledge and personality traits on

risk tolerance. The people who took part in this study are individuals who have put their money in different places like stocks, real estate, fixed deposits.

Objectives

The primary objectives of this research are threefold. First, the study aims to identify whether distribution of risk tolerance is same across the different categories of gender and marital status. Secondly, it seeks to measure the intricate relationship between the financial investor's investment knowledge, personality traits, and their overall risk tolerance levels. Lastly, the research endeavors to examine the impact of key factors, including investment knowledge, personality traits, gender, and marital status, on the risk tolerance of investors. By delving into these dimensions, the study aims to contribute valuable insights to the field of finance and investment by providing a comprehensive understanding of the nuanced interplay between individual characteristics and risk tolerance in the context of financial decision-making.

This research is structured as follows: Following a detailed "Literature Review," the study's "Research Methods" and "Findings" will be presented. The findings are analyzed and implications are provided in the "Interpretation and Discussion" section. Finally, the "Conclusion" section summarizes the work and provides future research recommendations.

Literature Review

In this section, study presents evidence on determinants of risk tolerance of individual investors in stock market. The main objective of the research is to evaluate the factors that determine the individuals' decisions and perception towards risk and risk appetite. It is essential to understand the factors of risk tolerance and how to manage these factors to

enhance the ability of risk tolerance in making investment decisions and increasing economic growth.

The research performed by Rahmawati *et al.* (2015) ^[28], evaluated the factors that determine the individuals' decisions. Study examined the factors of risk tolerance and how to manage these factors to enhance the ability of risk tolerance in making investment decisions and increasing economic growth. Study result showed that men are less risk averse than women, educated investors are more likely to take risk, less wealthy investors are less risk tolerant than wealthy investors and the interesting fact found is that there is no as such strong relation between age and the level of individual risk tolerance education and wealth are highly correlated with risk tolerance Furthermore, study of Grable (2008) ^[7] performed normative and descriptive models of risk tolerance. Study provided additional discussion regarding the measurement of risk tolerance. The chapter included the presentation of a conceptual model of principal factors affecting risk tolerance to enhance the consumer finance field's knowledge of risk tolerance; four hypotheses have been formulated and tested. The study concluded that men were less risk averse than women, educated investors were found to be more likely to take risk, less wealthy investors were less risk tolerant than wealthy investors and the interesting fact found was that there was no as such strong relation between age and the level of individual risk tolerance although the risk tolerance of each age group was significantly different. Education and wealth were highly correlated with risk tolerance.

VanDeVenter *et al.* (2012) ^[38] claimed a relatively minor shift in people's financial tolerance. Research disagreed on whether financial risk tolerance was a permanent psychological attribute, as a result, it was less likely to change during an individual's lifetime, or a changeable psychological state that alters rapidly in reaction to internal and external circumstances. The findings of a longitudinal research that investigated the yearly change in financial risk tolerance ratings of individuals over a 5-year period, as well as the factors that impacted such change, were presented in this article. The findings showed a relatively minor yearly shift in people's financial risk tolerance.

In addition, research focused on the examination of demographics factors effect on financial risk tolerance claimed that various demographic factors has effect and significantly differentiate risk tolerance of investors. Gibson *et al.* (2013) ^[6] study showed positive association between risk tolerance and income, investing expertise, and optimistic stock market predictions when examined the risk tolerance scores of over 2,000 people shortly following the 2008 Global Financial Crisis. Gibson *et al.* (2013) ^[6] study further empirically supported those females, the elderly, those who employed a financial advisor, and those who believed the stock market was riskier than two years ago have lower risk tolerance. Similarly, a recent study of (Shah *et al.*, 2020) ^[30] examined the association between demographic parameters and financial risk tolerance. The goal of the empirical study was to identify whether financial risk-tolerance differed among Pakistani business graduates depending on demographic parameters such as gender, age,

education, experience, income, saving, geography, and occupation. The findings of the study showed a positive effect in regards to all the demographics to financial risk-tolerance. Infact, the results implied that male business graduates with greater income and savings, with ample education qualifications and older graduates are positively related to financial risk-tolerance.

In a particular study conducted by Grable and Lytton (1999) ^[8], the financial risk-tolerance scale was created and was further evaluated empirically to measure the various characteristics of financial risk. For primary data collection, the study used a quantitative approach to a multinomial logistic regression model using an online questionnaire tool. The well-designed surveys were circulated via internet media to business grads. The study's empirical findings revealed a strong favorable influence from all demographics against financial risk-tolerance.

Research Framework

Based on the theoretical and empirical review presented in the section literature review, research came to develop following research framework. Age of respondents, gender, marital status, occupation, educational qualification, investment knowledge and personality traits are used as explanatory variables and risk tolerance is used as a dependent variable.

Age can influence risk tolerance as younger individuals may be more willing to take risks compared to older individuals who may have a more conservative approach. Research suggests that there may be gender differences in risk tolerance, with males generally exhibiting higher risk tolerance compared to females. However, it is important to note that individual differences can vary significantly. Marital status can potentially impact risk tolerance, as individuals with dependents may have lower risk tolerance due to their increased financial responsibilities. Different occupations can influence risk tolerance levels. For example, individuals working in high-risk professions such as entrepreneurs or investors may have a higher risk tolerance compared to those in stable jobs. Higher educational qualifications may indicate a higher level of financial literacy and understanding of risks, which can potentially influence risk tolerance levels. The current financial situation of an individual, including income stability, debt levels, and financial obligations, can impact their risk tolerance. Individuals with greater financial stability may be more comfortable in taking risk. Individual knowledge and understanding of investments can affect their risk tolerance. Informed individuals with a deeper understanding of investment products and risk-return trade-offs may have a higher risk tolerance compared to those with limited knowledge. Certain personality traits, such as openness to experience, confidence, and resilience, may influence risk tolerance levels. Individuals with a more adventurous and optimistic personality may exhibit higher risk tolerance. By observing the fact from the review researcher has formulated the research framework as presented in the figure 1. This framework may provide insights for financial advisors, researchers, and individuals themselves to make informed decisions regarding investments and financial planning.

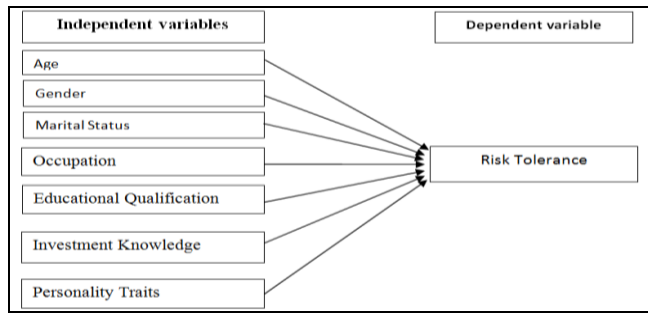


Fig 1: Research framework

Hypothesis

Using the insights from the literature review and the nature of data obtained from the respondent's researcher has developed different alternate hypothesis. The research hypotheses that are formulated for empirical investigation are presented in this section.

- H1: The distribution of risk tolerance is not same across the five categories of age.
- H2: The distribution of risk tolerance is not same across the two categories of gender.
- H3: The distribution of risk tolerance is not same across the two categories of marital status.
- H4: The distribution of risk tolerance is not same across the five categories of occupation.
- H5: The distribution of risk tolerance is not same across the four categories of educational qualifications.
- H6: There is significant effect of investment knowledge on risk tolerance level of individuals.
- H7: Personality traits have significant effect on risk tolerance level of individual investors.

Research Methodology

The study has adopted quantitative research method with a descriptive research design in order to measure the relationship between the independent and dependent variables without attempting to influence the variables. A structured questionnaire was used to collect the data, and statistical analysis was used to examine the results. The questionnaire is divided into two parts. The first part of the questionnaire contains information about respondents for demographic information regarding gender, age, marital status, occupation, and educational qualifications, personality traits and investment knowledge. The second section describes questions of risk tolerance level in which the respondents have to select one of six possible answers.

The survey method is used in the research. Individual investors from various parts of Nepal who invest in various securities such as stocks, bonds, debentures, and mutual funds were considered as the population of this research. The information was gathered by creating a structured questionnaire and distributing it to the investors through email and social media. The structured questionnaire was created using references from the work of professionals, researchers, and investors from various demographics who completed it. The first few questions of the questionnaire are used to collect the demographic information of the respondents which are in the form of single response questions. On the other hand, the specific questions are designed in 5 points Likert scale form the five-point Likert scale had values ranging from 1 to 5 where: 1= Strongly agree, 2= Agree, 3= Neutral, 4= Disagree, and 5= Strongly

disagree. Similarly, a sample size of 120 was taken at first, but the responses were neither reliable nor significant. A purposive sampling technique was used to collect the data because study purpose is to assess the risk tolerance status of investors who invest frequently in different securities. The structured questionnaire set of 390 were distributed to the respondent through electronic media and physically.

Reliability Test: Cronbach's Alpha (N=395)

The obtained alpha score for the variables results from 0.678 to 0.789, which indicates that the scale has internal consistency (reliability). Cronbach's alpha is a reliability coefficient that indicates how well the items are positively correlated to one another. The closer the Cronbach's alpha is to 1, the higher the internal consistency. As a thumb rule, values of below 0.6 are considered to be poor, 0.6 to 0.7 ranges are acceptable and those over 0.7 are good. In the above table, when the sample size is increased, and also when the uncorrelated number of items are removed the alpha scored is reliable.

The data are not normally distributed. We cannot go for parametric test. So, we have to go for non-parametric test. Under non parametric test for the independent sample, kruskal-wallis test has been done in this research paper. Kruskal-Wallis test was conducted to examine the differences on independent variables across the different groups of 395 responses on the basis of their risk taking behavior on more than two categorical variables. And for the variables having two categories are tested by using Mann- Whitney U test. The degree of a respondent's risk aversion is calculated by adding the weights of the answers. Those who scored a total between 7 to 10 are considered as low risk tolerable. Those who scored between 11 to 15 are classified as moderate risk tolerable, and those who scored between 16 to 21 points are classified as high risk tolerable. Cross tabulation method is used to find out risk tolerance level of categorical variables. Regression model is used to find out the effect of investment knowledge and personality traits on risk tolerance level.

Analysis of Results

The data analysis is done using different statistical measures like frequency, percentage, mean, correlation analysis, Kruskal-Wallin test, Mann-Whitney U test and Regression model. The data is presented in the following paragraphs.

Demographic Profile of the Respondents

Table 1 shows the demographic profile of the respondents. Based on the table, 49.9% of the respondents are male, and 50.1% of the respondents are female. It indicates that the female engagement in investment decision making is quite closer. Similarly, in terms of age group, more than half of them (58.5%) of the investors belong to the age group 15-25, which gives the impression that the active investors are young.

Furthermore, the engagement of people who are single in investment is more than the people who are married. Likewise, in terms of occupation 68.1% of the respondents are students. It appears that the people who have unsecured employment options are more interested in investments. Furthermore, 65.6% of the respondents have a master's degree which depicts that investors have a good educational background.

Table 1: Descriptive statistics of Variables

Variables	N	Min	Max	Mean	SD
Investment knowledge	395	1	6	1.7385	0.69723
Personality traits	395	1	6	3.4616	0.97737
Risk Tolerance	395	1.4	4.2	2.522	0.66164

Note. Survey 2023

Table 1 shows that the average score in investment knowledge is 1.7385 which is less than 3 so investors seem to have low investment knowledge. Furthermore, personality traits is 3.4616 and risk tolerance is 2.522,

Table 2: Risk Tolerance Level of Respondents among different Demographic Attributes

Variables		Risk Tolerance Level			Total
		Low	Moderate	High	
Gender	Male	37	120	40	197
	Female	78	88	32	198
Age	15-25	63	112	56	231
	26-35	52	88	16	156
	36-45	0	8	0	8
Marital status	Single	85	136	48	269
	Married	14	64	24	102
Occupation	Student	85	136	48	269
	Employee	14	64	24	102
	Businessman	16	8	0	24
Educational Qualifications	School level	0	16	0	16
	secondary level	8	0	0	8
	Bachelors	16	64	32	112
	Masters	91	128	40	259

Note. Survey 2023

The table 2 represents the distribution of respondents across different categories of the risk Tolerance Level. For this purpose, response of respondents in likert scale form were recorded into different categories. Low risks tolerate, moderate risks tolerate and high risks tolerate. Lowest 25 percent of the risk tolerance responses were found to be maximum value of 2. Therefore, those respondents were categorized as low risk tolerate category. Likewise, highest 25 percent of the response was found to be minimum value of 3. Therefore, those respondents were categorized as high risk tolerate. Remaining 50 percent of responses in between 2 to 3 were categorized as moderate risk tolerate category. It can be observed from the table 4 that single people, students, business man and the individual with high educational qualifications tolerate risk less compared to other demographic characteristics group.

Test of risk tolerance of respondent between gender and marital status

For the purpose of examining the difference in risk tolerance level among gender, Mann-Whitney test has been performed because test distribution risk tolerance follows non- normal distribution. The Mann-Whitney U test, also known as the Wilcoxon rank-sum test, is a non-parametric statistical test used to compare two independent groups or samples to determine if their distributions are different. The result of the analysis is presented in the figure 2.

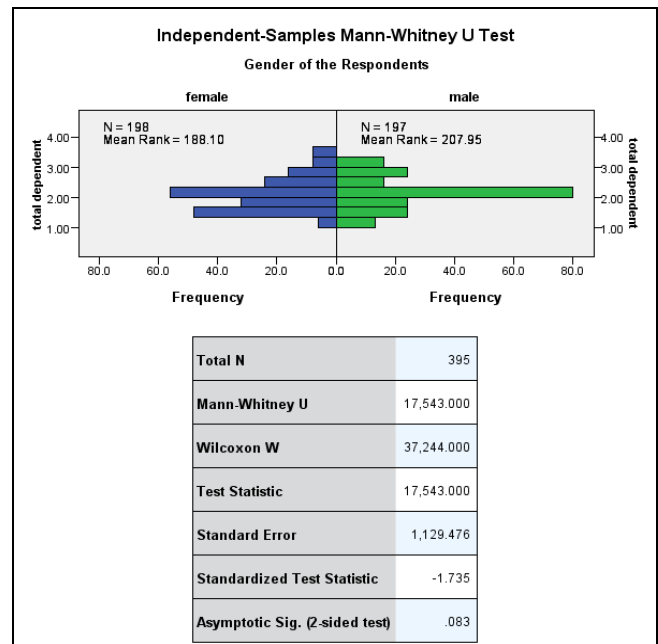


Fig 2: Result of independent sample Mann-Whitney U test of gender of the respondents

The figure 2 presents the result of Mann-Whitney U Test and shows the result of gender of two categories. As presented in the figure 2 it can be observed that mean rank of female is less compared to male (188.10 < 207.95). The P-value of Mann-Whitney U Test shows that the result is insignificant (.083 > .01). Therefore, it can be inferred that there is no significant difference in risk tolerance between male and female.

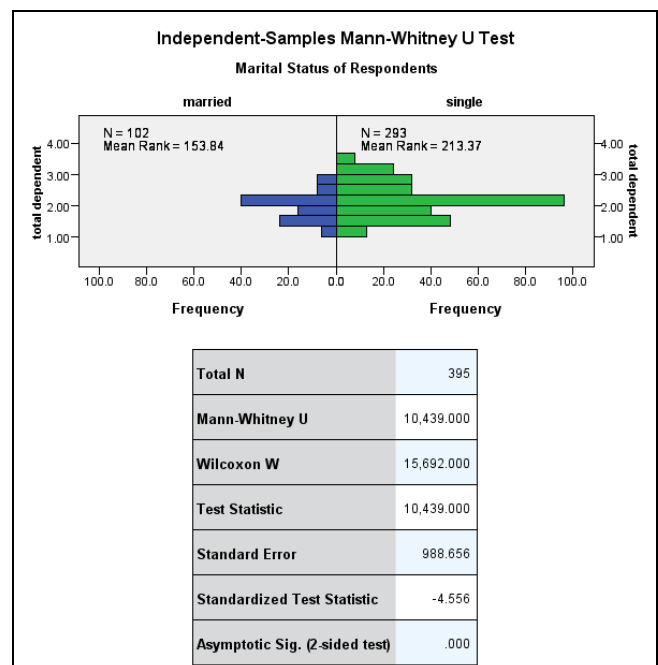


Fig 3: Result of Mann-Whitney U test marital status of the respondents

The figure 3 of Mann-Whitney U Test shows the result of marital status of two categories. As presented in the figure it can be observed that mean rank of married is less compared to single (153.84 < 213.37). The P-value of Mann-Whitney U Test shows that the result is insignificant (.000 < .01).

Therefore, it can be concluded that there is significant difference in risk tolerance between single and married.

Table 3: Hypothesis testing result of Kruskal-wallis test

Alternative Hypothesis	Result
H1: The distribution of risk tolerance is not same under category of gender of respondents	0.107>0.01, H1 is not accepted
H2: The distribution of age is not same across the five categories of risk tolerance	0.000<0.01, H2 is accepted
H3: The distribution of marital status is not same across the two categories of risk tolerance	0.000<0.01, H3 is accepted
H4: The distribution of occupation is not same across the five categories of risk tolerance	0.000<0.01, H4 is accepted
H5: The distribution of educational qualification is not same across the four categories of risk tolerance.	0.000<0.01, H5 is accepted

Note. Survey 2023

The following hypothesis is from a Kruskal-Wallis test, which is a non-parametric test used to compare the distribution of a continuous variable across multiple groups or categories. The test is typically used when the data does not meet the assumptions required for parametric tests like the analysis of variance. In each hypothesis, the null hypothesis (H0) states that there is no difference in the distribution of the variable across the different categories of risk tolerance. The alternative hypothesis (H1, H2, H3, H4, and H5) in each case suggests that there is a difference in the distribution of the variable. The p-values for all the hypotheses are reported as 0.000, which is less than the significance level of 0.01. In hypothesis testing, the p-value is the probability of obtaining results as extreme as the observed data under the assumption that the null hypothesis

is true. A p-value less than the significance level indicate strong evidence to reject the null hypothesis in favor of the alternative hypothesis

Since the p-values for all the hypotheses are less than 0.01, the results suggest that there is significant evidence to accept the alternative hypotheses. Therefore, it can be concluded that there are significant differences in the distribution of these variables among the different risk tolerance categories. The pairwise comparison of categorical independent variables which are gender, age, marital status, educational qualifications and occupation shows at least one of those categories have a significant positive relationship with risk tolerance.

Correlation analysis

It can be observed that there is a moderate positive correlation between Risk Tolerance and Investment Knowledge. There is a weak positive correlation between Risk Tolerance and Personality Traits which indicates that the correlation coefficient is statistically significant at a certain level of significance (usually p < 0.01). This means that independent variables are free from multi-collinearity for performing regression analysis. Likewise it can be inferred that as personality traits increases risk tolerance also tend to slightly increase as well, and vice versa.

Regression analysis

Enter method of regression as well as stepwise multiple regression models have been applied for the purpose of examining the effect of explanatory variables on financial risk tolerance. The result of the analysis has been reported in the session follows.

Table 4: Impact of Explanatory Variables on Financial risk Tolerance of Investors.

Models	Constant	IK	PT	DV Gender Male	DV Marital_Single	R ²	F	Sig
1*	1.590 (0.000)	0.281 (0.000) (1.00)	0.062 (0.070)	0.052(0.419)	0.275 (0.000)	0.160	18.529	.000
2	1.977 (0.000)	0.314(0.000) (1)				0.109	48.182	0.000
3	1.789 (0.000)	0.294(0.000) (0.989)			0.300 (0.000) (0.989)	0.148	34.098	0.000
4	1.594 (0.000)	0.277 (0.000) (0.961)	0.070 (0.031) (0.939)		0.274 (0.000) (0.961)	0.158	24.509	0.000

Note: The reported values are intercepts and slope coefficients of the independent variables with P-value and Variance Inflation Factor (VIF) in parenthesis respectively. * and ** show coefficients are significant at 0.05 and 0.01 level of significance.

The table 5 presents the results of regression model designed to analyze the impact of explanatory variables on financial risk tolerance of investors. The regression model used and the fitted model are;

$$RT_i = \alpha_0 + \beta_1 IK_i + \beta_2 PT_i + \beta_3 DVGenM_i + \beta_4 DV MsSi + \epsilon_i$$

RT _i	=1.590 (0.000)	+0.281 IK (0.000)	+ 0.062 PT (0.070)	+ 0.052 DVGenM (0.419)	+ 0.275DVMsS (0.000)	+ ε _i
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Where, RT, IK, PT, DVGenM, DV MsSi and α0 represents risk tolerance, investment knowledge, personality traits, gender dummy variable, marital status and constant term of the model respectively. Likewise, β1, β2, β3 and β4 are the beta coefficient of respective independent variables. εi indicates unpredicted portion of the model or error term. As presented in the table 5 it can be observed that value of R-square of maximum 0.16 suggests that the models explains 16 percent of variation in risk tolerance. The value

is relatively low however, all of the independent variable's impact is significant at least at 5 percent level of significance and model is free from multicollinearity as value of variance inflation factor (VIF) is less than 5. The coefficient in the outcome of regression analysis table shows the estimated effect of each predictor on the dependent variable risk tolerance. It can be observed from the result based on first model that every 1 unit change in investment knowledge, the risk tolerance is expected to increase by 0.281 units holding the effect of all other explanatory variables constant. Likewise, for each one unit increase in personality traits the risk tolerance is expected to increase by 0.062 units holding the effect of all other explanatory variables constant. Likewise, beta coefficient of dummy variable marital status of 0.275 indicates that risk tolerance of single is higher compared to married by 0.275 units and the effect is significant at least at 5 percent level of significance.

Table 6: Hypothesis Testing result of Regression Analysis

Alternative Hypothesis	Result
H ₆ : There is significant effect of investment knowledge on risk tolerance level of individuals.	P value <0.05, Rejected null hypothesis
H ₇ : Personality traits have significant effect on risk tolerance level of individual investors.	P value > 0.0, Failed to reject null hypothesis

Discussion

Multiple studies conducted in Individual investor's financial risk tolerance are significant in enhancing the knowledge regarding the factors explaining risk tolerance. This study result showed that investment knowledge and personality traits are strong determinants of financial risk tolerance as investment knowledge and personality traits increases the financial risk tolerance would also increase. The result of the study is consistent to the result of (Sharma *et al.*, 2017) [31]. Sharma, *et al.* (2017) [31] study result showed that educated investors were more risk-takers; age also affected risk tolerance significantly, and less wealthy investors were less risk tolerant than wealthy investors. This study result showed that marital status of the individual affect the risk tolerance it is found that single individual risk tolerance is higher compared to married. The result is consistent to the findings of the result of (Yao & Hanna, 2005) [40]. Study result of Yao and Hanna (2005) [40] depicted that Risk tolerance is highest for single males compared to married males then unmarried females and married females. According to research done by Sulaiman (2012) [36], it was concluded that gender of the individual investors and financial risk tolerance were independent of each other, the increase in age increases the financial risk tolerance of individual investors. However, this study results shows the contradiction. In the research performed by Wati *et al.* (2015) [39] educated investors were more likely to take risk, less wealthy investors were found to possess less risk tolerant ability then wealthy investors. Meanwhile, it was found that that there was no such strong relation between age and the level of individual risk tolerance although the risk tolerance of each age group was significantly different. This study result also depicts similar evidences with regard to the risk tolerance of investors in Nepal.

Conclusion

It was found that the distribution of risk tolerance is not same across different categories of age, marital status, occupation and educational qualification, but the distribution of risk tolerance is same across the two categories of gender. There is a significant positive relation between personality traits and risk tolerance. Risk tolerance and investment knowledge are significantly positive. The study reveals that young people especially students who are educated or graduated and are single loves to take risk and are high risk tolerable. Therefore, it can be concluded that risk tolerance level of investors is determined by different homogeneous attributes of investors and homogeneous demographic character bear similar types of risk tolerance level.

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