

Influence of Demographic Variables on Investor's Risk Tolerance Behavior: Empirical Study on Bangladesh

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Abstract

Research purpose: The risk tolerance behavior of an individual investor depends on many factors. This paper focuses on the impact of demographic factors on investors' risk tolerance.

Design/methodology/approach: A structured questionnaire was developed to collect the primary data to find the relationship and influence of demographic variables on the risk tolerance level of individual investors. Six demographic factors are considered as independent variables for the study which are namely gender, age, marital status, education, profession, and annual income level. The risk tolerance level of the investor is considered a dependent variable for the analysis. Data is being collected from the investor who is trading actively in the Bangladeshi financial market through questionnaires survey. Total 436 responses are collected from the investors. The data has tested its reliability and validity through the statistical tool of SPSS-16.

Findings: After analysis of the data, three demographic variables, namely gender, age, and marital status, have a negative relationship with the risk tolerance behavior of the investor, whereas the other three demographic variables, such as education, profession, and annual income, are positively correlated with the dependent variable. It is also found that gender, age, education level and income level have a significant impact on risk tolerance during the investment decision of an individual investor.

Originality/value and practical implications: Financial experts can suggest an investment portfolio for different people who have other risk tolerance levels based on demographic factors.

Research limitation: Collecting data from all over the country is a significant limitation of this study.

Keywords: Demographic variables, Risk tolerance, Investment, Investor, Financial market

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1. Introduction

The pattern of risk preference of an individual investor stimulates to invest in the capital market. The research is mainly focusing the influence of demographic situation on the risk absorption in asset allocation. People invest their surplus amount in the capital market with the hope of earning handsome returns compared to that of the money market. However, their actual earnings sometimes vary from the expected earnings due to market anomalies. The choice of risk preference might be determined by some demographic factors. Investors who have different demographic conditions exhibit different risk preferences while making investment decisions. The willingness to enter an investment where the attainable goal can be achieved but has the chance of loss is called risk tolerance (Kogan and Michael, 1964). Different types of risk preference behavior are found in the market such as risk averse, risk neutral, risk lover etc based on their unique demographic variables such as gender, age, income, marriage, occupation etc.

Risk tolerance is a key determinant that has a vast impact on the investment decision-making of an individual (Roszkowski and Snelbecker, 1990). As risk tolerance considers a key element of investment decision-making, it is a big challenge for both the investor and financial experts for understanding the volume of risk absorbed by the investor. Demographic factors are considered as an atmosphere where individuals make each decision including the financial decision. The demographic factors may have influenced the risk tolerance of the investor. Although Bangladesh has a small area of land, the numbers of the population are huge. Male people are usually earning members of the family in Bangladesh and investing their fund in financial market but few women are investing their funds in the securities market. The risk preference of male gender and female gender might not be similar. Likewise, other demographical variables may vary from one investor to another investor. This study analyzes the influence of demographic status on the risk tolerance behavior of individual investors.

As a rational investor, he/she wishes to ensure a higher amount of return with minimum or zero risk in his/her portfolio decision (Harry Markowitz, 1952). So, risk is considered a pivot element for decision-making in the market for fund investment. The behavior of an individual investor is affected by different personal characteristics and surrounding atmospheres during the decision-making of investment of funds. Surrounding situation refers to the demographic factors of an individual investor. Many researchers have claimed that demographic factors affect the fund investment decision in the securities market.

The core objective of this research is to view the impact of demographic factors on the risk tolerance behavior of investors. For achieving the objective, primary source of data has been gathered from the Bangladeshi investors. Risk is considered as key element for fund investment decision of an individual investor as well as for the investment firms. Investment experts such as fund managers need to know the risk preference level of an individual investor before preparing a portfolio for him/ her. This research is significant for financial advisors and investors to accommodate the risk preference of investor based on

his/her demographic variables. They may also suggest financial instruments that might match their age, level of income, education and risk preference. Besides, policymakers can consider the demographic conditions and risk tolerance behavior of individual investors for developing new policies in the financial sector.

Risk plays a vital role in an investor's investment decision-making. Financial firms need to understand the risk preference behavior. For knowing risk tolerance behavior, researchers find out the demographic factors that determine risk tolerance. Investment experts such as fund managers try to explore the risk preference of an investor before preparing a portfolio. There is some research gap to identify the demographic variables that have positive and negative impact on investment decision making of an individual investor. This research aims to determine the relation and impact of demographic variables on the risk tolerance characteristic of an individual investor in Bangladesh. This study will recognize the key demographic variables that influence the risk tolerance level of the investor in the capital market. It facilitates to understand the investor's heterogeneity based on their demographic factors that shape their preference, limitation, and investment goals. This research is significant for financial advisors and investors have to accommodate the risk preference level and risk tolerance capability based on their demographic condition. They may also suggest financial instruments that might match their age, level of income, education and risk preference. Besides, policymakers can consider the demographic factors and risk tolerance for developing new policies in the financial sector. Different studies have been conducted on risk tolerance behavior in different countries but this study is unique and new for Bangladesh because this research has been conducted to find out the influence of demographic factors on the risk tolerance of the investor in Bangladeshi financial market. And in Bangladesh, there are few studies on investors' risk tolerance level. Moreover, the finding can be supportive of the behavioral finance research fields for further research in the future.

2. Literature Review

Iyer et al. (2024) conducted a study to find out the interaction between demographic factors and behavioral biases in making investment decisions. They found that age and income level of the investors are the key demographical variables for mutual fund investment decision making. They further claimed that gender of the investor plays a vital role for investment decision making and risk acceptance.

Tanchi et al. (2023) found that investors' investment decision is mostly influenced by their self-financial consciousness, the organization's financial performance, macroeconomic variables, and psychological factors, including herd behavior. Ghosh (2022) has done a study on the demographic aspect of investor's investment decision-making in Bangladesh. The researcher considers both primary and secondary data with the objective to get a relationship between demographic variables and investment behavior over 477 respondents. He concludes that the age, gender, education, profession and income of the investor have a strong influence on investors' investment decision in the capital market.

Baruah & Parikh (2018) argued that financial decisions are determined by both the demographic variables and the risk tolerance capability of an individual investor. They found that the level of income of the investor had a significant effect on the risk tolerance level and investment decision from different investment products in the market.

Chavali & Mohanraj (2016) have done a study on the impact of demographic factors on risk tolerance characteristics of investors in the financial market. They explored the risk preference of the investors in different investment opportunities with their demographic situations. The researchers developed a structured questionnaire to survey Bangalore in India and risk tolerance was measured with the help of the model of Grable and Lytton. They proved statistically that age and occupation of an investor have a great influence on investment decision-making and risk preference behavior. Finally, they concluded that gender is the key demographic factor that shapes the risk tolerance level of an individual investor.

Kannadhasan et al. (2016) researched the relationship between demographic, environmental, and psychosocial factors with the risk tolerance of an investor. They surveyed over 951 investors with a structured questionnaire containing demographic factors-related queries. They found that sensation-seeking investors tended to absorb more risk than others. They argued that demographic factors played a significant role on risk tolerance behavior of an individual investor during the investment decisions in the financial market.

Heena (2015) conducted a study to determine the risk tolerance level of the investor from two factors- demographic factors and personality type in India. The researcher surveyed over 258 people with a structured questionnaire. From this study, male investors in the financial market are more risk tolerable than that of female investors. Additionally, the married investors are more risk avoider than the unmarried investors. Besides, the level of income of an investor and risk tolerance capability has a positive correlation. Investors who are doing business as profession have a high-risk tolerance level compared to those investors who work in an organization for salary.

Bashir et al. (2014) found that education and age have a positive consequence on risk tolerance level whereas gender and income level of the investors have a negative impact on risk tolerance behavior of the investor during investment decision-making. They argued that investors' portfolio management is highly dependent on risk preference; and risk tolerance behavior negatively affects the fund management decision of an investor.

Chitra & Jayashree (2014) have found a similar outcome of the study in India where gender, age, academic qualification and experience have strong relation with investment decision-making choices. Similarly, Sadiq & Ishaq (2014) concluded that education, age, income, investment knowledge and experience are positively correlated with the financial market investment decisions in Pakistan.

Jain and Mandot (2012) explored the correlation between demographic variables and risk preference of an individual investor in the capital market. The study was confined to Rajasthan state in India and the sample size was 200. They observed that many investors are highly risk lovers whereas several investors prefer to avoid the risk. The risk preference of the investors is analyzed through statistical tools and found that some demographical variables such as age, marriage, education, profession, and income level are the key factors for different risk tolerance of the investor in the financial market.

Dash (2010) researched on the key factors affecting the investment decisions to find the impact on the risk tolerance behavior of investors during decision-making. He collected data from primary sources data through questionnaires in India. The targeted samples were those investors who invested in the market regularly instead of the amount of investment and the sample size was 456. The researcher considered some demographic variables- age, gender, residential areas, profession, and annual income for the study. Among the factors, the researcher concluded that the gender and age of the investor greatly influenced the risk preference.

Rajarajan (2003) researched in India to find the relation and influence of demographical conditions on investors' risk tolerance capacity. The researcher concluded that demographic factors have a great influence on the risk-bearing capacity of investors. The study found that age and income level played a vital role on the risk tolerance capacity of the investor.

Grable & Lytton (1998) analyzed the risk tolerance behavior of the investor based on demographic variables among 1992 respondents. They found that education gender, employment, and income level are the key factors for determining the risk preference of an investor. They concluded that gender and education are the main determinants of risk tolerance behavior of an individual investor.

Horvarth and Zuckerman (1993) argued that demographic and socio-economic factors had a great dominance on the risk tolerance capacity of an individual investor. In their study, they considered 447 respondents and checked their behavior on risk.

Roszkowski et al. (1993) considered 12 demographic variables for understanding the risk tolerance behavior of investors. Among them, only six factors are statistically significant for determining the risk tolerance level of investors. They revealed that the risk tolerance behavior of an investor reduces when the age of the investor increases. They argued that male investor has more risk tolerance than that of female investor. They explained that the unmarried investors are more risk tolerable than the married investors because the married investors might ensure the flow of funds for running the family. Higher-income group investors are more risk seekers than low-income group people. Self-employed investors have more risk tolerance capacity than that of other type of profession. Hallahan et al. (2003) identified a positive correlation between demographic variables and the risk tolerance characteristic of the investor. They concluded that high-income level investors have more risk tolerance capacity than other income group people.

The above-discussed literature includes the relation and the impact of investment decision making, portfolio management, demographic variables, and risk tolerance level in different countries whereas this study is unique and new for Bangladesh because it works for finding the influence of demographic factors on the risk tolerance of the investor in Bangladeshi financial market. These studies has the lacking of considering all the demographic variables composite effect, holistic view of demographic and socio-economic effect on risk preference and tolerance. Additionally, there are research gap on investor's personal traits of risk preference, previous investment experience, capital market volatility, different stages of life and its goal. The current study put more emphasis on demographic variables such as gender, age, marriage, education, profession, and income level to find out the relation and influence on the risk tolerance capability of Bangladeshi investor. It will be helpful for investors, financial experts, brokers, dealers, and policymakers to take important decisions regarding investor behavior, risk preference and demographic factors.

3. Research Design

3.1 Research Objectives

The study has been developed to attain the following objectives:

- i. To find out the key demographic variables that influences on the risk tolerance level of an individual investor.
- ii. To examine the relationship among the selected demographic factors with the risk tolerance behavior of an investor.

3.2 Research Hypotheses

The research has designed to find the impact of demographic variables on the risk tolerance behavior of an investor during fund investment decision-making. Hypotheses of different demographic factors will be tested with the help of statistical tests for finding the significant factors. These hypotheses are developed for testing which is as follows-

Table 1: Research hypotheses

Independent Variables	Hypotheses
1. Gender	H ₁ : Gender has a noteworthy statistical influence on the risk tolerance behavior of the investor during investment decision-making.
2. Age	H ₁ : Age has significant impact on an individual investor risk tolerance behavior.
3. Marital Status	H ₁ : Marriage has a great dominance on the risk resilience behavior of an individual investor.
4. Education	H ₁ : Education level has strong influence on investors' risk tolerance behavior.
5. Profession	H ₁ : Profession category has great impact on the risk tolerance capacity of the investor.
6. Income Level	H ₁ : Level of income contributes a vital role for investor's risk tolerance characteristics.

4. Methodology of the Research

This research is conducted to find the relation and impact of demographic variables on the investor's risk tolerance behavior. Primary data has considered for the study. Questionnaire survey has been conducted among investors to acquire the data. The study is descriptive but the hypotheses are tested statistically, and for that reason, the qualitative data is converted into a quantitative format with the help of the Likert scale model.

4.1 Variables Definition

Table 2: Definition of variables

Dependent variables	
Risk Tolerance	The quantity of risk that an investor can tolerate during investment decision-making is considered as risk tolerance level. It can be identified by checking the risk-taking behavior during investment decisions.
Independent variables	
1. Gender	Human behavioral traits vary from one to another based on the sex. The gender of the investors is classified as male and female which are common in Bangladesh. Male and female investor's risk tolerance behavior is also a sub-goal of the study.
2. Age	Age refers to the stages of life. As the age goes up, people become more experienced and knowledgeable. No one can invest any funds in his/her account below 18 years old in Bangladesh. So, the minimum age range starts from 18 years. It considers different groups such as young people, middle age people, older people etc.
3. Marital Status	Marriage infers social relationships with others. It is a status in the civil society. Typically, a person should take responsibility for other or a family after marriage another person.
4. Education	Education is the formal instruction of everything. Education enhances the knowledge and experience of the people. People can learn from both formal and informal education. For this study, only the formal education level is considered by the investors.
5. Profession	Profession refers to the activity in which a person is involved to earn a livelihood. Occupation infers the earning source of an investor. The most popular occupations in Bangladesh are considered for this research.
6. Income Level	Generally, income indicated the regular flow of earnings from any activity. After consumption, a portion of income is saved by the people. And the savings turn into investments. The income level of an investor is a crucial factor for investment.

4.2 Data Collection and Sampling

For this study, questionnaire survey is used to gather the primary data. The questionnaire includes demographic variables related queries and risk tolerance behavior questions. The survey is the only method of data collection for this research. Data is acquired from the capital market investors who are trading actively in the market through printed

questionnaires, face-to-face interviews and social media. The numbers of investors who are actively trading in the financial market are not as much as the total population mostly from Dhaka and Mymensingh division in Bangladesh. No response has been collected from the investors whose age below 18 years because nobody can invest in the market below 18 years old. This questionnaire has been distributed to investors with the help of Google Forms. According to Gordon model the data size must be $384 \pm 5\%$ for large population. As the number of investors in Bangladesh is more than 10,000, the sample size must be around 384. So, a total of 500 questionnaires were distributed and received 436 filled up questionnaires. Therefore, the sample size is 436.

4.3 Research Method

The deductive research method has been used for this investigation to find out the impact of demographic variables on the risk tolerance behavior of an individual investor. The data is collected in the qualitative method through a questionnaire. For statistical analysis, the qualitative data is converted into the quantitative method by using the sequential number with the help of the Likert scale. Moreover, the collected data from the respondents is explained descriptively to get a generalized overview of demographic factors.

4.4 Data Analysis

Primary data is collected through a questionnaire survey for this study. Generally qualitative study is explained by descriptive analysis. Besides, discriminant analysis is also suitable for describing the impact of demographical factors on the risk tolerance behavior of investor. The reply of the investors has converted into sequential numbers on the Likert scale. SPSS is the statistical tool which is used for factor analysis. A simple regression method doesn't provide a good direction for this study as the data is categorical. For categorical data analysis and determine the significant association between two variables, Chi-square test provides the best result. The Chi-square test has been used for finding the impact of demographical variables such as age, gender, marriage, and education on investor's risk tolerance capacity. Besides, other statistical tools have been considered to test the normality of the data and find the correlation between the demographic variables and risk tolerance capacity of an individual investor. To test the hypothesis of this research, the chi-square test is fruitful because the data non-parametric. For data analysis, level of error is 5% to explain the research.

5. Result Analysis and Discussion

The collected data is sorted and analyzed to find out the trend of the responses. Descriptive research infers that the data is examined and explained with the support of tables, and graphs. The result from the survey is analyzed with the statistical tool of SPSS and discussed broadly to draw conclusions regarding the impact of demographic conditions on risk resilience capability of an individual investor.

5.1 Data Reliability

Table 3: Data reliability check

Cronbach's Alpha value	Number of variables
0.813	7

It is important to ensure that the dataset for the study is valid and reliable to draw a conclusion; otherwise, the finding will not add any value to the field of research. Data reliability checking infers the consistency of the replies from the respondents in a qualitative study. Besides, it measures the similar meaning of a question to different respondents. Cronbach's Alpha is one of the most used statistical tools that examine the reliability of the dataset. When the value of reliability statistics becomes higher, it is assumed that the dataset is more consistent and reliable for the research. The least acceptable value of Cronbach's Alpha is 0.70 for the internal consistency of data for a study. The higher the Cronbach's Alpha value of a dataset, the better reliability of the study is. The alpha value of this study is 0.813 which is higher than the minimum alpha value for data reliability check. So, the dataset is valid and reliable for finding conclusions regarding the influence of demographic factors on investors' risk tolerance. And, it can be inferred that most of the respondents assume the identical meaning of the questions and the answer is consistent with others.

5.2 Multicollinearity Test

Table 4: Multicollinearity check

Multicollinearity Value		
Demographic Variables	Tolerance Level	Variance Inflation Factors
Gender of the investor	0.941	1.063
Age of the respondents	0.969	1.032
Marital Status	0.934	1.071
Education	0.982	1.018
Profession	0.927	1.079
Income Level	0.923	1.083

Demographic variables such as gender, age range, marriage, education, profession, and annual income level are considered as independent variables whereas risk tolerance is as dependent variable for this study. Before finding out the impact of independent variables on dependent variables, it is important to know the internal relationship among independent variables. If there is high correlation among independent variables, the study is not able to provide a good result. So, it is significant to find out the internal correlations of the independent variables. Multicollinearity tests need to be done before moving forward with the analysis of the study. The multicollinearity test is a statistical check for the correlation of the independent variables. Variance inflation factors (VIF) are the popular tool for discovering multicollinearity. The study is considered as multicollinearity problem when the VIF value of any independent variable becomes greater than 2. So, the value of VIF should be below 2 for moving forward with the analysis of any research. From this study, the value of VIF of all independent variables such as gender, age, marriage,

education, profession, and income level is lower than 2. So, the study is free from multicollinearity problems.

5.3 Descriptive Analysis

5.3.1 Gender

Table 5: Gender frequency

Gender of the investor	Frequency	Percentage
Female	148	34%
Male	288	66%
Total	436	100%

Source: Questionnaire survey

Human beings are differentiated based on their gender in society. Human behaviors', norms and roles vary from one gender to another. Male and female are the common gender in human beings. 288 respondents of the survey are male which represents 66% of the total investors. 148 respondents out of a total of 436 respondents are female, and the proportion is 34% of the respondents. It can be inferred from the table that a greater number of male investors invest their funds and trade actively in the financial market than those female investors.

5.3.2 Age range

Table 6: Age frequency

Age Range	Frequency	Percentage
18 – 25	48	11%
26 – 35	70	16%
36 – 45	170	39%
46 - 55	105	24%
56 – 65	35	8%
Above 65	8	2%
Total	436	100%

Source: Questionnaire survey

Age of the investor is considered as an important demographic factor to analyze the financial market investment decision-making. Different age range infers different stages of life such as young, middle age, and old age etc of an individual. For this study, the age of the investors is categorized into different six groups. The highest portion of respondents is 39% and their age ranges from 36 years to 45 years. The second largest group of respondents is from 46 years to 55 years old. Bangladeshi government and rules are not permitted any person whose age is below 18 years in the financial market in their account. So, the first age range group starts from 18 years and the portion of respondents is 11%. The last portion of respondents from the survey is old age people whose age above 65 years. Young investors whose age is below 35 years are almost a quarter but the number is lower than that of middle age whose age range is between 35 years to 55 years. From this study, most of the investors are in middle age. And it can be concluded that people start

their career at an early age when they are not saved enough to invest in the market or some people take more time to start a job or business but middle age people are the highest number of active traders in the financial market because they might be in the middle stage of their career and interested to invest the surplus fund in the capital market. A few numbers of old age respondents are older age whose age is above 55 years. It can be suggested that older age people need cash for their medical purpose as well as they want to put that fund in liquid form. Senior citizens of Bangladesh are not interested in investing their funds in capital markets. Therefore, different age group of people is investing their fund in the financial market to earn a return and their preference towards risk may vary from one to another.

5.3.3 Marriage

Table 7: Marriage frequency

Marital Status	Frequency	Frequency Percentage
Not Married	87	20%
Married	345	79%
Single/Divorced	4	1%
Total	436	100%

Source: Questionnaire survey

Marriage refers to the bondage between a man and a woman by social rules or cultural customs. It is also a legal matter that infers the rights and responsibilities of the partner. Marriage creates extra responsibility for the spouse and the family. From this survey, most of the investors are married and the respondents' number is 345. Only 1% of the respondents are single in their life. 20% of investors from this research are unmarried. From the frequency table, the highest portion of the investors is married but a significant portion of unmarried investors' are also invested their funds in the financial market. Married people have to take responsibility for their spouses and family. Risk preference may vary between married and unmarried investors.

5.3.4 Education level

Table 8: Education of the investors frequency

Educational Status	Frequency	Percentage
Below School Certificate / Equivalent	31	7%
SSC / Equivalent	61	14%
HSC / Equivalent	70	16%
Undergraduate/ Honor's / Degree/ Equivalent	166	38%
Graduate/ Master's / Equivalent	104	24%
Doctoral degree/ Post-doctorate	4	1%
Total	436	100%

Source: Questionnaire survey

Education refers to learning from formal institutions. An individual gathers knowledge and skills from formal learning. The investment decision is assumed as complex because the return from the financial market considers a lot of factors. For that reason, there is a common myth that educated people can take better investment decisions rather than illiterate investors. The highest portion of respondents (38%) has a bachelor's or equivalent degree. The second highest portion of investors (24%) has a graduate or equivalent degree. Only 31 respondents reply that they do not have a higher degree than SSC or equivalent. Approximately one-third of the investors do not have a university degree like an honors or equivalent degree. Only 1% of respondents have a PhD or post-doctorate degree. From the table, it can be concluded that most of the investors who actively trade in the financial market have graduation degrees. And their knowledge may help them to take better investment decisions for them.

5.3.5 Profession

Table 9: Profession frequency

Profession	Frequency	Percentage
Housewife	9	2%
Businessman	74	17%
Private services	214	49%
Public services	70	16%
Unemployed	4	1%
Part-time	30	7%
Retired	35	8%
Total	436	100%

Source: Questionnaire survey

Occupation refers to the tasks or jobs that earn a livelihood. People spend a significant amount of time earning their livelihood. People in Bangladesh are involved in diverse types of professions such as businessmen, public service, private service, homemaker, part-time jobholders etc. Almost 50% respondents of this survey are private jobholders, and the number of investors is 214 out of 436 respondents. 17% of the investors are businessmen which is the second highest portion of the respondents. Unemployed person is the least portion of participants for this study because they might not trade actively due to lack of funds. Housewife is the second least portion of respondents in this survey. Besides, public jobholders are also trading in the financial market but the number is lower than that of private service holders. Part-time job holders are participating in the financial market to put their funds with the hope of higher returns. 8% of the investors are retired from their jobs. Although the private service holders are interested to put the fund in the capital market, people from other professions are also trading actively and making investment decisions regarding their funds.

5.3.6 Income level (annual)

Table 10: Income level frequency

Annual Income Level (Taka)	Frequency	Percentage
Below 2,00,000	48	11%
2,00,001 to 4,00,000	84	19%
4,00,001 to 6,00,000	122	28%
6,00,001 to 8,00,000	100	23%
8,00,001 to 10,00,000	39	9%
10,00,001 to 12,00,000	26	6%
More than 12,00,000	17	4%
Total	436	100%

Source: Questionnaire survey

Income is related chiefly to occupation. It refers to the flow of earnings from the profession or any legal sources. For this research, the annual income of an individual investor is considered with different ranges. From the table, half of the respondent's annual income ranges from Bangladesh taka (BDT) 4,00,000 to BDT 8,00,000. The highest portion of investors' income range starts from BDT 4,00,001 to BDT 6,00,000. 100 respondents out of 436 investors earn BDT 6,00,001 to BDT 8,00,000 in a year. The last portion of the respondent's annual earnings is above BDT 12,00,000. From the table, it can be concluded that most of the investors' earning level is below 8,00,000 taka per annum. It can be written from the above table that as the income level rises the responding percentage declines. Approximately one-third portion of the respondent's income level is below 4,00,000 per year which means the monthly income is around 30,000 take. People invest their funds in the financial market after meeting their needs such as basic needs, child education, entertainment etc.

5.4 Statistical Evaluation

5.4.1 Correlation analysis

Table 11: Correlation matrix

	Gender	Age	Marital condition	Education level	Profession	Income level	Risk tolerance
Gender	1						
Age	-0.048	1					
Marital condition	0.109	0.099	1				
Education level	0.018	0.082	-0.056	1			
Profession	-0.032	0.072	-0.216	0.056	1		
Income level	-0.176	0.082	0.000	-0.072	0.175	1	
Risk tolerance	-0.198*	-0.318**	-0.192**	0.135*	0.035	0.435**	1

** - At 1% level of significance.

* - At 5% level of significance.

The correlation matrix represents the relation among variables. The above table shows the relation of positive and negative relation between the risk tolerance behavior and the demographic variables. It also measures the linearity of two or more variables. Among six independent variables, three factors such as gender, age, and marriage are negatively correlated with risk tolerance level. Another three variables such as education level, profession and annual income level are positively related with the risk tolerance behavior. For this study, a 5% level of error is considered for finding the significant factor. Five factors except for the occupation of the investor are statistically significant variables and they maintain the stated relation with the dependent factor. Among the statistically significant variables, three factors as age, marriage, and annual income of the investor have the highest level of confidence with a 1% level of significance. From the statistical analysis, gender is negatively correlated with the risk tolerance capacity of the investor; and the correlation value is -0.198. Age has also negative relation with the risk tolerance behavior of an individual investor at a 1% level of significance. Marriage has negative correlation with the risk tolerance behavior as well whereas the annual level of income of the investor is positively correlated with risk tolerance behavior at a 1% level of significance. Additionally, education has a positive relation with risk preference at a 5% level of significance. Although the profession is not statistically significant, it has positive correlation with the risk tolerance capacity of an individual investor.

5.4.2 Chi-Square test

The core objective of this research is to find out the influence of demographic factors on risk tolerance capacity of an individual investor. For achieving the goal, the chi-square test will provide the best output for categorical data to find the impact of demographic factors of a qualitative study by testing the hypothesis. Chi-square analyzes the impact of one independent factor with the dependent factor and helps to decide for hypothesis analysis. Six independent variables such as gender, age, marriage, education, profession and annual income level are checked for the significance level with the dependent factor of risk tolerance capacity. The response from investors is analyzed to determine the effect of one independent factor on risk tolerance level using a statistical tool named SPSS-16.

5.4.3 Gender

Table 12: Chi-square test of gender

Independent Variable- Gender	Chi-Square Value	Degree of Freedom	Significance Level	Hypothesis Result
	23.23	11.01	0.000	Accept the alternative hypothesis for gender

Pearson chi-square test result for gender is statistically significant at 100% confidence level. The research hypothesis that gender variable of the demographic factors has a noteworthy statistical influence on the risk tolerance behavior of the individual investor during investment decision-making is accepted. The male or female gender of the investor has a strong impact on risk tolerance characteristics in the financial market investment. As the

null hypothesis of the research is rejected, the study has found a significant consequence of gender variation on risk tolerance.

5.4.4 Age

Table 13: Chi-square test of age variable

Independent Variable- Age	Chi-Square Value	Degree of Freedom	Significance Level	Hypothesis Result
	13.21	29.01	0.001	Accept the alternative hypothesis for age

The table represents the test outcome with a significant level which facilitates the hypothesis testing. The chi-square test value is 13.21 at a 0.1% level of significance. So, the alternative hypothesis for age is accepted; and the age of the investor has a strong impact on risk tolerance behavior. Alternatively, the age of the investor has a significant impact on an investor's risk tolerance during investment decisions as the research hypothesis is accepted. Therefore, different age level of the investor has different risk preference in Bangladesh.

5.4.5 Marriage

Table 14: Chi-square test of marriage factor

Independent Variable- Marriage	Chi-Square Value	Degree of Freedom	Significance Level	Hypothesis Result
	9.28	10.01	0.152	Reject the alternative hypothesis for marriage

The chi-square test table for marriage of the respondents shows the value, degree of freedom and the significance level of error. As the significance level of error of this variable is 15.2% which is higher than the estimated level of error of 5%, the research hypothesis must be rejected. So, the data can be explained as the marital position of the individual investors has no significant impact on risk resilience behavior during investment decision in the financial market. Although married and unmarried investors' investment decision does not influence risk preference, it has a negative relation between marriage and risk tolerance capacity of an individual investor in the capital market.

5.4.6 Education

Table 15: Chi-square test of education

Independent Variable- Education level	Chi-Square Value	Degree of Freedom	Significance Level	Hypothesis Result
	15.23	20.01	0.001	Accept the alternative hypothesis for education

The hypothesis test for the education variable is statistically meaningful at a 0.1% level of error. As the probability of significance level is 0.001, the alternative hypothesis of

education has been accepted. So, education has significant dominance on investors' risk tolerance behavior during financial market investment decisions. Educational level enhances the knowledge of the investor to take a better decision during capital market investment. And, educated people analyze the risk more than the less educated investor before putting the fund into that project.

5.4.7 Profession

Table 16: Chi-square test of profession/occupation

Independent Variable- Profession	Chi-Square Value	Degree of Freedom	Significance Level	Hypothesis Result
	16.18	23.01	0.150	Reject the alternative hypothesis for profession

Chi-square test information for the profession of the investor is mentioned in the above table. The significance probability is 15% which is higher than the considerable level of error (5%). So, the research hypothesis is rejected. It can be suggested that there has no impact on the profession of the risk tolerance behavior of the individual investor. Although the profession determines the earnings of an individual investor, it has no direct effect on risk preference.

5.4.8 Income level

Table 17: Chi-square test of income

Independent Variable- Income level	Chi-Square Value	Degree of Freedom	Significance Level	Hypothesis Result
	24.18	10.01	0.000	Accept the alternative hypothesis for income level

The chi-square test table for income level represents the chi-square value of 24.18 and the significance level of error. As the significance level of error of this hypothesis is 0% which is lower than the estimated significance level of error (5%), the alternative hypothesis has been accepted. So, the income level of an individual investor has a strong influence on risk resilience capacity of investors during the capital market investment.

6. Findings of the Study

From the analysis, the demographic variables have both the positive and negative relations with the risk tolerance behavior of the investors. From the correlation table, five demographic factors except the profession have a statistically meaningful relation with the risk tolerance capacity of the investor. From the hypothesis test, four demographic variables except marriage condition and profession have a statistically significant influence on investors' risk tolerance behavior. For this study, it has been assumed that the collected data is free from error and normally distributed. Additionally, the level of error for this research is considered at 5%. Gender has negative relation with and strong influence on the risk resilience capacity of the investors. Male investors have shown more risk seeker

than female investors. This situation may occur due to the social structure of Bangladesh where the society is dominated by male people. Female investors are considered a lot of things before investing money in the financial market, and risk preference is the key dominant factor in making capital market investment decisions.

Financial institutions, financial advisors, and policymakers should develop gender-based financial instruments for their goals and risk tolerance behavior to increase all gender's market participation. Additionally, they should design effective and inclusive financial policies for female investors to include them in the financial markets. The age of the investors is statistically significant in both the hypothesis test and correlation matrix. Age factor of the investor has negative correlation with the risk tolerance capacity. It infers that the risk preference level will decline as the age of the investor increases. Besides, age is considered a key demographic factor that determines the risk tolerance behavior of the investor. Young age investors are generally taking more risks compared to the older age investor because older age people need to bear the family expenditure, child's educational expenses, and medical expenses which are larger than young people. But few people can invest more funds at the early stage of their life due to fewer amounts of funds whereas the middle age people invest more funds in the financial market with their risk preference. The highest portion of the investors who invest their funds in the capital market is middle age people. So, regulators, financial institutions, policymakers can design financial products based on the age and goals. Marriage variable is negatively correlated with the risk tolerance capacity of the investor. The married investors are seemed to be more risk avoider than the unmarried investors because married people must obey the social rule to maintain the family. Married people have more responsibility in society than unmarried people. Although the marital position is statistically significant in the correlation matrix, it has no statistical significance. Education has positive relation with the risk tolerance behavior of investors. Since investors have enough knowledge and skills to analyze the market and security, they consider more risk for a higher return on the investment. Most knowledgeable investors can estimate the risk and return from the investment in the financial market.

Education is also statistically significant in hypothesis tests. And it has proved that education as a demographic factor has a strong impact on the risk tolerance level of the individual investor. As education is the most powerful determinant of financial behavior, the policymakers should more emphasize on it. Policymakers can arrange workshop or seminars to share financial literacy among general and less educated investors. Additionally, financial institution can launch special financial instruments for educated investors. The profession of the investor is considered a demographic factor for this research. Although the profession is not statistically significant in both hypothesis tests and correlation analysis, it has a positive relation with the risk tolerance of the investor. The annual income level of the investor is the last demographic variable of this study which is statistically significant in both the hypothesis test and correlation analysis. Income and risk tolerance capacity of the investor are positively correlated with each other. As the income

goes high, the investor will presume to take more risk. Moreover, income level of the investors has a great consequence on the risk preference of the investor during financial market investment decision. Mutual funds and financial institutions should categorize financial products based on their income to tolerate the risk level. And policymakers need to formulate financial policies and strategies for investor's financial protection, financial inclusion, and market participation. After all, demographic conditions of the individual investors have a strong influence on the risk resilience capacity of investors in Bangladesh. Investment organizations, mutual fund, brokerage houses, and consultant need to customize the portfolio according to the demographical factors and policy makers should formulate proper strategies based on the demographic variables on capital market investment and financial inclusion.

7. Conclusion

Financial investment decision is mostly dominated by the risk preference of the investor. Risk is considered a key determinant of the capital market investment decision. Investors must consider risk tolerance before taking an investment decision. Demographic variables of investors contribute a vital role on risk tolerance behavior. It has been found from the hypothesis testing that the demographic factors have great influence on the risk resilience behavior of the investor in Bangladesh. Among six demographic variables, only four variables such as gender, age range, education and level of income are proven as statistically significant and those factors have a strong influence on the risk tolerance behavior of the investors during investment decisions in the financial market. Gender, age range and marriage are negatively correlated with the risk preference of the investor whereas education, occupation and annual income level have positive relation with the risk tolerance capacity of the investors. Although marriage and profession are not statistically significant for the study, these two demographic variables have a strong influence on the financial market investment decision of an investor. Both objectives of the study have been achieved by analyzing the data. Financial experts can suggest classifying assets into different categories or portfolios for different people who are differentiated from each other based on demographic factors. Moreover, the policymakers and government should encourage women to take part in savings and investment in the capital market and launch a special type of security for female or young investors. The study has been conducted mainly in Dhaka and Mymensingh divisions. So, the findings might vary in different divisions in Bangladesh. Collecting data from all over the country is a big limitation of this study. Moreover, the respondents' and non-respondents' errors might change the findings of the study. Further research can be done broadly by collecting samples from all over the country and by including some variables such as birth order in the family, total net worth amount, psychological biases, and financial satisfaction of the individual investor. Moreover, the risk resilience behavior of the knowledgeable investor will be an area of future research.

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