

# A Critical Review of Research on Financial Risk Tolerance

Prasenjit Roy, S. K. Singh



**Abstract:** This paper conferred the objective to conduct a critical review of research on Financial Risk Tolerance. A total of 58 research papers were reviewed and published between 2000 and 2022. This investigation has been split into three sections. Firstly, focused on various types of personality. Secondly, have to do with Six demographic variables, and the remaining with various objectives. Tables and graphs were used to demonstrate the basis of the year of publication, the belonging country, the types of data, the objectives of the research, and the statistical tool used. Findings show that more no. of research had been done during the last decade, and India shares the most no. of research papers. Nearly 75% of research is based on primary data. Grable's 13-item questionnaire and 5-point Likert Scale are used often. Descriptive Statistics, Cronbach alpha, correlation, and regression are a few most common tools utilized in research papers.

**Keywords:** Critical Review, Financial Risk Tolerance, Risk Aversion, Big Five Personality, Type A & Type B Personality

**JEL Classification:** D14, D81, G02

## I. INTRODUCTION

In Behavioural finance, two schools of thought are considered the main inspiration for an investor's behavioral actions. Behavior that can be influenced by demographic features represents the first school of thought. Demographic features possess an investor's conditional characteristics, which can be measurable. In this research paper, age, gender, marital status, income level, education, and occupation are the demographic characteristics that are mainly brought into consideration, to scan the link between financial risk tolerance and investor demographics (ayuub et al., 2015 [3]; Bayar et al., 2020 [5]; Dohmen et al., 2005 [11]; Eker & Anbar, 2010 [12]; Faff et al., 2009 [13]; J. E. Grable, 2000 [20]; Hallahan et al., 2004 [23]; Hendrawaty et al., 2020, [25]; Kannadhasan, 2015, [30]; Mabalane, 2015 [33]; Mishra & Mishra, 2016 [35]; Reddy & Mahapatra, 2017 [44]; Shah et al., 2020 [50]; Shusha, 2017 [51]; Silvia Sutejo et al., 2018 [52]; Sulaiman, 2012 [54]) & whereas the psychological characteristics that bring impact belong to the second school of thought. These characteristics affect the equanimity of the investors' overconfidence, representativeness, heuristics, and conservatism.

The personality of an individual can be outlined as a set of traits and psychological dimensions to overview the harmonious pattern of thoughts, feelings, and actions. This paper mull over the models of personality for instance the big five personality factors, Type A and Type B Personalities, and Myers Briggs Personality Types that brought up the correspondence between personality factors and risk tolerance (Anic, 2007 [1]; Dhiman & Raheja, 2018 [9]; Ferreira, 2019 [15]; Jameel & Siddiqui, 2019, [29]; Lawrenson & Dickason-Koekemoer, 2020 [32]; Mathur & Nathani, 2019 [34]; Pak & Mahmood, 2015 [38]; Pan & Statman, 2012 [39]; Pinjisakikool, 2018 [40]; Rai et al., 2021, [43]; M. Sadiq & Amna, 2019 [46]; M. N. Sadiq & Akhtar, 2019 [47]; Thanki, 2015 [55]; Thanki et al., 2022 [57]; Thanki & Baser, 2019 [56]; Vaibhav & Mehak, 2020, [58]). According to (John. E. Grable & Lytton, 1998 [22]), a rational investor is dependent on four major fundamental inputs for progressing monetary and investment plans. These inputs are (i) goal, (ii) time horizon, (iii) financial stability, and (iv) financial risk tolerance (FRT). Whereas, (Dickason & Ferreira, 2018 [10]) identified personality and risk tolerance level as influencing factors for an individual investor's investment decision. Financial risk tolerance (FRT) is an omnipresent string of words used among financial advisors and investors. To define properly. Financial risk tolerance is the highest degree of unfavorable chances that an investor is willing to acknowledge while reaching any financial decisions (Eker & Anbar, 2010 [12]; Faff et al., 2008 [14]; J. E. Grable, 2000 [20]; Hallahan et al., 2004 [23]). Financial risk tolerance levels could be different, according to different investment backgrounds. For instance, investors who belong to a well-established family may not show a high level of financial risk tolerance compared to those who did not belong to a well-established family. Financial risk tolerance levels could vary for different investors for the same financial opportunity. Investors tend to take a higher level of financial risk to earn a superior and better level of financial return in a slow run, increasing their personality for adapting to the tolerance level and their fortune. On the contrary, if investors failed to valuation their risk tolerance balance, financial planning, and decision will perform wrong and start out performing negative returns and leaving misunderstanding and vague position.

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\*Correspondence Author(s)

Prasenjit Roy\*, School of Commerce and Business Studies, Junior Research Fellow, Faculty of Commerce, Jiwaji University, Gwalior (M. P), India. E-mail: [i\\_prasenjit@jiwaji.edu](mailto:i_prasenjit@jiwaji.edu), ORCID ID: [0000-0003-2523-0091](https://orcid.org/0000-0003-2523-0091)

S. K. Singh, School of Commerce and Business Studies, Dean, Faculty of Commerce, Jiwaji University, Gwalior 474011 (M.P), India. E-mail: [shivkumar67@gmail.com](mailto:shivkumar67@gmail.com)

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## II. LITERATURE REVIEW

### A. Research Papers Have to Do with Various "Types of Personality"

(Anic, 2007 [1]) provide a comprehensive view of factor influencing the Five Factor Model of an individual personality virtue with the hypothesis that three out of five traits under the Five Factor Model viz.

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conscientiousness, neuroticism, and agreeableness performs shallowly with risk-taking while the other two viz. extraversion and openness traits of personality perform excellent with risk-taking behavior. After analysis, it was found that openness scored high whereas neuroticism and agreeableness scored low with risk-taking. Furthermore, only openness charges with risk-taking when data are stratified according to gender.

(Pan & Statman, 2012, [39]) explore the synopsis for various models such as the Big five, Myres-Briggs, and Keirsey Models of personality. A sample size of 2500 was gathered from 'keirsey.com' to explore the channel among luck, skill, and life satisfaction with risk tolerance level, overconfidence, trust, and regret level. The data analysis concludes that a high level of extraversion in the personality is correlated with a high amount of risk tolerance level and overconfidence level. Similarly, a high level of openness makes personality more risk tolerable. Whereas, personalities with high conscientiousness are less tolerance power for financial decisions.

(Pak & Mahmood, 2015, [38]) understand the correlation among traits of the personality, mindset for taking risks and investment decisions in Kazakhstan: a post-soviet transition country. 20 questions were framed, referring to 4 questions for each trait of the big five personality model. This study tries to coach awareness among probable investors and marks the personal characteristics to include in the process of passing the advice to private investors. A positive result was between extraversion and openness, while a negative result was found between agreeableness, conscientiousness, and neuroticism.

(Thanki, 2015, [55]) work mainly provide a constructive view of the Type A and B personality model. This research paper presents the correlation between demographic characteristics and investors' performance under distinct personality traits. Cross-sectional descriptive research was conducted to measure with a quiz on 'Investment Risk Tolerance'. Findings show a convincing affair between tolerance level and income level but a unique behavior is sorted out that after increasing above a certain limit of income, the marginal rate of increase in risk tolerance level decreases. Furthermore, it is found that Type B personality people take lower risks than Type A personality, people.

(Dhiman & Raheja, 2018, [9]) studied the existing affair of risk tolerance with magnitudes of emotional intelligence and traits of personality. Emotional intelligence such as empathy, social skills, self-awareness, handling awareness, and motivation was used as the dimension for the study. This study shows the fact that an investor's feature of personal nature less influences risk tolerance level than emotional intelligence. This also depicts a straightforward relationship amid the investment decisions and emotional intelligence & investment decision and traits of the personality.

(Pinjisakikool, 2018, [40]) found out that risky investment is the behavioral part of the extraversion personality investors. Generally, they prefer Bonds, Mutual Funds, etc for their investment lists while safe investments such as savings or fixed deposits are the behavioral part of conscientiousness, emotional stability, and agreeableness personality investors. This study uses CentER Saving Survey as data, representing the information on Dutch Households.

This data is perfectly suitable for their objective to investigate the response of traits of personality to the real behavior of households regarding finance.

(M. Sadiq & Amna, 2019, [46]) in his descriptive analysis study classify personality traits parallel to the big five personality model, and makes a focus point on the bond between various decisions by an investor with their strength to the risk and their personality traits. Hypothesis testing was executed by Structural Equational Modelling (SEM) and reliability was checked by Confirmatory Factor Analysis (CFA), whereas SPSS analyses the data for finding the result, which provides a complete model design for using various analytical methods in any future research study. The finding shows that personality traits and investment decisions can be influenced by an intermediary risk tolerance variable.

(M. N. Sadiq & Akhtar, 2019, [47]) found multiple results in his study under one research. Organizational employees tolerate more risk confronting investors with business and profession. A positive relationship exists between financial risk tolerance with financial knowledge and the income level of the investor. Furthermore, an increasing number of family members from 3-5, 6-8, or above 8 shows the risk tolerance behavior from average to less risk taker. This data fulfills the objective to construct a bridge between FRT and demographic traits and personality types during investment selection.

(Mathur & Nathani, 2019, [34]) conduct their study on young investors to find out the interconnection between risk appetite level with various traits under Big Five Personality Model. They use various hypotheses to test the existing relations and come to the knowledge that no difference exists among the tolerance level for financial risk. Additionally, no link was established between extraversion and conscientiousness with risk tolerance, and the opposite for a healthy link associated with agreeableness, neuroticism, and openness.

(Thanki & Baser, 2019, [56]) provides an understanding view of the type A and B personalities and tolerance level of risk, which is an extensive view of his previous work in 2015 (Thanki, 2015 [55]). Additionally, under the descriptive research design, this paper successfully demonstrates the relationship among the independent variable such as age, education, occupation, income, marital status, gender, and personality types with Risk tolerance level for finance. In conclusion, the author insists that investment planners scrutinize the demographic variables and personality types of the stockholder.

(Ferreira, 2019, [15]) check out his study that whether various traits of individual personality can bring any possible changes in the tolerance level for credit risk or financial risk. a purposive sampling data collection was conducted by 13-question quiz questionnaires, which were developed by (J. Grable, 1999, [19]). They said that a financial planner must check out the demographic variables of an investor, then after apply any suitable idea or portfolio to the client.

(Lawrenson & Dickason-Koekemoer, 2020, [32]) in his study focused on the establishment of a structural equation model for the figuration of personality behavior, risk tolerance level, and the gravity of education for female capitalists.



They found out that risk tolerance level shows consequences due to lack amount of education. Furthermore, an inverse relationship exists between education level and risk tolerance level.

(Vaibhav & Mehak, 2020 [58]) studied the big five personality model, to gain a relationship with Financial Risk Tolerance. With the help of purposive sampling of 50 people, it is claimed that amid the traits of personality viz. Extraversion, openness, conscientiousness, neuroticism, and agreeableness, under the Big five model, an inconsequential relationship exists with financial risk tolerance.

(Rai et al., 2021 [43]) aimed to understand the factors conditioning issues of financial tolerance behavior with the big five personality traits model. This study provides a well-descriptive idea of the Big Five Personality model. With the help of the Structural Equational Model based on Partial Least Square (SEM-PLS) confirmatory factor analysis has been perfected for Big Five Personality Model and various other Personality Traits. In a conclusion, it is found that agreeableness, openness, and conscientiousness are the variables associated with Financial Risk Tolerance. Data denotes a 23% of the time personality factors are promisable to trace financial risk tolerance.

(Thanki et al., 2022, [57]) extend his work with another objective to resolve the gender-based tolerance level or the same factors performing the same result on both genders in all risk tolerance behavior. A sample size of 671 is used for analysis and the reliability of the data is checked by Cronbach alpha. This analysis leads to the conclusion that independent factors such as personality type, financial literacy, marital status, occupation income, and the number of dependents bring consequences to FRT whereas only four independent variables viz. financial literacy, marital status, income, and personality type bring consequences on financial risk tolerance level for women.

(Jameel & Siddiqui, 2019 [29]) contributed to the literature differently. First, they explore the effects of different variables on risk tolerance and psychological biases such as anchor bias, gambler fallacy, loss-averse bias, overconfidence bias, and representative bias. Secondly, they follow the single investors in Pakistan Stock Exchange to measure their demographic attributes on their risk-taking behavior. They find out that extroversion established a correlation between availability biases and overconfidence biases, but no correlation exists among anchor bias, loss averse, gamble fallacy, and representative bias.

## B. The Research Paper Has to Do With “Six Core Demographic Variables”

(J. E. Grable, 2000, [20]) inspect the variables related to demographic, socioeconomic, and attitudinal that affect the risk appetite behavior of an investor on daily basis and tried to conclude a theory that defines the utilization of these variables separately or collectively as a deciding factor of financial risk tolerance. With the 1075 respondents and descriptive analysis Grable generalizes a few points that feminine character in general is less financially risk tolerant than men. Long story short, personalities with Type A characteristics have higher risk tolerance power than Type B personalities.

(Hallahan et al., 2004, [23]) collects the data from the ProQuest Personal Financial data that measure the Financial Risk Tolerance into a score of 1- 100. This score represents a lower risk tolerance level with a lower risk tolerance score and vis versa. This paper fulfills the aim of research and results in the adverse connection of risk tolerance level with marital status and age factor. They try to support the statement that the feminine portion has less risk-tolerable behavior when they deal with finance.

(Dohmen et al., 2005 [11]) presented a paper that attempts to create a perspective and measurement of attitude toward risk management. With a survey size of 22000 individuals, they confronted the evidence that some demographic variables such as age. Gender, height, and parental education show a qualitative similar impact on risk attitude. Furthermore, the analysis presents a variety of individual behavioral outcomes, such as smoking, migration, and employment choice that affect individual risk attitudes.

(Faff et al., 2009, [13]) attempt the analysis of the survey collected on the Fina Metrica Personal Financial Profiling system, involving 15916 samples. The objective of the study is to examine the nonlinear correlation between FRT and demographic attributes. This data analysis was done using the regression model and presented data that the risk tolerance score diminishes at a decreasing rate as the dependent increases while with increasing age score for risk tolerance decrease at an increasing rate.

(Eker & Anbar, 2010, [12]) examined the demographic characteristics and financial risk tolerance of the sample collected at Uludag University in Turkey. This data shows 0.61 reliability in the Cronbach alpha test which is moderate in nature. This analysis provides ample information regarding the risk tolerance level among students. Public administration students show less credit risk-tolerant behavior than economics and business administration students. Furthermore, it is found that students with jobs and high-income sources have characteristics of high-risk tolerance levels.

(Sulaiman, 2012, [54]) in his research paper found a significant favorable bond financial risk tolerance with marital status and single investors earning level. Apart from this, the analysis data reflect a denying correlation between several dependents and assets-backed risk. they set the objective to investigate dependent and independent demographic variables with FRT, which also results in individuals with high formal education performing better results to analyze monetary risk.

(Mabalane, 2015, [33]) in his dissertation study expand his work to different countries. Do the respondent Investors from South Africa and those respondents from Australia, the USA, and the UK face the same level of tolerance level when they engage in monetary activity, this is the main aim of the research paper. A total of 6828 respondents were studied and it was found that the average financial risk tolerance score for Australia is similar to the USA but slightly different from South Africa and the UK. Furthermore. Male residents of south Africa with good education, income, and net worth are dealing with a higher tolerance level when they deal with money.

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(Ayuub et al., 2015 [3]) conduct a random sampling of 110 respondents from Pakistan with 12 questions based questionnaires and apply various descriptive analysis techniques. They also apply the POST HOC TUKEY test on the sample for better analysis to find out the responses through various demographic variables to measure risk-taking ability. They conclude that demographic independent variables such as education, age, and income were performed negatively with risk tolerance. Moreover, female in Pakistan contrary to take more risk and generally avoids them. Dependency on the alpha male of the family for all monetary expenses creates a less risk-taking environment for the families.

(Kannadhasan, 2015 [30]) studies the risk tolerance behavior of investors who are non-professional investors, normally indulged in buying and selling categories of securities like mutual funds or exchange-traded funds (ETFs). a cross-sectional survey on the sample results in four demographical variables in nature to influence the level of financial risk behavior of the retail investors, out of six independent demographic variables. The other two variables viz. income and education are pointless for determining the risk behavior of retail investors.

(Mishra & Mishra, 2016, [35]) contributed to the literature in different ways: first to check individual consumption value and socioeconomic attributes are reputable among individual variables, weighted variables, and FRT. Secondly, the breadth of engagement of individual value of materialism and socioeconomic factors towards the above mean value for risk tolerance investment from below mean value of FRT. The conclusion tries to explore materialism by establishing the correlation with the FRT and finds out that the below mean group shows lower materialism as compared to the high mean risk tolerance group.

(Shusha, 2017, [51]) explore how Egyptians react to financial risk tolerance due to various demographic attributes that can influence the outcomes. The study promised over 386 respondents, which results in the favorable correlation of financial literacy with educational level and yearly income while an unfavorable correlation exists between financial literacy and the number of dependents. On the other hand, financial risk tolerance is positively associated with educational level, financial literacy level, and yearly income, whereas negatively associated with the number of dependents, gender, and age of the investors.

(Reddy & Mahapatra, 2017, [44]) aimed to understand how working adults in India deal with risk tolerance with their financial ideas and demographic characteristics. Demographic characteristics such as gender, age, education, income, marital status, and occupation have been studied to get the conclusion on 297 respondents for the sample. After the analysis, it was found that age, education, and personal financial knowledge are the root of FRT. This encourages the debate to include a proper finance course in the education system for better handling of FRT.

(Silvia Sutejo et al., 2018, [52]) shows interest to conclude the literature by conducting a brief study on the independent demographic attribute of FRT for retail investors who specifically shows their concern to invest in the Indonesia Stock Exchange. The solution of this brief study is the positive correlation between independent variable income and dependent variable financial risk tolerance.

(Bayar et al., 2020, [5]) researched the recorded effect of demographic features and the financial literacy level of investors in connection with financial risk tolerance. For the fulfillment of this research efficiently, a sample of 325 respondents was collected from Usak university and charged logical regression for the testing of the hypothesis. Cronbach alpha was also used for checking the reliability of the data. This study agrees with the various other research paper that risk tolerance level in men is more than in women. Furthermore, a direct influence is found between financial literacy and FRT in investors.

(Shah et al., 2020, [50]) examined the business graduates in Pakistan to identify their financial risk appetite according to distinctive demographic factors. A Convenient sampling method has been adopted for the collection of data with a Questionnaire based on the Grable and Lytton risk tolerance scale. The finding of the investigation concludes that saving and income level is generally high in male business graduates and monetary tolerance level is positively correlated with the seniority level of business graduates. Furthermore, unfavorable affairs exist between investors' experience and tolerance level of financial risk.

(Hendrawaty et al., 2020 [25]) finds out that an individual literacy level does not bring an impact on the risk tolerance level of individuals. On the other hand, independent demographic variables such as age, income, and gender constantly affect the tolerance level of financial risk. These conclusions were measured on 200 respondents and Cronbach alpha was applied to check the reliability of the data.

### C. The Research Paper Has to Do Other Different Objectives

(Finke & Huston, 2003, [16]) turned his study towards scrutinizing the correlation among tolerance levels for financial risk, financial assets, and investors' net worth. They use data for 4305 households, from the 1998 survey of consumer finance (SCF). A descriptive and multivariate analysis of that sample data agrees on the correlation among variables. Youngsters are less risk prudent while as they grow older their behavior turns toward risk prudence.

(J. E. Grable et al., 2008, [21]) examined the model that affects the sensitivity to risky financial risk tolerance behavior can be examined. They contributed to the literature through their two findings. First, they limelight the method by environmental and biopsychosocial profiles of investors that can prognosticate financial risk tolerance and financial behavior. and then secondly, they state that equal marginal protection from age and self-esteem cannot be achievable as excessive debt can be procrastinated due to having wealth.

(Faff et al., 200, [8]) established a bridge between risk aversion and tolerance level in finance by a descriptive analysis of 162 respondents. Risk aversion describes the minimal tolerance level of financial risk or probably investor dislike to take risks related to any financial activity. The nature of risk aversion is lean towards women in comparison to men. They find out a non-linear pattern with age and Risk tolerance, as the age increases, FRT decreases first and rises after a definite point.



(Hammitt et al., 2009; [24]) summarized the idea of good health and investors' life expectancy with financial risk tolerance. They use a traditional life cycle model to measure the impact of FRT on the longevity of investors. A very large sample of 2751 respondents has been used for analysis, which results in downward behavior of risk tolerance with age on the Two-sided Jonckheere- Terpstra Non Parametric test. Furthermore, the tolerance level of investor income risk and his health and longevity is positively correlated, found in the investigation.

(Gilliam et al., 2010, [18]) tries to relate associations between the measures of risk tolerance and asset allocation. The analysis was on Grable and Lytton's 13-question multi-dimensional measure, with the single-question Survey of Consumer Finance (SCF). They gathered a sample from 328 respondents through convenience sampling to compare the SCF risk Measure and the GL-RTS. A survey of consumer finance looks less associated with FRT while more indulged with investment.

(Sadi et al., 2011, [45]) attempt to detect the errors in investor behavior and tries to build a bridge with the personality level of the investor. This study was conducted in Iran with 200 samples under the pattern of descriptive analysis. Despite the conclusion that depicts the direct relation of extroversion and openness along with hindsight and overconfidence biases, other indirect relations have come to the knowledge with conscientiousness and randomness bias, and openness and availability bias.

(Gibson et al., 2013, [17]) conduct a survey just after the world financial crisis in 2008 to measure the Financial Risk Tolerance level among the investor. The behavior of a large sample of 3931 respondents had been measured and concluded that Financial Risk tolerance has positive bonding with income while no bonding with marital status, education, and wealth. Again, those investors who have confidence in their positive investment return face a high level of risk tolerance level. Females and older investors show less risk tolerance behavior.

(Wasiuzzaman & Edalat, 2016, [59]) this study establishes the connection between investors' online social networks with their financial risk tolerance level. For that study, 220 samples size had been utilized for analysis. Several friends, frequency of logging into Facebook. The use of Facebook for self-expression use of Facebook for social connection is the variable that makes connections with FRT. The findings conclude that the more time an individual logging on to social network sites, the more he has FRT. Also, it results in less FRT when a social network is used for social construction by an individual.

(Kubilay & Bayrakdaroglu, 2016, [31]) bring efforts through a questionnaire to find out the closeness among investors' traits, psychological biases, and FRT. This study was conducted in the financial market of Istanbul, by taking responses from 536 investors. The analysis part of the sample is done by applying the Chi-Square test and Logical Regression analysis. This leads the investigation to the point that a high level of agreeableness in the personality is found for people with low FRT.

(Wong & Carducci, 2016, [60]) redirect their research paper with six variables such as personal information, financial dishonesty, ambiguity tolerance, locus of control,

sensation seeking, and financial risk tolerance. With these variables, the purpose was to establish the correlation with financial risk tolerance. The analysis supports the information taken on a seven-point scale from very accurate to very inaccurate, from 255 respondents, and presents the conclusion that financial risk tolerance does not affect by financial dishonesty. for the variable locus of control, the more an investor thinks he has control over income, the higher the risk an investor can tolerate. Furthermore. A null relationship was found between risk and ambiguity tolerance.

(Awais et al., 2016, [2]) aimed to provide a deeper understanding for investors during investing or designing a portfolio by creating a theoretical model. This attempt was fully backed by secondary data and descriptive in nature. The model expresses four variables such as financial literacy, investment experience, risk tolerance, and investment decisions. They finally wind up their study with a direct correlation between higher investment experience and financial literacy.

(Chiang & Xiao, 2017, [6]) investigate the financial risk tolerance for households and the characteristics of households in the USA, during the world financial crisis in 2008. For the analysis, they used the Survey of Consumer Finances collected from 2007 to 2009. That sample represents households with various cultures and races viz, White, black, Hispanic, and others. They find that financial crisis affects general households with lower endurance with financial risk. Furthermore, the study concludes that minority households across the USA were affected mostly during the financial crisis.

(Dickason & Ferreira, 2018, [10]) developed the link among investor personalities, financial risk tolerance, and behavioural finance biases. The analysis part was prepared over 1171 respondent and the Dospert scale were used to access risk preference in financial, health, recreation, ethical, and social factors. Also, a 7-point Likert scale was used during conducting the survey. The investigation leads to the conclusion of three risk categories. An investor with a high level of risk tolerance level portrays themselves as aggressive in nature for self-control, an investor with a moderate level of risk tolerance levels generally comes up with a moderate level for growth towards regret aversion, representativeness, overconfidence, gambling fallacy, and availability bias while an investor with the characteristics of less risk tolerance level is conservative in nature towards loss aversion and mental accounting.

(Rahman et al., 2019, [41]) contributed to the literature in a way to recognize the correlation between FRT and investors' behavioral factors in Malaysia's specific universities. Rahman considered behavior factors such as a propensity for regret, a propensity for trust, and happiness in life. The methodology part was backed by Smart-PLS software on 1204 respondent data, collected over five-point Likert scale. The crux of this investigation points out that a high level of Financial Risk tolerance level impacts factors such as a propensity for regret and a propensity for trust, while a low-level financial risk tolerance has an impact on happiness in life.

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(De Bortoli et al., 2019, [8]) contributed to the study with his broad ideas of an investigation by comparing four paradigms such as prospect theory, investor profile analysis, the big five personality test, and cognitive reflection test that best describes the risk tolerance of investors in their decisions related to financial assets investment. They perform their analysis part using logical regression and find out that a higher number of correct answer in the cognitive reflection test is inversely related to risk-taking behavior while the potential risk bearer investor profile -disobey prospect theory.

(Rahman, 2019, [42]) extend his investigation work on six behavioral factors in this research paper. He also questions the role of religiosity in the connection amid behavioral factors and FRT. Six behavioral factors viz. regret, trust, overconfidence, social interaction, attribute success to luck and happiness for life are selected and analysis was done in Smart PIs over 1204 sample size. The conclusion of this indicates that except for the propensity for social distance all other behavioral factors have a significant influence on financial risk tolerance.

(Nidhi Jain & Dr. Bikrant Kesari, 2020 [36]) in her study developed two hypotheses. The first one was for the correlation between investors' personal and mental biases and the second hypothesis was for the correlation between investors' behavioral biases and investment risk tolerance. They used 3 point Likert scale during the collection of 550 samples and used SPSS for analysis. The finding shows a confident correlation between investors' behavioral perceptions and behavioral traits.

(Basheer & Siddiqui, 2020, [4]) contributed to the literature by exploring the liaison among behavioral biases, financial literacy, personality, risk tolerance, and disposition biases. In the investigation research model was established for disposition biases by adding loss aversion, overconfidence, representativeness, anchoring, financial literacy, risk tolerance, and personality. A non-probability sample of 182 respondents was collected for the analysis of this descriptive research paper. The conclusion depicts that no substantial effect was recorded for disposition bias for investors related to factors comprising anchoring, representativeness, superego, obstinacy, parsimony, and orderliness. Furthermore, factors such as overconfidence, and loss aversion recorded a substantial effect on investors' disposition bias for investor regarding risk tolerance behaviour.

(Samanez-Larkin et al., 2020, [48]) found out that an investor faces risky financial behavior due to their overconfidence in financial decision-making. These impairments in financial decision-making are almost 6% in digit for overconfidence. While old age people between 60-90 years of age show the almost same level of financial literacy level. These results were determined over 1219 respondents using Cross-sectional Data from the Rush Memory and Aging Project.

(Istiqomah & Krisnawati, 2021, [28]) tries in his research paper to identify the impact of accounting information with risk tolerance over unbiased information in the MSME sectors. In this descriptive analysis, multiple regression was charged. This research clarifies that investors do not have reliable fully in accounting information to take a financial decision. Also, unbiased information always flourished the

decisions making ability of the investors, but in the same situation decision making partially affected by the upcoming risk that an investor faces later.

(Hermansson & Jonsson, 2021, [26]) focus his study on the investor's literacy level and interest level for upbringing the bridge with a financial risk tolerance level. This research paper follows the descriptive analysis and for that 12156 samples were selected via convenience sampling. Financial literacy leaves a lesser impression on an investor in against impation of financial interest in financial decisions, whereas, both of them are linked with a higher level of a risk tolerance level for an investor.

(ÇiFçi & ReiS, 2021, [7]) studied market liquidity in a different market with a provocative relationship with risk tolerance level for an investor. They found out that the degree of influence level does not equally stand for market liquidity and risk tolerance for all the investors. Also, a far-seeing bonding had been captured between the variables in the cointegration test.

(Hussain & Rasheed, 2022, [27]) in their descriptive research paper attempt to cover the effect of the personality level of an investor with financial literacy and overconfidence biases over the choice of taking risk tolerance level as a factor. A random sampling on Likert five-point scale model was conducted for sampling collection. It can be seen that Likert five-point scale is the most common and reliable scale in the questionnaire for data collection. The hypothesis related to financial literacy to risk tolerance and investment decisions, investor's personality to risk tolerance and investment decisions, and overconfidence biases to risk tolerance and investment decisions are accepted collectively.

(Singh et al., 2022, [53]) provide an extensive survey of financial risk tolerance by scrutinizing the link between an investor's behavioural biases and personality traits. An Individual's personality plays a key role during the selection of investment, and how much investors' can be ready to risk. A cross-sectional research design was prepared over the data of 847 respondents. The questionnaire contains 37 questions and evaluation was recorded over a Five-point Likert scale. The finding of this state that financial advisors extend their work with financial education to their clients for diminishing the business effects.

(Nurhidayah, 2022, [37]) focus the study on the behaviour of millennial investors with financial risk tolerance over the impact of social media. The noble quality of social media influences the millennial's tolerance level in financial decisions that may influence the trading activity in the capital market and vice versa. A positive correlation in investor behavior was found among the investors who indulge in trading activity and higher quality stock information scrolls in social media.

(Şen, 2022, [49]) provide an extensive survey to inspect the correlation between financial risk tolerance with individual narcissistic behaviour. They conduct a survey of undergraduate students and gather 383 responses for the analysis. The survey says that women behave less risk tolerant and less narcissistic than men. To be more specific, logical regression established a direct relationship between narcissism level and risk tolerance level.

### III. METHODOLOGY

This critical review scrutinizes the empirical research on financial risk tolerance, which belongs to the circle of behavioural finance. For collecting the literature, a software program “Publish and Perish”, was used. A range of online databases are analyzed under this software, with the following keywords: “Financial Risk Tolerance”, “Risk Behavior”, and, “Risk Personality” to get the tendered citation, then analyse these and results in a radius of citation metrics. The ancestry approach has also been used later for collecting more articles. This search ended with 58 articles that fulfill the purpose of decisive examination of previously

published research on financial risk tolerance, under the following limitations: (a) work published in English, (b) reported and published between January 2000 to December 2022, (c) peer-reviewed journal articles.

Every article was scrutinized by applying the following filters: (i) publication information, (ii) article related to investors’ type of personality, demographic variables, or other related areas, (iii) underlying theoretical framework, (iv) objectives of the article, (v) techniques of data collection, (vi) data analysis methods, and (vii) findings of the article.

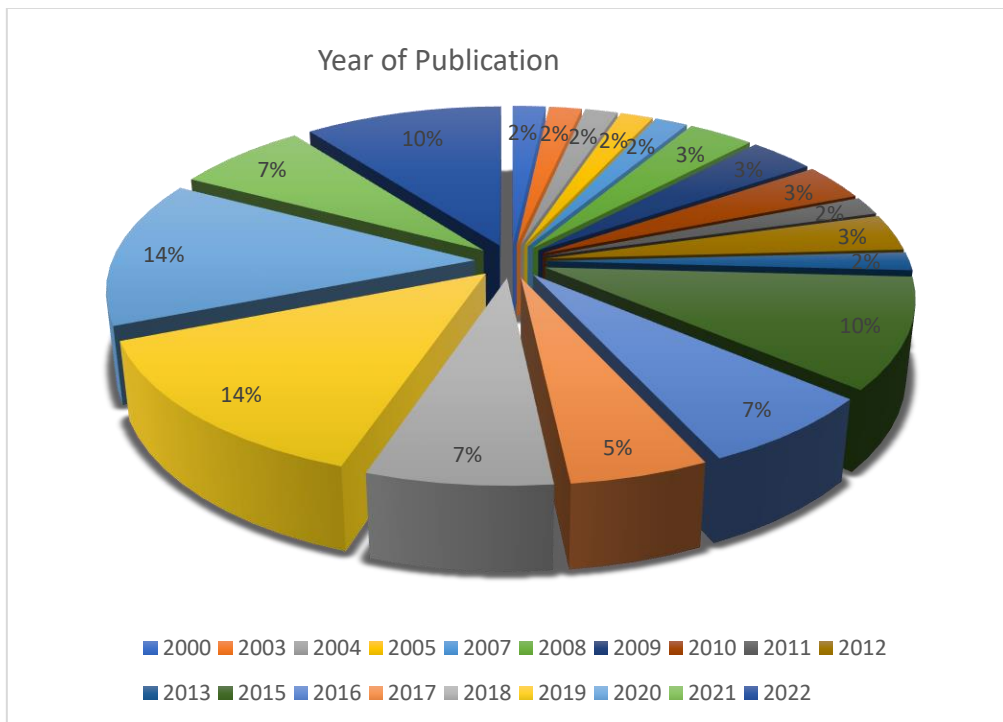
### IV. ANALYSIS OF REVIEW OF LITERATURE

This part of the research paper presents the extraction of a review of the literature on the following basis:

#### A. Research Published in Different Years

**Table 1: Number of Researches Published in Different Years**

Year of Publication	No. of Research Papers	Year of Publication	No. of Research Papers	Year of Publication	No. of Research Papers
2000	1	2010	2	2017	3
2003	1	2011	1	2018	4
2004	1	2012	2	2019	8
2005	1	2013	1	2020	8
2007	1	2015	6	2021	4
2008	2	2016	4	2022	6
2009	2				



**Figure 1: Number of Research Published in Different Years**

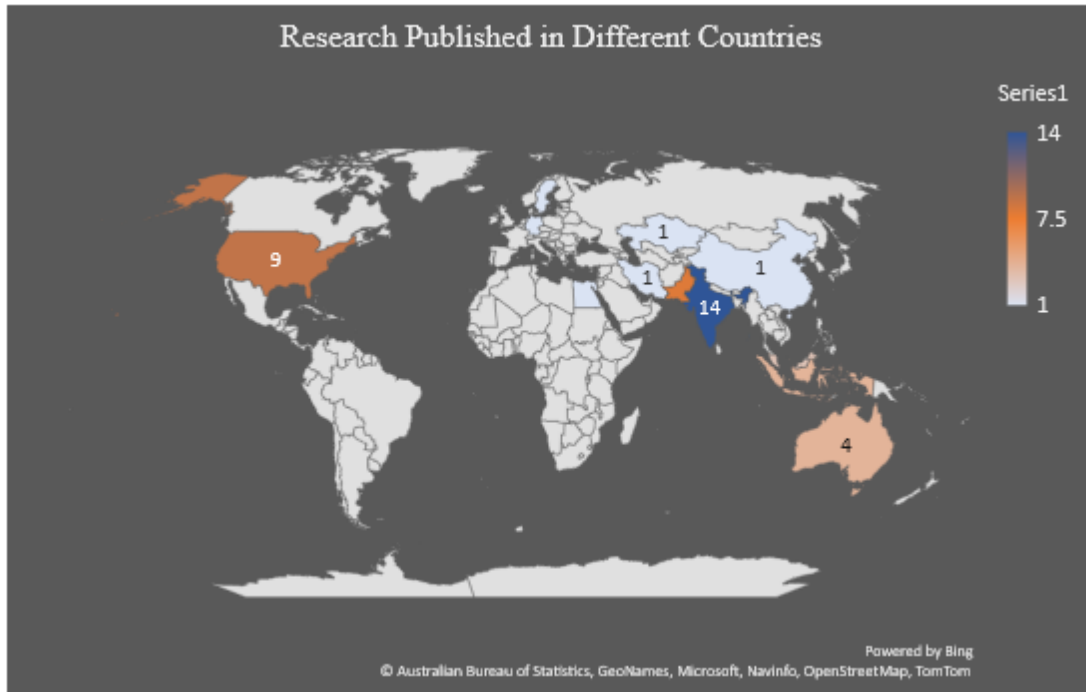
Figure 1 shows the number of research published between 2000 to 2022. It was observed that the primary paper published on financial risk tolerance were very limited, which increase bit by bit in later years. It was noticed that 2% of the article selected for review were published in 2000, 2% in 2003, 2% in 2004, 2% in 2005, 2% in 2007, 3% in 2008, 3% in 2009, 3% in 2010, 2% in 2011, 3% in 2012, 2% in 2013, 10% in 2015, 7% in 2016, 5% in 2017, 7% in 2018, 14% in 2019, 14% in 2020, 7% in 2021, and 10% in 2022 were published. It could be seen that article publishing was at its peak during 2019 and 2020, followed by 2015 and 2022.

## A Critical Review of Research on Financial Risk Tolerance

### B. Research Paper Published in Different Countries

**Table 2: Number of Different Researches Published in Different Countries**

Country	No of Research Paper	Country	No of Research Paper
Australia	4	Malaysia	3
China	1	Pakistan	8
Egypt	1	Romania	1
Germany	1	South Africa	4
India	14	Sweden	1
Indonesia	4	Turkey	5
Iran	1	USA	9
Kazakhstan	1		



**Figure 2: Map Diagram for Number of Articles Published in Different Countries**

Figure 2 highlights the map, according to research papers published in those countries. It can be seen that Asian Countries have active participation in investigations like Financial Risk Tolerance. A total of 38 articles were reported, which represent nearly two third of total research articles, whereas the Middle East alone shares one out of five articles from the total articles. The analysis of the articles shows India (14), the USA (9), Pakistan (8), and Turkey (5) are the few countries that represent the most research papers, respectively. Researches in India are analysis of FRT and demographic variables for individual, retail investor FRT and their risk-taking behaviour, risk tolerance dependent on what? Demographics or personality traits, FRT among Indian Investors, do personality traits and emotional intelligence of investors determine their risk tolerance, the influence of personality traits on households FRT, the interactive impact of demographic variable and personality types on risk tolerance, personality traits and FRT in young investors, analysis on investor behavioral biases, investment risk

tolerance, and decision making, personality traits lead to investors FRT, the role of gender in FRT, etc.

A country like the USA indulged in the research on FRT and additional factors that affect risk-taking everyday money matters, the brighter side of FRT, environmental and biopsychosocial profiling as a means for describing FRT, the effect of health and longevity on FRT, measuring the perception of FRT, investors personality in investors questionnaire, do sensation seeking, control orientation, ambiguity, and dishonesty traits affect FRT, overconfidence in financial knowledge with FRT. In Pakistan research is studied on financial literacy, investors' personality, overconfidence bias, investment decisions, and FRT, explaining the disposition bias among investors, analysis of FRT and demographic factors among graduates, etc. While in Turkey research on financial literacy and FRT of individual investors, exploratory study on narcissistic personality and FRT, investors' risk tolerance and market liquidity connection, etc.



C. Research Published under a Common Objectives or Area

Table 3: Number of Research Published with Common Objectives or Area

CODE NO	Common Objectives or Area	No of Research Paper	References
FRT01	Relationship between FRT and Demographic Variables	16	FC03, FC05, FC06, FC12, FC13, FC16, FC20, FC21, FC24, FC28, FC30, FC32, FC33, FC46, FC49, FC50
FRT02	Relationship between FRT and Net Worth/ Financial Position	2	FC04, FC14
FRT03	Relationship between FRT and Personality	16	FC07, FC18, FC22, FC25, FC34, FC36, FC38, FC39, FC40, FC42, FC44, FC45, FC51, FC53, FC57, FC60,
FRT04	Identification of different Variables that influence FRT	15	FC08, FC19, FC27, FC29, FC31, FC35, FC37, FC41, FC43, FC48, FC52, FC54, FC55, FC58, FC62
FRT05	The link between FRT and Risk Aversion	1	FC09
FRT06	FRT with Health & Longevity	1	FC11
FRT07	Error in Personality with Financial Decisions	4	FC15, FC26, FC47, FC59
FRT08	FRT and Online Social Media Network	2	FC23, FC61
FRT09	FRT and Market Liquidity	1	FC56

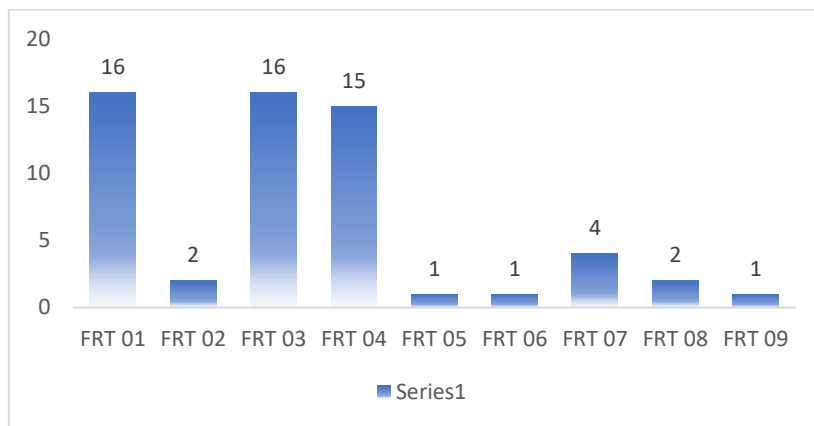


Figure 3: No of Research Paper with Common Objectives and Area

Figure 3 presents the objectives that dissented into 9 categories. Most of the articles fall into FRT01, FRT03, and FRT04 categories, which represent the relationship between FRT and Demographic variables (28 percent), the Relationship between FRT and personality (28 percent), and the Identification of different variables that influence FRT (26 percent), respectively. Furthermore, the relationship between FRT and investors’ financial position and net worth was caught up under FRT02 (4 percent), the Link between FRT and Risk Aversion under FRT05 (1 percent), FRT with Longevity under FRT06 (1 percent), Error in personality with Financial Decisions under FRT07 (7 percent), FRT and Online Social Media Network under FRT08 (4 percent) and FRT and market liquidity under FRT09 (1 percent).

D. Research Published According to Data Types & Methods

Table 4: No of Research Published with Data Types & Methods

Type of Data	Methods of Data Collection	No of Research Paper
Primary Data	Random Sampling	24
	Convenience Sampling	13
	Purposive Sampling	6
Secondary Data		15

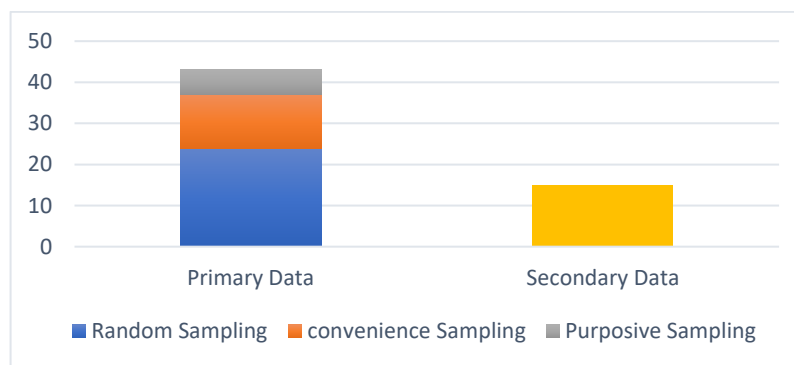


Figure 4: No of Research Published with Data Types & Methods



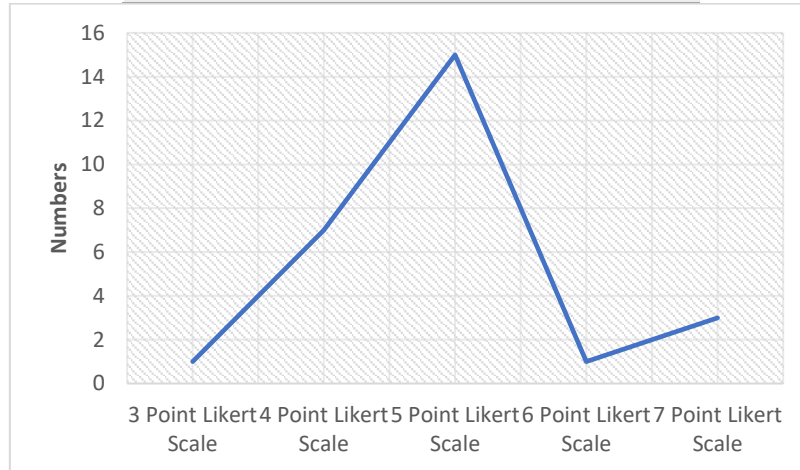
## A Critical Review of Research on Financial Risk Tolerance

Figure 4 shows that in the process of reviewing the literature, researchers go with mainly primary data, which covers 74 percent of the total literature under analysis, whereas secondary data was the second choice for the researchers, covering 26 percent literature. Random sampling, convenience sampling, and Purposive sampling are the techniques that were taken into consideration to describe the true nature of primary data in this research.

### E. Likert Scale used in Prior Research

**Table 5: No of Research Paper uses Likert Scale**

Likert Scale	No of Research Paper
3 Point Likert Scale	1
4 Point Likert Scale	7
5 Point Likert Scale	15
6 Point Likert Scale	1
7 Point Likert Scale	3



**Figure 5: No of Research Paper Uses Likert Scale**

Figure 5 states that out of a total of 58 reviews of literature, only 27 of them used the Likert Scale during the collection of data. The most common Likert Scale, that used often 5 Point Likert Scale (15), followed by 4 Point Likert Scale and 7 Point Likert Scale, which were used 7 times and 3 times, respectively.

### F. Statistical Tools Used in Research Paper

**Table 6: No of Statistical Tools used in the Prior Research**

Statistical Tools	No. of Papers	Citation Code for Research Paper
Descriptive Analysis	36	FC03, FC04, FC05, FC07, FC08, FC09, FC11, FC13, FC14, FC15, FC19, FC20, FC21, FC23, FC24, FC25, FC27, FC28, FC34, FC35, FC36, FC39, FC40, FC41, FC45, FC46, FC48, FC50, FC51, FC52, FC54, FC55, FC57, FC58, FC60, FC62
Regression	24	FC04, FC05, FC07, FC11, FC13, FC20, FC22, FC23, FC24, FC26, FC27, FC32, FC33, FC34, FC39, FC40, FC41, FC46, FC47, FC49, FC50, FC54, FC55, FC62
T Test	21	FC05, FC07, FC09, FC12, FC13, FC14, FC16, FC19, FC20, FC24, FC25, FC27, FC32, FC34, FC37, FC42, FC43, FC45, FC48, FC50, FC54
ANOVA	10	FC13, FC19, FC20, FC21, FC25, FC28, FC34, FC35, FC54, FC62
Chi-Square	22	FC07, FC08, FC13, FC14, FC16, FC20, FC25, FC26, FC28, FC31, FC37, FC40, FC43, FC44, FC45, FC46, FC47, FC48, FC49, FC53, FC57, FC61
SPSS	19	FC08, FC13, FC20, FC21, FC22, FC26, FC34, FC38, FC39, FC42, FC44, FC46, FC47, FC49, FC53, FC54, FC59, FC60, FC62
Least Square	4	FC04, FC14, FC19, FC23
R Square	16	FC05, FC06, FC07, FC12, FC18, FC19, FC22, FC24, FC26, FC34, FC36, FC39, FC48, FC53, FC54, FC58
P Value	22	FC05, FC09, FC11, FC12, FC14, FC19, FC22, FC23, FC24, FC26, FC27, FC28, FC31, FC46, FC48, FC49, FC51, FC52, FC56, FC57, FC58, FC61
Wilcoxon Rank Test	2	FC07, FC19
Incremental Index of Fit	1	FC08
Normed Fit Index	3	FC08, FC48, FC57
Sum of Square	6	FC21, FC25, FC28, FC39, FC42, FC62
Dospert Scale	2	FC35, FC62
Composite Reliability	8	FC37, FC43, FC48, FC55, FC57, FC58, FC59, FC61
Correlation	23	FC07, FC08, FC11, FC12, FC14, FC15, FC16, FC18, FC20, FC22, FC24, FC27, FC31, FC32, FC33, FC35, FC40, FC42, FC45, FC46, FC50, FC51, FC61,
F Test	19	FC05, FC13, FC19, FC21, FC24, 25, FC26, FC28, FC34, FC35, FC36, FC39, FC42, FC45, FC57, FC58, FC59, FC60, FC62



Z Test	3	FC07, FC55, FC56
Factor Analysis	7	FC15, FC31, FC43, FC53, FC57, FC59, FC55,
Cronbach Alpha	30	FC07, FC13, FC14, FC15, FC19, FC20, FC21, FC22, FC23, FC24, FC26, FC30, FC31, FC33, FC34, FC35, FC37, FC43, FC44, FC45, FC47, FC49, FC50, FC53, FC55, FC57, FC58, FC59, FC60, FC61
SEM PLS	11	FC08, FC37, FC38, FC43, FC45, FC48, FC53, FC57, FC58, FC59, FC61
Significance Level	19	FC04, FC09, FC13, FC20, FC21, FC24, FC25, FC28, FC32, FC33, FC34, FC35, FC40, FC42, FC45, FC54, FC59, FC60, FC62
Standard Error	25	FC05, FC09, FC12, FC13, FC14, FC19, FC21, FC22, FC23, FC24, FC26, FC31, FC33, FC34, FC37, FC39, FC40, FC42, FC43, FC46, FC53, FC54, FC60, FC61, FC62
Beta Coefficient	22	FC07, FC09, FC12, FC13, FC14, FC19, FC22, FC24, FC26, FC27, FC32, FC34, FC40, FC42, FC43, FC50, FC52, FC54, FC58, FC59, FC60, FC62
Degree of Freedom	16	FC08, FC13, FC16, FC20, FC21, FC25, FC26, FC34, FC35, FC39, FC40, FC42, FC44, FC45, FC53, FC62
Comparative Fit Index	2	FC08, FC59
Wald Test	6	FC08, FC09, FC13, FC24, FC26, FC40
Cluster Analysis	1	FC24
Bootstrapping	1	FC48
Harman One Factor Test	1	FC59

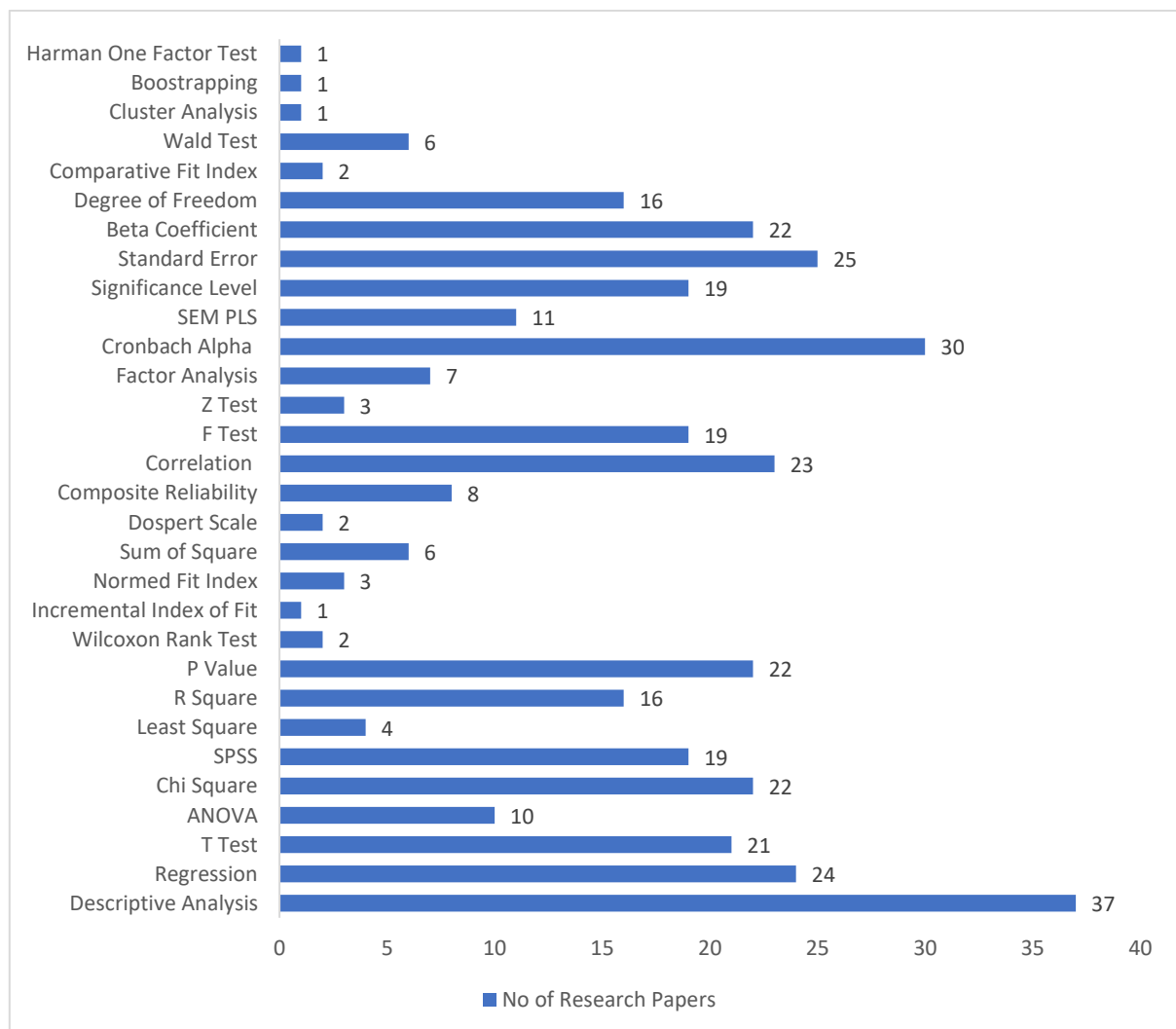


Figure 6: Statistical Tools Used in the Research Papers

Figure 4 present a bar diagram view of various test applied to the research papers collected for the review of the literature. A considerable no of research papers applied Descriptive statistics (37) in the analysis part which nominated it as the most common and important statistical tool, whereas Cronbach Alpha (30) which applies to checking the reliability of the data, is used almost in every second paper. Other statistical tools such as; Standard Error (25), Regression (24), Correlation (23), Chi-Square (22), Beta

Coefficient (22), P value (22), T-Test (21), F test (19), Significance Level (19), R Square (16), Degree of Freedom (16), etc, are used very often. Analytical Software such as SEM-PLS (11) and SPSS (8) plays a key role in the evaluation part of a research paper.

V. CONCLUSION

This study makes an effort to pore over the research published on Financial Risk Tolerance (FRT). A total of 58 articles were critically reviewed in all aspects to present a crux on every article. Initially, Grable (J. Grable, 1999 [19]; J. E. Grable, 2000 [20]; J. E. Grable et al., 2008 [21]; John. E. Grable & Lytton, 1998, [22]) present his extraordinary work and pave the way for further research, then Faff ((Faff et al., 2008, 2009) and other researchers, and recently Thanki (Thanki, 2015 [55]; Thanki et al., 2022 [57]; Thanki & Baser, 2019 [56]) showed very active participation in the area of financial risk tolerance. It was also found that a total of 19 countries were involved in Financial Risk Tolerance related investigations, which generalizes that it is a world-widely adopted. India is the most populated country in the world with a large no of investment plans for investors. So ultimately, it provides a large number of areas and views for research, but few no. of research has been done in India as compared to foreign countries collectively. However, India, still conducts more research on Financial Risk Tolerance, individually.

The review also highlights the trend of using primary data over secondary data in their investigation. Around two third of the investigation was on primary data. The pattern of collecting primary data may differ for different natures of investigation. However, gathering information with the questionnaire is one of the best methods. 13 item questionnaire shared by Grable (J. Grable, 1999 [19]) to measure Financial Risk Tolerance was used in a research paper (Gilliam et al., 2010 [18]; J. E. Grable et al., 2008 [21]; Mishra & Mishra, 2016 [35]; M. N. Sadiq & Akhtar, 2019 [47]; Şen, 2022 [49]; Shah et al., 2020 [50]; Shusha, 2017 [51]; Thanki, 2015 [55]; Thanki & Baser, 2019 [56]; Wasiuzzaman & Edalat, 2016 [59]) during the collection of data.

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Ethical Approval and Consent to Participate	No, the article does not require ethical approval and consent to participate with evidence.
Availability of Data and Material/ Data Access Statement	Not relevant.
Authors Contributions	All authors have equal contributions to this.

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APPENDIX

Table No. 7: List of Citation Supports Statistical Tools

CITATIONS	CODE No.	CITATIONS	CODE No.
(J. E. Grable, 2000)	FC03	(Dhiman & Raheja, 2018)	FC34
(Finke & Huston, 2003)	FC04	(Dickason & Ferreira, 2018)	FC35
(Hallahan et al., 2004)	FC05	(Pinjisakikool, 2018)	FC36
(Dohmen et al., 2005)	FC06	(Rahman et al., 2019)	FC37
(Anic, 2007)	FC07	(M. Sadiq & Amna, 2019)	FC38
(J. E. Grable et al., 2008)	FC08	(Thanki & Baser, 2019)	FC39
(Faff et al., 2008)	FC09	(Ferreira, 2019)	FC40
(Hammit et al., 2009)	FC11	(De Bortoli et al., 2019)	FC41
(Faff et al., 2009)	FC12	(Mathur & Nathani, 2019)	FC42
(Eker & Anbar, 2010)	FC13	(Rahman, 2019)	FC43
(Gilliam et al., 2010)	FC14	(M. N. Sadiq & Akhtar, 2019)	FC44
(Sadi et al., 2011)	FC15	(Lawrenson & Dickason-Koekemoer, 2020)	FC45
(Sulaiman, 2012)	FC16	(Shah et al., 2020)	FC46
(Pan & Statman, 2012)	FC18	(Nidhi Jain & Dr. Bikrant Kesari, 2020)	FC47
(Gibson'' et al., 2013)	FC19	(Basheer & Siddiqui, 2020)	FC48
(Mabalane, 2015)	FC20	(Bayar et al., 2020)	FC49
(ayyub et al., 2015)	FC21	(Hendrawaty et al., 2020)	FC50
(Pak & Mahmood, 2015)	FC22	(Vaibhav & Mehak, 2020)	FC51
(Wasiuzzaman & Edalat, 2016)	FC23	(Samanez-Larkin et al., 2020)	FC52
(Kannadhasan, 2015)	FC24	(Rai et al., 2021)	FC53
(Thanki, 2015)	FC25	(Istiqomah & Krisnawati, 2021)	FC54
(Kubilay & Bayraktaroglu, 2016)	FC26	(Hermansson & Jonsson, 2021)	FC55
(Wong & Carducci, 2016)	FC27	(ÇiFçi & ReİS, 2021)	FC56
(Mishra & Mishra, 2016)	FC28	(Jameel & Siddiqui, 2019)	FC57
(Awais et al., 2016)	FC29	(Hussain & Rasheed, 2022)	FC58
(Shusha, 2017)	FC30	(Singh et al., 2022)	FC59
(Chiang & Xiao, 2017)	FC31	(Thanki et al., 2022)	FC60
(Reddy & Mahapatra, 2017)	FC32	(Nurhidayah, 2022)	FC61
(Silvia Sutejo et al., 2018)	FC33	(Sen, 2022)	FC62

AUTHOR PROFILE



**Prasenjit Roy** is currently pursuing his Ph.D. from the School of Commerce and Business Studies, Jiwaji University, Gwalior. His areas of interest are "Financial Technology", "Risk Management" and "Financial Risk Tolerance". He has completed his Master's Degree from Vinoba Bhawe University, Hazaribagh. He was awarded a UGC-NET Junior Research Fellow Fellowship. He has several research publications to his name in various international journals and edited books. He presented many research papers at international conferences. He has guided research projects for seminars in MBA Hospital Administration. He is a Lifetime Member of the Indian Accounting Association and Indian Commerce Association. He was a part of the organizing group of the 44th Indian Accounting Association International Conference in 2022



**Professor S. K. Singh** received his M. Com. (Gold-Medal), M. Phil., and Ph.D. from Jiwaji University, Gwalior. He is a professor at School of Commerce & Business Studies, Jiwaji University, Gwalior. His areas of expertise include probability theory, inferential statistics, and consumer behaviour. He has published 43 research papers. He has written/edited eight books. Forty-four PhDs have been conferred under his supervision. In 2007, he won the prestigious title for Best Business Academic of the Year at the Golden Jubilee All India Commerce Conference. Additionally, he has held a variety of administrative and academic positions at the university.

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