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Impact of risk perception on investor behaviour and the moderating role of personality traits using logistic regression

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ABSTRACT: *The main objective of this study is to assess the impact of risk perception on investor behaviour and the moderating role of personality traits. The study entirely depends on primary data and a questionnaire is used to collect the responses from the respondents for this purpose. Stratified sampling technique has been used to identify the sample for the study. The sample size constitutes 180 respondents constituting traders and investors in equity market. The questionnaire was made up of three parts 1) personality questionnaire which measures (openness, conscientiousness, extraversion, agreeableness and neuroticism) 2) risk perception questionnaire to measure (Knowledge & understanding about the stock market, Awareness of financial products and attention to portfolio, Loss avoidance, Loss expectation, Anxiety, Capital allocation & Income source) and 3) Investor behaviour questionnaire which measures the behavioural biases (Herding, Loss aversion, Overconfident, Anchoring, Asymmetric Information, Cognitive dissonance, Mental Accounting, Status Quo bias, Sensation seeking, Representativeness, Risk aversion and Illusion of control). The risk perception factors are correlated with the selected behavioural biases and the moderating role of five main personality traits are studied. Two hypotheses were framed, the first hypothesis is formulated to test the impact of risk perception factors on investor behaviour and the second hypothesis is formulated to test whether personality acts as a moderator between risk perception and investor behaviour. In order to analyse the hypothesis logistic regression analyses were conducted. The study revealed that psychological biases are correlated to risk perception and the personality traits moderates risk perception and investor behaviour.*
KEYWORDS: *Risk perception, Investor Behaviour, Personality traits, Logistic Regression*

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I. INTRODUCTION TO THE STUDY

Behavioural finance is the application of psychological theories on the investor behaviour.The Efficient Model Hypothesis (EMH) suggests that in a liquid market the stock prices will reflect all available information about the stock at a given time. But many studies have contradicted the EMH model and identified that the participants do not always act in a rational manner.Investors are rather influenced by various behavioural biases. Behavioural finance as a study aims at identifying the influence of psychology on the behaviours of the investors.

The prospect theory was developed in 1992 by Daniel Kahneman and Amos Tverky and it explains the decision making process of individuals under uncertain conditions. As a behavioural model it shows how individuals decide between various choices. The prospect theory suggests that people are loss averse and they prefer to avoid losses and take more risks to gain from an uncertain situation.

Risk perception is the investors belief about the possibility of a loss. Risk is an inherent feature of all types of financial investments due to the variability in the actual and expected returns on investment. The concept ‘risk perception’ means the way in which investors view the risk of financial assets based on their concerns and experience. The researcher has identified the following factors to assess the risk perception of the investors based on the previous studies.

1.1 Risk Perception factors

Knowledge & understanding about the stock market: The variable measuresFamiliarity about stock market, faith in market and regulators and the understanding about the stock market is .

Awareness of financial products and attention to portfolio: This measures the awareness of the investors towards various investment products and the attention they give to their investments.

Nature of the portfolio: Diversification, investment time frame, source of information and portfolio benchmark is measured.

Loss avoidance: Investors ability to predict the movement of the market, loss avoidance strategy and profit realisation measuresare included in loss avoidance.
Loss expectation: Probability, frequency and magnitude of loss is measured.
Anxiety: Investor psychological factors like worry, anxiety and pain is measured.
Capital allocation & Income source: Source of income, percentage of savings invested in stocks and percentage of capital allocated to savings are measured.

1.2 Personality traits

Researchers believe that an individual's personality is determined by five traits.
Openness-Individuals who are open to new experiences preferadventures and enjoy learning new things. These people are curious, independent, imaginative, insightful and have wide interests.
Conscientiousness – Conscientious individuals are organised and self-disciplined. Their traits include achievement focussed, dependable, self-disciplined and goal-oriented.
Extraversion – Extroverts easily mingle with people. Their traits include talkative, energetic, confident, cheerful, self-assertive and authoritative.
Agreeableness – This trait measures the extent of a person's harmonious and warmth nature. Their traits include collaborative, kind, interactive and harmonious.
Neuroticism- Neuroticism refers to an individual's emotional stability. Their traits include tensed, unstable and moody.

1.3 Investor Behaviour

Investor behaviour as a study examines the mental processes and the emotional feelings the investors exhibit during the investment decision making process. Investors generally believe they are rational but the behavioural theories suggest that their decisions are rather based on emotional, social and other cognitive factors. Investors exhibit many behavioural biaseswhile decision-making**.**The research includes the following biases.

Herding – It is the natural tendency of the investors toimitate the crowd without any analysis on his own.
Loss aversion – Loss aversion is considered as a dominant bias. It is the propensity of the investors to avoid loss. Investors either avoid risk or they prefer to take more risks to gain from an uncertain situation to avoid loss.
Overconfidence – It is the tendency of the investors to have overconfidence on their skills and abilities in stock selection ignoring the market conditions and the risks involved in investing in it.
Anchoring- Investors prefer a stock based on pre-existing belief or the first information they collect regarding the stock.
Asymmetric information – During transactions or trade when one party getsaccess to all relevant and important information and the other party is unaware of the information.
Cognitive Dissonance – It is the unpleasant emotion that occurs mentally for the investors when they believe two contradictory information's at the same time.
Mental accounting – This bias occurs when the individuals value and treat money in different ways based on the source of money.
Status quo bias – This bias occurs when the investors prefer to maintain the same portfolio and remain in the same condition.
Sensation seeking – It is the tendency to seek excitement and thrill through trading and investment.
Representativeness – This bias occurs when investors evaluate the performance of a stock based on a similar situation in the past.
Risk aversion – It refers to the propensity of the investors to avoid risk.
Locus of control – It refers to the propensity of the investors to believe that they can control the events happening in the stock market.
Earlier studies have attempted to analyse the effect of risk perception and personality on the investor behaviour individually but very few studied about their influence together. So it is attempted to study about the influence of risk perception on investor behaviourand the moderating role of personality traits of the investors. The understanding about their risk perception level and their influence on personality traits willin turn help the investors to take better rationaldecisions in the stock market.

II. REVIEW OF LITERATURE

Anam Tariq and Arshad Hassan (2017) studied the impact of risk perception on the investment behaviour of individual investors while taking Emotional Intelligence as a moderator. They found out that risk perception has a significant impact on the investment behaviour. Further their study also revealed that

Emotional Intelligence does not show any significant impact as a moderator between risk perception and investor behaviour.

Arvid O.I Hoffmann et.al (2015) examined investors perception (i.e return expectation,risk tolerance and risk perception) on hypothetical trading and risk taking behaviour. They found out that investors with higher expectations on return are likely to trade more, purchase derivative products and transaction amounts are large and turnover is high. Investors with higher risk tolerance are likely to trade more, have more buy-sell trades, frequent use of limit orders and hold portfolios with high risk. Investors with higher risk perception also trade more, have less buy sell transactions, transaction turnover are higher and they hold portfolios with high risk.

Yuliani, Isnurhadi,**Ferry Jie**(2017) studied the impact of perception of risk and investors psychology on confidence and performance of stock. Risk perception, confidence and investors psychology were considered as exogenous variable and performance of the common stock as endogenous variable. The research findings show that investors confidence is affected by risk perception and psychology of the investors and confidence in turn have an impact on the performance of the stock.

HaroonShafi et.al (2011) studied the Relationship between Risk Perception and Employee Investment Behaviour.The investment behaviour factors analysed are risk attitude,control,confidence and time horizon.The individual investors were segmented into risk intolerant traders, confident traders, loss-averse young traders and conservative long term investors.The researchers concluded that there exists a significant relationship between risk perception and employee investment behaviour.

ZandriDickasonandSuneFerreira(2018) examined the investor personality and risk tolerance levels impact on behavioural biases. The findings indicated that that the conservative type and low-risk tolerance level investors are subjected to loss aversion and mental accounting biases. High-risk tolerance investors are subjected to self-control bias.

Dr.Sindhu K. P and Dr. S. RajithaKumar(2014) analysed the Influence of Risk Perception of Investors on Investment Decisions. They included various factors to analyse the risk perception impact on investment decisions. These factors included are chance for incurring loss, unpredictability of returns, diversification of portfolios, knowledge about the financial assets, and their dependence on professional investment advisors. Their study revealed that there exist a relation between risk perception of the investors and their investment decisions in mutual funds.

Charles .A and Kasilingam. R (2014) found out that the individual's personality trait determines the investor's success in investment.

Cliff Mayfield, Grady Perdue, Kevin Wooten(2008)revealed that extroverts engage in short-term investing. Neurotic personalities and risk averse investors and do not engage in short- term investing. Rather risk averse investors prefer to invest for a shorter period. Individuals who are open to new experiences prefer to invest for a longer period.

PrabhaRajagopalan S. Gurusamy (2015) findings revealed that psychological biases and personality is correlated.

III. METHOD

The study entirely depends on primary data and a questionnaire is used to collect the responses from the respondents for this purpose. Cluster sampling technique has been used to identify the sample for the study. The sample size constitutes 180 respondents who either trades or invest in equity market. The questionnaire was made up of three parts 1) personality questionnaire which measures (openness, conscientiousness, extraversion, agreeableness and neuroticism) 2) risk perception questionnaire to measure (Knowledge & understanding about the stock market, Awareness of financial products and attention to portfolio,Loss avoidance, Loss expectation, Anxiety, Capital allocation & Income source) and 3) Investor behaviour questionnaire which measures the behavioural biases (Herding, Loss aversion, Overconfident, Anchoring, Asymmetric Information, Cognitive dissonance, Mental Accounting, Status Quo bias, Sensation seeking, Representativeness, Risk aversion and Illusion of control). The 5 point Likert scale from strongly disagree, disagree, neither agree nor disagree, agree and strongly agree is used for the survey. The validity of the questionnaire has been tested using cronbach alpha coefficient.

The risk perception factors are correlated with the selected behavioural biases and the moderating role of five main personality traits are studied. Two hypotheses were framed, the first hypothesis is formulated to test the impact of risk perception factors on investor behaviour and the second hypothesis is formulated to test whether personality acts as a moderator between risk perception and investor behaviour. Inorder to analyse the hypothesis logistic regression analyses were conducted.Firstly, the impact of risk perceptionof the respondents (a) on the investor behaviour is studied. After confirming the significanceof risk perception on investor behaviour the moderator variable b (personality traits) was introduced in the model. Finally the interaction term (a*b) was calculated. The three terms risk perception (a), personality (b) and the interaction term (a*b) all of these three terms were included in the final model to properly test for moderation.The model's significance is analysed by comparing the -2log (likelihood) between the two models. .The step chi-square is analysed to check the moderating effects of personality are significant.

The research hypotheses formulated for the study:

1. The risk perception of the respondents have an impact on investor behaviour
2. The risk perception of the respondents have an impact on Locus of control bias moderated by their personality traits
3. The risk perception of the respondents have an impact on risk aversion bias moderated by their personality traits
4. The risk perception of the respondents have an impact on anchoring bias moderated by their personality traits

IV. ANALYSIS

Table No:1

Gender

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	123	68.3	68.3	68.3
Female	57	31.7	31.7	100.0
Total	180	100.0	100.0	

The above shows that the male respondents constitute 68.3% and that of the female respondents constitute 31.7% of the study.

Table No:2
Age

Age	Frequency	Percent	Valid Percent	Cumulative Percent
Below 25 years	15	8.3	8.3	8.3
25-35 years	60	33.3	33.3	41.7
35-45 years	66	36.7	36.7	78.3
45-55years	18	10.0	10.0	88.3
Above 55 years	21	11.7	11.7	100.0
Total	180	100.0	100.0	

The above table reveals that the majority (36.7%) of the respondents age group is 35-45 years.33.3% of the respondents belongs to the age groupof 25-35 years.11.7%, 10% and 8.3% of the respondents belongs to the age group of above 55 years, 45-55 years and below 25 years respectively.

Table No:3

Education

Education	Frequency	Percent	Valid Percent	Cumulative Percent
High school	12	6.7	6.7	6.7
Graduate	66	36.7	36.7	43.3
Post graduate	69	38.3	38.3	81.7
Professional degree	24	13.3	13.3	95.0
Others (diploma)	9	5.0	5.0	100.0
Total	180	100.0	100.0	

The above table shows that the majority (38.3%) of the respondents and (36.7%) of the respondents educational qualification is post graduate and under graduate respectively.13.3%, 6.7% and 5% of the respondents educational qualifications are professional degree, high school and others like diploma respectively.

Table No:4

Occupation

Occupation	Frequency	Percent	Valid Percent	Cumulative Percent
Government employee	9	5.0	5.0	5.0
Private company employee	102	56.7	56.7	61.7
Professional	9	5.0	5.0	66.7
Business	39	21.7	21.7	88.3
Retired	12	6.7	6.7	95.0
Student	3	1.7	1.7	96.7
Others	6	3.3	3.3	100.0
Total	180	100.0	100.0	

The above table reveals that majority of the respondents (56.7%) of the respondents work for a private company. 21% of the respondents are self-employed. Remaining 6.7%, 5%, 5%, 3.3% and 1.7% of the respondents are retired employees, professionals, government employees, others (like agriculture) and students respectively.

Table No:5

Income

Income (Rs.)	Frequency	Percent	Valid Percent	Cumulative Percent
Below 2,50,000	54	30.0	30.0	30.0
2,50,000-5,00,000	93	51.7	51.7	81.7
5,00,000-10,00,000	27	15.0	15.0	96.7
Above 10,00,000	6	3.3	3.3	100.0
Total	180	100.0	100.0	

The above table reveals that majority 51.7% of the respondents income is between Rs 2,50,000-5,00,000 , 30% of the respondents income is below Rs.2,50,000 and the remaining 15% and 3.3% of the respondents income is between Rs. 5,00,000 – 10,00,000 and above Rs.10,00,000 respectively.

Table No: 6 Logistic regression analysis of risk perception as predictors of investor behaviour

Investor Behaviour	**B**	**S.E**	**Wald**	**D.F**	**Sig**	**Exp(B)**
Herding	0.031	.013	5.595	1	.018	1.032
Loss aversion	0.080	.016	23.516	1	.000	1.083
Overconfidence	.083	.017	24.046	1	.000	1.087
Anchoring	.055	.015	14.454	1	.000	1.057
Asymmetric information	.099	.018	29.503	1	.000	1.104
Cognitive dissonance	.019	.013	2.125	1	.145	1.019
Sensation seeking	.054	.014	13.908	1	.000	1.055
Risk aversion	.044	.014	9.910	1	.002	1.045
Representativeness	.082	.017	23.778	1	.000	1.086
Locus of control	.065	.015	18.308	1	.000	1.067
Mental Accounting	.098	.018	29.173	1	.000	1.103
Status Quo	.055	.014	14.204	1	.000	1.056

Note: Exp (B) – odds ratio, Sig – significance level , df – degrees of freedom, Wald – Wald’s test , S.E Standard error &B – unstandardised regression coefficient

Table No.6 indicates that risk perception factors have significant relationship with all behavioural biases since p value is (.000) except cognitive dissonance since p value is (.145). Risk perception of the respondents leads to behavioural biases since the odds ratio is higher than 1 for all behavioural biases.

Table No:7
Logistic regression analysis of risk perception of the respondents as predictor of Locus of control moderated by their personality traits

Factors	B	S.E.	Wald	df	Sig.	Exp(B)
Riskperception	-.263	.155	2.893	1	.089	.769
Personality	-.473	.197	5.771	1	.016	.623
Personalityandriskperception	.005	.002	4.887	1	.027	1.005
Constant	26.209	13.866	3.573	1	.059	

Table No. 7 shows the moderating role of personality traits on risk perception and its impact on investor behavior. It is evident from the table that the p value (.027) is significant which shows that personality traits of respondents moderate the risk perception of the respondents. The odds likelihood ratio is also above 1 and the Wald's test static is 4.4887.

Table No:8
Logistic regression analysis of risk perception of the respondents as predictor of risk aversion moderated by their personality traits

Factors	B	S.E.	Wald	df	Sig.	Exp(B)
Riskperception	-.182	.118	2.382	1	.123	.833
Personality	-.378	.152	6.167	1	.013	.685
Personalityandriskperception	.003	.002	4.579	1	.032	1.003
Constant	20.647	10.831	3.634	1	.057	

Table No. 8 shows the moderating role of personality traits on risk perception and its impact on risk aversion bias. It is evident from the table that the p value (.032) is significant which shows that the personality traits of respondents moderate the risk perception of the respondents. The odds likelihood ratio is also above 1 and the Wald's test static is 4.579.

Table No:9
Logistic regression analysis of risk perception of the respondents as predictor of anchoring bias moderated by their personality traits

Factors	B	S.E.	Wald	df	Sig.	Exp(B)
Riskperception	-.321	.163	3.868	1	.049	.726
Personality	-.417	.205	4.162	1	.041	.659
Personalityandriskperception	.005	.002	4.803	1	.028	1.005

Constant	26.096	14.454	3.260	1	.071	

Table No. 9 shows the moderating role of personality traits on risk perception and its impact on anchoring bias. It is evident from the table that the p value (.028) is significant which shows that the personality trait of respondents moderates the risk perception of the respondents. The odds likelihood ratio is also above 1 and the Wald's test static is 4.803.

V. CONCLUSION

The study demonstrated the impact of risk perception of the respondents on the investor behaviour.Further the study also revealed personality traits of the respondents also acts as a moderator between risk perception and investor behaviour.It is evident that among the various behavioural biases the locus of control, risk aversion and anchoring bias were significantly influenced by risk perception of the respondents and moderated by their personality traits.

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