

**INVESTORS' DEMOGRAPHIC AND
PSYCHOLOGICAL CHARACTERISTICS ON
INVESTMENT BIAS IN SRI LANKA**

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**Dissertation submitted in partial fulfillment of the requirement for
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DECLARATION OF CANDIDATE

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text. Also, I hereby grant to University of Moratuwa the non-exclusive right to reproduce and distribute my dissertation, in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works (such as articles or books).

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Signature of the supervisor:

Date :

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Researcher

Abstract

Behavioral finance is not a new paradigm in financial markets, which has recently emerged in the 20th century as a response to the problems faced by modern financial theory. Broadly speaking, it discusses that some financial phenomena are better understood by means of models in which agents are not fully rational. Present study is an attempt to analysis the relationship between investors' characteristics and investment bias. For the study purpose researcher distributed 500 questionnaires among the CSE investors simple random sampling method. But only 67% of questionnaires were received by researcher. Investor's demographics variables and five personality traits variables are the independent variables. Deposition bias, herding bias and overconfidence bias are the dependent variables. From the analysis researcher can conclude that education level and age have significant relationship with investment bias. Therefore when the education level and age of the individual investors are increasing biases will be decreased. Psychological variables and investment bias results revealed that extrovert and neuroticism personality's individuals have significant relationship with investment bias. Further researcher can claim that when the education and income level of the extrovert personality's investors are increased, investment bias will be decreased. Investors who are qualified as having responsibilities and being open to experience should analyze market's information carefully and advise with the experts. They should find a real understanding of their own abilities in the stocking market. They should try to limit their false confidence by doing more trades for a decrease in the cost of the trades and an increase in their own outcome.

Keywords: Demographics Factors, Agreeableness, Conscientiousness, Neuroticism, Openness Extrovert, Overconfidence bias, Herding bias, Deposition effect and Investment Bias.

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List of Abbreviations

VEV	Variance-extracted value
CFR	Composite factor reliability
VIE	Variables in the equations
NM	Null model
OTM	omnibus tests of model
MS	Model summary
LR	likelihood ratio
C& S	Cox & Snell R Square
N	Nagelkerke
EL	Education Level
Gen	Gender
Ag	Age
Re	Religion
MS	Marital Status
MI	Monthly income
IV	Independent variable
VIE	Variable in equation
Op	Openness
Ag	Agreeableness
Ne	Neuroticism
Con	Conscientiousness
Oc	Overconfidence bias
De	Deposition effect
Hb	Herding bias
Ob	Optimism bias
PF	Psychological Factors
M	Male
F	Female

CHAPTER 01

INTRODUCTION

1.1 Background of the study

Investment analysis is commonly made by investors' use of fundamental analysis, technical analysis and personal judgment of individual investors. Further so many tools and techniques facilitate investment decisions. Factors in the financial market and received information systematically influence on individual investors decision making and market results too. Individual investors' market behaviour is based on psychological principals which is express the reason for why investors purchase or sales stock. Specified psychological factors (PF) of individual investors will determine act and react of investors on information received. Alson (2006) revealed that behavioural finance (BF) is seeking the results of individual of psychological processes on decision-making skill. In other way, explain this statement behavioural finance involving influence of individual personality trait on decision-making process. Bodie et al, (2005) research finding revealed that BF is a pattern which studies financial markets without traditional method and accomplished finding of the studies. But the conventional financial theory is explaining rational investors like to maximize their wealth. In another way basic financial rules and investors strategies based on the risk return trade off. But in the present scenario investors risk taking abilities is not a same it is mainly depend on the personal approaches. Market features, individual risk profiles and accounting information are the key factors to determine the investment decision. Deposition effect refers investors are prejudiced due to the irrespective accounting information by unequal risk preference for gain / loss situations. According to the Nay and Obenberger, (1994) study was evaluating the factors influencing the investor's behaviour. From the analysis researchers proposed that classical wealth maximization factors are significant association with investors. Even though investors are using many tools and techniques when they are selected capital market instrument, especially in shares.

1.2 PROBLEM STATEMENT

The importance of behavioural model can be decided as there is a sound essential to improve behavioural model to ask the factors of investor behaviour and their impact on individual investor's financial resolution taking process. According Shefrin (2007) defined bias as "predisposition towards error". Further, researcher expand, a bias is a prejudgment in taking of decisions while previously being predominance by highlighted hopes. There are emotional prejudices being communicated by the individual investors. More obviously it is quantified that during taking resolutions, if investors are behaviourally prejudiced after it is intentionally said that investor is having full knowledge about their investment in another way, if the person is not prejudiced at that moment maximum possibly researchers could say that they are balanced with their investment. In optimism bias is a predisposition for beliefs and traits being align with interests: subjective possibility is being enlarged by wanting something. Psychology and economics is being described by optimism bias. Exactness of understanding and information more than what investors really do is the occurrences of ob(Optimism bias) for resolution makers. Such behaviour is being conducted automatically so that accessible community information is being uncontrolled due to ob. needed evidence and absence of advantage of the information to take appropriate decisions is avoided by the resolution makers. Tendency of people to have trust that outcomes can be measured and influenced by them but in reality it does not happens is being well-defined as illusion of control. In simple words, self-control bias refers investors who individuals to spend today at the cost of saving for tomorrows are being produced. Absence of self-discipline is being communicated by individuals in regard of fund.

Endler & Manusson (1976) revealed that PF and external factors are responsible for development of human behaviour regarding decision making process. Goldberg, (1990) and Hogan et al., (1996) are strongly suggested the personality traits should be categorized under big five personality traits model. Robbins et al., (2008) suggested to categorized the model include Agreeableness(Ag), Extraversion(Ex), Conscientiousness(Con), Openness(op) and Neuroticism(Ne). Further they expand,

individuals who are having Exs' personality are in a habit to develop interactions and tend to be assertive, outgoing, and sociable. Individuals who are having Ag personality are comply with others opinion. Individuals who are having Con are determined, planned and dependable. Even though according to Rothman & Contzer (2003) Con personality traits individuals are goal-oriented, trust worthiness, and systematic. Ne personality individuals are having emotionally trust worthiness and ability of an individual to tolerate stress. Further people who are having Ne personality traits tend to be self-confident, cool and safe. Robbins et al., (2008) further add with their findings that highly open people are always asking questions and they have innovative ideas and creativity. The research study argued the influence of individual's behavioural traits on investment prejudices i.e. overconfidence bias (Oc), herding behaviour (Hb) and disposition effect (De). In the present study behavioural traits are classified under five model in that comprises the following traits i.e. ex, op, con and ne. In addition to this it also discusses the influence of behavioural traits on demographic investment prejudices.

Therefore, the study is an attempt to analysis the relationship between demographics and psychological characteristics of individual investors and investment bias.

1.3 Research objective

The objective is as follows:

- To identify the relationship between demographic factors and psychological characteristics of individual investors and investment bias

1.4 Significance of Study

The present study will contribute all the stake holders' analysis. Individual investor with any behavioural traits needs the information about the respective prejudice that makes serious part while involving financial decisions making. Financial planners, financial managers and financial advisors are using the information of the

behavioural traits of individuals' investor easily observe types of investments that greatest suits the investor.

The present study will important for other stakeholders based on their specific need, such as understanding of individual investors behaviours, understanding of related bias.

1.5 Chapter Frame work

The study is organized into five chapters. Following figure explains is as follows: Chapter I: The covers Introduction, problem, study objective, Significance and framework. The chapter II is classified in to two. They are: Theoretical review: The section will discuss the theories and factors related with behavioural finance Empirical review: The section discusses the result of the existing studies in order to analysis the review of literature. Chapter III explains the relationship between variables using graph, conceptualization, measurement of variables, hypothesis & model specification, key variables definition, sampling, data collection and data analysis techniques. Chapter IV includes the data presentation & analysis and hypothesis testing and Chapter V the chapter summaries the finding, answers to the research objective and communicate the finding of study.

CHAPTER 02

LITERATURE REVIEW

2.1 Introduction

Individual behaviour is a set personal difference those are influenced by the development of an individual values, attitudes, special remembrances, community dealings, behaviours, and abilities. Various authors expressed their personal explanations about personality on their hypothetical points. The term "personality trait" refers to permanent individual features that are showed in a specific form of behaviour in a variety of circumstances.

There are so many ways to measure characteristics of individuals, but psychologists do not want to divide humanity neatly into types. Instead, behavioural traits are focused by psychologists. The most commonly accepted of these behavioural personalities are (Jamshidinavid, Chavoshani, and Amiri, (2012) Openness, Conscientious, Extrovert, Agreeableness and Neuroticism.

2.1 Philosophies of Investors' Behavior

2.1.1 Regret-Theory

It involves with individual's feelings then they understood they did mistake after analysis of financial market. Price of a share is emotionally influence on individual investors' characteristics when they are buying a share. Therefore, investors do not want to involve in selling of the share, because, they are feeling shame of recording a loss from the sales of the investment. Regret theory is accurate for individuals who find the investment for purchasing but for the trading purpose. According to Pareto (1997) expressed his view that some investors terminate the possibility of feeling regret by use of knowledge and information about the market and purchasing only stock.

2.2.2 Theory of mental accounting

Mental accounting explains that individuals who are having a particular event in to mental section and the difference between the sections will influence on individuals' activities when they are having more events into mental section. For example, for unwillingness to trade an investment that once they had abnormal yield and now they have a normal gain. During the economic prosperous individuals get abnormal gain. When the market condition is decreasing trend, individual investors profit will reduce. Therefore, due this two events, investors do not involve sales of the investment.

2.2.3 Prospect/Loss-Aversion-Theory

The theory involves that individual's exhibit a various extent of feelings towards profit than losses. Normally individuals' investors are worried about potential losses than yield.

2.2.4 Over/Under reacting theory

it states that persons are having positive approach when the financial market instruments' prices increase up and they think market will continue to do so. At the same times individuals become negative approach when the market decreasing. Individual are placing highly focus on recent events than past information. Therefore, prices of an investment will change based on the information received by an individual. According to the Hong and Stein, (1999) revealed that when the highest of positive approach investment prices go up beyond its market value.

2.1.5 Theory of overconfidence

Theory of overconfidence sates that individuals are hoping above mean on their skills. They also overstate the accuracy of their abilities and investors knowledge comparative to others investors. They hope that their abilities are adequate for the time. Tapia and Yermo (2007) reveled that result from the action of overconfidence in surplus trades, with trading costs knocking profits.

2.2 Empirical review

In 2010, German researchers examined the part of the cognitive biases might have had in the global financial crisis beginning in 2007. Their finding results shows that stock financial crisis in the world was not influences on the stock analysts and traders' performance.

Loewenstein (2000), Romer (2000) study results shows that investor's sensitive state is appealed to influence asset prices.

Hirshleifer and Shumway (2003), Kamstra, Kramer and Levi (2000), Cao and Wei (2005) study results shows that individual investors humour is affected by weather conditions with sunshine, day temperature and rain. These psychological variables actually affect the individual investor's performance which is influencing on stock return. The study results show that BF theory could be used to explain why market is useless without information.

Bernard and Thomas, (1990) study informed that individual investors are be possible to over-react to private information and under-react to public information such as earnings declarations.

In 1972, Tversky and Daniel Kahneman introduced the cognitive bias. The notion of cognitive biases was introduced by in (1972) and produced out of their knowledge of investors' lack of numeracy, or incapability to reason automatically with the greater orders of extent. Tversky, Kahneman and coworkers verified several replicable ways in which investors decisions and decisions differ from balanced choice theory. Tversky and Kahneman explained individuals' changes in judgment and resolution taking in terms of heuristics. It is simple for the brain to calculate but sometimes familiarize "severe and systematic errors" (Tversky & Kahneman)

According to the Atif & Kafayat (2014) study involving self-attribution bias, overconfidence bias and optimism bias and decision making. The main objective of

the study is to identify the association between decision making and behavioral biases. Primary data collection method used for the study such as questionnaire and survey. Structural Equation Modeling (SEM) is used to examine the influence of behavioral biases on investors' decision making ability. Finding and conclusion of the study are useful for investors, financial manager and other decision makers to take their decision making process.

From the Babajide, and Adetiloye (2012) study the effect of the behavioral biases on security market performance in Nigeria. They have two main objectives. They are; first identify the degree of investment biases in Nigeria share market. Second one is that examine the influence of investment biases on performance of share market. For the study purpose 300 individual investors randomly selected and issued questionnaire among them. Pearson correlation coefficient is used to analyze the data. From the analysis results shows that investment biases are exists, but it has negative weak relationship with share market performance. Therefore, they suggested to investors use the investment advisor help to reduce the investment biases which would facilitate the portfolio management.

According to the Odean (1999) study results revealed that overconfidence investment bias had relationship with excessive trading. Further he added with his statement that overconfidence investors selected higher risky investment. Barber and Odean (2001, 2002) Glaser and Weber (2007) their studies results comply with Odean (1999) studies.

Lim (2012) examined association between investment prejudices and resolution taking of investors in MSM. Variables are Optimism bias, Cb, herding bise and and resolution making. Study results revealed that Optimism bias, Cb and Rb have positively significant association between resolution makings. But Herding bise was no significant relationship with investors' decision making

Bashir, Azam, Butt, Javed, Tanvir (2013) study results revealed that Ob, illusion of control, confirmation biases have positively significant relationship with decision making. Further these factors have strong influence on investors' decision making

Kengatharan (2014) studies from Sri Lanka revealed that investors' behavioral factors have significantly associated with their decision making abilities. Qadri and Shabbir (2014) and Nofsingera and Varmab (2013) studies also comply with the results of Kengatharan (2014).

Fama (1998) argued that normal investors are balanced when they are receiving information which is explaining efficient market theory. But there was unavailability evidence strengthens his statement.

According to the Merikas et al., (2003) study identifies the factors effect on investors' behavior. Their study results revealed that decision on buying a share is influence by economic factors and other variables.

An individual of this type is easily prejudiced by external elements and lacks self-control. They are characterized by low intellectuality, low objectivity, openness, lack of conflict, lack of attention, high ag, helplessness and good sense of humor, (Sadi et al. 2011). Investors with this personality type tend to be risk averse and continue holding losing stocks with the hope of revival, (Jamshidinaid et al. 2012).

According to Haugen (1999) classified financial thoughts such as old finance, modern finance and new finance. The traditional finance involved financial reporting and nature of finance. Modern finance considered on capital estimating and evaluation of capital and asset on rational economic behavioral based. New finance will deal with efficient market behavior

Baker and Haslem, (1973) argued that generally individual investors mainly focused on expectations about the future. At the same time, research was done by Lee and tweedie, (1975, 1976, and 1977) disclosures that the general public looks difficulties in accepting financial statement analysis in the corporate sector.

Baker and Nofsinger (2010) expressed the sociological aspects specified that behaviorists will confront critical difficulties in getting the significantly bigger traditionalist group to obtain their point of view. They contended that whether scholars will ever have the ability to address Fama and interest for a basic and refutable hypothesis is doubtful in light of the fact that individual conduct is characteristically mind boggling

According to Barber and Odean (2001) study results shows that men are more overconfidence than female. For this finding he used data from real estate for the period of 1991 to 1996. Further he was explaining females turn their portfolio 53% while men's 77% and men are trading 24% more the women due to the overconfidence. Chen, Kim, Nofsinger and Rui (2007), Aker and Duck (2008), Graham, Harvey and Huang (2009), Grinblatt and Keloharju (2009), Hoffmann, Shefrin, and Pennings (2010) their study results consist with Barber and Odean (1999) results.

Daniel, Hirshleifer, and Subrahmanyam, (1998) from the studies comply with Hong and Stein, (1999) model. Further Daniel et al discussed those investors over confidence about the private information they calculated share value. When the private information signal is not agreeing with public information which will lead the self-attribution bias.

According to the Fang (2013) suggested that a linear regression model is used for scale variables but logistic regression model involving categorical data. Assumptions and parametric is varied for both models.

Olivier, Blake, Steed and Salgado (1978) started his work in the medical science area using logistic regression. Fifteen years later it used in the business area. Kotha, Rajgopal, and Venkatachalam (2004), Blumenschein, Blomquist, Johannesson, Horn, and Freeman (2008), Kolasinski and Kothari (2008), Ellingsen, Johannesson, Lilja and Zetterqvist 2009), Lampe (2011), Mayew and Venkatachalam (2012), and Avnet, Pham and Stephen (2012).

The knowledge from LR is growing. Following authors added their results with this knowledge. Cox (1970), Breslow and Day (1980), Kleinbaum, Kupper, and Morgenstern (1982), Schlesselman (1982), Mansfield (1994), and Hair, Anderson, Tatham and Black (1995), and Lachin (2008). Here Lachin (2008) mainly focused on logistic regression in his study.

CHAPTER 03 METHODOLOGY

1.0 Introduction

The chapter three clearly explains methodology of the study. Such as profile of the study, sampling conceptualization, measurement of variables, hypothesis development and model specification, method of analysis and key variable definition.

3.1 Sampling & data collection

The research focus on individual investor's characteristic on investment bias. For the study purpose Researcher send to 500 questionnaires to individual investors via CSE branches on random sampling method but only 330 questionnaires were returned.

3.2 Conceptualization

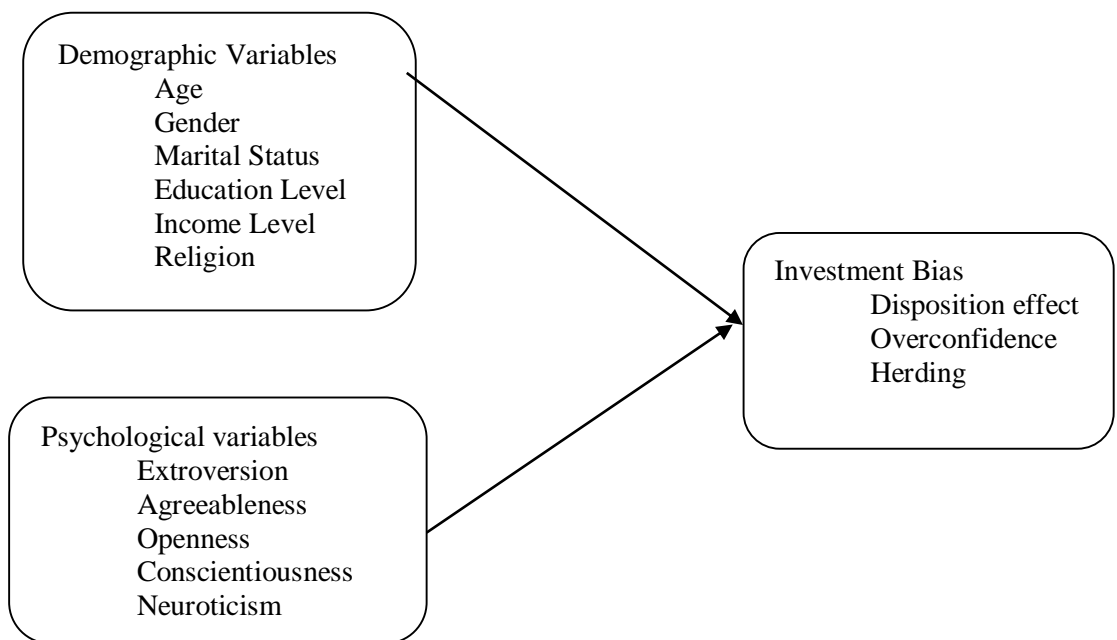


Figure 3.1 structure relationships of Demographics, Psychological factors and investment biases

3.3 Measurement of variable

Table 3.1 Measurement variables

Concept	Variable	Indicator	Measurement
Individual Investors' Characteristic	Demographic variable	gender	Questionnaire (1)
		Age	Questionnaire (3)
		Marital status	Questionnaire (5)
		Education level	Questionnaire (2)
		Income level	Questionnaire (6)
	Psychological	Extroversion	Questionnaire (9 a to 9 r)
		Agreeableness	Questionnaire (10 a to 10 i)
		Openness	Questionnaire (11a to 11 i)
		Conscientiousness	Questionnaire (12 a to 1)
		Neuroticism	Questionnaire (13 a to 9h)
Investment bias	Behavioural bias of individuals	Overconfidence	Questionnaire (14d,14e,14f,14g,14h,14i , and 14n)
		Disposition Effect	Questionnaire (14a, 14b, 14j, ,14k,14l, and 14m)
		Herding	Questionnaire (14c,14o and 14p)

ex individual regularly emphasizes on outside features and is under their effect.

Ag refers the individual's differences in relation with social co operations.

Con refers on the individual's faithfulness and is connected with the way we control and change the incentive.

Ne behavioural peoples are those who absence sufficient and efficient approaches for resolving their individual aims, are self-centred and selfish and are looking for superior goals.

Op refers to flexibility and desire for new elements.

Investment bias (Ib) is difficult to express however the a concept of Ib individual's decisions may differ the standard beliefs.

Questions are taken from Mc Croskey's distinct from measures of communication apprehension. It is measured as five Likert questions and finally average the results and recording it.

3.4 Method of Analysis

3.4.1 Logistic regression (LR)

LR analysis is the association between a dummy dependent variable and a set of independent (explanatory) variables. Consider a collection of prob. independent variables denoted by the vector $x' = x_1, x_2, \dots, x_p$.

The logit of the multiple LR model is given by the equation.

$$g(x) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p$$

β_0 = Constant/ intercept

$\beta_1 \rightarrow \beta_p$ = co efficient for p explanatory variables $x \rightarrow x_p$

The regression procedure finds the co-efficient which minimize the standard deviation of y. As the result of LR is binary, so residual variable needs to be converted so that the regression procedure can be used. The logit transformation is as follows:

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p$$

P = occurring event of probability

$$\left(\frac{pro}{1 - pro} \right) = \text{odds ratio}$$

If chances of the occurrence of interest happening for persons are wanted, the LR equation is as:

$$\pi(x) = \frac{\exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p)}{1 + \exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p)} \dots\dots\dots(1.a)$$

A transformation of $\pi(x)$ that is central to our study of LR is the logit transformation. The transformation is defined, in terms of $\pi(x)$, as:

$$g(x) = \ln \left[\frac{\pi(x)}{1 - \pi(x)} \right]$$

$$= \beta_0 + \beta_1 x$$

The importance of this transformation is that $g(x)$ has many of the desirable properties of a linear regression model. The logit, $g(x)$, is linear in its parameters, may be continuous, and may range from $-\infty$ to $+\infty$ depending on the range of x .

3.4.1.1 Fitting the logistic regression model

Y coded as 0 or 1 then the expression for $\pi(x)$ given in the equation provides (for an arbitrary value of $\beta = (\beta_0, \beta_1)$ the vector of the parameters) the conditional probability that y is equal to 1 given x . this will be denoted as $p(y = 1|x)$ it follows that the quantity $1 - \pi(x)$ gives the conditional probability that y is equal to zero given x , $P(Y=0|x)$. Thus for the pairs (x_i, y_i)

Where

$y_i = 1$, the contribution to the likelihood function is $\pi(x_i)$

$y_i = 0$, the contribution to the likelihood function is $1 - \pi(x_i)$

Where the quantity $\pi(x_i)$ denotes the value of $\pi(x)$ computed at x_i

A convenient way to express the contribution of likelihood for the pair (x_i, y_i) is through the expression on

$$\pi(x_i)^{y_i} [1 - \pi(x_i)]^{1-y_i} \dots\dots\dots (1.b)$$

Since the observations are assumed to be independent, the probability function is derived as the product of the terms given in expression (1.b) as follows;

$$l(\beta) = \prod_{i=1}^n \pi(x_i)^{y_i} [1 - \pi(x_i)]^{1-y_i} \dots\dots\dots(1.c)$$

The principle of optimum probability states that we use as our evaluation of β the value which optimum the expressions in equation (1.c). However, it is simple way to work with the log of the equation (1.c). This expression, the log likelihood, is defined as

$$L(\beta) = \ln[l(\beta)] = \sum_{i=1}^n \{y_i \ln[\pi(x_i)] + (1 - y_i) \ln[1 - \pi(x_i)]\} \dots\dots\dots(1.d)$$

To find the value of β that optimize $L(\beta)$, differentiate $L(\beta)$ with respect to β_0 and β_1 and set the resulting expressions equal to zero. These equations, known as the probability equation, are;

$$\sum [y_i - \pi(x_i)] = 0 \dots\dots\dots(1.e)$$

And

$$\sum x_i [y_i - \pi(x_i)] = 0 \dots\dots\dots(1.f)$$

The value of β given by the solution to equations (1.5) and (1.6) is called the optimum probability estimate and will be denoted as

3.4.1.2 Testing for the significance of the coefficients

The comparison of experiential to projected values using the probability function is based on the following expression;

$$D = -2 \ln \left[\frac{\text{(likelihood of the fitted model)} \dots\dots\dots}{\text{(Likelihood of the saturated model)}} \right] \dots\dots\dots(1.g)$$

Using equation (1.4) and equation (1.7) becomes

$$D = -2 \sum_{i=1}^n \left[y_i \ln \left(\frac{\hat{\pi}_i}{y_i} \right) + (1 - y_i) \ln \left(\frac{1 - \hat{\pi}_i}{1 - y_i} \right) \right] \dots\dots\dots(1.h)$$

Where $\hat{\pi}_i = \hat{\pi}(x_i)$

The statistic, D in equation (1.8) is called as deviance.

Specially, it follows from the definition of the a saturated model that $\hat{\pi}_i = y_i$ and the probability is

$$l(\text{Saturate model}) = \prod_{i=1}^n y_i^{y_i} * (1 - y_i)^{(1-y_i)} = 1$$

Thus it follows from equation (1.g) that the deviance is

$$D = -2 \ln(\text{likelihood of the fitted model}) \dots\dots\dots (1.i)$$

3.4.2 Composite reliability (CR) and Average Variance Extracted (AVE)

The degree of variance taken by construct value versus the measurement of error is measured by AVE which is above 0.7 is treated as very good however the degree is high than 0.5 is acceptable.

CR for construct ξ_j is as;

$$pc \epsilon_j = \left(\frac{\left(\sum_{k=1}^{k_j} \lambda_{jk} \right)^2}{\left(\sum_{k=1}^{k_j} \lambda_{jk} \right)^2 + \Theta_{jk}} \right)$$

Where

k_j = number of indicators for built ξ_j

λ_{jk} = factor loading

Θ = is the error of the variance of the k indicator $k = (1 \dots \dots k_j)$ for built ξ_j

$$\Theta_{jk} = \sum_{k=1}^{k_j} 1 - \lambda_{jk}^2$$

AVE for construct ξ_j is as

$$AVE_{\xi_j} = \frac{\sum_{k=1}^{k_j} \lambda_{jk}^2}{\sum_{k=1}^{k_j} \lambda_{jk}^2 + \Theta}$$

3.5 Hypothesis

H₁₀: There is no significant association with i_1 and y_1

H_{1a}: There is significant association with i_1 and y_1

H₂₀: There is no significant association with i_2 and y_1

H_{2a}: There is significant association with i_2 and y_1

Where

i_1 = demographic variables

y_1 = investment bias

i_2 = psychological variable

CHAPTER 04

DATA PRESENTATION AND ANALYSIS

4.0 Introduction

The fundamental phases in analysis process involving data presentation and applying statistical method for measuring, evaluating and conveying the results. Statistical package for social science and smart pls software are used analysis the results.

4.1 Data Presentation and Analysis

Mostly individual investors characteristics are considerably differing with the socio demographic profile like gen, edl, a, mi, ms and re. The following table 4.1 summarizes and presents information the respondents' information.

4.1.1 Percentage analysis

Table 4. 1: percentage analysis df

Socio demographic factors		Frequency	(%)
Total No of respondents		330	100
Gen	M	204	61.8
	F	126	38.2
	Total	330	100
Edl	O\ Level	12	3.6
	A\L	82	24.8
	Graduate	170	51.5
	Professional Qualifications	66	20
	Total	330	100
age	Below 25 years	81	24.5
	26-35 years	147	44.5
	36-45years	66	20
	46-55years	24	7.3
	56-65years	12	3.6
	Total	330	100
Re	Hindu	108	32.7
	Christian	64	19.4
	Islam	44	13.3
	Buddhist	114	34.5
	Total	330	100
	Single	154	46.7

M S	Married	176	53.3
	Total	330	100
M I	Below LKR 30,000	68	20.6
	LKR 30,000-LKR 50,000	106	32.1
	LKR 50,000-LKR 100,000	112	33.9
	Above LKR 100,000	44	13.3
	Total	330	100
Experience	Below 1 year	78	23.6
	1-5 years	166	50.3
	5-10 years	50	15.2
	Above 10 years	36	10.9
	Total	330	100

Table 4.1 indicates that, 61.8% of respondents are male and remaining 38.2% of respondents are female. All of the individuals were categorized into five groups such as O/L, O/L, A/L, graduate and professional studies. Nearly 29% of individuals have school level (O/L and A/L) whereas 51.5% are graduates, and 20% of them have completed or reading professional level of education.

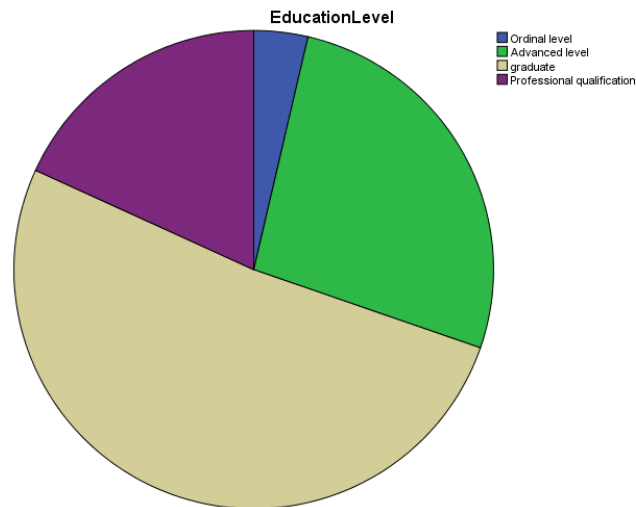


Figure 4.2 pie chart on Educational level

With regards to the age of the respondents, the table 4.1 found that a majority of the respondents (44.5%) are between the 26-35 years old. 24.5% of respondents are under

the 25 years old. 20% of respondents were between 36-45 years old and 10.9% of the respondents are above 46 years old.

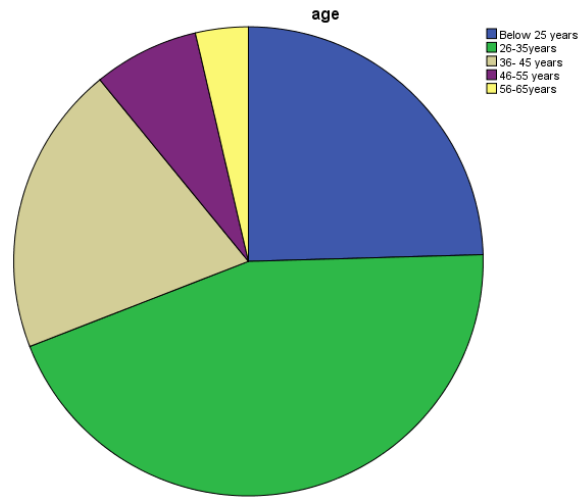


Figure 4.3 pie chart on Age

From the table 4.1 shows that a majority of the study sample (34.5%) belonged to the Buddhist re. 32.7% of Hindu participants, 13.3% of Islam participants and 19.4 are Christian participants.

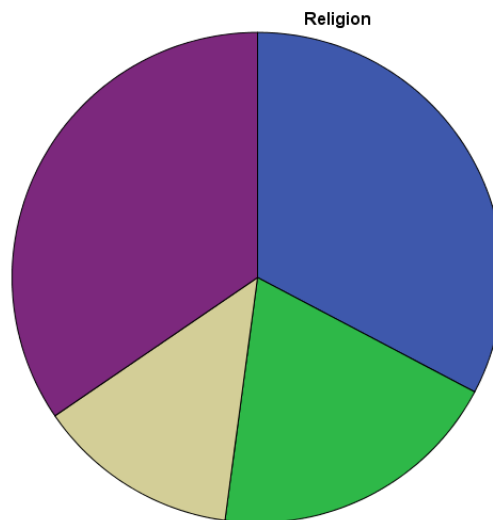


Figure 4.4 pie chart on Religion

Further table 4.1 explains that a majority of the respondents are married (53.3%) and rest of participants are single.

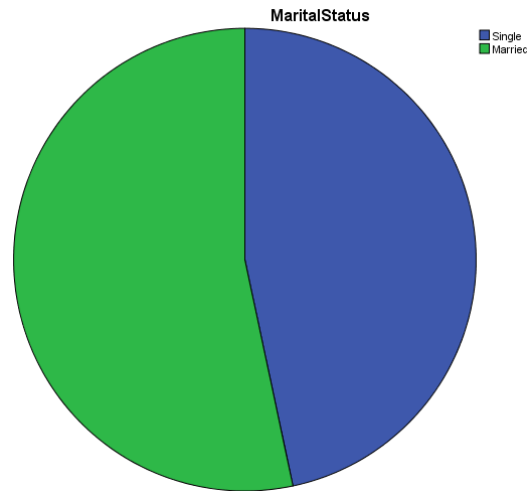


Figure 4.5 pie chart on Marital Status

30,000 per month. 32.2% of respondents earn between LKR 30,000-50,000 per month. 33.9% of respondent earn between LKR 50,00 From the table 4.1 it is understood that 20.6% of investors earn below LKR 0-100,000 and 13.3% of respondents earn income above LKR 100,000 per month.

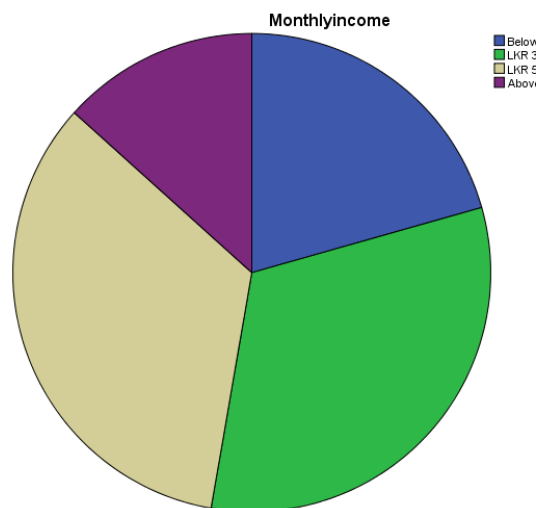


Figure 4.6 pie chart on monthly income

4.1.2 Factor identification

Initial factors loadings using smart pls

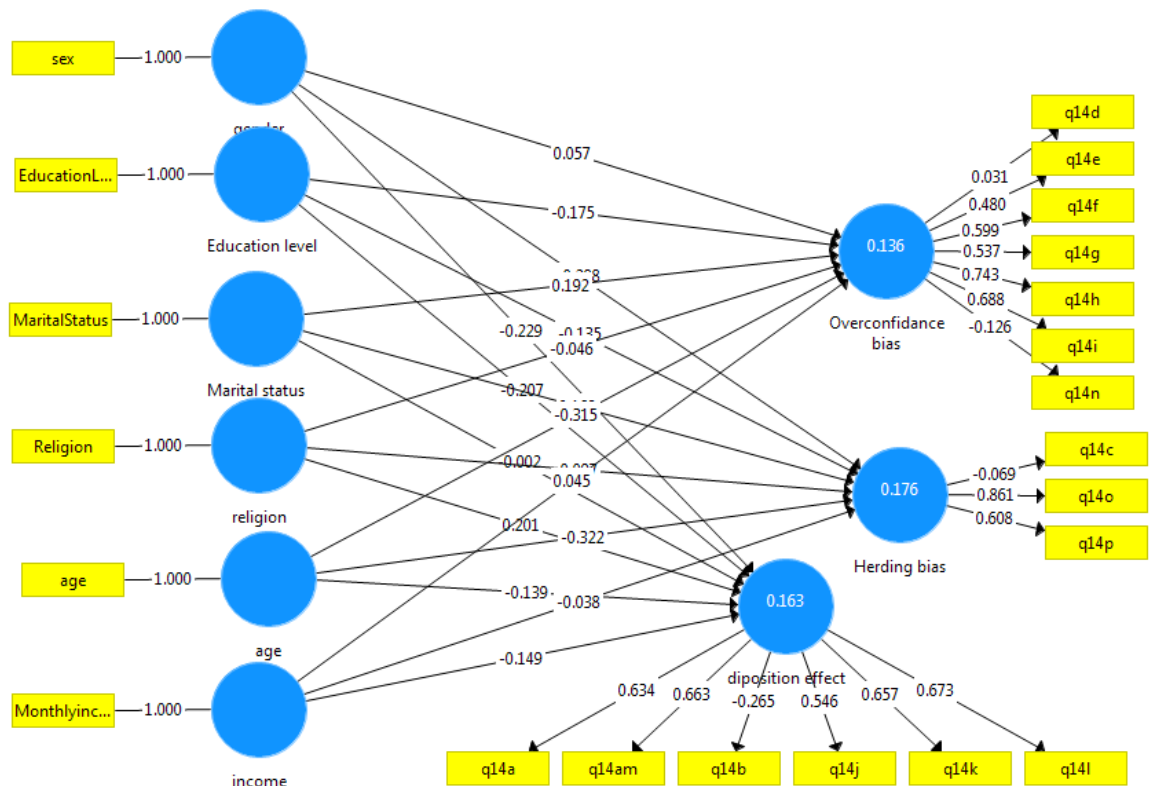


Figure 4.7 Initial factors of demographic variables and investment bias

In above figure overconfidence(oc), Herding(HB), and disposition effect(De) are the latent variables. Q14d,q14e,q14f,q14g,q14h,q14i and q14n are the measurement variables of oc, q14c,q14o and q14p are the measurement variables of Hb and q14a,q14m,q14b,q14j,q14k and q14l are the measurement variables of De.

Latent construct are examined to assess the accuracy and reliability of the factors in Smart pls. (Hulland, 1999). Final factors are selected based the loading factors. factor is selected when the loading is above 0.5

Factors loadings using smart pls

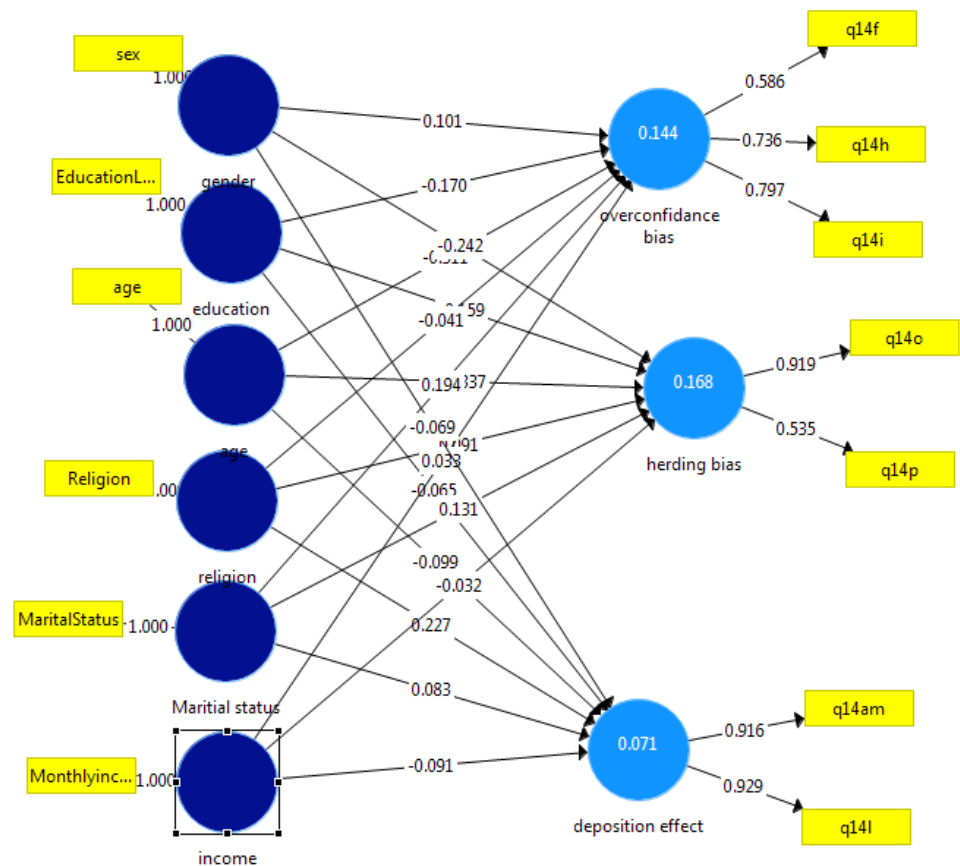


Figure 4.8 Final factors of demographic variables and investment bias

Table 4. 2 checking reliability and validity

Variables	Indicators	Loadings	AVE	Composite Reliability
Overconfidence	Q14f	0.586	0.507	0.752
	Q14h	0.736		
	Q14i	0.797		
Herding bias	Q14o	0.919	0.565	0.708
	Q14p	0.535		
Deposition effect	Q14m	0.916	0.851	0.920
	Q14l	0.926		

If the VEV is beyond 0.5, convergent validity is proven by Fornell and Larcker (1981). Analyzed results revealed that the VEV for five measures ranged from 0.507 to 0.851 . Ob, Hb and De convergent validity is proven by the analysis. CFR value is desired over α because it offers a better approximation of variance pooled by the respective variables (Hair et al., 2006). In present study the CFR coefficients of the builds ranged from 0.708 to 0.920 which met the ordinary of 0.70 as recommended by Fornell and Larcker (1981).

4.1.3 Logistic regression

4.1.3.1 Logistic regression with demographic variables and Herding Bias

The analysed results is divided into dual segments, they are block 0 and block 1. Block 0 measures the worthiness of having a Nm, which is the model with no independent factors. The ‘VIE’ table only contains a breakeven so each person has the same possibility of having high level of herding bias.

Table 4.3 VIE demographic variables and herding bias

	Beta	Stand.error.	Wald	deg.of.freedom	Sig.	Exp(B)
Step 0 Constant	-.950	.123	59.943	1	.000	.387

NM is

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 = -0.950$$

$$\text{Probability of high level} = \frac{\exp-0.950}{1 + \exp-0.950}$$

$$=0.278$$

As 27.8% of individual investors were correctly classified, classification from the NM is not accurate. The model is good, when the addition of independent variables should be increased

Block 1 is analysed after the independent variables selected

Table 4.4 Omnibus tests of model coefficients for demographic variables and herding bias

		Chi-square	Deg.of.freedom	p
Step 1	Step	90.383	15	.000
	Block	90.383	15	.000
	Model	90.383	15	.000

The OTM co-efficients table analysed the model fitness. The significant value is of less than 0.01 for block 1 model is an important enlargement to the block 0 model.

Table 4.5 Model summary for demographic variables and herding bias

Step	-2 Log Lr	C& S R ²	NR ²
1	300.208 ^a	.240	.345

R² states a sign of how much difference in dependent variable is explained by the model. But for the categorical variable this cannot be measured but the 'MS' table shows that the number for two R² amount which is quantity something related. From the table above, researcher can have claimed that 24% to 34.5% of the difference can be explained by the model in block 1.

Table 4.6 Classification Table Step 0 for demographic variables and herding bias

Observed		Predicted		Actual %
		high level	lower level	
Step 0	high level	238	0	100.0
	lower level	92	0	.0
Overall %				72.1

Table 4.7 Classification Table Step 1 for demographic variables and herding bias

Observed	Predicted			
			Actual %	
	high level	lower level		
Step 1	high level	226	12	95.0
	lower level	40	52	56.5
	Overall Percenta			84.2

Classification rate has risen by 72.1% to 84.2%

Table 4.8 VIE for demographic variables and herding bias

	Beta	Stand.error	Wald	Deg.of.freedom	p	Exp(B)
gen	-.981	.326	9.075	1	.003	.375
EdL			4.240	3	.237	
EdL(1)	1.329	.850	2.442	1	.118	3.777
EdL (2)	.055	.430	.016	1	.898	1.057
EdL (3)	-.344	.401	.735	1	.391	.709
a			31.060	4	.000	
a(1)	-.995	.834	1.426	1	.232	.370
a(2)	-1.907	.796	5.737	1	.017	.149
a(3)	-2.796	.889	9.885	1	.002	.061
a(4)	.928	.955	.943	1	.332	2.528
Re			19.433	3	.000	
Re (1)	2.113	.492	18.468	1	.000	8.272
Re (2)	.969	.476	4.142	1	.042	2.635
Re(3)	1.167	.615	3.604	1	.058	3.212
MS (1)	1.105	.323	11.669	1	.001	3.018
Mi			22.088	3	.000	
Mi (1)	-1.059	.640	2.736	1	.098	.347
Mi (2)	1.144	.529	4.673	1	.031	3.139
Mi (3)	.163	.588	.077	1	.781	1.177
Constant	-.849	1.107	.589	1	.443	.428

From above table explains that contribution of each independent variable (IV) to the model and its statistical significance. The Wald test is used to determine statistical significance for each of the IV. The statistical significance of the test is found in the

"p." column. From these results sex, Educational level, age, Religion, Martial status, and Monthly income are the IV. Herding bias is dependent variable.

The fitted value model is;

$$\hat{\pi}(x) = \frac{e^{\alpha+\beta x}}{1 + e^{\alpha+\beta x}}$$

The estimated logit of the study is given by the equation

$$\text{Herding bias} = 19.750 - 0.981X \text{ sex (1)} - 1.907 X \text{ a(2)} - 2.796X \text{ a(3)} + 2.113\text{Re(1)} + 0.969X \text{ Re(2)} + 1.105 X \text{ Marital Status(1)} + 1.114X \text{ Monthly income(2)}$$

4.1.3.2 Logistic regression with demographic variables and deposition effect

Table 4.9 VIE for demographic variables and deposition effect

	Beta	Stand.error	Wald	De.of.freedom	p.	Exp(B)
0 Constant	.036	.110	.109	1	.741	1.037

N ml is

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 = 0.036$$

$$\text{Probability of high level} = \frac{\exp 0.036}{1 + \exp 0.036}$$

$$= 0.508$$

Classification from the n m is 50.8% true. If the model is good, when the addition of independent variables should be increased

Table 4.10 omnibus tests of model Coefficients demographic variables and deposition effect

	Chi-square	De.of.free	p
Step	71.692	15	0.000
1 Block	71.692	15	0.000
Model	71.692	15	0.000

Significant value is less than 99%, so that the block 1 model is a significant

Step	-2 Log likelihood	C&S R ²	N R ²
1	385.676 ^a	.195	.260

improvement to the block 0 model.

Table 4.11 Model summary for demographic variables and deposition effect

From the table above, researcher can claim that 19.5% to 26.0% of the variation is explained by the model in block 1.

Table4.12 Classification Step 0 for demographic variables and deposition effect

Observed	Predicted			Actual %
	high level	lower level		
0	high level	0	162	.0
	lower level	0	168	100.0
	Overall %			50.9

Table4.13 Classification Step 1 for demographic variables and deposition effect

Observed	Predicted			Actual %
	high level	lower level		
1	high level	114	48	70.4
	lower level	49	119	70.8
	Overall %			70.6

Classification rate has risen by 50.9% to 70.6%

Table 4.14 VIE for demographic variables and deposition effect

	Beta	Stand.error	Wald	Degree of freedom	p	Exp(B)
gen(1)	-.036	.273	.017	1	.896	.965
EdL1			6.250	3	.100	
EdL(1)	-1.174	.895	1.722	1	.189	.309
EdL(2)	-.675	.396	2.904	1	.088	.509
EdL(3)	.044	.356	.015	1	.902	1.045
a			18.983	4	.001	
a(1)	-22.142	11558.367	.000	1	.998	.000
a(2)	-21.045	11558.367	.000	1	.999	.000
a(3)	-22.355	11558.367	.000	1	.998	.000
a(4)	-21.950	11558.367	.000	1	.998	.000
Step 1 ^a						
Re			8.373	3	.039	
Re(1)	.171	.321	.284	1	.594	1.187
Re(2)	.520	.366	2.020	1	.155	1.682
Re(3)	-.948	.501	3.590	1	.058	.387
MS(1)	.322	.271	1.415	1	.234	1.380
Mi			5.732	3	.125	
Mi(1)	-.527	.486	1.178	1	.278	.590
Mi(2)	-.664	.441	2.270	1	.132	.515
Mi(3)	.024	.468	.003	1	.959	1.024
Constant	21.958	11558.367	.000	1	.998	3437307344.148

From these results gen, Educational Level, age, Religion, Martial status and Monthly income are the independent variables. De is dependent variable.

4.1.3.3 Logistic regression with demographic variables and overconfidence bias

Table 4.15 VIE demographic variables and overconfidence bias

	B	STAND. ERROR.	Wald	de.of.fre e	Sig.	Exp(B)
Step 0 Constant	.626	.116	29.333	1	.000	1.870

SN ml is

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 = 0.626$$

$$\begin{aligned} \text{Probability of high level} &= \frac{\exp 0.626}{1 + \exp 0.626} \\ &= 0.651 \end{aligned}$$

Classification from the NM is 65.1% accurate.

Table 4.16 omnibus tests of model Coefficients for demographic variables and overconfidence bias

	Chi-square	De.of.free	p
Step	93.758	15	.000
1 Block	93.758	15	.000
Model	93.758	15	.000

Significant value is less than 99% , so that the block 1 model is a significantly increasing

Table 4.17 Model Summary for demographic variables and overconfidence bias

Step	-2 Log lr	C&S R ²	N ²
1	332.935 ^a	.247	.341

From the table above, researcher can conclude that 24.7% to 34.1. % of the variation is explained by the model in block 1.

Table 4.18 Classification Step 0 for demographic variables and overconfidence bias

Observed		Predicted		Actual %
		high level	lower level	
Step 0	high level	0	115	.0
	lower level	0	215	100.0
Overall %				65.2

Table 4.19 Classification Table step 1 demographic variables and overconfidence bias

Observed		Predicted		Actual %
		high level	lower level	
Step 1	high level	52	63	45.2
	lower level	26	189	87.9
Overall %				73.0

Classification rate is increased 65.2% to 73% in step 1.

Table 4.20 VIE demographic variables and overconfidence bias

	Beta	Stand.error.	Wald	de.of. free	p	Exp(B)
gen	.734	.304	5.841	1	.016	2.084
EdL			10.354	3	.016	
EdL(1)	-3.540	1.124	9.908	1	.002	.029
EdL(2)	-.235	.441	.284	1	.594	.791
EdL(3)	-.181	.423	.183	1	.669	.835
a			12.389	4	.015	
a(1)	-19.693	11495.543	.000	1	.999	.000
a(2)	-19.372	11495.543	.000	1	.999	.000
a(3)	-19.045	11495.543	.000	1	.999	.000
a(4)	-16.378	11495.543	.000	1	.999	.000
Re			12.393	3	.006	
Re(1)	.177	.358	.244	1	.622	1.193
Re(2)	-1.011	.391	6.670	1	.010	.364
Re(3)	.698	.526	1.764	1	.184	2.010
MS(1)	.774	.300	6.661	1	.010	2.169
Mi			31.772	3	.000	
Mi(1)	1.356	.525	6.670	1	.010	3.882
Mi(2)	2.443	.510	22.927	1	.000	11.506
Mi(3)	2.734	.546	25.065	1	.000	15.400
Constant	17.466	11495.543	.000	1	.999	38479079.1 51

From these results gen, EdL, a, Re, MS and Mi are the independent variables. Over confidence is dependent variable. From the above table education level has negatively significant with over confidence bias and monthly income group 2 & 3 has significant positive relationship with over confidence bias.

The fitted value model is as follows;

$$\hat{\pi}(x) = \frac{e^{\alpha+\beta x}}{1 + e^{\alpha+\beta x}}$$

The estimated logit of the study is given by the equation

OC= 19.054 +0.734X sex (1) -3.54 X Education Level (1) -19.369 X 1.011Re(2) + 1.113 X Re(3) +.774 X Marital Status(1) +1.356 X Monthly income (1)+ 2.444 X Monthly income(2) +2.734X Monthly income(3)

4.1.3 Factor identification for psychological Variables and investment biases

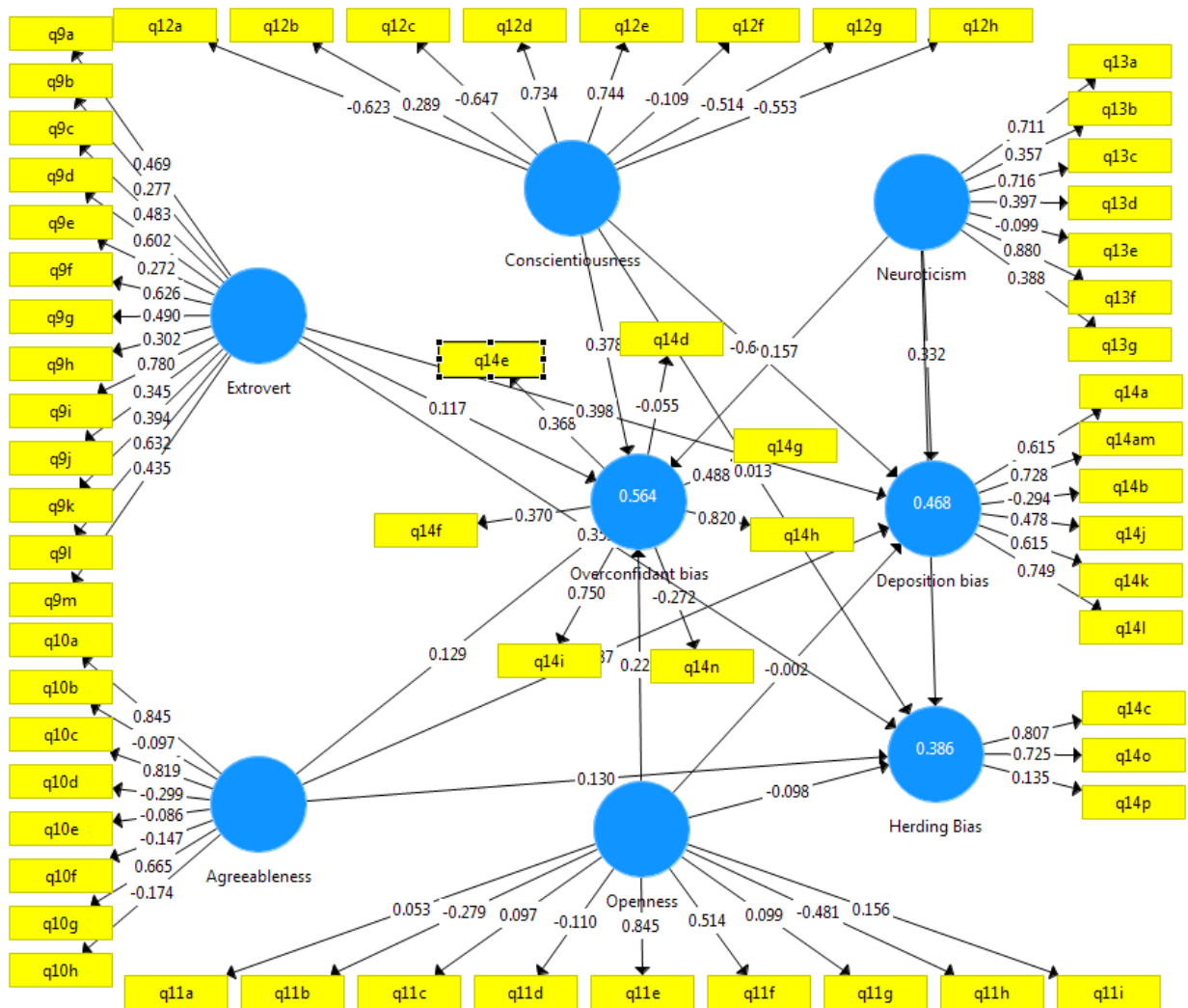


Figure 4. 3 Initial factors of psychological variables and investment bias

Latent variables	Measurement variables
EX	Q9 a to q9m
Ag	Q10a to q10h
Op	Q11a to q11i
Con	Q12a to q12h
Ne	Q13a to q13 g
De	Q14a,q14m,q14k,q14b and q14j
Hb	Q14c,Q14o and q14p
oc	Q14e,q14d,q14g,q14h,q14n,q14i and 14qf

Final model selected based on the loading factors of measurement variables.

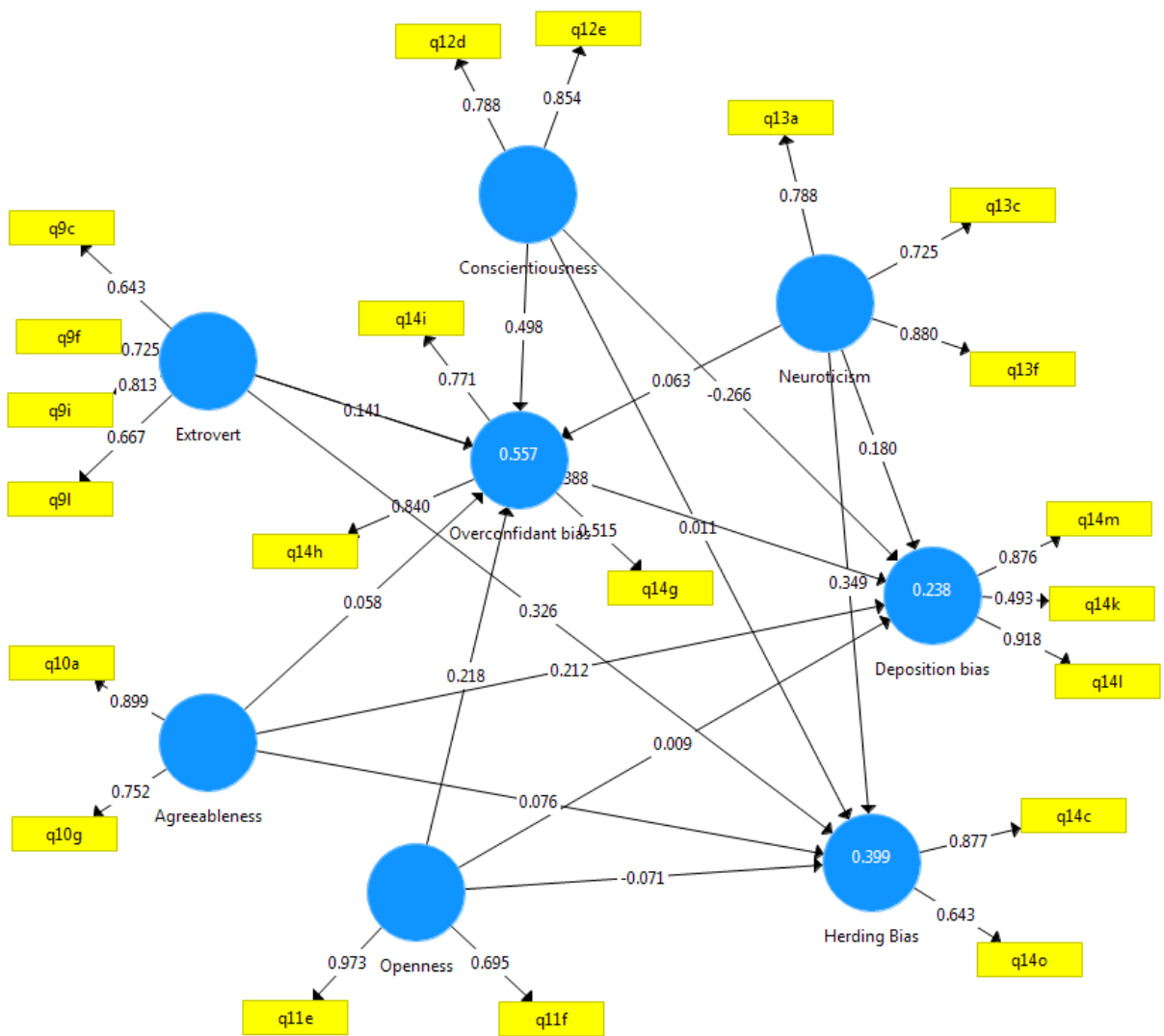


Figure 4.4 identified factors of psychological variables and investment bias

Table 4.21 checking reliability and validity

Variables	Indicators	Loadings	AVE	Composite Reliability
Overconfidence	Q14g	0.515	0.710	0.831
	Q14h	0.840		
	Q14i	0.771		
Herding bias	Q14c	0.877	0.594	0.743
	Q14o	0.643		
Deposition effect	Q14l	0.918	0.573	0.799
	Q14m	0.876		
Agreeableness	Q10a	0.899	0.652	0.848
	Q10g	0.752		
Conscientiousness	Q12d	0.788	0.675	0.805
	Q12e	0.854		
Extrovert	Q9c	0.643	0.522	0.813
	Q9f	0.725		
	Q9i	0.813		
	Q9l	0.667		
Neuroticism	Q13a	0.788	0.642	0.842
	Q13c	0.725		
	Q13f	0.880		
Openness	Q11e	0.973	0.736	0.846
	Q11f	0.695		

Analyzed results revealed that the AVE for five measures ranged from 0.522 to 0.736. All the variables convergent validity is proven by the analysis. CR value is desired over α because it offers a better approximation of variance pooled by the respective variables (Hair et al., 2006). In present study the CR coefficients of the

builds ranged from 0.743 to 0.848 which met the ordinary of 0.70 as recommended by Fornell and Larcker (1981). Therefore reliability is good.

4.1.5 Logistic regression with psychological Variables and investment bias

4.1.5.1 Logistic regression with psychological Variables and herding bias

4.22 VIE with Psychological and Hb

	B	Stand.err or.	Wald	de.of.free	Sig.	Exp(B)
Step 0 Constant	.231	.111	4.356	1	.037	1.260

NM is

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 = 0.231$$

$$\begin{aligned} \text{Probability of high level} &= \frac{\exp 0.231}{1 + \exp 0.231} \\ &= 1.023 \end{aligned}$$

Classification from the NM is 1.023 is very accurate.

Table 4.23 Model summary for psychological Variables and herding bias

Step	-2 Log likelihood	C & S R ²	NR ²
1	331.709 ^a	.308	.412

From the table above, we can conclude that 30.8% to 41.2% of the variation is explained by the model in block 1.

Table 2.24 Classification Table in Step 0 psychological Variables and herding bias

Observed		Predicted		Actual %
		high level	lower level	
		Step 0	high level	0
	lower level	0	184	100.0
Overall %				55.8

Table 2.25 Classification Table in Step 1 with psychological Variables and herding bias

Observed		Predicted		
				Actual %
		high level	lower level	
Step 1	high level	98	48	67.1
	lower level	28	156	84.8
Overall %				77.0

Classification rate has increased to 77%

Table 2.26 VIE with psychological Variables and herding bias

		B	Stand.err or.	Wald	de.of.free	Sig.	Exp(B)
Step 1 ^a	ag(1)	-.969	.348	7.771	1	.005	.380
	con(1)	-.954	.354	7.257	1	.007	.385
	ex(1)	-.705	.332	4.508	1	.034	.494
	ne(1)	-1.938	.300	41.842	1	.000	.144
	op(1)	.803	.311	6.680	1	.010	2.232
	Constant	1.050	.242	18.873	1	.000	2.857

All the personal traits have negatively significant relationship with herding bias but openness has positively significant relationship with investment bias.

$$\hat{\pi}(x) = \frac{e^{\alpha+\beta x}}{1 + e^{\alpha+\beta x}}$$

The estimated logit of the study is given by the equation

$$\text{Herding bias} = 1.050 - .705 X \text{ ex} (1) - .969 \text{ a}(1) + .803 X \text{ op}(1) - .954 X \text{ con}(1) - 1.938 \text{ net}(1)$$

4.1.5.2 Logistic regression with psychological Variables and deposition effect

Table 2.27 VIE with psychological Variables and deposition effect

	B	STAND. ERROR.	Wald	de.of.free	Sig.	Exp(B)
Step 0 Constant	.036	.110	.109	1	.741	1.037

NMIs

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 = 0.036$$

$$\begin{aligned} \text{Probability of high level} &= \frac{\exp 0.036}{1 + \exp 0.036} \\ &= 0.508 \end{aligned}$$

Classification from the NM is 50.8% accurate.

Table 4.28 MS with psychological Variables and deposition effect

Step	-2 Log likelihood	C & S R2	NR2
1	419.137 ^a	.109	.146

From the table above, researcher can conclude that 10.9% to 14.6% of the variation is explained by the model in block 1

Table 4.29 Classification Table in step 0 with psychological Variables and deposition effect

Observed			Predicted		%Correct
			dep1		
			high level	lower level	
Step 0	dep1	high level	0	162	.0
		lower level	0	168	100.0
Overall %					50.9

Table 4.30 Classification Table in step 1 with psychological Variables and deposition effect

	Observed	Predicted		
				Actual %
		high level	lower level	
Step 1	high level	78	84	48.1
	lower level	38	130	77.4
	Overall %			63.0

Classification rate is increased by 63%

Table 2.31 VIE with psychological Variables and deposition effect

	B	Stand. error.	Wald	de. of. free	Sig.	Exp(B)	
Step 1 ^a	ag(1)	-.466	.300	2.416	1	.120	.627
	con1(1)	-.005	.308	.000	1	.987	.995
	ex1(1)	-.708	.296	5.729	1	.017	.493
	ne1(1)	-.844	.280	9.046	1	.003	.430
	op1(1)	.831	.268	9.585	1	.002	2.295
	Constant	.071	.215	.109	1	.741	1.074

Extrovert and neuroticism have negatively significant relationship with deposition bias. Further openness has positively significant relationship with deposition effect.

$$\text{Deposition effect} = 0.071 - 0.708X_{\text{ex}(1)} + 0.833 X_{\text{op}(1)} - 0.844 \text{net}(1)$$

4.1.5.3 Logistic regression with psychological variables and overconfidence bias

Table 2.32 VIE with psychological variables and overconfidence bias

	B	STAND. ERROR.	Wald	de.of.free	Sig.	Exp(B)
Step 0 Constant	.833	.120	48.351	1	.000	2.300

NMis

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 = 0.833$$

$$\text{Probability of high level} = \frac{\exp 0.833}{1 + \exp 0.833}$$

$$= 5.290$$

Accurate level is 5.290

Table 2.33 Model summary with psychological variables and overconfidence bias

Step	-2 Log likelihood	C & S R2	NR2
1	288.321 ^a	.298	.421

From the table above, we can conclude that 30.2% to 46% of the variation in survival is explained by the model in block 1

Table 2.34 Classification Table with psychological variables and overconfidence

Observed		Predicted		Actual %
		high level	lower level	
		high level	0	
lower level	0	230	100.0	
Overall %				69.7

Table 2.35 Classification Table with psychological variables and overconfidence

Observed		Predicted		Actual %
		high level	lower level	
1	high level	54	46	54.0
	lower level	28	202	87.8
Overall %				77.6

Classification is increased to 77.6% in step 1

Table 2.36 VIE with psychological variables and overconfidence

		B	Stand.err or.	Wald	de.of.free	Sig.	Exp(B)
Step 1 ^a	ag(1)	-.166	.349	.227	1	.634	.847
	con1(1)	-1.995	.332	36.216	1	.000	.136
	ex1(1)	-1.056	.338	9.737	1	.002	.348
	ne1(1)	-.809	.328	6.078	1	.014	.445
	op1(1)	-.924	.367	6.334	1	.012	.397
	Constant	2.791	.354	62.299	1	.000	16.305

all the variables have negatively significant relationship with overconfidence bias other than agreeableness.

$$\hat{\pi}(x) = \frac{e^{\alpha+\beta x}}{1 + e^{\alpha+\beta x}}$$

The estimated logit of the study is given by the equation

Deposition effect = 2.791 -1.056 X ex (1) + -0.924 X op(1) - 1.995 X con(1) -0.629 X con(2) -0.809 net(1)

4.2 Hypothesis testing

H₁₀: There is no significant association with i_1 and y_1

H_{1a}: There is significant association with i_1 and y_1

Education level has negative significant relationship with investment bias. Monthly income has negative significant relationship with deposition effect and overconfidence bias and Re has negative significant relationship with deposition effect. Models identifies that demographic variables and investment bias are significant associated and indeed can explain around 30% of the variance in outcome. Therefore the study partially supported with H1a which means there was significant relationship with some demographic variables and investment bias.

H₂₀: There is no significant association with i_2 and y_2

H_{2a}: There is significant association with i_2 and y_2

All the personal traits have negatively significant relationship with herding bias but openness has positively significant relationship with investment bias. Extrovert and neuroticism have negatively significant relationship with deposition bias. Further openness has positively significant relationship with deposition effect. all the variables have negatively significant relationship with overconfidence bias other than agreeableness. Therefor H_{2a} supported for the study.

CHAPTER 05

FINDINGS

5.0 Introduction

The research is main objective is to identify the association between demographics factors, PB and investment bias. Chapter 5 explains conclusion and recommendation

5.1 Summary of the study

In the 1st chapter gives detail explanation of introduction of research, problem, significant and objectives. The second chapter includes theoretical review of literature and empirical studies on between investors' characteristics and investment bias. The third chapter focused on with detail research. 4th chapter employ with data presentation and analysis. Percentage analysis gives a brief description about sample investors' categories. LR used find the relationship among the variables. The 5th chapter consists findings , conclusion and recommendation .

5.2 Findings of the study

To conducting the present study two types of variables are considered specially Independent (investors' characteristics) and dependent (investment bias) variables. Findings of the statistical analysis of the study have explained and discussed thoroughly. The following are the summary of the key findings of the present study.

age has significant negative relationship herding bias and re has positively significant relationship with herding bias and further 24% to 34.5% of variation is explained by the demographics variables.

a negatively significant value with deposition effect. further 19% to 26% of variation is explained by the demographics variables.

Monthly income and Martial status have positively significant with over confidence bias and religion 2 has significant negatively relationship with over confidence bias. Further 24.7% to 34.1% of variation is explained by the demographics variables.

All the variables have negatively significant relationship with herding bias. but openness has positive relationship with herding bias. Further 30.8% to 41.2% of variation is explained by the psychological factors.

Extrovert and neuroticism have negatively significant relationship with deposition effect and openness has positively significant relationship with psychological factors. Further 10.9% to 14.6% of variation is explained by the psychological factors.

All the variables have negatively significant relationship with overconfidence bias and other than agreeableness. Further 28.9% to 42.1% of variation is explained by the psychological factors.

5.3 Conclusion

The main purpose of the study is to identify out the relationship between investors behaviour and investment bias. This has to be done very carefully, otherwise misleading conclusions may be drawn and the whole purpose of doing research may get vitiated. The socio demographic factors examined in the study are gender, age, educational level, Religion, marital status and monthly income. The primary data was collected through structured questionnaire.

From the analysis researcher can conclude that education level and a have significant relationship with investment bias. Therefore, H1 There is a significant relationship between Demographic variables and Investment Bias is partially accepted. Therefore, when the ae of the individual investors are increasing biases will be decreased.

From the analysis of psychological variables and investment bias results revealed that extrovert and neuroticism personality's individuals have significant relationship with investment bias. Therefore, H₂ There is a significant relationship between Psychological variables and Investment Bias is supported.

5.4 Recommendation and suggestion

Researcher concludes the following recommendation and suggestion;

- The individual investors should be aware of psychological biases with which they can face by knowing their own personality traits and also make decisions depending on their financial risk.
- Individuals investors should analyse financial market with their own experience or with the help of experts
- All the variables have negatively significant relationship with herding bias other than openness. Therefore, other behaviour should aware about the herding bias.
- The individuals who are having neuroticism behaviour should develop stop loss and lock gain points. Because to avoid the loss resulted from the herding bias and deposition effect.
- Government and other related institutions should create awareness among the individual investors.
- Local active investors ratio is declining trend, therefore encouraging and awareness of workshops or other event are important

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QUESTIONNAIRE

I'm Tharshiga Murugesu, students of Department of Mathematics in Faculty of Engineering, University of Moratuwa, currently carrying out a research about "Investors Characteristics and investment bias". The study is entirely academic and the information provided shall be treated with utmost confidentiality. you are therefore requested to fill in this questionnaire with utmost good faith.

Thank you very much,

Ms.M.Tharshiga

Student,

Department of Mathematics,

University of Moratuwa.

Please put the mark (X) in the appropriate cage.

Socio demographic factor

1. Gender: male female

2. Education Level

Ordinal level		Advanced level		Graduate	
Under graduate		Professional qualification		others	

3. Age group

Below 25 years		36- 45 years		56-65years	
26-35years		46-55 years		Above 65 years	

4. Religion

Hindu		Islam	
Christian		Buddhist	

5. Marital Status

Single

Married

6. Monthly income

Below LKR 30,000		LKR 50000-100000	
LKR 30000-50000		Above LKR 100000	

7. Have you invested stock markets before?

Yes

No

8. State your experience in Investment

Below 1 year		5-6 years	
1-5years		Above 10 years	

9. The **introversion/Extrovert scale** was developed by McCroskey to be distinct from measures of communication apprehension. Please mark whether you Strongly Disagree, Disagree, No option, Agree, Strongly agree with each of these statements.

Statement		SD	D	N	A	SA
a.	Are you inclined to keep in the background on social occasions					
b.	Do you like to mix socially with people?					

c.	Do you sometimes feel happy, sometimes depressed, without any apparent reason?					
d.	Are you inclined to limit your acquaintances to a select few?					
e.	Do you like to have many social engagements?					
f.	Do you have frequent ups and downs in mood, either with or without apparent cause?					
g.	Would you rate yourself as a happy-go-lucky individual?					
h.	Can you usually let yourself go and have a good time at a party?					
i.	Are you inclined to be moody?					
j.	Would you be very unhappy if you were prevented from making numerous social contacts?					
k.	Do you usually take the initiative in making new friends?					
l.	Does your mind often wander while you are trying to concentrate?					
m.	Do you like to play pranks upon others?					
n.	Are you usually a "good mixer?"					
o.	Are you sometimes bubbling over with energy and sometimes very sluggish?					
p.	Do you often "have the time of your life" at social affairs?					
q.	Are you frequently "lost in thought" even when you should be taking part in a conversation?					
r.	Do you derive more satisfaction from social activities than from anything else?					

10. The following some statements reveal **Agreeableness** of Individuals. Please mark whether you Strongly Disagree, Disagree, No option, Agree, Strongly agree with each of these statements

Statement		SD	D	N	A	SA
a.	I see myself as someone who have a habit of to find fault with others					
b.	I see myself as someone who is helpful and unselfish with others					
c.	I see myself as someone who starts arguments with others					
d.	I see myself as someone who has a forgiving nature					
e.	I see myself as someone who is generally trusting					
f.	I see myself as someone who can be cold and aloof					

g.	I see myself as someone who is considerate and kind to almost everyone					
h.	I see myself as someone who is sometimes rude to others					
i.	I see myself as someone who likes to cooperate with others					

11. The following some statements reveal **Openness** of Individuals. Please mark whether you Strongly Disagree, Disagree, No option, Agree, Strongly agree with each of these statements

Statement		SD	D	N	A	SA
a.	I see myself as someone who is original, comes up with new ideas					
b.	I see myself as someone who is curious about many different things					
c.	I see myself as someone who is ingenious, a deep thinker					
d.	I see myself as someone who has an active imagination					
e.	I see myself as someone who is inventive					
f.	I see myself as someone who values artistic, aesthetic experiences					
g.	I see myself as someone who prefers work that is routine					
h.	I see myself as someone who likes to reflect, play with ideas					
i.	I see myself as someone who has few artistic interests					
j.	I see myself as someone who is sophisticated in art, music, or literature					

12. The following some statements reveal **Conscientiousness** of Individuals. Please mark whether you Strongly Disagree, Disagree, No option, Agree, Strongly agree with each of these statements

Statement		SD	D	N	A	SA
a.	I see myself as someone who does a thorough job					
b.	I see myself as someone who can be somewhat careless					
c.	I see myself as someone who is a reliable worker					
d.	I see myself as someone who tends to be disorganized					
e.	I see myself as someone who tends to be lazy					
f.	I see myself as someone who perseveres until the task is finished					

g.	I see myself as someone who does things efficiently					
h.	I see myself as someone who makes plans and follows through with them					
i.	I see myself as someone who is easily distracted					

13. The following some statements reveal **Neuroticism** of Individuals. Please mark whether you Strongly Disagree, Disagree, No option, Agree, Strongly agree with each of these statements

Statement		SD	D	N	A	SA
a.	I see myself as someone who is depressed, blue					
b.	I see myself as someone who is relaxed, handles stress well					
c.	I see myself as someone who can be tense					
d.	I see myself as someone who worries a lot					
e.	I see myself as someone who is emotionally stable, not easily upset					
f.	I see myself as someone who can be moody					
g.	I see myself as someone who remains calm in tense situations					
h.	I see myself as someone who gets nervous easily					

14. The following some statements reveal **investment bias** of Investors. Please mark whether you Strongly Disagree, Disagree, No option, Agree, Strongly agree with each of these statements

Statement		SD	D	N	A	SA
a.	I consider the past performance of a stock before investing in it					
b.	trading volume of a stock affect my investment decision					
c.	You have poor knowledge about Company X's stock and is therefore uncertain about investing in it. Suddenly many of your co-workers and competitors start buying it. How would this affect your attitude towards 'X'?					
d.	Do you believe it is possible to find future value of a share through detailed analysis of past performance?					
e.	Do you feel you can, on average, predict future share prices better than others?					
f.	Would you go ahead and invest in a stock if your valuation of a stock is different from that made by a well-known expert on some financial news channel or paper?					

g.	Do you fix a target price for buying/selling in advance (say, before start of trading day)					
h.	Does your mind try to justify mistakes committed while making investment decisions?					
i.	If you hear views from a famous analyst that conflicts with your opinion about a stock, would you change your opinion immediately?					
j.	Are you able to anticipate the ends of good/poor market returns (reversals)?					
k.	Suppose an unbiased coin is flipped three times, and each time it lands on 'Heads'. What do you feel would be the outcome of the next flip?					
l.	I prefer to buy stocks if many "buy" orders were placed from the beginning of the trading session					
m.	My disappointment after losing money on an investment diminishes a little if others have also experienced the same loss.					
n.	I try to invest in risky assets for better return.					
o.	I usually invest in companies which i know and trust.					
p.	I am more comfortable investing in assets of local companies than foreign companies.					

Any suggestions:

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.....

.....

.....

.....

Thank you for your corporation

Initial loading factor (figure 4.6) demographic factors and investment bias

Latent Variables	Measurement	Loading factor	
Overconfidence bias	Q14d	0.031	
	Q14e	0.480	
	Q14f	0.599	
	Q14g	0.537	
	Q14h	0.743	
	Q14i	0.688	
	Q14n	-0.126	
Herding bias	Q14c	-0.69	
	Q14o	-0.140	
	Q14p	0.608	
Deposition effect	Q14a	0.634	
	0.663	Q14m	0.663
		Q14b	-0.265
		Q14j	0.546
		Q14k	0.657
		Q14l	0.673

Initial loading factor (figure 4.8) psychological and investment bias

Latent Variables	Measurement	Loading factor
Overconfidence bias	Q14d	-0.055
	Q14e	0.368
	Q14f	0.370
	Q14g	0.488
	Q14h	0.820
	Q14i	0.750
	Q14n	-0.272
Herding bias	Q14c	0.807
	Q14o	0.725
	Q14p	0.135
Deposition effect	Q14a	0.615
	Q14m	0.728
	Q14b	0.298
	Q14j	0.478
	Q14k	0.615
	Q14l	0.749
	Agreeableness	Q10a
Q10b		-0.097
Q10c		0.819
Q10d		-0.299
Q10e		0.086
Q10f		-0.147
Q10g		0.665
Q10h		-0.174
Extrovert	Q9a	0.469
	Q9b	0.277
	Q9c	0.483
	Q9d	0.602
	Q9e	0.272
	Q9f	0.626
	Q9g	0.490
	Q9h	0.302
	Q9i	0.780
	Q9j	0.345
	Q9k	0.394
	Q9l	0.632
	Q9m	0.435
Conscientiousness	Q12q	-0.623
	Q12b	0.289
	Q12c	-0.647
	Q912d	0.734
	Q912e	0.744
	Q912f	-0.109
	q12g	-0.514

	q12h	-0.553
Neuroticism	Q13a	0.711
	Q13b	0.357
	Q13c	0.716
	Q13d	0.397
	Q13e	-0.099
	Q13f	0.880
	Q13g	0.388
Openness	Q11a	0.053
	Q11b	-0.279
	Q11c	0.097
	Q11d	-0.110
	Q11e	0.845
	Q11f	0.514
	Q11g	0.099
	Q11h	-0.481
	Q11i	0.156