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Does Investor's Heuristics Determines Their Investment Decisions?

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ABSTRACT

Investors use many rules to make an investment decision. Many of the rules will be framed based on the trial and error method. This leads to the development of rules of thumb. Investors use these rules to make decisions in a complex and uncertain environments. But in reality, the investors' decisions are not rational. They are frequently influenced by psychological biases during investment decisions. One such bias is heuristic. This paper looks at these heuristics and its influence on investor's investment decisions. Heuristic variables such as representativeness, overconfidence, anchoring-adjustment, conservatisms and aversion to ambiguity were taken for this study. The multistage random sampling technique was used to collect the data from retail investors through the structured questionnaire. The data so collected was analysed quantitatively by using different statistical tools. Findings of this study suggest that investors are categorised based on the influence of heuristics as heuristic satisficing, heuristic bounded and heuristic unbounded. Further, based on the interactions of demographic and investment variables with the heuristics, investor's heuristic model has been framed and explained in this study.

Keywords: Investors, Decision making, Heuristics, Investor's segmentations, Heuristic model.

JEL Classification: M20

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INTRODUCTION

Behavioural finance is a psychology used to understand how individual investors' make financial decisions when the situations become complex and unknown. Studies from psychologists and economists suggest that investors' use some shortcut strategy to make decisions. In psychology these shortcut strategies are called as 'heuristics' or 'rules of thumb'. Previously, researchers argued that 'heuristics' affect rational decision-making. But in practical these heuristics are helpful for better and quick decision-making. This was supported by Nobel laurel Simon (1957, 1979) and Newell and Simon (1972). According to Simon (1957), good decisions are made by considering all the possible solutions. This was further expanded by Newell and Simon. They have developed the theory of human information processing by giving more importance to cognitive for effective decision making. Further, this was developed by Baron (1985), Evans (1989) and Shanteau (1992). They emphasise that

heuristics expand levels of information and also reduces the number of alternatives available for problem resolution. Behavioural finance identifies a number of heuristics to explain the decision-making process to be simple and effective. According to West *et al.* (2008), heuristics play a significant role in critical thinking. Shefrin (2000) shaped the final heuristics which are representativeness, overconfidence, anchoring-adjustment, conservatisms and aversion to ambiguity. The present paper addresses these heuristic variables and its influence on investors' investment decisions. Further, this paper explores the significance association of heuristics with demographic and investment variables. Based on these associations heuristic models are framed and explained. The findings of this study can be useful to expand the study of heuristics with respect to mood, emotion and personality.

REVIEW OF LITERATURE

From the Greek dictionary, heuristic means to discover. Heuristics – man is not capable to process all the information. Based on his experience only, he could act. This process creates rules of thumb. This can be used when the situation becomes uncertain and complex. This phenomenon is called as heuristics (*Shefrin, 2000*). Gilovich *et al.* (2002) identify six general purpose heuristics (affect, availability, causality, fluency, similarity and surprise) and six special purpose heuristics (attribution, substitution, outrage, prototype, recognition, choosing by liking and choosing by default). Later attribution–substitution replaced by representativeness and anchoring-adjustment. According to the affect heuristic theory, affective impression is used to make quick decisions than judging probability, when the decisions are complex or uncertainty (*Macgregor et al., 2000*). Forgas (1995) argued that decision characteristics such as risk and uncertainty determine the importance of feelings. Traditional finance lacks the exclusion of heuristics and assumes all decisions being based on rational statistical tools (*Shefrin, 2000*). But behavioural finance argued that heuristic is helpful for better and quick decision making. A common case of heuristics is the use of representativeness. Representativeness is a psychological term used to describe the use of stereotypes. This stereotype affects the rational decision making. A good example is the winner/loser effect given by De Bondt and Thaler and also discussed by Shefrin (2000). 'According to Tversky and Kahneman (1974), people often judge probabilities "by the degree to which A is representative of B, that is, by the degree to which A resembles B." Tversky and Kahneman called this rule of thumb as 'representativeness heuristic'. People tend to use these stereotypes to make judgments in an uncertain situation. They assume that past familiar patterns will predict the future patterns. This type of human judgment is called as *representativeness heuristic*. This was demonstrated in a number of experiments by psychologists Tversky and Kahneman'.

Other common heuristics that can be applied in the financial world is overconfidence. 'No problem in judgment and decision making is more prevalent and more potentially catastrophic than overconfidence', Plous (1993). Psychologists have determined that overconfidence causes people to overestimate their knowledge, underestimate risks and exaggerate their ability to control events. There are two main implications of investors' overconfidence. The first one is that investors take bad bets because of the fear of failure. The second is that they trade more frequently, which leads to excessive trading volume. According to Shefrin (2000) 'When people are overconfident, they get surprised more often than they anticipated. Psychological studies show that most people are overconfident about their own relative abilities, and unreasonably optimistic about their futures' (e.g., *Weinstein, 1980; Taylor and Brown, 1988*).

Anchoring is one of the heuristic bias which influence investment decisions. Kahneman and Tversky (1973) argued that anchoring or expertise advice not only affect the decision makings but also make the investors' to adjust with arbitrary value. But experimental evidence indicates that the adjustments are often insufficient. Simply saying, people are highly affected by 'anchoring' on the initial value.

Conservatism bias is one of the heuristic bias in which it may cause the trader to under-react to the new information or new estimates rather than on the updated information. These people are very slow to adapt the changes. The conservatism bias has tug of war with representativeness bias. If there is a change, people might under-react during a short period of time. This is due to conservatism bias. But during long period of time, they will adjust to it and maybe over-react. Similarly, bad experience makes the investors to be more alert to their decisions when the same situations are encountered. This is often seen among people that have experienced a market crash. According to Shefrin (2000) these type of investors may display more carefulness than the other professionals in the same environment.

Aversion to ambiguity is a heuristic bias similar to the concept of risk-aversion. People are not willing to take risk if the situations become unknown. Investors may take high risk and also yield high return if the situations are only known. Otherwise they do not take the risks (*Shefrin, 2000*). Based on the influence of psychological biases, each individual follows two different style of decision making. They are intuitive and deliberate decision making. Intuition arises from different forms. They are creative, affective, moral, social or experience. But on investment decisions, intuitions are referred as 'gut feelings'. According to the dual processing model (*Evans, 2008; Kahneman, 2003*), decision makers are of two types, one is deliberate and other one is intuitive. Deliberate decision makers depend on the logical and analytical way of decision making, whereas intuitive decision makers take very less time to make quick decision. Their decisions often associated with biases and errors (*Kahneman, 2003; Simon, 1955; 1957; Tversky and Kahneman, 1974*).

Sometimes intuitions outperform deliberations (*Damasio, 1994; Dijksterhuis and Olden, 2006; Gigerenzer, 2007, 2008; Plessner and Czenna, 2008; Wilson, 2002*). Noble laurel Simon (2008) claimed that investors are classified as rational bounded and rational satisficing. Rational satisficing investors are deliberate decision makers. They are cognition-based, follow rules, analytical, accurate and conservative. They expect mere satisficing return. While rational bounded investors are intuitive decision makers, intuitive investors may ignore important information and also some facts while making decisions. They may expect an optimising return. From the above review, it is clear that heuristic variables influence investor's investment decisions.

RESEARCH METHODOLOGY

Sources of Data

The descriptive method was much more suitable to design this study. Primary data were dependent on this study. The necessary data were collected by using the structured questionnaire from the retail investors living in Tamil Nadu. This was conducted during the period of November 2011 to January 2012.

Sampling Size and Procedure

The size of the populations was so high. So for the paucity of the study, the multistage random sampling technique was used. The sample size of 1000 questionnaires was targeted to collect the data from various cities located in Tamil Nadu. The majority of retail investors was identified in cities such as Chennai,

Coimbatore, Trichy, Erode and Salem. Leading five broking firm was identified in each place to collect a target of 200 questionnaires from each location. Some questionnaires were handed over to investors directly when they visit the stock broking offices. In addition broking office managers were approached personally to deliver the questionnaires to their regular clients. Finally questionnaires were delivered to investors' mail id, which was gathered from leading stock broker's offices in Tamil Nadu. The sum of distributed questionnaires was 1000. But error-free responses were 742. This accounts for a valuable response rate of 75% of the total sample.

RELIABILITY TEST FOR HEURISTIC VARIABLES

Confirmatory factor analysis is used to test how well the heuristic variables are fit for the research. The estimated value of different heuristic variables meet the satisfactory limit of 0.50 and above.

Table 1, explores the fit indices criterions of the CFA test. goodness of fit index (GFI), adjusted goodness of fit index (AGFI), CMIN/*df*, comparative fit index (CFI), normed fit index (NFI), increment fit index (IFI) and root means squared error of approximation (RMSEA) are satisfactory corresponding to its threshold value. This suggests that the heuristic model is perfectly fit for the reliability test.

FACTORISATION OF INVESTOR'S HEURISTIC VARIABLES

Heuristic variables such as representativeness, overconfidence, anchoring, adjustments, conservatism and aversion to ambiguity are taken for factorisations. Each variable represents a statement related to investment. Questionnaires are framed by using a five-point Likert scale starting from strongly disagree to strongly agree. Investors are requested to give their opinion in the questionnaire. Before performing factor analysis, the Kaiser–Meyer–Olkin test of sampling adequacy and Bartlett's test of sphericity are conducted to find out the suitability of data.

Table 2: KMO and Bartlett's test

Kaiser–Meyer–Olkin measure of sampling adequacy		0.860
Bartlett's test of sphericity	Approx. Chi-Square	2.672E3
	df	15
	Sig.	0.000

The KMO sampling adequacy test shows that >86% of the data are useful for factor analysis (Table 2). Moreover, the significant value of Bartlett's test of sphericity is 0.000. These two tests suggest that the given heuristic variables are relevant for further analysis.

DETERMINATION OF FACTORS

The factors which have eigenvalue >1 was taken by using the principal component method. The variance explained by the factors and their eigenvalues are shown in Table 3.

Table 3 illustrates that the total variance explained by two factors with eigenvalue >1 is 76 %. Remaining 24% of variances is explained by other factors. Further standard orthogonal rotation method called Varimax rotations are carried out to extract the final factors. The extracted factors and its loadings are shown below.

Table 1: Fit indices of heuristic factors

Fit indices	**Chi-square**	**GFI**	**AGFI**	**CFI**	**NFI**	**IFI**	**RMSEA**
	29.14	**0.99**	**0.99**	**0.99**	**0.99**	**0.99**	**0.06**
Cut-off values	Smaller to 0	≥ 0.95	≥ 0.95	≥ 0.95	≥ 0.95	≥ 0.95	≤ 0.10

Table 3: Variance explained by factors

Factors	Eigen value	Variance explained (%)	Cumulative (%)
Component 1	3.181	53.015	53.015
Component 2	1.375	22.916	75.931

Table 4: Rotated component matrix

	Component	
	1	2
Adjustment	0.899	
Overconfidence	0.894	
Anchoring	0.870	
Conservatism	0.799	
Aversion to ambiguity		0.917
Representativeness		0.654

Table 4 shows the factor loadings of different heuristic variables. Here the first factor contains overconfidence, anchoring, adjustments and conservatisms and the second factor contains representativeness and aversion to ambiguity. The first factor is christened as submissive heuristics and the second factor is assertiveness heuristics.

FREQUENCY ANALYSIS OF HEURISTIC FACTORS

Based on the convenience, the five-point scale of investor's different heuristic factors can be segmented into three groups for simple interpretations of data. Number of factors falling under each category and its mean frequencies are shown in Table 5.

SUBMISSIVE HEURISTIC

The first factor is named as submissive. Submissive means stay away or a nervous feeling towards something. Here submissive contains anchoring, adjustments, conservatisms and overconfidence. About 53% of the total variances is explained by these variables.

Table 6 displays that the entire submissive variable has almost equal factor loadings. Submissive heuristic refers to the passive state of behaviour. These factors explain the investor's passive attitude towards the market. Table 5 illustrates that >60% of the investors are not influenced by submissive heuristics. This shows that investor's cognition and return satisfaction level may determine their risk averse investment attitude. High cognitive and satisfaction level may force the investors to adopt submissive heuristic behaviour.

ASSERTIVENESS HEURISTIC

Assertiveness means confident and active state. Assertiveness factor contains representativeness and

Table 5: Frequency analysis

Scale	1–2.5		2.5–3.5		3.5–5	
Factors	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Submissive	458	62	93	13	191	25
Assertiveness	170	23	193	26	379	51

Table 6: Submissive heuristic

Factors	Description of the factor statement	Factor loadings
Overconfidence	I frequently overestimate the market	0.894
Anchoring	I stick on random number estimation given by experts	0.870
Adjustments	I modify my portfolio based on the expert advices.	0.899
Conservatisms	I am too slow in updating my beliefs in response to recent evidence	0.799

aversion to ambiguity. It explains around 22% of the total variances.

Aversion to ambiguity has higher factor loadings of 0.92 (Table 7). This shows that aversion to ambiguity explains more assertiveness attributes of investors. Table 5 illustrates that 51% of the investors are influenced by assertive heuristics, 26% are neutral and remaining 23% are not displaying assertiveness. This shows that ~50% of investors have come under influence category. Given that representativeness explore intuitiveness behaviour, it is concluded that ~50% of investors are somehow influenced by intuitive on their investment decisions.

SEGMENTATION OF INVESTORS

Factor analysis is used to deduct the given factors into smaller numbers for easy interpretation of data. These deducted factors are further classified into three groups by using the tool of K-means clustering.

Table 8 contains mean values for the three clusters, which explain the characteristics of each cluster. The rank of the mean values is shown in brackets. The result of the ANOVA table 8 indicate that the *F* value of submissive is high. This shows that the submissive variable explains major attributes of investor's heuristics. Further significant value of assertiveness and submissive is 0.000. This shows that these two factors are helpful to divide the investors into three groups. It is clear from the table that 34% of investors belong to cluster one, who are named as high assertiveness and low submissive heuristic state, cluster two contains 29% of investors who are high assertiveness-low submissive heuristic state and the remaining 37% of investors are in cluster three who are low assertiveness-low submissive heuristic state behaviour. The explanations of each heuristic category are shown below.

HEURISTIC UNBOUNDED INVESTORS

Investors of cluster one explore *high assertiveness and high submissive* heuristic state. This resembles the behaviour of heuristic bounded category, but they are highly influenced by submissive behaviour. This conveys that investors of this group are frequently approached the market and may take high risk on expecting an optimum return (not a satisficing return) from their investments. This resembles the behaviour of inexperienced intuitive decision makers. According to Dijksterhuis and Nordgren (2006); Sadler-Smith (2008), intuitions are powerful tools for quick decision making. This is possible only if the intuitions

Table 7: Assertiveness heuristic

Factors	Description of the factor statement	Factor loadings
Aversion to Ambiguity	I prefer to invest only on familiarity stocks.	0.917
Representativeness	Past winners influence me a lot when compared to past losers	0.657

Table 8: Final cluster and ANOVA

Factors	Cluster			*F*	Sig
	1	2	3		
Submissive	3.97(I)	1.55(III)	1.69(II)	2.381E3	0.000
Assertiveness	4.31(I)	4.26(II)	2.42(III)	956.290	0.000
Mean	4.14	2.905	2.055		
No of cases in each cluster	251	213	278		
Total percentage	34	29	37		

and cognition become matured. Otherwise it leads to irrational decision making. Investors of this type too have these attributes. So they are called as heuristic unbounded investors. Here, unbounded refers to unlimited risk, over confident, immature intuitions.

HEURISTIC BOUNDED INVESTORS

The second category investors have the attributes of *high assertiveness and low submissive* category. Given that investors of this category are highly influenced by representativeness, they should be frequently accessing the market. At the same time they are less influenced by submissive behaviour. This shows that they are exhibiting the behaviour of partly intuitive and deliberativeness. Investors who have these attributes may be short- to medium-term investors. Sadler-Smith (2008) found that there exists a strong relationship between investor's intuitiveness and short-term investment pattern. According to him, intuitive decision makers are not rule governed investors. They are smart decision makers. Simon (1957, 1983) hypothesised that deliberate decision makers are satisficing investors. Based on these findings, cluster one investor has christened as partly intuitive and deliberate decision maker. Since they are controlled, self-disciplined and flexible investors, then they are called as heuristic bounded investors. Here bounded refers to intuitive and deliberative attributes.

HEURISTIC SATISFICING INVESTORS

The third cluster category is at least dominating cluster. Investors of this category come under the heuristic state *of low assertiveness and low submissive.* This resembles the behaviour of long-term investors. Since they are long-term investors, then they should be deliberate decision makers. According to Simon (1957, 1983), satisficing investors are deliberate decision makers. They may use more logical and analytical works before making decisions. They follow step-by-step work on making decisions. Moreover, they do not want to take any risk and self-satisfied investors in terms of their investment return. Based on the above heuristic state and Simon's thoughts, investor of this category is called as heuristic satisficing investors.

RELIABILITY OF CLASSIFICATION

Reliability of heuristic cluster classifications is tested by using Discriminant analysis. In order to perform discriminant analysis, independent variables should be taken as heuristic factors and grouping variables as heuristic clusters.

Table 9 contains Wilks' lambda, the *F* statistic, its degrees of freedom and significance level. Here Wilks' lambda varies from 0.3 to 0.5. Submissive has smaller Wilks' lambda. This shows that there exists a strong group difference between the mean values of two heuristics. Further F statistics of submissive are higher than assertiveness heuristics. This explains that submissive contributes more on between groups' variability to within groups' variability. The significance values of heuristics are 0.000. This illustrates that the group differences between two heuristic factors are statistically significant.

Table 10 contains eigenvalues of the two functions and its canonical correlations. The eigenvalue is defined as the ratio of between-groups sum of squares to the

Table 9: Tests of equality of group means

	Wilks' Lambda	*F*	*df*1	*df*2	Sig.
Submissive	0.134	2.381E3	2	739	0.000
Assertiveness	0.279	956.290	2	739	0.000

Table 10: eigenvalues

Function	Eigenvalue	Variance (%)	Cumulative (%)	Canonical correlation
1	6.888	79.7	79.7	0.934
2	1.755	20.3	100.0	0.798

within-groups sum of squares. Function 1 has the largest eigenvalue, which explains maximum characteristics of the groups' means. Canonical correlations of functions one are very high. This shows that there exists a strong correlation between the function one and the heuristic factors.

Table 11: Structure matrix

	Function	
	1	2
Submissive	0.956*	-0.294
Assertiveness	0.403	0.915*

*explains the significant correlation between heuristic factors and discriminant functions

A further way of studying the reliability of discriminant function is the structure matrix (Table 11). It shows the correlation of each discriminant function with each heuristic variable. Here submissive and assertiveness has shown a positive correlation with function one and two. These are explained in equation as follows:

$$Z = 0.956^{*} \text{ submissive} + (0.915)^{*} \text{ assertiveness}.$$

Z is the discriminant function which will explain the investor's different heuristic attributes.

Figure 1 demonstrates that cluster classifications of three heuristic groups' are segregated correctly. Further, the centroids of each cluster are far away from each other. This shows that cluster groups are properly classified.

Results of cluster classifications Table 12 suggest that 98% of original clusters are correctly classified. This suggests that cluster classifications of heuristic variables explain almost reliable findings (Table 12).

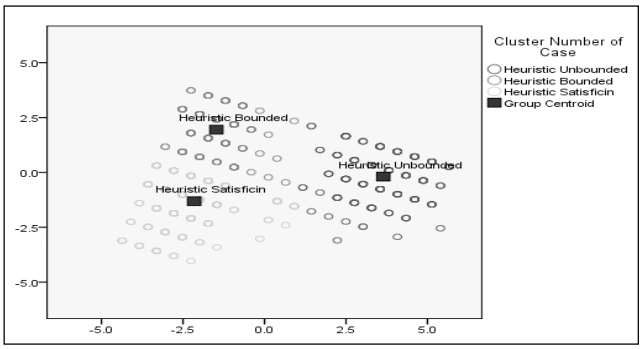

Figure 1: Cluster classification of Heuristic's

RELATIONSHIP BETWEEN INVESTOR'S DIFFERENT HEURISTIC STATE AND DEMOGRAPHIC VARIABLES

The chi-square test is used to find the association of each demographic variable with investor's three heuristic states. The chi-square and the significance values are shown below.

From Table 13, it is inferred that demographic variables such as age, profession and income have shown a significant association with different heuristic states. Other demographic variables have shown no significant associations with their heuristic variables.

Age: The chi-square test results reveal that there exists a significant association between the investor's ages and their heuristic states. The chi-square and significant value of this association are 405.343 and 0.000, respectively.

Correspondence Figure 2 demonstrates that investors between the age of 16 and 25 have heuristic unbounded, 26 and 35 have heuristic bounded and age >35 is heuristic satisficing investors. These associations suggest that young investors who are new to market may face the difficulties to understand the market realities. Further they may expect an optimising return during a short term of time. They are impatient, emotionally immature, problem of cognitive dissonance, etc. These factors stimulate them

Table 12: Classification of results

Heuristics			Predicted group membership			Total
			Heuristic unbounded	Heuristic bounded	Heuristic satisficing	
Original	Count	Heuristic unbounded	249	2	0	251
		Heuristic bounded	0	210	3	213
		Heuristic satisficing	8	0	270	278
	%	Heuristic unbounded	99.2	0.8	0.0	100.0
		Heuristic bounded	0.0	98.6	1.4	100.0
		Heuristic satisficing	2.9	0.0	97.1	100.0

98.2% of original grouped cases correctly classified.

Table 13: Relationship between heuristic categories and demographic variables

Investment variables	Chi-square value	Sig
Age	405.343	0.000*
Education	79.550	0.060
Marital status	10.783	0.676
Profession	868.584	0.000*
Financial dependents	32.681	0.090
Income	577.451	0.000*

*indicates that the variable is statistically significant

to use more intuitive approach towards the market. Investors who have the age bracket of 26–35 are matured in terms of cognition and emotions and settled in their life. Middle age is the primary time for accumulations of wealth. Simultaneously their previous experience may force them to adopt intuitive and deliberative decisions. Hence their heuristics are bounded. At the same time, investors who have crossed 36 may have good knowledge of market and emotionally matured. Due to growing age, high financial responsibilities and poor memory, they may reduce their investments gradually which drive them to stick on deliberative decision makers. This was supported by Spaniol and Bayen (2005). They found that individuals find it difficult on making decisions in the latter part of their life because of poor working memory contains recall and recognitions.

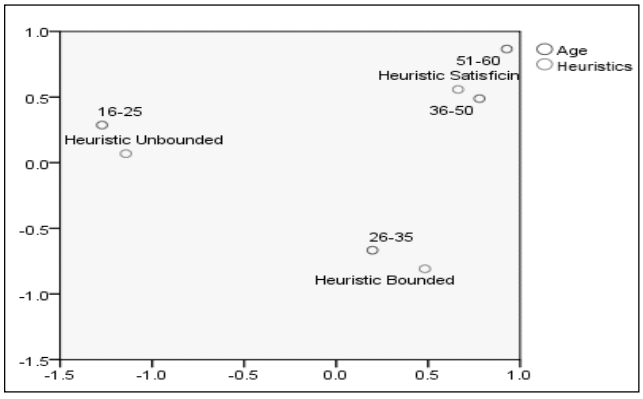

Figure 2: Association between age of investors and their heuristic category

Income: the chi-square test is a statistic used to find out the association between investors income and their heuristic state. The chi-square and significant values of this association are 577.451 and 0.000, respectively. Association figure illustrates that investors who is earning of <5 lakhs associate with heuristic unbounded behaviour, 5–10 lakhs associate with heuristic bounded and finally investors who is earning >10 lakhs associate with heuristic satisficing behaviour. This shows that the low-income group is highly influenced by heuristic biases. 'Get eventis' is the major factor drives the individuals to make error and biased decision. The various attributes of get eventis investors are low-income, high-equity investment with less cognition and emotionally immaturity. These factors make the investors to act as irrational investors. Concurrently

middle- and high-income group may not influenced by get eventis factor. So they become bounded and satisficing investors.

Profession: The relationships between different heuristic state of investors and their professions have found out by using the chi-square test. The chi-square and significant values of this association are 868.584 and 0.000, respectively. Investors who are engaged in teaching/academic, business and banking associate with heuristic satisficing, engineers and lawyers associate with heuristic unbounded, management professionals and investment consultants associate with heuristic bounded. From these, it is interpreted that investors who are influenced by heuristics satisficing may be lacking market information to inculcate on their financial decisions. This explores that their professions may not provide much information to their investment decisions. So they depend on deliberative decisions. Engineers and lawyers may get quantity of market information, because their profession itself may provide more information. They may not have enough cognition to segregate the quality of information useful for their decisions. So they became unbounded. Management professionals and investment consultants may snatch quality of information from the market and their cognition may be good, because their professions to build up their cognition often. So they are not influenced by heuristic biases. This leads to the conclusion that investor's knowledge (cognition) and profession-based market information determines their heuristics.

RELATIONSHIP BETWEEN HEURISTIC CATEGORIES AND INVESTMENT VARIABLES

The chi-square test is a statistical tool used to find the association between each investment variable with their heuristic states. Chi-square and significance values are shown in Table 14.

Table 14: Relationship between heuristic categories and investment variables

Investment variables	Chi-square value	Sig
Attraction	4.830	0.566
Reasons for equity	482.620	0.000*
Investment type	40.814	0.510
Experience	636.668	0.000*
Approach	6.244	0.154
Total investment	35.067	0.061
Equity investment	569.440	0.000*
Holding period	193.312	0.980
Investment portfolio	4.874	0.300
Induces to stay	7.466	0.282
Source of fund	130.787	0.030*
Kinds of stocks	6.795	0.340
Pattern of investing	131.183	0.000*
Risk profile	251.420	0.000*

*indicates that the variable is statistically significant

REASONS FOR INVESTMENTS IN EQUITY MARKET

Every individual has different financial goal while approaching the market. Their financial goal outlines their investment behaviour. The relationship between individual's heuristic state and their expectations from the market was explored through the chi-square test.

Heuristic bounded investors have a source of income and wealth preservations, heuristic satisficing investors have retirement planning and education funding, heuristic unbounded have capital appreciations. This indicates that heuristic satisficing investors have perceived the market as an investment option for a long-term perspective, while heuristic bounded and unbounded may have medium- to short-term perspective.

Experience: the chi-square analysis is used to identify the strength of association between investors' equity experience and their heuristics. The chi-square and

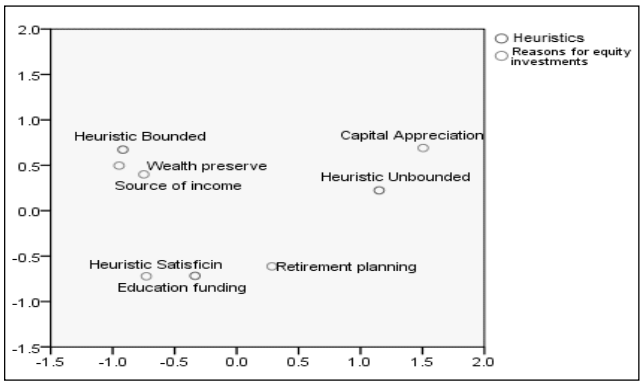

Figure 3: Association between reasons for equity investments and heuristic category

significant values are 666.668 and 0.000, respectively. Correspondence association Figure illustrates that investors who have <3 year of equity experience associate with heuristic unbounded, 3–5 years of experience have heuristic bounded and >5 years have heuristic satisficing attributes. Investors who have less equity experience are highly influenced by heuristic biases (Unbounded) than highly experienced investors. This shows that investors' equity experience is directly proportional to their rationality. Less equity experience can make the investors to be highly influenced by cognitive and emotional disturbance, which further show the way of adopting intuitiveness. Individuals who have high experience may have a lower recall (*Gilchrist et al., 2008*), reduced ability to make connections (*Mitchell et al., 2000*), less task focus (*Isella et al. 2008*) and slower information processing (*Cerella, 1985*). Findings of this study also confirmed the above studies that high experienced are deliberative investors. The noticeable point of this study explores that heuristic bounded investors are moderately experienced, good recall and fast decision makers.

Equity Investment: the chi-square and significant values of associations between investor's dissimilar heuristic state and their investments in equity market are 569.440 and 0.000, respectively. Heuristic satisficing investors prefer <50 percent of their total investments in the equity market, heuristic unbounded investors have 75–100% and heuristic bounded investors have 50–75% of investments in equity market. This indicates that heuristic unbounded investors have poor portfolio management skill than the other two categories of investors. This concludes that lacking the knowledge of portfolio management is a primary cause of heuristic biases.

Pattern of investing: individual's investment pattern depends on their financial goals. Investor's investment pattern and their heuristics are statistically significant. Association figure displays that heuristic unbounded investors stick with the same set of stocks, heuristic bounded have a variety of stocks and heuristics satisficing investors have adopted both these patterns of investments. This suggests that heuristics unbounded investors are less cognitive, lacking portfolio skills and conservative than heuristic bounded and satisficing investors.

Source of fund utilised for equity investments: emotions and cognitions are two primary factors, which affects individual's heuristics. Individuals who use what source of funding for investments may explore their heuristic state. The chi-square test results reveal that there is a significant association between source of fund and investors heuristic state. These associations are analysed to understand which fund contributes heuristic biases amid the investors. The correspondence figure illustrates that heuristic bounded and satisficing investors only use their savings and other personal income fund for equity investments while heuristic unbounded investors stick on loans and pledging. This suggests that heuristic unbounded investors are high risk seeker and want big success. But they may have the trouble of cognitive dissonance, less equity experience and emotional problems. These factors contribute their error and biased decisions. Consequently, heuristic bounded and satisficing

investors are displaying opposite attributes of unbounded investors.

Risk profile of the investors: risk-taking attitude of an investor indirectly explain their heuristic state. Some of the risk-taking attributes of the investors are risk averse and risk seeking. Chi-square result suggests that there is a significant association between the risk profile of investors and their heuristic state. What type of risk adopted by what kind of heuristic state investors are shown in the correspondence figure. Association figure explains that heuristic bounded investors have moderate risk; heuristic satisficing investors have low-risk and heuristic unbounded have high-risk takers. This suggests that investors who have low and moderate risk explore rational decisions-making attitude while high-risk seekers have irrational attitude. Since investor's irrationality associated with risk-seeking attitude, it will be confirmed that heuristic unbounded investors are negative emotional state investors. Risk as feelings was present in early psychometric studies of risk perception (*Fischhoff et al., 1978; Slovic, 1987*). This was further extended by the model of 'risk as feelings' proposed by Loewenstein *et al.* (2001) and with dual process theories put forth by Epstein (1994), Sloman (1996), and others. This concludes that the risk associated with emotions creates heuristic biases.

HEURISTIC MODEL

An investment decision is a complex process faced by individuals while approaching the market. Cognition is the major factor determines the investment behaviour of the investors. 'Cognition is the activity of knowing: the acquisition, organisation, and use of knowledge' Ulrich Neisser (1976). According to the American Heritage Dictionary of the English Language (4th edition, published in 2000), 'Cognition is a mental process of knowing, including aspects such as awareness, perception, reasoning, and judgment'. Emotion is an affect which actually enhances individual's ability to make rational choices (*Frank, 1988; Damasio, 1994; LeDoux, 1996; Elster, 1998; Isen, 1999*). Furthermore, it allows the people to transcend the details, prioritise, and focus on the decision to be made. The following model explains how the investor's heuristic developed with the help of their cognition and emotions (Figure 4).

Awareness

It is the first stage of heuristic development in which demographic variables such as investor's age, income, and profession explore individual's market awareness level. For example, investors who are young, earning less, working in finance or non-financial areas have a different perspective of market than the investors who is matured or old, earning moderate or high, working in finance or non-finance areas. Their awareness level may vary from low to high. How each demographic factor contributes the heuristic development is explained in 'demographic factors and its influence on heuristic development section'.

Perceptions

It is the second stage of heuristic development. Here investor's perception towards the market is determined by their reasoning and judgment skill. Investment variables such as reasons for equity investments, investment pattern, equity experience, equity market investments, source of fund utilised and the risk taken by investors explore their reasoning and judgment skill, which will develop their perceptions towards the market. Investors who have less equity experience, high investments in the equity market, may expect an optimum return during a short span of time will pessimistically approach the market. At the same time, investors who have moderate or high equity experience may properly diversify their investments into various investment avenues i to reduce the risk and maximising the return during a medium- to long-term period.They optimistically approach the market.

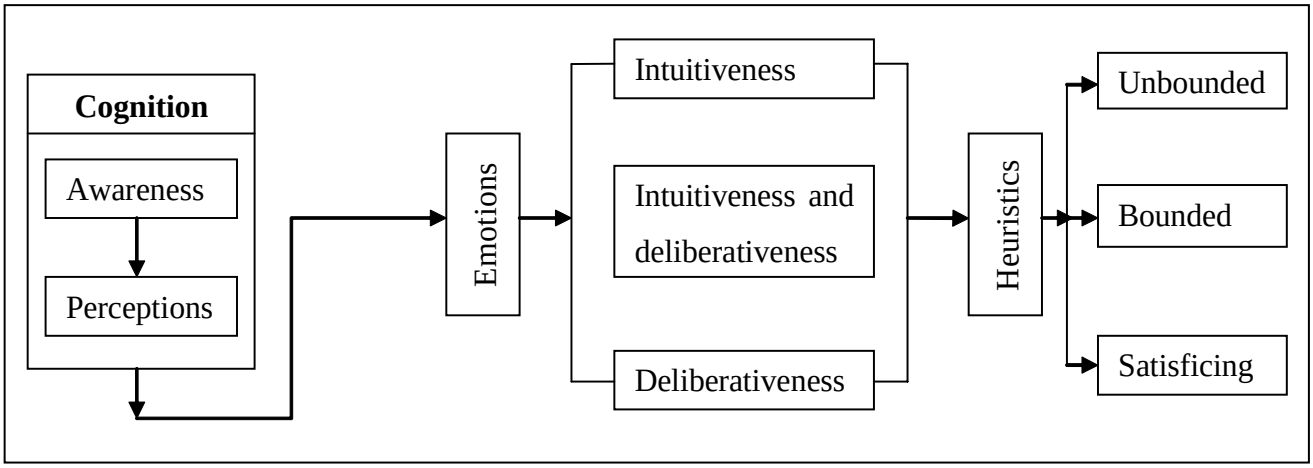

Figure 4: Investor's heuristic model

Heuristic development

Based on the investor's cognition towards the market, their emotions and heuristic behaviour are determined. Investor's emotions are triggered by market anomalies such as speculations, volatility, bullishness, bearishness, etc. There is much evidence to support this viewpoint. According to Lazarus (1991) individual's emotional experience is influenced by the surrounding environment. Further, he added that cognitive appraisal plays a crucial role on emotional experience. Chartrand *et al.* (2006) confirmed that automatic (cognitive) appraisal processes can influence emotional state. Smith and Kirby (2001) also supported that those individual's emotional experiences is influenced by associative processes and by reasoning. Models of heuristic cognition, focus on situations in which people need to act fast (rarely a concern for logical models of mind), the probabilities or utilities are unknown, and multiple goals and ill-defined problems prevent logic or probability theory from finding the optimal solution. This fast-track decision is called as intuitions. According to Gigerenzer (2007), intuition is defined as a judgment that is fast in consciousness, whose underlying mechanism is unconscious, yet is nevertheless strong enough to act upon. Based on the intense of emotional influence, investors explore intuitiveness or deliberativeness or intuitiveness and deliberativeness behaviour. These behaviours are called as heuristic unbounded, heuristic satisficing and heuristic bounded.

CONCLUSION

Decision making is a complex phenomenon. Investors use tools such as statistics, logical and heuristics to make decisions. Previous research shows that statistics and logical are associated with rational decision making and heuristics are associated with errors and biases. How these heuristic affect or influence individual's investment decisions is taken as the primary aim of this study. Around 742 samples were chosen to carry out this study. The findings of this study suggest that heuristics are good for quick and accurate decision making. Besides, investors are categorised based on the influence of heuristics are heuristic satisficing, heuristic bounded and heuristic unbounded investors. The heuristic model suggests that individual's cognition and emotion contribute more of determining their heuristic development. This study has limited to some restrictions. First, investors in this study are limited to retail investors who access Indian secondary market

from the Tamil Nadu region only. Second, the research data were restrained to collect from the five major cities of Tamil Nadu state only. Finally, heuristic is the only behavioural factor which was taken to find out its influences of determining their investment decisions. The major implications of this study will be useful to retail investors to understand the influence of emotions on determining their investment personality, investment success, etc. Further, this study is also useful to investment analysts, broking firm and investment managers to create awareness among their clients on successful investments in the equity market. At the same time, fund managers can use this study to design a suitable product to meet their clients' needs. An overall conclusion of this study explores that heuristics is a best tool for quick and fast decisions, if it is properly used in an appropriate decision.

DIRECTIONS OF FUTURE RESEARCH

This study has focused on heuristic variables and its influence on investor's investment decisions. Certain psychological factors such as mood, emotion and personality are excluded from this study. How these factors contribute to heuristic development is the promising area of future research related to this study.

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