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AN EXPLORATORY APPROACH TOWARD IDENTIFYING BEHAVIORAL BIASES ON INDIVIDUAL INVESTORS

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Abstract

The efforts to identify behavioral biases displayed by individual investors still continue. In addition to it, detecting these biases has also importance in behavioural finance domain. Through individuals' statements, produced from a previous in-depth interview study, this paper aims to explore whether those statements represent the denominated behavioral biases (i.e., preference for certainty, confirmation bias, consultancy bias, overconfidence bias, regret avoidance, loss aversion) as they are supposed to be and to observe whether those biases are related to individuals' risky investment behavior. We conducted exploratory factor and correlation analysis through the data of 107 individuals. Factor analysis results indicated that those statements represented their respective behavioral biases well. Correlation analysis showed that preference for certainty and loss aversion had a negative association with risky investment behavior, enabling that the relation between these two biases and risky investment behavior makes sense as expected. Managerial implications and research limitations were also discussed.

Keywords: Behavioral biases, individual investors, risky investment behaviour.

1. Introduction

The efforts to identify behavioral biases of individuals making their financial decisions have been exerted by the researchers ever since prospect theory has assumed that the deviations from rational behavior are systematic, not random (Tversky & Kahneman, 1986, p.252). In other words, people display some biased behaviors in a systematic way. This is crucially important to economic behavior as it is previously supposed that the deviations from rational behavior are random and amended automatically in

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a rationally operating market. However, it is said that prospect theory does not negate expected utility theory as a whole. Exclusively, the former extends the assumptions of the latter. Herewith, behavioral finance views individuals as error-prone, cognitively and affectively biased human being, not a "Bayesian Statistician" (Giocoli, 2013) as recognized by rational finance paradigm.

Some studies (i.e., Ritter, 2003) view prospect theory as "a descriptive theory of choice under uncertainty" while expected utility theory is the normative one. Furthermore, Tversky and Kahneman (1986: p. 275) states: "… the normative and the descriptive analyses of choice should be viewed as separate enterprises". Accordingly, in an attempt to delineate the descriptive analysis of choice, a lot of behavioral biases exhibited by individuals as economic agents have been articulated by the researchers. These biases can be originated from both cognitive and also affective processes (see Aren, Kaya, & Aydemir, 2014). In other words, cognitive based biases stem from the activities such as interpreting the new or incoming information incorrectly, evaluating the stochastic probabilities improperly whereas affective based biases originate from negative feelings, emotions or images which have been directed or attached to the decision making object in any way. Those cognitive biases such as representativeness, anchoring, availability are largely suggested in a study (i.e., Tversky & Kahneman, 1974), grounded by their assumptions of subjective probabilities and several statistical fallacies. On the other hand, affective biases such as mental accounting (Thaler, 1985), endowment bias (Kahneman et al., 1991), and affect heuristic (Finucane et al., 2010) have an emotional origin.

In psychology, there are so many methods to detect these behavioral biases. Some methods such as perception tests, scenarios, probabilistic questions can be seen in the studies (e.g., Tversky & Kahneman, 1974). On the other hand, it is known that content analysis of the verbal statements can be exploited to capture many underlying psychological states of behaviors (Gottschalk & Gleser, 1969). In this paper, following and extending a study using in-depth interview method (Sahi, Arora, & Dhameja, 2013), we aim to identify some cues of behavioral biases on individuals. Through thirty semi-structured and in-depth interviews, Sahi et al. (2013) analysed the verbal data and named them according to their similarities. Our research asks the question whether those biased statements of individuals regarding their financial investment decisions have resemblance to each other and whether they represent certain psychological biases. In other words, do these statements form a series of distinctive factors? This study also asks whether these statements are related to risky investment behavior.

This study may contribute to the literature for some reason. Although some psychological tests are currently available in the literature in order to observe some biases, the content analysis findings of verbal behaviors could be also exploited well. Our study findings show that verbal statements of individual investors have some similarities and can be grouped into some categories. Besides, these groups can be renamed according to some behavioral biases articulated in the literature since they seem to be similar to these biases. We don't claim that the groups of these statements constitute behavioral biases scale since developing a scale is quite different and thorough process. Yet, it can be said that these statements refer to the presence of their relevant biased behaviors. Or, in an attempt to develop these kinds of scales, researchers may exploit these statements as well. Thus, our study can be recognized as a preliminary stage of scale development process and be used in the item generation stage. It is good to state that our study is an extension of the mentioned study, (i.e., Sahi et al., 2013) however different from it in some ways. They analysed the verbal, interview data and renamed them as tendencies. Yet, while doing that,

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they seem not to have employed any statistical technique. Then, it can be recognized as a qualitative study. However, we carried out exploratory factor analysis (i.e., multivariate statistical technique), a quantitative technique. Additionally, we linked these extracted factors consisting of the statements to risky investment behavior. Thus, this enabled us to observe whether these factors (i.e. behavioral biases) could be used in predicting people's risky investment behavior. We used only the statements of six biases since they are mostly focused in the literature

2. Literature Review and Theoretical Framework

Researchers have exerted much more efforts and taken a closer look into individual financial decision making since the prospect theory (Kahneman & Tversky, 1979), relatively new paradigm, has proposed that people do not always behave in a rational manner and that these deviations from rational behavior are systematic. Rational theory (i.e., expected utility theory), older paradigm has claimed that everyone is rational, that the sum of these deviations is zero even if there are some people who behave in an irrational manner. Also, rational theory has seemed to describe an ideal behavior of an idealized individual. For instance, Tversky and Kahneman (1986: p.251) have stated: "The (rational) theory was conceived as a normative model of an idealized decision maker, not as a description of the behavior of real people". However, prospect theory propounds a descriptive analysis of actual behavior. Fundamentally, this theory extends the assumptions of the expected utility theory, not negating it as a whole. Actually, it should be better to conceive the two theories as separate enterprises (Tversky & Kahneman, 1986). Prospect theory presents a descriptive choice model for anomalies in expected utility theory.

In fact, the normative model seems reasonable when the choice behavior has been conceived as the maximization process. This process inherently necessitates the engagement of individual's statistical and computational capabilities into the decision making process. Yet, it is known that people are not "Bayesian Statisticians" (Giocoli, 2013) as deemed by the rationalists. What's more, owing to bounded rationality assumption (Simon, 1955) and limited information processing capacity (Dolinsky & Feinberg, 1986), people are error-prone hence they could make computational errors and evaluate stochastic probabilities improperly. More importantly, the probabilities are subjective (Tversky & Kahneman, 1974), not stochastic as proposed by rational theory. Thus, people could behave irrationally in a systematic way because of their subjective perceptions, anticipations and evaluations. This can be thought as the starting point to understand behavioral biases of individuals. Thus, some studies have argued the identification (e.g., Agrawal, 2012; Albaity, Rahman, & Shahidul, 2014; Bailey, Kumar, & Ng, 2011; Mittal, 2010; Oechssler, Roider, & Schmitz, 2009; Sahi et al., 2013) and the role (e.g., Olsen, 2007; Pompian, 2008) of investor biases on financial decisions.

Actually, extant research regarding behavioral biases on investors includes two main strands of literature, both of which are biases on (i) individual and (ii) institutional investors. Although we emphasize biases of the former, past research regarding the latter mainly addresses and reveals three biases, all of which are home bias, disposition effect, and herding effect (See Aren, Aydemir, & Şehitoğlu, 2016 for review). There are also many biases exhibited by individual investors in the literature.

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Although named differently at times, they can be collected under a few main titles (see Aren & Aydemir, 2014 for a review). We'll focus on the individual ones in this paper.

There are several studies why investors apply to these behavioral biases, deemed also as heuristics by some researchers (e.g., Goldberg & Von Nitzsch, 2001). To exemplify, in this study, it is claimed that individuals use heuristics to reduce information complexity and to make quick judgements as a strategy for controlling difficult situations. Accordingly, in the same study, simplification, mental accounting, availability are deemed as three heuristics used for reducing information complexity. Anchoring and representativeness are examples of heuristics for making quick judgements. On the other hand, mental accounting, availability, representativeness and anchoring are recognized as biases (e.g., Thaler, 1985; Tversky & Kahneman, 1974). In a study (Ritter, 2003), heuristics, overconfidence and mental accounting, framing, representativeness, conservatism and disposition effect are discussed under the title of cognitive biases. Consequently, there seems a complexity on the terms in the literature. Some research (Odean, 1999) shows that investors' trading volume is excessive due to the fact that they are overconfident. In another study (Odean, 1998), disposition effect, the tendency of holding losing investments too long and selling winning investments too soon, is found. It is generally accepted that people exhibit these behavioral biases due to their time and mental capacity constraints (Agrawal, 2012). After all, these biases or heuristics seem to cause individuals' economic or financial actions to deviate from rational manner

3. Research Method

3.1. Measurement of Variables

In order to operationalize these biases, we exploited the study of Sahi et al. (2013). They analysed the in-depth interviews with participants and resulted that individuals mostly enunciated the statements below. They asserted that these largely pronounced statements refer to some behavioral biases and they denominated them without examining how well these statements represent their relevant biases. First, we converted these statements into items of five point Likert type scale. Following Tomas and Amparo (1999) and Woods (2006), we did not use reverse statements for the sake of the scale's validity and reliability. The original statements can be seen in tables below.

Table 01. Preference for Certainty

Item Code	**Statement**
T1	"Prefer to take a fixed rate on housing loan… more certainty."
T2	"I don't invest in the share market as it goes up and down."
T3	"I invest more in debt instruments where the principal is secure and return fixed."
T4	"I opt for the dividend option in mutual funds, as there is more surety."

Table 02. Confirmation Bias

Item Code	Statement
T7	"Before making an investment decision, I seek information that supports my decision."

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T8	"In case someone suggests to me a particular investment option, I would check from two to three people before investing."
T9	"If someone suggests something, I check with others on that suggestion and if it's good, I go and invest."
T10	"I always find information that matches my beliefs about the investments."

Table 03. Consultancy Bias

Item Code	Statement
T11	"I let my investment advisor make my investment decisions for me."
T12	"I consult an investment advisor before making an investment decision."
T13	"Advice given by analysts is not genuine, so I don't rely on their advice."
T14	"I get convinced only if an expert tells me that an investment option is worth putting my money into."
T15	"I believe that my investments will do well if I have investment advisors guiding me."
T16	"I don't trust financial advisors."

Table 04. Overconfidence Bias

Item Code	Statement
T17	"I invest where I feel I will do well."
T18	"I am at par with the knowledge of financial experts."
T19	"I know that my investments will go up in the future/long term."
T20	"The investments I made have always outperformed the market."
T21	"I have the ability to perform successfully all the financial investment planning activities myself."

Table 05. Regret Avoidance

Item Code	Statement
T22	"Burnt hands in share market have not gone again.
T23	"I reflect on past financial decisions when making current decisions."
T24	"If I bought something and it went down, I would feel very bad."
T25	"I feel bad that I didn't invest in that option, as it increased drastically some months later."

Table 06. Loss Aversion

Item Code	Statement
T26	"Will try minimize the loss."
T27	"I will not sell my portfolio at a loss."
T28	"I look at the risk of losing money, before deciding where to invest."
T29	"I prefer that my investments grow slowly rather than taking a chance of losing my money in an attempt to seek higher returns."

Risky investment intention represents the risky investment behavior in our study. We define risky investments as the investment alternatives such as stocks, stock weighted fund. In the literature, risky asset ownership is frequently related to holding stocks in the investment portfolio (e.g., Gilliam,

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Chatterjee, & Grable, 2010; Gutter & Fontes, 2006). Besides, Hanna and Chen (1997) examine subjective and objective risk tolerance on six financial assets which are totally comprised of stocks and long-term bonds. Furthermore, in another study, risk taking is found to be related to the chance of owning stocks (Xiao, 1996). Hence, our definition can be considered as consistent with the literature. In order to measure it, we exploited the purchasing intention scales (Dodds, Monroe, & Grewal, 1991; Putrevu & Lord, 1994). Then we modified them into risky investment context. According to the planned behavior theory (Ajzen, 1991), behavioral intention can be recognized as an indicator of actual behavior. Hence, we aim to measure individuals' risky investment behaviour through risky investment intention scores. In marketing literature, purchase intention is defined as the inclination of a consumer to buy a specific good or use a service. Hence, in our study, we define risky investment intention as the tendency of an individual investor to buy a risky investment product (i.e., stock). Also, it is a unidimensional, five-point likert type scale. Items N1-N7 represent our risky investment intention items. Higher scores refer to higher risky investment intention level.

We asked participants their gender and age since previous research has showed that the relationship between gender and risky financial behavior is strong (e.g., Bajtelsmit & Bernasek, 1996). Women are less likely to take risks in their financial decisions. Although there are some controversial results (e.g., Grable & Lytton, 1998), age has been another demographic attribute in relation to risky behavior. In these studies, while getting older, both men and women tended to have a lower risk tolerance. That's why; we included these two demographic attributes.

3.2. Sampling

The study sample comprises of 107 individuals who participated in an online survey. Our sample is chosen with convenience sampling method. They are financially independent and at the age of 20 or above. Out of 126, 19 participants were excluded from the study sample since they are not financially independent. We assume that they are financially independent if they have a regular, monthly income. Hence, we can consider that they are able to make appropriate financial decisions. Also, while expressing their perceptions about the statements regarding Likert type scale items, they are asked to consider only their monthly income and to ignore their family, spouse, flatmate, etc. as if they are the sole person to make a financial risk taking decision each. Otherwise, the presence of the other people (i.e., spouse, partner, etc.) naturally makes the decision environment different. Regarding gender, the sample is almost equally dispersed. However, the sample mostly consists of the people aged between20-40 (92%). Thus, it is necessary to observe the distribution of the sample whether any skewness or kurtosis exists. As suggested by Hair et al. (2010, p.73), in its absolute value, skewness/kurtosis statistics of the sample at 0.05 error level weren't higher than 1.96, critical value, providing evidence for normality.

3.3. Measurement Validity and Reliability

As stated in previous section, Sahi et al. (2013) concluded that individuals' statements can be categorized into some tendencies (henceforth, biases) and then they called them. Yet, it is better to exploit factor analysis in order to observe how well these statements represent their respective biases. Thus, we conducted an exploratory factor analysis rather than the confirmatory one since we aren't sure about a

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priori structure. While Sahi et al. (2013) classified and renamed the verbal data, they didn't base their study on a statistical analysis. Table 7 exhibits the final factor analysis results with varimax rotation method through IBM SPSS Statistics 22.

Firstly, item T4 (I opt for the dividend option in mutual funds, as there is more surety) was not included in the analysis since it had more missing values than 10 % of observations (Hair et al., 2010). Our explanation is that individuals in general seem not to have understood this item since the individual investors in Turkey are not familiar enough with mutual funds. Also, T2 (I don't invest in the share market as it goes up and down), T19 (I know that my investments will go up in the future/long term) were omitted due to their lower factor loadings than 0.45 (Hair et al., 2010). T17 (I invest where I feel I will do well), T22 (Burnt hands in share market, have not gone again), T23 (I reflect on past financial decisions when making current decisions), T27 (I will not sell my portfolio at a loss) were also deleted since they loaded on one factor solely. Exploratory factor analysis is also used to evaluate the scale validity. This tests convergent validity. Hence, it could be said that convergent validity of our scales was fulfilled. Excluding Factor 5 and 7 whose reliability values were under 0.70, critical value (Nunnally & Bernstein, 1994), so we can say that the extracted factors are reliable enough. Table 7 summarizes the final factor analysis results and reliability value for each factor.

Table 07. Factor Analysis Results

	Fac. 1	**Fac. 2**	**Fac. 3**	**Fac. 4**	**Fac. 5**	**Fac. 6**	**Fac. 7**
N1	.466						
N2	.741						
N3	.776						
N4	.933						
N5	.897						
N6	.936						
N7	.915						
T11		.520					
T12		.712					
T13		.659					
T14		.680					
T15		.830					
T16		.809					
T1			.712				
T3			.543				
T5			.595				
T6			.629				
T26				.721			
T28				.565			
T29				.696			
T7					.506		
T8					.689		
T9					.690		
T10					.649		
T24						.847	
T25						.836	
T18							.548
T20							.507
T21							.868
Cronbach'sAlpha	0.93	0.83	0.71	0.70	**0.68**	0.74	**0.58**

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Note: Fac.1: Risky investment intention, Fac. 2: consultancy bias, Fac. 3: preference for certainty, Fac. 4: loss aversion, Fac. 5: confirmation bias, Fac. 6: regret avoidance, Fac. 7: overconfidence bias.

4. Findings

In order to explore relations between factors, we made correlation analysis. Through correlation analysis, we also examined nomological validity of the newly obtained factors. Because their items have been produced from a verbal data analysis, it is necessary to observe the relationships between the new factors and risky investment intention. According to Hair et al. (2010), if there are significant associations between these behavioral biases (i.e., the factors in our study) and risky investment intention as expected in the literature, we can say that these factors make sense in measuring their relevant biases. Accordingly, preference for certainty, loss aversion and gender are negatively related to risky investment intention. These relations really make sense since it is well known in the behavioral finance literature that people who prefer certainty are less likely to take risks in their financial decisions. Similarly, people avoiding from losses are expected to take no risks in their investments. Lastly, consistently with the literature, women are less likely to take financial risks. Briefly, it can be said that some behavioral bias factors produced from our study (i.e., preference for certainty and loss aversion) have logical connections with risky investment behavior, providing evidence for nomological validity.

Table 08. Correlation Analysis

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	1	-.08	-.42**	-.11	-.12	.18	-.26**	-.24*	-.15
2		1	.36**	.48**	.22*	.18	.33**	.09	-.07
3			1	.34**	.20*	.00	.39**	.12	.06
4				1	.18	.10	.29**	.13	-.11
5					1	.08	.27**	.15	-.14
6						1	-.01	.18	.08
7							1	.11	.06
8								1	.07
9									1

Note: 1: risky investment intention, 2: consultancy bias; 3: preference for certainty; 4: confirmation bias; 5: regret avoidance; 6: overconfidence bias; 7: loss aversion; 8: gender; 9: age.

**: Correlation is significant at the 0.01 level (2-tailed).

*: Correlation is significant at the 0.05 level (2-tailed).

5. Conclusion and Discussions

In this paper, we aim to extent the study of Sahi et al. (2013), following their in-depth interview results. While that study is a qualitative research, our study can be recognized as the quantitative one. When classifying and renaming the interview data regarding behavioral biases, they seem not to have employed any statistical method. Therefore, we have the research question of whether and how well individuals' statements in those interviews represent some behavioral biases. Even so, for the nomological validity purposes, we also intend to examine whether these biases are related to risky investment intention as an indicator of actual risky investment behavior.

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Factor analysis results indicate that these interview statements largely represent their respective biases suggested by Sahi et al. (2013) well. Yet, in terms of regret avoidance, two statements remain only. One caveat to this result is the possibility of problem about model identification in confirmatory models for future research. Yet, generally, our study results show that these statements could be utilized in order to detect behavioral biases of individual investors. On the other hand, we don't claim that we develop a scale in order to operationalize behavioral biases. The scale development accommodates more exhaustive and thorough process. Perhaps, this paper is recognized as a preliminary study for the future research aiming to develop scales to measure individual investors' behavioral biases.

These biases seem to be in relation to risky investment behavior. Preference for certainty and loss aversion are found to be negatively related to risky investment intention. More clearly, individuals preferring for certainty more and avoiding from losses are less likely to take financial risks in their investments. These findings show consistency with the literature. It is generally said investors preferring known risks over the unknowns invest in more secure, less risky investment alternatives. Also, in the extant literature, loss aversion bias has been negatively related to invest in risky alternatives. Unfortunately, other biases are not found to have a significant relation to risky investment behavior. Briefly, it can be concluded that correlation analysis provides evidence that two behavioral bias factors have a nomological validity as well. Besides, we find that gender is negatively related to risky investment intention. More clearly, women are found to have lower risky investment intention scores. This is also consistent with the extant literature since there is consensus on which women take risks less due to their lower financial knowledge and their ongoing social role.

This study has also some practical implications. Financial consultants may use these statements in detecting the behavioral biases of individual investors and hence in directing them to appropriate investment alternatives for their biases. Banks could also take advantage of these results by using the statements as a guideline for a better understanding of their customers' biased behaviors. They could be able to know whether their customers tend to undertake risky investments or not. It is not reasonable to persuade a person avoiding from losses to buy a risky investment product.

Just as any study, our study has been carried out under some limitations. Although we conducted this study through a greater sample than that of them (Sahi et al., 2013), it is certain that larger sample size enables to achieve more generic results. Besides, unlike our exploratory approach in this study, larger sample size also facilitates to replicate and confirm this study through confirmatory factor analysis. Second, we don't focus on all behavioral biases articulated by them (Sahi et al., 2013), however they identified several other ones. We used mostly emphasised biases in the literature. We suggest future research should include these substantial behavioral biases into the research design. Third, while evaluating our results, it should be remembered that the factors of regret avoidance and loss aversion have lower reliability values.

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