The Role of Emotional Regulation, Self-Efficacy, Heuristics and Risk Appetite on Financial Decision-Making Process. A Study on Groups of Senior and Junior Investors

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Abstract

This study analyzes the role that four variables – self efficacy, emotion regulation, and heuristics and risk appetite - play on tendency to trade stocks in a group of 80 investors: 40 senior investors and 40 students of Faculty of Economics. They completed: Emotion Regulation Questionnaire to measure differences in the use of emotion regulation strategies; General Self-Efficacy Scale to assess the general sense of perceived self-efficacy; General Decision Making Style to value individual decisional style; Questionnaire for collecting anamnestic data to measure experience, knowledge of stocks and its risks, capital and debts, risk appetite, availability heuristic and experience. The results show that, in both groups, men have more optimism than women, whilst the latter have a lower financial risk appetite. In senior investors' group, experience influences affect reaction, availability, risk appetite and optimism. In both group, auto-efficacy is predictor of overconfidence and risk appetite.

Keywords: Self-efficacy; Emotional regulation; Heuristic; Risk appetite; Decision-making.

Introduction

The decision-making process requires a significant amount of time and a high cognitive effort, since information is not always available and choosing the best alternative is complex (Pellerone, 2013; 2014). In order to save time and cognitive resources, individuals can use heuristics, that is mental shortcuts deriving from personal experience, that allow individuals to get more quickly to a decision (Pellerone, 2015; Pellerone et al., 2015). The use of such heuristics can lead to errors, defined cognitive distortions, which are different depending on the stage of the decision-making process in which they occur (Simon, 1976). In the early stages (problem analysis and goal setting) may arise distortions due to framing, or excessive focus on a particular aspect of the problem, leaving the analysis of other important elements?

In the later stages of the decision-making process (collection and assessment of information and possible alternatives), individuals may be unaware of distortions, that's to say:

a)   Availability: the tendency to estimate the probability of an event on the basis of the frequency and vividness of the emotional impact of a memory, rather than on the objective probability of the event; then individuals, in an uncertain situation, tend to look for comparison between the characteristics of the situation they are experiencing and the characteristics of a situation already lived which remember better than other ones;

b)   Representativeness: the propensity to attribute similar characteristics to a like objects, and to classify entities on the basis of their correspondence to certain stereotypes, ignoring objective information;

c)   Anchoring: the tendency to rely too heavily on the first information that are available using them as landmarks to which anchor their estimates, slowing the review of the valuation estimates;

d) Affect reaction: the disposition to take decisions based on instinct and intuition.

In the last two stages – choosing the best alternative and evaluation of results – may occur: a) attribution error, the tendency to attribute one's failures to internal factors and one's successes to external factors, or vice-versa; b) self-confirmation, the propensity to gather only the information that confirms their choice, without considering the factors that confute them.

Other variables that influence investment choices are: optimism and excessive confidence by investors or overconfidence. The optimism represents a common error in managers and investors as they tend to overestimate the frequency of favorable results and, consequently, to underestimate that of unfavorable results. The investment decision is made on the basis of a risk perception not adequate to the corresponding expected return. The overconfidence induces investors to use the same information, available to everyone, in different ways depending on their degree of overconfidence, as determined by previous experiences. If choices made on the basis of such information, prove to be correct (with respect to the occurrence of events), then individuals will commit a further error, which is to attribute that small success to their own capacity (self- attribution bias), but then they talk of fate or bad luck or chance, in case of failure.

Individuals show, therefore, a tendency to overestimate the reliability and accuracy of the information acquired and tend to overestimate their ability to process them. Tversky and Kahneman (1991) were the first to study this phenomenon in psychology; in their works, authors argue that when people are faced with an uncertain event and/or the need to assess an uncertain quantity, they make use of so called principles called heuristic principles (availability, representativeness and anchoring). This tendency of individuals, to overestimate their own abilities and their knowledge, if applied in the financial field, can lead investors to excessive trades, overestimating the opportunity to achieve gains, taking advantage of information that, because of their mental distortion, consider themselves to be the only ones to have.

To explain this process, Hirshleifer and Subrahmanyam (1998) propose a theory of over-reaction under-reaction of equity markets: in the model, the authors define as overconfident an investor who overestimates the precision of the signals provided by private information, without, on the contrary, attributing great weight to public one. The overconfidence creates an excessive price reaction to the news, at least in the short term. The authors show how investors, as soon as found, through public information, confirmation of the decision taken by themselves (e.g. if a good news comes after a decision to purchase), will increase the confidence in their own abilities (Daniel et al., 1998).

1.2 Investment choices and heuristics

The theory of efficient markets assumes that investors use a rational decision-making style and they rationally assess the "qualifications", i.e. price equal to fundamental value of security; furthermore, this theory underlines there are perfect arbitrage opportunities that nullify all price fluctuations caused by the investment strategies of any irrational investors. As shown in the literature, emotional factors can influence investment decisions of individuals, who do not seem to behave in a perfectly rational way rather violating the expected utility theory (Odean, 1998).

Tversky and Kahneman (1973), in contrast to what claimed by the traditional expected utility theory, noted that in risky situations, individuals' behavior was different depending on which of the two options with equal expected value concerned a risk of loss or gain (Prospect Theory). In particular, in a first position in which it's offered to a person the opportunity to choose between two alternative options each with equal expected value, but one with certainty of gain, and the other one random but with the possibility of greater gain: the attitude will be of risk aversion. But if the individual has the opportunity to choose between two options, with the same expected value, but one with a sure loss, and the other one with a random risk of loss greater, there will be a risk appetite attitude (Ruminati & Bonini, 2001).

Tversky and Kahneman (1973) noted that the sorrow one feels in losing a sum of money is greater than the pleasure in gaining the same amount. Precisely the amount of displeasure caused by a loss is roughly twice the pleasure produced by a gain of equal amount. Therefore, when people find themselves in the position of having to make a decision involving a change (positive or negative), to evaluate the utility resulting from this choice, they do not consider the absolute value of the result, but make a comparison between the pre-choice and post-choice situation. So the well-being that an individual experience as result of its total consumption, is not only a function of the level of consumption, but also depends on a comparison with the level of consumption to which he was accustomed.

Of particular interest is the process referred to as " the effect of heuristics ", whereby people quickly consult their affective moods when make choices. This heuristic allows us to be rational actors in a lot of situations. It works well when experience enables us to accurately anticipate the consequences of our decisions. However, it fails when the consequences are very different from what we expect. In the latter cases, rational actors could become irrational subjects (Slovic et al., 2002).

Contrarily to popular belief, according to which the feelings negatively influence the decision-making process, the literature shows that people who have experienced more intense sensations get higher decision-making performance. Individuals who are better able to identify and distinguish between their feelings reach higher performance decision-making, through their ability to control possible distortions induced by these feelings (Slovic et al., 2004). Therefore, the experiential mode of the individual can be either analytical or intuitive: first mode is automatic, and is based on images which feelings (positive and negative) were correlated to through learning and experience; the other mode is analytical, deliberative, and reason based.

1.3 Affect reaction, risk-appetite and investment choices

Emotions can affect information retrieval, directly bias cognitive processes engaged in decision-making, bias the value attached to outcomes and significantly modify risk perceptions and behavior (Lerner & Keltner, 2002).
Lo, Repin and Steenbarger (2005) found some clear associations between day-traders' emotions (as measured by an emotional-state survey), their decision making, and performances; investors who experienced more intense emotional reactions to gain and loss were poorer performers than those with more attenuated emotional responses. Schunk and Betsch (2006) show that lower levels of emotional experience seem to be associated with higher levels of financial decision-making performance through greater risk neutrality.

Literature show that emotion regulation would lead to increased risk-seeking behavior, as individuals able to successfully regulate it tend to make choices that maximize performance, and place less weight on outcome of the single decision, in turn leading to a reduction in loss aversion (Sokol-Hessner et al., 2009).Martin and Delgrado (2011) suggest that cognitive emotion regulation strategies influence subsequent decision-making: specifically, successful use of cognitive strategies can foster more goal-directed behavior, compared to riskier decision-making. This is in slight contrast with recent studies that suggest successful use of emotion regulation can lead one to reduce loss aversion and maximization of rewards (Seo & Barrett, 2007).According to literature, it seems essential to deepen some of the practical implications resulting from the way this heuristic influence how we perceive and evaluate risk, more generally, the way this variables affect financial decision making process.
This study analyzes the role that four variables – self efficacy, emotion regulation, and heuristics and risk appetite – play on the tendency to trade stocks in a group of investors and a group of university students of Economic Faculty.

Specifically, we hypothesize that the capacity for emotion regulation affects attitude towards financial risk.
Also, we assume that there is a correlation between decision-making style, general approach to investment and heuristics, in detail, that: the intuitive style is related to the affect reaction, risk appetite and optimism, the avoidant style is negatively correlate with over-confidence; the dependent style is negatively correlated with the optimism and affect reaction; the rational style is correlated with over-confidence. We assumed that the self-efficacy affects optimism, risk appetite and even over-confidence.

Finally, we hypothesize that: the ability to feel emotion and auto-efficacy represent predictor variables of overconfidence; lower level of auto-efficacy is predictor of the affect reaction; the ability to feel emotions and auto-efficacy are predictors of risk appetite.

2 Method

2.1 Participants and procedure

The research involved 80 subjects, with knowledge of financial markets, divided into:

a) A group of 40 students who attend the third year of the Faculty of Economics with theoretical knowledge about investment (see Table 1), i.e. 26 males (60%) and 14 females (40%), aged between 20 to 31 years (M = 25.95; *SD* = 1.40);
b) A group of 40 senior investors (see Table 2), aged between 45 to 58 years (M = 47.35, *SD* = 1.35), i.e. 14 females (35%) and 26 males (65%), with different levels of experience applied to investments (see Table 3).

Tab. 1: Description of the students' age

	Age	Frequency	Percent	Valid Percent	Cumulative Percent
	20.00	8	20.0	20.0	20.0
	24.00	8	20.0	20.0	40.0
	26.00	6	15.0	15.0	55.0
Valid	28.00	8	20.0	20.0	75.0
	30.00	4	10.0	10.0	85.0
	31.00	6	15.0	15.0	100.0
	Total		40	100.0	100.0

Tab. 2: Description of the senior investitors' age

	Age	Frequency	Percent	Valid Percent	Cumulative Percent
	31.00	2	5.0	5.0	5.0
	33.00	2	5.0	5.0	10.0
	38.00	6	15.0	15.0	25.0
	41.00	2	5.0	5.0	30.0
	42.00	4	10.0	10.0	40.0
	43.00	2	5.0	5.0	45.0
	44.00	2	5.0	5.0	50.0
	45.00	2	5.0	5.0	55.0
	46.00	2	5.0	5.0	60.0
Valid	49.00	2	5.0	5.0	65.0
	50.00	2	5.0	5.0	70.0
	56.00	2	5.0	5.0	75.0
	57.00	2	5.0	5.0	80.0
	58.00	2	5.0	5.0	85.0
	60.00	2	5.0	5.0	90.0
	66.00	2	5.0	5.0	95.0
	70.00	2	5.0	5.0	100.0
	Total	40	100.0	100.0	

Tab. 3: Description of the level of experience in the senior investors' group

Experience level		Frequency	Percent	Valid Percent	Cumulative Percent
	Low	16	40.0	40.0	40.0
	Medium	14	35.0	35.0	75.0
Valid	High	8	20.0	20.0	95.0
	Very high	2	5.0	5.0	100.0
	Total	40	100.0	100.0	

The first group of participants was identified involving students who attend the Faculty of Economics at the "Kore" University of Enna, through authorization of the dean of the Faculty; the administration of instruments has taken place during academic timetable. The second group was recruited from a bank advisor, who recruited potential participants by informing clients; volunteers were then seen by the researcher, who gave further information about the study. All participants were informed that participation was not paid, and they were made aware that they could withdraw from the study at any time.

2.2 Measures

The group of participants completed the Emotion Regulation Questionnaire, the General Self-Efficacy Scale, the General Decision Making Style and the Questionnaire for collecting anamnestic data.

The *Emotion Regulation Questionnaire* (Gross & John, 2003) to measure individual differences in the habitual use of two emotion regulation strategies, i.e.: the individual meaning attributed to emotion that a person feel inside (the cognitive reappraisal) and the ways to express this emotion, through talk, gesture and behaviour.

The *General Self-Efficacy Scale* (Schwarzer & Jerusalem, 1995) to assess a general sense of perceived self-efficacy, with the aim in mind to predict coping with daily hassles as well as adaptation after experiencing all kinds of stressful life events.

The *General Decision Making Style* (Scott & Bruce, 1995), constructed for detecting individual decisional style, is a questionnaire consisting of 25 items grouped in five subscales corresponding to five decisional styles: rational (deep search for information and systematic evaluation of alternatives), intuitive (confidence in one's own Intuitions and feelings), dependent (search for advice and opinions from people to be considered competent), avoiding (attempt to avoid decision making), and spontaneous (making the choice in the shortest possible time).

The *Questionnaire for collecting anamnestic data*, constructed ad hoc to measure: experience, knowledge of stocks and its risks, capital and debts, risk appetite, availability heuristic, affect reaction and experience.

3. Data Analysis

The Univariate Analysis of Variance (Anova one-way) is used to measure the influence of gender on heuristics; the same analysis is carried out to value the influence of experience on heuristics. The Pearson's correlation is used to assess the relation between capacity for emotion regulation and attitude towards financial risk; the same data analysis is used to measure relationship between decision making style, general approach to investment and heuristics. The analysis of multivariate factorial variance (Manova) is used to assess the way self-efficacy influences risk appetite and over-confidence. The analyses of hierarchical regression were used to detect the predictor variables in the use of heuristics, in which the possible predictors were: age, gender, ability to feel and express emotions and level of auto-efficacy. All analyses were conducted with SPSS (Statistical Package for Social Sciences) 19.0 statistical program.

4. Preliminary Results

The Univariate Analysis of Variance (Anova) shows that, in both groups, the gender influences optimism ($F = 6.03$, $p < 0.05$) and risk appetite ($F = 5.52$; $p < 0.05$); the analysis of the mean scores shows that: men manifest more optimism than women (Males: M = 2.62, *SD* = 0.96; Females: M = 1.57, *SD* = 0.79); whilst the latter have a lower risk appetite than men (Males: M = 2.69, *SD* = 0.95; Females: M = 1.71, *SD* = 0.76).

The Anova also shows that, in senior investors' group, the experience influences affect reaction ($F = 3.26$; $p < 0.05$), availability ($F = 6.80$; $p < 0.01$), risk appetite ($F = 4.25$; $p < 0.05$) and optimism ($F = 4.40$; $p < 0.05$); the Tukey's post hoc shows that investors with high level of experience manifest higher availability and optimism, but lower affect reaction and risk appetite.

4.1 Results

In the whole group of participants, the first hypothesis is partially confirmed, because the cognitive reappraisal of emotions influences the risk appetite ($F = 18.43$; $p < 0.001$): the Tukey's post hoc shows that participants with high level of cognitive reappraisal manifest higher risk appetite; although the ability to express emotions does not appear to affect the risk appetite ($p = 0.12$). The second hypothesis seems confirmed: in the senior investors, the use of an intuitive style is related to the affect reaction; the avoidant style is negatively correlate with over-confidence; the dependent style is negatively correlated with optimism; the rational style is correlated with over-confidence (see Table 4).

Table 4: Pearson's correlation: decision style, approach to investment and heuristics in the senior group

Measures	a.	b.	c.	d.	e.	f.	g.	h.	i.	l.
a. Avoidant style	-									
b. Dependent style	.53**	-								
c. Rational style	-.41**	-.20	-							
d. Intuitive style	.06	-.08	-.70**	-						
e. Spontaneous style	.01	-.11	-.56**	.63**	-					
f. Overconfidence	-.49**	-.39*	.58**	-.13	.01	-				
g. Affect reaction	-.09	.23	-.36*	.52**	.14	-.38*	-			
h. Availabilty	.32*	-.25	-.04	.15	-.05	.12	-.24	-		
i. Optimism	-.49**	.52**	.33*	.14	.17	.76**	-.19	.19	-	
l. Risk appetite	-.35*	-.40*	.21	.15	.24	.60**	-.28	.34*	.90**	-

*Note: ** p < 0.01, two-tailed; * p < 0.05, two-tailed.*

In the students' group: the dependent style is significantly related with affect reaction and availability heuristic; the intuitive style is significantly correlated with over-confidence, risk appetite and optimism (see Table 5).

Table 5: Pearson's correlation: decision styles, approach to investment and heuristics in the student's group

Measures	a.	b.	c.	d.	e.	f.	g.	h.	i.	l.
a. Avoidant style	-									
b. Dependent style	.37**	-								
c. Rational style	.82*	.40*	-							
d. Intuitive style	.72**	.03	.82**	-						
e. Spontaneous style	.37**	.32*	.53**	.26	-					
f. Overconfidence	-.38**	.60**	-.43**	.78**	-.09	-				
g. Affect reaction	.15	.71**	.32*	.61**	-.09	-.89**	-			
h. Availabilty	-.26	-.78**	.05	.35*	-.45**	-.75**	.86**	-		
i. Optimism	-.18	.58**	-.46**	.72**	.13	.92**	-.93**	-.90**	-	
l. Risk appetite	-.25*	.53**	-.26	.58**	-.05	.89**	-.96**	-.73**	.82**	-

Note: ** $p < 0.01$, two-tailed; * $p < 0.05$, two-tailed.

Also the third research hypothesis is partially confirmed; the multivariate analysis of variance shows that: the overall level of self-efficacy significantly affects optimism ($F = 6.33$, $p < 0.05$) and even more risk appetite ($F = 21.06$; $p < 0.01$), but not over-confidence.

In reference to the last research hypothesis, in the senior investors' group: lower age and higher level of auto-efficacy are predictor variables of overconfidence (55.6% total variance); the ability to feel emotions is the only predictor of affect reaction (45.9% total variance); as well as higher level of auto-efficacy is the only predictor of risk appetite (91.8 % variance). Otherwise, in the students' group: the higher age, the ability to feel emotion but not to express it, higher level of auto-efficacy represent predictor variables of overconfidence level (98.5% total variance); being man with higher age, with difficulty to feel emotions and with lower level of auto-efficacy is predictor of affect reaction (99.9% total variance) and availability heuristic (84.5% total variance); at the last, older age, the ability to feel emotions and higher level of auto-efficacy are predictors of risk appetite (99.5 % variance).

Conclusion and Discussion

This study analyzes the role that self efficacy, emotion regulation, heuristics and risk appetite play on tendency to trade stocks in groups of junior and senior investors. The study underlines that in economic choices men show more optimism than women, whilst the latter have a lower risk appetite than men; also, the most experience in general makes individuals less prone to affect reaction and risk appetite, but more prone to availability and optimism. In fact, the availability heuristic is a prerogative of people with more experience, because of the increased wealth of information in their possession; in this context, affect reaction assumed a conservative connotation and induces individuals with greater experience not to risk even when objective quantitative data evaluated without bias would lead to accept a calculated risk.

In both groups, confirming the first hypothesis, the cognitive reappraisal of emotions seems to influence the risk appetite, according to international literature who underlines as individuals who reported the experience of more intense emotions achieved a higher decision-making performance. Confirming the second hypothesis, the senior investors are more inclined to regulate emotions and may display a willingness to cope with negative feelings in the interests of objectivity and maintaining pursuing longer term goals. Also, the senior investors with high level of affect reaction use the intuitive decision style; those with high level of over-confidence tend to use the rational style, rejecting the use of the avoidant style. By contrast, students, less expert traders, engaged either in avoidant behaviours, or invested a significant cognitive effort in suppressing expression of emotional reactions; also, in this group, the dependent style is related with affect reaction and availability heuristic, but the intuitive style is related to over-confidence, risk appetite and optimism. Also the third research hypothesis is partially confirmed, because the overall level of self-efficacy affects optimism and even more risk appetite, but not over-confidence.

Finally, in both group higher level of auto-efficacy is predictor of overconfidence and risk appetite; although, in the senior investors' the ability to feel emotions is the only predictor of affect reaction; so in the students' group, higher age, the difficulty to feel emotions, lower level of auto-efficacy are predictors of the affect reaction and availability heuristic.

It is common for traders to talk about the useful role of "gut feelings" in trading decisions based on prior experience, whilst emphasizing the importance of subjecting such feelings to conscious monitoring and deliberation. On the other hand, traders worry about incidental emotions biasing their decisions, because the incidental emotions are subjective emotional experiences which should be unrelated to present judgments and choices.

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