A study on small investors' sentiment, financial literacy and stock returns: evidence for emerging market

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Abstract

Humans are constantly susceptible to cognitive errors and these create biases in their judgments. The main purpose of this paper is to determine how the sentiment of the small investors affects their decision making by examining their portfolio returns and does experience level can reduce this errors.

The proposed model of this research uses the classification trees analyses to examine this relationship. Investor's biases have been measured by means of a questionnaire comprising several items. As for the selected sample, it has been composed of 128 small investors actively trading on the Tunisian stock market.

The findings show that the portfolio returns of the small investors were somehow influenced by behavioral biases and the results indicate that anchoring, familiarity, age and experience to be important contributory factors to the decision making performance. Also our findings reveal that their experience level can reduce the biases in their judgments.

Keywords: *Anchoring; Emerging Market; Experience; Financial Literacy; Portfolio Return.*

1. Introduction

The most of the academic researchers in finance are based on the hypothesis of the investors' full rationality. Empirical results from study in corporate finance has been mixed, but has commonly not supported the hypothesis of complete rationality which is one of the basic assumptions of the Efficient Market Hypothesis (EMH) and modern portfolio theory (Dreman and Berry, 1995).Ever since recent movements, nevertheless, the financial academic researcher's enthusiasm for this hypothesis becomes much weaker. This changing perception motivated psychologists and economists alike to carry out experimental research by introducing irrationality of human beings. Researchers in finance were then incited to break with the full rationality hypothesis and to recognize from now on the neutral effect of some psychological biases on the investors' decisions and reactions, and subsequently the effect of such reactions on the stock price movements. In our study we tend makes an attempt in the behavioral finance research and focuses on the cognitive biases affecting individual investors' behavior in the Tunisian context. Taking into consideration the theory of irrationality, researchers have revealed that investors across financial markets do not act in purely rational style, relatively their investment decisions are prejudiced by a number of variables which also incorporate psychological biases, heuristics, social affiliation, demographic factors and so on (Kumar and Lee, 2006; Baker and Wurgler, 2007; Gärling et al, 2009; Barnea et al, 2010; Oganion, 2012; Welsch, 2013). Prior studies have shown that analysts often suffer from a number of biases. However, the implications of these potential cognitive biases for investors and even more so far managers are less understood. This study considers the behavior of financial markets participants from a perspective different from that previous research, it focuses on anchoring bias, a topic that has been characterized by Hishleifer (2001) as an important part of "dynamic psychology-based asset pricing theory in its infancy"(Altman, 2012; Bay, 2012; Riaz, 2012; Gthergood, 2013; Scholonik, 2013; Taylor, 2013).

The objective of this study is to identify the impact of several behavioral and contextual factors on the Tunisian investor's decision making in the stock market. We argue that unlike their peers in developed financial markets Tunisian individual investors are more susceptible to psychological biases while making investment decisions. To discover the behavioral factors and establish their relationship with investor behavior, we follow the cognitive approach and carried out a structured survey of individual investors (Azzouzi, 2013).

Using the widely approved methodology of the classification trees, in addition to univariate techniques, we apply a Quest classification tree to extract and truncate the factors from variables/items captured by the questionnaire survey. We find that for sample Tunisian individual investors, three pertinent axes of cognitive factors are mainly affecting their decision-making measured by the stock returns. These factors are: anchoring, representativeness, in addition to other socio-economic variables: age, experience and competency.

The paper is structured as follow: previous studies are discussed in section 2. Section 3 contains data sources and methodology. The findings of the study are in section 4 while the conclusions and implications are in section 5.

2. Literature review and hypothesis

2.1. A review of investors' behavior

Many recent studies argue that individual investor behavior is frequently affected by a variety of psychological heuristics and biases. In general, the sentiment of individual and small investors does affect stock prices, as their trading is systematically correlated (Barber, Odean and Zhu, 2005). Sentiment underlying individual investor behavior consists of many psychological factors. A combination of mental accounting (Thaler, 1985) and risk seeking in the domain of losses (Kahneman and Tversky, 1979) may lead investors to hold onto losing investments and sell winners (Shefrin and Statman, 1985; Odean, 1998; Weber and Camerer, 1998; Heath, Huddart, and Lang, 1999; Grinblatt and Keloharju, 2001; and Dhar and Zhu, 2006). The representativeness heuristic (Tversky and Kahneman, 1974) leads investors to buy securities with strong recent returns. Overconfidence causes investors to trade too aggressively and, in combination with self-attribution bias, could contribute to momentum in stock returns (Kyle and Wang, 1997; Odean, 1998b; Daniel, Hirshleifer, and Subrahmanyam, 1998, 2001; and Gervais and Odean, 2001). Limited attention may constrain the set of stocks which investors consider buying (Barber and Odean, 2005) thus concentrating purchases in attention grabbing stocks and anticipated regret may dissuade investors from purchasing stocks that have risen since they were previously sold or purchased (Odean, Strahilevitz, and Barber, 2004).Kim and Nofsinger (2007) conclude that overall the poor performance by individual investors can largely be explained by this tendency to hold value stocks during advancing markets and high risk stocks during declining market and generally they deviate from recommendations of financial theory what lead to considerable welfare losses (Fischer ;Gerhardt, 2007 and M.Edelen (2010) reveals that fluctuations in relative retail sentiment are positively associated with contemporaneous stock market returns and negatively associated with future stock market returns and that overconfidence, anchoring, mental accounting and herd behavior made the strongest influence on their financial decision-making process (Altman, 2012; Bay, 2012; Riaz, 2012; Gthergood, 2013; Kartasova, 2013; Scholonik, 2013; Taylor, 2013).

Our empirical analysis of the factors influencing individual investor behavior in Tunisian stock market relies on the cognitive approach and we carried out a structured survey of sample investors. Not many studies have been pursued in Asian or Africa, particularly in the Tunisian context. Given the mixed empirical results on individual investment behavior especially in emerging market context, more empirical research from other emerging financial markets is needed to better understand the individual behavior with respect to their investment decision-making. This current paper aims to examine behavioral issues in Tunisia. Specifically, this paper investigates how four behavioral biases; overconfidence, representativeness, anchoring and loss aversion affect directly the financial decisions and indirectly their stock returns.

2.2. Behavioral finance and investor's performance

Decision-making can be defined as the process of choosing a particular alternative from many available alternatives (Statman, 2000 and Kaustia; 2011). It is a complicated multi-step process involving analysis of various personal, technical and situational factors. Considering investment decisions the most crucial challenge faced by investors. Some socio-economic factors are age, education, income etc. On the technical side, investment decisions can be derived from various models of finance, for e.g. the capital asset pricing model (CAPM). Decisions should not be reached without considering situational factors that take into account the environment, the market psychology in other words (Kartasova, 2013; Nolte, 2013).

Effective decision making in the stock market requires an understanding of human nature in a global perspective on top of financial skills. Thus cognitive psychology should be given importance in the process of decision-making (Chandra, 2008).As a result of the bull market from 2004 to 2007 and the subsequent financial crisis, there has been a lot of fresh focus on the irrational investor. "Behavioral Finance is becoming an integral part of decision-making process because it heavily influences the investors' performance". (Banerjee, 2011), "An understanding of how our emotions result in irrational behavior is indispensable for any investor". (Parikh, 2011)

Investors can educate themselves about the various biases they are likely to exhibit and then take steps towards avoiding it thus improving their effectiveness. Some common mistakes made by investors are selling too soon while booking profits, holding too long while facing losses, buying overpriced stocks based on market sentiments and positive evaluation by all and sundry. The key, according to Parikh (2011), for an investor so succeed is to get in touch with the emotional according to indiscipline he has exhibited, and deal with it so that it is not repeated. The foregoing discussion suggests the following hypothesis: The more the experience level decrease, the more the behavioral biases affect investor stock returns.

2.3. Hypothesis

People may make predictable, non-optimal choices when faced with complicated and uncertain decisions because of heuristic simplification (Chen et al, 2007).

2.3.1. Overconfidence bias

Shefrin (2000) figured that Overconfidence 'pertains to how well people understand their own abilities and the limits of their knowledge". A common trait among investors is a general overconfidence of their own ability when it comes to picking stocks, and to decide when to enter or exit a position. Overconfidence encouraged investors to trade more than rational investors and lowered their expected returns because overconfident investors tend to be over certain about their own judgments (Odean, 1998; Barber, 2005) and them not going to learn from their mistakes because they do not observe overconfidence as a bias affecting their decision making (Galant and Debbie, 1995; Parikh, 2011 and Kartasova, 2013)

H1: A high level of overconfidence bias will have aninfluence on the stock return.

2.3.2. Representativeness bias

The investors' recent success tends to continue into the future also. The tendency of decisions of the investors to make based on experiences is known as stereotype (Shefrin, 2000). Ritter (1991) noted another interesting consequence of judgment by representativeness bias where he attributes long run underperformance of IPOs to the investors' short term orientation. While making investments, individuals tend to attribute good characteristics of a company directly to good characteristic of its stock. These companies turn out to be poor investments more often than not (Lakonishok et al, 1994).As a result of this, investors might ignore the remote possibility of repetition and brush off the fact that few firms can consistently maintain positive growth. "Good firms" might drive their stock prices higher until a point of being overpriced. Over time, investors may be caught in a situation where stock prices plunge due to unachievable forecast earnings (Furnham, 2011; Kartasova, 2013).

H2: A high level of representativeness bias will have an influence on the stock return.

2.3.3. Anchoring bias

Anchoring is a psychological heuristic which can be said to occur when investors give unnecessary importance to statistically ran-

dom and psychologically determined 'anchors' which leads them to investment decisions that are not essentially 'rational' Furnham (2011), Yu and al (2011). Pompians (2006) conclude that the concept of Anchoring can be explained by the tendency of investors to "anchor" their thoughts to a logically irrelevant reference point while making an investment decision Welsh (2013Andersen (2010) shows the involvement of Anchoring in decision making of market participants by using an existing trading algorithm and he provide evidence that anchoring had a role to play in the weekly price fixing of the Dow and CAC40 (Oganion, 2012 and Welsh, 2013).

H3: A high level of anchoring bias will have an influence on the stock return.

2.3.4. Loss aversion

The emergence of the concept of loss aversion of the investor has made it possible to analyze the processes of decision-making where investors appear very sunny losses (Lehrer, J. 2007).Loss aversion may encourage investors to avoid trading their underperforming stocks as they perceive that today's underperforming stocks may eventually outperform today's winning stocks. Loss aversion can also cause investors to be too conservative in their investment strategy (Yeoh, 2006). Investors may turn to other investment products such as fixed deposits, unaware that the return on investment could be negative when inflation is factored in. Consequently; they fail to protect their real wealth (Kaustia, 2011; Polman, 2012 and Kartasova, 2013).

H4: A high level of loss aversion bias will have an influence on the stock return.

2.3.5. Experiences and competency

According to Graham, Harvey and Huang (2005) investor competency can determine investor trading behavior. They measured investors' competence based investor characteristics such as gender, age, educational level and income category. They defend the point that the correlation between high competence and high trading frequency arises through a different mechanism, in which investors were more willing to gamble on their judgment when they felt more skilful and knowledgeable. However, an experienced investor did not mean a competent investor as pointed out by Chen, Kim, Nofsinger and Rui (2004). Chen et al.claimed that a significant evidence to place higher experienced investors in the pool of stockholders who are more inclined towards making trading mistakes, exhibiting the disposition effect and suffering losses from representativeness bias butWelsh (2013) conclude that experience helps investors reduce certain behavioral biases because learning from experience can produce a purely rational behavior (Mc Elroy (2007); Soder, 2009, and Oganion, 2012).

H5: A high level of experience and competency will have an influence on the stock return.

3. Methodology

3.1. Data sample selection

Our empirical study is based on qualitative research. We use a questionnaire as a method of data collection. The questionnaire is specifically designed and online survey is used as well. The questionnaire was available online and this allowed ensuring anonymity and safety of data provided by investors, 128 individual investors fully completed the questionnaire. Taking the requirements ensuring the validity of such researches into consideration, they were all completed, the results were statistically significant and reflected current situation in the Tunisian financial market. The survey consists of three sections. First section is to obtain some information pertaining to the background of the respondents. Respondents are asked questions with regard to their portfolio returns, age, gender, income, employment status, trading experience. The second section is on determinants of psychological effect on

investors' decision-making (Azzouzi, 2013). Each of the psychological variables of four questions. Respondents are required to answer all the questions based on their opinions and perceptions. The last section aims to assess the financial literacy level. Respondents are required to answer 11 question exam-types (Lusardi, 2007; P Tufano, 2009 Mitchell, 2010 and Rooji, 2011).

3.2. Variables 'measurement

3.2.1. Stock return (dependant variable)

One of the appropriate measures in the literature to evaluate portfolio performance is the stock return level which uses the annual return rate (Table1).

3.2.2. Cognitive biases (independent variables)

To measure the investor's cognitive biases, we take the same steps than the most of studies have used an adaption of the original questionnaire elaborated by Meyer and Allen (1991).

This instrument is chosen because of its validity and its multidimensional character shown by several researches (Meyer, Stanley, Hercovitchand Topolnytsky, (2002); Azouzi and Jarboui (2013)). (Table1)

Table 1: Operational Definitions of Variables

Class	Phenomena	Measure	Type
Dependant variable			
Stock returns	Stock return rate class	Take 2 follows: 1 if the investor has a higher level of stock return,0 if the investor has lower level of stock return.	Dummy
Independents variables : cognitive biases			
Cognitive biases	Cognitive biases class	Take 2 follows:1 if the investor has a high bias level, 0 if not.	Dummy

3.2.3. Control variables

Our study control for age, gender, income, employment status, investor's experience, as previous papers has shown that these variables affect the stock return.

Table 2: Operational Definitions of Variables

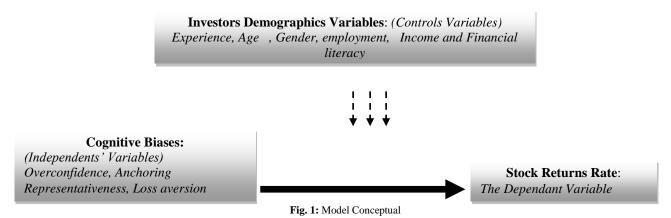| Class	Phenomena	Measure	Variables
Control variables			
Investor's knowledge	Knowledge and skills	A continue variable (skill) that varied from 1 to 11, that measured the financial literacy level of the investor.(appendix)	FL
Investor's Experience	Experience category	A categorical variable that take 1, 2 and 3 respectively if the respondent response is: a less than 2 years, between 2 and 5 years, and 5 years and more.	IE
Age	Age category	A categorical variable that take : 1,2,3,4,5 respectively if the age group is (18-30), (30 -40), (40-50),(50-60) and (+60) .	AGE
Gender	Gender	GEN = 1 if a respondent is a male, 0 otherwise	GEN
Education Level	Education level category	A categorical variable that take: 1,2,3,4 respectively if the education level group is: high school education, college education, diploma/higher diploma and postgraduate degree.	EDUC
Annual Income	The annual income category	A categorical variable that take: 1,2,3,4 respectively if the respondent earns (TD) (<10000), (10000-20000), (20000-30000) and (> 30000).	INCOM
Employment Status	The employment status category	A categorical variable that take: 1,2,3,4,5 respectively if the respondent is self employed, retried, public firm employed, private-firm employed and unemployed or others.	EMPT

Theoretical framework is presented in figure (1)

Investors Demographics Variables: *(Controls Variables)*
Experience, Age   , Gender, employment,   Income and Financial literacy

Cognitive Biases:
(Independents' Variables)
Overconfidence, Anchoring
Representativeness, Loss aversion

Stock Returns Rate:
The Dependant Variable

Fig. 1: Model Conceptual

Figure 1 shows the conceptual framework for this research. In this framework, the four factors or independent variables are overconfidence, anchoring, representativeness, loss aversion.
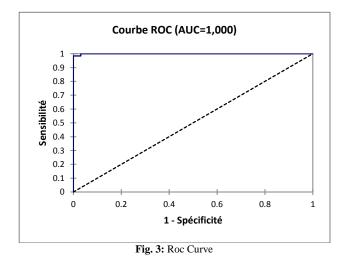
4. Empirical results and discussion

4.1. Results

The tree analysis (figure n °2) broadly confirms the descriptive evidence. Having a lower or higher rate of return, through errors of judgment of investors (small investors) and other control variables (age, education, income, experience and level of financial literacy). The binary representation of the endogenous variable allowed retaining the method of decision tree which is in the course of artificial intelligence (Quinlan, 1993).

This technique differs from traditional techniques that apply in this area (logistic regression, discriminate analysis, cluster analysis). It allows modeling simply, quickly and graphically measured phenomenon so there in the first node 64 investors who have low portfolio returns and 64 investors who have a high rate of return.

When only two classes are present in the dependent variable, the ROC (Receiver Operating Characteristics) curve may also be displayed. It is the curve of points (1-specificity, sensitivity). It can be used for comparison with other models as it displays the performance of a model. The area under the curve (or AUC) is a synthetic index calculated for ROC curves.

Fig. 3: Roc Curve

The AUC corresponds to the probability that a positive event has a higher probability given to it by the model than a negative event. For an ideal model, AUC=1 and for a random model, AUC = 0.5. A model is usually considered good when the AUC value is greater than 0.7. A well-discriminating model must have an AUC of between 0.87 and 0.9. A model with an AUC greater than 0.9 is excellent :(AUC of this model = 1; an excellent model).

The ROC curve shows good predictive characteristics for the model (figure 3). The AUC value, which ranges from zero to one, is 1. This confirms that the model has a good ability to discriminate between the higher and lower rate of the stock returns.

Table 5: The Confusion Matrix

From\ to	0	1	Total	% correct
0	64	0	64	100,00%
1	2	62	64	96,88%
Total	66	62	128	98,44%

The confusion matrix summarizes the reclassification of the observations, and allows to quickly seeing the % of well classified observations, which is the ratio of the number of observations that have been well classified over the total number of observations. It is here equal to 98.44%. From the results in the table (5), it is observed that the average correct classification rate in validation sample is 98.44 % with 64 (64) class higher (lower) stock returns rate.

4.1.1. Personal characteristics and stock returns

According to the decision rule associated with the node 11, the educational and intellectual level of the investor appears to influence the performance of the portfolio, it is possible that when investors do not have the required knowledge, it cannot exploit the available information and make informed decisions. These explanations justify the implementation of many initiatives dedicated to improving the available information and knowledge of investors on financial education (Simon, 2008).However, some authors call into question the full benefit of such programs for investors (Williams 2007 , Willis 2008, Willis 2009) , and adds a third explanation for the poor performance observed. This performance would result from the lack of rationality of individuals and a set of bias only transactions literacy cannot fix. As written Shefrin (2002) «People are imperfect processors of information and are frequently subjects to bias, error, and perceptual illusions." The decision rules associated with nodes 8, 13, 21 and 24 confirm this explanation.

Limited rationality and biases of the investors are an important topic for research regulatory authorities as well as for policy makers and several reasons for this. For example; it is generally assumed that the disclosure of more information will allow officers to make better decisions. This is not necessarily the case if investors are not able to rationally use the information or if they are saturated by a mass of information that they cannot assimilate (Paredes, 2003).Thus are predicted accredited investors will make good decisions in the absence of the prospectus and intermediate, due to their experience and knowledge. Nevertheless this shall not be the case if they are affected by a bias of over-confidence (see Choi and Pritchard 2003 and Choi 2006).According to the decision rules associated with the nodes 6, 7, 3, 22 and 23 investors whose the category of the age (1, 2 and 4) (see Table 1) and that

the cognitive biases are revealed, have a low rate of portfolio returns.

Table 3$_a$: The Decision Rules of the QUEST Algorithm.

Node	Rule	Consequent	Purety
2	If age is (1, 2, 4)	0	56.3 %
5	If anchoring (1) and age (1, 2, 4)	0	70.4 %
8	If experience (1) , age (1, 2, 4) and anchoring (0)	0	100%
21	If age (1, 2, 4), anchoring (1) and financial literacy (3.5, 9)	0	73.1 %
24	if age (1, 2, 4), anchoring (1) , representativeness (0) , financial literacy (3.5, 9) and experience (1, 2)	0	73.3 %

This finding is in line with the hypothesis that the cognitive biases were a predictive variable of an investor's portfolio returns. Therefore, when the investor has a higher level of anchoring and representativeness biases, the algorithm ranks the performance of the portfolio in the category a low rate, it will lead to confirm the assumptions 2 and 3.

The categorical variable (nominal) "age», divides the first node into two nodes. In node 2 when the age of the investor class (1, 2, 4) , decrypts the tree there has 56.36 % of these investors have a low rate of return portfolio and only 43.64% these investors have a high rate of return portfolio.

Node 3 demonstrates that there is 14.1 % of investors including the category of age (3, 5) and 88.89% of those investors who belong to these two categories of age have a high yield portfolio. This result is consistent with the variable age is a predictor of rate of return of an investor's portfolio. Thus, if the investor is age (1, 2, 3), the algorithm ranks the performance of the portfolio in the category of low, this will lead to confirm the hypothesis No. (5).

The accumulation phase begins from the entry on the labor market (category 1, 2), this phase is characterized by low financial assets, a high level of debt. It is relatively youth, so it has a time horizon long enough. The latter thought to increase income, and is more inclined to take more risk in the hope of higher returns.The consolidation phase (category 3), the incomeexcess expenditure and the investor opt for a well-balanced portfolio with a bias towards research capital gains especially in the early years of this phase. It avoids excessive risk even if the investment horizon is still long (he still has 10 to 20 years before retirement).

Concerning the phase of financial independence and transfer, the current expenditures are no longer covered by the salary income but from the investment of pension or retirement. Well aware that his investment horizon was reduced, the investor in these two phases opts for relatively secure investments which provide them regular incomes whilst protecting their purchasing power.However, if the investor gets to appropriately cover its expenses, a higher proportion of its portfolio must be geared towards finding the capital gain. Indeed, the level of risk tolerance remains the same as that of the previous phase (Kenneth et al. 2007 and Al-ajmi, 2008).

4.1.2. Experience and stock returns

According to the decision rules associated with nodes respectively 6, 7 and 8, we can deduce that the experience of the investor plays a very interesting role in predicting the category of portfolio profitability. Nicolosi et al (2004) found that the trading experience helps the individual investor to improve the performance of its portfolio returns.Some empirical studies suggest that investors can learn from their experience (Daniel et al. 1998).Dhar and Zhu (2006), List (2003) showed that learning from experience can produce a purely rational behavior, which is consistent with the results of Argyris and Shan (1978) which showed that learning from experience involves the detection and the correction of errors

thereafter. Experienced subjects are able to avoid problems associated with information overloads and to select pertinent diagnostic information (Kartasova, 2013 and Welsh, 2013).

4.1.3. Anchoring and stock returns

Behavioral finance offers two opposed phenomena but related to the investor behavior. The first phenomenon is the overreaction and the second is the under reaction of the investors to information [De Bondt and Thaler (1985, 1987)].

May (1992) highlights the phenomenon of over-reaction on the French stock market. This over-reaction to information implies a reversal of the returns of long-term securities following the announcement of an event of the firm as the results. The second phenomenon is the under- reaction of investors to information (Bernard and Thomas, 1989). These authors show that the course does not immediately integrates the good or the bad news announced, as measured by the degree of surprise results created during the most recent results announcements compared with analysts' expectations that threatens the annual rate of portfolio returns of the small shareholders.Various studies reveal a subtle difference that offers an interpretation of how each investor react to information. Or risk / return relationship of the thesis (Fama and French (1992, 1993, 1998)) or criticism related to data mining methods [Black (1993), Ball, Khotari and Shanken (1995), Knez and Ready (1997)] were able to explain the success of contrarian strategies day.The supporters of behavioral finance, explain the returns of shares is a psychological one and would rely on the limited rationality of the investor under psychological biases in accordance to the work of Kahneman and Tversky (1973, 1974).

Table 3$_b$: The Decision Rules of the QUEST Algorithm.

Node	Rule	Consequent	Purety
3	If age is (3, 5)	1	88.8 %
7	If experience (2, 3), anchoring (0) and age (1, 2, 4)	1	75 %
5	If anchoring (0) and age (1,2,4)	1	57.14 %
11	If experience (2, 3) , age (1, 2, 4) and educational level (3, 4)	1	100 %
13	If age (1, 2, 4), anchoring (0), income (2, 4) , educational level (3, 4) and experience (2, 3)	1	100 %
41	If experience (2, 3) and age (3, 5)	1	100 %

Recent behavioral models (Daniel, Hirshleifer and Subrahmanyam (1999), Barberis, Shleifer and Vishny (1998) and Hong and Stein (1999)) are trying to reconcile the phenomena of over-reaction and under - reaction. Each model fits the positive short-term negative serial correlation in long term courses assuming different assumptions about the nature of the behavioral biases and / or heterogeneity of investors. Barberis, Shleifer and Vishny (1998) justify the initial under - reaction and subsequent over-reaction by the anchoring bias and the representativeness heuristic investor.

A large number of studies in social psychology focus on the processes by which people form and change their beliefs about themselves and the world in which they live. Human judgments are no longer seen as the result of a rational and impartial information processing approach in inferences. Instead, we consider that the powers and predictions are subject to bias and systematic errors. Biases in human judgment described in the psychological literature are considered cognitive biases. Cognitive biases are due to the limited capacity of individuals to consider and treat all information potentially available (Senkowska et al., 1995). They involve systematic errors, so that judgments are systematically deviate from accepted norms and standards. Indeed, this bias will bring the individual investor to make decisions purchase or sale of securities of a poorly structured that affect the profitability of its

portfolio, which confirms the hypothesis # 2 way. Thus, to Barberis, Shleifer and Vishny (1998), investors in heuristic representativeness bias magnitudes give more information as to recent structural information. In financial markets, the mobilization of this heuristic leads to over- reactions in the price. Bond and Thaler (1985) were the first to demonstrate an over-reaction of stock prices. According to these authors, financial analysts who consider extreme past earnings are a good representation of the future beneficiary will over-react to the announcement of good (or bad) benefits. The effect of anchoring bias on market participants such as sell-side analysts and investors has not been extensively investigated previously. This study tests the proposition that market participants are affected by anchoring bias when they estimate the future profitability of a firm, and the empirical results are consistent with this hypothesis.

4.2. Discussion

Can experience reduce the susceptibility to overconfidence and anchoring biases?
Different studies have investigated the relation between behavioral biases (especially overconfidence) and experience. Some empirical literature suggests that investors may learn from their experience (Daniel, 1998 and Gervais, 2001) and that experience helps investors reduce certain behavioral biases (List, 2003; Dhar and Zhu, 2006; Kartasova, 2013 and Welsh, 2013).

4.2.1. Overconfidence and experience

In such a case, learning through experience permit to develop either a purely rational or a somewhat behaviorally forecaster. This finding is in accordance with Argyris and Schan (1978) who argument that learning involves the detection and correction of error. In applying this idea to trading behavior, Gervais and Odean (2001) conclude that experience and learning overtime will tend to eliminate the harmful effects of overconfidence (table 4). Experienced professional traders learn their true abilities and exhibit little or no evidence of overconfidence. Fraser (2006) and Tufano (2009) argue that experienced entrepreneurs may be expected to be more realistic and less susceptible to the over -optimism bias. These results lead us to conclude that the experience and learning will tend to eliminate the harmful effects of overconfidence. This will aims to confirm the hypothesis no (5) and further it can explain the absence of a strong contribution of the overconfidencebias on the investor's behavior in our sample.

Table 4: Self-Assessed of Financial Literacy Level.

	Level	Effectives	%
Self-Assessed Financial Literacy Level	Excellent	16	12.500
	Medium	98	76.563
	Low	12	9.375
	Very Low	2	1.563

Indeed, Koestner et al (2012) showed that individual investors learn from their mistakes in decision-making, which leads to weaken the effect of over- confidence. Comparing the decision rule associated with the node 6 then the associated one to the node 7 and 11, it can reveal on the one hand a strong correlation between experience and the educational level of the other hand. Intuition in this way may permit heuristics to be rapidly deployed, and likely arises through the merging of complex .knowledge patterns, developed during learning (Harteis and Gurber, 2008). The learning process with forecasters and decision makers is not well-understood and the results regarding individual learning seem to be mixed.

4.2.2. Anchoring and experience

Table 5: The Goodness of-Fit Test of Model

Statistique	DDL	Khi²	Pr > Khi²
-2 Log(Vraisemblance)	12	46,0405952	< 0.0001
Score	12	39,2812361	< 0.0001
Wald	12	28,0828895	0,005
R² (Cox and Snell)		0.000	0.320

According to Barberis, Shleifer and Vishny (1998), the anchoring mechanism would explain the under-reaction of stock prices in the recent news that investors do not revise their beliefs enough that affected the profitability of its portfolio and logically the portfolio rate returns will be affected by this cognitive bias which confirms the hypothesis n3, but the recent research revealed that the anchoring can be the source of inertia in the behavior, especially in a stable context .Hirshleifer and Welsh (2002) show, in fact that when agents remember their past actions but not their determinants, they tend to renew their past actions and that, especially in a stable environment than an environment volatile. According to Robert BDlts (2009), anchoring can be a very useful tool for helping to establish and reactivate the mental processes associated with creativity, learning, concentration and other important resources. The process of anchoring, for instance, is an effective means to solidify and transfer learning experiences. In its simplest form, 'anchoring' involves establishing an association between an external cue or stimulus and an internal experience or state.

Table 6: The Logistic Regression Results

Source	Valeur	Ecart-type	Khi² de Wald	Pr > Khi²	Wald Borne inf. (95%)	Wald Borne sup. (95%)
Constante	-3,179	1,392	5,216	0,022**	-5,906	-0,451
experience-2	0,000	0,000				
experience-1	0,840	0,475	3,127	0,077*	-0,091	1,771
FL level-1	0,000	0,000				
FL level-0	1,316	0,542	5,903	0,015**	0,254	2,378
AGE-3	0,000	0,000				
AGE-2	1,085	1,227	0,783	0,376	-1,319	3,490
AGE-1	3,362	1,352	6,185	0,013**	0,712	6,011
AGE-5	1,499	1,760	0,726	0,394	-1,950	4,949
AGE-4	2,705	1,574	2,953	0,086*	-0,380	5,790
GEN-1	0,000	0,000				
GEN-0	1,951	0,751	6,739	0,009***	0,478	3,424
EDU-4	0,000	0,000				
EDU-2	2,041	1,244	2,691	0,101	-0,398	4,481
EDU-3	-0,790	0,764	1,068	0,301	-2,288	0,708
IN-COM-4	0,000	0,000				
IN-COM-1	-0,943	1,025	0,847	0,357	-2,952	1,065
IN-COM-3	-0,843	1,024	0,678	0,410	-2,849	1,164
IN-COM-2	-0,755	0,898	0,708	0,400	-2,514	1,004

This table reports the results from a conditional logistic regression linking the anchoring bias level and the individual differences of individual Tunisian investors. The delisted sample consists of 128 individual investor delisted from the French stock exchange. The dependent variable equals one for higher anchoring level and zero for the lower level. Experience = a binary variable that take 1 and 2 respectively if the investor experience is: a less than 2 years, 2 if the investor experience is between 2 years, and 5 years and more. ; FL level = the financial literacy level : a binary variable that take 2: 1 if the investor has a higher level of financial literacy; 0 if not ; Age = A categorical variable that take : 1,2,3,4,5 respectively if the age group is (18-30), (30 -40), (40-50),(50-60) and (+60) ; Gender = 1 if the investor is a male, 0 if not; Edu = A categorical variable that take: 1,2,3,4 respectively if the education level group is: high school education, college education, diploma/higher diploma and postgraduate degree; Incom = A categorical variable that take: 1,2,3,4 respectively if the respondent earns (TD) (<10000), (10000-20000), (20000-30000) and (> 30000); *, **, *** denote significantly different from zero at the 0.10, 0.05 and 0.01 levels, respectively.

A lot of learning relates to conditioning, and conditioning relates to the kind of stimuli that become attached to reactions. An anchor is a stimulus that becomes associated with a learning experience. If you can anchor something in a classroom environment, you can then bring the anchor to the work environment as, minimally, an associative reminder of what was learned.The influence of context relates to the process of 'Learning'. In addition to being part of the anchoring stimulus, context shapes perceptual filters and attention; anchoring is a classical « Learning – process ».Many research found that a fundamental aspect of the anchoring effect is that individuals are sensitive to information which they have experienced Welsh (2013). Inspection of the demographic measures reveals that reductions in anchoring, level were related significantly or nearly so –to experience, financial literacy, but not to income and educational level. That is, lower level of anchoring bias was observed in the higher financially literate; in those who had higher level of experience. To clarify the relationship seen in the correlation matrix and described above, logistic regression modeling was applied as follows. First, one model was specified in which a binary variable representing the anchoring level (1 = higher level, 0 lower level) was regressed on the demographic variables, financial literacy and experience. Six variables were retained in our model: age, financial literacy, gender, educational level, income and experience.

Taken as a whole, the results were generally consistent with our predictions. The increased experience within our anchoring level resulted in lessened susceptibility to anchors makes sense in light of Wegener et al (2001) and Welsh (2013) plausibility hypothesis. Of the four demographic measures included only income and educational level seemed completely unrelated to the anchoring level. By comparison, there was a significant association between investor gender and reductions in anchoring level during their trading experience. Males were significantly more likely to report higher levels of experience which was, in turn, related to the degree of reduction in anchoring level were also observed in people with higher financial literacy level which was in turn significantly related to all of the cognitive measures (educational level) implying that more highly financial literate investors are more likely to engage in reflective rather than intuitive responses. Thus, there was evidence to suggest that previous knowledge and expertise appeared to reduce susceptibility to potentially anchoring values. If one is confident that a person making an estimate is an expert, then one can also expect that their estimates will be less affected by anchoring values than less-expert individuals (Welsh, 2013).One of the reasons for overconfidence relates to the anchoring bias, a tendency to anchor on one value or idea and not adjust away from it sufficiently, (Russo, 1992)Plausibly, people with greater expertise in a particular area of decision-making should be less prone to biases such as anchoring (figure 2). However, there is clear evidence to suggest that experts as well as novices are affected by anchors (Northcraft and Neale, 1987).One possibility

is that cognitive ability in and it plays no role in reducing susceptibility to anchoring but instead acts only as a mediating factor in the development of expertise. If this is the case, then this would predict that the relationship between anchoring and cognitive ability be visible only sometimes (where expertise has been developed).

Despite the evidence provided by Wegener et al. (2001) most research into anchoring has shown the effect to be highly resistant to awareness-based debiasing (Chapman, Johnson, 2002; Welsh, Begg and Bratvold, 2006). As result, there is increasing interest in whether people's susceptibility to anchoring might be related to individual differences in cognitive and metacognitive abilities (Altman, 2013; Bergman, 2010; Svensson, 2010 and Welsh, 2013).

5. Conclusion

Overall, the survey findings reveal the presence of psychological factors underlying the decision-making of Tunisian stock market investors. The evidence documented in this study shows that psychological characteristics will affect investors in their decision-making and influence their stock returns.

Their investment knowledge and skills were often low and decisions were more likely to be influenced by behavioral biases. Some investors were overly confident of their personal ability to trade stocks. They were likely to trade due to their desire to make quick gains because of price anchoring and representativeness biases rather than because of the company's fundamentals or its future growth. Our results improve that experienced professional traders learn their true abilities and exhibit little or no evidence of overconfidence. This is an important issue in order to understand the nature of local individual investors. Further, we examine the possible extent to which our sample investors are influenced by select psychological biases considered in our study. Examining individual investor behavior and explaining the underlying psychological biases is expected to contribute to our understanding of market microstructure.

In conclusion, we have verified that susceptibility to anchoring is associated to a variety of cognitive measures (experience and financial literacy) we have examined and other measures such as educational level, age and expertise. More notably, however, it seems that these abilities moderate people's advance of expertise and it is this expertise within a specific assessment context that actually reduces susceptibility to anchoring.

Future research should be under taken to investigate when or under what circumstances investors are most likely to make these behavioral responses.

This study has implications for the development of the portfolio performance of the individual investor. Also some psychological aspects of a theoretical nature could not be wholly approached in a complete empirical way.

The paper pushes investors to make their financial decisions based on their financial capability and experience level and to avoid relying in their sentiment when making financial decision.

This paper incites government to establish training programmes aimed to develop the individual investor financial literacy and competency.

Actually, for the sake improving the explanatory power of the financial literacy, the authors goals consists in highlighting the role played by the behavioral factors as a cognitive errors affecting the financial decision-making. The current study is considered the first of its kind conducted in the Tunisian context. To the best of our knowledge, no such studies have been conducted regarding measuring financial literacy in the Tunisian or the relationship between cognitive abilities, stock return and financial literacy.
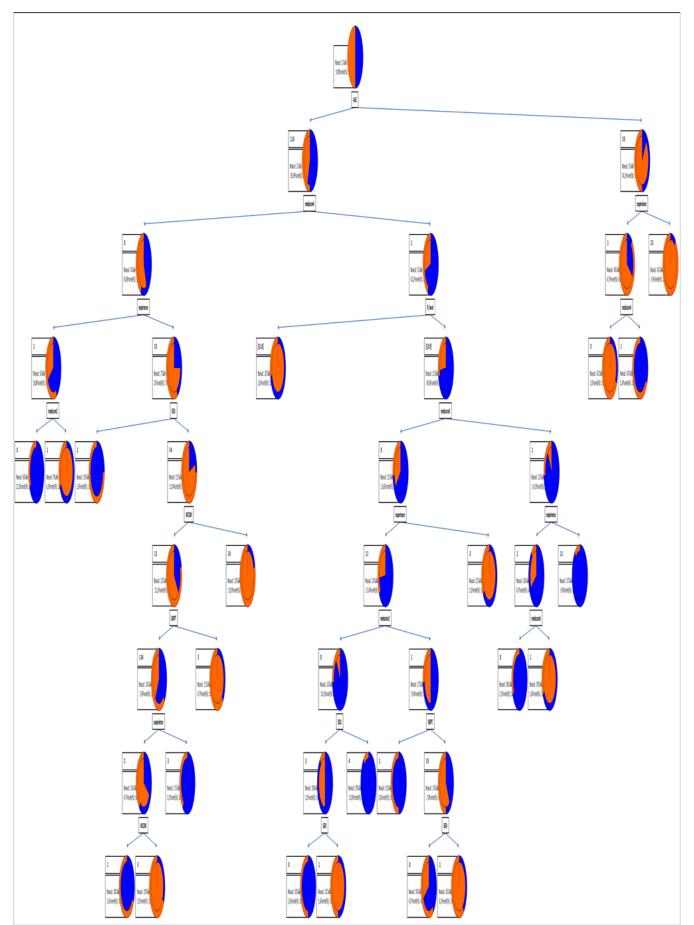
Fig. 3: The Classification Tree

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Appendix

Questionnaire:

a) Financial literacy index :

1) Suppose you had 100D in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

(1)More than 102D, (2) Less than 102D, (3) exactly 102D, (4) Do not know.

2) Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?

(1)More than today, (2) exactly the same, (3) Less than today ;(4) Do not know.

3) If interest rates rise, what will typically happen to bond prices?
(1)They will rise, (2) they will fall, (3) Do not know, (4) Do not know.

4) Which of the following statements describes the main function of the stock market?

(1)The stock market helps to predict stock earnings ,(2)The stock market results in an increase in the price of stocks,(3)The stock market brings people who want to buy stocks together with those who want to sell stocks, (4)None of the above,(5)Do not know,(6)Refusal.

5) Which of the following statements is correct? If somebody buys the stock of firm B in the stock market:

(1)He owns a part of firm B, (2) He has lent money to firm B, (3) He is liable for firm B's debts, (4) none of the above, (5) Do not know, (6) Refusal.

6) Which of the following statements is correct? If somebody buys a bond of firm B:

(1)He owns a part of firm B ,(2) He h has lent money to firm B , (3)He is liable for firm B's debts, (4)None of the above, (5)Do not know,(6) Refusal.

7) Considering a long time period (for example 10 or 20 years), which asset normally gives the highest return?

(1) Savings accounts, (2) Bonds, (3) Stocks, (4) Do not know, (5) Refusal.

8) Normally, which asset displays the highest fluctuations over-time?

(1)Savings accounts, (2) Bonds, Stocks, (3) Do not know, (4) Refusal.

9) When an investor spreads his money among different assets, does the risk of losing money:

(1) Increase, (2) Decrease, (3) Stay the same time, (4) Do not know, (5) Refusal.

10) Stocks are normally riskier than bonds. True or false?
(1)True, (2) False, (3) Do not know, (4) Refusal.

11) If the interest rate falls, what should happen to bond prices?
(1)Rise, (2) Fall, (3) Stay the same, (4) none of the above, (5) Do not know, (6) Refusal.

a) Overconfidence score:
   1) I am an experienced investor.
   2) I feel more confident in my own investment opinions over opinions of my colleagues or friends.
   3) I consult others (family, friends or colleagues) before making stock purchase.
   4) I can predict the future stock price movement after I did some analysis.

b) Anchoring score:
   1) I compare the current stock prices with their recent 52 week high and low price to justify my stock purchase.
   2) I am likely to sell my stock after the price hits recent 52 week high.
   3) Am unlikely to buy a stock if it was more expensive than last year.
   4) I see the stock price as high if the price has increased to 52 week high.

c) Representativeness score:
   1) I tried to avoid investing in companies with a history of poor earnings.
   2) I rely on past performance to buy stocks because I believe that good performance will continue.
   3) Good stocks are firms with past consistent earnings growth.
   4) I trust the research and past performance of the past stocks composed my portfolio.

d) Loss aversion score:
   1) I am more concerned about a large loss in my stock than missing a substantial gain (profits).
   2) I feel nervous when large paper losses (price drops) have in my invested stocks.
   3) I will not increase my investment when the market performance is poor.
   4) When it comes to investment, no loss of capital is more important than returns.

Table: Results for Reliability Analysis

Variables	No. of item	Gronbach's Alpha
Overconfidence	4	0.624
Loss aversion	4	0.745
Price anchoring	4	0.720
Representativeness	4	0.719