



Factors Influencing Moroccan Individual Investor Behavior: Survey Evidence

Impact des facteurs socio-cognitifs sur le comportement des investisseurs marocains: Cas de la Bourse de Valeurs de Casablanca

Hind Bourezk¹, Nawfal Acha², Hafid Barka³

¹Phd Student, National Institut of Posts and Telecommunications (INPT), Rabat, Morocco

²Professor, National Institut of Posts and Telecommunications (INPT), Rabat, Morocco

³Professor, National Institut of Posts and Telecommunications (INPT), Rabat, Morocco

Abstract: *Investor's behavior is affected by a variety of psychological heuristics and biases while making investment decisions. Efficient market hypothesis (EMH) accuracy to provide explanations for certain phenomena that occur in the financial markets seems limited. Behavioral finance has challenged this notion by highlighting the important role of behavioral and emotional factors in investor decision-making. In this paper, we investigate the cognitive biases to which Moroccan individual investors are subject mainly the overconfidence bias, herding behavior, loss and risk aversion. We conducted a survey study on a representative sample of individual investors in order to investigate whether they are affected by these biases when making investment decisions.*

Key Words: Behavioral Finance, Cognitive Bias, Overconfidence, Herding, Prospect Theory, Stock Market, Individual investor, Investment decision making.

Résumé: Le comportement de l'investisseur est affecté par une variété de biais psychologiques lors de la prise de décision d'investissement. L'hypothèse des marchés efficients (EMH) semble désormais ne plus fournir des explications à certains phénomènes qui se produisent sur les marchés financiers. La finance comportementale a remis en question cette notion en mettant en évidence le rôle important des facteurs comportementaux et émotionnels dans la prise de décision des investisseurs. Dans cet article, nous étudions les biais cognitifs auxquels sont confrontés les investisseurs marocains individuels, principalement le biais de la confiance excessive, le comportement moutonnier et l'aversion au risque et aux pertes. Nous avons mené une enquête auprès d'un échantillon représentatif d'investisseurs individuels afin de déterminer s'ils sont affectés par ces biais lors de la prise de décisions d'investissement.

Mot clefs: Finance comportementale, Biais cognitif, Confiance excessive, Comportement moutonnier, Théorie des perspectives, Marché boursier, Investisseur individuel, Prise de décision d'investissement.

1. INTRODUCTION

Behavioral economics is a discipline at the frontier of economics and psychology that seeks to study cognitive biases situations in which the human mind deviates from rationality strictly postulated by classical economic theory.

This discipline, born 30 years ago, was officially recognized in 2002 with the awarding of the Nobel Prize in economics to its two founders, Daniel Kahneman and Vernon Smith, and recently with the Nobel Prize of 2017 to the economist Richard Thaler.

The 1960s witnessed the emergence of the concept of financial market efficiency developed as a result of the work of Fama and Markovitz (Fama, 1970), (Markowitz, 1952).

Today, even though this concept is the hard core of modern finance, it is subject of much criticism from supporters of Behavioral Finance (BF) who have identified a number of anomalies which contradict the theory of market efficiency especially during the 2008 subprime crisis.

In this context, Behavioral Finance (BF) has appeared as a reply to those anomalies that could not be explained by traditional financial models.

1.1 Traditional finance Vs Behavioral finance

Behavioral Finance has therefore challenged the hypothesis of the rationality of investors. However, researchers who have been trying to disclose factors underlying these anomalies can be divided into two schools:

The first school consists of supporters of classical finance theory. The traditional theory concentrates on market equilibrium mechanisms and the efficient market hypothesis (Fama, 1970). This theory states that stock prices change according to variables that are called "economic fundamentals" (Fama, 1970), (Samuelson, 1965).

The major aspect of this school is that investors are supposed to act rationally and make decisions by evaluating all available information.

Rationality means that they comply to the assumptions of expected utility theory (EUT) (Neumann and Morgenstern, 1944) which supposes that agents make their decisions in a rational way and having a clear vision of their preferences.

In the other hand there are researchers opposed to the idea of fully rational investors. In the late 70s and early 80s, some theorists began to examine the model of market efficiency by pointing to different anomalies going against it. They tried to study the behaviors actually observed among investors and particularly how they interpret and react to the information available.

It becomes difficult for the investors to make their investment decision because they have to take into account various factors before making decision.

An important concept was introduced by Kahneman and Tversky in 1979 (Kahneman and Tversky, 1979) which is the prospect theory.

They assert that the level of investors 'rationality is limited, which they called bounded rationality (Simon, 1955) and that they are skeptical to the assumption made by expected utility theory (Neumann and Morgenstern, 1944).

This school, played a major role in explaining the behavior of agents when they do not follow Markowitz's assumptions of expected utility theory (Markowitz, 1952) and shows how individuals maximize their earnings based on a point of reference often defined subjectively.

Indeed, it can be biased by various factors such as aspirations, expectations, social comparisons or social norms of each agent.

The Figure 1 shows that Expected Utility Theory (EUT) and prospect theory are two approaches to investor decision-making from two different perspectives.

Prospect theory focuses on subjective decision-making influenced by the investors 'value system, whereas EUT concentrates on investors 'rational expectations (Failback et al, 2005).

Furthermore, (Kahneman and Tversky, 1979) offer an alternative to the utility function of EUT, called the hypothetical value function with a S shape: "The value function is (i) defined on deviation from the reference point; (ii) generally concave for gains and commonly convex for losses; (iii) steeper for losses than for gains" (Kahneman and Tversky, 1979, p. 279).

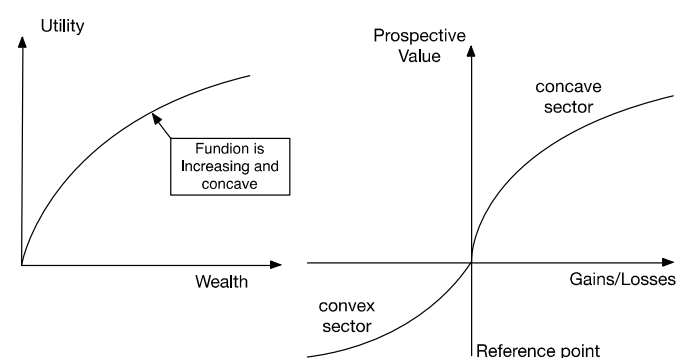


Fig 1: Prospect theory vs Expected utility theory

Behavioral Finance also introduced the idea of heuristics (Kahneman, 1974) to describe methods that make it easier to formulate judgments. It is a process of judgment without deliberating analytical approach or treatment constraint.

This concept is central in BF because it allows to understand how the operators deviate from the rational agent. According to (Kahneman, 1974), agents don't have

cognitive skills required to make rational decisions about financial markets.

That's why they simplify reality and change models to be more understandable. That is what they call heuristic simplifications.

1.2 The context of research

Most of the empirical studies available on behavioral determinants of stock market are made in context of Western countries.

Researches regarding the existence of cognitive biases and their implications for investors were realized for developed stock markets, it will be interesting to expand the research also for emerging markets.

Therefore, we believe that Morocco as an emerging economy is a "fertile ground" to investigate behavioral biases of investors. There is many research literature available on behavioral determinants of stock market in context of Western countries.

However, it is shown in existing literature that individual investors 'behavior varies from context to context.

Behaviors cannot be generalized by only seeing it in a specific geographical territory, they differ on the basis of different societal distinctiveness possessed by local society.

According to (Javed et al, 2017) collectivist societies cause individuals to get trapped more by behavioral biases.

In collectivist culture, socio-cultural barriers impact the investor decisions rather than the processing of market information. (Lane and Quack, 1990) show that the stock market investment is affected by social interaction.

They state that individuals are more influenced by behavioral biases in collectivist cultures because of mimic behavior of individuals, social influence and family members or friends pressure in making investment decisions (Filipa et al, 2015),(Chiang and Zheng, 2010).

Prior researchers conducted studies on impact of cognitive biases in individualistic dominated culture, but researchers in collectivist dominated countries are comparatively less concern about this cultural aspect in decision making. This research will fill this contextual gap.

The current study attempts to address the unexplored area of research in Morocco where the impact of behavioral factors among investors may be considerably higher than the Western countries due to collectivism.

The objective of the empirical validation is to test the existence of behavioral biases on a sample of individual investors on the BVC (Bourse de Valeurs de Casablanca), to study whether they are victims of these biases when making their decisions.

We have applied a deductive approach; as the aim of our study is to explain the relationship between behavioral determinants which are independents variables and their impact on the behavior of investors in the process of

decision making, which is already being stimulated; hence deduction is the most suitable approach in this regard.

The remainder of this paper is organized as follows:

Section 1 surveys literature especially empirical evidence on the three main biases we are testing on BVC which are overconfidence, herding and loss aversion as well as research hypothesis; Section 2 presents the empirical researches of behavioral determinants in emerging markets, Section 3 details the experimental design and procedure, Section 4 exposes rudimentary results and section 5 concludes the paper.

2. LITERATURE REVIEW

The study of the behavior of financial markets is at the heart of behavioral finance.

The experiences of psychologists continue to show that the investor is far from being the rational as argued by classical economic and financial theory (Neumann and Morgenstern, 1944), (Markowitz, 1952),(Sharpe, 1964), (Black et al, 1972). Behavioral finance will integrate new fields previously ignored in traditional theories and portfolio theories. It is essentially psychology and sociology.

The Figure 2, show that BF is a discipline that combines the components of the field of finance, psychology and sociology; All the three components are vital to understand the basics and dimensions of markets and investors.

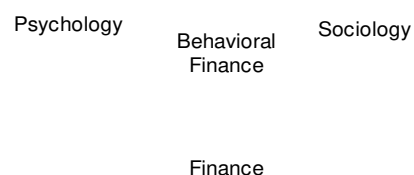


Fig 2: Behavioral finance component

Indeed, several stock market behaviors have been identified by the followers of the behavioral paradigm, there are called Cognitive biases.

They can be defined as deviations from reasoning the negative counterpart of complex situations (Kahneman and Tversky, 1979).

They can help to deflect the decision maker but, as an aggravating factor, they mask this deviation.

They don't allow decision-maker neither a complete search for information nor a perfect interpretation of the facts.

Among others, loss aversion behavior, overconfidence bias, availability bias, representativeness bias, herding bias, mental accounting, and mental anchoring bias (Griffin and Tversky, 1992; Hirshleifer, 2001; Mussweiler and Strack, 2000; Tversky, 1974; DeBondt, 1985;

Kahneman and Tversky, 1981; Taylor and Brown, 1988; Christie, 1995).

Nevertheless, there are other behaviors that are cited by the supporters of this paradigm, but whose importance is minimal.

Figure 3 illustrate the behavioral factors that affect investor's while making investment decisions.

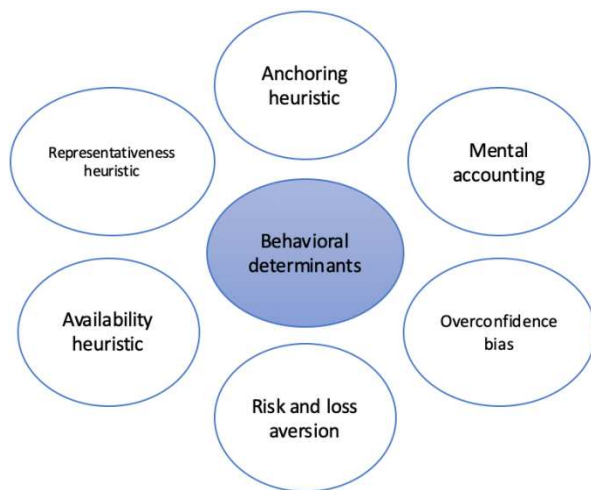


Fig 3: Behavioral determinants

2.1. Overconfidence and investor's decision making

One of the biases that is considered the strongest conclusion in psychology of judgment (DeBondt and Thaler, 1985) is the overconfidence.

In the literature in psychology there is no precise definition of overconfidence. It comes under different forms:

(1) A first characteristic of this overconfidence is the "better than average effect" highlighted by (Taylor and Brown, 1988).

The agent overstates his or her skills, abilities or knowledge compared to those of other individuals.

(Svenson, 1981) illustrates this effect by showing that 93% of motorists place their driving abilities above average. They think they are superior to others and overestimate their chances of gain compared to reality.

(2) "Miscalibration", according to this effect, individuals overestimate their own knowledge (Fischhoff et al, 1977).

For example, studies in which individuals are made to form a 90% confidence interval for different quantities uncertain, show that the percentage of surprises is greater than 10%.

(3) "The illusion of control" or unreal optimism: (Langer, 1975) defines the illusion of control as "the expectation of the probability of personal success being higher, so inappropriate, that the objective probability".

(Weinstein, 1980) notes that this phenomenon is similar to the phenomenon of unrealistic optimism that

individuals are particularly optimistic about future events that are personally favorable to them.

Researchers are increasingly looking at the bias of overconfidence with the help of questionnaires or experimental studies (DeBondt and Thaler, 1985), (Biais et al, 2005), (Glaser and Weber, 2007), (Klayman et al, 1999). (Bondt and Werner, 1998) for example, studies different measures of overconfidence (better than average effect, illusion of control and unreal optimism) using a large questionnaire.

The author shows that investors are optimistic about the performance of the securities they hold, but not about the level of the market index in general. In addition, individual investors are miscalibrated and their confidence intervals are very close.

(Glaser and Weber, 2007) study the relationship between investor overconfidence and trading volume. They only show the effect "Better than average" generates high trading volumes. The miscalibration not being related to the trading volume.

However, (Gervais and Odean, 2001) show that overconfidence is even greater when the investor obtains a series of positive returns. This increases his confidence and he will be inclined to invest more.

(Odean, 1998) also shows that this bias leads to an increase in risk taking and the number of transactions.

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We therefore formulate the following hypothesis:

Hypothesis 1: The overconfidence has a positive impact on individual investor's behavior.

2.2. Herding behavior and investor's decision making

Another bias that is widespread among investors is the phenomenon of mimicry or sometimes called "herding behavior"

This concept is located on the border between classical and behavioral finance.

The herding behavior of investors can be defined as the tendency of the investors to imitate the actions of other market participants, thus ignoring their own information and signals (Chesnay and Jondeau, 2000).

In fact, many investors may have to buy the same securities because, acting independently of each other, they have received correlated information.

(Bikhchandani and Sharma, 2001) have emphasized the distinction between intentional herding behavior and false herding behavior.

The intentional herding behavior refers to a clear intention of the investors to imitate the behavior of other market participants.

On the other hand, the false herding behavior is based on the situation when a group of investors face the same difficulties in taking an investment decision, and finally, take similar investment decisions.

A large amount of existing herding literature focuses on specific market participants such as mutual fund managers and financial analysts, due to the importance of institutional investors in financial markets, such as the work of (Lakonishok et al, 1991),(Grinblatt et al, 1995),(Wermers, 1999).

(Oberlechner and Osler, 2004) stated that herding behavior is commonly highlighted in financial markets, showing that investors are drifted away by the actions of other people.

(Tran, 2007) investigated the impact of herding on the stock performance and found a very strong impact on the returns of the market.

In addition, mimicry also depends on the types of investors, for example, individual investors tend to follow crowds to make more investment decisions than institutional investors and due to the huge information asymmetry that affects their risk appetite (Goodfellow et al, 2009).

Among the various determinants of herd behavior, some are very common, including the type of investor, the volume of shares traded and the buying and selling of shares.

However, the phenomenon of mimicry as proven by (Schmidt et Zank, 2001) is a consequence of risk aversion. Otherwise, (Yahyazadehfar et al, 1985) claim that herding behavior is a form of regret aversion, since it doesn't feel as bad to fail within a herd compared to taking a road less traveled and face a failure.

Hypothesis 2: Herding Bias has a positive impact on investor's behavior.

2.3. Prospect theory and investor's decision making

Prospect theory showed human behavior when they face risk and uncertainly.

In fact, traders are most disposed to take subsequent risks if they have already experienced losses.

By contrast, trader who have experienced profit, usually their exposure to the next risk. Therefore, people respond differently, depending on whether the choices are framed in terms of gains or in term of losses. The most famous example of framing effects was illustrated by (Kahneman and Tversky, 1981).

Loss aversion bias describes the behavioral biases with the effect of disposition (Prospect theory) (Kahneman, and Tversky 1979), risk and return paradox.

It explains the behavior of investor become risk averse when prior return was above the target level and risk seeker in case of previous loss.

This theory applies in different perspective when there are so many alternatives because decision makers are not constant in their preferences.

According to prospect theory (Kahneman and Tversky, 1979), aversion to loss implies being more sensitive to losses than gains. This can be concluded from aS-shaped value function, convex for losses and concave for gains as shown in figure 1.

This theory describes some states of mind affecting an individual's decision-making processes including regret aversion, loss aversion and mental accounting (Waweru et al, 2008).

Hypothesis 3: Loss Aversion has a positive impact on investor's behavior.

2.4. Social factors and investor's decision making

The stock market can be considered as a system of human interactions (Hirschey and Nofsinger, 2008). Investors generally communicate with friends, relatives, friends and colleagues to discuss and share financial information. They seek advice from analysts, bankers and planners. Therefore, investment decision-making by individual investors can be defined as complex decision-making behavior that is influenced by rational and irrational factors which lead to the inefficiency of the financial markets. This ineffectiveness is generally associated to the behavioral biases of investors (Shanmugham and Ramya, 2012).

Social influence and interactions with other people will cause investors to behave irrationally. Investors can make common mistakes collectively, due to social influence and the strength of media news.

Social attitude, personality traits and other concepts related to behavioral dispositions are crucial in predicting and explaining human behavior and were highlighted by early researchers (Sherman and Fazio, 1983; Janzen, 1985).

Among all the theoretical frameworks which explain the decision-making processes of investors, the Theory of reasoned action (TRA) (Fishbone and Janzen, 1977) and the theory of planned behavior (TPB) (Janzen, 1985, 1991) which have proved to be popular behavioral models.

Despite researchers' interest in behavioral finance in the late 1980s, the number of empirical studies that study the underlying factors in the investment behavior of individual investors isn't sufficient.

Economists, sociologists and psychologists have all attempted to explain the behavior of investors in various countries. Investors' surveys of investor behavior have focused on the "rationality" or "irrationality" of investor decision-making. Sociologists explain the behavior of

investors by focusing on social environments. Psychologists explain the behavior of investors by focusing on individual characteristics.

Hypothesis 4: Social networks have a positive impact on the behavior of individual investors.

The figure 4 illustrates the theoretical framework of this research based on the literature review detailed previously and according to the specificity of Moroccan stock market.

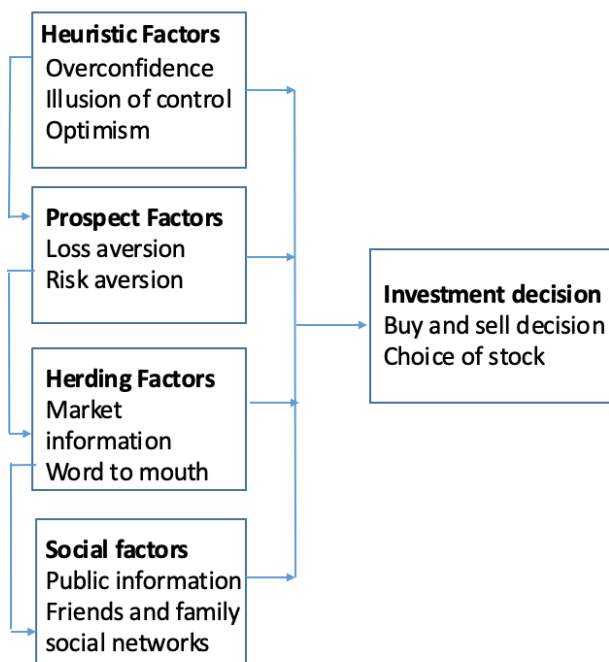


Fig 4: Conceptual framework

3. BEHAVIORAL FACTORS IN EMERGING MARKETS

In the context of emerging markets, many recent studies have been studying behavioral factors from different perspectives.

(Hwang and Salmon, 2001) claimed that developed markets such as the United States and the United Kingdom displayed less herding behavior than emerging markets such as South Korea, while (Chiang and Zheng, 2010) conclude that herding behavior is often more prevalent in emerging markets compared to developed markets, due to information asymmetries.

Number of studies has been studying the behavior of individual investors in emerging stock markets using mainly surveys; for example (Hsieh, 2013) examines the existence of herding behavior on the Taiwanese stock market, (Sulasalmi, 2014) on the Finnish stock markets.

On the Pakistan Stock Exchange (PSX) (Qasim et al, 2019) studies the impact of herding behavior and the overconfidence bias on decision-making of investors by collecting data through questionnaires distributed to 150 active stock market respondents.

(Javed et al, 2017) also studied behavioral determinants, in particular herding behavior, overconfidence, availability bias and representativeness bias on the Pakistan Stock Exchange (PSX) and found that these biases have a positive impact and significant on the investment performance perceived.

However, (Toshino and Suto, 2004) studies the cognitive biases of Japanese institutional investors. Investors have been optimistic in forecasting market returns, which is more important for the time horizons of the domestic markets.

This optimism is consistent with the existence of availability heuristics. Herding behavior and loss aversion have also been detected with Japanese institutional investors.

In South Africa, (Zaiane and Abouab, 2010) studied the bias of overconfidence using a questionnaire from individual investors on the Tunis Stock Exchange, They have shown that Tunisian investors are subject to overconfidence because they trust their intuitions; they consider themselves lucky and trade securities aggressively.

In the same direction, (Belanes and Hachana, 2010) analyzes three cognitive biases which are overconfidence, the illusion of control and herding behavior.

They study if these cognitive biases have an impact on managerial risk-taking among Tunisian leaders; they highlight the existence of a positive association between overconfidence, herding behavior and managerial risk-taking. However, the illusion of control has a negative impact on the proportion of Tunisian managers taking risks.

(Thi and Ngoc, 2014) studies behavioral factors influencing the decisions of individual investors in Ho Chi Minh stock exchange in Vietnam. The results indicate that these biases affect investors' decisions.

(Pop, 2012) used the methodology proposed by (Hwang and Salmon, 2004, 2008) to measure and test herding behavior for the Romanian stock market.

It turned out that in times of crisis, investors reduced their appetite to follow the crowd.

The author underlines the importance of carrying out such a study for other emerging economies in the region (Poland, Czech Republic, and Hungary).

However, (Demurer et al, 2018) shows that global risk aversion is an important determinant of international equity correlations, consistently across all of the emerging markets they have examined.

The positive effect of risk aversion on developments in emerging markets is particularly strong for South Africa and Turkey.

4. RESEARCH METHODOLOGY

In this research, the examination of behavioral factors influencing the decision-making of investors is the main objective, instead of deducing and constructing the theory, the deduction approach seems to be the most appropriate choice.

The study begins by reviewing the theories of behavioral finance in general and the stock market in particular, to obtain the theoretical and conceptual context as well as the empirical results of previous research, from which the research model is proposed. Then the questions used in the questionnaires are prepared.

This process is entirely consistent with the positivist paradigm and the hypo-deductive approach.

Current framework represents a causal relationship because the four independent variables are the factors (cause) that affect the investment decision (effect).

We applied a deductive approach; researchers on the basis of existing theory propose their respective hypotheses and study them through empirical evidence.

The main objective of this study is to explain the relationship between the behavioral determinants impacting the investors' decision.

3.1. Data collection method

The deductive approach is generally associated with quantitative research, which involves the collection of quantitative or quantifiable qualitative data and the analysis of statistical methods, which is also compatible with quantitative research strategies (Bryan and Bell, 2007, p. 11-13).

The nature of this research is quantitative because the data are collected from the population by questionnaire.

Data were only collected from the population sample at one point in time, so the research design for this study is cross-sectional.

3.2. The quantitative approach

Unlike qualitative methods, quantitative methods are used to collect objective data that are observable in the field and measurable.

This approach is said to be quantitative, because it uses measurement and quantified analysis as well as statistical calculations which make it possible to ensure that the conditions for the generalization of the results are respected.

The basic technique of quantitative survey is usually the questionnaire. The latter is considered to be the most widely used and illustrative instrument of quantitative methods.

Indeed, it is a fundamental form of data collection for research in management sciences since it makes it possible to process large samples and establish statistical relationships or quantified comparisons.

The quantitative approach allows us to receive answers to a set of specific questions which will then be analyzed in

order to be able to interpret them according to the objectives of our research.

3.2.1. Sampling

The survey relates to a sample of individual investors, distributed throughout the national territory, composed of all socio-professional categories and of different levels of education and belonging to different age categories.

The sample each has an online account and was asked to respond to an online questionnaire designed to measure various biases.

In fact, there is no public data on exact number and personal information of individuals within the target population.

Therefore, this makes it hard to conduct a standardized random sampling to choose the sample group for this research. Consequently, the sampled group consists of volunteer participants.

We used Sphinx Déclic software for this study, which allowed us to design the questionnaire, and to collect the responses.

3.2.2. Instrument

The 30-item questionnaire were based on the theories of behavioral finance: Heuristic theory, Prospect theory, herding factors and social factors on investors' decision-making, as highlighted in (Waweru et al, 2008, p. 24-38).

The 4-point Likert scale, which are rating scale widely used for asking respondents' opinions and attitudes (Fisher, 2010, p. 214), is utilized to ask the individual investors to evaluate the degrees of their agreement with the impacts of behavioral factors on their investment decision. The 4 points in the scale are respectively from 1 to 4: highly disagree, somewhat disagree, somewhat agree, highly agree.

After having discussed the hypotheses to be tested, clarified the research methodology and determined the study sample, we expose below the primary results of statistical analysis.

4. RESULTS

For the factual variables represented by the characteristics of the investors who answered the questionnaire, which are age, gender, educational level, monthly income, profession, investment horizon and investment objective and the horizon of investment on the stock market, we conducted the descriptive statistics of each variable.

The purpose of this descriptive analysis is to study the profile of Moroccan individual investors.

In what follows, we present the descriptive statistics of the main socio-demographic characteristics of our sample.

4.1. Characteristics of individual investors

-The distribution of the sample by gender, age group, level of education, socio-professional category and monthly income:

We found from analysis of our primary data that out of 115 respondents, 84 respondents were men with a percentage of 73 % and 17 were women with a percentage of 14.8 %.

It indicates that women's participation in the investment is still much lower than males.

This can also be explained by the fact that women investors do not feel comfortable in money management, although this has not yet been statistically proven by any research. This is just an observation.

In addition, the vast majority of French individual investors are also men at the rate of 78% (Boolell-Gunesh et al, 2008).

Although (Barber and Odean, 2001) points to an interesting conclusion that women are very averse to risk when making investment decisions, but men frequently mix their investment portfolios and make unwarranted mistakes, resulting in losses monetary on their investments.

Individuals aged between 35 and 49 are the most represented in our sample with a percentage of 40% followed by those that aged between 25 and 34 (26.1%) while investors aged between 50 and 60 represent 16,5%. These figures contrast with the results of another study by (Graham et al, 2004) where the average age is 49 years and (Barber and Odean, 2001) where the average age is around 50 years.

With these statistics, we can say that Moroccan investors are relatively younger than their American counterparts.

Of the 115 investors questioned those with a master's degree or more represent 65.2%, followed by those with a bachelor with a percentage of 22.6%.

Our sample shows that the higher the level of education, the more people tend to invest in the stock market.

The proportion of senior managers is also very high.

Thus, the latter represent the majority of our sample 42.6% followed by traders with a percentage of 16.5%, entrepreneurs, professional investors, liberal professions at the rate of 15.7%, retirees with the rate of 14.8% and finally the students 7.8%.

The majority of the subjects belong to the upper middle class, with a monthly income of more than 10,000MAD at a rate of 60.9% followed by those with an income varying between 7,000 and 10,000 MAD (21.7%).

We can conclude that the vast majority of individual investors have the means necessary to invest in the stock market.

The table 1 presents a summary of the demographic profile of survey respondents.

An overview of summary statistics provides an idea of the characteristics of the individual investors interviewed for this research.

-The investment horizon and the investment objective:

The first step in the stock market decision-making process is that setting the investment objective, either in terms of time horizon or in terms of return objective.

Regarding the stock market investment horizon, we noted that 49.6% of our population invests in the middle term that seek to invest in an interval of (1 to 5 years), followed by long term investors (more than 5 years) 27.8% and short term investors (less than a year) at 20.9%.

These results are completed by the results of the investors' investment objective.

Axe	Element	Frequency	Percent	Valid percent	Cumulative percent
Gender	Female	17	14.8	14.8	27.0
	Male	84	73.0	73.0	100.0
	Total	115	100.0	100.0	
Age (in years)	25-34	30	26.1	26.1	27.8
	35-49	46	40.0	40.0	67.8
	50-60	19	16.5	16.5	84.3
	Below 25	8	7.0	7.0	91.3
	Above 60	10	8.7	8.7	100.0
	Total	115	100.0	100.0	
Income group (in MAD)	Below SMIC	3	2.6	2.6	4.3
	5000-7000	9	7.8	7.8	12.2
	7000-10000	25	21.7	21.7	33.9
	Above 10000	70	60.9	60.9	94.8
	SMIC	6	5.2	5.2	100.0
Education	Bac	1	0.9	0.9	2.6
	Bac+2	9	7.8	7.8	10.4
	Secondary education	2	1.7	1.7	12.2
	Bachelors	26	22.6	22.6	34.8
	Masters and more	75	65.2	65.2	100.0
	Total	115	100.0	100.0	
Profession	Other	18	15.7	15.7	18.3
	Executive	49	42.6	42.6	60.9
	Trader	19	16.5	16.5	77.4
	Student	9	7.8	7.8	85.2
	Pensioner	17	14.8	14.8	100.0
	Total	115	100.0	100.0	

Table 1-Summary statistics- Demographic Variables

We find that almost all investors seek the return which takes into account dividends and capital gains and represent 83.5% followed by those seeking only the return on their shares (12, 2 %).

In practice, long-term investors are those who only seek dividends, they invest their capital in a value that generates a significant annual rate of return.

The tables 2, 3 shows the frequency, percentage, valid percentage and cumulative percentage of each variable of investor characteristics.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1,7	1,7	1,7
Short term (<1 year)	24	20,9	20,9	22,6
Long term (>5 years)	32	27,8	27,8	50,4
Middle term (>1year and < 5 years)	57	49,6	49,6	100,0
Total	115	100,0	100,0	

Table-2: Investment horizon

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	2,6	2,6	2,6
Other	2	1,7	1,7	4,3
Yield (Dividend)	14	12,2	12,2	16,5
Profitability (Dividend and capital gain)	96	83,5	83,5	100,0
Total	115	100,0	100,0	

Table-3: Investment objective

Correlation is the most widely used assessment tool in researches. This analytical tool is used to analyze the relationship between two or more variables.

This explains the linearity between the observed variables. A correlation coefficient of +1 point indicates a strong linear relationship and the negative value represents a negative linear relationship.

4.2. The correlation matrix

	Investment Decision making	Overconfidence bias	Herding behavior	Loss and risk aversion	Social interactions and media
Pearson correlation					
Investment Decision making	1	,375**	,780**	,688	,036
Overconfidence bias	,375**	1	,502**	,468**	,005
Herding behavior	,780**	,502**	1	,392**	,034
Loss and risk aversion	,688	,468**	,392**	1	-,116
Social interactions and media	,036	,005	,034	-,116	1
**The correlation is significant at the 0.01 level (bilateral)					
*The correlation is significant at the 0.05 level (bilateral)					

Table 8- Correlation Matrix

We have linked the different factors, namely: Risk and loss aversion, Overconfidence bias, herding behavior, investment decision making in a correlation matrix via the test of Pearson. So we assumed the existence of a significant relationship between these variables.

The correlation matrix is analyzed to verify the relationship model. We have linked the different variables by the correlation test, the results are as follows:

-Cognitive bias and investment decision making:

The statistics in the table above show a moderate positive significant relationship ($R = 0.375$; $P\text{-value} = ,000$) between the bias of over-confidence and investment decision-making.

When the overconfidence bias variable increases, the Investment decision-making variable also increases.

This shows that investors who put too much emphasis on their skills and abilities make more irrational decisions.

Thus, there is a positive and significant impact of over-confidence on the decision-making of stock market investors.

They seem too confident about their skills and tend to stick to a point of reference for their decisions.

The correlation between herding behavior and investment decision making shows that investors who follow others also make irrational investment decisions.

There is therefore a significant and strong positive impact ($R = 0.780$; $P\text{-value} = ,000$) of mimicry on investment decision-making.

We can explain this strong correlation by the fact that Moroccan individual investors often tend to imitate others in their investment decisions.

The correlation between the risk and loss aversion bias and investment decision-making is positive, significant and strong ($R = 0.688$; $P\text{-value} = ,000$), when the risk and loss aversion variable increases the variable of investment decision making also increases.

Moroccan individual investors are very risk and loss averse. This aversion is a primordial factor that influences both their reasoning and their decision.

These variables highlight the symmetrical behavioral attitude of risk aversion and calculated investment decisions.

This behavior factor infers the caution attitude of individual Moroccan investors on the stock market.

-Social interactions and media, investment decision making and cognitive bias

The relationship between the investment decision-making, social interactions and media is a positive but non-significant correlation ($R = 0.036$; $P\text{-value} = ,705$), when the Investment decision-making variable increases, the variable Social media and investor behavior is also increasing.

Thus, Investor decision-making is slightly influenced by social media.

The correlation between the overconfidence bias and the variable social interactions and media is positive but not significant correlation ($R = 0.005$; $P\text{-value} = ,960$), when

the variable bias of overconfidence increases, the variable Social interaction and media is also increasing.

The more the investor is overconfident more he consults social media to decide on the purchase or the sale of their shares.

The relationship between herding behavior bias and Social interactions and media is a positive but not significant correlation ($R = 0.034$; $P\text{-value} = .734$), when the herding behavior Bias increases, the Social interactions and media is also increasing.

The more mimic investors, the more they neglect the information disseminated to the public about stocks.

The relationship between the risk and loss aversion variable and the Social interactions and media is a negative but not significant correlation ($R = -0.116$; $P\text{-value} = .236$), When the Risk and loss aversion variable increases, the variable Social media and investor behavior decreases.

The more risk and loss averse investors are, the less they use social media.

Furthermore, according to the statistics of our research, the positive and significant correlation between the cognitive biases studied between them has been proven.

Indeed, the relationship between the variable of overconfidence and the variable of mimicry shows a moderate positive and significant correlation ($R = 0.502$; $P\text{-value} = .000$).

When the bias of overconfidence increases, the bias variable mimicry also increases and vice versa.

The more overconfident investors are, the more they imitate others.

When an investor invests, he assesses the information and makes decisions based on that information.

When he has excessive confidence, he makes the investment decision based on his convictions, and not by evaluating whole information, the decision is therefore not rational.

Similarly, the relationship between the Bias of overconfidence variable and the Aversion to risk and loss variable is a moderate and significant correlation ($R = 0.468$; $P\text{-value} = .000$).

Investors choose a shortcut to make a decision. When the investor is too confident, he takes more risks and if he is too confident, his decision is not rational.

The relationship between the Risk and Loss Aversion variable and the Mimicry Bias variable is a medium and low positive and significant correlation ($R = 0.392$; $P\text{-value} = .000$).

When the Risk and Loss Aversion variable increases, the Mimicry Bias variable also increases.

When investors invest a large amount of capital in their investment, they tend to follow the actions of others to reduce risk, at least the way they feel. The more the investor is risk averse the more he is mimetic.

4.3. Hypothesis testing

We used the student test to examine the causal model in order to study the significance of the links and validate the hypotheses. The following table shows the results of Student's T test and its significance.

Variable causal relation	Estimate	S.E.	C.R.	P	Label
Social interactions- Investment decision making	0,055	0,065	0,837	0,403	Invalid
Overconfidence bias - Investment decision making	0,212	0,144	1,405	0,16	Invalid
Herding behavior -Investment decision making	1,540	0,471	3,087	0,001	Valid
Risk and loss aversion - Investment decision making	1,243	0,414	2,900	0,003	Valid

Table 9- Student's Test

The variable "Bias of overconfidence" has a positive but not significant impact on the variable "Investment decision" ($\text{Reg} = 0.212$; Student's $T = 1.444$; $p\text{-value} = 0.16$). (Impact rejected). When the variable "Overconfidence bias" increases, the variable "Investment decision" also increases.

The variable "Mimicry bias" has a positive but not significant impact on the variable "Investment decision" ($\text{Reg} = 1.540$; Student's $T = 0.471$; $p\text{-value} = 0.001$). (Impact accepted). When the "Mimicry Bias" variable increases, the "Investment Decision" variable also increases.

The variable "Risk aversion" has a negative but not significant impact on the variable "Investment decision" ($\text{Reg} = 1.243$; Student's $T = 0.414$; $p\text{-value} = 0.003$). (Impact accepted). When the "Risk Aversion" variable increases, the "Investment Decision" variable decreases.

The variable "Social interactions" has a positive but not significant impact on the variable "Investment decision" ($\text{Reg} = 0.055$; Student's $T = 0.065$; $p\text{-value} = 0.403$). (Impact rejected). When the "Social interactions" variable increases, the "Investment Decision" variable also increases.

Hypothesis	Statements	Decision statuts
H1	The overconfidence has a positive impact on individual investor's behavior.	Rejected
H2	Herding Bias has a positive impact on investor's behavior.	Accepted
H3	Loss Aversion has a positive impact on investor's behavior.	Accepted
H4	Social networks have a positive impact on the behavior of individual investors.	Rejected

Table 10- Testing of hypothesis

5. CONCLUSIONS

Behavioral finance is currently one of the hottest topics in financial research.

It interests not only university researchers but also practitioners, especially fund managers who use the concepts of behavioral finance to develop their strategies. The prospects for practical applications of behavioral finance are good.

Using the survey data of 120 individual investors who invest on the Casablanca stock exchange, we have concluded four main rudimentary conclusions.

First, investors make investment decisions based on heuristics; they are too confident in their judgments.

Second, their investment behavior is strongly influenced by herding behavior.

Finally, they are very risk and loss-averse to the extent that they take losses more into account than gains when making investment decisions.

The main contribution of this article is to try to operationalize the concepts relating to the socio-cognitive behavior of the investor while making investment decisions.

In addition to the three cognitive biases (overconfidence, mimicry and risk aversion), we also try to test the effect of social networks on the behavior of the investor.

Finally, an equally interesting study could be done in the same research framework, it is to test the presence of other psychological biases such as anchoring and mental accounting.

Despite of the existence of behavioral finance discipline, it is still new to the stock market.

Most of the people, whether they are investors or academicians, have limited knowledge about behavioral finance; therefore, explanatory research has helped us to develop a clear understanding.

Existing literature provided the foundation to propose the hypotheses about investors' behavior at the Casablanca Stock Exchange and were tested with the help of data collected through questionnaires.

This research has significance for particularly individual investors trading in the Casablanca stock exchange. The factors that influence their investment decision making are crucial as this will influence their financial plans of future.

The outcomes of the study are useful for the investors, financial advisors and institutions to find out the reasons of irrational decision making due to those behavioral biases. It will help the researchers to recognize how these behavioral biases vary in collectivist and individualist cultures and impact on the performance of an emerging stock market like Casablanca stock exchange.

The current research offers a portrait of the individual Moroccan investor in terms of characteristics and

behavior on the Moroccan stock market which will be supplemented by subsequent analysis.

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ANNEXES:

Investment decision making	Abbreviation	Items
1	PDI-1	You carefully examine the changes and variations in the prices of the stocks in which you wish to invest.
2	PDI-2	Market information is important for your equity investment
3	PDI-3	You put past stock trends under your consideration for your investment.
4	PDI-4	You are interested in the fundamentals of the underlying stocks
5	PDI-5	You are interested in the most popular actions
6	PDI-6	You are interested in seasonal stock price cycles

Table 1-Investment decision making items

Overconfidence bias	Abbreviation	Items
1	BSC-1	Your stock market skills and knowledge can help you outperform the market
2	BSC-2	You feel capable enough to personally control unforeseen events and hazards
3	BSC-3	The majority of economic news (events, microeconomic publications, macroeconomic decisions, financial indicators...) does not surprise you
4	BSC-4	You almost always manage to assess the chances of success of the decisions taken

Table 2- Overconfidence bias items

Herding behavior	Abbreviation	Items
1	BM-1	I hear what others are saying before I make a decision to buy or sell a stock
2	BM-2	To manage hazards and uncertainty, I observe and analyze what the market leaders are doing.
3	BM-3	Differentiating yourself from others is an opportunity to excel.
4	BM-4	Following the market trend is more soothing and reassuring
5	BM-5	The general state of the economy is causing concern over the next few months and most investors are selling their shares. Given this, I would also sell all or part of my equity investments in this situation.

Table3-Herding behavior items

Loss and risk aversion	Abbreviation	Items
1	ARP-1	New actions: I don't take risks when I don't know.
2	ARP-2	I take a closer look at the growth potential than the loss potential of an investment
3	ARP-3	If I am asked to choose between: a certain gain of 250 MAD (A) and 25% chance of winning 1,000 MAD and 75% chance of winning nothing (B). I will choose A.
4	ARP-4	If I am asked to choose between: a certain loss of 750 MAD and 75% chance of losing 1,000 MAD and 25% chance of losing nothing (D). I will choose D.

Table 4-Loss and risk aversion items

Social interactions	Abbreviation	Items
1	SI-1	Discussing an investment decision with your fellow investors reduces the pressure to succeed
2	SI-2	You receive information from those around you (family, friends, etc.) on the opportunity to invest in a security, this also encourages you to seize the opportunity.
3	SI-3	The more you read newspapers and social networks the more you imitate other investors

Table 5- Social interactions items