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ORIGINAL

Analysis of the Relationship between Financial Behavior and Short- and Long-Term Returns among Moroccan Investors: A Behavioral Finance Approach

Análisis de la relación entre el comportamiento financiero y los rendimientos a corto y largo plazo entre los inversores marroquíes: Un enfoque de finanzas conductuales

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ABSTRACT

The efficient market hypothesis (EMH) theory has been vigorously challenged for its inability to explain certain anomalies, stimulating the development of behavioral finance. This discipline, emerging over the past thirty years, provides a new perspective on the analysis of financial markets, highlighting the behavioral biases of investors. Faced with this issue, our study aims to evaluate the impact of behavioral biases on Moroccan financial markets by testing the hypothesis that these biases influence investment decisions and short- and long-term performance. Thus, we seek to understand how the behaviors of Moroccan investors, influenced by psychological biases, can affect financial returns in a context where the efficient market hypothesis is being questioned.

Keywords: Rationality; Behavioral Finance; Behavioral Biases; Profitability.

RESUMEN

La teoría de la hipótesis del mercado eficiente (EMH) ha sido vigorosamente cuestionada por su incapacidad para explicar ciertas anomalías, estimulando el desarrollo de las finanzas conductuales. Esta disciplina, que ha emergido en los últimos treinta años, proporciona una nueva perspectiva sobre el análisis de los mercados financieros, destacando los sesgos conductuales de los inversores. Ante este problema, nuestro estudio tiene como objetivo evaluar el impacto de los sesgos conductuales en los mercados financieros marroquíes, probando la hipótesis de que estos sesgos influyen en las decisiones de inversión y en el rendimiento a corto y largo plazo. Así, buscamos entender cómo los comportamientos de los inversores marroquíes, influenciados por sesgos psicológicos, pueden afectar los retornos financieros en un contexto donde la hipótesis del mercado eficiente está siendo cuestionada.

Palabras clave: Racionalidad; Finanzas Conductuales; Sesgos Conductuales; Rentabilidad.

INTRODUCTION

The informational efficiency hypothesis, which forms the foundation of modern finance, posits that stock prices reflect all available information about firms and converge at all times to their fundamental value. This

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is achieved through the use of relevant and accurate information by rational investors, resulting in equality between the true value of the stock and its market price. However, in the presence of irrational investors, errors identified in pricing would be corrected through arbitrage mechanisms, leading to the maintenance of the fundamental value.

For instance, in the case of stocks, the fundamental value equals the present value of future dividends. This underscores the need for rational anticipation of future dividends through research, analysis, and the use of available information, which play a crucial role in decision-making. Investors focus on the relevance of publicly available market information, their own private information, the anticipation of private information held by other economic agents, and the calculation of the speed of data incorporation into stock prices.

However, this theory fails to provide adequate explanations for certain anomalies observed in financial markets, such as over/under-valuation, excess volatility, speculative bubbles, and size and calendar effects. This raises doubts about the efficiency of the informational efficiency hypothesis and challenges the notion of absolute rationality of market participants, where each participant seeks to maximize their profit regardless of the effort required to manage analytical calculations and useful information sorting.

These notable contradictions in efficiency over the past thirty years have led psychologists to enter the financial arena and assert that individuals' decisions are potentially biased by emotions, sensations, heuristics, and mental states. Kahneman and Tversky are the founders of a recent trend that combines finance and psychology. They highlight the fact that investors are subject to several psychological factors that directly and spontaneously influence their interpretations, reasoning, and decisions, giving rise to the concept of bounded rationality. The study of human behavior in general, and psychology in particular, has led to plausible and suitable explanations for deviations from the efficient market hypothesis. This integration between finance and other social sciences has marked the emergence of behavioral finance, which introduces a major paradigm shift in the financial milieu.

To guide our presentation, we will adopt the following research question: How do behavioral biases influence the financial decisions of Moroccan investors, and what are the significant impacts of these decisions on short and long-term returns in the financial market?

Based on this question, we can formulate the following research questions:

- To what extent do these behavioral biases influence short-term financial returns?
- What is the impact of behavioral biases on the long-term financial returns of Moroccan investors?
- How can Moroccan investors mitigate the influence of behavioral biases in their financial decisions?

To better structure our presentation and provide coherence to our study, we will divide our task into two main sections. The first will address fundamental analysis and the main flaws of the dominant theory, while the second will highlight the emergence of behavioral theory, essential biases and heuristics, their explanations, as well as some contributions and limitations of this theory.

Literature review: fundamental analysis and primary cracks in the dominant framework

No one can mention the Efficient Market Hypothesis (EMH) without acknowledging the pivotal role of Eugene Fama in its conception. It was through the application of probabilistic mathematics to the financial realm during the 1950s and 1960s that laid the foundation for financial modeling and the immediate development of new market finance tools. According to Fama (1965), a market is deemed informationally efficient if the price of an asset equals its fundamental value, as determined based on all available information.

The Significance of Information

According to Fama, the Efficient Market Hypothesis (EMH) defines market efficiency by its ability to fulfill its functions. A market is considered efficient if the prices within it provide reliable foundations for its participants to act upon. This underscores the pivotal role of information, which becomes an indispensable element within this hypothesis. Put differently, the classical definition of an efficient market is one where the prices of listed financial assets generate and reflect all available information, thus rendering regulation or reassessment unnecessary to maintain the fair value of securities at all times. It posits that in a sufficiently large market where information spreads instantaneously, such as the stock market where operators react correctly and almost immediately to information if they have the cognitive capacity to interpret it accurately, the price of a financial asset is always an unbiased estimation of its intrinsic value. Consequently, predicting its future variations is impossible since all known or anticipated events are already incorporated into the current price.

Informational efficiency is fundamental for the proper functioning of markets as it fosters credibility and attracts investors. Hence, this efficiency is crucial for the development of financial markets. This is why market authorities and stock exchanges seek to establish regulatory and organizational foundations to achieve this state of informational efficiency. However, market reality dictates that the transmission of useful information through price signals is not straightforward as investors are often hindered by a lack of information. In an inefficient market, agents lack the true value of assets and are constantly seeking all useful data to make

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appropriate evaluations for risk assessment, gains, and opportunities offered by the market. In this first part of our article, we will establish the link between the concept of investor rationality and market efficiency.

The second acceptance of the concept of financial market efficiency depends firstly on the rationality of investor behavior. According to this acceptance, as well as the principle of valuation, if the price of a financial asset reflects the expected future income it generates, then the market for financial assets is efficient. It is said that the financial market is efficient because the prices of listed assets only reflect investors' expectations regarding their future income. Indeed, investors must not only correctly understand the basic value of assets but also grasp the real model correctly. Therefore, it is necessary to have a sufficiently large inventory of information to reasonably analyze price trends to obtain the best required conditions. With the aim of price setting, by the best possible estimation of the intrinsic value of securities, all while adhering to the principle of financial rationality which confronts traders with a problem of profit maximization.

Financial research follows the trajectory that economists take when studying the behavior of agents in the market for goods and services in an economy. Indeed, economists felt the need to determine individuals' behavior through the study of people in their economic environment to develop their theories. To simulate individuals' behavior, they modeled based on specifications, with the aim of seeking to establish equilibrium in the economic relationship between individuals and between economies, and they introduced rationality into the problem of using scarce resources to meet conceptual demand. The ultimate goal of economics.

In the same logic, financiers have also assumed the rationality of market participants to develop theories and model observed behaviors in these markets. Among these theories is the Efficient Market Hypothesis, which assumes the rationality of agents both in their behaviors and in their expectations, implying that rationality is extremely necessary for efficiency.

The concept of "rationality"

According to Allais (1953), "a person is considered rational when they pursue coherent ends and employ appropriate means to achieve those ends." More broadly, "rational" refers to that which converges towards reason or pertains to reason, while "irrational" denotes that which is not in accordance with reason or the realm of reason. In line with this, psychologists Drozda-Senkowska et al. (1995) define a rational person as a reasonable individual, one of sound mind (free from madness), and one endowed with reason (in terms of the ability to reason and judge).

Rationality generally has three meanings, which tend towards a philosophical rather than a psychological concept. These three meanings, although completely different, are closely related to each other:

- Rational means justified, demonstrated, approved: based on incontrovertible reason, where no one can doubt it.
- Rational also implies criticism and investigation, not being trapped by apparent evidence and previous choices.
- Rational is also understood as effective in the sense of maximizing expected returns.

The first two meanings better reflect the definitions that interest social psychologists, while the second meaning is adopted by economists and financiers. Indeed, from an economic standpoint, any individual capable of clearly defining their needs and optimizing the use of resources while choosing the best or most suitable service to directly meet those needs is considered rational.

However, there are several forms of rationality:

- Instrumental or classical rationality: According to Allais (1953), agents are distinguished based on the preferences or objectives they seek to achieve, taking into account constraints that limit the scope of their possible choices. This represents instrumental rationality, which involves the adequacy between means (income) and desired ends.
- Cognitive rationality: The cognitive abilities of the individual have also led to the development of other rational concepts based on moderating classical rationality. Walliser (1982) introduced the concept of cognitive rationality to consider the correspondence between the information held by the agent and the representation (representative beliefs vary from one agent to another). Therefore, cognitive rationality emphasizes that there can be differences between the actual environment and the perceived environment, reflecting whether the information held is consistent with the environment.
- Bounded or procedural rationality: This notion is primarily founded by Simon (1987), who highlights that individuals can only have imperfect constraints and possible choices. Herbert Simon emphasized that faced with individuals whose information is imperfect, the choices they make are not optimal but simply attempt to fulfill certain desires or requirements. Reason is no longer absolute and objective, but rather subjective and relative. Reason is primarily procedural, thus depending to a large extent on the organization in which the individual acts.

Les différentes formes d'efficience des marchés financiers

According to Fama's (1965) definition, characterized by its generality and the difficulty of verifying this

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notion of efficiency through a single test, Fama (1970, 1991) found it necessary to subdivide it into three levels: weak form, semi-strong form, and strong form. Several empirical studies are then mentioned to verify these different forms of efficiency regarding the predictability of prices for each illustration cited.

Weak form efficiency: Based on weak form efficiency, the price of an asset generally focuses on its historical price or invokes the notion of "no one can beat the market" while concentrating on past prices. However, the labeling of this type of efficiency is established through the archive of past prices, which can be considered abundant and momentarily available information for all market participants. On one hand, no one can benefit from this data due to its dissemination within the market; on the other hand, several investors conduct a chronological study of past prices and transaction volumes to identify short-term trends and generate profits. However, the random walk hypothesis is based on the independence of movements.

Semi-strong form efficiency: The semi-strong form of efficiency theory assumes that all available information related to financial assets is also incorporated into the price of that security at the same time as this information is made public. This may include all information about the issuing company, such as annual reports, earnings announcements, stock splits, information provided by the press, etc. The objective is to test whether the price can adjust quickly to accommodate this information. The importance lies in verifying whether announced prices immediately correlate with the multiple pieces of information perceived by the market, thus highlighting the market's adjustment capacity. Therefore, according to Fama's perspective, if the market is efficient according to the semi-strong level, fundamental analysis, which allows for the selection of undervalued assets (to buy) and overvalued assets (to sell), is insignificant.

Strong form efficiency: According to this form of efficiency, prices not only reflect publicly disclosed information but also include data held by company insiders, i.e., all public and private information, which is very difficult to empirically verify due to the confidential nature of the information.

Main Cracks in the Dominant Paradigm and Rationale for Behavioral Finance

The Lack of Market Efficiency

Classical finance relies heavily on the efficient market hypothesis, a notion that behavioral finance challenges with compelling arguments. In classical theory, the price of financial assets reflects all publicly available data. It's a perfect world where price is the perfect indicator of value. Fama believes that past data has been incorporated into the price. The past shows no signs of the future; hence, we speak of a "random walk," implying that stock prices are random in the short term if we consider the absence of relevant data or earnings forecasts.

In the same context, classical finance theory relies on market actors, and it is through their rationality that the market achieves efficiency. One of the immediate repercussions is the convergence between a stock's price and its fundamental value. The intrinsic value of a company's stock is the discounted sum of its future cash flows.

$$\text{Fundamental value} = \text{Cash Flow}(1) / (1+r)1 + \text{Cash Flow}(2) / (1+r)2 + \ldots + \text{Cash Flow}(t) / (1+r)t$$

Where r = discount rate, and Cash Flow(t) represents the cash flows generated by the company at a future time t. Theoretically, as soon as overvaluation or undervaluation occurs between market value and fundamental value, we have risk-free arbitrage for rational agents.

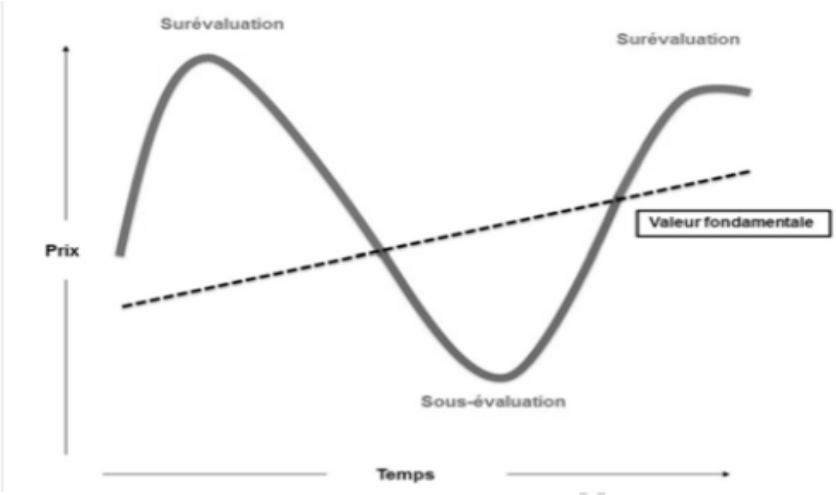

Figure 1. Over/Undervaluation and Fundamental Value
Source: Yannick Coulon (2015)

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This gap is closed by market participants and actors who profit from it. The overvaluation of a stock compared to its fundamental value means an instant gain that will stimulate sales and bring the stock price back to its fundamental value. Conversely, undervaluation triggers purchases, which also reduce prices to their fundamental values. This mechanism thus spontaneously eliminates valuation differentials in markets.

Behavioral finance questions this dogma because it considers that arbitrage is associated with risk, which is reflected in confronting two significant obstacles:

- The presence of irrational agents who rely on false information, rumors, or noise traders.
- The return to fundamental value is not immediate, as this operation requires absolute performance.

Excessive Volatility and Trading Volumes

From a theoretical perspective of an efficient market, asset price volatility should evolve within reasonable bounds. However, this has been called into question by Gervais and Odean (2001), who highlight that stock prices exhibit more excessive volatility than the efficiency hypothesis predicts. They announce that price volatility relative to fundamentals is high. The results of this study are consistent with the research of Shiller (1981), one of the first authors to identify the existence of excessive volatility in financial markets. He compared price and fundamental volatilities. The test involves comparing the evolution of prices actually observed in the market with that of optimally determined prices separately, which can be determined based on actual dividends collected, which unfortunately differ from the calculated fundamental value of the security. If the market were efficient, the two values should exhibit very similar dynamics.

Therefore, it is essential to declare that statistically calculated prices are more stable and smooth than those observed in the market, which directly challenges the informational efficiency hypothesis. This excessive price volatility is due to the presence of irrational investors who act on data unrelated to fundamentals, particularly their beliefs and perceptions. These valuation errors will be difficult to correct by rational investors.

The Calendar Effect

One of the earliest anomalies observed in markets is that identified at the end of cycles, which represent pockets of temporary inefficiencies. Two notable anomalies are the end-of-week and end-of-year effects.

The end-of-week anomaly, highlighted by Osborne (1962), reveals that some securities have a negative average on Mondays and positive averages throughout the rest of the week. This finding has been confirmed by other authors, such as Venezia and Shapira (2007), who demonstrate that returns during the days following the weekend are less favorable than those of other days. As a result, professionals tend to reduce transactions at the beginning of the week.

The end-of-year anomaly, also known as the January effect, introduced by Rozeff and Kinney (1976), emphasizes that stocks experience higher returns in January, particularly during the first two weeks. The justification for this phenomenon is the tax incident. Essentially, investors realize losses at the end of the year to minimize their taxable income. A behavioral finance explanation for this incident is investors' perception that the end of the year is a time for assessment and the beginning of the year represents a fresh start. This anomaly is related to mental accounting.

Several anomalies related to firm characteristics have been identified, irregularities whose justification does not lie within fundamental models based on the efficient market hypothesis. These models include the market model and the asset pricing model.

METHOD

De Long et al. (1990) shed light on the existence of two types of investors: rational investors and irrational investors, often referred to as noise traders. Rational investors act based on accurate beliefs and information, while noise traders operate on erroneous beliefs and behaviors, deviating prices of securities from their fundamental values. According to the efficient market hypothesis, rational investors seize all arbitrage opportunities to generate profits.

Psychological research reveals that real human behavior is not always consistent with the assumptions of standard economic theory. Tversky and Kahneman (1974) demonstrated that individuals often use reasoning shortcuts, leading to biased decision-making.

In the early 2000s, several studies conducted by psychologists were adopted by finance researchers, following the works of Tversky and Kahneman. The starting point of behavioral finance is to test the rationality of agents and associated axioms. The findings of these studies challenge traditional economic assumptions:

- Violation of independence and transitivity axioms in individual decisions.
- Herd behavior among investors.
- Departure from Bayesian updating.
- Overconfidence among investors.
- Simplification of complex choices using heuristics, which are mental shortcuts or rules of thumb.

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Heuristics describe principles and methods that allow individuals to make judgments or evaluations quickly and spontaneously. They are crucial in behavioral finance as they explain how market participants deviate from rationality. These findings have led researchers to reject the assumptions of rationality and market efficiency.

Behavioral finance seeks to explain market anomalies by studying human behavior, particularly decision-making processes. Individuals often rely on mental shortcuts rather than engaging in lengthy analytical investigations. Key heuristics studied in behavioral finance include:

- Familiarity bias: Individuals prefer options they are familiar with, even if other options offer the same probability of success.
- Emotional biases: Emotions influence decision-making, leading to biased judgments and actions.
- Framing bias: Decision-making varies depending on how information is presented.
- Herding behavior: Investors tend to imitate the actions of others, leading to deviations from fundamental value.
- Disposition effect: Investors tend to sell winning stocks too early and hold onto losing stocks for too long, impacting portfolio returns significantly.

The environment of our study

The Casablanca Stock Exchange, founded in 1929, is the primary stock market in Morocco. Since its inception, it has undergone three major reforms in 1967, 1986, and 1993. As a private entity, it is primarily owned by Moroccan banks and the Caisse de Dépôt et de Gestion. The Casablanca Stock Exchange plays a crucial role in the Moroccan economy by facilitating corporate financing. It allows listed companies to issue and trade shares, thus offering investors the opportunity to buy and sell securities. Fluctuations in stock prices reflect investors' perceptions of Morocco's economic performance and international factors. The stock exchange enables investors to diversify their portfolios and participate in the country's economic growth.

The research tool we are using is a questionnaire intended for stock market investors. In the context of behavioral finance, this tool is essential for obtaining reliable data and conducting in-depth analyses of financial behaviors. The validity of the questionnaire is first addressed from the perspective of content validity, emphasizing the need for a comprehensive representation of relevant concepts in the studied field.

The variables in this study are classified into two categories: exogenous variables and endogenous variables. Exogenous variables include risk perception and psychological behavior, while endogenous variables encompass stock performance. These variables are measured using a Likert scale.

The Likert scale used ranges from 1 to 5 and includes the following options: Strongly Disagree (score 1), Disagree (score 2), Neutral (score 3), Agree (score 4), Strongly Agree (score 5).The use of the Likert scale is relevant for quantifying variables that are difficult to measure. This scale is commonly used in behavioral and psychological studies to progressively assess perceptions, attitudes, or opinions. Its flexible format allows for collecting data on abstract or complex concepts, making it an appropriate choice for our study.

The sample for this study consists of portfolios from 93 regular investors in the Moroccan stock market. We collected the realized performances and associated risks of these portfolios, then compared these results to possible optimal behaviors. We also seek to explain the observed discrepancies by examining the influence of behavioral biases on financial decisions, based on current theories in this field.

The data processing followed the following protocol. First, we used Python and the Pandas library to describe the characteristics of our sample. Then, Eviews 12 and IBM SPSS Statistics 27 were used to analyze the results, as these tools are particularly suited to econometric modeling, estimation, and regression.

The main objective is to analyze the role of behavioral variables in financial decisions. To do this, we will develop regression models to establish quantitative relationships between these behaviors and observed investment choices. By comparing these models with the collected data, we will determine the extent to which these behaviors influence the financial decision-making process, thereby confirming or refuting the initial hypotheses of the study in light of specific behavioral aspects.

Our hypothesis, based on the studies referenced in our theoretical framework, is as follows:

H1: Moroccan investors, under the influence of behavioral biases, are likely to make financial decisions that have a significant impact on their short-term and long-term returns in the financial market.

To confirm or refute our hypothesis and address our central problem, we will examine the main behavioral biases likely to disrupt the market and influence the returns of our sample portfolios. To do this, we will conduct a reliability test, a causality test, and a correlation test to determine the existence of relationships between the various variables in our study. Subsequently, we will provide the necessary explanations, drawing on existing theories, to interpret the events observed in the market.

RESULT AND DISCUSSION

At this stage of our study, we aim to identify the economic factors influencing participants' responses. To achieve this, we will examine statistical parameters such as mean, median, maximum value, minimum

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value, and standard deviation. These measures will help us better understand general trends and evaluate the relevance of our research on the psychological aspects within the stock markets, particularly in relation to confidence and performance. The tables below list the study variables, such as confidence level and market performance, and calculate measures of central tendency for each, including mean, median, maximum and minimum values, and standard deviation.

These statistical data will assist us in understanding the distribution of participants' responses and identifying any potential trends or outliers. Additionally, it's possible to include other statistical measures if they are relevant to your research. The analysis of the results obtained in this stage will lead to significant conclusions related to the objective of our study.

Table 1. Coding of Study Variables

Variables explained	Coding	Explanatory variables	Coding
Psychological behavior	V7	Fear and anxiety	V8
		Cultural origins	V9
		Influence of emotions	V10
		Avoid losses rather than seek gains	V11
		Trend follower	V12
		Past experiences	V13
		Overconfidence	V14

Source: Personal development using Excel software.

View | Proc | Object | Print | Name | Freeze | Sample | Sheet | Stats | Spec

	V7	V8	V9	V10	V11	V12	V13	V14
Mean	3.032258	2.806452	2.967742	2.451613	3.387097	3.838710	3.548387	3.451613
Median	3.000000	3.000000	3.000000	2.000000	4.000000	4.000000	4.000000	4.000000
Maximum	5.000000	5.000000	5.000000	5.000000	5.000000	5.000000	5.000000	5.000000
Minimum	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000
Std. Dev.	1.542525	1.287550	1.263635	1.528825	1.414461	1.304593	1.298127	1.047939
Skewness	-0.054154	0.272547	-0.134216	0.422357	-0.498735	-0.939323	-0.466562	-0.640507
Kurtosis	1.544830	1.946269	1.856872	1.604048	1.917097	2.774243	2.196671	3.009689
Jarque-Bera	8.250843	5.453970	5.342841	10.31611	8.399546	13.87358	5.874729	6.359219
Probability	0.016157	0.065416	0.069154	0.005753	0.014999	0.000971	0.053005	0.041602
Sum	282.0000	261.0000	276.0000	228.0000	315.0000	357.0000	330.0000	321.0000
Sum Sq. Dev.	218.9032	152.5161	146.9032	215.0323	184.0645	156.5806	155.0323	101.0323
Observations	93	93	93	93	93	93	93	93

Figure 2. Descriptive statistics of variables
Source: Personal development using Eviews software

Regarding the statistical interpretation of the variable V7, which represents "Psychological Behavior" and is explained through a combination of other explanatory variables (V8, V9, V10, V11, V12, V13, V14), here are some important statistics:

The mean is 3,03, which is a measure of central tendency representing the average value of the dataset. To calculate the mean, you sum all the values in the sample (in this case, the responses to variable V7) and divide the total by the number of responses (93).

The median is 3, another measure of central tendency. It represents the value that divides the dataset into two equal parts, so that half of the values are below the median and the other half are above it.

The maximum observed value is 5, while the minimum is 1, highlighting the divergence in the responses given by the participants.

Additionally, by examining the characteristics of the distribution of V7:

The skewness coefficient is between -0,5 and 0, indicating a slight leftward skewness in the data distribution relative to the mean. This means that the distribution is slightly asymmetrical to the left, with a longer tail on the left side of the mean.

The kurtosis coefficient measures how much the data distribution deviates from a normal distribution. A

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kurtosis coefficient between 1 and 3 suggests a moderately peaked (leptokurtic) distribution compared to a normal distribution. A leptokurtic distribution indicates that values are more concentrated around the mean, with thicker tails, implying the presence of extreme values further from the mean compared to a normal distribution. It is important to note that the Jarque-Bera test is used to assess the normality of the data distribution. It compares the data distribution to a normal distribution based on the skewness and kurtosis coefficients, checking if the probability associated with this test is below a predetermined threshold of 5 %.

These statistics provide insights into the central tendency, dispersion, and shape of the distribution of V7, aiding in understanding the variability and behavior of psychological factors among the participants.

Table 2. Internal reliability test

Summary for processing observations			
		N	**%**
Observations	Valide	93	100,0
	Exclu[a]	0	,0
	Total	93	100,0
a. Suppression par liste basée sur toutes les variables de la procédure.			
Reliability statistics			
Alpha de Cronbach		Number of elements	
,822		8	

Source: Personal development using Eviews software

A Cronbach's alpha coefficient of 0,822 is generally considered quite reasonable for evaluating the internal reliability of a scale or a set of questions concerning psychological behavior in behavioral finance. This indicates a moderate to high consistency among the various items or questions used to assess this behavior related to financial decisions.

Covariance Analysis: Ordinary
Date: 05/19/24 Time: 18:26
Sample: 1 93
Included observations: 93

Correlation Probability	ROA2	ROA1	V7	V8	V9	V10	V11	V12	V13	V14
ROA2	1.000000 -----									
ROA1	0.287632 0.0052	1.000000 -----								
V7	-0.122259 0.2430	0.125808 0.2295	1.000000 -----							
V8	-0.246403 0.0173	0.019397 0.8536	0.544993 0.0000	1.000000 -----						
V9	-0.278298 0.0069	-0.037815 0.7189	0.586068 0.0000	0.376925 0.0002	1.000000 -----					
V10	-0.164894 0.1142	-0.006138 0.9534	0.242650 0.0191	0.707519 0.0000	0.210174 0.0432	1.000000 -----				
V11	-0.318106 0.0019	0.065080 0.5354	0.547198 0.0000	0.542931 0.0000	0.572627 0.0000	0.265106 0.0102	1.000000 -----			
V12	-0.278315 0.0069	0.072279 0.4911	0.456330 0.0000	0.408301 0.0000	0.511102 0.0000	0.118665 0.2573	0.511326 0.0000	1.000000 -----		
V13	-0.311740 0.0024	0.036099 0.7312	0.001560 0.9882	-0.088488 0.3990	0.155562 0.1365	-0.270802 0.0087	-0.102671 0.3274	0.162364 0.1200	1.000000 -----	
V14	-0.290549 0.0047	0.089794 0.3920	0.031235 0.7663	0.331330 0.0012	0.183496 0.0783	0.278384 0.0069	0.144769 0.1662	0.363933 0.0003	0.174566 0.0942	1.000000 -----

Figure 3. Correlation between ROA and the different psychological aspects
Source: Personal development by Eviews software

The figure presented above delineates the influence of psychological factors on Return on Investment (ROI) across two dimensions: short-term ROI (ROA1) and long-term ROI (ROA2). The objective of our study is to statistically quantify the extent to which psychological factors influence investors' financial returns within our sample.

Starting with the effect of psychological behavior (V7) on ROA1 and ROA2, we observe a positive short-term

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correlation of 0,125 and a negative long-term correlation of -0,122. This suggests that psychological behavior and attitudes have a detrimental impact on long-term profitability.

Next, examining the role of fear and anxiety (V8), we find a non-significant yet positive short-term correlation of 0,02. Conversely, in the long term, there is a moderately weak negative correlation of -0,246, indicating that fear and anxiety adversely affect long-term profitability.

Regarding cultural origin (V9), the short-term correlation is -0,037, which is non-significant but negative. In the long term, the correlation is -0,278, which is moderately weak and negative, suggesting that cultural origin negatively influences long-term profitability.

For emotional influence (V10), the short-term correlation is -0,006, non-significant but negative. However, a long-term correlation of -0,164, moderately weak and negative, indicates that emotional influence detrimentally impacts long-term profitability.

Considering loss aversion (V11), the short-term correlation is 0,006 and non-significant. Nonetheless, in the long term, a coefficient of -0,318 reveals a moderately weak but negative correlation, indicating that loss aversion negatively impacts long-term ROI (ROA2).

Examining follower behavior or the herding effect (V12), we find a short-term correlation of 0,072, which is non-significant but positive. In the long term, a correlation of -0,278, moderately weak and negative, implies a negative effect on long-term profitability.

Analyzing past experience (V13), the short-term correlation with ROA1 is 0,036, non-significant but positive. In the long term, a coefficient of 0,312 indicates a moderately weak but negative correlation, showing that past experience negatively influences long-term profitability (ROA2).

Lastly, overconfidence (V14) shows a short-term performance correlation of 0,089, positive but not significant. In the long term, a coefficient of -0,291 indicates a moderately weak but negative correlation, demonstrating that overconfidence negatively impacts long-term ROI.

In summary, these findings suggest that while cognitive biases have a negligible impact on short-term profitability (ROA1), they significantly and negatively affect long-term profitability (ROA2). This negative impact is particularly notable, potentially resulting in a loss of up to 32 %, highlighting the critical importance of emotional management in the domain of behavioral finance.

Pairwise Granger Causality Tests
Date: 05/19/24 Time: 18:32
Sample: 1 93
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
ROA2 does not Granger Cause V7	91	2.16083	0.1214
V7 does not Granger Cause ROA2		6.10787	0.0033
ROA1 does not Granger Cause V7	91	0.73300	0.4834
V7 does not Granger Cause ROA1		0.70306	0.4979
ROA1 does not Granger Cause ROA2	91	0.16613	0.8472
ROA2 does not Granger Cause ROA1		0.18743	0.8294

Figure 4. Granger causality test
Source: Personal development by Eviews software

Based on the null hypothesis “H0: there is no causal relationship between V7 and ROA1 and ROA2”, we observe a probability of 0,48, which is higher than the critical threshold. Therefore, there is no statistical evidence of a causal relationship between ROA1 and V7. This is further confirmed by the second probability of 0,49, confirming the absence of direct causality between psychological behavior and short-term returns.

However, for long-term returns ROA2, we observe a probability of 0,12, indicating the absence of a direct causal relationship between long-term returns and psychological behavior V7. However, for the relationship between V7 and ROA2, we observe a probability of 0,003, which is lower than the critical threshold of 0,05. We partially accept the hypothesis. This suggests that V7 does indeed have a causal effect on ROA2, as the probability that this relationship is due to chance alone is sufficiently low to be considered statistically significant.

After conducting a Cronbach’s alpha reliability test, which yielded a reliability coefficient of 82 %, indicating high reliability, as well as a correlation test, which revealed a positive correlation with a probability of error below the critical threshold, demonstrating the existence of a correlation between our variables, and finally a causality test which showed no direct causality between variables V7 and ROA1 (positive correlation of

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0,13, statistically significant as the probability of error is below the critical threshold), but indicated a causal relationship between psychological behavior V7 and ROA2 (negative correlation of -0,12, statistically significant as the probability of error is below the critical threshold), it appears that financial behavior impacts and generates long-term returns but does not affect short-term returns, as one does not directly cause the other. Thus, our hypothesis H1 is partially confirmed..

CONCLUSION

It is clear that the theory of market efficiency, based on concepts such as the atomization of market participants, profit maximization, transparency, and the free flow of information, has long dominated the understanding of financial markets. This theory posits that markets are unbeatable and follow a random walk, where asset prices always reflect their fundamental value.

However, this idealized view often clashes with empirical reality. The perfect rationality of economic agents, a central pillar of the efficiency theory, is increasingly questioned. Economists and financiers have shown that real investor behavior often deviates from this hypothetical rationality due to cognitive and heuristic biases. These biases, which influence decision-making in complex situations, highlight the presence of irrational agents in the markets.

Behavioral finance offers a pertinent response to these challenges. By integrating concepts from social and cognitive psychology, it aims to understand the actual behavior of investors. This discipline examines the discrepancies between observed behaviors and those predicted by classical theory, accounting for biases and errors in information processing. It highlights the flaws and anomalies in the perception of economic reality, thereby providing a more nuanced and realistic view of financial markets.

In the Moroccan context, our study revealed significant results regarding the impact of behavioral biases on financial returns. After conducting a Cronbach's alpha reliability test, which showed a reliability coefficient of 82 %, and a correlation test, revealing a positive correlation with an error probability below the critical threshold, we demonstrated the existence of a correlation between our variables. Furthermore, a causality test showed no direct causality between variables V7 and ROA1 (positive correlation of 0,13, statistically significant), but indicated a causal relationship between psychological behavior V7 and ROA2 (negative correlation of -0,12, statistically significant). These results suggest that financial behavior influences long-term returns but not short-term returns, partially confirming our hypothesis H1.

These findings are particularly relevant for Moroccan investors. Indeed, the Moroccan stock market, while dynamic, is also subject to the same behavioral influences observed in other markets. Moroccan investors, by becoming aware of these behavioral biases, can improve their investment strategies and optimize their returns. Behavioral finance thus provides valuable tools and perspectives for navigating the complexities of the Moroccan market. It offers a deep and pragmatic understanding of financial markets using psychological and sociological approaches. It presents a credible alternative to classical theory by explaining market anomalies through the real behaviors of investors. For Moroccan investors, recognizing and managing behavioral biases can enhance decision-making and optimize long-term returns. This approach remains underutilized by modern financial theory, despite its considerable explanatory potential.

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CONFLICT OF INTEREST

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