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The impact of behavioural biases on the behaviours of informed and uninformed individual stock investors: case of the Egyptian Stock Exchange

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Abstract: Behavioural finance theories study human psychological and emotional biases. Behavioural finance explains the effect of psychological and emotional biases on the financial behaviour of both investors and financial markets. These biases often lead people to make irrational investment decisions. Understanding these biases can help investors to spend their money more rationally and make better-informed decisions. This paper examines the influence of a full array of behavioural biases on Egyptian stock investors' behaviour in the Egyptian stock market. Our research sample is composed of 407 stock investors in Egypt. The research sample was divided into two classes (informed and uninformed stock investors) based on their financial knowledge and skills. Based on the analysis done to the responses collected from an online questionnaire, the findings show that both classes of investors are affected by emotional, cognitive, and behavioural biases. These biases adversely affect their behaviour, leading to irrational stock investment decisions. However, the level of impact varies significantly by the level of financial knowledge.

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1   Introduction

Emerging market asset pricing research is based on understanding investor decision-making behaviour based on US investors and studying and applying the psychology of other developed countries. Emphasis is placed on our understanding of the decisions made by US investors or other developed stock market investors, not developing and emerging ones. Having only most research done in developed countries leads to inappropriate psychological and cultural perceptions of investment decisions in emerging markets such as the Egyptian stock market. The Egyptian Stock Exchange (ESE) is one of the leading stock exchanges in the world. It consists of the Alexandria Stock Exchange of 1888 and the Cairo Stock Exchange of 1903. In the 1990s, market-oriented reforms brought financial institutions, businesses, and policymakers closer to internationally accepted norms and procedures. These reforms affected the stock market's development and capital creation financing over the long-term (Egyptian Stock Exchange, nd). Over time, more than one thousand companies were on CASE's main board (Mecagni and Sourial, 1999).

Managing such a large corporate base was a challenge for officials. Since January 2011 events Egypt has been an economically and politically fragile country. These events have badly impacted the economy in several ways. Inflation, unemployment, poverty, the budget deficit, and the debt rate have all grown since 2011. In addition, the investment sector has suffered since the country lost its appeal to local and foreign investors due to widespread unpredictability. As such, the Egyptian stock markets have been impacted by severe economic cycle volatility and political unrest (Azab, 2002). In addition, during this period, the Egyptian stock market was marked by poor performance, particularly in

corporate information disclosure. Due to limited public information, investors' lack of market awareness, and market participants' lack of financial understanding, the ESE was deemed ineffective.

However, considerable changes have occurred in the Egyptian economy during the last two decades (Metawa et al., 2018). This change has focused on implementing privatisation policies and transitioning to a market economy (Omran, 2007; Youssef, 1996; Metawa et al., 2018; Weiss and Wurzel, 1998; Oweiss, 1990; Hamed, 1981). This enhanced investment opportunities for both local and foreign investors. Thus, diverse security instruments, economic activity, and market breadth exploded in the Egyptian economy. Therefore, the Egyptian stock market has offered an excellent opportunity for research in investments and finance. Considering the volatility of the Egyptian economy, a great need to reduce the absurdity in the market arises. This need is to reduce the level of risk investors are facing since the capital markets are becoming increasingly complex. According to Waweru et al. (2008) and Le Luong and Ha (2011), numerous researchers in the academic field believe behavioural finance is an excellent theory for understanding the perceptual and reasoning errors that affect stock investment decisions.

In addition, proponents of behavioural finance think that studying social sciences, such as psychology, might help in shedding the light on stock market behaviour, market bubbles, and market collapses (Menkhoff et al., 2006; Le Luong and Ha, 2011). Behavioural finance is not a new field of research. However, economists and the securities investment industry did not officially recognise it until 2002, when researchers Kahneman and Smith (2002) were awarded the Nobel Prize for revolutionary research in behavioural economics (Altman, 2004). In traditional finance, decision-making is defined as the rational choice of alternatives or a conscious choice of action among the available options. In addition, under traditional theory, investors are also considered rational people. However, when faced with a decision, individuals experience cognitive and emotional biases, leading to what some authors see as irrational behaviour.

The Egyptian stock market, an emerging stock market, could be optimised by understanding investor behaviour. This can be done in terms of studying how individual stock investors are driven by fear and greed, and how personal and behavioural factors affect their investment decisions. Considering the importance of the Egyptian stock market, it is essential to do thorough investigations on the behavioural aspects that play a role in the process by which investors arrive at their financial decisions either informed investors (stock market field experts and customer account managers) or uninformed (normal investors) investors in the ESE. The results of our study will assist investors and security companies in making more accurate predictions and business decisions. In addition, behavioural finance may be useful in this scenario because it makes use of psychological concepts to explain the reasons why people buy or sell stocks and shares (Waweru et al., 2008). Consequently, the level of trading in the Egyptian stock market can be optimised by investigating how behavioural factors might affect the process of making stock investment decisions, studying the impact of perceptive and emotional preconceptions on investors, and lastly understanding the psychology of financial decision-making and how investors prioritise these decisions.

2   Theoretical framework

There are many decision-making models; among them are the two fundamental assumptions based on Simon's (1955) work on rational choice and bounded rationality: the first regard decision-making as an orderly and sensible process with inherent logic; the second, the decision-making process follows an orderly and rational order. If the steps in a process occur in a logical and orderly sequence, then decisions result from judgments or conclusions (Simon, 1955). According to Riccardi and Simon (2000), when individuals are faced with a decision under the influence of heuristics, they exhibit an apparent lack of attention to a hierarchical structure. The peculiarity of role-based behaviour is that everyone can freely explore all ideas: relaxed emotional and social tone, openness, originality, and the search for consensus are elements of decision-making concealed by heuristics (Svenson, 1979). In short, this is a type of creative decision-making. Heuristics are variables that directly influence investor decisions. On the other hand, the prospect theory is considered a replacement for the utility theory, as explained by behavioural economists. This theory defines intellectual shortcuts and their impact on decision making.

According to Yin (2017), prospect theory divides the decision-making process into two phases: the preliminary phase and the assessment phase. In the preliminary decision-making phase, the outcomes of decisions are classified according to existing facts (heuristics or rules of thumb). Next, individuals define what they consider comparable, set a point of reference then consider the small results as a loss to avoid such a significant result again in the future. In the assessment phase, people start looking for the value (benefit) of the results. They determined this value based on the possible outcomes and their respective probabilities (Kahneman and Tversky, 1979). Based on this data, they chose the highest possible outcome and decided. An individual's decision-making process is affected by various psychological changes leading to a specific behaviour. Therefore, heuristics and prospect theory assumptions are needed to determine how behavioural factors based on behavioural finance theory can affect individual investors' decisions.

3   Behavioural factors influencing the investment decision-making of Egyptian investors: a bird's eye view

Previous behavioural economics and behavioural finance research done in an Egyptian context only looked at the impact of a limited array of behavioural factors on retail investors (see for example Heshmat and Mahran, 2014; El-Shiaty and Badawi, 2014; Touny and Shusha, 2014; Allam, 2014), which focuses primarily on the effects of herding. At the time, only Bassiouny and Ragab (2014) studied the over- or under-reaction effect, and the overconfidence effect was studied by Aziz et al. (2016).

The main reason behind investors' poor performance is behavioural and cognitive biases, leading them then to act based on deep-seated emotions and misunderstandings about investment risks. Behavioural bias is related to processing information to make decisions and our preferences (Shefrin, 2002). Investor judgment is influenced by many behavioural aspects (both inner and outer aspects), such as the psychology and influence of other individuals or groups in the market (for example, the concept of crowd psychology or herding behaviour) and the fortunate or unfortunate recollection of prior

financial or investment decisions depending on whether the outcome of the trial is a success (again) or failure (loss). Nowadays, investors operate in an overconfident world, hate losing money, and are sometimes very greedy, although this is often predictable. As a result, investors exhibited the 'cynical nature' of fear, worry, and procrastination, while other financial professionals displayed joy, happiness, and a magnificent 'hopeful mindset', acting as an investment roller coaster.

3.1 Heuristic theory

Prior research has shown the impact of heuristic biases on the investment choices of individual and institutional investors (Kasoga, 2021). Heuristics are identified as the unwritten rule or rules of thumb that minimise the intricacy of estimating odds and estimated values to make more forthright decisions (Tversky and Kahneman, 1974). Thus, it facilitates decision-making, especially in complicated and ambiguous circumstances (Ritter, 2003). At large, heuristics might sometimes be helpful, mainly when investors are limited in time (Waweru et al., 2008). However, they can occasionally result in biased decisions (Tversky and Kahneman, 1974; Ritter, 2003). Tversky and Kahneman (1974) introduced three Heuristics in 1947 to behavioural finance research: representativeness, bias, availability bias, and anchoring. Later in 2008, Waweru et al. included two more factors: gambler's fallacy and overconfidence which were from that point on itemised in the behavioural finance theories.

Representativeness bias refers to how similar an event is to its parent population. Representativeness bias may result in several biases. Representativeness bias is when individuals place an excessive amount of weight on more recent events while disregarding average rates that have been sustained over longer periods of time (Chen et al., 2007). Therefore, representativeness bias is a cognitive technique influencing the assessment and choice of possibilities (Galavotti et al., 2021; Nisbett and Ross, 1980; Schwenk, 1984).

Numerous cognitive biases have been uncovered so far, with anchoring bias being one of the most significant, extensively researched, and well-known cognitive biases (Rezaei et al., 2022; Ünveren and Baycar, 2019). According to Costa et al. (2017), anchoring is when individuals, when deciding, use some initial reference points to predict future outcomes; since different starting reference points will produce other estimates, the decision will not be very objective towards the initial value (Costa et al., 2017).

The overconfidence bias results from people believing that they can (even accidentally) control events (Čuláková et al., 2017). Previous studies have shown that investor overconfidence leads to stock market volatility (ul Abdin et al., 2022; Mushinada and Veluri, 2018). However, overconfidence might enhance how good people feel about their potential and abilities, helping them make better investment decisions with longer time horizons (Oberlechner and Osler, 2008). Therefore, it is essential to investigate the effects of overconfidence bias on the investment performance of stock market investors (ul Abdin et al., 2022; Pikulina et al., 2017; Trejos et al., 2019).

According to Cowan (1969), a gambler's fallacy is when a person falsely believes that an unplanned event is unlikely to occur after a specific event or series of unrelated events. Barberis et al. (1998) stated that people who observe random walks could fluctuate between beliefs in gamblers' fallacies (in which any trend reverses rapidly) and views in hot hands (in which trends continue), depending on what they have seen recently

in the number of price reversals achieved. Thus, people with greater self-confidence trade more often, whereas those with low self-confidence are more cautious (Pradikasari and Isbanah, 2018; Wijayanti et al., 2019).

The availability bias proposes that information comes to mind quickly, leading to inferences about the entire population from which the information was extracted; this can lead to potential biases, illusory relevance, and biases due to the recoverability of examples (Raghubir and Das, 1999). Stock market participants commonly overreact to new information, causing the price of an asset to fluctuate more than expected. They also noted that investors prefer to invest in domestic stocks rather than foreign ones. In addition, investors rely on the advice of close friends and family members when making investment choices (Shukla et al., 2020; Kasoga, 2021).

According to Mushinada (2020), individuals are more likely to act rashly, and form opinions based on their past experiences and gut feelings than actively seeking relevant information that may motivate them to make wiser decisions. Financial knowledge, historical performance, previous experiences, and investors' expectations all play a role in the judgments they make. As a result, individual traders often engage in biased behavioural patterns, which leads to the mistakes that characterise their trading performance (Shukla et al., 2020; Kasoga, 2021).

3.2   Prospect theory

According to Erdogan (2021), under uncertainty and risk, prospect theory is essential for understanding investment decision-making. Prospect theory emphasises that cognitive and emotional processes can affect individual decisions in certain risky behaviours and uncertain situations, thus affecting persistent biases. Mellers et al. (1998) noted that prospect theory assumes that investors evaluate results based on gains or losses related to a specific benchmark rather than the final value of their overall portfolio. In line with the research done by Le Luong and Ha (2011), regret aversion drives investors to predict and dread the regret that results from experiencing a loss or giving up a profit. Such hesitation and inability to act out of fear results in bad decisions. Regret aversion bias arises from wanting to avoid being responsible for bad outcomes (Pompian, 2020). Regret can be generated by omission (inaction) or commission (act), but generally, in the short-term, regret caused by the commission is stronger (Jahanzeb, 2012).

According to Barberis et al. (2001), loss aversion bias is the tendency of individuals to go through various stages of mental punishment from gains or losses of comparable size (Barberis et al., 2001). According to Bouteska and Regaieg (2018), the issue is that different types of investors place different amounts of importance on different gains and losses. The investor affected by this bias makes decisions based on gain rather than loss because he is attempting to avoid the risk associated with loss. According to the literature, there is evidence that individuals feel more distraught by the prospect of future losses than being content about the same number of future gains (Barberis and Thaler, 2005).

According to Thaler and Ganser (2015), individuals treat money differently based on where they came from and where it will be spent, not by their absolute value. In this sense, investors exercising mental accounting is when investors divide their investment portfolios in to separate accounts in their minds and act accordingly (Barberis and Thaler, 2005; Ritter, 2003). Santi et al. (2019) examined the impact of mental accounting on equity investment decisions. The results showed that mental accounting causes investors

to use a more significant portion of their money to invest, with monthly private funds being more critical than bonus funds. They are also more afraid of the risk of investing in monthly private funds than bonus funds, and when there is a loss, the level of loss is higher. The research indicated that investors favour mental accounting (Santi et al., 2019).

3.3 Behavioural biases and equity investment decision making

Behavioural biases that encourage people to act based on emotions and established beliefs about investing risk are the primary reasons for investors' under-performance. Investor psychology generates market fluctuations that cause the prices of various assets to fluctuate above or below their fair values. Consequently, behavioural finance posits the foundations of an alternative financial theory based on the premise that investor behaviour is not entirely rational (Bouteska and Regaieg, 2018). Behavioural biases include how we assimilate information and make decisions, as well as our preferences (Shefrin, 2002). They may affect various decision-making processes, but have particular implications on financial and investment choices. Numerous studies have investigated the impact of behavioural variables on individual investors' investing choices and investment success (Le Luong and Ha, 2011; Velumoni, 2017). Wamae (2013) discovered that the herding effect, risk aversion, prospecting, and anchoring influence stock market investment choices. Bakar and Yi (2016) explored the effect of psychological factors on investors' decision making in the Malaysian stock market and found that overconfidence, conservatism, and availability bias all have a substantial effect, however, herding had no significant influence. In the same context, Shabgou and Mousavi (2016) discovered a favourable relationship between investment performance and behavioural traits such as anchoring, overconfidence, representativeness bias, availability bias, and gamblers fallacy. On the other hand, negative correlations exist between loss aversion, mental accounting, regret aversions, and investing performance (Aziz et al., 2016).

Tuyon and Ahmad (2016) contended that adoptive rationality in the Malaysian Stock Exchange regulates prices and stabilises the market, resulting in adopted and bounded market efficiency. Filip et al. (2015) observed herding behaviour among investors in the capital markets of Vienna and Prague. Vieira and Pereira (2015) investigated the behaviour of investors in the Portuguese financial market. They discovered that herding intensity is negative and statistically significant, indicating that investors systematically copy each other rather than exploiting their private knowledge and behaving irrationally. Gunay and Demirel (2011) investigated the demographic and behavioural influences on Pakistani individual investors. They found that gender interacts with five financial behavioural factors: overreaction, herding, cognitive bias, illogical thinking, and overconfidence, while individual savings interacts with four: overreaction, herding, cognitive bias, and irrational thinking. According to a study by Rekik and Boujelbene (2013), Tunisian investors do not always make prudent investment decisions. However, there is no overconfidence bias in the Tunisian Stock Market. Al-Tamimi (2006) examined the variables affecting the behaviour of UAE investors. Six variables had the most impact: projected corporate profitability, get rich fast, stock marketability, previous success of the firm's shares, government holdings, and establishing an organised financial market (i.e., Dubai Financial Market and Abu Dhabi Securities Markets). Fares and Khamis (2011) employed multiple regression to examine the stock trading behaviour

of individual Jordanian investors. Age, education, internet access, and investor-broker interaction influenced investment decisions. Age, education, and internet access positively influenced stock trading, but negatively influenced investor-broker interaction. Nasrin et al. (2012) found in a study conducted in Bangladesh that the eight most influential factors in retaining investors are company-specific attributes and reputation, net asset value, accounting information, trading opportunity, publicity, ownership structure, people's influence, and personal financial needs.

Compared to other research conducted on conventional finance theories in the stock market, the number of studies on behavioural finance is small, especially in underdeveloped economies like Egypt. Academic finance has only later embraced it as a viable model to describe how financial market players make choices and how these decisions impact asset price. Sakr et al. (2014) illuminates the significance of analysing retail investors in the Egyptian stock market in their study, as they constitute 53%–66% of the total value traded in the market. Bassiouny and Ragab (2014) examined whether short-term overreaction or under-reaction occurs on the Egyptian Exchange (EGX) from January 1998 to December 2013 by comparing two standard methodologies, those of Ali et al. (2011) and Clare and Thomas (1995), to test the overreaction/under-reaction hypothesis over various holding periods ranging from one week to 52 weeks. For their study, they used the weekly closing prices of all equities listed on the Egyptian Exchange in 2014. Bassiouny and Ragab (2014) found that, whereas short-term overreaction does not exist on the Egyptian Exchange, there is statistically significant evidence of under-reaction during the holding of one to four weeks' duration. Youssef et al. (2021) studied how financial literacy affects investor biases in the Egyptian stock market. The research evaluates 403 Egyptian investors' data. The data demonstrated three behavioural biases among individual investors in the ESE: belief persistence biases, information processing biases, and emotional biases (Pompian, 2012). This suggests that individual investors are not always rational (Youssef et al., 2021).

Based on the literature review and against the theoretical background on the relationship between behavioural finance and investment decision-making, we developed the following hypotheses:

Hypothesis H1   The informed investors' stock investment decisions are affected by heuristics and prospect biases at the ESE.

Hypothesis H2   The uninformed investors' stock investment decisions are affected by heuristics and prospect biases at the ESE.

Hypothesis H3   Heuristics and prospect biases have the same impact on both informed and uninformed investors' stock investment decisions at the ESE.

4   Scope of the study

This paper attempts to use the complete assumptions put by both the heuristic theory and prospect theory to assess the impact of behavioural biases on financial experts and financially illiterate investors in the Egyptian stock market. This paper is considered the only study done in an Egyptian context to measure the effect of a wide array of behavioural factors and biases on the behaviour and decision-making ability of ordinary stock investors, financial professionals, and stock market experts in Egypt. The primary

purpose of this study is to investigate the effect of behavioural factors on the stock investment decisions of both informed and uninformed investors. In addition, this paper compares the degrees of influence between the two groups. As there is little research on behavioural finance in Egypt, it is anticipated that this work would significantly contribute to the growth of this field in Egypt. There are two compelling reasons behavioural finance should be applied to the Egyptian stock market. Initially, behavioural finance was a very recent field of research in Egypt. Until recently, it was believed to be a viable model to describe how investors in financial markets make choices, impacting the financial markets mainly in developed markets (Kim and Nofsinger, 2008).

Second, experiential, scholarly, and empirical evidence determined that Egyptian retail stock investors often engage in certain types of behavioural biases. These include herding, the disposition effect, overreaction, and under-reaction to price changes, respectively (Allam, 2014; Bassiouny and Ragab, 2014; and few others). Therefore, behavioural aspects must be considered while analysing the decision-making process of Egyptian retail stock investors. Most research done on behavioural finance topics has been carried out in industrialised and developed economies such as the USA and Europe as well as in several developing markets (Caparrelli et al., 2004; Fogel and Berry, 2006; Lai, 2019; Waweru et al., 2008). However, less behavioural finance research has been conducted on the frontier and developing economies than in industrialised markets. In this paper, behavioural finance is applied to the Egyptian stock market, an emerging stock market in Africa and the Middle East. Behavioural finance is used in our paper, to identify the driving behavioural factors of retail investors' behaviour, both the educated and uneducated stock investors, and to determine the extent to which these behavioural factors influence the decisions and recommendations of stock market field experts.

5 Methodology

The primary objective of this study was to investigate how behavioural biases influence the investing decisions of Egyptian stock market participants. Behavioural finance theories already include these behavioural biases. Thus, the deduction strategy was the best option. This investigation is, therefore, undertaken using deductive reasoning. Moreover, we employed deductive reasoning to arrive at a reasonable conclusion based on evaluating the hypotheses throughout the study. For this research, an exploratory method was used to investigate behavioural determinants, and a descriptive cross-sectional design was used to explain investors' behaviour.

5.1 Design of questionnaire

This methodology allows the collection of qualitative and quantitative data from a large sample on nominal and ordinal scales. This research uses a five-point Likert scale in measuring the informed and uninformed investors' agreement with the influence of behavioural aspects on their investment decision making. The questionnaire includes personal, demographic, and investment-specific questions and behavioural elements impacting investing choices. Nominal and ordinal metrics are used for personal, demographic, and investment issues. Nominal scales categorise items; ordinal scales classify and rank objects or observations (Ghauri et al., 2010).

5.2   Research sample

Given that the purpose of the study is to assess the impact of behavioural biases on retail investors in the Egyptian stock market, it was suggested that the sample size was to be on the larger side. With a bigger sample size, there is a greater likelihood that the findings are reliable; hence, the results may have relied upon more (Saunders et al., 2009). Nonetheless, the sample size is determined by the researchers' available resources such as time, money, and personnel (Saunders et al., 2009). According to O'Hair et al. (1998), a minimum of one hundred respondents must be surveyed for quantitative research to conform to statistical data analysis techniques. To get more than 100 replies, 450 questionnaires are sent to financial sector specialists and individual investors. Convenience sampling alone cannot provide a representative sample due to the potential of estimate bias; hence, the result cannot be extended to the whole population. However, the more uniform the convenience sample, the more generalised it is and the less likely it is to include sampling bias. Furthermore, the population consists only of those participating in the stock market. Hence, it is homogeneous.

5.3   Data collection

Our research hypotheses were assessed through data collection using an adapted online questionnaire designed for each investor class in the research sample. In addition, semi-structured interviews with experts in the securities field were conducted to provide a deeper understanding of the field of behavioural finance in Egypt. For example, interviews with high-ranking investment and financial analysts and equity trading advisors of major Egyptian brokerage firms like Mubasher Trade, Acumen Holding, Alpha Capital, and Pharos Holding. These interviews showed whether retail investors show certain behavioural biases while investing in the Egyptian stock market or not. Furthermore, these interviews provided a better understanding of the nature of individual stock investors, their level of influence by behavioural factors, and whether this impact varies with stock market education.

5.4   Data process and analysis

SPSS software was used to handle and analyse the research data in our study. First, poor-quality questionnaires were removed, such as incomplete questionnaires or too many biased responses. The study hypotheses were put to the test using statistical methods such as factor analysis, descriptive statistics, Cronbach's alpha coefficient, and the T-test.

6   Results and discussion

6.1   Data background

From the 450 online questionnaires sent to individual stock investors at the Egyptian stock market by email, the response of 156 informed and 251 uninformed investors were reported, so the questionnaire responses rate is 90.4%, which is considered a high response rate for online questionnaires. The demographic information of the 407-

respondent sample, along with their investment-specific information, is presented as follows. The 400-respondent sample characteristics of demographics such as (gender, age, education, and other demographics) and investment-specific information such as the total investment amount are described as follows:

6.2 Demographic analysis

A summary of the results shown in Tables 1, 2 and 3 is presented as follows:

- *Gender:* Females in the research sample are not equal in number to male stock investors as male investors represent 74% of the sample and 26% are composed of female investors. These results might show that most of the investors in the Egyptian stock market are males and that females have less interest in investing in the market, and accordingly, issues related to gender bias do exist.

- *Age:* Stock investors in the study sample range in age from 30 to 40 (representing 54.8% of the overall sample). This percentage reflects the fact that a large proportion of individual stock investors in the Egyptian stock market are under the age of 40.

- *Marital status:* Most of the stock investors are married (238 investors constitute 58.5% of the total sample), while 31% of the respondents are single, 6.1% of our research sample are divorced, and only 3.9% are widowed. This sample reflects that the marital status of a high percentage of stock investors at the ESE matches their age ranges.

A summary of the results shown in Tables 4, 5 and 6 is presented as follows:

- *Education:* Most of the sample is of good literacy and has diversified academic backgrounds, which will increase the reliability of the research outcomes and conclusions.

- *Experience:* Most of the sample are investors with over ten years of professional working experience (about 82.6% of the total sample), which matches the most significant age range category that the investors were classified under previously in the analysis.

- *Investment:* According to the analysis, stocks and shares ranked first, followed by depositing in the bank, mutual funds, or making post office deposits, then last, savings certificates. Investors, as a condition, had to hold stock in the ESE besides any other investment avenue they preferred to be eligible as a part of our research sample.

Table 1   Gender

Gender	Valid percent
Male	74.0%
Female	26.0%
Total	100%

Table 2   Age

Age	Valid percent
<30 years	16.2%
30–40 years	54.8%
40–50 years	20.4%
50–60 years	8.6%
Total	100%

Table 3   Marital status

Marital status	Valid percent
Single	31.4%
Married	58.5%
Widowed	3.9%
Divorced	6.1%
Total	100%

Table 4   Education

Level of education	Valid percent
High school	1.7
Graduate	81.3
Post-graduation	17.0
Total	100.0

Table 5   Experience

Work experience	Valid percent
Under 5 years	2.7
5–10 years	14.7
Over 10 years	82.6
Total	100.0

Table 6   Investments

Investments	Valid percent
Bank deposits	9.8%
Post office deposits	1.0%
National savings certificates	0.7%
Stock market	85.5%
Mutual funds	2.9%
Total	100%

Table 7 Investment objective

Investment objective	Valid percent
High returns-high risk	54.3%
Moderate returns-moderate risk	35.6%
Low returns-low risk	9.1%
Others	1.0%
Total	100.0%

Table 8 Amount

Investment amount	Valid percent
Under 5 K EGP	17.7%
5 K–10 K	9.6%
10 K–25 K	12%
25 K–50 K	24.8%
Over 50 K	35.9%
Total	100.0%

Table 9 Strategy

Investment amount	Valid percent
Buying stocks and holding it	50.1%
Immediate buying and selling of stocks	46.4%
Other	3.4%
Total	100.0%

Table 10 Ownership duration

Duration	Valid percent
Under 3 months	16.2%
3–6 months	40.3%
6–12 months	22.4%
More than one year	21.1%
Total	100.0%

Table 11 Investment term

Duration	Valid percent
Short-term	45%
Intermediate-term	25.8%
Long-term	29.2%
Total	100.0%

A summary of the results shown in Tables 7, 8 and 9 is presented as follows:

- *The objectives of the investment:* 54.3% of the respondents were seeking a superior level of return while accepting the high-level of risk that accompanies that desired investment objective which means that 221 investors were risk-takers, and this is suitable for being stock investors as the stock market can sometimes be a gamble and possess a high-level of uncertainty and risk. 35.6% were risking neutral, desiring a moderate level of returns, and accepting a moderate level of risk, while only 9.1% of the investors were risk-averse.

- *Amount:* Almost 40% of the respondents hold stock investments of over 50 K EGP, while 25% held investments that range from 25 to 50 K, 12% fell in the range of between 10 to 25 K, while 10% fell in the range of between 5 to 10 K, and 20% held stock investments of less than 5 K.

- *Investment strategy:* The investors are almost equally divided into two main stock investment strategies, 50% invested in stocks intending to buy and hold them, and those usually seek total stock return (dividends and added value), while around 47% invested in stocks planning to buy and sell the stocks immediately and those seek capital gains only, while only 3.4% had other institutions from investing in the Egyptian stock market.

- *Ownership duration and investment term:* it is interesting to observe that numerous investors prefer a short-term strategy for stock investments, i.e., 40.3% invested in the duration from 3–6 months, instead of an intermediate-term of 6–12 months where only 22.4% chose this option or long-term of over than one year where only 21.1% of respondents preferred this long-term period. This rate shows that many retail stock investors prefer the 'hit and run' stock investment strategy.

- *The effect of behavioural factors on the stock investor's decision making:* Calculating the values of each variable's sample mean on a five-point scale reveals how behavioural aspects influence stock trading choices. As a result, the mean values of these factors may determine the extent of the effect on stock investing decisions.

6.3   Effect of heuristic variables on informed and uninformed investors

The heuristic variables are grouped into five constructs: availability bias, over confidence, anchoring, gambler's fallacy, and representativeness bias. A descriptive statistics analysis is done for heuristic variables to measure the attitude of informed and uninformed investors toward the heuristic factors and their impact on them. Tables 12 and 13 show the statistical results for heuristic variables measuring the attitude of informed and uninformed investors towards the heuristic factors and their impact on them.

From Table 12, the following output can be concluded:

1   The total weighted mean for availability bias is (3.1589), with a coefficient of variation of (30.43%), showing that we have a conservative attitude from informed investors towards the availability heuristic, meaning that it has a moderate impact on them.

2   While the value of the total weighted mean for over confidence is (2.8278), with a coefficient of variation of (35.02%), we have a conservative attitude from informed investors towards the over confidence meaning that it has a moderate impact on them.

3   The value of the total weighted mean for the anchoring heuristic is (3.2506), with a coefficient of variation (25.31%); shows that we have a conservative attitude from informed investors towards the anchoring heuristic, meaning that it has a moderate impact on them.

4   The value of the total weighted mean for gambler's fallacy is (3.1467), with a coefficient of variation of (28.13%); shows that we have a conservative attitude from informed investors towards the gambler's fallacy heuristic, meaning that it has a moderate impact on them. As informed investors base their decisions on fundamental and/or technical analysis before determining what will happen to a trend, they do not seem to fall prey to gambler's fallacy in predicting what might happen to stock in the future.

5   The value of the total weighted mean for the representativeness bias heuristic is (3.0380), with a coefficient of variation of (28.88%); shows that we have a conservative attitude from informed investors towards the representativeness bias heuristic, meaning that it has a moderate impact on them. This proves that informed investors do not usually rely on mental shortcuts to make investment decisions nor draw patterns in genuinely random sequences of data or those future patterns of future earnings may resemble past ones.

Table 12   Descriptive statistics for heuristic variables (informed investors)

Variables	Mean	SD	CV
Availability bias	3.1589	0.96135	30.43
Overconfidence	3.8278	0.99021	35.02
Anchoring	3.2506	0.82282	25.31
Gamblers fallacy	3.1467	0.88528	28.13
Representativeness	3.0380	0.87725	28.88

Table 13   Descriptive statistics for heuristic variables (uninformed investors)

Variables	Mean	SD	CV
Availability bias	3.7928	0.65830	17.36
Overconfidence	3.5920	0.69788	19.43
Anchoring	3.3701	0.63376	18.81
Gamblers fallacy	3.0733	0.65618	21.35
Representativeness	3.4472	0.76999	22.34

From Table 13, the following output can be concluded:

1   The total weighted mean for availability bias is (3.7928), with a coefficient of variation of (17.36%); we have an agreement attitude from uninformed investors towards the availability heuristic, meaning that it has a high impact on them, which means that uninformed investors use mental shortcuts that rely on immediate

examples that come to their minds when evaluating a specific investment or about to make an investment decision. Therefore, from the heuristic variables, the availability bias is significant in terms of affecting the stock investors' investment decision-making; this means uninformed investors at the ESE tend to rely on known and available information sources for equity investment, for example, the information supplied by friends or family.

2   The weighted mean for the anchoring heuristic is (3.3701), with a coefficient of variation of (18.81%); shows that we have a conservative attitude from uninformed investors towards the anchoring heuristic, meaning that it has a moderate impact.

3   The total weighted mean for gambler's fallacy is (3.0733), with a coefficient of variation of 21.35%; show that we have a conservative attitude from uninformed investors towards the gambler's fallacy heuristic, meaning that it has a moderate impact on them, as they do not seem easy to fall prey to gambler's fallacy in predicting what might happen to stock in the future.

4   The total weighted mean for the representativeness bias heuristic is (3.4472), with a coefficient of variation of (22.34%); we have an agreement attitude from uninformed investors towards the representativeness bias heuristic, meaning that it has a high impact on them.

6.4   The impact of prospect variables on the stock investment decisions of informed and uninformed investors

The *prospect* variables are grouped into three constructs: the first construct is loss aversion bias; the second construct is regret aversion bias, and the third construct is mental accounting bias. A descriptive statistics analysis for prospect variables was done to measure the attitude of informed and uninformed investors towards the *prospect* factors and their impact on their investment decisions, as shown in Tables 14 and 15.

Table 14   Descriptive statistics for prospect variables (informed investors)

Variables	Mean	SD	CV
Loss aversion bias	3.1824	0.89623	28.16
Regret aversion bias	3.0473	0.85007	27.90
Mental accounting bias	3.1655	0.86353	27.28

Table 15   Descriptive statistics for Prospect variables (uninformed investors)

Variables	Mean	SD	CV
Loss aversion bias	3.1523	0.78270	24.83
Regret aversion bias	2.9750	0.83970	28.23
Mental accounting bias	3.2412	0.82950	25.59

A summary of the results shown in Tables 14 and 15 is presented as follows:

•   *Loss aversion bias:* A conservative attitude from informed investors towards loss aversion is noticed, meaning that it has a moderate impact on them. Informed investors view investments in terms of risk and return and not only gains and losses. Based on the results, uninformed investors have a conservative attitude towards loss

aversion, meaning that it has a moderate impact on them. This means that uninformed investors might value gains and losses differently. As such, they will base decisions on perceived gains rather than perceived losses.

- *Regret aversion bias:* Results showed that we have a conservative attitude from informed investors towards regret bias, meaning that it has a moderate impact on them. As informed investors rely on fundamental and technical analysis before making any investment decision, the likelihood of them feeling regret after making an investment decision that did not result in any unexpected returns is minimised. On the other hand, we have a conservative attitude from uninformed investors toward regret aversion bias, meaning that it has a moderate impact. This bias is associated with risk aversion, which is the case for most uninformed investors.

- *Mental accounting bias:* From the analysis, informed and uninformed investors sometimes mentally 'bucket' investments and assets on criteria like their source, purpose, and importance. Accordingly, they often categorise investments as safe or risky.

6.5 *Measuring the influence of behavioural biases on the stock investment decisions of investors in the ESE*

One T-test was used to measure the significant differences between the sample's mean and population's parameter in latent variables and sub-items (Ross and Willson, 2017) of the heuristic and prospect variables. The results revealed in Tables 16 and 17 show that there are significant differences between the sample's mean and the population's parameter mean ($\mu = 3$), at significant levels less than (0.05) for heuristic and prospect variables, which means that these variables *influence* the investment decisions of both informed and uninformed stock investors at the ESE.

Table 16   One-sample T-test (*informed* investors)

Behavioural factors	Investors sample	Significance level	Mean	Stock-investment decisions
Heuristics	Informed	0.0235*	3.0667	influenced
Prospect	Informed	0.032*	3.1280	Influenced

Notes: *parameter is significant at the (0.05) and confidence level of 95%.
        **parameter is significant at the (0.01) and confidence level of 99%.
        ***parameter is significant at less than (0.001) and confidence level of 100%.
        ****parameter is insignificant at more than (0.05) and confidence level less than 95%.

Table 17   One-sample T-test (*uninformed* investors)

Behavioural factors	Investors sample	Significance level	Mean	Stock-investment decisions
Heuristics	Uninformed	0.000***	3.4519	influenced
Prospect	Uninformed	0.004**	3.1195	influenced

Notes: *parameter is significant at the (0.05) and confidence level of 95%.
        **parameter is significant at the (0.01) and confidence level of 99%.
        ***parameter is significant at less than (0.001) and confidence level of 100%.
        ****parameter is insignificant at more than (0.05) and confidence level less than 95%.

One sample T-test was used to determine the impact of heuristic and prospect factors on informed and uninformed investors in the ESE. The results presented in Table 7 confirm that there is a significant difference between the influence levels of informed and uninformed investors concerning the *heuristic variables* since the total significance level is less than (0.001) level and the T-test value of (6.940), which means that *uninformed investors are more influenced by the heuristics* while making their stock investment decisions as they have a higher total mean value of (3.4519) than informed investors. Accordingly, *informed investors are less influenced by heuristics than uninformed investors* while marking their stock investment decisions in the Egyptian stock market.

Also, there is no significant direct difference between the *two* influence levels of informed and uninformed investors concerning the prospect *variables* since the total significance level is more than (0.05) and the T-test value of (0.121) as shown in Table 18, which means that informed investors and uninformed investors are equally influenced by prospect variables while making their stock investment decisions. Therefore, *informed and uninformed investors are equally influenced by prospect variables* while marking their investment decisions on the ESE.

Table 18   Independent samples T-test (informed vs. uninformed investors)

Behavioural factors	Investors sample	Significance level	Mean	Variability of influence
Heuristics	Informed	0.000***	3.0667	Uninformed investors are more influenced
	Uninformed		3.4519	
Prospect	Informed	0.904**	3.1280	Equally influenced
	Uninformed		3.1195	

Notes: **parameter is insignificant at more than (0.05) and confidence level less than 95%.
***parameter is significant at less than (0.001) and confidence level of 100%.

7   Conclusions and recommendations

This study investigated the influence of specified behavioural finance factors, namely heuristics and prospects, on the stock investing choices of informed and uninformed ESE investors. Investment decisions of investors in emerging markets are influenced by various rational and irrational/behavioural factors, especially in Egypt. The study findings show investors' decision making is not as rational under standard finance theory. Heuristics and prospects are the behavioural factors evaluated for the research. This paper's unique empirical study investigates the many mediation mechanisms of risk tolerance and financial literacy in relation to heuristic biases and investing choices on the ESE. The results validate the research hypotheses that heuristics and prospect variables do affect the investment decision making ability of informed and uninformed investors in the Egyptian stock market, one of the emerging stock markets. The heuristics factor includes four impacting behavioural variables: availability bias, over confidence, anchoring, and gambler's fallacy. Prospect possesses two variables that impact investment decision making: loss aversion and mental accounting (two sub-variables). These findings support Hypothesis H1.

As for informed investors, most heuristics and prospect behavioural variables had a moderate impact. Regarding uninformed investors, two factors affect the stock investment decisions of uninformed investors in the Egyptian stock market: heuristics and prospects. The heuristics include four variables that impact: availability bias, over confidence, anchoring, and representativeness bias. The two variables of prospect that affect the stock investment decision making of Egyptian investors the most are loss aversion and mental accounting biases. These findings partially support Hypothesis H2.

As for Hypothesis H3, the findings partially reject it because of a variance in the impact of heuristics and prospects on informed and uninformed investors' stock investment decisions. In contrast, prospect variables only support Hypothesis H3. Heuristics informed they overall less influenced Investors than uninformed investors. However, two heuristic variables (availability bias and over confidence) had a higher impact on uninformed investors. In contrast, informed and uninformed investors were equally influenced by only one heuristic (anchoring) variable while making their stock investment decisions in the ESE.

As for prospect, informed and uninformed investors were equally influenced by two variables (loss aversion and mental accounting), as they had similar moderate impacts. Without question, a financial advice relationship will benefit from comprehending how investor psychology influences investing results. As a result, the upgraded partnership will be a portfolio to which the adviser can stick comfortably while achieving the client's long-term objectives. In addition, the study of behavioural finance will aid in understanding the reasoning behind the individual investors' investing goal-setting choices. The findings reveal that availability bias impacted both informed and uninformed Egyptian stock investors. Accordingly, the best thing is to retain a sense of perspective while several biases might influence their decision making. The key to managing availability bias for informed investors is to use checklists that distinguish impending investment drawbacks, such as reacting to existing reminiscence or judging based on an apparent resemblance. In addition, investors should follow a long-term approach based on extensive research and not a short-term approach based on the latest news.

Besides availability bias, another heuristics over confidences was proven to influence the investment decision making of informed and uninformed Egyptian stock investors, as both classes of investors are sometimes inclined to undermine the risks of their current stock investments, which leads to poor investment performance and return. Therefore, informed investors need to identify when their overconfidence misleads them in investment appraisal abilities and if their uninformed investors are showing signs of overconfidence. Uninformed investors can be counselled by informed investors and financial professionals against trading too much. Financial advisors can be the voice of reason, helping clients understand that confidence in investments must underpin facts. Using real-life evidence can help make these issues clearer to clients. However, advisors cannot force their clients to rein in their overconfidence or stop chasing what they believe is the next hot investment. In addition, informed investors should carefully consider the results of previous stock investment decisions and be honest about which performed well, and which did not result in the desired performance.

Another dimension of heuristics is anchoring bias. It affects both informed and uninformed investors, and they should do extensive research on the stock decision at hand as research contributes to rational decision making. The first step to avoid anchoring

is education. Financial advisors must ensure their clients understand that stock prices move due to numerous factors, from changes to the underlying company's growth prospects to uncorrelated events such as weather or political events halfway around the world. As a result, a stock's price may not accurately reflect a company's value at any given time. Advisors can help their clients avoid anchoring biases by working with them on evaluating stocks on current fundamentals, from earnings and revenue growth to industry trends and other factors, rather than recent price history only. Again, IT-based systems help the client advisors and informed investors to act without emotions getting in the way. Financial advisors can also identify potential anchoring biases and consider ways to shift clients' thinking about those issues. For example, clients may be anchored to reaching or maintaining a certain level of retirement savings or be mentally stuck to the value of a stock. Also, a client may be reluctant to sell the stock until its market value reaches a specific number. Financial advisors may be able to reframe these decisions considering clients' financial goals rather than arbitrary numbers. Hence, we can also use checklists to identify potential investment anchoring pitfalls.

According to this paper, informed investors are only affected by gambler's fallacy while making stock investment decisions. Thus, they should always keep in mind that the probable shifts of trends can be mitigated by statistical models that try to track trend shifts and are not biased or affected by emotional biases. In addition, the findings showed that uninformed investors only are affected by representativeness bias while making their stock investment decisions. Accordingly, they are about to make a stock-related investment decision. Therefore, they should look at more extended periods. Also, uninformed investors should seek financial advice from professionals who can analyse and explain the trend of their investments in the past.

Alongside heuristics, the findings align with the research done by Le Luong and Ha (2011). Prospect biases (loss aversion bias and mental accounting bias) also impact the stock investment decisions of both informed and uninformed investors. To protect them from having their emotions and cognitive biases govern their financial matters, recommendations given to uninformed investors are for them to abide by a long-term investment plan. As a result, more rational thinking is put into making investment decisions without only being guided by losses and gains (Le Luong and Ha, 2011). This can harm the psychology and the investment performance of investors. Therefore, informed financiers and client advisors ought to rely on extensive research to review regularly whether their strategy still meets the market conditions or not.

Moreover, uninformed investors are advised against splitting their investment portfolios into different mental accounts as each part of their portfolio may have a stringent connection to the other parts. Thus, treating each piece independently can lead to bad investment performance (Le Luong and Ha, 2011). As for informed investors, they are advised to research and understand more about framing and mental accounting. Furthermore, they could spread awareness to their clients on these matters and always keep in mind that while dealing with their clients the mental accounts that the clients make and the investment goals, they have in mind according to their risk lenience. Informed investors should also remember that there is no single overall tolerance level of risk for all clients. However, instead, their client may have diverse risk tolerances. Therefore, informed investors should advise clients to appraise their financial and monetary instruments with the broadest possible outlook and avoid fixing specific financial instruments. Additionally, proper investment planning might be of immense help. An investor with a clearly defined investment plan will be safe from falling victim

to indiscriminate investment based on the above-mentioned factors and biases. In addition, pre-planning grants investors the ability to ignore the temptations of any investment opportunity promising 'imaginary' huge returns without any supporting evidence.

The following practical implications may be gleaned from our research findings: first, when shares of new and diverse companies are offered on the ESE, where this study was conducted to provide insights to existing and potential investors, investors can present and make practical decisions without relying on incorrect information or having to keep unsuccessful projects, and this occurs when shares of new and diverse companies are offered on the market.

Second, counsellors, financial advisors, and brokers may use this research to understand the impact of behavioural biases on financial market trading activities, market dynamics, and how to manage newly traded assets. As a result, they may develop training programs and tools for current and potential investors, correcting any distortions or abnormalities in the stock exchange market encountered by investors when making investment decisions.

Third, policy implications of our study for governments are designing techniques for the effective operation and management of the Egyptian stock market while emphasising the behavioural perspective in trading decisions. Furthermore, the Egyptian stock market is enacting rules and regulations to encourage investors to develop their financial literacy via different programs before participating in investment transactions. Finally, the findings of this study will provide a deeper understanding of the influence of behavioural biases of individual investors on their stock investment decisions, as well as the role of gender differences in this relationship, for teaching bodies that will expand this research into other areas of study.

8 Further research

It is suggested that for future research that the study of behavioural finance and behavioural biases should be tested for institutional investors trading at the ESE. Furthermore, such expanded research can aid in applying behavioural finance theories for all types of stock investors in all kinds of emerging stock markets.

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