

INVESTIGATING THE PSYCHOLOGICAL FACTORS THAT AFFECT EGYPTIAN INVESTORS' BEHAVIOUR AND DECISIONS BEFORE AND AFTER THE PANDEMIC

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Abstract

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Egyptian investors have lost a large portion of their investment due to the coronavirus pandemic. This research is novel research that aims to identify the behavioral factors of Egyptian investors that affect their investment decisions, before and after the pandemic. A number of survey questionnaires were distributed to Egyptian investors, in addition to personal interviews. Descriptive statistics and a regression model were used to analyzing the impact of psychological factors on the investment decisions for Egyptian investors. Results revealed that demographic and psychological factors influence investment decisions: overconfidence, loss, and regret aversion, disposition effect, representativeness and herding behavior, but it is not affected by gambler's fallacy. It is affected also by some other demographic variables. However, income level has no effect. After the pandemic, not all demographic and psychological factors affect Egyptian investor's behaviour. The behaviour finance theory is valid only and applied before the pandemic. This research opens the door for a new dimension to studying how to work on the governance of investors' decisions, rationalizing those decisions and their effectiveness, which ultimately contributes to achieving high returns on their investment portfolios.

Keywords: Behavioural Finance, Investors' Governance, Emerging Markets

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1. INTRODUCTION

Literature science of finance has three schools of thought: old, modern, and new finance. The old school focused on the nature of finance claims and financial statement analysis. The modern school focused on asset pricing models and different valuation techniques employing rational economic behavior. Whilst the new finance school in the late

1990s deals with efficient markets by adopting behavioral models. Moreover, traditional finance theories assured that rational investors use the information and making a decision based on utility function to maximize their wealth. The new classical finance tries to tell us the following: 1) the market value of an asset should be consistent with its fundamental value; 2) finance markets react quickly to any newly available information upon

arrival to the stock market; 3) asset prices follow a random walk stemming from the random arrival of new information in the capital market; and 4) no investor can consistently beat the market or even earn abnormal returns. Since then, efficient market hypothesis (EMH) is a major topic in finance. Financial theories have been based on rational investors and the market efficiency hypothesis. Investors are rational enough to use such information to purchase undervalued and sell overvalued stocks. If investors did not make rational decisions, their irrationalities are traded randomly in the stock market and cancel out each other on average. Investors are always seeking to maximize their returns against acceptable certain levels of risk. This remains the reason for the irrationality of investor's behavior. This irrationality exists from taking investment decisions that deviated from logic (Chang, 2008). Therefore, the efficient market theory has been criticized for a number of reasons since it assumes that:

- All investors have the same expectation regarding stock prices. If this is the case security trading would not exist because we will not find any investor ready to sell or purchase.
- In real life, investors do not have full access to all available information.
- It assumes that stock markets are not a reflection of reality. Although, investments in stock markets are used in the operations of existing companies.

There are many contradicting views to reject or support the hypothesis of the efficient market. If the capital market is efficient, investors will have no chance of achieving any abnormal returns. Investors can only obtain abnormal returns by investing in risky assets. Malkiel (2003) defined the efficient capital market in which prices fully reflect all available information, therefore, investors cannot obtain abnormal returns from capital market transactions. Thus, the representative investor is an individual who acts to maximize their expected utility. The hypothesis that investors are rational and have full access to information is unrealistic because investor behavior is usually unpredictable. Therefore, the efficient capital market hypothesis does not exist in reality since investment decisions by individuals investors are usually affected by psychological factors.

Grossman (1980) argued that if the efficient market theory is valid then investors will have no incentives to making any deal in the market since stock prices are fair and there are no overvalued or undervalued stocks. Even when information are accessible by all investors, stock prices will not reflect such information immediately because this requires some time for information to transfer from informed investors to the public in the end.

Fama and Jensen (1983) believe that markets are efficient and stock prices are adjusted rapidly to the announcement of any new information. Gad (2011) stated that the same expectations for Egyptian investors they have let them are unbiased in anticipating their future returns. Chang (2008) argued investors can understand the patterns in the stock market using different pricing models. Park and Sohn (2013) assured that the efficient market theory is invalid because recently available information is not reflecting in traded stock prices,

as stock prices moving in different patterns from their fundamental value and a discrepancy exists between security prices and the calculated prices using pricing models. Neither investors are rational nor is the market efficient. Malkiel (2003) rejected the theory since exceptional events could not make the market efficient. The irrationality of stock prices usually exists because there are arbitrage opportunities. This allows the trading mechanism to correct the deviation in stocks prices over the short term and pushes stocks prices back to inequality with its fundamental prices over the long term (Chang, 2008). Yaclin (2010) argued that the efficient market theory ignores the impact of psychology on individual's behavior and consequently their investment decisions. Fama (1998) defended the efficient market theory as it cannot completely be replaced because findings of the behavioural finance theory contradict each other and the psychological factors are immeasurable. According to Ritter (2003), behavioral finance was formulated as a new branch of theory and actually challenges the efficient market hypothesis by combining the knowledge of psychology, sociology, and other social sciences that could influence stock prices. Al-Hajieh, Redhead, and Rodgers (2011) added that investors' emotional state influences asset prices, that investors' mood swings have been attributed to weather conditions including sunshine, daylight, and temperature. As a result, behavioral finance theory can be used to explain why financial markets are inefficient. According to Ackert and Deaves (2010), individual investors easily beat the market by employing fundamental analysis. But, this is incorrect since some psychological factors have an impact on the investment decision. Lawrence, McCabe, and Prakash (2007) concluded that stock prices are not consistent with their fundamental values and 20% of changes in the stock market could be attributed to changes in fundamental value. Fair (2002) also concluded that many changes in S&P 500 index occur with no change in fundamental value. As a result of this research, there are two viewpoints have been developed. The first is that investors usually make rational decisions based on fundamental analysis, this view is also known as traditional finance (Yaclin, 2010). The second view is related to the presence of many psychological factors that affect investment decisions taken by individuals' investors. It is a new standpoint adopted the integration of behavioral factors into other financing theories in order to explain investment decisions taken by individuals' investors. The invalid assumption of the irrationality of investors imposes a challenge on behavioral finance to introduce the main variables that can influence investors' behaviour in the stock market (Chang, 2008). Investors are influenced by psychological factors such as their beliefs and emotions, thus deviating from rational choices and causing a shift in asset prices in relation to their intrinsic value. Since then, there are many attempts that have been conducted to determine the psychological factors that impact investors' behaviour. The behavioral finance theory aims to reduce the gap between the propositions of market efficiency theory and practical reality in order to understand market irregularities through relying on investors' psychological factors. Its importance stemmed from its ability to explain how

and why financial markets are inefficient. Sarkar and Patel (1998) and Ritter (2003) supported this argument with evidence of the stock market bubbles in Japan in the late 1980s, Taiwan in 1987-1989, and the U.S in the late 1990s. These bubbles are driven by systematic repetitive error due to the excessive overconfidence and massive reliance of investors on their skills and experience.

The research attempts to answer the following questions:

RQ1: What are the demographic and physiological factors that affect the behavior of the investor in the Egyptian capital market, as it is one of the most important emerging markets in the Middle East and North Africa region.

RQ2: Did these factors differ in their impact on the behavior of the Egyptian investors with the emergence of the coronavirus pandemic?

RQ3: Can we provide an applied guide for the governance of investment decisions for Egyptian investors, which works to maximize returns on their investment portfolios?

The structure of this paper is as follows. Section 2 reviews the relevant literature, research motivation, research contribution, and research aims and objectives. Section 3 analyses the methodology that has been used to psychological factors of Egyptian investors. Section 4 outlines the governance of investment decisions and Section 5 concludes the paper.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Prospect versus expected utility theory

Traditional and behavioral finance are developed on two main theories: prospect and expected utility theory. Expected utility is defined as a decision under certain conditions of risk. Each decision yields a certain outcome and the probability associated with this certain outcome is unknown. In the investment world, individuals always choose preferences that maximized their satisfaction, given two choices and considered that preferences are rational the individual investor should prefer one preference against the other or he is indifferent. Utility theory tries to emphasize and investigate how investors should rationally act and what they should do and how they should behave. This deviation leads researchers to develop another theory in which enables them to overcome and explain such deviation.

Tversky and Kahneman (1992) introduced the prospect theory to explain what the actual behaviours of individual investors are. Investors, usually act against the theory of expected utility. There is no ideal behaviour, investors are irrational because many factors affect investor's behaviour. The main findings of this study are summarized as follows:

- Individual investors making investment decisions in terms of gains and losses.
- Individual investors tend to conduct the problem in a different way.
- Individual investors give more weight to options that have a certain outcome.
- Individual investors focus on different factors among alternatives.

Muradoglu and Harvey (2012) assured the necessity to identify the psychological biases that influence the investment decisions of investors. Ignoring to understand their investment decisions will have an impact on investors' decisions and affect their portfolios' performance. Furthermore, grasping the psychological biases can help individual investors to avoid common mistakes and assist them to develop more rational decisions and better evaluation and forecasting performance. Accordingly, a large number of researchers in many countries have conducted surveys to reach the main bias factors that influence investors' decisions. Das (2012) investigated demographic variables' effects on investor's decisions and the security selection process. Iqbal and Usmani (2009) and Subrahmanyam (2007) besides other studies across the globe found that there are many psychological factors that affect investor's decisions and vary among them and differ from country to country. The prospect theory focuses on three biases: regret aversion, loss aversion, and mental accounting. Loss aversion is when individual investors fear losses much more than they value gains. The state of loss aversion selling prices is always higher than buying prices. Investors usually demand a minimum compensation to sell a stock. This compensation is several times higher than the price they are willing to pay for it.

Lim (2012) examined the relationship between psychological biases and the decision-making of investors in the Malaysian stock market. Results revealed that overconfidence, conservatism bias, and regret have positive significant impacts on investors' decision-making. However, herding behavior has no impact on investors' decision-making. Yung and Liu (2009) showed that the behavior patterns of individual investors in Ho Chi Minh stock market such as overconfidence, anchoring, herding, loss aversion, and regret aversion have moderate impacts on the investors while market factors have the highest impact among all on the investors' decision-making. Pourbijan, Setayesh, and Janani (2014) found that overconfidence bias has a significant impact on investment decisions in Tehran Stock Market. They examined the effects of behavioral factors such as heuristics (representativeness, gambler's fallacy, anchoring, overconfidence, and availability bias) and risk aversion on the decision-making of equity fund managers of Pakistan. Results demonstrated a positive and significant relationship exists between the behavioral factors and investment decision-making. In conclusion, most of the previous studies have found psychological factors have positive and significant impacts on investors' decision-making. It meant that trading was influenced by the investors' irrational behavior. Behavioral finances could relatively easily explain why an individual had made a decision.

2.2. Behaviour finance main blocks

Ackert and Deaves (2010) and Kengatharan and Kengatharan (2014) classified behaviour finance into behaviour preferences and heuristics and biases. Behaviour preferences are *regret aversion, loss aversion and overconfidence*. Whilst, biases and heuristics focus on *herding behaviour, gambler's fallacy and representative* and, finally, *disposition effect*.

2.2.1. Behaviour preferences

Regret aversion

Individuals' investors seeking to avoid the investment decisions that result in achieving loss in order not to regret due to their previous investment decisions. Accordingly, they usually aim to afford a lower degree of risk to minimize losses that could result from their investment decisions. Investors are very reluctant to bear any degree of risk. Malaysian investors are losing opportunities since they buy at a high and sell at low prices, they do not buy stocks at good prices at the right time. Therefore, they are to regret their investment decisions. Chin (2012) defined regret as the emotion of pain and regret resulted when individual investors take a bad investment decision whilst they can make a good decision and purchase another stock. In that sense, investors experience regret when they buy stocks at high prices and sell them at lower prices. Also, individual investors experience regret when they sell stocks too early and lower future gains. This means they hold some stocks for a longer time than necessary until prices go down compare to the price they bought stock. Therefore, we expect to find a relationship between regret and investors' investment decision.

H1₀ (null hypothesis): There is no significant relationship between regret aversion and investors' behaviour for Egyptian investors.

H1: There is a significant relationship between regret aversion and investors' behaviour for Egyptian investors.

Loss aversion

In the world of investment, investors fear losses more than they value gains. Barberis and Huang (2001) found that the loss aversion level depends on the previous track record of investors in the stock market. Losses after previous gains are more painful than to have gains to overcome previous losses. Thus, potential investors always weigh risks to avoid any future losses to protect their current wealth.

H2₀ (null hypothesis): There is no significant relationship between loss aversion and investors' behaviour for Egyptian investors.

H2: There is a significant relationship between loss aversion and investors' behaviour for Egyptian investors.

Overconfidence

Overconfidence and risk perception has a positive effect on the risk-taking behaviors of investors. Overconfidence corresponds to individual investors who are too confident and underestimate risk. Overconfidence investors believe more in their skills and capabilities than other investors, they refer any profits to their own skills and experience. Yung and Liu (2009) stated that overconfidence investors always blame their failure on external factors since they consider themselves as competent. Graham, Harvey and Huang (2009), Cronqvist and Siegel (2014), and Daniel and Titman (1999), therefore they put more emphasis on facts and opinions in order to justify only their decisions and ignore those that contradict their decisions. According to Barber and

Odean (2000) and Chandra and Kumar (2012), those investors are quite confident that they can beat the market. This confidence pushes them to trade excessively and pay extra transaction costs in which results in poor investor performance and a negative abnormal return, especially if they have a lack of experience. Park, Konana, Gu, Kumar, and Raghunathan (2010) concluded that men are more confident than women. On the other hand, Barber and Odean (2011) proved that men overestimate their reactions compared to women. Which resulted in trading excessively (De Bondt, Muradoglu, Shefrin, & Staikouras, 2008). Overconfidence in investor behaviour leads to excessive trading. The more overconfident the investor, the higher-risk investments the investor undertakes.

H3₀ (null hypothesis): There is no significant relationship between overconfidence and investors' behaviour for Egyptian investors.

H3: There is a significant relationship between overconfidence and investors' behaviour for Egyptian investors.

2.2.2. Heuristics and biases factors

Disposition effect

According to Chang (2008), Shefrin and Statman (1985), a disposition is selling winners stocks excessively soon in order to gain value and hold losers stocks for a long period. This process aiming to increase the value of loser stock someday and proved on Taiwan investors. Kaustia (2004) and Ferris, Haugen, and Makhija (1988) proved the presence of disposition effect in the investors' behaviour. Stocks that have high trading volume have also a high level of return are having and vice versa. In addition, investors who are gained returns sell their stocks frequently than those investors who experience a loss because there is a disposition effect. Garvey and Murphy (2004) defined the disposition effect as "when investors choose to trade in small caps stocks that have low prices and hold less volatile stocks".

H4₀ (null hypothesis): There is no significant relationship between disposition effect and investors' behaviour for Egyptian investors.

H4: There is a significant relationship between disposition effect and investors' behaviour for Egyptian investors.

Herding behaviour

Many researchers have agreed that the herding behaviour effect is the main source of investors' irrationality especially during times of uncertainty. Kengatharan and Kengatharan (2014) defined the herding behaviour phenomena as the tendency to follow other investors' actions. Investors are very concerned about the collective information than private information and are affected by their social interactions. Herding behaviour exists if some investors are imitating the observed actions of other investors rather than employing their own knowledge and skills (Daniel, Hirshleifer, & Subrahmanyam, 1985). Barberis and Huang (2001) stated that social investor finds the stock market more attractive if more of his peers engaged. Individuals' investors who interact with their neighbors have a higher probability to be engaged in

the stock market. Herding behaviour usually exists when investors buy/sell the same stock at the same time during the market fluctuations.

H5₀ (null hypothesis): There is no significant relationship between herding behaviour and investors' behaviour for Egyptian investors.

H5: There is a significant relationship between herding behaviour and investors' behaviour for Egyptian investors.

Gambler's fallacy

Gambler's fallacy is defined as the outcome that has been repeated for consecutive events. However, it is less likely to repeat again at the next event. Islam (2012) applied this concept in the stock market, if a stock has increased for several consecutive sessions then investors are not expecting that the same stock will continue rising, then investors will tend to liquidate their positions claiming that the stock price will decrease afterwards. And vice versa, if a certain stock falls for several consecutive sessions, then it is a hidden invitation for investors to purchase this stock since the stock will not follow the same trend again (the decrease case). Amin, Shoukat, and Khan (2009) proved Gambler's fallacy as investors in Pakistan take their investment decision on the wrongly assumed probability of a trend; 75.1% of investors in Pakistan believe that the current pattern is determined by the occurring some series of events. However, this is not correct because there are some consequences as well.

H6₀ (null hypothesis): There is no significant relationship between gambler's fallacy and investors' behaviour for Egyptian investors.

H6: There is a significant relationship between gambler's fallacy and investors' behaviour for Egyptian investors.

Representative bias

Elbadry (2010) stated that investors always rely on their own experience, skills, knowledge, and information that they have about the target investment. Wu (2009) noticed that investors overreact and overuse representativeness in their investment decisions. Ackert and Deaves (2010) found that when investors believe that information are recent and updated, companies with high performance in recent years will perform better in the coming years. Therefore, individual investors tend to invest in a stock that has a high price if its price tends to increase. Investors also ignoring stocks whose market prices are below their fair (fundamental) value. Gad (2011), Ackert and Deaves (2010), and Ackert and Church (2006) stated that investors invest more money in companies that have a positive image. Iqbal and Usmani (2009) added that investors are more biased toward companies that apply business ethics social responsibility.

We can conclude that several studies proved the existence of irrational investor behavior on the capital market, such investors can cause changes in the movement of prices in relation to their fair values. Trading is influenced by the investors' irrational behavior. Meaning that the hypothesis of rationality is rejected and capital markets are influenced by psychological and sociological factors and are not necessarily efficient. Behavioral finance give evidence that the market was not efficient and the investors were not rational. This matter can be

seen from the decision-making of investors affected by some psychological factors.

Accordingly, this study is designed to investigate the irrationality in the behaviour of Egyptian investors. Due to the recent economic events that hit the world and the stock market in Egypt, in particular, because of the coronavirus pandemic. This resulted in a change in investors' performance, behaviour, and their confidence in the market and losing part of their wealth. The purpose of this study is to develop a governance guide for Egyptian investors in which enabling them to avoid common trading mistakes so that they can develop rational investment decisions, enhance their forecasting performance, and generate a more efficient evaluation (Muradoglu & Harvey, 2012). This study focuses on investigating the psychological factors of Egyptian investors' behaviour. The effect of these factors on the investment decisions of Egyptian investors to correcting and preparing a governance guide to their investment decisions

H7₀ (null hypothesis): There is no significant relationship between representative bias and investors' behaviour for Egyptian investors.

H7: There is a significant relationship between representative bias and investors' behaviour for Egyptian investors.

2.3. Research motivation

The stock market index fell sharply from the beginning of 2020 until the end of July 2021. Where the index decreased during the year 2020 from 13,961 points to 10,844 points with a decrease rate of 22.32%. In addition to its ups and downs during the year 2021, it fluctuates within very narrow limits, declining until July 2021 by 1% without achieving any significant rise or rebound rate. This contributed to a sharp decline in most of the securities traded in the market and resulted in a decline in the portfolios of investment funds and the portfolios of major investors, the incentive to conduct this research to identify the behavioral and demographic factors affecting the Egyptian investor when making an investment decision.

2.4. Research contribution

This research is novel research that deals with the impact of behavioral and demographic factors on the behavior of the Egyptian investor when making an investment decision before and after the coronavirus pandemic. Which is a real addition in the field of behavioral finance and also a new dimension to the study of investor behavior and the impact of that behavior on investment decisions by applying to Egypt as one of the emerging markets. Not only that, but the research adds a new dimension to studying how to work on the governance of investors' decisions, rationalizing those decisions and their effectiveness, which ultimately contributes to achieving high returns on their investment portfolios.

2.5. Research aims and objectives

This research aims to examine the demographic and psychological factors that affect Egyptian investors' behaviour and therefore their investment decisions before and after the pandemic.

By identifying demographic and psychological factors we can assist Egyptian investor to maximize their return by avoiding these biases.

This research assists brokerage companies and investment banks to identify the physiological biases for their clients and therefore to implement the appropriate effective asset allocation strategies to satisfy their investment needs and maximize their returns. The research recommends a governance guide for Egyptian investors in order to avoid these psychological biases and generate optimal returns.

3. RESEARCH METHODOLOGY

3.1. Data collection

We adopted a quantitative approach in collecting and analyzing data using a questionnaire to collect data about opinions and behavioural for Egyptian investors — during the interim period from 2018 to 2020 — and are a more appropriate tool for explanatory and analytical purposes and are used by most of the previous research. A questionnaire is distributed and interviews are conducted among small, medium, and professional Egyptian investors representing different brokerage firms in Egypt. In that essence, we will ensure the credibility of the sample and the reliability of the results. Results are analyzed using multiple regression analysis. The questionnaire is divided into three sub-sections.

The first section is devoted to investigating investor's socio-economic and demographic details, as well as investors' trading transactions. The second section investigates the behavioural preferences of Egyptian investors. Whilst the last section is to investigate behavioural biases. The questionnaire is designed and structured on 20 questions as scenario questions. Egyptian investors answered on a questionnaire using a Likert scale from "strongly agree" (scale 1) to "strongly disagree" (scale 5). According to Saunders, Lewis, and Thornhill (2012), the interview is an efficient tool to investigate the psychological biases of Egyptian investors. Using questionnaires will give good and fair results since respondents will be subject to standardized questions and subjectivity does not exist.

3.2. Sample size

According to Kourtidis, Sevic, and Chatzoglou (2011) in Greece, Chandra and Kumar (2012) in India, Islam (2012) in Bangladesh, and Chin (2012) in Malaysia, samples of 345, 350, 350, and 250 have been taken, respectively. Therefore, the sample size of this study is entirely random and was taken as the previous studies which is almost 300 respondents. However, only 245 investors responded to the survey at a rate of 81.6%.

Table 1. Research variables

| Independent variables | Demographic variables (control) | Dependent variable |
|-------------------------|---------------------------------------|-------------------------------|
| Loss aversion | Age | Egyptian investors' behaviour |
| Regret aversion | Gender | |
| Disposition effect | Level of education | |
| Overconfidence | Years of experience | |
| Herding behaviour | Level of income | |
| Gambler's fallacy | Average returns over the last 5 years | |
| Representativeness bias | Number of stocks | |

Independent variables refer to the behaviour of Egyptian investors which represents the psychological factors on how Egyptian investors act in the stock market. Control variables represent the demographic information of Egyptian investors.

a retirement fund. Those investors investing in the Egyptian stock market to make a capital appreciation. Investors in the late age of 65 years are not enthusiastic to invest in the stock market. Since their income is allocated to meet their cost of living.

3.3. Data analysis

3.3.1. Reliability analysis

We can rely on Cronbach's value if the coefficient of alpha is 0.60 and above. Table 2 shows the data collected are reliable since the alpha coefficient is 0.801 indicates that the factors examined are homogenous.

Table 2. Reliability test

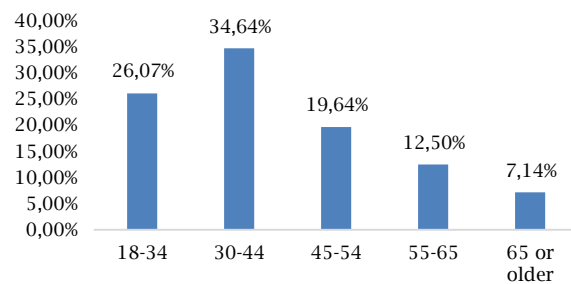
| Cronbach's alpha | No. of items |
|------------------|--------------|
| 0.801 | 245 |

3.3.2. Descriptive statistics

Control variables (demographic variables)

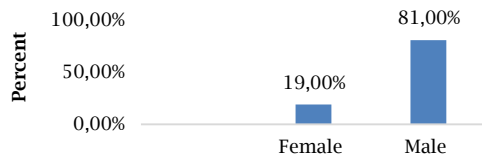
1. *Age*: Many Egyptian investors who are between the age of 30-44 are in the beginning and middle of their careers. Their income inflow grows over time. They need to accumulate income to invest in

Figure 1. Age



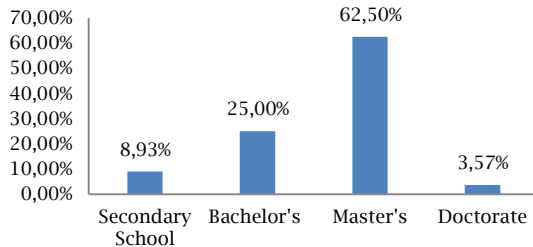
2. *Gender*: Most investors in Egypt are male since they represent 81% of the survey. The remaining 19% were female. Since, the standard deviation and mean calculated are 0.321 and 0.79, respectively. Men trade more in the Egyptian stock market than females. This is attributed to the Arab culture in general. Men are taking care of their families, they need more income through the investment in the stock market to cover their spending.

Figure 2. Gender



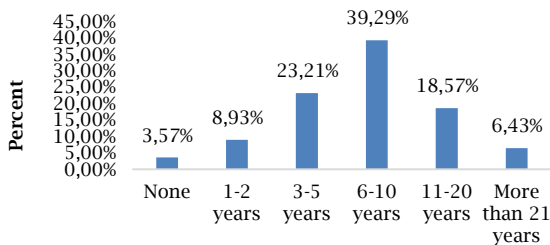
3. *Level of education:* Many Egyptian investors have a master's degree, they represent 62% of the sample. They have a prestigious level of education; compared to 25% who have a bachelor's degree and compared to who 9% have had secondary schools; 2.7% is the mean of investors who have a master's degree with a 0.698 standard deviation and data have low dispersion. Egyptian investors have some basic knowledge of finance to invest in the stock market.

Figure 3. Level of education



4. *Years of experience:* Many Egyptian investors have 6 to 10 years of experience in the stock market at a rate of 39.29% of investors; 23.21% and 18.57% have 3-5 years of experience and 11-20 years respectively. Only 3.57% of investors have a lack of experience in the stock market. At a mean of 3.25 and a high standard deviation of 1.24 diverge from the mean. Egyptian investors who have lack of experience are more likely to have losses and no longer invest in the market. Whilst, investors who have experience are eager to learn from their previous behaviour to avoid any degree of risk. That would result in an increase in that kind than less experienced investors.

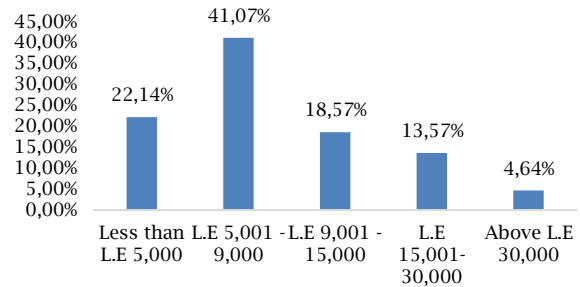
Figure 4. Years of experience



5. *Level of income:* Many Egyptian investors tend to invest in the stock market if their income lays between LE 5000 and LE 9000. Also, they tend not to invest in the stock market as their income

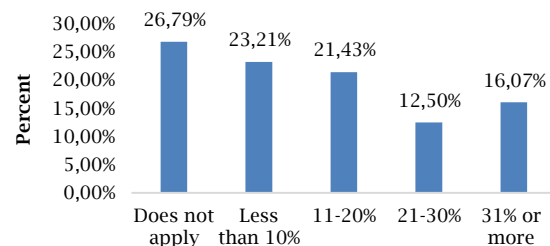
level increases gradually from LE 9000 to LE 35000 and above. This result is supported by a mean of 2.78 and a standard deviation of 1.06. It is biased toward a low level of income. Investors seeking to satisfy their lower basic needs first when they have a low-income level. According to Kaur (2013), investors seeking to increase their income by investing in highly risky assets to cover their basic needs. As a result, when investors have a lower level of income they aiming to invest in the stock market for capital and wealth appreciation.

Figure 5. Level of income



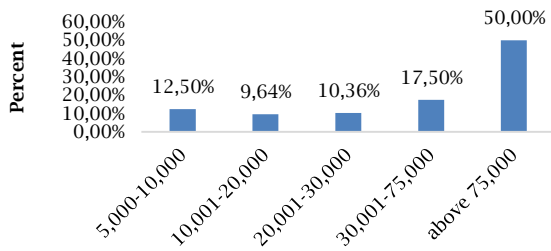
6. *Average returns over the last 5 years:* It is not surprising to conclude that 26.79% of Egyptian investors did not achieve gains over the interim period. This is because the stock market was move in a random walk due to economic instability caused by COVID-19 that affected the market. As a result, gains and losses of those investors are cancelling each other. In addition, investors who are able to beat the market that was because their money is invested in less risky investment vehicles as mutual funds. As a result, a large number of investors is on both extremes since the standard deviation is 1.18.

Figure 6. Average return over the last 5 years



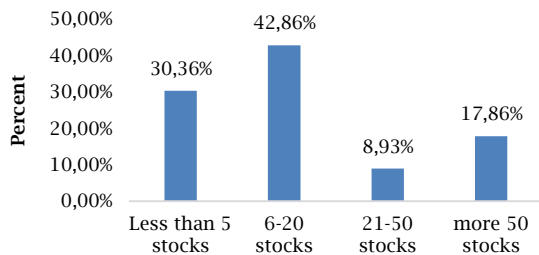
7. *Portfolio size:* 196 repondents of 245 invest amount above 75,000 EGP, whilst the rest of Egyptian investors are allocated among the other categories from LE 5,000 to LE 30,000. With an average of 19.9%. The mean value of the investment is 3.71 represents the average of LE 30,000 to LE 75,000 and a 1.23 standard deviation dispersion from the mean. These findings are not consistent with the findings of income. We attribute this conclusion to the fact that Egyptian investors keep adding their gains to their principal and reinvest again in the stock market. Since they are able to generate more income. This strategy repeated over time to maximize their wealth. Therefore, the investment value is not correlated to the level of income of Egyptian investors.

Figure 7. Portfolio size



8. *Number of stocks*: A high percent of Egyptian investors (42.86%) are most likely to have a portfolio of a maximum of 20 stocks; 30.36% of Egyptian investors invest in less than 5 stocks in their portfolios; 8.93% of Egyptian investors invest between 21–50 stocks, and 17.86% of Egyptian investors invest in more than 50 stocks. At a mean of 1.89 results are dispersed from the mean at a rate of 1.73. We can conclude that most Egyptian investors prefer to invest in small portfolios of a maximum of 20 stocks rather than large portfolios in order to avoid high transaction costs. However, for investing more than 50 stocks indicating their interest in investing in well-diversified portfolios such as mutual funds and not to construct individual portfolios or investing in individual stocks.

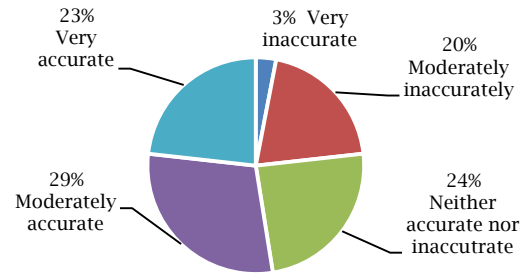
Figure 8. Number of stocks in investors' portfolio



Psychological factors

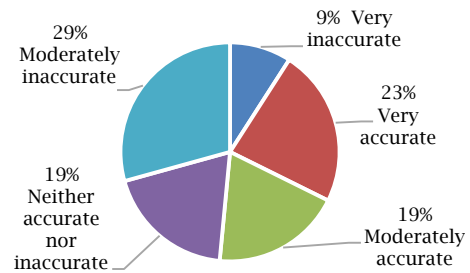
9. *Overconfidence*: 50% and more of Egyptian investors see themselves better than other investors since they have a high level of confidence. Overconfidence, according to Cronqvist and Siegel (2014), is an individual bias and is affected by demographic and socio-economic factors. It has a significant relationship with the size of the portfolio and the investment value of investors. Egyptian investors who have a high degree of confidence have a large size of portfolio of more than 50,000 EGP. Low confident investors invest a low amount of their wealth between 15,000 EGP and 25,000 EGP. They represent only 60% of Egyptian investors.

Figure 9. Overconfidence



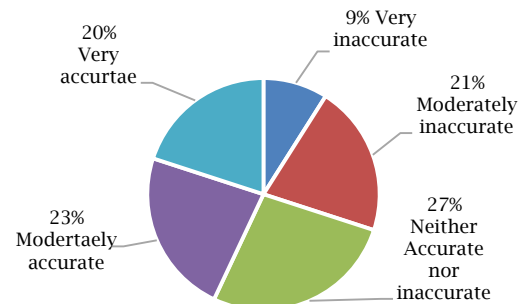
10. *Loss aversion*: 61% of Egyptian investors are loss-averse. The relation with age, portfolio size, and average returns were significant; 60% of investors who are loss averse are in middle age. They have large portfolios and their average return on investments is between 13–22% over the past three years; 31% of Egyptian investors are not loss averse and did not achieve any gains in the last two years. Since they did not weigh the risk.

Figure 10. Loss aversion



11. *Regret aversion*: 34% of Egyptian investors are regret averse. There is a significant relation with average returns, portfolio size and age of investors. Egyptian investors who are between the age of 30–44 regret averse. They have an average return of less than 12.5%. They sell profitable stocks too early and never wait for any increase in price. This leads to losing some good opportunities in the stock market; 88% of Egyptian investors regret averse to have a portfolio of a maximum of 6 stocks less than those less regret averse investors. They try to avoid the volatility in asset prices and losing their money.

Figure 11. Regret aversion



Biases factors and heuristics

12. *The effect of disposition*: 80% of Egyptian investors are more biased towards the disposition effect. They sell stocks whose prices are recently increased to redeem gains very quickly. The instability of the stock market enforces Egyptian investors to get any gains soon. They are not certain about the future movements in stock prices; 70% of Egyptian investors hold their losing stocks for a long period of time hoping the value increase over time. A low percent of Egyptian investors (8%) sell their losing stocks once they start to decline in value to apply the stop-loss strategy.

Figure 12. The effect of disposition (Part 1)

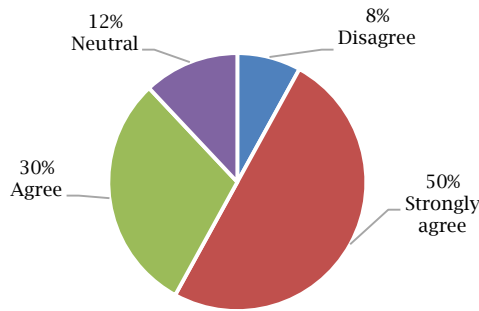
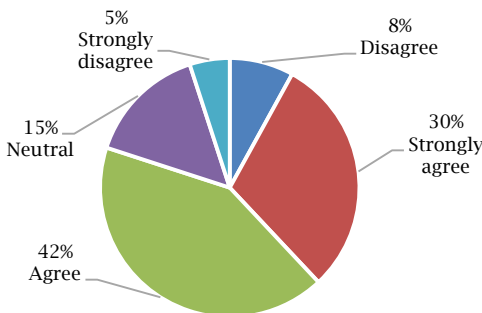
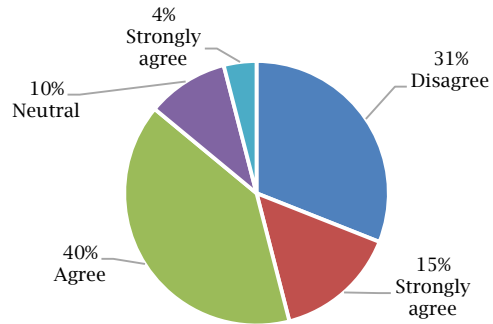


Figure 12. The effect of disposition (Part 2)



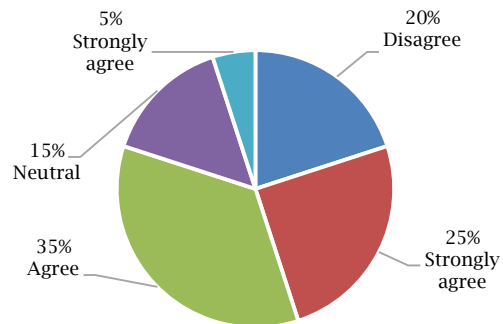
13. *Herding behavior*: Egyptian investors follow the market trend since 62% of investors would prefer to buy a specific stock if there is a huge demand for the stock at the beginning of the trading session. Whilst 9% disagree to follow this behaviour. Results were consistent when Egyptian investors were asked about following their broker advice or media recommendations, as 73% of Egyptian investors would prefer the media recommendations much more than fundamental and technical analysis. They base their investment decisions accordingly. Compared to only 5% who disagreed to follow the media recommendations.

Figure 13. Herding behaviour (Part 1)



Note: Follow the brokers' advice, friends, and media recommendations.

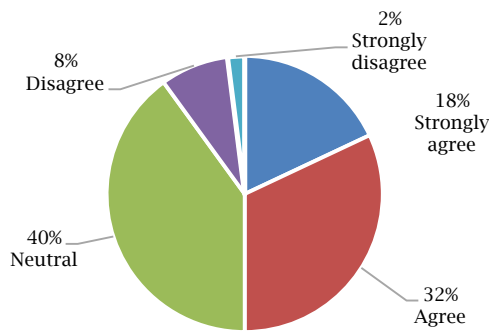
Figure 13. Herding behaviour (Part 2)



Note: Buy stock when there are many submission orders at the beginning of the trading session.

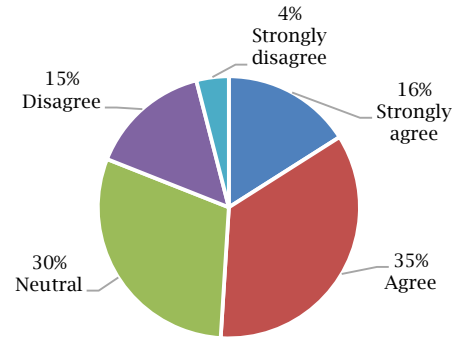
14. *Gambler's fallacy*: Egyptian investors are affected by the concept of the gambler's fallacy; 54% of investors expect that the market will not follow the same pattern as previous periods, however, only 10% disagreed. Egyptian investors believe that prices are moving in a random walk. If prices are going up in the last three months, they will go down in the next period; 43% of Egyptian investors are not sure about the future price movements. Therefore, they were not able to draw future expectations. Many Egyptian investors rely on the evaluation of the market trends when they taking investment decisions; 72% of Egyptian investors believe that evaluating the market trend will assist them in taking better investment decisions. Egyptian investors believe that trading is not related to gambling since winning depends on luck and is not related to the performance of traded stocks. As a result, evaluating the market enables Egyptian investors to make rational investment decisions.

Figure 14. Gambler's fallacy (Part 1)



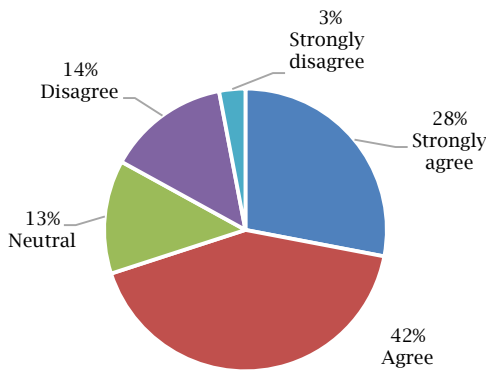
Note: Taking rational investment decisions is based on evaluating market trend.

Figure 15. Representative bias (Part 2)



Note: Investors invest in companies that are well known and have a good image and reputation in the market.

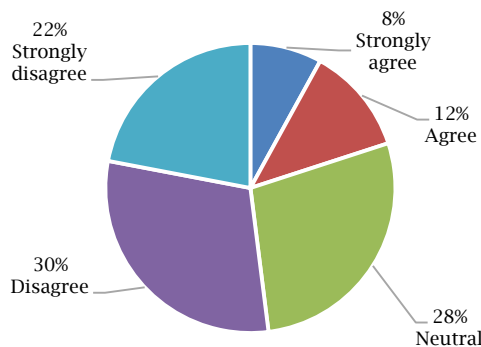
Figure 14. Gambler's fallacy (Part 2)



Note: Due to the increase in the value of EGX30 over the last six months, expecting the index decrease.

15. Representative biases: 79% of Egyptian investors would prefer to invest in well-known companies compared to those companies that they rarely hear about. The recommended companies have a good image, reputation and are financially strong. 59% of Egyptian investors sell stocks that have announced bad news and buy a stock that has good news. This confirms the conclusion that Egyptian investors are biased to how the company is presented in the market regarding different financials and social aspects such as corporate social responsibility. We conclude that Egyptian investors are representative bias.

Figure 15. Representative bias (Part 1)



Note: Investors buy stocks if a firm has positive announcements and sell those that have negative announcements.

3.4. Statistical model

Since the sample size is greater than 30 respondents then according to the central limit theorem, the sample mean distribution tends to move towards a normal distribution. Since the number of the respondents is 245 out of 300, as a sample size then the data are normally distributed and there is no need to conduct a normality test. A multicollinearity test is conducted to avoid any inappropriate influence or reverse effect on the dependent variable. Egyptian investors' behaviour is measured by the investment value. Ordinal regression is used to conduct the analysis.

3.4.1. Main model hypothesis

H_0 : The model is significant.

$H1$: Parameter estimates are significant $ij = 0, i = 1, \dots, 14, j = 1, \dots, 6$.

Significance of the model:

Table 3. Model fitting information

| Model | Log-likelihood | Chi-square | df | Sig. |
|-----------|----------------|------------|----|------|
| Intercept | 442.417 | | | |
| Final | 229.138 | 213.279 | 47 | 0.00 |

Table 4. Goodness of fit

| Model | Chi-square | df | Sig. |
|----------|------------|-----|------|
| Pearson | 18515.19 | 425 | 0.00 |
| Deviance | 229.138 | 425 | 1.00 |

Table 5. Pseudo R-square

| Model | Chi-square |
|---------------|------------|
| Cox and Snell | 0.820 |
| Nagalkerke | 0.845 |
| McFadden | 0.478 |

The model is significant, we can reject the null hypothesis at a significant level of 5%. $R^2 = 86.5\%$, it means that 86.5% of the variability in the investment value of Egyptian investors is affected by demographic and psychological variables. 13.5% of the variation in the investment value of Egyptian investors is affected by other variables not explained by the model.

3.4.2. Regression model

| | |
|---|-----|
| <p>Before COVID-19 pandemic</p> $\ln\left(\frac{\text{Prob}(\text{investments})}{1-\text{prob}(\text{investments})}\right) = \beta_0 + 5.78b_{12} + 7.45b_{13} + 7.94b_{14} - 2.40b_{21} + 2.75b_{22} + 0.16b_{31} - 0.61b_{32} + 0.07b_{33} + 2.80b_{41} + 7.41b_{42} + 7.24b_{43} + 8.42b_{44} + 5.60b_{45} - 21.60b_{51} - 22.82b_{52} - 18.86b_{53} - 14.91b_{54} - 4.83b_{61} - 4.03b_{62} + 3.57b_{63} - 5.28b_{64} - 4.61b_{71} - 6.92b_{72} - 4.41b_{73} - 6.38b_{74} - 2.67b_{81} + 3.43b_{82} + 0.79b_{83} - 0.80b_{84} - 6.59b_{91} - 8.92b_{92} - 7.35b_{93} - 7.18b_{94} + 0.41b_{101} + 3.75b_{102} + 0.79b_{103} + 5.01b_{104} + 9.15b_{111} + 10.89b_{112} + 11.41b_{113} + 0.65b_{121} - 0.44b_{122} - 3.45b_{123} - 4.06b_{124} - 2.31b_{131} - 0.58b_{132} + 2.89b_{133} + 4.41b_{141} - 2.46b_{142} - 1.11b_{143}$ | (1) |
| <p>After COVID-19 pandemic</p> $\ln\left(\frac{\text{Prob}(\text{investments})}{1-\text{prob}(\text{investments})}\right) = \beta_0 + 3.18b_{12} + 1.16b_{32} + 3.33b_{61} + 2.16b_{71} + 5.25b_{72} + 3.57b_{81} + 4.11b_{82} + 6.15b_{92} + 7.18b_{95} + 1.81b_{101} - 2.17b_{104} + 2.56b_{105} + 7.20b_{111} + 6.42b_{112} - 3.19b_{141} - 4.21b_{142}$ | (2) |

3.4.3. The interpretation of coefficients

Control variables (demographic variables)

1. *Age*: Before COVID-19, high investment value has a significant positive relationship with the investor age of 35–44, 45–54, and 55–64 by 5.78 times, 7.45 times, and 7.94 times, respectively. Compared to other Egyptian investors of age 65 or older. We can conclude that as age increases, the value of investment increases as well. However, the age of 26–34 has no significant impact on investment value. After the pandemic, high investment value has a significant positive relationship only with the investor age of 35–44.

2. *Gender*: Before COVID-19, since $b_{21} = -2.40$, gender has a significant negative relationship with the investment value. Males are less likely to invest in the Egyptian stock market than females by 2.40 times, at a 19% significant level. After the pandemic, gender has no significant relationship with the investment value.

3. *Level of education*: Before COVID-19, there is a significant negative relationship between the level of education and the investment value of investor.

A low investment value has a significant relationship with Egyptian investors who have a master's degree more than investors who are in secondary school by 0.61 times. Whilst a high investment value has relationship but not significant with Egyptian investors who have bachelor degree more than Egyptian investors in secondary school by 0.07 times. We conclude that the investment value of investors decreases as the educational level increases. Last but not least, Egyptian investors who have a doctorate and who are in secondary schools have no significant effect on the investment value of investors.

After the pandemic, Egyptian investors who have a master's degree have a positive significant relationship with the investment value.

4. *Years of experience*: A high investment value has a significant positive relationship with Egyptian investors who have 1–2, 2–5, 6–10, and 11–20 years of experience by 7.41, 7.24, 8.42, and 5.60 times, respectively. Compared to those Egyptian investors who have more than 21 years of experience. This indicates that as the experience of Egyptian investors increases their investment value will increase as well. The highest probability to invest more in the stock market is for those investors who have 3–5 years of experience. However, investors who

have lack of experience in the stock market have no effect on the investment value. Whilst those investors who have more than 21 years of experience have no effect on the investment value.

After the pandemic, the investment value has no significant relationship with years of experience for Egyptian investors.

5. *Level of income*: Results revealed that income level has no significant relationship to the investment value of Egyptian investors before and after the pandemic of COVID-19.

6. *Average return over the past three years*: Before COVID-19, low investment value has a significant relationship with Egyptian investors who did not achieve an average return in the past three years. Compared to Egyptian investors who have more than 31% or more by 4.83 times.

Low investment value has a significant relationship with Egyptian investors who have a return of less than 10% compared to those investors who have a return of more than 31% or more by 4.03 times.

Low investment value has a significant relationship with Egyptian investors who have a return of 11% to 12% than those who have more than 31% or more by 3.57 times.

Low investment value has a significant relationship with investors who have a return of 21% to 31% than those who have more than 31% or more by 5.28 times.

We conclude that investors' return over the past three years has had a negative impact on the investment value of investors. As investors' return increases, they tend not to invest in the stock market.

After the pandemic, the investment value has had no significant relationship with return over the past three years.

7. *Portfolio size*: Before COVID-19, the number of stocks in a portfolio has a significant negative relationship with the value of the investment. Low investment value has a significant relationship with investors who have a portfolio of 3 stocks, 6 to 20 stocks, and 21 to 50 stocks compared with those Egyptian investors who have a portfolio of 50 stocks or more by 4.61, 6.92, and 4.41 times. We can conclude that the number of stocks increases, the less likelihood of Egyptian investors to invest decreases. After the pandemic, the investment value has a significant positive relationship with Egyptian investors who have a portfolio of 5 stocks and between 6 to 20 stocks.

8. *Overconfidence*: Before COVID-19, high investment value has a significant positive relationship with Egyptian investors who have low confidence level than those investors who have a high level of confidence by 3-43 times. We can conclude that the higher the value of investment of Egyptian investors, the lower degree of confidence for Egyptian investors. However, investors who have a low level of confidence have no impact on the investment value. After the pandemic, high investment value has a significant positive relationship with not and low confident Egyptian investors only.

Psychological factors

9. *Regret aversion*: Before COVID-19, low investment value has a significant relationship with Egyptian investors who do not regret averse, low regret aversion, regret averse investors than those investors who have a high regret aversion by 6.59, 8.92, 7.35 times, respectively. We conclude that as the regret aversion level increases, the investment value of investors decreases as well.

After the pandemic, high investment value has a significant positive relationship with low and highly regret aversion Egyptian investors.

10. *Loss aversion*: Before COVID-19, a high investment value has a significant positive relationship with Egyptian investors who have a low level of loss aversion and who have a lower level of loss aversion than Egyptian investors who have a high loss aversion by 3.75, 5.01 times, respectively. We conclude that as loss aversion increases the investment value of investors decreases as well.

After the pandemic, a high investment value has a significant positive relationship with loss-averse and not loss-averse Egyptian investors. A low investment value has a significant negative relationship with loss-averse Egyptian investors.

11. *Disposition effect*: Before the pandemic, there is a significant positive relationship between the investment value of investors and the disposition effect. Egyptian investors who take their investment decisions based on the disposition effect are likely to invest more than those investors who have no disposition effect by 9.15 and 10.89 times. Egyptian investors who are not affected by the disposition effect tend to not invest by 11.41 times. We conclude that as investors base their investment decisions on disposition effect decreases the investment value of Egyptian investors increases also.

After COVID-19, a high investment value has a significant positive relationship with a high disposition and disposition effect.

12. *Herding behaviour*: Before and after the pandemic, there is no significant relationship between the investment value of investors and herding behaviour. Egyptian investors whose decisions are neutrally affected by herding behaviour tend not to invest in the stock market by 3.45 times. We conclude that herding behaviour has no effect on the investment value of investors.

13. *Gambler's fallacy*: Before and after the pandemic, there is no significant relationship between the gambler's fallacy and the investment value of Egyptian investors.

14. *Representativeness*: Before the pandemic, there is a significant positive relationship between

the investment value of investors and representativeness. Egyptian investors whose investment decisions are highly affected by representativeness invest more than Egyptian investors who are not affected by representativeness by 4.41 times. Egyptian investors whose investment decisions are slightly affected by representativeness are less to invest more than those who are not affected by representativeness by 2.46 times. We conclude that the investment value of investors decreases as representativeness' effect on investors' value decreases.

After the pandemic, a low investment value has a significant negative relationship with high and representative Egyptian investors.

4. GOVERNANCE OF INVESTMENT DECISIONS FOR EGYPTIAN INVESTORS

4.1. Education

4.1.1. Delivery

Full cooperation between investment entities in Egypt, such as investment banking firms, business schools, the Egyptian Regulatory Authority, and the Egyptian stock market. Through offering a wide variety of seminars, publications to educate Egyptian investors about their investment objectives, philosophy and strategies, various investment tools, and the current environment of investing in Egypt, types of risks associated with each investment tool. This obligation toward investor education arose last year in response to the impact of the COVID-19 pandemic and its impact on the investment environment in Egypt. Therefore leading to protect investors from potential losses.

4.1.2. Content of the education program

The key cognitive biases lead to conservatism and excessive loss aversion, overconfidence and representativeness, and brain functioning outside of one's awareness and regret. Once investors are impaired or delayed responses to new information they can react upon receiving any new information. Excessive loss aversion in connection with holding the loser's state that risk of loss is essential in investment selection. Investors should be trained properly about the superior strategy was to "cut losses". Finally, investors should specify criteria and circumstances when they buy and sell a security.

4.2. Market regulation: Local educational subvention

During the process to open an investment account the broker has to obtain information regarding the client's investment objectives: mainly net worth and income. Information include different aspects of investor psychology. Brokerage firms choose which of various psychological factors seem most relevant to their understanding of what investments would be suitable for a particular client. Loss aversion is a good indicator of the types of securities that an investor would purchase. The investor considers his/her emotional orientation towards investing. Neither investor education program is likely to eliminate cognitive biases or their effects.

4.3. Corporate finance

Most legal issues are raised when a transaction is made at a different price from fundamental value to exploiting the market inefficiency. Sometimes the issuer fails to disclose reasons beyond such difference. In that sense, the corporation takes advantage of cheap financing. Current shareholders benefiting when issuing new shares at overpricing. New buyers are considered a bad deal. This would represent a violation since the company is exploiting a market inefficiency. Directors face a conflict between the commitment owed to current shareholders and to the new buyers. Managers usually make high-priced offerings to get the best price to current shareholders.

4.3.1. Dividends and shares repurchase

Companies prefer share repurchase if the company's shares are underpriced. If a company spent funds to purchase back stocks management generates real returns to current shareholders but not all shareholders will be treated equally. The gain goes to current shareholders after the repurchase. Investors who are selling at a lower price than fair value will not enjoy any benefit. Shareholders who purchased that stock within a short time earlier will lose value. In that way directors affecting a share purchase and impair current shareholders' interests? This perspective exposes a major ambiguity. Dividend policy matters in the sense of prices constituting accurate valuations. But under behavioral finance, dividend policy starts to matter very much for pricing. Dividends become a managerial tool that can be deployed to market the company's securities.

4.4. Litigation

4.4.1. Fraud on the market

The theory of efficient market crumbles if investors rely on the statements when they trade, paying an inflated price when they buy, and receiving a deflated price when they sell. The price has no connection to the statements. Prices do not always reflect the material false statements. Investors do not always respond to information in rational ways but according to a whole set of cognitive biases. If Egyptian investors having taken the education program have been trained to think properly investment fundamentals and of behavioral finance.

4.4.2. The stock market exception to the appraisal remedy

Shareholder seeks to cash out minority shares on an open market. Some minorities might be sellers and the majority could buy their shares. This pushes up the prices and induces minority shareholders to sell. The majority values the shares at a level higher than the market price. Minority shareholders refuse to sell at that price, they value the shares at a level still higher than the offered price by the majority. The minority may hold out for more than they reasonably value their shares. The majority may honestly and reasonably value them at more than that last seller too. Remitting a minority to

the market price on squeeze-out day interferes with capital allocations the parties would readily agree to. Instead of the majority buying in the open market at prices that increase, it enables the majority to use a single market price below both its and the minority's private valuations. The minority could claim an inflated valuation, leading the majority to pay substantially more than a fair private valuation. But that is what appraisal proceedings are supposed to uncover that the market cannot, and an important judicial function remains even where subject shares trade in liquid markets. The judge would simply choose one expert's model and valuation over the others, period. This yields an accurate valuation to reflect the subjective valuations of both the majority and minority.

5. CONCLUSION

This research proves the irrationality of investors and the inefficiency of the Egyptian stock market. Demographics and psychological factors affect the behaviour of Egyptian investors: in terms of demographics factors before COVID-19, age has a positive impact relationship on investor's investment value. The investment value of Egyptian investors who have an age of 35 years old and older increases as they take rational decisions compared to those younger investors. Investors who are of 26-35 years have no impact on investment value. Education level has a negative significant relationship with the investment value. Highly educated investors use fundamental analysis to invest in a good firm. Thus, their investment value tends to decrease as they could lose market opportunities. As investors' expectations increase, the investment value of investors is expected to increase since they try to avoid risks. The average return for investors over the last three years, they less likely to invest in the stock market. Investors are satisfied with current gains since they are not sure if the stock market will generate the same level of gains. The larger the size of the portfolio, the more investor diversifies his/her wealth. This results in high transaction costs and decreases the value of the portfolio. Income level has no significant impact on Egyptian investors' behaviour, their investment is not based on their overall wealth. After COVID-19, gender, years of experience, level of income, and average return over the past three years have had no impact on the investment value. A high investment value has a significant positive relationship with the investor age of 35-44 years, investors who have a master's degree, a portfolio of 5 stocks and between 6 to 20 stocks and with not and low confident Egyptian investors. As the overconfidence level decreases, investors will have more tendencies to make rational decisions and feel less confident in their ability to analyze available information. They are caring about measurable risks and making investment decisions based on fundamental analysis.

In terms of psychological factors, before COVID-19, overconfidence, loss and regret aversion, disposition effect, herding behaviour, and representativeness have a significant positive impact on Egyptian investors' behaviour. However, the gambler's fallacy has no significant impact. Egyptian investors are overconfident, moderately loss-averse, and slightly regret-averse. Loss and

regret aversion have a negative impact on the investment value of Egyptian investors. The higher the level of loss and regret aversion the lower the investment value. Egyptian investors lose investment opportunities since they fear losses and are reluctant to bear additional risk. The lower the impact of disposition effect on investors' decisions, the more gains they generate by investing in winning stocks. They sell losing stocks too soon. Neutral behaviour investors have a negative effect on the behaviour of other investors and follow the market trends to not decrease the investment value for investors. When they become less representative bias their investment value decreases, since companies' reputations have more impact on the stock value than the stock performance. Gambler's fallacy has no impact on Egyptian investors' behaviour, they cannot draw expectations since the stock market in Egypt is volatile. Herding behaviour has no impact on Egyptian investors' behaviour. They tend to have a disposition effect on their behaviour. This generates unnecessary expenses and reduces their performance in the stock market. These results are consistent with El-Shiati and Badawy (2014), Barber and Odean (2011). After COVID-19, herding behaviour and gambler's fallacy have no impact on the investment value of Egyptian investors. A high investment value has a significant

positive relationship with a high disposition effect and with low and highly regret aversion of Egyptian investors. A low investment value has a significant negative relationship with loss-averse investors and the representativeness of Egyptian investors.

We conclude that behaviour finance theory is valid before the pandemic and not valid after the pandemic since the Egyptian stock market is an emerging market and not efficient.

Some Egyptian investors were reluctant to answer questions related to portfolio size, investment amount, and their income. We can attribute this to the nature of Egyptian culture. Also, we have noticed that other investors provided ideal answers rather than the reality in order to reflect a good reputation and image about themselves.

Since most of the surveys have been filled after the trading sessions, the investor's mood and their achievements of the day could affect their answers.

Men represent most of the Egyptian investors because Egyptian men are responsible for the costs of living and providing for their families by virtue of Egyptian culture. However, this fact may be completely different in application to one of the other countries, and therefore it is very possible to obtain different results.

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APPENDIX

Table A.1. Results of regression analysis (Part 1)

| Variable | Label | Indicator | Degree of significance | |
|--|-----------------|-------------------|------------------------|------------------------|
| | | | Before COVID-19 | After COVID-19 |
| <i>Age</i> | | | | |
| | b ₁₁ | 25-34 | Not significant | Not significant |
| | b ₁₂ | 35-44 | Significantly positive | Significantly positive |
| | b ₁₃ | 45-54 | Significantly positive | Not significant |
| | b ₁₄ | 55-64 | Significantly positive | Not significant |
| | b ₁₅ | 65 or older | Not significant | Not significant |
| <i>Gender</i> | | | | |
| | b ₂₁ | Male | Significantly negative | Not significant |
| | b ₂₂ | Female | Not significant | Not significant |
| <i>Education</i> | | | | |
| | b ₃₁ | Doctorate | Not significant | Not significant |
| | b ₃₂ | Master's | Significantly negative | Significantly positive |
| | b ₃₃ | Bachelor's | Not significant | Not significant |
| | b ₃₄ | Secondary school | Not significant | Not significant |
| <i>Years of experience</i> | | | | |
| | b ₄₁ | None | Not significant | Not significant |
| | b ₄₂ | 1-2 years | Significant positive | Not significant |
| | b ₄₃ | 3-5 years | Significant positive | Not significant |
| | b ₄₄ | 6-10 years | Significant positive | Not significant |
| | b ₄₅ | 11-20 years | Significant positive | Not significant |
| | b ₄₆ | > 21 years | Not significant | |
| <i>Level of income</i> | | | | |
| | b ₅₁ | < 5,000 EGP | Not significant | Not significant |
| | b ₅₂ | 5,000-1,0000 EGP | Not significant | Not significant |
| | b ₅₃ | 10,000-20,000 EGP | Not significant | Not significant |
| | b ₅₄ | 20,000-30,000 EGP | Significantly negative | Not significant |
| | b ₅₅ | > 30,000 | Significant negative | Not significant |
| <i>Return over the past five years</i> | | | | |
| | b ₆₁ | Does not apply | Significantly positive | Significantly positive |
| | b ₆₂ | < 10% | Significant positive | Not significant |
| | b ₆₃ | 11-20% | Significantly negative | Not significant |
| | b ₆₄ | 21-30% | Significantly positive | Not significant |
| | b ₆₅ | 31% or more | Not significant | Not significant |
| <i>Portfolio size</i> | | | | |
| | b ₇₁ | < 5 stocks | Significantly negative | Significantly positive |
| | b ₇₂ | 6-20 stocks | Significant negative | Significantly positive |
| | b ₇₃ | 21-50 stocks | Not significant | Not significant |
| | b ₇₄ | > 50 stocks | Not significant | Not significant |

Table A.1. Results of regression analysis (Part 2)

| Variable | Label | Indicator | Degree of significance | |
|---------------------------|------------------|-------------------------|------------------------|------------------------|
| | | | Before COVID-19 | After COVID-19 |
| <i>Overconfidence</i> | | | | |
| | b ₆₁ | Not confident | Not significant | Significantly positive |
| | b ₆₂ | Low confident | Significantly positive | Significantly positive |
| | b ₆₃ | Neutral | Significantly positive | Not significant |
| | b ₆₄ | Confident | Not significant | Not significant |
| | b ₆₅ | Highly confident | Not significant | Not significant |
| <i>Regret aversion</i> | | | | |
| | b ₆₆ | Not regret averse | Not significant | Not significant |
| | b ₆₇ | Low regret averse | Significantly negative | Significantly positive |
| | b ₆₈ | Neutral | Not significant | Not significant |
| | b ₆₉ | Regret aversion | Not significant | Not significant |
| | b ₇₀ | Highly regret aversion | Not significant | Significantly positive |
| <i>Loss aversion</i> | | | | |
| | b ₁₀₀ | Not loss aversion | Not significant | Significantly positive |
| | b ₁₀₁ | Low less aversion | Significantly positive | Not significant |
| | b ₁₀₂ | Neutral | Significant positive | Not significant |
| | b ₁₀₃ | Loss averse | Significantly positive | Significantly negative |
| | b ₁₀₄ | Highly loss averse | Not significant | Significantly positive |
| <i>Disposition effect</i> | | | | |
| | b ₁₁₁ | High disposition effect | Significantly positive | Significantly positive |
| | b ₁₁₂ | Disposition effect | Significantly positive | Significantly positive |
| | b ₁₁₃ | Neutral | Significantly positive | Not significant |
| | b ₁₁₄ | Low disposition effect | Not significant | Not significant |
| | b ₁₁₅ | No disposition effect | Not significant | Not significant |
| <i>Herding behaviour</i> | | | | |
| | b ₁₂₁ | High herding behaviour | Not significant | Not significant |
| | b ₁₂₂ | Herding behaviour | Not significant | Not significant |
| | b ₁₂₃ | Neutral | Significantly negative | Not significant |
| | b ₁₂₄ | Low herding behaviour | Not significant | Not significant |
| | b ₁₂₅ | No herding behaviour | Not significant | Not significant |
| <i>Gambler's fallacy</i> | | | | |
| | b ₁₃₁ | High gambler's fallacy | Not significant | Not significant |
| | b ₁₃₂ | Gambler's fallacy | Not significant | Not significant |
| | b ₁₃₃ | Neutral | Not significant | Not significant |
| | b ₁₃₄ | Low gambler's fallacy | Not significant | Not significant |
| | b ₁₃₅ | No gambler's fallacy | Not significant | Not significant |
| <i>Representativeness</i> | | | | |
| | b ₁₄₁ | High representativeness | Significantly positive | Significantly negative |
| | b ₁₄₂ | Representativeness | Significantly negative | Significantly negative |
| | b ₁₄₃ | Neutral | Not significant | Not significant |
| | b ₁₄₄ | Low representativeness | Not significant | Not significant |
| | b ₁₄₅ | No representativeness | Not significant | Not significant |

Physiological factors