# Behavioral Biases and Investment Performance: Does Gender Matter? Evidence from Amman Stock Exchange

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## ABSTRACT

This study investigates the existence of behavioral biases in Amman Stock Exchange and their effect on investment performance from investor's point of view. In specific, the effects of overconfidence bias, familiarity bias, loss aversion bias, disposition bias, availability bias, representativeness bias, confirmation bias and herding bias are investigated. Moreover, the study inspects whether the behavioral biases differ between males and females. The results show that there is a statistically significant effect of overconfidence bias, familiarity bias, availability bias, representativeness bias and herding bias on investment performance ($p \leq 5\%$). Moreover, disposition bias, confirmation bias and loss aversion bias significantly affect investment performance but at a critical level of ($p \leq 10\%$). No statistically significant differences are found between the answers of males and females.

Keywords: Behavioral Biases, Investment Performance, Gender, Overconfidence, Familiarity, Loss Aversion, Disposition, Availability, Representativeness, Confirmation, Herding, Amman Stock Exchange.

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## INTRODUCTION

According to the classical financial theory, a security's price equals its "fundamental value" as frictions do not exist and agents seem to be rational. The fundamental value is said to be the "discounted sum of expected future cash flows", in the context that investors are able to process all available information accurately and the discount rate is consistent with the accepted preference specification (Barberis and Thaler, 2003, p.1054). The Efficient Markets Hypothesis (EMH), which supports the opinion that actual prices reflect fundamental values, affirms that prices are right as they are determined by agents, who have sensible preferences and understand Bayes' law, which relates to conditional probabilities (the probability of an event given by another one). Moreover, efficient market is the market where average returns on investment cannot be greater than what is warranted for its risk despite whatever investment strategy is applied (Luong and Ha, 2011). According to EMH, stock prices reflect all past, publicly available and insider relevant information. Being different from this theory, behavioral finance believes that sometimes, financial markets do not have informational efficiency (Ritter, 2003). Due to the fact that people are not always rational, their financial

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decisions may be driven by behavioral preconceptions. Thus, studying behavioral finance plays an important role in finance, in which cognitive psychology is employed to understand human behaviors. In case the decisions of investors do not follow rational thinking, effects of behavioral biases should be identified. It will be more important if their cognitive errors affect prices and are not arbitraged away easily (Kim and Nofsinger, 2008).

Behavioral finance evolves as a reaction to the inability to verify the EMH. Although of its important theoretical appeal, many anomalies are found against the EMH. Thus, investor behavior cannot be explained by the EMH. Behavioral finance is introduced to study how investors systematically make errors in judgment, or "mental mistakes" (Fuller, 2000). Thus, Behavioral biases denote to the irrationality in decision making. The empirical evidence in the behavioral finance literature shows that investors do not act rationally. For example, Barberis and Thaler (2003) give a good quality summary of models that try to explicate the equity premium puzzle; excess volatility, excessive trading, and stock return predictability by applying Prospect Theory of Kahneman and Tversky (1979). Also, Daniel *et al*. (2002) sustain that markets are not efficient and investor biases have an effect on security prices virtually. Black (1986), De Long *et al*. (1990), Shleifer and Vishny (1997), Barberis *et al*. (2001), Hirshleifer (2001), Daniel *et al*. (2002), and Subrahmanyam (2007) argue that investors are not rational and markets may not be efficient. Hence prices may extensively deviate from fundamental values due to the existence of irrational investors. This can lead us to the fact that in the real market place, investors are tending to be irrational.

Research in psychology has documented a range of decision-making behavioral biases. These biases can affect all types of decision-making, but have particular implications in relation to money and investing. The biases relate to how we process information to reach decisions and the preferences we have. The importance of studying such topic comes from the consequences that these behavioral biases could have on the investors' gains and losses and on the stock market as a whole. For example, the overconfidence bias can lead investors to pay too much brokerage costs and taxes and make them more vulnerable to high losses because of having too much trades and taking too much risk in the investments which they are overconfident about. The herding behavior could explain the bubbles and bubble bursts in the stock market as a whole because of the lack of individuality in decision making. The representativeness bias could result in purchasing overpriced stocks because of the tendency to associate new event to a known event. The disposition bias could result in reducing investors' returns because it indicates selling winners too soon and holding losers too long.

Generally, deviation from the correct and optimal investment decisions in stock exchanges is one of the basic and most important problems and it often leads to poor returns for investors. Thus, identifying factors that lead to incorrect decisions, can lead to better investment decisions. According to the importance of psychology and behavioral finance in financial decisions and pricing in stock exchanges, this study investigates major behavioral biases. It investigates the existence of behavioral biases for 242 investors in Amman Stock Exchange and the effect of these biases on investment performance from investor's point of view. In Addition, it tests whether gender matters in such issue. In fact, we focus on eight well-known behavioral biases that are found in other developed and emerging stock markets. These biases are overconfidence bias, familiarity bias, loss aversion bias, disposition bias, availability bias, representativeness bias, herding bias and confirmation bias. To the best of author's knowledge, this is the first study in Jordan that tackles such important topic. It will be useful to researchers, academicians, regulators, companies and investors in ASE to understand the impact of behavioral biases on investment decision-making. The results of this study

have several policy implications, they could help policy makers to understand the trading behavior from a psychological perspective which in turn could have insights to explain irregular patterns in volatility, market return and portfolio selection.

The remaining of the study is organized as follows: Section 2 reviews the related literature. Section 3 describes data and methodology. Section 4 defines the examined behavioral biases. Section 5 reports the results of analysis. Section 6 concludes.

## 2. Literature Review

Fama (1970) has introduced the EMH which assumes that markets are efficient and investors are rational. The intellectual dominance of the efficient-market revolution has more been challenged by economists who stress psychological and behavioral elements of stock-price determination and by econometricians who argue that stock returns are, to a considerable extent, predictable (Malkiel, 2003). Behavioral finance is relatively a new paradigm in financial markets, that has recently emerged as a response to the problems faced by modern financial theory which in turn is based on the EMH. Broadly speaking, it discusses that some financial phenomena are better understood by means of models in which agents are not fully rational (Saeidi, 2007). During the last two decades, an increasing number of studies used a behavioral approach in explaining stock price movements in financial markets in both developed and emerging stock exchanges (Edmans *et al*., 2007; Kaplanski and Levy, 2010; Corredor *et al.,* 2015). However, Lim and Brooks (2012) find that emerging markets are less efficient and in general experience more frequent price deviations. Earlier research on irrationality in emerging markets presented evidence that investors in China exhibit behavioral biases and make poor investment decisions (Chen *et al*., 2004).

Several researchers worldwide have investigated the effect of behavioral biases on investment decision and whether this effect differs between males and females. Barber and Odean (2001) find that men are more overconfident than women as they trade more and earn lower returns in USA. Chen *et al.* (2007) conduct a study on the Chinese stock market and find that investors are affected by the disposition bias. Barber and Odean (2008) show that investors tend to consider stocks that have recently caught their attention in making purchase decisions confirming the availability bias in US stock exchanges. Park *et al.* (2010) find a significant confirmation bias in Korea that makes investors more overconfident and adversely affect their investments. Fish (2012) finds that females are more risk averse than males, even when controlling for financial knowledge and experience in USA. Based on a survey, Rekik and Boujelbene (2013) find that Tunisian investors' behaviors are subject to five behavioral biases: representativeness, herding attitude, loss aversion, mental accounting, and anchoring. Moreover, they find that gender, age and experience have an interaction with behavioral financial factors in investment decisions. On the other hand, Bashir *et al.* (2013) conclude that there is no significant difference between the responses of male and female decision making regarding overconfidence bias in Pakistan.

Mobarek *et al*. (2014) report a significant common herding behavior across a large number of markets in Europe. Onsomu (2014) finds that investors are affected by availability bias, representativeness bias, confirmation bias and disposition bias in Kenya. However, no significant effect of overconfidence bias has been found. Moreover, Onsomu (2014) demonstrates that gender does not matter in this topic. Finally, Rostami and Dehaghani (2015) document a significant relationship between behavioral biases (overconfidence, ambiguity-aversion and loss-aversion) and investing in Tehran stock exchange.

To the best of author's knowledge, this is the first study in Jordan that tackles such important topic.

Moreover, there is a lack of studies worldwide that investigates whether behavioral biases are affected by investor's gender.

## 3. Data and Methodology

A 5-point Likert scale questionnaire is used to answer the questions of the study. 300 questionnaires are distributed randomly to 150 male investors and another 150 female investors in Amman Stock Exchange and 251 ones have been returned back (130 from males and 121 from females). The response rate is 83.7%. In order to have equal number of questionnaires for both sexes we disregard nine male questionnaires and the answers of 242 respondents (121 males and 121 females) are analyzed using frequencies, ordered logistic regression, Chi-square test and t-test. The questionnaire consists of three parts, part one asks about the demographic characteristics of the investors, part two consists of eight paragraphs each asking about a certain behavioral bias and part three includes three questions asking about investment performance from investor's point of view. In order to check the validity of the questionnaire and whether the questions measure what they are intended to measure we asked four experts in the field to evaluate it and we revised the questionnaire according to their comments. The reliability of the questions is assessed using Cronbach's Alpha, which allows researchers to estimate the reliability of participants' responses to the measurements (Helms *et al*, 2006). As Cronbach's Alpha calculates the average of all split-half reliability coefficients, it can totally answer the question of internal reliability that whether or not the indicators that make up the scale or index are consistent (Bryman and Bell, 2011, p.159). As many authors suggest the acceptable factor loading is 0.7 and above (Shelby, 2010), so that all achieved scores for this study are more than 0.7 shows high level of internal reliability. Table 1 shows that Cronbach's Alpha averages 82% for the questions of the questionnaire.

**Table 1**
**Cronbach's Alpha values of questionnaire questions**

| Behavioral biases and investment Performance | Number of Questions | Cronbach's Alpha |
|---|---|---|
| Familiarity bias | 3 | 0.80 |
| Representativeness bias | 2 | 0.83 |
| Availability bias | 2 | 0.84 |
| Confirmation bias | 2 | 0.81 |
| Disposition bias | 2 | 0.80 |
| Overconfidence bias | 4 | 0.85 |
| Herding bias | 2 | 0.84 |
| Loss aversion | 2 | 0.82 |
| Investment Performance | 3 | 0.79 |
| **Average** | - | **0.82** |

## 4. Operational Definitions of the Behavioral Biases

### *a. Overconfidence Bias*

Overconfidence is defined as "the investors tendency to overestimate the precision of their knowledge about the value of security", (Odean, 1998a). Investors who have this bias are overconfident of their abilities, knowledge, and future expectations which causes them trade excessively at a lower level of expected utility (Odean, 1998b). Glaser and Weber (2003) have divided overconfidence into miscalibration (causing higher trading activities), the better-than-average effect (investors expect that they have skills better than average skills) and illusion-of-control (the tendency of people to think they can affect outcomes but in reality they cannot affect the outcomes of their decisions). Barber and Odean (1999) find that investors who have high confidence in their trading skills often have high trading volume, with a negative effect on their returns. Overconfidence is also supported by 'self-attribution biases. This means that investors attribute the positive results to their abilities and skills, while attributing the negative consequences to bad luck.

### *b. Representativeness Bias*

It is introduced as one of the classical heuristics by Kahneman and Tversky (1972). Gilovich *et al*. (2002) define representativeness as "an assessment of the degree of correspondence between a sample and a population, an instance and a category, an act and an actor or, more generally, between an outcome and a model." Representativeness can be reduced to 'similarity' (Kahneman and Tversky, 1972). It is concerned with determining conditional probabilities. Thus, representativeness results in investors labeling an investment as good or bad based on its recent performance. Consequently, they buy stocks after prices have risen expecting those increases to continue and ignore stocks when their prices are below their intrinsic values.

### *c. Disposition Bias*

Closely related to regret aversion is the disposition effect, which refers to the tendency of selling stocks that have appreciated in price since purchase ("winners") too early and holding on to losing stocks ("losers") too long. According to Shefrin and Statman (1985), the disposition effect indicates that individuals tend to sell winners' investments too quickly and hold losers' investments too long. The disposition effect is consistent with the prospect theory by Kahneman and Tversky (1979). It challenges the expected utility theory of Von Neumann and Morgenstern (1944). Therefore, it suggests that people make their decisions based on gains or losses from that value. Thus, they are risk averse when they are winning and risk seeking when they are losing. The disposition effect is harmful to investors because it can increase the capital gains taxes that investors pay and can reduce returns even before taxes.

### *d. Familiarity Bias*

This bias occurs when investors have a preference toward familiar investments despite the seemingly obvious gains from diversification. Investors display a preference for local assets with which they are more familiar (local bias) as well portfolios tilted toward domestic securities (home bias). Foad (2010) argues that "researchers have studied familiarity bias in both the domestic (local bias) and international (home bias) settings. In both cases, familiarity bias occurs when investors hold a portfolio biased toward "familiar" assets compared to an unbiased portfolio derived from a theoretical model or empirical data". In other words, it happens when some investors are too concentrated on opportunities in their own countries, or in companies that they work in. They are more familiar with and sure about local investment opportunities.

### *e. Confirmation Bias*

Confirmation bias (confirmatory bias or my-side bias)

is a tendency to confirm one's believes and hypotheses regardless of whether the information is true, which leads to statistical errors (Plous,1993). Confirmation bias can cause investors to seek out only information that confirms their beliefs about an investment that they have made and not to seek out information that may contradict their beliefs (fall, 2000). This confirmation bias would make them more overconfident and adversely affect their investment performance. Pompian (2006) suggests that confirmation bias can lead investors to be overconfident; therefore their investment strategies will lose money.

***f. Loss aversion Bias***

Loss aversion bias is developed by Kahneman and Tversky (1979) as a part of the original prospect theory. It is the tendency that people generally feel a stronger impulse to avoid losses than to acquire gains. Behavioral finance theory suggests that investors are more sensitive to loss than to risk and return. "Some estimates suggest people weigh losses more than twice as heavily as potential gains" (Montier, 2002). Loss aversion includes another idea that is investors try to avoid closing on loss, and prefer to close on profit (Barber and Odean, 1999).

***g. Availability Bias***

Availability bias happens when a decision maker depends on knowledge that is readily available. It refers to people's tendency to determine the likelihood of an event according to the easiness of recalling similar instances and, thus, to overweight current information as opposed to processing all relevant information (Kliger and Kudryavtsev, 2010). Its estimation depends on frequency, probability, and causality relationships that relies on how easily information is recalled from memory (Tversky and Kahneman, 1974). Researchers find some evidence suggests that recently observed or experienced events strongly influence decisions (Shefrin, 2000).

***h. Herding Bias***

Herding in financial markets can be defined as mutual imitation leading to a convergence of action (Hirshleifer and Teoh, 2003). This is the most common mistake where investors tend to follow the investment decisions taken by the majority. Herd behavior is the tendency individuals have to mimic the actions of a large group irrespective of whether or not they would make the decision individually. One reason is that people are sociable and generally tend to seek acceptance from the group rather than being a standout. Another reason is that investors tend to think that it is unlikely that a large group could be wrong. This could make them follow the herd under the illusion that the herd may know something they do not know.

**5. Results of Analysis**

Table 2 describes the demographic characteristics of the respondents of the study. Half of the respondents are males while the other half is females. 21.1% of the respondents are between 18 and 30 years old, 35.5% of them are between 31 and 40, 23.6% are between 41 and 50, 16.9% are between 51 and 60 and only 2.9% are over 60. None of the respondents are uneducated, 16.9% of them got high school, 18.6% got diploma, 42.1% are bachelor degree holders and 22.3% are highly educated. With respect to their occupation, the results show that 43.4% of the respondents have their own business, 38% of them work in the private sector while 11.6% work in the public sector. On the basis of investment period, the results demonstrate that around 37.2% of the respondents have invested in ASE for less than 3 years, 27.7% of them have invested for 3-5 years, 21.5% have invested for 5-10 years and 13.6% have invested for more than 10 years.

**Table 2**
**The demographic characteristics of the respondents of the study**

| **Sex** | **Frequency** | **Percent** |
|---|---|---|
| Males | 121 | 50.0 |
| Females | 121 | 50.0 |
| Age | Frequency | Percent |
| 18-30 | 51 | 21.1 |
| 31-40 | 86 | 35.5 |
| 41-50 | 57 | 23.6 |
| 51-60 | 41 | 16.9 |
| 60 or more | 7 | 2.9 |
| Educational Background | Frequency | Percent |
| High school | 41 | 16.9 |
| Diploma | 45 | 18.6 |
| Bachelor | 102 | 42.1 |
| Higher Education | 54 | 22.3 |
| Occupation | Frequency | Percent |
| Public sector | 28 | 11.6 |
| Private sector | 92 | 38.0 |
| Free work | 105 | 43.4 |
| Other | 17 | 7.0 |
| Investment Period | Frequency | Percent |
| less than 3 | 90 | 37.2 |
| 3-5. | 67 | 27.7 |
| 5-10. | 52 | 21.5 |
| More than 10 | 33 | 13.6 |

Table 3 reports the frequencies of respondents' answers to the behavioral biases and investment performance questions. Questions 1-3 measure the familiarity bias, questions 4&5 measure the representativeness bias, questions 6&7 measure the availability bias, questions 8&9 measure the confirmation bias, questions 10&11 measure the disposition bias, questions 12-15 measure the overconfidence bias, questions 16&17 measure the herding bias, questions 18&19 measure the loss aversion bias and questions 20-22 measure the investment performance. The results show that the investigated behavioral biases exist for most of

the respondents. If we sum the percentages of respondents who agree and strongly agree with each question we will get the following results: 88-100% of the respondents agree and strongly agree with the familiarity bias questions. 89% & 91% of them show representativeness bias when investment decision is taken. Similarly, 100% of the sample investors are affected by availability bias and herding bias. Moreover, the results indicate that 68-98% of the respondents are overconfident when they take their investment decisions. 64% & 100% agree and strongly agree with the questions of confirmation bias and 59% &75% do so with the questions of disposition bias. 67% & 88% of the investors who have been questioned are affected by loss aversion bias when they make their investment decisions. Table 4 reports the mean and standard deviation values of the behavioral biases and investment performance. All mean values are above the midpoint of the Likert scale (2.5) which confirm the existence of the behavioral biases examined. The average age of the respondents is 39 years old.

**Table 3**

**The frequencies of the respondents' answers for behavioral biases and investment performance questions**

| No. | Question | Frequencies of respondents' answers (%) | | | | |
|---|---|---|---|---|---|---|
| | | SD | D | N | A | SA |
| 1 | I prefer to invest in the well-known companies that have wider media coverage. | 0 | 0 | 1 | 43 | 56 |
| 2 | I prefer to invest locally and not to diversify my portfolio internationally. | 0 | 9 | 3 | 70 | 18 |
| 3 | I prefer to invest in the companies which I know their history and management. | 0 | 0 | 0 | 12 | 88 |
| 4 | I think that we can forecast the future value of the stock on the basis of its past performance. | 2 | 6 | 1 | 71 | 20 |
| 5 | I prefer to depend on the past performance of the stock when I take my investment decision over any other indices. | 3 | 8 | 0 | 44 | 45 |
| 6 | I prefer to buy stocks in the days that witness an increase in the general index of Amman Stock Exchange. | 0 | 0 | 0 | 12 | 88 |
| 7 | I prefer to sell stocks in the days that witness a decrease in the general index of Amman Stock Exchange. | 0 | 0 | 0 | 23 | 77 |
| 8 | Before buying a share, I ignore the information in the market that conflict with mine. | 15 | 20 | 1 | 52 | 12 |
| 9 | Before buying a share, I appreciate the information in the market that support mine. | 0 | 0 | 0 | 90 | 10 |
| 10 | I prefer to quickly sell stocks whose prices have recently increased. | 12 | 13 | 0 | 70 | 5 |
| 11 | I prefer not to quickly dispose the stocks whose prices started to decrease. | 15 | 23 | 3 | 30 | 29 |
| 12 | I feel that I can, on average, predict future share prices better than others. | 0 | 8 | 6 | 35 | 51 |
| 13 | I attribute my investment success to my knowledge and understanding of the stock market. | 5 | 6 | 10 | 42 | 37 |
| 14 | I take the responsibility of managing my portfolio and I trust my decisions. | 0 | 2 | 0 | 10 | 88 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 15 | I think that sharing others' opinions would decrease my success opportunities. | 14 | 18 | 0 | 48 | 20 |
| 16 | I prefer to buy stocks that witnessed many buying orders during the trading day. | 0 | 0 | 0 | 1 | 99 |
| 17 | I prefer to sell stocks that witnessed many selling orders during the trading day. | 0 | 0 | 0 | 11 | 89 |
| 18 | If I have savings of JD 100,000, I would prefer to invest them in a bank account not in stocks to avoid engaging in risk. | 9 | 22 | 2 | 50 | 17 |
| 19 | I prefer low risk investments over risky investments even if their returns is low | 2 | 10 | 0 | 22 | 66 |
| 20 | The return rate of your recent stock investment meets your expectation. | 20 | 25 | 2 | 33 | 20 |
| 21 | Your rate of return is equal to or higher than the average return rate of the market. | 23 | 21 | 1 | 29 | 26 |
| 22 | You feel satisfied with your investment decisions in the last year (including selling, buying, choosing stocks, and deciding the stock volumes). | 15 | 12 | 5 | 40 | 28 |

**Table 4**

**Descriptive Statistics of the study variables**

| Variable | Mean | Standard Deviation |
|---|---|---|
| Familiarity Bias | 4.4667 | 0.6667 |
| Representative Bias | 4.1050 | 0.6250 |
| Availability Bias | 4.8250 | 0.6900 |
| Confirmation Bias | 3.6800 | 0.6600 |
| Disposition Bias | 3.3900 | 0.5950 |
| Overconfidence Bias | 4.1375 | 0.6125 |
| Herding Bias | 4.9400 | 0.7300 |
| Loss Aversion Bias | 3.9200 | 0.6100 |
| Investment Performance | 3.2533 | 0.5500 |
| Age | 39.4000 | 10.3248 |

In order to test whether behavioral biases have statistically significant effect on investment performance, the following model is estimated where the average score for each question is used as a proxy for the underlying variable that it reflects.

The model is as follows:

$$IP_i = \beta_0 + \beta_1 FAM_i + \beta_2 REP_i + \beta_3 AV_i + \beta_4 CON_i + \beta_5 DIS_i + \beta_6 OV_i + \beta_7 HER_i + \beta_8 LA_i + e_i$$

Where $IP$ denotes investment performance, $FAM$ represents familiarity bias, $REP$ is the representative bias, $AV$ denotes availability bias, $CON$ is the confirmation bias, $DIS$ represents the disposition bias, $OV$ denotes overconfidence bias, $HER$ is the herding bias and $LA$ is the loss aversion bias. Ordered logistic regression is used to determine the behavioral biases that affect investment performance. Table 5 summarizes the

results. The results show that familiarity bias, representative bias, availability bias, overconfidence bias and herding bias significantly affect the investment performance (at 5% critical level) for the study sample. On the other hand, disposition bias, confirmation bias and loss aversion bias show statistically significant effect on investment performance but at a critical level of ($p \leq 10\%$). Thus, Jordanian investors seem to be affected by all the examined biases. All the z-values are highly statistically significant confirming the vital effect of the examined behavioral biases on investment performance in ASE. The results are not changed when age and other demographic variables are added as control variables to the model. Tables are not reported but are available upon request. Our results are consistent with (Chen *et al.*, 2007; Barber and Odean, 2008; Mobarek *et al*., 2014; Onsomu, 2014; Rostami and Dehaghani, 2015) who find significant effects of behavioral biases on investment performance in different stock exchanges around the world.

**Table 5**
**Ordered logistic regression results**

| Model | Coefficients | z | Sig. |
|---|---|---|---|
| constant | -0.742 | -0.862 | 0.268 |
| *FAM* | 0.523 | 5.434 | 0.000 |
| *REP* | 0.246 | 2.516 | 0.012 |
| *AV* | 0.224 | 3.095 | 0.003 |
| *CON* | 0.127 | 1.810 | 0.070 |
| *DIS* | 0.053 | 1.840 | 0.068 |
| *OV* | 0. 241 | 2.622 | .012 |
| *HER* | 0.611 | 5.842 | 0.000 |
| *LA* | 0.093 | 1.720 | 0.085 |
| LR chi2 | 31.56 | | |
| Prob > chi2 | 0.000 | | |
| Pseudo R2 | 28% | | |

In order to investigate whether gender matters in our topic, Tables 6 and 7 report the Chi-square test and t-test, respectively, of the differences between the male and female respondents' answers. Both tables show that there are no statistically significant differences between the answers of males and females. All the test values are insignificant. Thus, gender does not seem to matter when studying the behavioral biases. These results are consistent with (Bashir *et al.*, 2013) and (Onsomu, 2014) who find no significant differences between males and females when considering the effect of behavioral biases on investment decision in Pakistan and Korea, respectively. However, they are contrasting with (Barber and Odean, 2001) who report that males are more overconfident than females in USA. Moreover, our results are contrasting with (Rekik and Boujelbene, 2013) who find significant differences between males and females when considering the effect of different behavioral biases on investment decision in the Tunisian stock exchange.

**Table 6**

**The Chi-square test of behavioral biases for male versus female respondents**

| **Familiarity Bias** | **Value** | **Asymp. Sig. (2-sided)** |
|---|---|---|
| Pearson Chi-Square | .123[a] | .726 |
| Continuity Correction[b] | .009 | .923 |
| Likelihood Ratio | .121 | .727 |
| Representitiveness Bias | Value | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | .025[a] | .865 |
| Continuity Correction[b] | 0.000 | 1.000 |
| Likelihood Ratio | .025 | .875 |
| Availability Bias | Value | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | 2.778[a] | .096 |
| Continuity Correction[b] | 1.972 | .160 |
| Likelihood Ratio | 2.578 | .108 |
| Confirmation Bias | Value | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | .129[a] | .719 |
| Continuity Correction[b] | .008 | .930 |
| Likelihood Ratio | .127 | .722 |
| Disposition Bias | Value | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | 1.161[a] | .281 |
| Continuity Correction[b] | .760 | .383 |
| Likelihood Ratio | 1.187 | .276 |
| Overconfidence Bias | Value | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | 1.304[a] | .253 |
| Continuity Correction[b] | .774 | .379 |
| Likelihood Ratio | 1.234 | .267 |
| Loss Aversion Bias | Value | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | .256[a] | .613 |
| Continuity Correction[b] | .069 | .793 |
| Likelihood Ratio | .263 | .608 |
| Herding Bias | Value | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | .604[a] | .437 |
| Continuity Correction[b] | .320 | .572 |
| Likelihood Ratio | .595 | .441 |

**Table 7**

**The t-test of behavioral biases for male versus female respondents**

| Hypotheses | | Levene's Test for Equality of | | Test for Equality of Means | | | |
|---|---|---|---|---|---|---|---|
| | | F | Sig. | t | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Familiarity bias | Equal variances assumed | .091 | .764 | .499 | .619 | 0.024 | 0.049 |
| | Equal variances not assumed | | | .495 | .623 | 0.024 | 0.049 |
| Representativeness bias | Equal variances assumed | 6.035 | .015 | 1.078 | .283 | 0.077 | 0.071 |
| | Equal variances not assumed | | | 1.163 | .249 | 0.077 | 0.066 |
| Availability bias | Equal variances assumed | 3.014 | .085 | .579 | .563 | 0.041 | 0.071 |
| | Equal variances not assumed | | | .525 | .602 | 0.041 | 0.079 |
| - Confirmation bias | Equal variances assumed | 1.813 | .180 | -.765 | .445 | -0.055 | 0.072 |
| | Equal variances not assumed | | | -.725 | .472 | -0.055 | 0.076 |
| Disposition bias | Equal variances assumed | .423 | .517 | -.567 | .572 | -0.033 | 0.059 |
| | Equal variances not assumed | | | -.566 | .574 | -0.033 | 0.059 |
| - overconfidence bias | Equal variances assumed | 1.198 | .276 | 1.393 | .166 | 0.069 | 0.050 |
| | Equal variances not assumed | | | 1.459 | .150 | 0.069 | 0.047 |
| Loss aversion | Equal variances assumed | .142 | .707 | -1.122 | .264 | -0.048 | 0.043 |
| | Equal variances not assumed | | | -1.132 | .263 | -0.048 | 0.043 |
| Herding bias | Equal variances assumed | .094 | .759 | .266 | .791 | 0.019 | 0.070 |
| | Equal variances not assumed | | | .266 | .791 | 0.019 | 0.070 |

## 6. Conclusions

Behavioral finance theories, which are based on the psychology, attempt to understand how emotions and cognitive errors influence individual investors' behaviors. The main objective of this study is to investigate the behavioral factors influencing individual investors' decisions. In specific, this study examines eight different behavioral biases in Amman Stock Exchange and their effect on investment performance. The study also asks whether these biases differ between males and females. We use a 5-point Likert scale questionnaire to answer the research questions. The results demonstrate a statistically significant effect of overconfidence bias, familiarity bias, loss aversion bias, disposition bias, availability bias, representativeness bias, confirmation bias and herding bias on investment performance. However, no statistically significant differences are found between males and females. These results are based on the answers of 242 investors in ASE. These findings have important implications to investors in ASE to make more rational investment decisions. Moreover, investment strategies may be developed based on the investigated biases. These findings also have important implications for researchers and academicians interested in the efficient market hypothesis which assumes that investors are rational while in practice the empirical studies show irrationality in investment decisions. Future research could examine the effect of behavioral biases on stock prices and rates of return in ASE.

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# الإنحيازات السلوكية وأداء الاستثمار: هل يهم الجنس؟ دليل من بورصة عمان للأوراق المالية

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## ملخص

تهدف هذه الدراسة إلى اختبار وجود الإنحيازات السلوكية وأثرها على أداء الاستثمار من وجهة نظر المستثمر في بورصة عمان للأوراق المالية وتشمل هذه الانحيازات الثقة المفرطة والإلمام وتجنب الخسارة والترتيب والتوفر والتمثيل والتأكيد والانقياد. إضافة إلى ذلك تختبر الدراسة إن كانت هذه الانحيازات تختلف بين الذكور والإناث. بينت النتائج بأن هناك أثر ذو دلالة إحصائية لإنحيازات الثقة المفرطة والإلمام والتوفر والتمثيل والانقياد على أداء الاستثمار عند مستوى دلالة 5%. كما أنه هناك أثر ذو دلالة إحصائية لإنحيازات تجنب الخسارة والترتيب والتأكيد على أداء الاستثمار عند مستوى دلالة 10%. لم يكن هناك فروق في التأثير بين الذكور والإناث.

**الكلمات الدالة:** الانحيازات السلوكية، أداء الاستثمار، الجنس، الثقة المفرطة، الإلمام، تجنب الخسارة، الترتيب، التوفر، التمثيل، التأكيد، الانقياد، بورصة عمان للأوراق المالية.

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