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The Role of Releasing Financial Statements in Shaping Behavioral Biases

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Abstract

The publication of financial statements, a vital corporate communication tool, significantly influences behavioral biases in both individuals and organizations. While the importance of behavioral factors for investors is well recognized, the impact of financial statement releases on these biases in the Iranian capital

market has yet to be thoroughly examined. This study investigates the effect of financial statement releases on two key biases: loss aversion and overconfidence among investors. By employing both quantitative and qualitative research methods, comprehensive data was collected from the Iranian stock market. For the analysis of loss aversion, a sample of 111 companies over six years (2017–2022) was selected using the systematic elimination method, while overconfidence bias was assessed at the market level. An event study method was used to measure the impact of financial statement releases on these biases. To analyze loss aversion, a regression model using the Dynamic Panel Data (GMM) method was applied, and for overconfidence, a Vector Autoregression (VAR) model was estimated during the financial statement release period at the market level. The fiddisss sho tha ivvestrr ’s eiii bit heightene loss aversio during financial statement releases, and overconfidence bias was also evident, with investors attributing positive market outcomes to themselves and acting more aggressively in subsequent transactions. Based on the results, investors should consider behavioral bias patterns in their decision-making and incorporate technical analysis. Additionally, companies should ensure transparency and accuracy in their financial statements while remaining attentive to market behaviors and reacting promptly to changes.

JEL Classification: G40, G41

Keywords: Behavioral biases, publication of financial statements, Loss Aversion, Overconfidence

Introduction

Examining and analyzing the financial behavior of investors and market participants is considered one of the topics in the field of behavioral finance. Based on the approaches available in this area, investors' decision-making is not solely based on quantitative and rational analysis; other factors also significantly impact how shareholders respond to market actions and reactions.(Heydarpour, Farzaneh, Tarivardi, Yadaleh, and Mehrabi, Maryam. (2012).

In the investment process, investors often encounter a phenomenon known as an "emotional rollercoaster." This phenomenon encompasses emotions and sentiments briefly described below:

Fig. 1. The rollercoaster of emotions (World Bank Investment and Credit Bank Switzerland)

The investment cycle involves gathering information, selecting stocks, holding and selling investments, and then making new choices, and it is fraught with psychological pitfalls. While investors may improve their decision-making by becoming aware of behavioral biases, awareness alone does not guarantee unbiased decisions. The goal of behavioral finance is to help identify and understand these biases to promote better financial behavior. (Pope, Devin G., and Maurice E. Schweitzer. 2011)

The established economic and financial theory suggests that individuals are well-informed and steadfast in their decision-making. Investors are believed to be "rational," meaning that, firstly, when individuals receive new information, they update their beliefs correctly. Secondly, individuals make normatively acceptable choices. While this framework is very straightforward, it is evident that, in reality, humans do not act rationally. In non-normative and systematic patterns, 80% of retail investors and 30% of institutional investors are more inert than logical. (Haruna Jaiyeoba et al. 2019)

These deviations from theoretical predictions have paved the way for behavioral finance. Behavioral finance focuses on the cognitive and emotional aspects of investing and utilizes psychology, sociology, and even biology to examine real financial behavior.

Despite the classical economists' perspective that the market is efficient and investors' decisions are rational, in reality, investors' behavior and the market can be noticeably contradictory and irrational. According to the psychological approach to investment, stocks may be mispriced, and markets may lack the

necessary efficiency. By formulating behavioral models, behavioral finance helps to understand the capital market better, enabling this understanding to alleviate some of the constraints arising from effective behavioral patterns. Behavioral finance theory has various dimensions and approaches. This theory states that perceptual errors have a significant impact on financial decision-making.

Therefore, it can be concluded that traders' disruptive irrational behavior leads stock prices astray from fundamental factors. Ultimately, despite all these issues, a flaw is introduced into behavioral finance theory. The flaw is that while behavioral finance shatters the foundations of the efficient market hypothesis, it fails to provide an independent paradigm for explaining inefficiencies. In behavioral finance theory, many perceptual and behavioral errors have been identified, and these issues have been widely discussed in behavioral finance; however, behavioral finance has not yet been able to replace classical financial theories fully.

Given that any change in economic, political, and other conditions can quickly impact the stock market and lead to fluctuations, identifying the factors that cause such fluctuations is crucial. Apart from the political and economic conditions extensively studied, there is a crucial aspect that needs to be considered and, in fact, not considered in neoclassical theories. This study aims to address that aspect.

The publication of financial statements by companies serves as a fundamental principle of transparent and dynamic commerce, providing essential information about companies' financial status and performance. Investors, auditors, financial analysts, and other market participants rely on this information for investment decisions, credit assessment, and risk and return evaluation. Therefore, the release of financial statements is a significant event in the capital market information chain. However, the impact of publishing financial statements goes beyond this. Financial markets are not only influenced by financial information but also by the behaviors of investors in response to this information.

One of the primary sources of information for investors when making investment decisions is the information contained in the company's financial statements. The publication of financial statements in society through various information channels triggers considerable reactions among investors (S. Imam, 2010). In efficient markets, the publication of financial statements is associated with an appropriate reaction from investors, such that the price and volume of stock transactions reflect the relevant information accurately and promptly.

The primary objective of this research is to analyze the role of publishing financial statements in the pattern of behavioral biases among investors. This study aims to advance the field of behavioral finance in the context of Iranian financial markets and, specifically, to analyze the phenomenon of behavioral biases through a measured and modeled approach in a new domain for financial research in Iran.

Literature Review

Investment decisions

Investment decisions involve selecting various options, typically influenced by past investment returns and expected future returns (Sobash, 2012). There are two types of investors in investment decision-making: rational investors and irrational investors. Rational investors decide solely based on logical reasoning and information relevant to the investment outlook. In contrast, irrational investors make decisions based on their psychological aspects, leading to biases in investment decisions (Farnsidi, 2016).

The Prospect Theory

The Prospect Theory was introduced by Kahneman and Tversky (1979). Generally, this theory explains how investors make decisions under specific risks. According to this theory, individuals evaluate their losses and gains asymmetrically. Therefore, unlike the Expected Utility Theory, in which investors make entirely rational decisions, the Prospect Theory aims to describe real people's behavior (Wei & Yajia, 2016). They found that losses are nearly twice as emotionally impactful as gains; while losses trigger feelings of sorrow and distress, gains lead to happiness and satisfaction. This means that people feel the pain of loss almost twice as much as the pleasure of an equivalent gain, a concept known as loss aversion psychologically (Virginianni & Bascara, 2017). Another concept of the Prospect Theory is that people tend to prevent more risks for additional losses rather than seeking risks for potential gains. In other words, Prospect theory presents the opposite perspective: individuals become risk-seeking in the face of losses and risk-averse when facing gains. This finding contradicts Markowitz's Utility Theory (1952), positing that a rational investor exhibits a consistent behavior regardless of risk-seeking or risk-averse (Zheng et al., 2017).

The Heuristic Theory

The term heuristic was utilized by Kahneman and Tversky (1974) to explain the reasons behind the occurrence of biases in the field of finance. Describing decisions made amidst complexities and uncertainties primarily based on beliefs regarding the probabilities of uncertain events. Uncertainty in events refers to uncertainty about the occurrence of an event. These beliefs then shape a heuristic thinking approach through which individuals tend to use simple rules to simplify decision-making processes. This perspective was later reinforced by De Bondt and colleagues (2008), who suggested that individuals (investors) have biases that affect their thinking and decision-making. Frommel (2001) defined heuristics as "the use of experience and practical efforts," involving an attempt to interpret information quickly based on experiences accompanied by intuition. This definition explains how individuals or groups make decisions in conditions of uncertainty. Investors often need to be more accurate in decision-making because they rely on general rules as a basis for information processing. From a heuristic approach, decision-making can facilitate quicker decisions. However, this approach may lead to bias or systematic errors. Kahneman and Tversky (1974) classified heuristic biases into three types: representativeness biases, availability biases, and anchoring biases (Cartini & Nada, 2021).

Overconfidence

One of the cognitive biases proven to have theoretical relevance is the overconfidence bias. People are overconfident breed due to their level of knowledge, though it should be surprising when those operating outside their main area of specialization fall prey to this mistake. It is hoped that an individual in a certain field of expertise will possess a high level of knowledge and accurate perception. In an actual sense, people are generally overconfident when involved in non-mechanical tasks where evidence is ambiguous and has low predictability (Fischhoff & Hall, 1992; Lichtenstein & Fischhoff, 1977). They tend to need more confidence in their knowledge when dealing with complex issues (Shefrin, 2008). Overconfidence causes investors to misinterpret the accuracy of the information and overestimate their skills when analyzing information. It causes people to overrate their knowledge, underrate risks, and exaggerate their ability to control events. Overconfidence is one of the most pronounced biases when discussing stock investment decisions.

Publication of financial statements

Financial statements published by companies are the primary source of information for investors and other participants in the stock market. These financial statements provide crucial information, including the financial position, financial performance, economic status of the company, related risks, and development and profitability strategies. With abundant information available in financial statements, investors can make buying and selling decisions based on this information. (Penman, Stephen H. 2012)

The decision-making process of investors involves various stages, including information search, evaluation of options, decision-making, and post-decision behaviors. At each stage of this process, financial statements act as one of the most important sources of information accessible to investors.(Schultz, Paul, and R. Jayant A. 2010)

Investors' decisions may be influenced by various factors, including internal factors such as personal investment goals, previous experiences, and personal analyses, as well as external factors such as stock market conditions, economic conditions, and political changes. These influences can directly or indirectly affect individuals' investment decisions. Therefore, publishing financial statements plays a significant role in a business's transparent and dynamic nature, impacting investors' decision-making processes and shaping market behaviors. (Shiller, Robert J. 2006)

Even in developed economies, statistics and reviews of stock investors indicate that most need more financial knowledge and investment skills. They need access to the required data or analyze and utilize financial information in their decisions. The total risks present in the stock market constantly expose investors, especially small investors, to the possibility of unusual losses and damages, as Shabani (2012) highlighted in his research. Most financial and economic theories are based on the assumption that investors act completely rationally during decision-making, which aligns perfectly with the theory of rational economic man. Investors consider all aspects when investing and make the most rational decisions. However, in some cases, factors lead to irrational behavior and influence their decision-making, stemming from the inefficiency of financial markets. Therefore, the lack of accurate information leads to perceptual errors. By identifying investors' personality traits and behavioral deviations and providing programs that reduce the impact of these deviations on financial behavior, the deviation from long-term decisions can also be reduced, helping investors achieve their long-term financial goals, as stated by Frino et al. (2014).

The primary objective of financial statements is to provide useful information for both internal and external users. Owners and managers, employees, investors, financial institutions, suppliers, and other creditors, customers, governments and their agencies, and other stakeholders use financial statements for rational decision-making regarding investment issues. Companies listed on the stock exchange typically use financial statements as a primary means of communication with stakeholders. Stock market regulators and accounting standards setters strive to improve the quality of financial statements to increase transparency in financial reporting (Vishwanan & Shah, 2008).

Several empirical studies have examined the reaction of stock prices to the disclosure of various information. The first significant work in this area was conducted by Fama (1965) in the US stock market. Following that, several studies focused on developed markets and emerging/frontier markets to determine whether the stock market efficiently prices traded stocks. Studies focusing on developed markets include Fama and Blume (1966), Topel and Brown (1968), Pratz (1969), Kemp and Reid (1971), and Solnik (1973). Jennergen and Korsvold (1975), Pohlman (1978), and Urrutia (1995) studied emerging markets. Through these studies, efforts have been made to determine whether the stock market efficiently prices stocks traded in the market.

The empirical literature on the stock market's reaction to information disclosure is extensive. A wide range of information disclosures, such as earnings announcements, dividend distributions, and changes in macroeconomic policies, are covered. Most previous studies have focused on the impact of earnings information on stock prices. The evidence reported in these studies largely aligns with the information content hypothesis and the Efficient Market Hypothesis (EMH), meaning that earnings announcements contain value-relevant information, and the stock market quickly responds to this information. These studies have predominantly concentrated on earnings announcements, with less attention paid to measuring the impact of annual financial statement information on stock prices. However, Opong (1996), Nasar (2002), and Heyati (2010) have attempted to examine the informational content of annual reports on stock prices. Nevertheless, further research on the impact of annual financial statements on stock prices is crucial.

Tohidi, Mohammad (2019), in a study titled "Extraction of Composite Emotional Bias Index in the Tehran Stock Exchange," stated that in classical finance, there is no place for the emergence of traders' emotions. However, the behavioral finance paradigm suggests that sometimes, changes in securities prices have no fundamental basis, and investors' emotional biases play a significant role in price determination. Investor emotions define the inclination

of market participants towards stock trading. Since traders make decisions based on market emotions and sentiments, the Emotional Bias Index is used to explain the behavior of these traders.

Bootska Ahmed (2019), in a study titled "The Impact of Investor Sentiments on Market Reactions to Financial Restatements," utilized an econometric approach based on event study methodology and multivariate regression models, considering macroeconomic factors, firm characteristics, and income size. The empirical results indicate that an increase in the standard deviation of investor sentiments enhances abnormal returns by up to 56.0%. It also demonstrates that investor conservatism indicates a dominant factor in explaining the positive effect.

Jami Al-Ahmadi and Razdar (2018) investigated behavioral biases and their impact on investors' decision-making in the stock market. The results of this study indicate that investors' decisions are influenced by several biases, and behavioral biases based on prospect theory and loss aversion significantly impact investors' decisions.

Khan, M. F., & Sadiq, M. (2018), in a study title "dThe Influence of Financial Reporting on Investor Behavior ",stated that the way financial information is presented can exacerbate biases such as loss aversion, affecting investors' decisions and leading to suboptimal trading behavior.

In a case study within the banking sector in Indonesia, Hayati (2010) examined the impact of financial statement disclosure on stock prices. The results of this study showed that financial statements act as a primary indicator for a more accurate and logical estimation of companies' prospects. The market rapidly responds to the information provided in financial statements. The study demonstrated that delays in financial statement disclosure negatively affect investors, undermining their confidence in the company. These reactions manifest in changes in stock prices.

Mankhuf (2009) conducted a study titled "Acceptance of the Financial Approach by Professionals and Its Impact on Professional Behavior." This study examined variables such as investment strategies, information processing, and self-assessment in two groups: one advocating behavioral finance and the other opposing it. The findings of this research indicated that the acceptance and endorsement of behavioral finance significantly influence professionals' understanding of the market and affect their decisions and behaviors.

Chhaochharia, V., & Grinstein, Y. (2007) investigated The Effect of Financial Statement Characteristics on Investor Behavior. This paper discusses ho the transparency an clarity of financial statements iffluence ivvestors' biases, particularly loss aversion, leading to more cautious investment decisions.

Malmendier, U., & Tate, G. (2005), in a study titled "Behavioral Biases in Investor Decision Making: A Study on Loss Aversion and Overconfidence," Highlights how overconfidence leads to greater exposure to losses, especially in volatile markets, while loss aversion results in holding losing investments longer.

Hanton (2005) identified the behavioral characteristics of shareholders in the Chicago Stock Exchange in a study titled "Behavioral Finance of Shareholders in the Chicago Stock Exchange." The variables studied in the research included the impact of market trends on investors' decision-making and the influence of economic and political factors on decision-making. One of the most important findings of this study was that news and rumors significantly impact the decision-making of investors who pay little attention to financial variables at the company level. Attention to risk tolerance based on different criteria and determining the impact of economic factors and their differences from other factors are prominent features of this research.

Naser (2002) examined the stock price reaction to the release of financial statements on the Saudi Arabian Stock Exchange. This empirical study uses a market model to investigate the relationship between stock price reactions and the release of annual financial statements. Conducted through event study methodology, this study, utilizing five years of data (1995 to 1999), demonstrated that the published financial statements have influenced investors' behavior changes. The sample size of this study is concentrated only on 36 industries. Therefore, the results cannot be used to measure trends in developing markets.

Odean, T. (1998) investigated Overconfidence and Trading Volume. The results of this study indicate that overconfident investors trade excessively, believing they can better predict market movements, which leads to increased costs and potential losses.

Benos, A. V. (1998), in a study titled "Investor Overconfidence: The Role of Self-Attribution Bias in Financial Markets, "Concludes that self-attribution bias increases overconfidence, leading to riskier investment strategies, particularly after positive outcomes.

Ball and Brown (1968) took the initial steps to examine the impact of annual earnings announcements on stock prices. They found that earnings contain beneficial information, which needs to be fully reflected in stock prices and is not immediately incorporated at the time of disclosure. Additionally, Beaver (1968), May (1971), and Foster (1977) in the United States, and Firth (1981), Brocklehurst and Moir (1992), and Opong (1995) in Britain have examined either trading volume, stock prices, or both. The major weakness of these early studies was their inability to isolate the effect of earnings changes from other disclosed information (accounting information disclosure).

According to the explanations provided, the primary objective of this research is to analyze the role of financial statement release in shaping two specific behavioral biases among investors: loss aversion and overconfidence. This study aims to contribute to advancing behavioral finance within the context of Iranian financial markets by examining these biases through a measured and modeled approach, representing a new domain for financial research in Iran. The research emphasizes how disseminating financial statements influences these particular behavioral factors, providing more precise insights into investor decision-making.

Since behavioral finance is a relatively nascent field worldwide and the number of studies conducted in Iran is not extensive, the transparency of financial information has significantly impacted investors' investment strategies in the past decade. On the other hand, the increasing number of research studies indicates that the accessibility and quality of companies' financial information are two key factors influencing investment decisions.

The Iranian stock market is relatively small compared to some developed and developing markets, providing an opportunity to research the effect of publishing financial statements and determine the importance of the informational content of annual financial statements.

This study deviates from previous research and contributes to the literature in several important ways. Firstly, using daily stock prices and trading volume fluctuations, it investigates whether behavioral biases occur in the Iranian stock market during the period of publication of the annual financial statement. Secondly, it evaluates the informational content of annual financial statements using recent data to depict recent trends in the stock market.

To achieve the research goal and based on the theoretical and research foundations, we proposed the research hypothesis as follows:

H1: Investors exhibit greater loss aversion after the release and interpretation of financial statements.

H2: Investors with overconfidence are more likely to underestimate the risks associated with financial statements, leading to increased trading volume in the market.

Research Methodology

As a pervasive phenomenon in behavioral finance, behavioral bias is influential and has various cognitive and emotional aspects, the assessment and measurement of which can be challenging. In empirical studies in this field, evaluating behavioral biases and their impact based on a reliable methodological approach is crucial. In the context of research methodology, identifying and quantifying behavioral biases and assessing the validity of their measurement method are essential. Researchers have attempted to refine and validate measurement methods, especially in the context of assessing financial market biases. In this study, among the models examined to mitigate investors' behavioral biases, those biases that can be measured based on data from the Iranian stock market are selected and assessed.

The method used in this research to measure loss aversion and overconfidence biases around the publication of financial statements is the standard event study method.

The first step in conducting this research is to determine the peak time for publishing financial statements. To assess the impact of publishing financial reports, it is necessary first to determine the date of occurrence of this event to examine its effect on behavioral biases around that date. Identifying the appropriate timing for evaluating the impact of the occurrence of this event on behavioral biases depends on market participants' awareness of the information available in the market. Generally, it is not possible to determine the exact date of the event occurrence according to the guidelines for the disclosure of information by listed companies with the Securities and Exchange Organization of Iran. The date of financial statement publication is determined as follows:

Companies whose securities are listed on the stock exchange must prepare and disclose reports and financial statements per national standards or forms provided by the organization within specified deadlines. Audited annual financial statements of the parent company and consolidated financial statements of the group at least 10 days before the annual general meeting and up to 4 months after the end of the financial year, considering that financial statements

will not be disclosed to the public until they are reviewed at the annual general meeting, the date of financial statement publication is considered as the date of the annual general meeting.

In general, to evaluate the impact of financial statement publication, it is necessary to calculate the post-event criterion from that report for both the experimental and control groups. Then, there is a significant difference between the criteria of these two groups. In that case, the publication of financial statements plays a role in shaping behavioral biases.

Determining the study's time frame is crucial to ensure it is narrow enough to include unrelated events yet not too narrow to hinder the recognition of trends in the variables under investigation. The examination of the past six years is chosen because economic conditions and regulations set by the stock exchange organization may influence financial reporting and disclosure practices. By adopting this approach, the effects of macroeconomic variables and regulations can be reflected.

One essential variable in accounting research is the fiscal year of companies, which forms the basis for holding the annual general meeting. According to Iran's commercial law, all companies must hold this event within four months after the end of the fiscal year. Most Iranian companies prefer to conclude their fiscal year concurrently with the end of the Persian calendar year. However, due to subsidiaries or the need to align with their parent companies, some choose another time, especially the month of Shahrivar.

Based on this, the "Rahavard Novin" software examines the combination of capital market companies based on their fiscal year. Among the 635 listed companies, 459, equivalent to 72.28%, have fiscal years ending in Esfand (the last month of the Persian calendar). Therefore, considering the necessity of holding the annual general meeting within four months after the end of the fiscal year, Tir (the fourth month of the Persian calendar) is chosen as the season for holding these meetings.

Loss Aversion

Changes in trading volume around the release of financial statements will indicate additional informational content stemming from these disclosures. Therefore, the power of testing the informational content of the report will depend on the date of the event and the influence of other variables on trading volume. (Elliott, 1983)

The research population was determined based on the scope of the study,

including all companies listed on the Tehran Stock Exchange during the years 1396-1401. The sampling method is non-probabilistic or non-random, whereby certain criteria are set for selecting sample elements so that the researcher cannot intervene in the sampling process.

The sample consists of 111 companies listed on the Tehran Stock Exchange, which meet the following conditions:

1. Their fiscal year ends on the 29th of Esfand. (the last month of the Persian calendar)
2. Companies with a trading history of more than 2 years are included.
3. Investment companies are excluded from the sample due to their different nature of valuation and the impact of their transactions and returns on portfolio assets.
4. They have not halted trading during the period under study.

In order to approximate the market closely, all stocks present in the market should ideally be included in the sample. However, due to various limitations in the Iranian market, some symbols are closed for an extended period, and their reopening may significantly affect market returns and trading volume. Therefore, the explained filter has been applied to select stocks included in the model to avoid bias in the data. Top of Form

Since trading is correlated with the trading volume of the last period before it, the error in the model below will reflect other factors, including the effect of investor behavior on trading volume. The error is derived from the model below: Top of Form.

$$\log v_{i,t} = \beta 0 + \beta 1 \log pt + \beta 2Rt + \beta 3R2t + \beta 4 \log Mv_{t-1} + \beta 5 \log v_{\mathrm{i},t-1} + \beta 6 \log v_{i,t-2} + ut \quad (1)$$

Where;

P_t = daily shares price of the company

R_t = Daily stock returns calculated as follows: LN (Pt/Pt-1) =Rt

R^2_t = daily volatility stock variable equal to squared daily stock returns

MV_{t-1} = delay variable of daily market turnover of the prior period

V_t = Late variable of daily turnover of stock

$\mathbf{V_{t-1}}$ = delay turnover of daily stocks variable of last period

$\mathbf{V_{t-2}}$ = Late turnover volume variable in two last shares period

u_t = disruption or waste of normal daily turnover of stock

In the second step of the used panel data model so that, residuals (errors) are calculated in the first regression (u) as the dependent variable, and a dummy variable with a value of zero and one is an independent variable of the model. The second model is as follows:

$$ut = \beta 1 + \beta 2D + \varepsilon \quad (2)$$

Where;

D: Dummy variable that is equal to one in loss aversion; otherwise, it is zero. The following six cases are defined for recognizing loss aversion:

Case one: In the event that the share for the last month period is profitable and has been in profit since the beginning of the investment period, the investment company trades for loss aversion and identifies profit in order to prevent losing the made profit. As a result, transaction volume increases.

Case two: If the share, since the beginning of the investment period, is in the profit and has loosed over the past one-month period (profit since initial > loss of period), investment company trading due to loss aversion identifies profits not to lose the profit more. As a result, trading volume increases.

Case three: If the share is in profit since the start of the investing period and loss more than profit during one month, the investment company does not trade due to loss aversion and does not identify the loss because it believes this loss is just on paper before recognition and does not occur. Therefore, trading volume did not change.

Case four: If the company has been in a loss since the start of the investment period, and its profit is more than the loss during the last one-month period, the investment company does not trade due to risk-aversion and identifies the profit not to suffer loss. Therefore, Trading volume increases.

Case five: The share has been in danger since the start of the investment and, during the last month, has profit less than at the start; the investment company does not trade due to loss aversion and does not identify the loss because it believes this loss is on paper before recognition and is not certain. Therefore, trading volume did not change.

Case six: If the share is in loss during one month and is in a loss since the start of the investment period, the investment company does not trade due to loss aversion because it believes this loss is on paper before recognition and is not certain. Hence, trading volume did not change.

D: At least in one case defined above, it is 1. Otherwise, it is 0. Diagram 2 represents these six cases briefly.

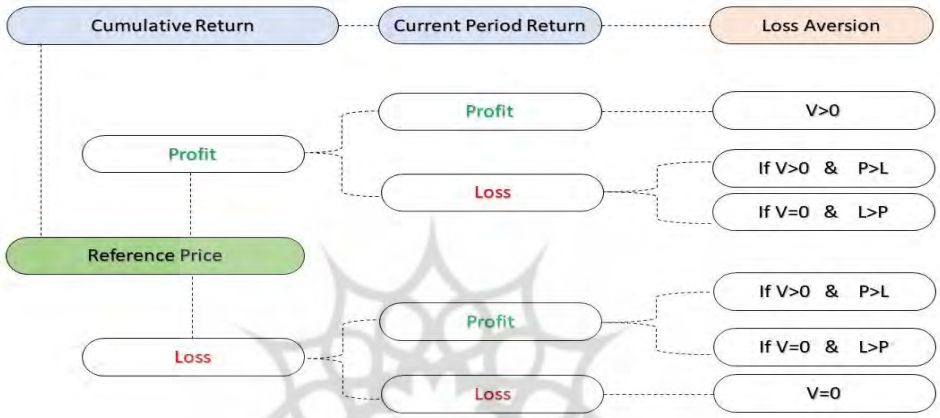

Fig. 2. The loss aversion on the basis of turnover and efficiency

Overconfidence

Overconfidence of investors in their own analyses and information is a form of cognitive bias where an individual, due to slow feedback and errors, cannot accurately perceive their abilities and skills in decision-making under risky conditions. One of the signs of excessive trust in the stock market is an increase in trading volume by investors after achieving returns in previous periods. To examine the existence of such a relationship among investors, we formed a Vector Auto regression (VAR) model with endogenous and exogenous variables.

If investors have excessive confidence, a positive causal relationship exists between the previous stock return rate and the current trading volume. The reason for such a relationship in a market where participants are overly confident is that when an investor achieves a return on a stock, their perception of earning that return is attributed to their skill and expertise in selecting that stock. They express confidence in their analyses and information. Because this investor believes they still can achieve such returns using their analyses and information,

after gaining returns on a stock, they proceed to sell it. They then replace it with other stocks, hoping to achieve additional returns beyond the risk incurred, similar to the past, using their assessments. This action results in an increase in trading volume for the investor.

This phenomenon occurs when this return is also related to the overall market, meaning that even when the entire market is on an upward trend and all stocks in a given period achieve high returns, some individual investors cannot discern this situation. They attribute the returns obtained on their stocks to their own abilities and expertise. This situation leads to an increase in their trading volume. Suppose the number of such self-assured investors in the market is high after gaining returns on the overall market or several stocks. In that case, the overall trading volume of the market increases.

In this case, our goal is to test the coefficients obtained from the model, employ the impulse response functions on the model, and analyze the resulting responses. For this purpose, we use the following VAR model, which includes two endogenous variables, market return (mret) and market turnover (mturn), as well as two exogenous variables, market volatility (msig) and market return dispersion (disp).

$$\begin{bmatrix} \text{mturn}_t \\ \text{mret}_t \end{bmatrix} = \begin{bmatrix} \alpha_{\text{mtunn}} \\ \alpha_{\text{mret}} \end{bmatrix} + \sum_{k=1}^{k} A_k \begin{bmatrix} \text{mturn}_{t-k} \\ \text{mret}_{t-k} \end{bmatrix} + \sum_{l=0}^{l} B_l \begin{bmatrix} \text{mii}_{t-l} \\ \text{di}_{t-l} \end{bmatrix} + \begin{bmatrix} e_{m\,\text{tum},t} \\ e_{\text{mret},t} \end{bmatrix} \quad (3)$$

The data used for the market is extracted from the monthly statistical reports of the capital market published by the Stock Exchange Organization. Top of Form

We calculated the variables using the following formulas:

Market Trading Volume (mturn):

$$\text{mturn}_t = \sum_{i=1}^{t} \text{turn}_{it} = \frac{(\text{numbe . o . share . traded})_{it}}{(\text{share . issued})_{it}} \quad (4)$$

Top of Form

To calculate the Market Trading Volume (mturn), the trading volume of major and block trades was excluded from the total monthly trading volume, as these trades are usually not part of the regular daily trading activity.

Market Return (mret):

$$\text{mret}_t = \sum_{i=1}^{t} (ret_{it}) = \frac{\text{ending.makket.value} \cdot (EMV)}{\text{beginning. makket.value} \cdot (BMV) - D + IC} \quad (5)$$

Where;

Ret: Market return in month *t*t,

EMV: Market value at the end of month *t*t,

BMV: Market value at the beginning of month *t*t,

D: Stands for the number of dividends distributed during that month

IC: Represents the increase in capital from cash inflow and shareholders' claims.

Market volatility (msig):

$$msig^2 = \sum_{i=1}^{n_t} r_{it}^2 + 2\sum_{i=1}^{n_t-1} r_{it}r_{i+1,t} \quad (6)$$

Where;

***nt*:** number of days with transactions during month t,

rij: daily return in month *t*t

The reason for including this variable is to account for the findings from the Karpoff survey regarding the direct relationship between trading volume and volatility (Karpoff, 1987). French and colleagues (1987) used this method to calculate this variable.

Market return dispersion (disp):

$$\text{disp}_t = \sum_{i=1}^{t} \left(ret_{it} - \bar{ret}\right)^2 \quad (7)$$

After determining the values of endogenous and exogenous variables, we conduct the Generalized Least Squares (GLS) test to determine the "stability" of the variables. Following the assessment of the stability rank of variables in the VAR model, it is time to determine the number of breaks in the corresponding model.

In a VAR model, each variable at time t is a function of its own k previous values and the k previous values of all variables in the VAR system. Selecting an appropriate number of breaks may be one of the most critical parts of the VAR model. Among the criteria used to determine the number of breaks are the Schwarz criterion, the Akaike criterion, and the Hannan-Quinn criterion. After evaluating the values obtained by various criteria, we use the value 2 for the number of breaks in the endogenous variables.

Once the stability and the number of breaks of the variables are determined, we test the VAR model using software such as EViews and Micro fit, extract the coefficients of the variables, and examine their significance. For the significance

of individual coefficients, we use the t-test and p-value; for the overall significance of the coefficients, we use the F-test. Then, the significance of the coefficients is determined by applying the impulse response function to the variables' response paths to a shock size of one standard deviation over several periods. In investigating overconfidence, we give a shocking size of one standard deviation to the market return variable; then, using the estimated coefficients and the dynamic structure of the VAR, we examine the trajectory of trading volume response to this shock over time.

Since the number of estimated parameters is extensive and simultaneous analysis of them is difficult, by doing this, the final result can be examined after the effect of all coefficients in the model over time on endogenous variables.

Results

Loss aversion bias

Descriptive statistics

Descriptive analysis is a method that helps interpret empirical studies intuitively. Descriptive statistics involve finding the mean, median, and mode and interpreting the numerical range of collected data, and qualitative analyses include charts of changes and expressing the magnitude of numbers in intuitive-qualitative formats, both of which convey coordinates and concepts to the audience.

Before testing the research hypothesis, descriptive statistical variables are briefly examined in Table 1. These tables include indices for describing research variables, such as central indices and dispersion indices. Table 1 shows the characteristics of the variables.

Table 1. Descriptive statistics of the research variables

Variable	Mean	Standard Error	Median	Standard deviation	Minimum	Maximum
Pre-event - control group						
Pt	8389	164.7	2457	19020	45.44	281782
Rt	-0.002	0.003	0.000	0.352	-4.934	4.638
R2t	0.124	0.009	0.000	0.9895	0.000	24.35
Log Vt-1	11.68	0.044	13.37	5.1294	0.000	22.60
Log Vt-2	11.74	0.044	13.38	5.084	0.000	22.60
Log V	11.65	0.045	13.37	5.1686	0.000	22.60
LOG MVt	5.609	0.005	5.982	0.5306	4.812	6.199
Event period						
Pt	9116	206.6	2673	24686	43.32	559081

Rt	0.003	0.000	0.000	0.0379	-0.380	2.756
R2t	0.001	0.001	0.000	0.0639	0.000	7.593
Log Vt-1	12.03	0.042	13.66	5.0541	0.000	22.11
Log Vt-2	12.08	0.042	13.66	4.9946	0.000	22.11
Log V	11.97	0.043	13.66	5.1155	0.000	22.11
LOG MVt	5.658	0.005	6.084	0.5422	4.896	6.284
Post-event - control group						
Pt	8708	228.7	2363	27196	42.38	628661
Rt	0.001	0.000	0.000	0.0268	-0.338	0.245
R2t	0.001	0.000	0.000	0.0019	0.000	0.114
Log Vt-1	12.33	0.038	13.54	4.5264	0.000	22.45
Log Vt-2	12.22	0.039	13.53	4.6549	0.000	22.45
Log V	12.43	0.037	13.55	4.3971	0.000	22.45
LOG MVt	5.639	0.005	5.417	0.5561	4.908	6.318

The Pearson correlation matrix has been used to test the direction and magnitude of the linear relationship between dependent and independent variables in the model. This test helps to detect potential multicollinearity among variables. As shown in Table 2, the Pearson correlation coefficients are relatively low, indicating that there is no significant linear relationship between the variables.

Table 2. Pearson correlation test results

Variable	Pt	Rt	R2t	logVt-1	logVt-2	log V	log MVt
Pt	1						
Rt	0.04	1					
RT^2t	0.02	-0.2	1				
logVt-1	0.09	0.0	0.0	1			
logVt-2	0.09	0.0	0.0	0.0	1		
log V	0.09	0.0	0.0	0.1	0.1	1	
log MVt	0.10	0.0	0.0	0.0	0.0	0.0	1

Reliability of variables

Before using the least squares method, it is essential to ensure that the classical assumptions about the data used are preserved. One of the most important of these assumptions is the assumption of variable stability. If the data are not stable, the regression fitted to those data is not interpretable because the relationship obtained from the least squares method in such conditions is spurious. Therefore, in this study, a test of variable stability was conducted before using the least squares method, and the results are shown in Table 3.

Table 3. The results of the reliability of variables

Variable	ADF - Fisher Chi-square	Probability
Pt	2928	0.0000
Rt	22468	0.0000
RT^2t	21450	0.0000
logVt-1	18791	0.0000
logVt-2	18791	0.0000
log V	6140	0.0000
log MVt	16387	0.0000

As reflected in Table 3, the significance level of the test statistic for all variables is less than 0.05. Therefore, the null hypothesis (H0) is rejected, and the variables are stable. This means that the means and variances of the variables over time and the covariances of the variables in different years have remained constant. Therefore, using these variables in the model does not lead to spurious regression.

Normality of error

Based on the results in Table 4, the value of the Jarque-Bera test is 5.23, with a p-value of 0.094120. Therefore, the model is accepted in terms of the normality of the disturbance term. As mentioned, since trading is related to costs, efficiency, and the volume of transactions in the previous period, the model error indicates other factors, such as the influence of investor behavior on trading volume.

Table 4. The results of normality of error

Jock-braw test	Sig
5.239	0.0941

Random and fixed effects

The Hausman test is employed to choose between panel regression and pooled regression methods. This test relies on the determination coefficients of the regressions performed by both methods, indicating whether the determination coefficient of the regression with fixed effects is significantly greater than that of the combined regression model or not.

Based on the above explanation, the results of conducting these tests for the first model with trading volume data for calculating loss aversion are presented in Table 5.

Table 5. F-Limmer and Hausman Test results in Top of Form

F-Limmer Test	Test value	Sig
H0: There is no difference between the fixed effects method and the pooled method.	F:(234,119) = 6765.4	0.0000
Hausman Test	Chi-square	Sig
H0: there is a difference between fixed and random effects method	35.227	0.0000

In Table 5, the Leamer F-test statistic is 4.6765, indicating that the null hypothesis of no difference between the pooled and fixed effects methods is rejected. Therefore, the best panel data method for use in this study is determined to be the fixed effects panel data method. Additionally, the results of the Hausman test support the use of the fixed effects method according to the statistics of this test.

The results of loss aversion estimation in the period of publication of financial statements are reported in Table 6.

Table 6. Model Fits and Estimates for loss aversion (Event period)

$\log vt = \beta 0 + \beta 1 \log pt + \beta 2Rt + \beta 3R2\ t + \beta 4 \log Mvt + \beta 5 \log vt{-}1 + \beta 6 \log vt{-}2 + ut$			
Variables	Coefficients	t-value	sig
C	-40.144	1.6534	0.0000
P	0.0285	0.0021	0.0000
Rt	51.014	1.6432	0.0000
RT^2t	-10.613	0.3072	0.0000
logMvt	-0.4590	0.1466	0.0000
logV (-1)	0.0043	0.1630	0.0000
logV (-2)	-0.0817	0.0099	0.0000
The coefficient of determination	0.97		
Durbin Watson	2.1		
F-value	71.111		
P-value	0.0000		

According to the estimation results, the probability of the t-test for the intercept, coefficients of the daily stock price variable, daily stock return, volatility, daily market trading volume, trading volume of the previous period's stocks, and trading volume of stocks two periods ago is less than 5%. Therefore, the estimated coefficients of the variables are statistically significant.

Table 7. Model Fits and Estimates for loss aversion (pre- Event)

$\log vt = \beta 0 + \beta 1 \log pt + \beta 2Rt + \beta 3R2\ t + \beta 4 \log Mvt + \beta 5 \log vt{-}1 + \beta 6 \log vt{-}2 + ut$			
Variables	Coefficients	t-value	sig
C	0.2223	0.6477	0.5172
P	0.0063	0.1144	0.0009
Rt	-0.5986	-6.5853	0.0000
RT^2t	-0.0797	-2.4730	0.0134
logMvt	0.5161	8.2054	0.0000
logV (-1)	0.6901	79.558	0.0000
logV (-2)	0.0405	4.6314	0.0000
The coefficient of determination	0.72		
Durbin Watson	1.87		
F-value	2479.74		
P-value	0.0000		

Table 8. Model Fits and Estimates for loss aversion (Post event)

$\log vt = \beta 0 + \beta 1 \log pt + \beta 2Rt + \beta 3R2\ t + \beta 4 \log Mvt + \beta 5 \log vt{-}1 + \beta 6 \log vt{-}2 + ut$			
Variables	Coefficients	t-value	sig
C	0.5494	2.1925	0.0284
P	0.0090	1.4309	0.0025
Rt	4.2616	4.7820	0.0000
RT^2t	325.25	25.803	0.0000
logMvt	0.6512	81.236	0.0000
logV (-1)	0.0703	9.0237	0.0000
logV (-2)	0.4858	10.538	0.0000
coefficient of determination	0.76		
Durbin Watson	2.1		
F-value	2948.15		
P-value	0.0000		

The important point in finding a pattern for loss aversion is that by analyzing the model in Tables 6, 7, and 8, the residual of the model was ultimately considered the dependent variable. The independent variable of the model, namely loss aversion, was constructed through a virtual variable based on a 6-factor pattern using Excel and used as an explanatory variable in the model as below.

$$ut = \beta 1 + \beta 2D + \varepsilon \quad (8)$$

The chosen method for estimating the research model is the Dynamic Panel Data (GMM) method. The GMM method will be used to address issues related to endogeneity and heterogeneity. We could have used the Random Effects model proposed by Hansen (1999) as an alternative method. However, issues related to endogeneity still remain unresolved for some explanatory variables.

This is the main reason for using the dynamic panel system. The static panel method has some problems in terms of serial correlation, variance heterogeneity, and endogeneity for some explanatory variables. The dynamic panel system's estimator allows researchers to address issues related to serial correlation, variance heterogeneity, and endogeneity for some variables. To estimate using this method, it is necessary to first identify the instrumental variables used in the model. The compatibility of the GMM estimator depends on the validity of the assumption of no serial correlation in error terms and the instruments used. This validity can be examined through the Sargan test, which tests the validity of the instruments. In other words, the GMM estimator is compatible when there is no second-order serial correlation in the error terms from first-order difference equations.

According to the explanations provided above, the results of estimating the model for measuring loss aversion in the financial statement release period for the event period and control groups (pre-event and post-event periods) are presented in Table 9.

Table 9. Model Fits and Estimates for loss aversion

Pre-event			
Variables	Coefficients	t-value	sig
Ut	-3.2	-40.1	0.0000
D	3.7	43.0	0.0000
Logvt-1	-0.27	-38.9	0.0000
Sargan F-Value	2.7046		
P-value	0.1068		
Event period			
Variables	Coefficients	t-value	sig
Ut	-0.30	-12.2	0.0000
D	1618	97.8	0.0000
Logvt-1	-0.358	-54.15	0.0000
Sargan F-Value	4.8016		
P-value	0.1896		
Post-event			
Variables	Coefficients	t-value	sig
Ut	-3.16	-43.3	0.0000
D	3.48	45.5	0.0000
Logvt-1	-0.26	-42.6	0.0000
Sargan F-Value	2.8477		
P-value	0.1124		

As observed in Table 9, the results of estimating the model are reported, in which trading volume is considered the dependent variable, and according to the dynamic panel estimation system, its one-period lag (V(t-1)) is considered the explanatory variable in the GMM system. As discussed regarding the Sargan test, the null hypothesis of this test has been accepted. The p-value of the Sargan test statistic is 0.1896, which, since it is greater than 0.05, indicates a failure to reject the null hypothesis, suggesting that the selected instruments are uncorrelated with the error terms and that the dynamic model is valid.

According to the model estimation results, the coefficients for loss aversion for the pre-event and post-event are 3.674 and 3.483, respectively, with a probability of 0.0000. Given the p-values obtained for these variables, the results indicate the significance of these coefficients at a 5% error level. The coefficient for loss aversion during the event period is 1618, with a probability of 0.0000. Comparing the coefficients of loss aversion for the event period with the pre-event and post-event periods indicates that investors exhibit more severe loss aversion during the release of financial statements.

Overconfidence bias

Descriptive statistics

The variables of descriptive statistical analysis have been summarized in Table 10, which includes indices for describing research variables such as central tendencies and dispersion measures. Table 10 illustrates the characteristics of the variables.

Table 10. Descriptive statistics of the research variables

Variable	Mturn	mret	Msig	disp
Mean	0.116	0.095	0.006	0.007
Median	0.092	0.111	0.000	0.002
Minimum	0.058	-0.064	-0.002	0.000
Maximum	0.300	0.330	0.036	0.038
Standard deviation	0.062	0.115	0.011	0.010

Correlation Analysis

The Pearson correlation matrix has been used to test the direction and strength of linear relationships between dependent, explanatory, and independent variables in the model. This test helps to detect potential multicollinearity among the variables. As shown in Table 11, the Pearson correlation coefficients are relatively low, indicating that there is no significant linear relationship between the variables.

Table 11. Pearson correlation test results

Variable	Mturn	mret	Msig	disp
mturn	1			
mret	0.2	1		
msig	0.03	0.41	1	
disp	0.72	0.04	-0.07	1

The matrix above indicates that market trading volume positively correlates with market returns. Additionally, fluctuations and volatility show a positive correlation with market trading volume. The strongest correlation in the entire matrix is between market trading volume and return volatility, with a coefficient of 0.72.

Reliability of variables

In this section, the reliability and validity have been addressed initially. To use the least squares method, it is essential to ensure that the classical assumptions regarding the data used are preserved. One of the most important of these assumptions is the reliability of the variables. If the data are not reliable, the regression fitted to those data is not interpretable because the relationship obtained from the least squares method under these conditions is spurious. Therefore, in this study, before using the least squares method, a test of the reliability of the variables was conducted, the results of which are shown in Table 12.

Table 12. The results of the reliability of variables

Variable	ADF [1]	PP [2]
mturn	-6.011	-4.725
mret	-12.10	-11.31
msig	-8.923	-9.013
disp	-7.985	-8.493
Critical Value		
1%	-4.002	-3.472
5%	-3	-2.88
10%	-3	-2.576
[1] Augmented Dickey-Fuller (ADF)		
[2] Phillips-Perron		

As compared to the critical values, the significantly higher values of variables establish that the variables discussed above have no unit root. Therefore, a null hypothesis on the basis of these results is rejected at a 1% level of significance, and the series is found stationary at I (0), good enough to test for the relationship between lagged returns and turnover.

Vector Auto Regression (VAR) Model

As described in the research methodology, when the returns are related to the overall market, meaning even if the entire market is experiencing growth and all stocks benefit from the trend within a specific time period, individual investors are unable to discern this situation. They attribute the returns obtained from their stocks to their own abilities, leading to an increase in their trading volume. Now, if the number of such confident investors in the market is high after gaining returns on the overall market or a number of stocks, the trading volume of the entire market increases. Therefore, the overconfidence bias model is estimated in the financial statement release period at the market level.

Table 13. Vector Auto Regressive Estimates for Endogenous and Exogenous Variables

Panel-A									
MTURN = C+ MTURN (-1) +MTURN (-2) + MSIG (-1) + MSIG (-2) + MRET (-1) + MRET (-2) + DISP (-1) + DISP (-2)									
	C	MTURN	MTURN	MSIG	MSIG	MRET	MRET	DISP	DISP
		(-1)	(-2)	(-1)	(-2)	(-1)	(-2)	(-1)	(-2)
Coefficients	5.17	0.59	0.001	0.005	0.004	0.31	0.652	-1.98	-2.7
t-value	3.66	14.41	0.035	1.643	9.446	2.97	3.667	-1.11	-0.048
P-value	0.0000	0.0000	0.9720	0. 149	0.0090	0.0000	0.0000	0.0000	0.0000
coefficient of determination				0.66					
Adjusted coefficient of determination				0.72					
Durbin Watson				2					
Panel-B									
MRET = C+ MRET (-1) + MRET (-2) + MSIG (-1) + MSIG (-2) + DISP (-1) + DISP (-2)									
	C	MRET	MRET	MSIG	MSIG	DISP	DISP		
		(-1)	(-2)	(-1)	(-2)	(-1)	(-2)		
Coefficients	-0.4	-0.768	-0.213	-0.025	-0.017	-0.07	-0.78		
t-value	-12.48	19.14-	-5.305	-14.95	-12.64	-1.64	-1.640		
P-value	0.0000	0.3680	0.2480	0.0000	0.0000	0.9980	0.1510		
coefficient of determination				0.42					
Adjusted coefficient of determination				0.58					
Durbin Watson				2.03					

The VAR model is used to evaluate the relationship between the variables under study, particularly market volatility and market returns. Market volatility and dispersion have been added as exogenous variables to the model.

In Panel A, Table 13, a significant positive relationship between market turnover and the market turnover function variable is observed. The relationship found for the first lag is sufficiently strong with a 99% confidence interval, but it weakens and disappears with an increase in the number of lags.

In Panel A, Table 13, a strong positive relationship between market turnover and market volatility is evident. Since market turnover is largely dependent on trading volume, the results confirm the volume-volatility relationship proposed by Karpoff (1987) and French, Schwert, and Stambaugh (1987). When it comes to the first lag of market volatility, this relationship disappears. However, the relationship becomes significant again at the second lag. Further analysis with an increase in the number of lags may provide stronger results regarding the nature of the relationship between lagged volatility and market turnover.

As shown in Panel A, Table 13, market returns have a significant positive relationship with market turnover. This relationship exists for both lags in the system, as evidenced by the considerable positive coefficients. The results indicate that continuous positive or high returns earned by the market increase future market turnover with an increase in trading volume. These findings are consistent with the overconfidence bias theory, where investors tend to attribute positive returns to their stock-picking abilities and engage in trading aggressively, leading to increased trading volume and market turnover.

As reported in Panel A, Table 13, there is a negative relationship between market turnover and stock return dispersion. This suggests that as market turnover increases, stock market returns decrease. The inverse nature of the relationship between these two variables indicates that an inclination towards increasing market volatility leads to a decrease in market returns. Market volatility creates uncertainty about the future, prompting investors to trade less to avoid potential losses, thereby reducing market financial turnover.

In Panel B, Table 13, no relationship was found between returns and lagged returns for the specified lag length, indicating that it cannot be used to predict future returns.

According to the estimation results in Panel B, Table 13, volatility is negatively associated with returns. The inverse nature of the relationship

between these two variables suggests that as market volatility increases, market returns decrease. Volatility in the market creates uncertainty about the future, causing investors to trade less to avoid potential losses, thereby reducing market financial turnover.

No relationship was found between return dispersion (Disp) and market returns in Panel B, Table 13.

Investigating the effect of the event period on the relationships between variables.

To examine the effect of the financial statement release period on the relationships between variables, one period before the annual general meeting (AGM) and one period after it has been considered as control groups. A summary comparison of the implementation of this model in each of the groups is presented in Table 14.

Table 14. Vector Auto Regressive Estimates

Panel-A							
Variables	Groups		C	Mturn (-1)	Msig	Mert	Disp
Mturn	Pre-event	Coefficients	0.0375	0.432	0.006	0.0229	11.731
		t-value	4.8134	55.451	0.0068	0.2998	7.959
		P-value	0.0000	0.0000	0.6952	0.0000	0.3854
	Event period	Coefficients	0.0916	0.27	5.7219	0.591	-1.5416
		t-value	9.4498	12.623	0.8679	11.134	-1.6519
		P-value	0.001	0.0000	0.4769	0.0000	0.0000
	Post-event	Coefficients	0.0816	0.491	1.1916	0.2514	5.3917
		t-value	1.7705	9.2508	0.6153	0.9117	2.7097
		P-value	0.0000	0.0000	0.601	0.0000	0.1134
Panel-B							
Variables	Groups		C	mert (-1)	msig	disp	mturn
Mert	Pre-event	Coefficients	-0.0681	-0.326	-0.028	-0.077	0.114
		t-value	-0.1409	-8.124	-20.81	-0.001	1.5
		P-value	0.9008	0.2871	0.0000	0.7121	0.0015
	Event period	Coefficients	-0.2134	-0.882	-15.941	-1.59	2.304
		t-value	-7.8577	-21.981	-1.124	-0.766	7.923
		P-value	0.0058	0.2591	0.0000	0.5236	0.0005
	Post-event	Coefficients	-0.1448	-0.796	-3.449	6.2471	0.278
		t-value	-1.1869	-19.837	-0.897	0.7667	3.639
		P-value	0.3571	0.4769	0.0000	0.5233	0.0000

In investigating the effect of the financial statement release period on the relationships between variables in Panel A, it is observed that the market return has a significant positive relationship with market turnover. This relationship is significant both during the event period and in the control periods. The coefficient of market return for the event period is 0.591, and for the pre-event and post-event, it is 0.0229 and 0.2514, respectively. The noticeable difference in coefficients during the event period compared to the control periods indicates the impact of financial statement release on overconfidence bias. The results suggest that a continuously positive or high market return increases future market turnover. This increase is more pronounced during the financial statement release period as an event period. These findings are consistent with the theory of overconfidence bias, where investors tend to relate positive returns to their stock-picking abilities and engage in trading aggressively, leading to increased market turnover.

A significant positive relationship was found between market turnover and the market turnover function variable. These findings are consistent with the results obtained from the VAR model, which is estimated only for the financial statement release period. However, the intensity of the coefficients in the control periods is higher than in the event period. These findings suggest that the increase in market turnover before and after the financial statement release is more influenced by the previous day's turnover than overconfidence bias.

No significant relationship was found between volatility and return dispersion and market return in both the periods before and after the release of the financial statement.

In Panel B, no relationship was found between returns and lagged return variables for the specified lag length during the event period and control periods. Therefore, it cannot be used to predict future returns.

Volatility is negatively associated with returns. The inverse nature of the relationship between these two variables indicates that as the desire for increased market volatility rises, market returns decline. The volatility coefficient during the financial statement release period is -15.941, which is higher than the coefficients pre and post event period (0.028 and 3.449, respectively). As observed, this relationship is stronger during the financial statement release period compared to the pre-event and post-event periods. Market volatility creates uncertainty about the future, leading investors to trade less to avoid potential losses, which reduces market turnover.

No relationship was found between return dispersion and market return in any of the tested periods.

VAR Granger Causality

The Granger causality test has been used to test the null hypothesis. This test determines whether variable B is caused by variable A or not. Additionally, it tests the relationship of lagged values of one variable with another. Therefore, using the results of the Granger causality test as an additional test, we aim to investigate whether the existence of a causal relationship between variables is discernible during the financial reporting period (event) or not. The results of the Granger causality test for VAR are presented in Table 15.

Table 15. VAR Granger Causality/Block Exogeneity Wald Test

DV: TURNOVER			
Excluded	Chi-sq	df	Probability
RETURNS	8.19	2	0.003*
DV: RETURNS			
	Chi-sq	df	Probability
TURNOVER	13.81	2	0.006*

Having turnover as a dependent variable, the p-value obtained is 0.003, which is lesser than the critical value of 0.05, which provides us with a sufficient base to reject the null hypothesis and determine that market returns granger causes market turnover. The same results were obtained by implying a VAR system, which also exhibited that there is a positive and significant relationship between returns and turnover for one-day and two-day lags under study. In the VAR model, with returns as the dependent variable, the p-value obtained is 0.006, which is significant at a 95% confidence interval. This makes the null hypothesis rejected and establishes that market turnover granger causes market returns. VAR also establishes the same results.

Reaction function

Another method for investigating the relationship between market turnover and returns is the impulse response function. The impulse response of market turnover to return shocks is illustrated in Figure 3.

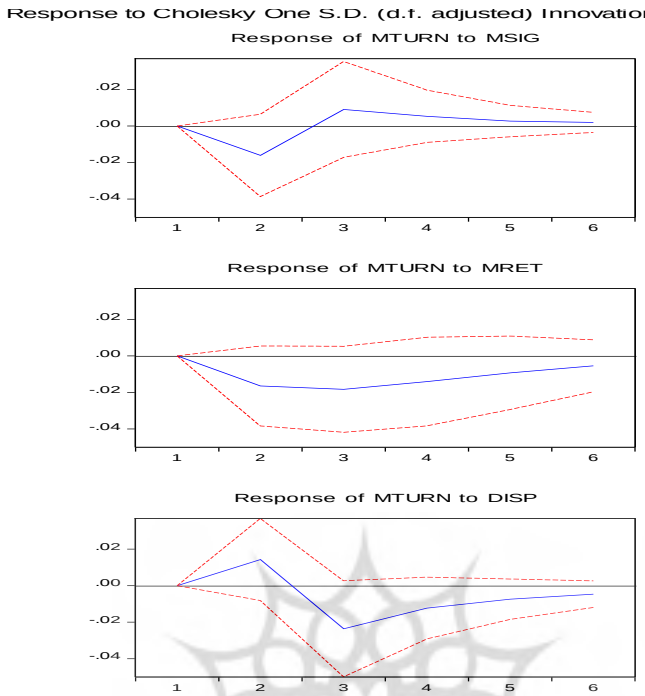

Fig. 3. Response to Cholesky on S.D. (d. f. adjusted) innovations ±2 S.E.

In the first chart, the model's response to the MSIG (Market Volatility Index) shock is illustrated. A positive shock to MSIG leads to an increase in the model's response. Therefore, an increase in stock price volatility results in excessive confidence. This may stem from various factors, such as the release of unfavorable economic or political news or the occurrence of bias during financial statement publication periods, leading to decreased predictive accuracy.

In the second chart, the model's response to the MRET (Market Returns) shock is depicted. A positive shock to MRET results in a decrease in the model's response. Hence, an increase in market returns leads to reduced excessive confidence. This could be due to various factors, such as increased demand for stocks or a decrease in interest rates, resulting in improved predictive accuracy.

In the third chart, the model's response to the MTURN (Daily Market Trading Volume Changes) shock is shown. A positive shock to MTURN leads to an increase in the model's response. Consequently, an increase in daily market trading volume changes results in excessive confidence. This may result from various factors, such as the release of economic or political news or bias during financial statement publication periods, leading to increased stock price volatility.

Overall, the results of these charts indicate that shocks introduced into the model equations can have a significant impact on the model's response. These effects can be positive or negative and can influence the model's accuracy. In this study, shocks introduced into the model led to excessive confidence. This indicates that negative shocks, such as the release of unfavorable economic or political news or the occurrence of bias during financial statement publication periods, can lead to increased stock price volatility and decreased predictive accuracy, ultimately driving investors to excessive confidence.

The large distance between the dotted lines and the error bars from the response function line indicates that the response function had considerable variability across different periods. Therefore, relying on the response function for inference due to the large distance of the error bars from the function line is not reliable. Hence, to assess the model's explanatory power with the introduction of shocks, residual changes in the model are presented in Chart 4.

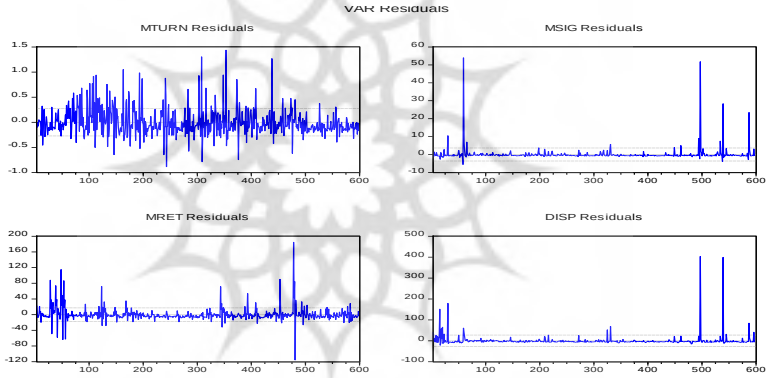

Fig. 4. Response to VAR residual

Figure 5 illustrates the model residuals in response to the imposed shocks. Model residuals represent the difference between the actual values of endogenous variables and the values predicted by the model. This Figure demonstrates how shocks introduced into the model equations can affect the model residuals.

In cases where a positive shock leads to an increase in model residuals, it means that the model cannot fully explain the variable. As reflected in the Figure, a positive shock to MSIG results in an increase in model residuals. Therefore, the model cannot fully explain stock price volatility. A positive shock to MRET leads to a decrease in model residuals. Hence, the model can fully explain market returns. A positive shock to DISP results in an increase in model residuals.

Therefore, the model can fully explain market trading volume.

Table 15. The results of the reaction function to the residuals

Shock Type	Variables	Residual	Interpretation	Result
Positive (Negative)	MSIG	increase (decrease)	The model cannot fully explain the MSIG	Increase in overconfidence
Positive (Negative)	MRET	(decrease) increase	the model can fully explain MRET	Decrease in overconfidence
Positive (Negative)	DISP	increase (decrease)	The model cannot fully explain the DISP	Increase in overconfidence
Positive (Negative)	MTURN	increase (decrease)	The model cannot fully explain the MTURN	Increase in overconfidence

Conclusion

The main purpose of financial statements is to provide useful information for both internal and external users. Owners and managers, employees, investors, financial institutions, suppliers and other creditors, customers, governments and their agencies, and other stakeholders use financial statements to make informed decisions about investment matters. Listed companies usually use financial statements as one of the primary means of communication with stakeholders. Market regulators and accounting standards setters attempt to improve the quality of financial statements to enhance transparency in financial reporting.

The research results showed that investors exhibit more pronounced risk aversion during financial reporting periods and their interpretation. In this regard, the initial part of the proposed model examines the impact of daily stock prices, daily stock trading volume, market trading volume, volatility, and one-day and two-day trading volume interruptions on stock trading volume. The findings indicate that loss aversion behavior has a positive and significant impact on stock trading volume. Behavioral tendencies are defined as "systematic errors" in judgment. Some authors refer to behavioral biases as "heuristics," while others call them "beliefs," "judgments," or "preferences." Investors can leverage behavioral finance knowledge for extensive benefits in specific situations. Proper company performance enhances market efficiency. Therefore, unbiased decisions can be effective in the market. This study indicates risk aversion among Tehran Stock Exchange investment companies. Like many other financial and behavioral research, investment decisions are influenced not only by economic indicators and rationality but also by other factors such as investment horizon and investor confidence and risk.

This study also examined the relationship of overconfidence during the financial statement publication period, and VAR testing showed a positive relationship between stock trading volume and market return. Changes in market prices and stock returns affect trading volume. Therefore, the research results confirm the existence of overconfidence bias, indicating that investors tend to attribute positive outcomes in the market to themselves and become more aggressive in future transactions due to this bias.

One of the key findings of this study is that appropriate allocation and accurate information content in annual financial statements can have a significant impact on investors' behavioral biases. The pattern of behavioral biases in the Iran capital market changes with variations in the informational content of financial statements, leading to either attenuation or reinforcement.

The primary objective of this research is to analyze the role of financial statement releases in shaping investors' behavioral biases. This study aims to advance the field of behavioral finance within the context of Iranian financial markets by specifically examining behavioral biases through a measured and modeled approach in a new context for financial research in Iran. Accordingly, recommendations are provided around this focus. Investors are advised to consider behavioral bias patterns in their decision-making and to use both technical and fundamental analyses. By staying informed with accurate and up-to-date information about market behaviors and future changes, they can make more informed and effective decisions. Researchers and academics are encouraged to conduct further studies on market behaviors and the impacts of behavioral bias patterns. Specifically, research that leads to the development of solutions and proposed models for better management of market behaviors is highly recommended. Educators and learners are advised to design training courses on market behavior analysis and the use of various analytical tools, as well as the risks associated with behavioral biases and how to manage them.

The current research also faces the following limitations:

1. Controlling external variables such as economic or political developments may be challenging in studies of financial markets.
2. Understanding how behavioral patterns emerge and how these patterns are connected to investors' decision-making involves complexities that may need to be more easily discernible.
3. Sudden events or market disruptions can negatively impact the accuracy of research results.

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