Probing the Impact of Recognition-Based Heuristic Biases on Investment Decision-Making and Performance.

Abstract

Purpose – This study aims to explore and clarify the mechanism by which recognition based heuristic biases influence the investment decision-making and performance of individual investors, with the mediating role of fundamental and technical anomalies

Design/methodology/approach – The deductive approach was used, as the research is based on behavioral finance's theoretical framework. A questionnaire and cross-sectional design were employed for data collection from the sample of 323 individual investors trading on the Pakistan Stock Exchange (PSX). Hypotheses were tested through the structural equation modeling (SEM) technique.

Findings – The article provides further insights into the relationship between recognition-based heuristic-driven biases and investment management activities. The results suggest that recognition-based heuristic-driven biases have a markedly positive influence on investment decision-making and negatively influence the investment performance of individual investors. The results also suggest that fundamental and technical anomalies mediate the relationships between the recognition-based heuristic-driven biases on the one hand and investment management activities on the other.

Practical implications – The results of the study suggested that investment management activities that rely on recognition-based heuristics would not result in better returns to investors. The article encourages investors to base decisions on their financial capability and experience levels and to avoid relying on recognition-based heuristics when making decisions related to investment management activities. It provides awareness and understanding of recognition-based heuristic-driven biases in investment management activities, which could be very useful for decision-makers and professionals in financial institutions, such as portfolio managers and traders in commercial banks, investment banks, and mutual funds. This paper helps investors to select better investment tools and avoid repeating the expensive errors that occur due to recognition-based heuristic-driven biases.

Originality/value – The current study is the first to focus on links recognition-based heuristic-driven biases, fundamental and technical anomalies, investment decision-making and performance of individual investors. This article enhanced the understanding of the role that recognition-based heuristic-driven biases plays in investment management. More importantly, it went some way towards enhancing understanding of behavioral aspects and their influence on investment decision making and performance in an emerging market.

Keywords, name fluency, alphabetical order, names memorability fundamental and technical anomalies, investment decision-making, and investment performance

1. Introduction

Behavioural finance is the study of the manner in which various psychological and social factors influence the individual decision-making thought processes of finance practitioners and the collective impact it creates on the conduct of the markets in which they operate. It is a field of study that helps us understand how persons, or groups of persons, make choices relating to management of their monetary resources, in order to achieve their preferred objectives. Behavioural finance's importance stems from the fact that it enables us to enrich our understanding of the financial market by including the human elements into it. It illustrates the investing pattern of investors, notably those who exhibit underreaction in the short run and overreaction in the long run. It could present a model of integration of principles of psychology and economics.

The traditional economics and finance theories assumed that individual investors are rational decisions maker because they consider all available information in their investment decision-making process. According to Fama (1970) and other believers in the fundamental theories of standard finance hold that markets are almost always efficient. Investors are regarded as rational, unbiased, and consistent actors who make optimal investment decisions without being affected by their psyches or emotions in efficient markets. The efficient market hypothesis (EMH) implies that no investors can outperform the stock market because share prices reflect all the available information. According to EMH, share prices in the stock market are trading at fair value, and it is impossible for the investors to purchase undervalued stock or sell stock at a higher value because of the market efficiency, and the only do risky investments is the way to outperform (Fama, 1970).

Investors and financial professionals used various economic models to forecast stock values. For example, the arbitrage pricing theory (Ross, 1976) and capital asset pricing model (Sharpe, 1964), etc. However, in various pieces of literature, there are some indications of irrational and poor investment decision-making such as the tendency of investors to retain loss-making stocks too long while selling winning stocks too early, where losing security continue to underperform and winning security continue to outperform (Odean, 1998; Kahneman and Tversky, 1974), Investors tend to experience a strong bias towards holding stocks of their home country or local area (Hirshleifer, 2001). hold under-diversified portfolios (Goetzmann and Kumar, 2008); They assign more weight to domestic investments in their portfolios. They ignore the potential benefits of diversification (Ahearne et al., 2004), following the crowed and information cascade (Tan, Chiang et al., 2008). Due to bounded rationality, investors often fell prey to behavioral heuristics, e.g., overconfidence (Statman et al., 2006; Barber and Odean, 2001), anchoring (Furnham and Boo, 2011; Tversky and Kahneman, 1974), representativeness (De Bondt and Thaler, 1985; Tversky and Kahneman, 1974), disposition effect (Barberis and Xiong, 2009; Odean, 1998), herding (Lee et al., 2004; Wermers, 1999), familiarity (home) bias (Ahearne et al., 2004; French and Poterba, 1991), and framing (Thaler and Sunstein, 2008: Choi et al., 2004).

When trading in the stock market, investors often use recognition-based heuristics, which results in a variety of recognition-based heuristic-driven biases. Specifically, reliance on alphabetical order, name memorability, and name fluency lead investors to make less than optimal choices. Recognition heuristic is a simple mental strategy that considers only the recognition cue and leads to efficient decision-making (Pachur, et al., 2011). When one alternative is recognized, and the other is not, it selects the recognized one; such a phenomenon is known as the recognition heuristic (Goldstein and Gigerenzer, 2002). Additionally, Gigerenzer, and Gaissmaier (2011) state that heuristics that bases judgments only on recognition information and neglect other signals is called recognition heuristics. Thus, the recognition heuristic is a judgment and decision-making

strategy in which judgement is made by relying on one single cue (recognition), ignoring other information. According to Ahmad (2022), the human mind relies on recognition-based heuristics strategies affected by systematic and predictable errors (biases), that allows only a second-best decision. Literature highlights behavioral biases are the main reason for irrationality in decision-making (Shefrin, 2007).

The traditional financial theories are failed to capture these behavioral anomalies in the stock market. But a study of behavioral finance can help us to understand why and how these behavioral anomalies exist in the stock market and how the stock markets and investor's performance are affected due to these anomalies. According to behavioral finance scholars, unavoidable behavioral biases exist in the personality of every individual that prevents them from making rational decisions; as a result, anomalies occur in the stock market, which has bad consequences on investment decision-making, investors' performance (Ahmad, & Shah, 2021), and market efficiency (Shah, Ahmad, & Mahmood, 2018). Understanding of behavioral finance enables us to avoid emotion-driven speculation (that may lead to losses) and equips us with a capacity to maintain a balance between rationality and personal preferences. Such a balance can led to development of appropriate financial management strategies.

This study examines the influence of recognition-based heuristic biases, namely alphabetical order, name memorability, and name fluency, on investment decision-making and the performance of individual investors in the context of a developing economy. It further examines the mediating role of fundamental and technical anomalies between the relationship of recognition-based heuristics and investment management activities (investment decision-making and performance). The mediation moderation analysis is considered to understand the complexities of the relationship between recognition-based heuristics and investment management activities. Recognition-based heuristics are the most essential heuristic among all as it showed the strongest impact on investment management activities (Ahmad, 2022). Investors suffer most from recognition-based heuristics than other types of heuristics. To the best of the author's knowledge, the recognition-based heuristics have never been systematically tested with investment management activities (i.e., investment decision-making and investment performance), nor have its predictive power been examined in the emerging economy.

Ahmad (2022) emphasized the scarcity of studies on recognition-based heuristics in developing economies. Developing economies have higher growth possibilities, and investors are more prone to invest in the stock market. He also highlighted that an emerging market contain more conditions of uncertainty when compared with the developed markets. The uncertainty prevails in the form of more sparse informational environments, fewer analysts following, reduced accounting disclosure, and the like. In such a context, fast and frugal reasoning works better, which needs to be studied further. Ahmad and Shah (2022) recommended that future studies explore the effect of alphabetical ordering, name memorability, and name fluence on investment management activities because limited research has been carried out on these name-based heuristics among investors. They also suggested that fundamental and technical anomalies might also be used as mediating variables between them. A handful of studies have shown evidence that heuristics cause inevitable behavioral biases in investment decisions from developing economies (Metawa et al., 2018; De Vries et al., 2017; Jaiyeoba and Haron, 2016) and from developed economies (Yalcin et al., 2016; Wang et al., 2011; Hirshleifer, 2001; Coval and Moskowitz, 1999; Tversky and Kahneman, 1986;). The findings of various studies were inconclusive in explaining these recognition-based biases. Therefore, this study has tried to provide the desired empirical evidence

from the developing economy by using a data set of individual investors who have invested in the stock market.

Thus, the current study makes a few contributions to the existing body of literature on recognition-based heuristics, and investment management activities. First, the present study improves the understanding of the role that recognition based heuristic-driven biases plays in investment management activities. The current research provides an explanation of how and why investors' behavior deviates from rationality and make trading mistakes. Second, the findings of the current research offer novel contributions to the existing literature by suggesting that investors suffer from recognition based heuristic-driven biases underestimate their downside risk and trade excessively in the stock market, which can have a detrimental effect on their returns. Hence, the present study also advances an important stream of existing research, which posits that the human mind relies on heuristic strategies affected by systematic and predictable errors (biases), that allow only sub-optimal decisions (Tversky & Kahneman, 1974). Third, the mediating effect of fundamental and technical anomalies on the relationship between recognition based heuristic-driven biases and investment management activities of individual investors is studied for the first time through this survey which differentiates this study from others. The current research contributes to the literature by defining recognition based heuristic-driven biases as antecedent, fundamental, and technical anomalies as intervening variables for irrational investment management activities. These results add to the existing body of knowledge by inferring that fundamental and technical abnormalities endure in the stock market as an outcome of recognition based heuristic-driven biases; as a result, investment management activities of investors are affected adversely.

Fourth, the primary reason for this research is to investigate if recognition heuristics matters in stock investors' decision-making and investment performance. This study also enhances the understanding of the psychology of the choices of investors from an emerging market. Moreover, understanding investor behavior can help investors avoid recognition based heuristic driven biases and can improve their decisions when choosing investment services, products, and plans. The study provides a significant and meaningful contribution to the prevailing young and emerging finance paradigm. Most studies focus on individualistic cultures and well-developed financial markets, and very little is known about the profiles, inspirations, and conduct of individual investors in collectivist cultures and less-developed markets (Ahmad & Shah, 2022). This article also helps fill this gap by considering how investors' recognition based heuristic driven biases influences investment management activities, especially in an emerging country like Pakistan where the market fundamentals are different from those in developed countries.

Of three theories supporting the research phenomenon, one is known as prospect theory, the other is known as bounded rationality theory, and the third is heuristics theory. The theory of bounded rationality, which Simon explained in (1955), states that decision-makers cannot make a rational decision due to the limited information they have, the cognitive limitations of their minds, and the limited time they have to make a decision. Thus, even decision-makers who intend to make optimal decisions are bound to make satisficing (rather than maximizing or optimizing) decisions in complex situations, within their data processing and cognitive limitations. One way to deal with this limitation is through heuristics or shortcuts, which might cause systematic errors in judgment and lead to satisfactory investment choices, but which do not maximize utility. Prospect theory, which Kahneman and Tversky (1979) explained, posits that people make decisions based on gains and losses, rather than final outcomes, and set reference points and make decisions accordingly. People value gains and losses differently. This value is calculated from a reference point.

According to heuristics theory, decision-makers use heuristics to avoid the risk of losses in uncertain situations. Heuristics are rules of thumb, which decision-makers use in complex and uncertain situations to make decisions easily (Ritter, 2003) by reducing the complexity of measuring probabilities and forecasting values to simpler judgments (Kahneman and Tversky, 1974). Heuristics allow human beings to speed up decision-making, compared to rationally processing the available information. In general, these heuristics are beneficial and useful when time is limited (Waweru et al., 2008), but sometimes they lead to biases (Kahneman and Tversky, 1974; Ritter, 2003). According to Shah and Oppenheimer (2008), all heuristics are a form of effort reduction, using one or more of the following: analysing only a few clues, integrating less information or analysing only a few alternatives.

Alphabetical ordering, name memorability and name fluency, are recognition-based heuristic driven biases that are used by investors due to bounded rationality to reduce the risk of loss in uncertain situations. When investors use recognition-based heuristics, they reduce the mental effort in the decision-making process, but that leads to errors in judgment and, as a result, anomalies persist in the market; due to these anomalies, investors make irrational investment decisions, and their investment performance reduces. Many researchers in financial economics argue that these heuristics can affect financial decision-making and forecasting financial variables, namely earnings or material profit (Abarbanell & Bernard, 1992), as well as influencing financial markets' behaviour (Debondt and Thaler, 1985). Standard finance does not explain these patterns satisfactorily; they normally hurt the investor's portfolio performance. But behavioral finance provides a satisfactory demonstration and understanding of why investors trade, how they choose their portfolios, how they perform (Subrahmanyam, 2008), and why markets become inefficient.

2. Literature Review

2.1 Investment Decisions and Performance

Investment is the process of buying assets with available resources to generate greater future benefits. These assets are financial assets, such as securities and tradeable instruments, in the capital market context. The return-on-investment portfolio is referred to as investment performance. A portfolio of investments may include two or more assets. Every investor intends to make optimal investment decisions (Sharpe, 1964). As Merton (1987) contends that optimal and rational investment decisions are dependent on advanced financial knowledge. Standard finance presumes that people have complete information and make rational decisions at all times (Ameur et al., 2019). Behavioral finance, however, assumes that investment decisions are often irrational due to bounded rationality (Pompain, 2006), fundamental heuristics (Baker and Nofsinger, 2010), imperfect information (Bikhchandani et al., 1992), anomalies (Ajmal et al., 2011), psychological biases (Baker and Nofsinger, 2002) or behavioral biases (Shefrin, 2007) and Psychological accounts of investors' mental developments play a key role in irrational decision-making.

According to the cognitive theory, cognitive biases and heuristics may cause individuals to participate in less than rational decision-making (Baron, 1998; Bazerman, 1998). Bazerman et al. (1984) argue that cognitive biases are personal beliefs that help individuals deal with difficult decisions. Both biases and heuristics are mental shortcuts, which decision-makers use in complex and uncertain situations (Ritter, 2003), by reducing the complexity (Barnes, 1984). According to Kahneman and Tversky (1974), due to these heuristics and biases, systematic errors occur; as a result, decision outcomes are affected adversely (Barnes, 1984).

A limited review of prior studies regarding recognition-based heuristics and biases are discussed below.

2.2 Recognition-Based Heuristics

One of the most fast and frugal heuristics introduced by Gigerenzer and colleagues is the recognition heuristic (Goldstein & Gigerenzer, 2002; Goldstein & Gigerenzer, 1999). It is defined as "If one of two objects is recognized and the other is not, then infer that the recognized object has the higher value" (Goldstein & Gigerenzer, 1999). It is a simple mental strategy which considers only the recognition cue and leads to efficient decision making (Pachur, et al., 2011). When one alternative is recognized and the other is not, it selects the recognized one; such a phenomenon is known as recognition heuristic (Goldstein and Gigerenzer, 2002). Additionally, Gigerenzer, & Gaissmaier(2011) state that heuristics that bases judgments only on recognition information and neglecting other signals is called recognition heuristics. Thus, recognition heuristic is a judgment and decision-making strategy in which judgement is made by relying on one single cue (recognition), ignoring other information. The recognition heuristic was considered as a one-cue, non-compensatory inference strategy (Dhami & Ayton, 2001), which means that no additional information aside from recognition is taken into consideration in the judgment. In the recognition-based heuristics debate, we have two streams of thought: Gigerenzer and his research group (1999) claim that recognition-based heuristics can be successful in complex and uncertain environments as they guide the decision maker in searching information "by effectively and efficiently exploiting information structures in the environment" (Bertel and Kirlik, 2010). Contrary to this position, some researcher postulated that the human mind relies on recognition-based heuristics strategies affected by systematic and predictable errors (biases), that allows only a second-best decision (Tversky & Kahneman, 1974). There are three type of recognition-based heuristic-driven biases which are listed and discussed below.

2.2.1 Names Fluency

Name fluency is a recognition-based heuristic-driven bias, in which decision makers rely on recognition and retrieval fluency when making judgments. It is also known as name based behavioral bias (Itzkowitz & Itzkowitz, 2017). When information is easy to process, or fluent, people tend to feel at ease, and therefore incorrectly regard this as a positive assessment of the information. "Because investors link the ease of processing a fluent name with positive feelings toward the stock, stocks with more fluent names should trade more than stocks with less fluent names" (Itzkowitz & Itzkowitz, 2017). According to Hertwig et al. (2008), names fluency is a heuristic that bases judgments only on fluency cue: "when both alternatives are recognized but one is recognized faster, it selects the one that is recognized faster".

2.2.2 Alphabetical Order

Another recognition-based heuristic-driven biases, in which decision makers choose early alphabet options more frequently than others. It is also known as name based behavioural bias (Itzkowitz, & Itzkowitz, 2017). Itzkowitz, Itzkowitz, and Rothbort (2015) argue convincingly, investors prefer trading in company stocks commencement with the letters that appear early in the alphabet more than stocks commencement with later letters of the alphabet such a phenomenon is known as

alphabeticity bias. Two psychological factors contribute to alphabeticity bias one is known as status quo bias and other is satisficing

Investment alternatives are normally listed in alphabetical order (Doellman, et al., 2018). Even though a list of investment choices can easily be re-ordered based on individual stock characteristics, people more often rely on the default (status quo) list given to them (Kahneman, Knetsch, & Thaler, 1991). Thus, because information related to stocks are normally presented in alphabetical order and individuals depend on the default ordering (status quo), early alphabet stocks are bought and sold more frequently than stocks with later alphabet, as a result stocks beginning with the early letters of alphabet have greater turnover and value than stocks beginning with later letters of alphabet (Itzkowitz & Itzkowitz, 2017).

Doellman, et al., (2018) assert that conviction on the status quo correlates with decision makers tendency to satisfice resulting in an alphabeticity bias. When making a choice between large numbers of options, decision makers often satisfice, as a result, stops the search after an acceptable option is found, even if prolonged searching could yield a better result (Caplin et al., 2011). Furthermore, when decision makers (investors) glance through lists of stocks, they will be preferably to buy and sell stocks appearing toward the beginning of the list. Thus, initial ordering has a significant influence on which stocks are elected for purchase or sale.

2.2.3 Names Memorability

Finally, names memorability is a recognition-based heuristic-driven biases, in which decision makers rely on recall and recognition when making judgments. When investors make investment, decisions based on the stock of a firm they remember, such a phenomenon is known as names memorability bias. According to Itzkowitz, and Itzkowitz (2017) the memorability of a firm's name is a name-based behavioural bias: when investors simply limit their stock choices to firms, they remember, such behaviour is the reflection of names memorability bias. This article measures the impact of name-based heuristic biases on investment decision-making and performance A limited review of prior studies regarding name-based heuristic biases and their effect on investment decision-making and performance is discussed below.

2.3 Recognition-Based Heuristics, Investment Decisions and Performance

Investor psychology has a direct effect on the decision-making process. The effects of recognition-based heuristic-driven biases on stock valuation have also been revealed in real-life investment situations. The paper by Itzkowitz and Itzkowitz (2017), seeks to highlight the influence of the recognition-based heuristic-driven biases i.e., alphabetical ordering, name memorability, and name fluency on the investment decision-making of individual and institutional investors. The results of the study reveal that investors use these name-based shortcuts when trading stocks, resulting in irrational decisions. Chan, Park, and Patel, (2018) studied the impact of company name fluency on the venture investment decisions in pre-venture and post-success stages. The results show that pre-ventures investors prefer low linguistically fluently named ventures because they prefer to invest in unique enterprises with high phonetically fluent names. The high phonetic fluency automatically elicits a favourable impression. On the other hand, post-success investors may still prefer to invest in ventures with high phonetically fluent names but are less affected by linguistic fluency because they are less concerned about the uniqueness of an enterprise.

Green, and Jame, (2013) have elucidated the impact of name fluency and their effect on the investment decisions and firm value. The results are in the context of USA and it has proved

that name fluency has a significant influence on the investment decisions i.e. with fluently named mutual funds attracting greater fund flows and fluent closed-end funds trading at smaller discounts. Moreover, it also showed that companies with short and easily pronounced names have higher turnover and value than companies with difficult names to pronounce. Anderson and Larkin (2019) also documented that companies with English word tickers and fluent names have a higher turnover, valuation ratios, and breadth of ownership (Xing et al., 2016). According to Song and Schwarz (2009) investors tend to perceive such companies as "less risky investment opportunities" because the company fluency name could diminish risk perception and develop a sense of skill with a greater familiarity with the company (Weber et al. 2005). Investors are more likely to optimistically value companies with fluent names as those firms tend to prompt a more favourable impression of associated objects (Alter and Oppenheimer 2006) as a result they intend to engage more investment in such firms.

Itzkowitz, Itzkowitz, and Rothbort, (2016) explore the effect of alphabetical ordering on stock turnover and value. The results revealed that stocks with early alphabet names are traded more often than stocks with later alphabet names and that alphabetical ordering also has a significant effect on the value of a firm. Jacobs and Hillert, (2016) investigate the impact of alphabetic bias on the trading behavior of investors actively trading on the U.S. stock market. The results show stocks with early alphabet names have about 5–15% higher trading activity than stocks with later alphabet names. Similarly, Doellman, et al., (2019) studied the role of alphabeticity bias in investment allocation decisions. The results indicate that alphabeticity bias has a significant influence on investment allocation decisions even in small choice sets, such as the case with 401(k) investing. Thus, investors are more likely to purchase and sell stocks with early alphabet names. Grullon, Kanatas, and Weston, (2004) explain the mechanism by which advertising influences the breadth of ownership and liquidity of a firm. The results show that greater advertising companies have a greater number of both individual and institutional stockholders, as well as better liquidity of their common stock. The overall results of the study suggest that the degree of investor familiarity with a company may affect the cost of capital and, consequently, its value.

After reviewing the relevant literature, the researcher concluded that investors relying on recognition-based heuristic-driven biases when trading stocks, resulting in irrational decisions. Due to these name-based behavioral biases, investors choose inappropriate or risky investments, as well as trading excessively, which can have a negative effect on their returns. Investors are more likely to optimistically value companies with fluent names alphabetical ordering, and name memorability as those companies tend to prompt a more favorable impression of associated objects, as a result, they underestimate their downside risk and intend to engage more investment in such companies which in turn adversely affect their investment performance.

Hypothesis 1: *The names fluency bias has a significant positive influence on the investment decision-making of individual investors on the PSX*

Hypothesis 2: *The names memorability bias has a significant positive influence on the investment decision-making of individual investors on the PSX*

Hypothesis 3: *The alphabetical order bias has a significant positive influence on the investment decision-making of individual investors on the PSX*

Hypothesis 4*: The names fluency has a significant negative influence on the investment performance of individual investors on the PSX*

Hypothesis 5*: The names memorability has a significant negative influence on the investment performance of individual investors on the PSX*

Hypothesis 6*: The alphabetical order has a significant negative influence on the investment performance of individual investors on the PSX*

2.4 Anomalies and Mediating Role of Anomalies

The literal meaning of an anomaly is an unusual event. According to Frankfurter, and McGoun, (2001), an anomaly can be defined as "an irregularity, a deviation from the common or natural order, or an exceptional condition or circumstance". If we talk about the stock market anomalies, it can be defined as an unusual occurrence or abnormality in the stock market's smooth pattern. Thus, anomalies refer to deviation from the normal situation. When the actual result is different from the expected result under a given set of assumptions, it is known as anomalous. As per Pompain (2006), these anomalies can be divided into three main categories: calendar, fundamental and technical.

Fundamental anomalies are the irregularities that emerge when stock prices are anticipated based on fundamental analysis. Investors consistently overestimate or underestimate the prospects of growth companies which leads to irregularities. Technical anomalies are the irregularities that emerge when stock prices are anticipated based on technical analysis. Calendar anomalies are the irregular behavior of stock prices during a specific time period. The pattern of stock return varies from year to year or from month to month. An example of a calendar anomaly is "the January effect" (Pompain, 2006). This study explores the mediating effect of anomalies between heuristic-driven biases and investment management activities and between the connection of heuristic-driven biases and perceived market efficiency. As ul Abdin et al. (2017) argue convincingly, only two anomalies, namely, technical, and fundamental, mediate the relationships between heuristic biases and investment management activities; that is why the study has taken these two anomalies as mediator variables.

Several previous studies indicate that anomalies mediate the bivariate relationship. When investors used heuristics to make their financial decisions, they reduce the mental effort in the decision-making process, leading to errors in judgment (Shah et al., 2018). As a result, anomalies arise in the market, which affects investors' investment decisions and performance, which could lead to the market becoming inefficient. Ul Abdin, et al. (2017) finding shows that fundamental anomalies mediate the relationship between the heuristic-driven biases and investment performance. Psychologically, this all means that heuristic-driven biases are the causes of fundamental anomalies that ultimately affect investors' investment decisions and performance. The divergent prospect guides every investor, and the paper by Abdin, et al., (2017) explored the different prospect (namely regret aversion, loss aversion, and mental accounting) of the individual investors and their effect on investment decisions and performance with mediating role of stock market anomalies, i.e., technical, fundamental, and calendar anomalies. The results indicate that calendar and fundamental anomalies mediate the relationship between certain prospect elements and investment decisions, and investment performance of individual investors. Of these prospect elements, regret aversion was a significant predictor of investment decisions and performance,

mediated by calendar anomalies. It also has a significant influence on investment decisions and performance with the mediating role of fundamental anomalies.

Lazuarni, (2019) empirically investigated whether heuristic-driven biases such as hindsight representativeness and availability are anyway related to the occurrences of stock market anomalies (fundamental and technical anomalies) in the context of Indonesia. And also examined the mediating effect of these anomalies between the relationship of heuristic-driven biases and the investment performance of individual investors who are treading at the Indonesia stock exchange. The findings suggest that heuristic biases, namely hindsight and representativeness, have a significant positive effect on fundamental and technical anomalies which means that hindsight and representativeness biases are reasons for the existence of the technical and fundamental anomalies in the Indonesian stock market. The results of the study also revealed that the relationship between heuristic- driven biases (namely hindsight and representativeness biases) and the investment performance of individual investors is partially mediated by technical and fundamental anomalies, and these anomalies do not have any mediating effect between the relationship of availability bias and the investment performance of individual investors. After reviewing the literature in a similar domain, the author observed that some investigations demonstrated that investors make errors in judgment due to heuristic-driven biases. As a result, anomalies arise in the stock market, which affects the investment management activities of individual and could lead to the market becoming inefficient. Thus, technical, and fundamental anomalies meditate the relationships between recognition heuristic biases, and investment management activities. Based on previous literature following relationship is expected.

Hypothesis 7*: Fundamental and technical anomalies mediate the relationship between names fluency bias and investment decision-making of individual investors on the PSX.*

Hypothesis 8*: Fundamental and technical anomalies mediate the relationship between names memorability bias and investment decision-making of individual investors on the PSX.*

Hypothesis 9*: Fundamental and technical anomalies mediate the relationship between alphabetical order bias and investment decision-making of individual investors on the PSX.*

Hypothesis 10: *Fundamental and technical anomalies mediate the relationship between names fluency bias and the investment performance of individual investors on the PSX.*

Hypothesis 11: *Fundamental and technical anomalies mediate the relationship between names memorability bias and the investment performance of individual investors on the PSX.*

Hypothesis 12: *Fundamental and technical anomalies mediate the relationship between alphabetical order bias and the investment performance of individual investors on the PSX.*

3. Research Methodology

3.1 Sampling and Data Collection

Osborne, Costello, and Kellow (2008) suggested a ratio of 10 to 15 respondents to one item as an acceptable criterion for deciding the sample size to get unbiased estimates. Following this criterion (23 items x 10 = 230 responses), a total of 700 questionnaires were directly delivered to individual investors currently trading at PSX, to get a response of at least 230. Of these, 408 were returned,

but only 323 questionnaires were fully completed by individual investors and used for analysis, representing an effective response response rate of 46.14% which is consistent with Ahmad (2021) who also has a response rate of less than 50%. This rate is reasonable because the target audience was real investors. This sample size is large enough to fulfill all the statistical requirements and this was also confirmed by reviewing various studies conducted on similar topics in different environments, such as those of Waweru et al. (2008), ul Abdin et al. (2017), Rasheed et al.(2018), Shah et al. (2018), Ahmad (2021), and several others, in which the sample size ranged from 143 to 324. While the present study was conducted in the Pakistani context and its focus is on the investment decision-making and performance of individual investors in this market, it may well have relevance to investors in many stock exchanges in other developing countries. A convenient purposively sampling technique was used to collect the data for this study rather than a random sampling technique, because data from the whole population are required for random sampling (Sekaran and Bougie 2016). The Pakistani economy is a developing economy and, therefore, data are not available in standard form, which is why the researcher chose convenient sampling.

3.2 Operationalization of Variables

To achieve the research objective, a survey method was used, and a questionnaire was developed, based on existing measurement instruments from the literature. Where necessary, the authors modified the scales to make them more suitable to the context of Pakistani investors' decisions' relationship with heuristics. Some relevant studies consulted at this stage are Luong and Ha (2011), Van et al., (2011), Lautiainen (2015), Mouna and Jarboui (2015), Jacobs and Hillert (2016), ul Abdin et al. (2017) Ahmad (2020) and Baker et al., (2020). For all multi-item construct measurements, the author used a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). All constructs were operationalized with reflective measurement models. Simultaneously, five behavioural finance experts were engaged in the assessment of the questionnaire, specifically to ensure the validity and reliability of the instrument used for this study. Furthermore, a pilot test was conducted to fine-tune the questionnaire for reliable data collection. Further details related to the operationalization of the variables are discussed below.

3.2.1 Dependent Variables

The authors use investment decision-making and investment performance as endogenous variables: Investment decision-making was measured with five items adapted from Rasheed, et al. (2018). To measure investment decision-making, respondents were asked to what extent they agree/disagree with *"When making an investment, you trust your feelings and reactions"* and *"When I make an investment, it is more important for me to feel the investment is right than have a rational reason for it"* etc. Three items were used to measure investment performance, adopted from ul Abdin, et al. (2017). To measure investment performance, respondents were asked to what extent they agree/disagree with *"The return rate of your recent stock investment meets your expectation" and "You feel satisfied with your investment decisions in the last year (including selling, buying, choosing stocks, and deciding the stock volumes)"* etc.

3.2.2 Independent Variables

The author uses cognitive recognition-based heuristic-driven biases as predictor variables: recognition-based heuristic-driven biases were measured with nine items. This study includes three

components of recognition-based heuristic-driven biases, namely alphabetical ordering, name fluency, and name memorability. The items were adapted from Ahmad (2020), lautiainen (2015), and jacobs and hillert (2016). To measure alphabetical ordering, respondents were asked to what extent they agree/disagree with "*you are more likely to trade the stocks of firms beginning with letters appearing early in the alphabet than stocks beginning with later alphabet letters*" and "*you would like to change your investment portfolio, but you feel stressed to put yourself into new one's options*" *etc.* To measure name fluency, respondents were asked to what extent they agree/disagree with "*you are more likely to trade the stocks of firms which names are easily pronounced than stocks of firms with difficult to pronounce names*" and "*you prefer to buy the stocks of firms having a short name as compared to stocks of firms having a long name*". To measure name memorability, respondents were asked to what extent they agree/disagree with "*you are more likely to trade the stocks of firms which names are easily remember than stocks of firms with difficult to remember names*" and "*you prefer to buy the stocks of firms that are highly advertising*". *Operationalization of independent variables is consistent with pandey and jessica (2019), who also used four components of behavioural biases, namely anchoring, representativeness, availability bias and regret aversion to measure the behavioural biases variable.*

3.2.3 Mediating Variables

Fundamental and technical anomalies were used as an intervening variable; fundamental anomalies were measured with four items, and technical anomalies were measured with two items, adopted from ul abdin et al. (2017). To measure fundamental anomalies, investors were asked to what extent they agree/disagree with "*you carefully consider the price change of stocks that you intend to invest in*" and "*you study the market fundamental (economic indicators) of underlying stocks before making investment decisions*" etc. To measure technical anomalies, investors were asked to what extent they agree/disagree with "*market information is important for your stock investment*" and "*you put the past trends of stocks under your consideration for your investment.*"

3.3 Data Analysis Method

The data gathered through the survey were examined by utilizing SPSS and Amos graphics software. Firstly, a pilot test was conducted for checking the validity and reliability of the instrument. Then confirmatory factor analysis (CFA) was run to confirm the factor structure, evaluate the convergent validity of the study constructs, and remove the items having low standardized factor loading. Statistical techniques used in order to achieve the research objectives include correlation analysis and structural equation modeling (SEM) technique. The data analysis process adopted for this study consistent with Ahmad (2021) and Ahmad, Shah, and Abbass (2021).

4. Empirical Findings

4.1 Pilot Testing

A pilot study was conducted to find out the reliability of items included in the instrument, using data collected from 63 investors. For pilot testing, 130 questionnaires were delivered by hand to individual investors and collected right after they completed it. Only 86 were returned from which

63 questionnaires were useable, representing an effective response rate of 48.46 percent. The Cronbach's Alpha coefficient estimated the degree of the variable's consistency. Overall, the variables presented values ranging between 0.754 and 0.860 (Table I), thus being classified as satisfactory. Therefore, the estimation of all components incorporated into the variables provided a good representation of each of the variables under study, thus allowing further analysis (correlation analysis and Structural Equation Modelling).

Table 1. Analysis of Variables Validity and Reliability

Variables	Cronbach's Alpha	CR	AVE	√AVE
Names Fluency	0.833	0.872	0.694	0.833
Names Memorability	0.801	0.843	0.641	0.801
Alphabetical Order	0.829	0.868	0.688	0.829
Fundamental Anomalies	0.800	0.877	0.640	0.800
Technical Anomalies	0.813	0.796	0.662	0.813
Investment Decision-Making	0.833	0.840	0.568	0.754
Investment Performance	0.801	0.895	0.739	0.860

CR = Composite Reliability; AVE = Average Variance Extracted

4.2 Confirmatory Factor Analysis (CFA)

Firstly, CFA was run to authenticate the factor structure, evaluate the convergent validity, discriminant validity, and internal consistency reliability of the study constructs as well as removing the items having low standardized factor loading. The measurement model was performed in order to test the validity and reliability of the constructs, which is shown in Figure 1. A satisfactory model fit was accomplished by following the model modifications tactics proposed by Hair et al. (2014) after dropping a few items that either had high error terms cross-loading or weak factor loadings.

Figure 1 divulges that the factor loadings for each latent construct ranging from 0.72 to 0.89, signaling that all the observed factors illustrate the latent variables significantly. The fitness of the model was examined with the help of CMIN/DF, which is 1.100, and was found within the accepted thresholds of 1−3 (See Table 2). To further confirm the fitness of the model, RMSEA, SRMR, TFI, PCLOSE, CFI, and NFI were used. The values regarding model fit indices (See Table 2) were found within the accepted thresholds where CF1 = 0.995, NFI = 0.923, TLI = 0.961 represent good model fit values. Similarly, RMSEA = 0.018, SRMR = 0.032, and PCLOSE = 1.000 indicated good model fitness as per the recommended thresholds of previous studies (Hair et al., 2014; Vieira, 2011; Hu & Bentler,1999; Tanaka, 1993).

Furthermore, the measurement model was approved by establishing convergent validity, discriminant validity, and internal reliability of the study constructs. The average variances extracted (AVE) for each set of measures were computed to evaluate convergent validity. The results reported in Table 1 divulge that AVE values ranging from 0.568-0.739 for the constructs which are above the minimum thresholds of 0.50 indicate that the loaded items show a higher variance in the respective construct than the error term (Hair et al., 2010). Similarly, the square root of AVE values for each set of measures were computed, which are above the benchmark of 0.70 (See Table 1), suggesting that every construct is different from one another (Hair et al., 2014; Hu & Bentler, 1999). Thus, results suggesting that convergent validity was accomplished. Moreover, AVE's square root value is higher than the highest square correlation of the construct with any other latent construct, which confirms that adequate discriminant validity was achieved.

Additionally, the composite reliability (C.R.) values were utilized to evaluate the internal consistency reliability of the study constructs. As reported in Table 1, the C.R. values are all above the benchmark of 0.70 (Bagozzi & Yi, 2012), which reveals that the scales had good internal consistency. Hence, the achievement of all the criteria for fitness of measurement allowed to proceed to structural equation modeling testing.

Table 2. Goodness of Fit Statistics

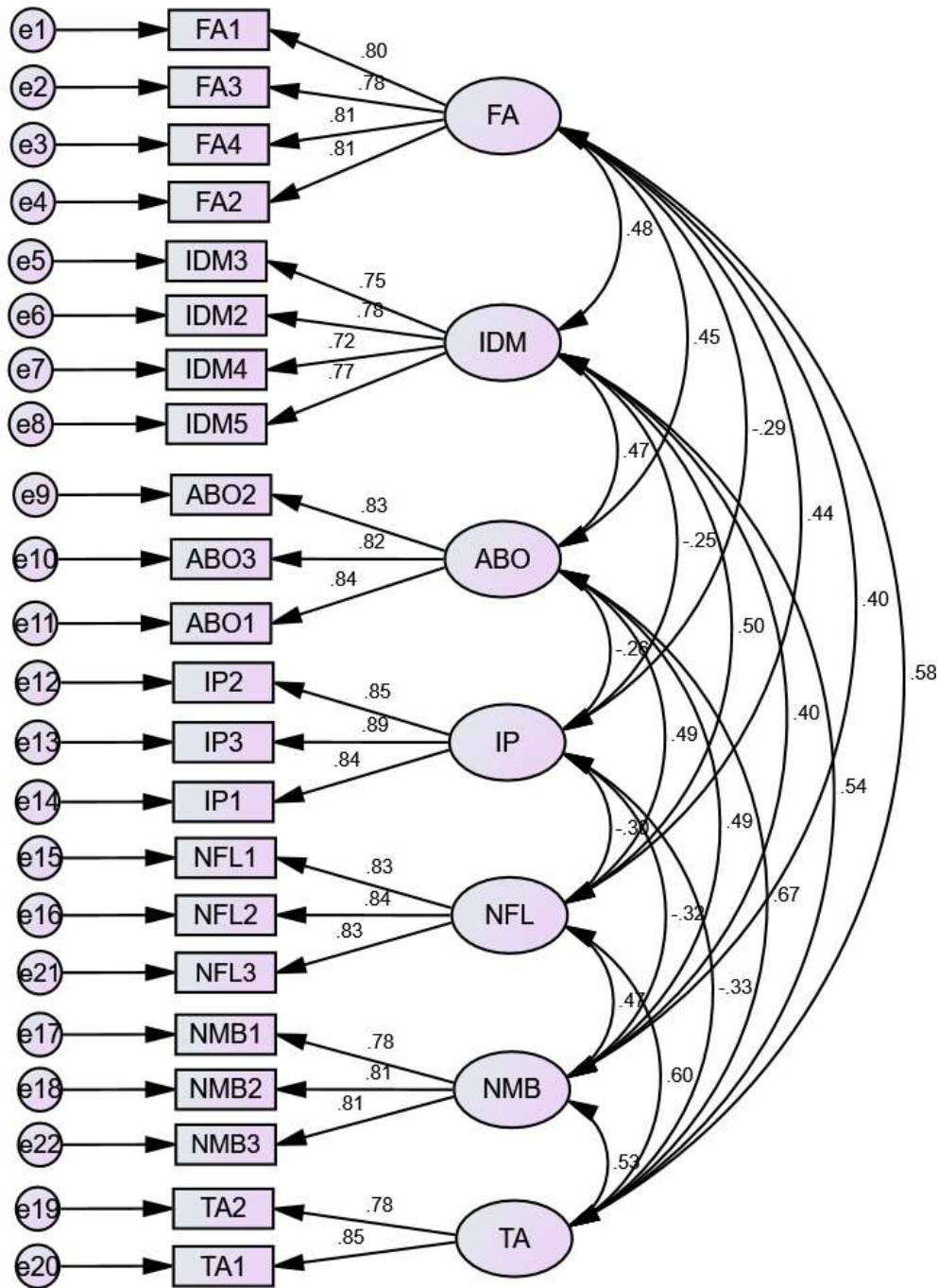| Models	CMIN	DF	CMIN/DF	NFI	CFI	SRMR	TLI	PCLOSE	RMSEA
Measurement	206.751	188	1.100	0.923	0.995	0.032	0.961	1.000	0.018
Acceptable range	-	-	$1-3$	>0.90	>0.95	< 0.08	> 0.90	> 0.05	< 0.06

Figure 1. Measurement Model

4.3 Common Method Bias

CMB was also tested for institutional data set by executing Harman's single-factor test using SPSS through principal component analysis as an extraction method. The output of the analysis shows eight factors with eigenvalues greater than 1, of which the first factor explains only 42.367 percent

variation of total variance explained, which is less than 50 percent. This confirms that there is no threat of CMB affecting the statistical results.

4.4 Descriptive Statistics and Correlation Analysis

Descriptive statistics and correlation analysis are displayed in Table 3. Correlation analysis provides preliminary support for the anticipated hypothesis in the study. The output of the analysis shows the correlation coefficient for seven variables. The results show that each variable is perfectly correlated with itself because the correlation coefficient value is one (r = 1). The output also shows recognition-based heuristic biases, namely alphabetical order, names memorability, and names fluency are positively related with investment decision-making of individual investors with Pearson's correlation coefficients of r = 0.466, 0.399, and 0.503, respectively, which is significant at p< 0.001, and negatively associated with investment performance of individual investors with Pearson's correlation coefficients of r = -0.265, -0.323, and -0.299 respectively which is also significant at p < 0.001. Psychologically this means that, as recognition-based heuristic biases increase, the investment of individual investors in the stock market also increases but investment performance decrease.

The results of the study also show that the recognition heuristic biases, i.e., alphabetical order, names memorability, and names fluency, are positively related to the fundamental anomalies, with Pearson's correlation coefficients of r = 0.450, 0.401, and 0.440, respectively, which is significant at p < 0.001, and technical anomalies with Pearson's correlation coefficients of r =0.666, 0.533, and 0.600 respectively which is significant at p < 0.001. This means that, as recognition heuristic biases increase, fundamental and technical anomalies in the stock market also increase. The stock market anomalies, namely fundamental anomalies, and technical anomalies are positively related to individual investors' investment decision-making with Pearson's correlation coefficients of r = 0.483, and 0.535 respectively, which is significant at p < 0.001 and negatively associated with the investment performance of individual investors with Pearson's correlation coefficients of r = -0.290, and -0.329 respectively, which is significant at p < 0.001. Psychologically, this means that, as recognition heuristic biases increase, individual investors' investment in the stock market also increases, and investment performance of individual investors decreases.

Table 3. Descriptive statistics and Correlation Analysis

Variables	Mean	St. Dev	1	2	3	4	5	6	7
1.Alphabetical order	3.09	1.166	1						
2.Names memorability	3.10	1.115	0.489***	1					
3.Names fluency	3.09	1.125	0.493***	0.467***	1				
4.Fundamental anomalies	3.18	1.071	0.450***	0.401***	0.440***	1			
5.Technical anomalies	3.09	1.178	0.666***	0.533***	0.600***	0.579***	1		
6.Investment decision-making	3.07	1.063	0.466***	0.399***	0.503***	0.483***	0.535***	1	
7.Investment Performance	3.12	1.234	-0.265***	-0.323***	-0.299***	-0.290***	-0.329***	-0.253***	1

N=323; ***p < 0.001

4.5 Structural Equation Models

Structural equation model 1 (See Figure 2) was performed to test the influence of recognition-based heuristic biases on the investment decision-making and investment performance of individual investors trading on the PSX. The hypotheses predict that recognition-based heuristic biases such as alphabetical order, names memorability, and names fluency are positively related to the investment decision-making and negatively associated with the investment performance of individual investors. The results reported in Table 4 show that recognition based heuristic biases such as alphabetical order ($\beta = 0.280$, $p < 0.001$), names memorability ($\beta = 0.169$, $p < 0.010$), and names fluency ($\beta = 0.352$, $p < 0.001$) have a significant positive influence on the investment decision-making of individual investors. From an economic standpoint, these findings verify the notion that individual investors who fell prey to recognition heuristic-driven biases intend to engage in excessively high investment in the stock market—these findings lending to support H1, H2, and H3. The output of the analysis also divulges that recognition based heuristic biases such as alphabetical order ($\beta = -0.110$, $p < 0.05$), names memorability ($\beta = -0.216$, $p < 0.001$), and names fluency ($\beta = -0.177$, $p < 0.010$) have a significant negative influence on the investment performance of individual investors. These findings on the economic viewpoint suggest that recognition heuristic-driven biases reduce the investment performance of individual investors lending support H4, H5, and H6. Overall, the analysis results suggest that individual investors suffering from recognition heuristic-driven biases generate high trading volumes in the stock market, which adversely affects their investment performance.

Table 4. Results of Structural Equation Model 1

Relationships: (standardized)	Estimates
Investment Decision-Making <--- Alphabetical Order	0.280 ***
Investment Decision-Making <--- Names Memorability	0.169 **
Investment Decision-Making <--- Names Fluency	0.352 ***
Investment Performance <--- Alphabetical Order	-0.110 *
Investment Performance <--- Names Memorability	-0.216 ***
Investment Performance <--- Names Fluency	-0.177 **

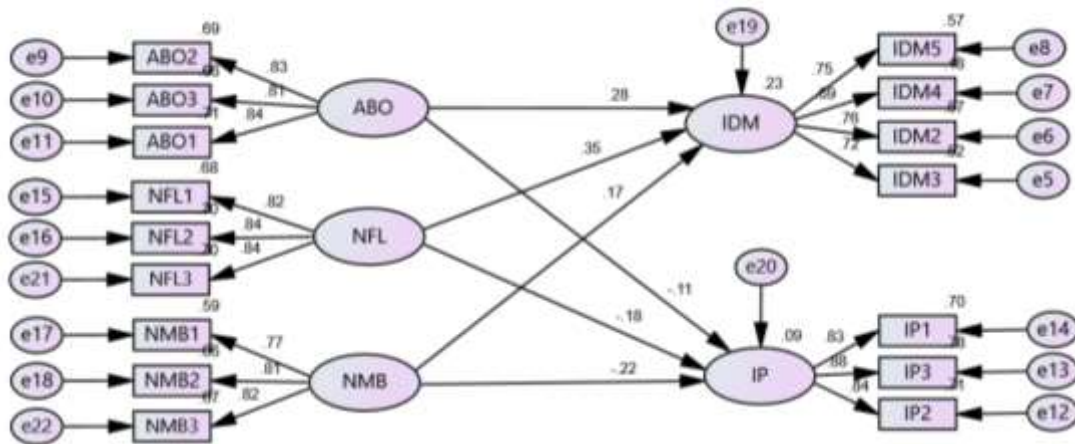*Note: N= 323; *** p < 0.001, ** p < 0.010, * p < 0.050*

Figure 2. Structural Equation Model 1

4.6 Mediation Analysis

The mediation analysis is considered in order to understand the complexities of the relationship between recognition heuristic biases and investment management activities, Mediation analysis was conducted to explore the mediation effects of fundamental and technical anomalies between the relationship of recognition heuristic-driven biases and investment management activities (investment decisions and investment performance) of individual investors The researcher followed Baron and Kenny's (1986) steps for mediation analysis, which is consistent with Ahmad and Shah (2021), who also used the Baron and Kenny method to test the mediation effect of risk perception between overconfidence bias and investment management activities.

The first condition of the mediation process was tested through SEM 1. The direct influence of independent variables (recognition heuristic-driven biases) on dependent variables (investment management activities) was checked shown in Figure 2. The results of the analysis (See Table 4) demonstrate that heuristic-driven biases have a significant effect on investment decision-making and investment performance of individual investors. Thus, the first condition of the mediation process was duly met.

The second condition of the mediation process was tested through structural equation model 2 that was exhibited in Figure 3. In this model, the influence of independent variables (recognition heuristic-driven biases) was checked on mediating variables (fundamental and technical anomalies). The results reported in Table 5 show that recognition heuristic biases i.e., alphabetical order ($\beta = 0.296$, $p < 0.001$), names memorability ($\beta = 0.201$, $p < 0.010$), and names fluency ($\beta = 0.281$, $p < 0.001$) have a significant positive effect on fundamental anomalies. Similarly, a significant positive relationship with technical anomalies was found for the alphabetical order ($\beta = 0.506$, $p < 0.001$), names memorability ($\beta = 0.250$, $p < 0.001$), and names fluency ($\beta = 0.382$, $p < 0.001$). These outcomes divulge that fundamental and technical anomalies arise in the stock market due to recognition heuristic biases of individual investors. Hence, the second condition of the mediation process was also met.

Table 5. Results of Structural Equation Model 2

Relationships: (standardized)	Estimates
Fundamental Anomalies <--- Alphabetical Order	0.296 ***
Fundamental Anomalies <--- Names Memorability	0.201 **
Fundamental Anomalies <--- Names Fluency	0.281 ***
Technical Anomalies <--- Alphabetical Order	0.506 ***
Technical Anomalies <--- Names Memorability	0.250 ***
Technical Anomalies <--- Names Fluency	0.382 ***

*Significance level: *** p < 0.001, ** p < 0.010*
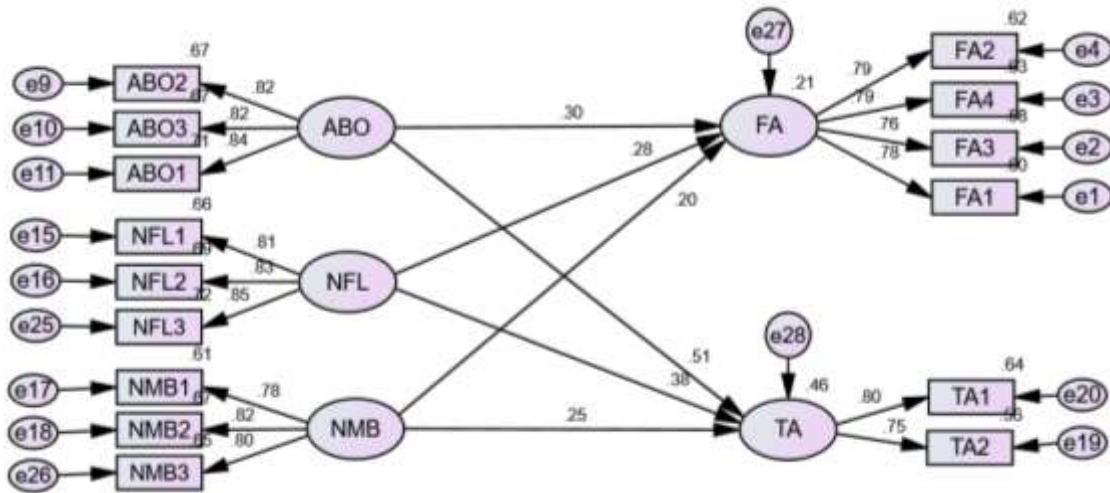
Figure 3. Structural Equation Model 2

Structural equation model 3 (See Figure 4) was performed to check the impact of mediating variables (fundamental and technical anomalies) on dependent variables (investment decision-making, and investment performance,) for meeting the third condition of the mediation process. The results presented in Table 6 demonstrate that fundamental anomalies (β = 0.329, p < 0.001) and technical anomalies (β = 0.400, p < 0.001), have a significant positive effect on investment decision-making of individual investors. The results of analysis also show that fundamental anomalies (β = -0.181, p < 0.010) and technical anomalies (β = -0.258, p < 0.001) were negatively related to investment performance of individual investors. These findings suggest that individual investors generate high trading volume due to anomalies (fundamental and technical), which reduces their investment performance. So, all the three conditions were met; it was confirmed that fundamental and technical anomalies mediate the relationship between recognition heuristic-driven biases and investment management activities of individual investors. The next step was to test whether fundamental and technical anomalies play a partial or full mediating role between recognition heuristic-driven biases and individual investors investment management activities.

Table 6. Results of Structural Equation Model 3

Relationships: (standardized)	Estimates
Investment Decision-Making <--- Fundamental Anomalies	0.329 ***
Investment Decision-Making <--- Technical Anomalies	0.400 ***
Investment Performance <--- Fundamental Anomalies	-0.181 **
Investment Performance <--- Technical Anomalies	-0.258 ***

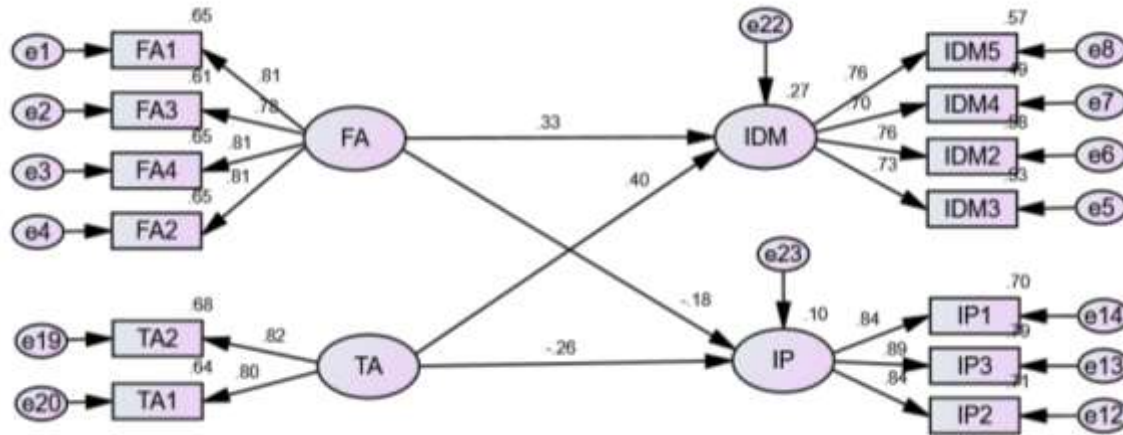*Significance level: *** p < 0.001, ** p < 0.010*

Figure 4. Structural Equation Model 3

In order to check the partial or full mediating role of fundamental and technical anomalies, structural equation model 4 was performed, as shown in Figure 5. The results reported in Table 4 show that the direct impact of the recognition heuristic biases i.e., alphabetical order ($\beta = 0.138$, p < 0.001), names memorability ($\beta = 0.169$, p < 0.010), and names fluency ($\beta = 0.352$, p < 0.001) on investment decision-making of individual investors, without a mediator was significant. After including mediating variables in the model, results reported in Table 7 shows alphabetical order ($\beta = 0.138$, p < 0.05), names memorability ($\beta = 0.086$, p > 0.05), were insignificant predictor of investment decision-making of individual investors; likewise, the value of beta was also reduced (See Figure 5). Therefore, these findings suggest that fundamental and technical anomalies completely mediated the relationship between recognition heuristic biases (i.e., alphabetical order and names memorability) and investment decision-making of individual investors. The output analysis also shows that names fluency ($\beta = 0.234$, p < 0.010) was a significant predictor of investment decision-making of individual investors with mediating variables likewise, the value of beta was also reduced. This finding demonstrate that fundamental and technical anomalies partially mediated the relationship between names fluency and investment decision-making of individual investors. These findings lending to support H7, H8, and H9

The results also show that the recognition heuristic biases namely alphabetical order ($\beta = -0.110$, p>0.05), names memorability ($\beta = -0.216$, p < 0.001), and names fluency ($\beta = -0.177$, p < 0.010) were a significant predictor of investment performance of individual investors before mediating variables including in the model (See Table 4). The results reported in Table 7 divulges that after including mediating variables in the model, an insignificant relationship with investment performance of individual investors was also found for the recognition heuristic biases i.e.,

alphabetical order (β = -0.027, p>0.05) and names fluency (β = -0.106, P>0.05); but names memorability (β = -0.168, p < 0.05) was a significant predictor of investment performance of individual investors likewise, the value of beta was also reduced (See Figure 5). Thus, these findings suggest that fundamental and technical anomalies fully mediated the relationship between recognition heuristic biases (i.e., alphabetical order and names fluency) and investment performance of individual investors and partially mediated the relationship between names memorability and investment performance of individual investors. Overall, these findings lend support to H10, H11, and H12.

Table 7. Results of Structural Equation Model 4

Relationships: (Standardized)	Estimates
Investment Decision-Making <--- Alphabetical Order	0.138
Investment Decision-Making <--- Names Memorability	0.086
Investment Decision-Making <--- Names Fluency	0.234 **
Investment Performance <--- Alphabetical Order	-0.027
Investment Performance <--- Names Memorability	-0.168 *
Investment Performance <--- Names Fluency	-0.106
Fundamental Anomalies <--- Alphabetical Order	0.296 ***
Fundamental Anomalies <--- Names Memorability	0.201 **
Fundamental Anomalies <--- Names Fluency	0.280 ***
Technical Anomalies <--- Alphabetical Order	0.506 ***
Technical Anomalies <--- Names Memorability	0.250 ***
Technical Anomalies <--- Names Fluency	0.382 ***
Investment Decision-Making <--- Fundamental Anomalies	0.216 **
Investment Decision-Making <--- Technical Anomalies	0.162 *
Investment Performance <--- Fundamental Anomalies	-0.11 *
Investment Performance <--- Technical Anomalies	-0.103 *

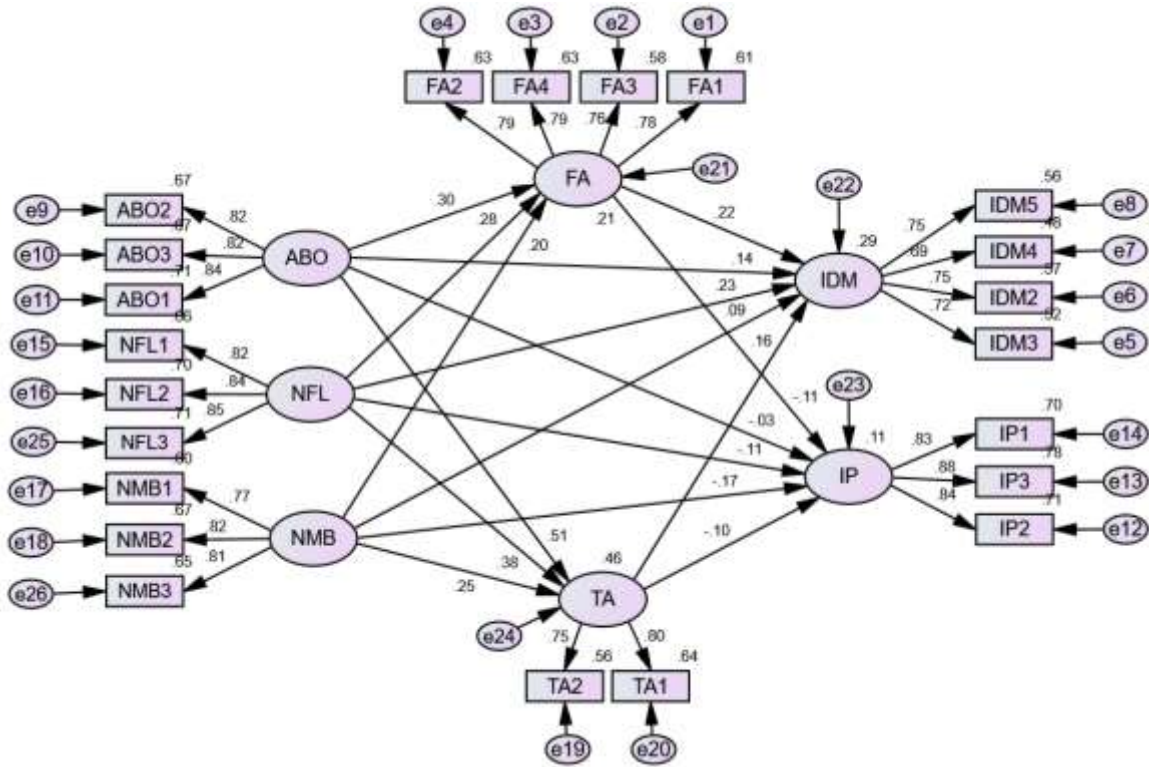*Significance level: *** p < 0.001, ** p < 0.010, * p < 0.050*

Figure 5. Structural Equation Model 4

5. Discussion

This article has expanded the prospect theory, bounded rationality theory, and heuristic theory regarding investment management activities by measuring individual investors' perceptions regarding their recognition-based heuristic biases, investment decision-making, investment performance, fundamental and technical anomalies. The idea of this study developed from the existing literature of behavioral finance and was tested with the help of the SEM technique, using AMOS graphics software. The findings of this study confirm that investors behave irrationally and make trading mistakes due to recognition heuristic-driven biases, which adversely affect their investment performance. Furthermore, the empirical findings are contrasted and supported in the light of the literature review, as illustrated hereunder.

The findings of this study divulge that the recognition-based heuristic biases, namely alphabetical order, name fluency, and name memorability, have a significant positive influence on the investment decision-making of individual investors. These results suggest that investors who fell prey to recognition heuristic biases intend to make inappropriate or risky investments and trade excessively in the stock market. Many researchers from the behavioral finance community highlighted that fast and frugal rules and other mental shortcuts induce excessive trading behaviors in the stock market (Bodnaruk & Simonov, 2015; Palomino & Sadrieh, 2011; Pikulina, Renneboog, & Tobler, 2017). The study results also indicate that the namely alphabetical order, name fluency, and name memorability, negatively influence investment performance of individual investors. These results demonstrate that recognition-based heuristic biases reduce the investment

performance of individual investors. These results are similar to Ahmad and Shah (2020), who assert that when investors use fast and frugal rules, their technical knowledge and reasoning faculties are impaired, leading to errors in judgment. As a result, investors make irrational decisions, which in turn adversely affect their investment performance. Overall, the results of the analysis suggest that investors often utilize recognition heuristics causing several behavioral biases when trading in the stock market; specifically, reliance on the recognition-based heuristics, namely alphabetical ordering of firm names, name memorability, name fluency, lead investors to make less than an optimal decision related to investment management activities. Due to these recognition-based heuristics biases, individual investors trade excessively in the stock market, and their investment performance is affected adversely.

Highlighting the mediating role of fundamental and technical anomalies, this study divulged that fundamental and technical anomalies significantly mediate the relationship between recognition heuristic biases and investment management activities (investment decision-making and investment performance) of individual investors. Individual investors often use recognition-based heuristics when trading in the stock market; they reduce the mental effort in the decision-making process, but that leads to errors in judgment and, as a result, anomalies persist in the market; due to these anomalies, investors make irrational investment decisions, and their investment performance affected adversely. The findings are consistent with research by Lazuarni, (2019), who found that heuristic biases are reasons for the existence of the technical and fundamental anomalies in the stock market, which negatively affect the investment performance of investors.

This study revealed that fundamental and technical anomalies completely mediated the relationship between recognition heuristic biases (i.e., alphabetical order and names memorability) and investment decision-making of individual investors and partially mediated the relationship between names fluency and investment decision-making of individual investors. The results of the study also show that fundamental and technical anomalies fully mediated the relationship between recognition heuristic biases (i.e., alphabetical order and names fluency) and investment performance of individual investors and partially mediated the relationship between names memorability and investment performance of individual investors.

In the heuristics debate, we have two streams of thought: Gigerenzer and his research group (1999) claim that heuristics can be successful in complex and uncertain environments as they guide the decision-maker in searching information "by effectively and efficiently exploiting information structures in the environment" (Bertel and Kirlik, 2010). Contrary to this position, Tversky and Kahneman (1974) postulated that the human mind relies on heuristics strategies affected by systematic and predictable errors (biases) that allow only a second-best decision. Overall, the results of this article consistent with Tversky and Kahneman (1974) because in emerging markets, socio-political factors seem to create uncertainty in a highly volatile market; as a result, investors often fell prey to recognition heuristic biases that lead them to make irrational investment decisions, ultimately their investment performance affected adversely.

6. Conclusion

This article demonstrates the recognition-based heuristic biases and their influence on individual investors' investment decision-making and investment performance in the emerging economy, Pakistan. The study results divulge that individual investors often used heuristics when trading in the stock market; specifically, reliance on the recognition-based heuristics, namely alphabetical order, name fluency, and name memorability, lead investors to make less than an optimal decision. Our findings highlight recognition-based heuristic biases have a significant positive influence on the individual investor's investment decision-making and negatively affect the investment performance of individual investors. From an economic standpoint, these results suggest that individual investors suffering from recognition heuristic-driven biases generate high trading volumes in the stock market, which adversely affects their investment performance. The study results also indicate that fundamental and technical anomalies mediate the relationships between the recognition-based heuristic biases on the one hand and investment decision-making and investment performance of individual investors on the other. Overall, these findings suggest individual investors' suffering from recognition-based heuristic-driven biases when trading in the stock market; as a result, anomalies (fundamental and technical) persist in the stock market; due to these anomalies, investors make irrational investment decisions,

In emerging markets, investors have to cope with additional difficulties in making decisions related to investment management activities. Socio-political factors seem to create uncertainty in a highly volatile market, deeming investors to be extremely conservative in their investment decisions. It is probably one of the major reasons they suffer from the recognition heuristic-driven biases when trading in the stock market. When individual investors use recognition-based heuristics, their technical knowledge and reasoning faculties are impaired, leading to errors in judgment. as a result, anomalies persist in the market, that anomalies misrepresent the price of shares and destabilize markets, and they make irrational investment decisions, which in turn adversely affect their investment performance. The high levels of economic uncertainty and a lack of information have an influence on the investment decisions made by investors in an emerging economy such as Pakistan. Furthermore, the present study suggests that one of the major differences in investment decisions made by emerging and developed economies is the socio-economic background against which decisions related to investment management activities are made.

6.1 Theoretical implications

The findings of the current research contribute to the existing body of literature on recognition based heuristic-driven biases and investment management activities in at least three ways. First, the present study contributes to understanding the recognition based heuristic-driven biases in investment management activities. The current research provides an explanation of how and why investors' behaviour deviates from rationality and make trading mistakes. This study combines the academic fields of cognitive psychology and recognition heuristic-driven biases research with investment management activities. Thus, the article makes an academic contribution by providing further insights into the recognition heuristic-driven biases and investment management activities relationship by exploring how investment management activities are affected by investors' recognition based heuristic-driven biases. The findings of the current research offer novel contributions to the existing literature by suggesting that investors exhibiting recognition based heuristic-driven biases underestimate their downside risk and trade excessively in the stock market,

which can have a detrimental effect on their returns. Hence, the present study also advances an important stream of existing research, which posits that the human mind relies on heuristics strategies affected by systematic and predictable errors (biases), that allow only sub-optimal decisions (Tversky & Kahneman, 1974).

Second, the mediating effect of fundamental and technical anomalies on the relationship between recognition based heuristic-driven biases and individual investors' investment management activities is studied for the first time through this survey which differentiates this study from others. The current research contributes to the literature by defining recognition based heuristic-driven biases as antecedent, fundamental, and technical anomalies as intervening variables for irrational investment management activities. These results add to the existing body of knowledge by inferring that fundamental and technical abnormalities endure in the stock market as an outcome of recognition based heuristic-driven biases; as a result, investment management activities of investors are affected adversely. Third, most studies focus on well-developed markets, and very little is known about the investor's behavior in less-developed markets or emerging markets like Pakistan (Ahmad, 2022). The present study contributes to filling this gap in the literature. The results of study imply that it goes some way toward enhancing the understanding of recognition-based heuristics and its influence on investment decision-making and investment performance in an emerging economy. The current study is the first to focus on links between recognition-based heuristics and investment management activities within the specific context of an emerging economy. The paper provides empirical insights regarding recognition-based heuristics affecting the investment decision-making and investment performance of individual investors. It is probably one of the pioneering efforts in Pakistan concerning the investment management activities-recognition-based heuristics relationship.

6.2 Practical Implications

In addition to the above theoretical contributions, the findings of this research have also generated important policy implications for finance practitioners such as investor who plays at stock exchange, a financial strategist/advisor in an investment firm, a portfolio manager, a financial planner, an investment banker, a trader/ broker at stock exchange, or a financial analyst. But most importantly, the term also includes all those persons who manage corporate entities and are responsible for making its financial decisions and academia. The present research findings suggested that investment management strategies based upon recognition heuristics would not result in better returns to investors. Thus, investors should not rely on recognition-based heuristics while making decisions related to investment management activities, but should rather conduct a proper analysis of investment opportunities, develop quantitative investment criteria and establish investment objectives and constraints, base decisions on their financial capability and experience levels, to make better investment decisions, and move towards appropriate investment opportunities.

It provides awareness and understanding of recognition based heuristic-driven biases in investment management activities, which could be very useful for investors when making investments in the stock market The study is a good reference point of financial behavior for the investor, finance manager, financial broker, and other financial decision-makers to deliberate and examine the financial market trend before making desirable investment decisions. It furnished effective information about the effect of recognition heuristic-driven biases on investment management activities with mediating role of fundamental and technical anomalies It is beneficial

7. Directions for Future Research

This study examines the influence of recognition based heuristic-driven biases on investment management activities, specifically in Pakistan. It would, therefore, be imperative for researchers to substantiate the findings of this research with a greater diversity of respondents from other areas of the country as well. It is also recommended, for further research, to probe the link between recognition based heuristic-driven biases and investment management activities by taking other suitable mediators and moderator variables to understand comprehensively how recognition based heuristic-driven biases impact investment management activities. Furthermore, the authors of this paper use individual investors as a unit of analysis. It is also suggested that future research compare different types of investors, such as individual and institutional investors, to uncover the heterogeneity and homogeneity of their behaviour and to demonstrate the differential effect of heuristic-driven biases on their financial decisions.

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