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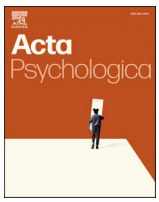

Herding behavior, disposition effect, and investment decisions: A multi-mediation analysis of risk perception and dividend policy

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ABSTRACT

The traditional perspective of finance believes that volatility in the stock market is due to market efficiency. However, the perspective of modern behavioral finance is more concerned with the emotional and psychological factors associated with an investor. This research aims to identify the multi-mediating mechanism of risk perception and dividend policy in the Pakistan Stock Exchange (PSX). The cross-sectional quantitative design was used, and the data was collected from 256 individuals for further analysis. The structural equation modelling (SEM) was used to assess the multi-mediation mechanism. The statistical results confirm that there is a significant positive impact of herding behavior and disposition effect on investment decisions. Moreover, this direct relationship is further assessed by inducting risk perception and dividend policy as mediators. The multi-mediation was proved by observing the specific effects. The results confirmed that individuals with an outcome of investment decision intend to behave more positively. Hence, individual investors having herding behavior and disposition effect produce an emphasizing effect on investment decision because it is mitigated with the simultaneous mediating effects of risk perception and dividend policy. The findings imply that investors should be aware of their behavioral factors and policymakers have to make their strategy accordingly.

1. Introduction

There has been a contradiction in the conceptualization of traditional and behavioral finance. Traditional finance mainly relies on the information symmetry in the rational decision making of investors, however, the argument of behavioral finance take a great concern on the emotional and psychological factors associated with investors (Almansour & Arabyat, 2017). These psychological or emotional elements are actually the non-financial factors that influences the stock prices and this is the assortment of behavioral finance theory that information symmetry is not only one factor which effects the stock prices but there are also other cognitive factors in the volatility of stock market (Almansour & Arabyat, 2017). The literature shows extensive work on the factors of behavioral finance and their impact on investment decisions. Mainly, the factors which are investigated are personality traits, perceived risk, social influence and emotional biases (Ahmed et al., 2022; Fama & French, 1988; Lather et al., 2020; Menon et al., 2023). Several researchers have looked at how these characteristics affect investing decisions and discovered that they can result in less-than-ideal choices (Goswami et al., 2020; Kartini & Nahda, 2021; Mahapatra & Mishra, 2020; Sharma et al., 2021; Singh & Goyal, 2016). The studies revealed that when it comes to investor side, a risk-averse attitude tend to be observed and investors want the stream of cash flows in a way where they feel stable risk tendency, risk propensity, and risk perception (Fama & French, 1988; Hossain & Siddiqua, 2022; Pa et al., 2022). According to Ahmed et al. (2022) there is a difference between investors' risk attitude and risk perception as risk attitude is consistently attached with investors, however, the perception of risk includes some changing dynamics and it keeps on changing overtime in different scenarios. Therefore, the frequency of transactions may be increased when risk perception tends to be higher than expected and eventually it reduces the investment ratio in the stock market. Here is the point where herding behavior starts among investors. Considering low-risk perception shows a positive psychological element and it turns the investors engage in herding behavior (Mavruk, 2022). The risk related perception of investor, stock price and total shareholder wealth can all be impacted by dividend policy.

The disposition effect also reflects a situation where investors intend

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to avail the investment gains immediately in order to save the investment from the potential losses (Chang, 2021). In addition, disposition effect also showing up certain willingness of investors to keep the investment on hold when the return position is not favorable or selling them before the maturity (Richards et al., 2017). The disposition effect may influence the dividend policy of the firm. During the holding period the consistency in the dividend policy can shift a significant change in the investment decision. The financial aspect of dividend policy includes the payout where company decides whether to pay the dividends or retain the amount for reinvestment purpose (Hoang & Hoxha, 2016). Among other things, companies can decide to buy back shares, reinvest profits into the company, or declare dividends. In addition, the behavioral aspect of dividend policy reflects the behavioral determinants like anticipated level of future earnings, stakeholders' interest, and pattern of past dividends (Trabelsi et al., 2019).

Pakistan Stock Exchange (formerly, Karachi Stock Exchange) was established in 1949 at Karachi. Initially, KSE had no market share capital, it was registered as a company limited by guarantee. Karachi Stock Exchange Limited (KSE) was the name given to the Exchange after it became a publicly traded corporation in 2012, as required by the Stock Exchanges (Corporatization, Demutualization and Integration) Act, 2012. The Exchange's ownership rights and trading privileges were divided by corporatization. In 2015–16, the Pakistan Stock Exchange Limited was formed by the merger of the Karachi Stock Exchange, Lahore Stock Exchange, and Islamabad Stock Exchange. The Pakistan Stock Exchange has developed into a platform that offers premium products and services to all its clients, including issuers, investors, and market players (Annual Report-PSX, 2023). Table 1 shows some important comparisons of PSX between 2022 and 2023.

Pakistan encountered extraordinary difficulties in FY2023 as a result of political unpredictability exacerbated by catastrophic floods. Furthermore, rising inflation brought on by global commodity prices, currency devaluation, and fiscal imbalances further worsened the economic position of Pakistan (Annual Report-PSX, 2023). Moreover, as the PSX set a benchmark for gauging economic health, investors use the PSX as a key indicator for the investment decision.

This research has targeted the investors of Pakistan stock exchange (PSX) to understand their behavioral dilemmas. The behavioral factors like disposition effect, herding behavior and other factor have significant impact on investment decision as such behavioral factors enable them to observe the market trends (Aljifri, 2023; Parveen et al., 2020). According to Bhutto et al. (2020) there are several behavioral factors of dividend policy which directly affect investment decision making. The consistency of dividend policy creates a positive mind-set of investors to retain the investment. This consistency in dividend policy includes the anticipated level of future earnings, stakeholders' interest, pattern of past dividends (Trabelsi et al., 2019). Some other behavioral factors which are widely studied in the field are, overconfidence bias, representativeness bias, financial literacy, herding behavior, trust and loss aversion (Ababio, 2020; Aljifri, 2023; Jaiyeoba et al., 2018; Mouna & Anis, 2015; Ossareh et al., 2021; Raveendra & Singh, 2018; Stella et al., 2022). For instance, the overconfidence bias can result in excessive trading without adequate financial understanding, which puts investors at risk of large losses and raises brokerage expenses. Similarly, because of the propensity to conflate recent occurrences with past occurrences, the representativeness bias could lead to the buying of expensive stocks and one major problem that causes stock market investors to receive inadequate returns is making inefficient investment decisions (Jaiyeoba et al., 2018). The inefficient investment decision can also be taken in a condition where investors underestimate the probability of rare event or tend to overreact on negative market rumors (Aljifri, 2023; Grable et al., 2004; Kim et al., 2022). The degree of financial literacy influences how investors perceive risk. An increased level of financial literacy makes investors more capable of comprehending and assessing the risks involved in investment decision (Stella et al., 2022). On the other hand, dividend policy as a mediator explains the relationship between behavioral determinant of dividend policy and firm performance. According to Almansour and Arabyat (2017) the risk perception mediates between factors of behavioral finance and investment decision. Behavioral finance identifies that investors' emotional reactions and cognitive preferences which can potentially affect their choice of investments. In the given scenario, risk perception and dividend policy act as an important multi-mediating element that helps explain how people evaluate and comprehend dividend policy and perceived risk, which consequently influences their investment decision making.

Table 1
PSX market comparison of 2023 and 2022.

Indicators	June 30, 2023	June 30, 2022
KSE 100 Index	41,452.69	41,540.83
KSE 30 Index	14,636.72	15,805.04
Market Capitalization	6,369,473	6,956,507
Listed Capital (PKR)	1,627,167	1,525,899
No. of Listed Companies	524	530

Source: Annual Report-PSX, 2023.

In the best of our knowledge, there is hardly any study where risk perception and dividend policy tapped as multiple mediators between herding behavior, disposition effect and investment decisions. It is a dire need to understand a better psychological mechanism of investors, and such multi-mediating mechanism can give us a better emotional and cognitive understanding about investors that what possible causes can be included to better explain the relationship of behavioral factors and investment decisions. It is ignored that behavioral finance elements like herding behavior and disposition effect can be explained with risk perception and dividend policy particularly in the context of PSX. Given that the PSX is still a developing stock market and that investors' decision-making process has a major influence on how the market behaves, this research intends to contribute as new behavioral dilemma in field of finance and specifically for the better understanding of emotional and cognitive components among investors. Investors may find this research useful in making better-informed investment decisions, and policy makers may find it useful in creating regulations that support a steady and prosper equity market.

The study's remaining sections are planned as follows. The detailed literature review on each research variable along with their relationships is outlined in Section 2. Section 3 details the study's methodology and results, while section 4 conclusively discusses the implications, limitations, and recommendations for future research.

2. Literature review & hypothesis development

The financial decision making is a crucial factor of finance and it is addressed in different aspects. The financial decision making is not only dependent on some numeric estimations, meanwhile, the behavioral finance includes the broader view of financial decision making considering the psychological factors. Bazley et al. (2021) stated the limitations of traditional methods of finance referring to the investors' irrational behavior and capture the financial scenario inadequately. This major shortcoming has been addressed by academicians and researchers considering the behavioral factors in the field of finance such as herding behavior, disposition effect, loss aversion, and overconfidence (Bazley et al., 2021; Ventre et al., 2023). Dividend policy and risk perception are two essential factors determining the investment decision making (Trabelsi et al., 2019). Risk perception is considered as one of the critical component related to investment decision making (Bazley et al., 2021). The risk perception is rooted with several interconnected factors, the factors like cognitive biases, market conditions and individual psychological characteristics are more highlighted and influential on investment decision making (Gonzalez-Igual et al., 2021; Ventre et al., 2023). The field of behavioral finance tend to prioritize the complexities of risk perception and how it is surrounded with investors' decision-making.

Table 2
Literature plan.

Layers	Factors	Relationship	Citations
1st Layer	Herding Behavior and Investment Decision	*Direct Effect*	Zhang et al. (2022), Mundi et al. (2022), Dickason and Ferreira (2018), Lim et al. (2018)
2nd Layer	Disposition effect and Investment Decision	*Direct Effect*	Ahmed et al. (2022), Ullah et al. (2020), Richards et al. (2017)
3rd Layer	Herding behavior, risk perception, and investment decision	*1st Mediating Effect*	Zhang et al. (2022), Mundi et al. (2022), Dickason and Ferreira (2018), Lim et al. (2018)
4th Layer	Disposition effect, risk perception and investment decision	*2nd Mediating Effect*	S. U. Ahmed et al. (2022), Ullah et al. (2020), Richards et al. (2017)
5th Layer	Dividend Policy as Mediator between disposition effect, herding behavior and investment decisions	*3rd Mediating Effect*	Bhutto et al. (2020), Shiva and Singh (2020), Wattanasan et al. (2020), Parveen et al. (2020), Chen et al. (2018), Hau (2001)

Areiqat et al. (2019) argued that the deviation in individual's risk perception does not only reflects to the objective factors, but the rational decision making can also be a subjective assessment of heuristics, cognitive biases, and dividend policy. Thus, studying the dividend policy and risk perception as multi-mediating factors contributes a better understating and insights of psychological factors emphasizing the behavioral model of investment decision making. The multi-mediating factors provide evidence to explain the relationship between herding behavior, disposition effect and investment decision. The literature observes six layers in building the research framework and illustrates a multi-mediating mechanism in behavioral finance. The below Table 2 provides a brief detail of the layers/strands.

2.1. Herding behavior and investment decision

Herding behavior has been determined by psychological and economic studies as a means of explaining the occurrence of a huge number of people acting in unison (Mundi et al., 2022). It is unique psychological phenomena that investors herd without diligence. This imitating behavior shifts the whole market situation, for instance, if few investors tend to buy a security and they feel that investment can be given with lucrative returns, so the others would start imitating them and buying that security without estimating risk and return. However, when we see the theoretical groundings, it is suggested that the contest of investment decision mainly rely on selecting the best possible alternative which reaps maximum benefit, and, this is how we are trained by economic theories in making a rational investment decision (Zhang et al., 2022). But the real-life scenario is way different. In most situations, investors do not possess the complete information to estimate the risk & return. The asymmetric situation put them in a risk of wrong estimations resulting a damage or loss on investment (Lim et al., 2018). In this case, institutional investors work as a key indicator for individual investors. The institutional investors have more access to the market information due to large portfolio investment (Dickason & Ferreira, 2018). The study of Lakshman et al. (2013) documented the evidence of herding behavior in Indian capital market. They mainly focused the institutional investors to examine the returns and volatility on herding behavior. The Black-Scholes asset pricing model may be helpful in determining herding behavior through risk aversion and compensation (Chen & Pelger, 2013). The results indicate manger's risk aversion and compensation are influential forces to drive the herding behavior. Market performance has a positive correlation with herding behavior and a negative correlation between herding behavior and market volatility, the herding behavior keeps on changing in both bullish and bearish market (Chiang et al., 2013). Ashland Company which is a renowned listed company in New York stock exchange (NYSE) was investigated to determine why herding behavior exists? The results showed that the trending position of buying and selling of stock develops a psychological state to follow the trend of buying or selling of stock (Cipriani & Guarino, 2014). Using data at the individual and industry levels, Demirer and Kutan (2006) investigated the effects of herding information in the Chinese market. Additionally, they discovered the return dispersion during the market index's rising and falling phases. The outcome demonstrated that there is no herding behavior in the Chinese market and that the dispersion of equity returns was considerably larger during the time when the aggregate index changed significantly. Using an internet experiment design, Drehmann et al. (2005) investigated the effects of herding and dissident behavior in the financial market. 264 experts from multinational companies took part in this experiment. They found that prices are biased, and herding behavior and dissident conduct are prevented by flexible market prices, which are justified by error models. Using the Hwang and Salmon (2004) measure, Kallinterakis and Kratunova (2007) investigated the effect of herding behavior and thin trading in the Bulgarian market. The outcome demonstrated that the herding behavior is decreased by having thin trading in the market. Oehler et al. (2022) used managers' purchasing and selling data from 2000 to 2005 to determine the herding tendency of mutual funds in Germany. The outcome demonstrated that they engage 70 % of their money in the stock market, indicating a strong herding tendency in the equities market. Ornelas and Alemanni (2008) used data from nine emerging markets between 2000 and 2005 to examine herding behavior in these regions. The analysis demonstrates that emerging markets experience herding. It also demonstrated that volatility was unaffected by the herding. Raddatz and Schmukler (2013) used unique, monthly asset-level statistics from the first-ever case of Chile to examine the herding behavior of 84 managers of pension funds. The outcome demonstrated that the fund managers cooperate with one another to optimize returns and minimize risks. The literature is highly evident that herding behavior has a significant and positive impact on the investment decision. This study takes the investors of Pakistan stock exchange (PSX) and expects the positive effect of herding behavior on investors' investment decision.

Hypothesis 1. ***(H1):*** *Herding behavior has significant and positive effect on investment decision.*

2.2. Disposition effect and investment decision

The term disposition effect took great importance after the behavioral study of Sherfin and Statman in 1985. They simply illustrated the investors' psychology regarding disposition of security. It is seen among investors that they try selling a good stock too early and hold bad stock too long. In other terms, a stock having bullish view tend to have quick chances of sell then a bearish one (Zhang et al., 2022). The disposition effect sometimes put a great reduction in the aggregate market return on investment, it happens due to the immediate sell of bullish stock (Khan, 2022). If we recall the law of demand and supply so it would become easy to conclude that excess supply eventually disrupts the market situation in the financial market when investors observe a price hike in stock, they want the stock to be sold immediately and earn a relatively good capital gain (Adil et al., 2022). Consequently, excess of sell leads to more availability of stock which results decline in aggregate market return. The disposition effect is considered as a misbehavior of investors in capital market. According to Ullah et al. (2020), investors lose their patience when stock price increases, their sudden decision to sell the stock leaves them with a great loss on investment and they completely

missed out the bigger profits. The study of Sattar et al. (2020) reported that investors are not rational specially when see rise in stock price, they tend to earn immediate return, meanwhile, disposition effect comprehensively show a positive effect on investment decision. In addition, disposition of stock will be bought by others, they took decision to invest and shortly they will be again on the same side to sell for better investment return, this circulation of funds increases the investment decision (Badola et al., 2023). The studies conducted by Ullah et al. (2020), Ahmed et al. (2022), and Sattar et al. (2020) reported disposition effect as positive factor to effect the investment decision.

Hypothesis 2. ***(H2)****: Disposition effect has significant and positive effect on investment decision.*

2.3. Herding behavior, risk perception, and investment decision

According to Balcilar et al. (2013), herding behavior results from the impact of risk perception on stock returns. When making investing decisions, many investors have a tendency to follow the herd or have overconfidence biases. This herding tendency is a result of investors' ability to face low-risk inclination, it is also known as risk avoidance/aversion nature, which is motivated by their need to reduce the risk and save the investors from an uncertain financial loss (Dickason & Ferreira, 2018). In the course of herding, even intelligent people begin acting foolishly because they depend on the opinions of others. This conduct could be the result of misunderstanding about investments or a propensity to adopt the beliefs and strategies of others around them (Wattanasan et al., 2020). A strong correlation has been found between risk-return dynamics and herding behavior (Balcilar et al., 2014). The researchers noted that at times of extreme market volatility and uncertainty, herding tendencies typically increase. Due to the increasing tendency of herding, investors are more likely to base their judgments on overall market psychology and it would result a critical evaluation of the risks associated with their investments. Herding behavior is examined in the context of risk and uncertainty by Bekiros et al. (2017) and they found that it is common in the US stock market. According to Dickason and Ferreira (2018), risk perception has a substantial mediating role in the link between behavior characteristics and investment performance. In addition, Mundi et al. (2022) demonstrate how differentiation exists among individual regarding risk perception and how it can be mitigated between investors' overconfidence and investment decisions. The studies of Zhang et al. (2022) and Lim et al. (2018) documented risk perception as a mediating variables between behavioral factors and investment decision. According to Ahmed et al. (2022), there is no mediating role of risk perception in the association between investment decisions and herding behavior. However, other research studies reported positive mediating effect of risk perception between the investors' behavioral factors and investment decision (Areiqat et al., 2019; Gonzalez-Igual et al., 2021; Hossain & Siddiqua, 2022; Zhang et al., 2022).

Hypothesis 3. ***(H3)****: Risk perception mediates the relationship between herding behavior and investment decision.*

2.4. Disposition effect, risk perception and investment decision

A behavioral bias known as the disposition effect is seen in investors, who have a propensity to sell winning investments too soon and hang onto losing investments for a long time (Richards et al., 2017). Essentially, it represents investors' propensity to hold onto stocks during the conditions when market trend is declining and sell them quickly during upward trending market, putting realized losses ahead of prospective return (Chang, 2021). Compared to short position, the disposition effect has a greater influence on long position. Ploner (2017) exhibits compelling evidence that the disposition appears in investment behavior. According to a study by Richards et al. (2017), one bias that is frequently seen in investment behavior is the disposition effect. The disposition effect is the propensity of investors to hang onto equities that have lost returns more quickly than those that have made the returns. This tendency is more common among less experienced and sophisticated investors and is linked to weaker returns on investments. The study places a strong emphasis on managing vulnerability to the disposition effect through the use of stop losses approach. Through an examination of individual investor trading experiences in the UK stock market from 2006 to 2009, the study shows that the disposition effect can be effectively mitigated by including a stop losses approach into investment decisions. In addition, considering the results, investors are to be observed less experienced using stop losses approach, although if they ignore to use this approach they may be seen as more reluctant to realize certain losses. Ullah et al. (2020) concentrate on behavioral biases in the process of making investment decisions, with a particular emphasis on the disposition effect. The results show that investment decisions are significantly and positively influenced by the disposition effect. According to Ahmed et al. (2022), there is no mediating role of risk perception in the relationship between investment decisions and the disposition effect. According to Chang (2021), the disposition effect significantly affects investment decisions. According to Grosshans and Zeisberger (2018), disposition significantly affects how risk is perceived. Meanwhile, it can be concluded based on the available literature that disposition effect and investment decision have significant chance to mediate through risk perception.

Hypothesis 4. ***(H4):*** *Risk perception mediates the relationship between disposition effect and investment decision.*

2.5. Dividend policy as mediator

In quantitative terms, dividend policy simply refers to the dividend payouts to the existing shareholder (Ali, 2022; Chua et al., 2023). However, it is more than a payment in the domain of behavioral finance (Tinungki et al., 2022). Dividend policy entails the psychological factors and investors thoroughly observe such elements to take the investment decisions (Barros et al., 2022). Investors tend to examine how company refrain from altering its dividend rates if they will need to be changed again in a year or two (Tinungki et al., 2022). In addition, investors determine when and how investors got sufficient notice of the reasons behind any changes to the dividend policy (Khan, 2022). The study of Ali et al. (2021) revealed that a company ought to make an effort to have an unbroken record of dividend payments. On the other side, the company ought to set a goal oriented payout ratio and make regular adjustments to the distribution to move closer to the objective. According to Trabelsi et al. (2019) the relative riskiness of retained earnings versus dividends is perceived differently by investors. They also contributed that dividend policy work as a “signaling device” of future prospects which is reflected by dividend distributions. Tinungki et al. (2022) stated that dividend announcements are used by the market as data to determine the value of securities. For investors it matters more to alter the current dividend payout schedule than it does the precise dividend amount. Businesses with dividend policies that suit a stockholder's unique tax situation tend to draw in investors and anticipated capital gains from holding onto earnings carry a higher level of risk in comparison to dividend expectations. Waris et al. (2021) reported that companies with high dividend are attractive to investors in lower tax levels. Moreover, the firm's new capital investment requirements often have no impact on changing the dividend behavior pattern. On the other hand, low-dividend equities are attractive to investors in higher tax levels. Dividend payments ought to be seen as a leftover amount after planned investments have been funded by available earnings. Decisions on financing should not be influenced by a company's dividend policy. A company's dividend policy may be influenced by a number of variables, such as industry, access to liquidity, and development potential. High-growth companies might keep more of their earnings to reinvest in the company, whereas mature businesses might give out a bigger share of

their earnings as dividends. Decisions about dividend policy may also be negatively affected by the agency problem, which results from the conflicting interests of shareholders and management. By encouraging accountability and transparency, dividends can be used as a tool to bring management and shareholder interests into alignment (Barros et al., 2022; Tinungki et al., 2022). A business may choose to pay dividends in order to benefit from reduced capital gains tax rates because dividends are often taxed at a higher rate than capital gains. But choosing the right dividend policy is a difficult choice that has to take into account tax implications, predicting prospects, and alignment between shareholders' interest and management. To maximize profitability and shareholder value, the ideal dividend policy will vary according to the industry, stage of development, and strategic objectives of the firm (Barros et al., 2022; Sami & Abdallah, 2021). Additionally, it has been demonstrated that dividend policies control the relationship between board independence (Alves, 2023; Waris et al., 2021), the dual role of the CEO (Barros et al., 2022), and board size and profitability (Phan & Tran, 2019; Setyabudi, 2021; Waris et al., 2021). Setyabudi (2021) asserts that dividend policy has the potential to moderate the relationship between institutional ownership and profitability. While Guizani and Abdalkrim (2022) found a weaker correlation between CEO compensation and profitability for companies with a higher dividend payout ratio, Purba and Africa (2019) found a positive relationship between dividend payment ratio and the positive impact of institutional ownership on profitability. Meanwhile, the literature asserts that there is hardly any study conducted on the mediating effect of dividend policy on the relationship between herding behavior and disposition effect. However, this research expands the conceptualization of herding behavior and disposition effect by introducing multi-mediating mechanism. This research expects that both herding behavior and disposition effect may cause the dividend policy and eventually it has an emphasizing effect on investment decision. Therefore, this study hypothesizes as;

Hypothesis 5. ***(H5):*** *Dividend Policy mediates the relationship between herding behavior and investment decision.*

Hypothesis 6. ***(H6):*** *Dividend Policy mediates the relationship between disposition effect and investment decision.*

Fig. 1 presents a graphical illustration of the hypotheses derived from the above discussion.

3. Methods

3.1. Population, sample and procedure

In research, population refers to the group of individuals which have the specific characteristics that the researcher is interested to study (Adil et al., 2022). The target population helps to validate and generalize the research outcomes (Hair et al., 2019). This research has taken the investors of Pakistan stock Exchange (PSX) as target population. Investors which are directly or indirectly involved in investment activities of PSX were considered to collect the responses. This particular inclusion helps to generalize the investment behavior and validate the presence of behavioral factors among individual investors. Previously, it was stated that this research includes the behavioral factors and enhances the conceptualization in the field of behavioral finance. Hence, this study is purely quantitative and primary data was collected to examine the behavioral factors. In this regard, the adopted and modified questionnaire were sent to 298 respondents out of which 256 were collected and valid for the analysis. The estimated response rate of data collection and screening of questionnaires was 85.9 %, which is a suitable percentage showing the interest in sampled population to response on the chosen behavioral factors. In addition, to make sure the sample is in line with the goals of the study and is capable of yielding insightful data, this research has employed purposive sampling. Until data saturation is reached, which indicates that more participants are unlikely to offer novel or important information, researchers continue to pick respondents. Purposive sampling improves the overall rigor of the research by carefully choosing individuals who closely fit the topic of interest. This increases the credibility of the data and outcomes (Campbell et al., 2020). In addition, covariance-based structural equation modelling was used as statistical approach. CB-SEM is a comprehensive statistical approach and effective to assess the multi-mediating mechanism (Hair et al., 2019). The questionnaire items were initially validated through the reliability analysis and then correlation analysis was used as the assumption of CB-SEM (Hair et al., 2019).

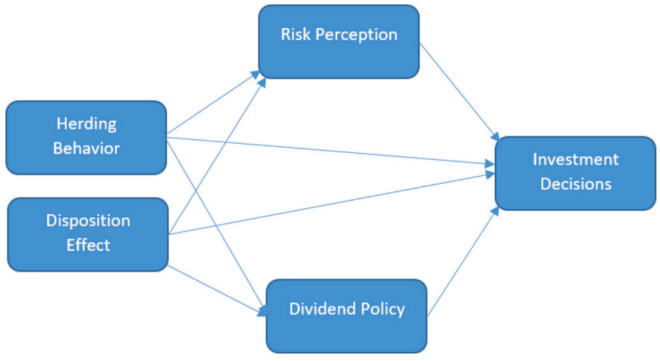

Fig. 1. Conceptual framework.
Source: Own research.

3.2. Research instrument

This research is consisting of behavioral factors that are associated with investment decisions of speculators and investors involved in Pakistan stock exchange (PSX). Therefore, the questionnaire was used as a survey instrument. The questionnaire is a comprehensive instrument to collect primary data (Campbell et al., 2020). The survey instrument was divided into two portions, the first phase contains the demographic factors like gender, age group, education and experience in stock market. In the second phase of the questionnaire, 32 questions were specifically pertained to collect information for behavioral factors of study. These factors are herding behavior (IV), disposition effect (IV), risk perception (MV), dividend policy (MV), and investment decisions (DV). The purpose of these questions was to determine the emotional and psychological aspects that could influence an investors' decision-making process. The selection of scale is specifically important in the primary data collection. In this regard, 5-Point Likert Scale (ranged from strongly disagree to strongly agree) was used as point of measuring the response. In addition, the collected data was initially processed with SPSS software. The SPSS was used to assess the demographic profile of respondents, reliability analysis of scale, and other normality measures. After initially screening of the data set, AMOS software was used to assess the hypotheses of study. The structural equation modelling (SEM) was implicated to assess the multi-mediating mechanism of risk perception and dividend policy. Table 3 illustrates a high percentage of male respondents (71 %) compared to female respondents (29 %) which may suggests that there is gender imbalance in the participation of Pakistani nationals in the PSX. In the demographic summary of respondents, with 71 % of the sample being male and 29 % female. This result might be explained by the social and cultural norms that are common in Pakistan, where women are typically underrepresented in the workforce and encounter cultural obstacles when trying to access financial possibilities. These differences in gender may also affect women's access to opportunities and education related to investing, which could ultimately result in women participating in the equity market at a lesser rate than males. Furthermore, the age is classified into four groups and the most dominant (34 %) age group respondents fall between the age of 35 to 40 years. In this regard, this research can be

stated to target the experienced and matured age group of investors whose investment tolerance and risk-taking ability is more compared to the younger age groups.

Given that 138 respondents had a master's degree, the study includes a greater proportion for respondents with higher educational and training level. It is vital to acknowledge that people with lower educational attainment may possess different perspectives and methodologies regarding equity market investment. Put differently, those with lesser educational backgrounds could have different investing methods, risk appetites, and financial objectives than people with higher education levels. For example, instead of making stock market investments, individuals can be more risk cautious and try to facilitate the safer investment options like savings account or fixed deposits.

The experience was taken as the last demographic factor, this factor intends to show the expertise of the respondents in the particular field and it helps a researcher to evaluate the findings essentially. The study appears to be capturing the behavior of somewhat experienced investors, as evidenced by the fact that 36 % of respondents have 3 to 7 years of investment experience in Pakistan stock exchange (PSX). It is also vital to remember that the PSX has seen a lot of advancements and modifications recently. As a result, in light of these modifications and advancements, experienced investors might view the market approach differently.

As mentioned in the previous discussion that this research has used adopted and modified questionnaire for primary data collection. Table 4 illustrates the number of factors chosen in the study, nature of variable, number of questions for each factors and sources from which the questionnaires was adopted.

4. Data analysis & interpretation of results

4.1. Scales' consistency score

The estimation of internal consistency of scale which is often known as “reliability of scale” essential to determine the validity of survey instrument. The reliability analysis was performed using Cronbach's alpha. It should be noted here that Cronbach's alpha is a statistical approach to estimate the reliability score of interval scale (Likert scale), the demographic phase of the questionnaire was not the subject to assess the internal consistency (Sarstedt et al., 2019). Table 5 shows that all the factors have established the internal consistency of scale. Through the implementation of this analysis, the study confirmed the validity of the data obtained and the ability to derive meaningful conclusion regarding the behavioral aspects influencing investing decisions in the PSX.

Table 3
Respondents' profile.

Criteria		n	%
Gender	Male	182	71
	Female	74	29
Total		***256***	***100***
Age	25 Years - 30 Years	55	21
	30 Years - 35 Years	65	25
	35 Years - 40 Years	88	34
	40 Years and above	48	20
Total		***256***	***100***
Education	Bachelors	114	45
	Masters	138	53
	PhD	4	2
Total		***256***	***100***
Experience	Minimum of 3 Years	59	23
	3 Years – 7 Years	92	36
	7 Years – 10 Years	48	19
	Above 10 Years	57	22
Total		***256***	***100***

Table 4
Factors, items and references of adopted questionnaire.

Factors	Nature of Factor	Items/No. of Questions	Citations
Herding behavior	Independent Factor	8	Marjerison et al. (2023), Kumari et al. (2022), Balcilar et al. (2013), Almansour and Arabyat (2017)
Disposition Effect	Independent Factor	5	Ballis and Verousis (2022), Adil et al. (2022), Verma and Verma (2018), Paraboni and da Costa (2021).
Risk perception	Mediating Factor	8	Putri Pa et al. (2022), Oyekale (2022), Hossain and Siddiqua (2022), Gonzalez-Igual et al. (2021).
Dividend Policy	Mediating Factor	5	Baker et al. (1985), Bhutto et al. (2020).
Investment Decisions	Dependent Factor	6	Khawaja and Alharbi (2021), Renu Isidore and Christie (2018), Almansour and Arabyat (2017), Liang and Reiner (2009)

Table 5
Reliability analysis.

Factors	Nature of Factor	Items/No. of Questions	Alpha Score
Herding behavior	Independent Factor	8	0.79
Disposition Effect	Independent Factor	5	0.82
Risk perception	Mediating Factor	8	0.76
Dividend Policy	Mediating Factor	5	0.86
Investment Decisions	Dependent Factor	6	0.80

Note: The alpha score must be >0.70 to achieve moderate to high internal consistency.

4.2. Mean score, multicollinearity and correlation analysis

Table 6 illustrates the comprehensive outcomes of mean score of scale, multicollinearity diagnosis by using variance inflated factor (VIF), and correlation analysis as measure of association among variables.

In the context of Table 6, it summarizes the main statistical outcome for five variables that were measured in the study. The mean score for HerdBeh (Herding behavior), DispEff (Disposition Effect), RiPer (Risk perception), DivPol (Dividend Policy), InvDec (Investment Decisions) were all ranging from moderate to moderately high. Moreover, the collinearity diagnosis was performed by determining the VIF statistics. Table 6 is evident that factors are not overlapping each other, hence, inflated factor was normal in the suggested threshold and has no multicollinearity issue ($VIF < 10$, (Hair et al., 2019). In addition, correlation analysis was performed as the key assumption of structural equation modelling. The correlation examines the strength and weakness of degree of association among variables, if results illustrate that the factors are moderately correlated among each other then it enables to extract meaningful results in the hypotheses testing (Hair et al., 2019). The results of correlation in Table 6 shows that variables are positively correlated at 0.01 level of significance and the correlation coefficient value showing the moderate correlation among study variables.

4.3. Hypotheses assessment & discussion

This research has used covariance-based structural equation

Table 6
Mean score, VIF and pearson correlation movement.

Factors	Mean	VIF	1	2	3	4	5
HerdBeh	3.91	1.610	1				
DispEff	3.78	1.801	0.545***	1			
RiPer	3.80	1.761	0.491**	0.551**	1		
DivPol	3.71	1.710	0.390**	0.610**	0.413**	1	
InvDec	3.88	1.380	0.333*	0.483**	0.591**	0.502**	1

HerdBeh (Herding behavior), DispEff (Disposition Effect), RiPer (Risk perception), DivPol (Dividend Policy), InvDec (Investment Decisions).
** 0.01 level (2-tailed).
* 0.05 level (2-tailed), VIF <10.

Table 7
Establishing validities of constructs and GoF.

Convergent Validity					
Criteria	HB	DE	RP	DP	ID
If AVE >0.50	0.783	0.725	0.751	0.729	0.783
If CR >0.70	0.913	0.915 .	0.947	0.931	0.937

Discriminant Validity
The AVE score of factors is greater than Squared Multiple correlation of each pair
Model Fit indices
Chi-square = 2.65, GFI =0.951, AGFI = 0.933, TLI >0.961, CFI =0.940, RMSEA =0.051

Factors: HB (Herding behavior), DE (Disposition Effect), RP (Risk perception), DP (Dividend Policy), ID (Investment Decisions).
Thresholds: AVE > 0.50, CR > 0.70, Chi-square < 3, GFI >0.90, AGFI>0.90, TLI >0.90, CFI >0.90, RMSEA <0.08 (Fornell & Larcker, 1981; Kline, 2005).
Statistical terms: AVE = Average variance extracted, CR = Composite reliability, GFI = Goodness of fit index, AGFI = Adjusted Goodness of fit index, TLI = Tucker Lewis Index, CFI = Comparative Fit index, RMSEA = Root mean square error of approximation.

Table 8
Path-coefficients, *P*-Value, and GoF Indices.

Direct Effects		
Latent Constructs	Coefficient	P-Value
HB ➔ ID	0.49	***
DE ➔ ID	0.60	***
Model Fit indices		
Chi-square = 1.68, GFI =0.971, AGFI = 0.960, TLI >0.982, CFI =0.950, RMSEA =0.041		

Factors: HB (Herding behavior), DE (Disposition Effect), ID (Investment Decisions). Thresholds: Chi-square < 3, GFI >0.90, AGFI>0.90, TLI >0.90, CFI >0.90, RMSEA <0.08 (Fornell & Larcker, 1981; Kline, 2005). Statistical terms: GFI = Goodness of fit index, AGFI = Adjusted Goodness of fit index, TLI = Tucker Lewis Index, CFI = Comparative Fit index, RMSEA = Root mean square error of approximation.

Table 9
Path-coefficients, P-Value, and GoF Indices.

Mediating Effects				
Latent Constructs	Coefficient	P-value	Coefficient (1st Model)	P-Value
HB ➔ ID	*0.18*	*0.541*	0.49	***
DE ➔ ID	*0.24*	*0.231*	0.60	***
Model Fit indices				
Chi-square = 1.88, GFI =0.991, AGFI = 0.980, TLI >0.972, CFI =0.940, RMSEA =0.023				

Factors: HB (Herding behavior), DE (Disposition Effect), RP (Risk perception), DP (Dividend Policy), ID (Investment Decisions).
Thresholds: Chi-square < 3, GFI >0.90, AGFI>0.90, TLI >0.90, CFI >0.90, RMSEA <0.08 (Fornell & Larcker, 1981; Kline, 2005).
Statistical terms: GFI = Goodness of fit index, AGFI = Adjusted Goodness of fit index, TLI = Tucker Lewis Index, CFI = Comparative Fit index, RMSEA = Root mean square error of approximation.

modelling (CB-SEM) to assess the multi-mediating mechanism of risk perception and dividend policy. The CB-SEM includes the blend of statistical techniques that are useful to proof the hypotheses (Wang et al., 2021). It is a restricted statistical approach operated on maximum likelihood function. Basically, SEM illustrates two types of the model, 1) measurement model and 2) structural model. In this research, we have analyzed both models. Initially, we have performed confirmatory factor analysis (CFA) to establish the convergent and discriminant validities (See Fig. 2). For hypotheses assessment, we have generated two structural models (See Fig. 3 and Fig. 4). The first model revealed the results proposed direct relationship between factors and second one was to determine the tendency or existence of mediating effects.

Fig. 2 and Table 6 illustrate the outcomes of modified confirmatory factor analysis (MCFA). The MCFA analysis was essentially performed to examine the factor loadings, the covariance statistics, and goodness of fit indices. The pictorial outcome of CFA (Fig. 2) shows that some of the items were removed, and residuals covariance were interacted to improve the goodness of fit of the model. In addition, Table 7 shows the results of convergent and discriminant validities.

Interestingly, after doing necessary model modifications both validities were established/proved as per the suggested threshold of Fornell and Larcker (1981). These validities actually confirmed that each of the latent construct has ability to explain itself with their related measured items. Therefore, establishing validities and achieving suitable GoF giving a positive direction to further analyze the model.

The proposed hypothesis 1 (H1) and hypothesis 2 (H2) were assessed in the structural model. Fig. 3 and Table 8 illustrate the SEM outcomes where it was statistically confirmed that both herding behavior and disposition effect have a positive and significant effect on investment decisions. The first path coefficient (Fig. 3) reported that herding behavior has 0.49 or 49 % positive effect on investment decision (HB ➔ ID) at 0.01 level of significance. The second coefficient value revealed that disposition effect has 0.60 or 60 % positive impact on investment decision (DE ➔ ID) at 0.01 level of significance.

The findings show that individual investors on the Pakistan Stock

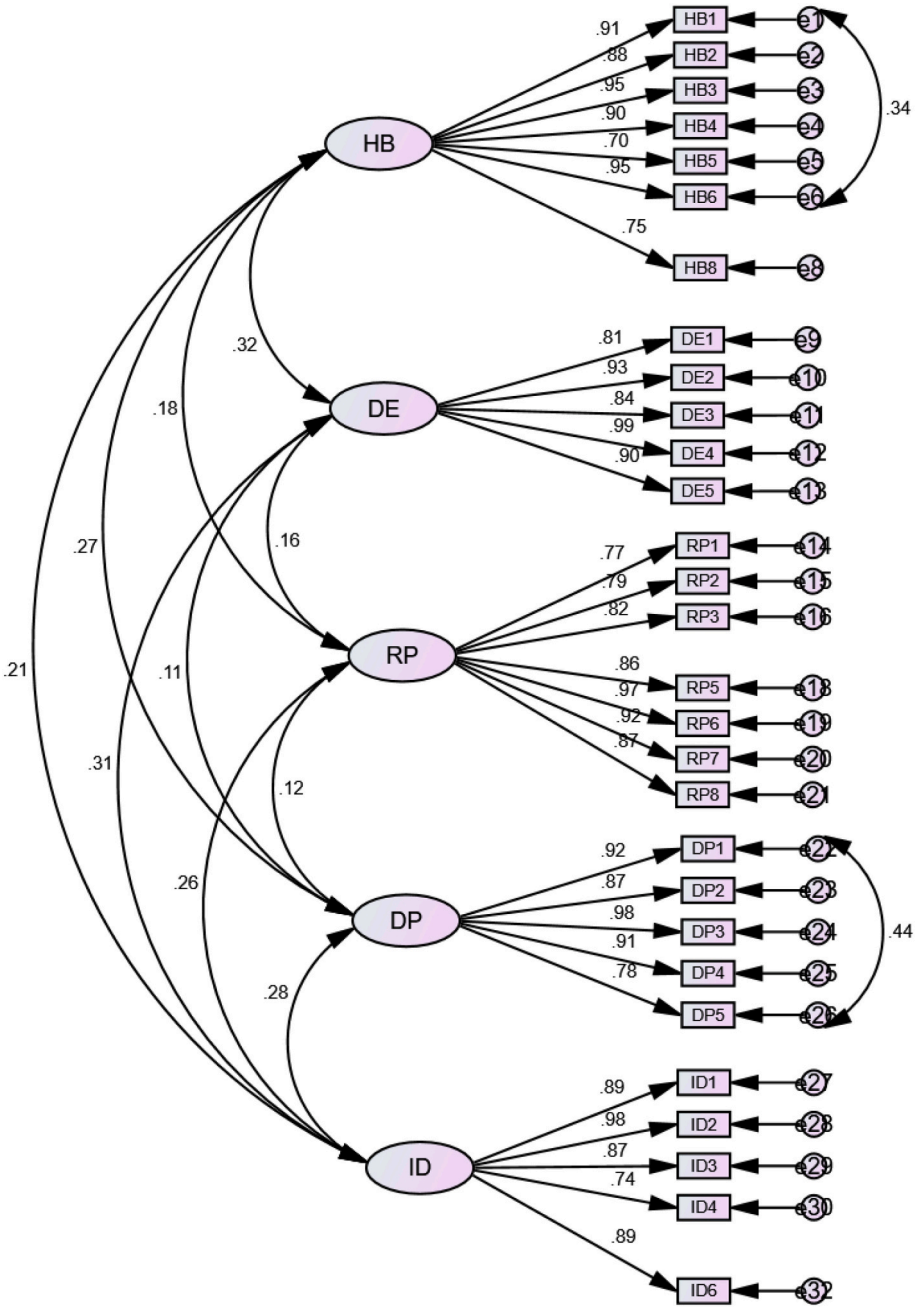

Fig. 2. Measurement model.

Exchange (PSX) have a tendency to exhibit herding behavior. This can result in a situation where a large number of investors follow the herding, inflating asset values and creating bubbles in the PSX. On the other hand, quick drops or crashes may occur when the trend of herding leaves a PSX (Tudor, 2021). Additionally, herding can lead asset prices to diverge from their inherent value, which lowers PSX market efficiency. As per results it can be stated that individual investors who follow the herding may pass up chances to make good independent investment decisions that could end up being more rewarding in the long run (Tudor, 2021). Regarding disposition outcomes, hanging onto losers and selling wins too soon can result in a less efficient portfolio and lost chances for higher returns. While selling winning investments can result in loss in future gains, holding onto losing investments exposes oneself to additional drops (Mavruk, 2022). Emotional elements like loss aversion and regret aversion drive the disposition effect, which results in actions that are not always logical or grounded in market principles (Areiqat et al., 2019). Holding onto losers could lead to higher losses being realized later, which could not be good for tax planning and selling winners could result in immediate taxes on capital gains. Conclusively, the result of this research is in line with other studies conducted into different contexts (Gonzalez-Igual et al., 2021; Hossain & Siddiqua, 2022; Zhang et al., 2022).

Fig. 4 and Table 9 confirming the results of H3, H4, H5, and H6. We provided a conclusive result in Table 9, showing a mediation outcomes of risk perception and dividend policy. The 1st model (see Fig. 3) determined the direct effect of herding behavior and disposition effect on investment decision showing the coefficient b = 0.49*** and b = 0.60***. If we see the Fig. 4, we have inducted risk perception and dividend policy as mediators, after inducting the multiple mediators on the relationship between herding behavior, disposition effect and investment decision the direct relationship had become insignificant and coefficient values have been insignificantly reduced.

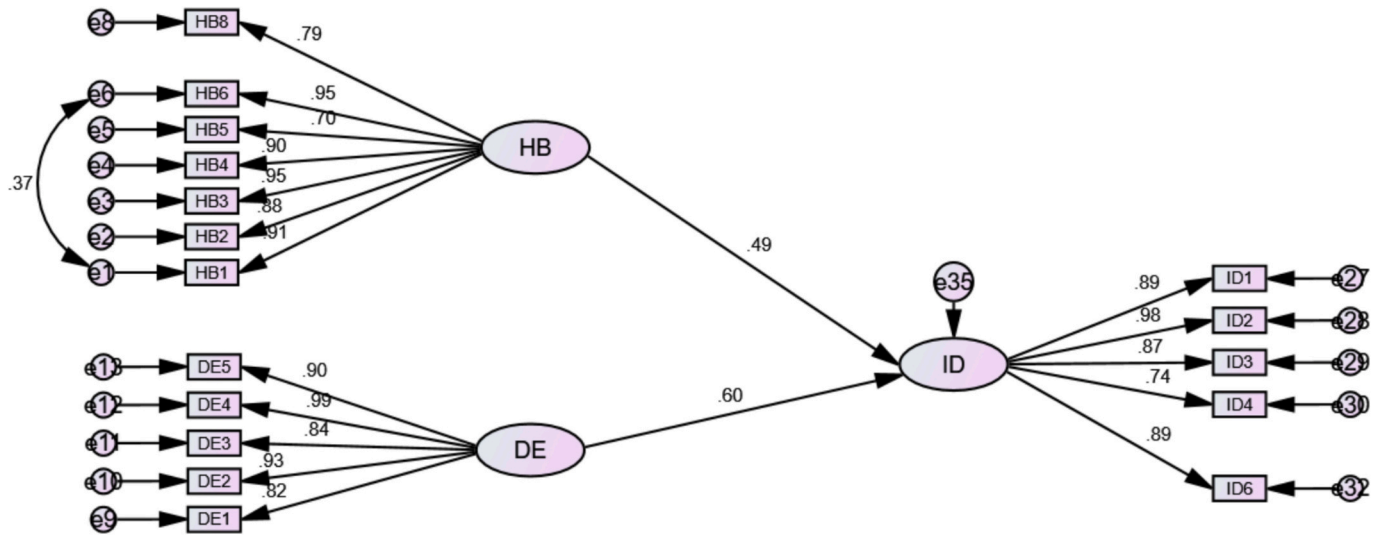

Fig. 3. Structural model -direct effects.

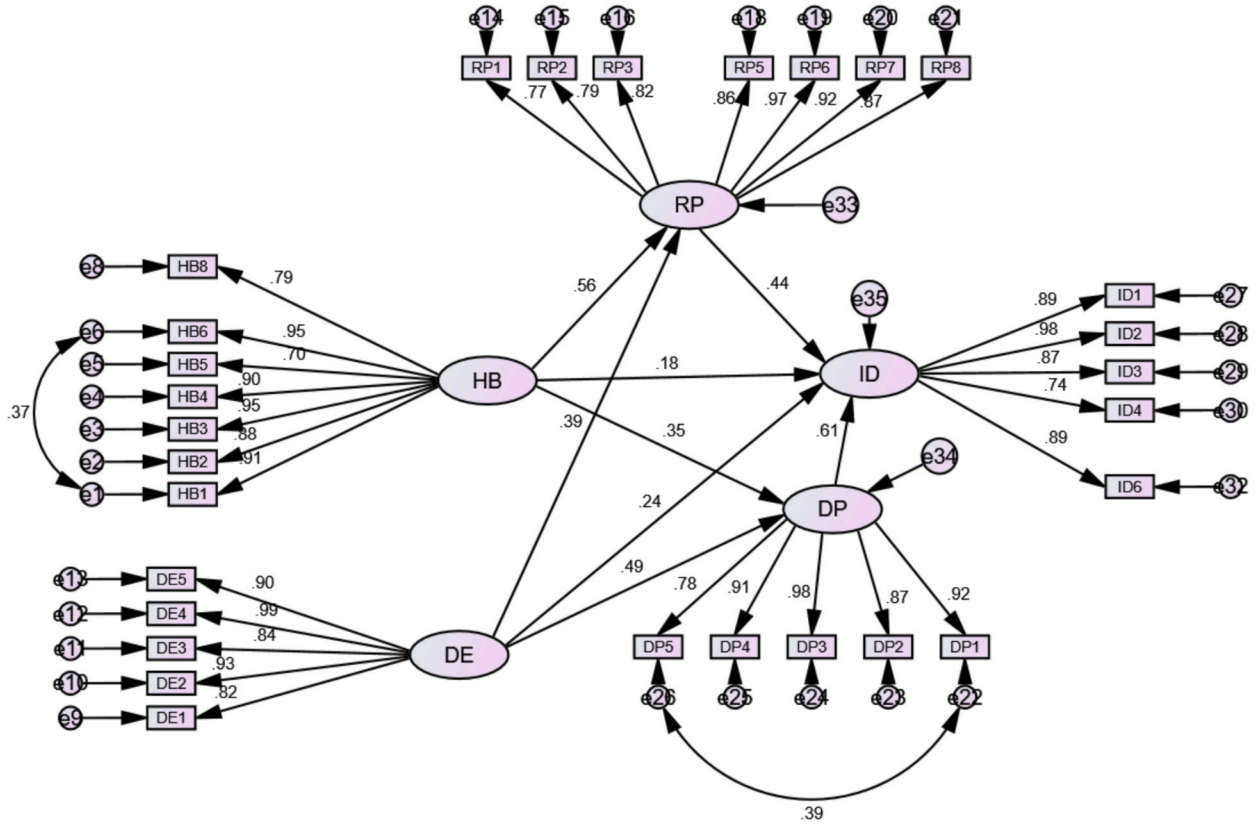

Fig. 4. Structural equation modelling.

This massive drop down of coefficient values of path HB ➔ ID from b = .49$^{\text{p-value=}***}$(1st model) to b = .18$^{\text{p-value=0.541}}$ (2nd model) and DE ➔ ID from b = .60$^{\text{p-value=}***}$ (1st model) to b = .24$^{\text{p-value=0.231}}$ (2nd model) manifested the emphasizing effect of mediators. To put it another way, the outcomes of mediation model indicate that herding behavior and disposition effect have an indirect, as well as direct, influence on investment decision making through an individual's perception of risk (Abdin et al., 2017; Chua et al., 2023). Accordingly, risk perception among investors shows that the decisions to make investments are influenced by behavioral characteristics, which also have an impact on the actual decisions that are previously made by same investors. For instance, herding behavior might affect investors risk perception by fostering a sense of security in numbers. Moreover, investors' lack of diversification in their portfolio can result from their perception that the danger of going against the herd is too great. The study shows that this kind of herding behavior influences risk perception, which in turn influences investment decision making in an indirect manner. Investors perceive less risk when they observe a substantial number of people following a specific investment strategy or trend. This view is based on the idea that the likelihood of losses or unfavorable outcomes may be reduced if a large number of people are making comparable financial decisions. Finding market inefficiencies and vulnerabilities can be

facilitated by having a thorough understanding of the presence and influence of herding behavior in investing decisions.

Additionally, the outcome suggests that risk perception plays a major indirect role on the relationship of disposition effects and investment decisions. According to the research, investors who have the disposition effect may have a skewed perception of risk, which influences their investment decision-making and that may not be in line with their risk tolerance or financial objectives. Investors' perceptions of risk may be distorted by the disposition effect. Investors who engage in this type of behavior frequently underestimate the risks attached to their winning investments while overestimating the possibility that their losing investments would return. A greater number of financial decisions based on false assumptions may result from this skewed perception of risk. For example, even when it would make sense to reduce losses and reallocate capital, investors may choose to hang onto failing investments in the hopes of a future recovery. On the other hand, they can sell their profitable investments too soon, losing out on possible future returns. In the same way investors also determine about company's consistent dividend policy, the behavioral finance factors (herding behavior and disposition effect) can affect individual investment decision through company's dividend policy. The sense of herding behavior towards firm's consistent dividend policy can psychologically influence the investors for fresh investment, re-investment, or investment retention.

The study offers a deeper understanding regarding the complex multi-mediating mechanism of risk perception and dividend policy on the relationship between behavioral finance factors and investment decision. Finally, it can be concluded that policymakers and financial professionals should take note of this mediation mechanism since it reveals insight into the decision-making process of investors and the variables that affect their investment choices. Practitioners and government officials can create interventions that better fit with investors' decision-making processes and result in more optimal investment outcomes by acknowledging the significance of risk perception and dividend policy.

5. Conclusion, limitations, and implications

In conclusion, this research studied important behavioral finance factors. The herding behavior and disposition effect were taken as independent behavioral factors, risk perception and dividend policy as mediating factors, and investment decision as outcome/dependent factor. The results confirmed the H1 and H2 by examining that herding behavior and disposition effects have significant and positive impact on investment decision among the individual investors of Pakistan stock exchange (PSX). Both factors (HB and DE) are observed to be significant and positive with risk perception and dividend policy and dividend policy and risk perception again created a significant and positive impact on investment decisions. These finding were not the part of proposed hypotheses, but these results would be helpful for future researchers. Interestingly, the study also found that both behavioral finance (risk perception and dividend policy decision) factors mediate the relationship between herding behavior, disposition effect and investment decision. This shows that these behavioral finance elements have an impact on investors' risk perception and dividend policy connected to their investments, which in turn has an impact on the actual investments that investors made. However, it can have a substantial impact on an investors' willingness to accept risks and, ultimately, the profitability of their investment portfolio. Therefore, the study emphasizes the significance of taking into account an individual's perception of risk and dividend policy when making investment decisions.

There are essential economic implications of this research. The first and foremost contribution/implication of this study is to enhance rational decision making and market stability. This suggests that investor behavior might result in mispricing and market inefficiencies, suggesting that financial markets may not always function efficiently. Economic distortions resulting from this mispricing may impact resource allocation and perhaps cause market bubbles. In order to make wise decisions and support market stability, investors, financial institutions, and policymakers must comprehend how behavioral aspects affect investment decisions. The study has concluded some notable social consequences. Both individual investors and society at large may suffer substantial consequences as a result of behavioral factors. Investors' financial security may be at risk when they make poor investing decisions due to herding behavior and disposition impact. Individual investors may experience monetary losses as a result, which could affect their quality of life and general economic stability. Hence, this could have wider societal repercussions. Meanwhile, the study desires investors to adopt a more independent and impartial approach to decision-making by bringing these behavioral factors into their consideration.

Despite having comprehensive contributions and findings of this research, there are some limitations which are needed to acknowledge. The very first limitation is self-reported data, it may highlight the social desirability bias, and it may not reflect actual behaviors of respondents. Second one is contextual limitation because this study has only taken the individual investors of Pakistan Stock Exchange (PSX) and therefore the results may not achieve enough generalizability due to other cultural contexts. Moreover, institutional investors were not the part of study, only individual investors were taken to determine the variability of investment decisions. Finally, the study only focused on herding behavior and disposition effects as behavioral factors. However, there are other potential factors such as overconfidence, investors' sentiments, which may influence individual investment decisions.

CRediT authorship contribution statement

Sarfaraz Ahmed Bhutto: Writing – original draft, Formal analysis, Conceptualization. **Nazia Nazeer:** Methodology, Data curation. **Muhammad Saad:** Writing – review & editing, Data curation, Conceptualization. **Kewal Talreja:** Writing – review & editing, Data curation.

Declaration of competing interest

The authors declare that they have no conflict of interests.

Data availability

Data will be made available on request.

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