



## The determinants of perceived risk: A moderating role of investor sophistication

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### ABSTRACT

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This study investigates the factors affecting perceived risk and the moderating effects of investor sophistication. Young investors are known to possess low financial literacy, exhibit herding behavior, and rely heavily on social media for information. A cross-sectional method was used to collect data through online questionnaires developed with Google Forms. At the same time, partial least squares structural equation modeling was adopted for data analysis using SmartPLS version 4. Purposive sampling was applied using a sample size of 344 young Indonesian investors aged 30 years and below with one year of experience in stock investing. Herding behavior and investor sophistication were adopted as mediating and moderating variables, respectively. The results show that social media influence significantly affects the perceived risk and herding behavior of young investors. Additionally, social media has an indirect impact on perceived risk through herding behavior. In this context, investor sophistication is a critical moderating factor amplifying the effects of social media and herding on perceived risk. This study contributes to prospect theory, behavioral finance, and social influence theory.

**Contribution/Originality:** This research contributes to prospect theory and behavioral finance by providing empirical evidence on the relationship between investor sophistication, social media influence, herding behavior, and perceived risk. Herding behavior can mediate the effect of social media influence on perceived risk. Investor sophistication moderates the effects of social media influence and herding behavior on perceived risk.

## 1. INTRODUCTION

Investing is the allocation of money with the expectation of future returns and benefits. Traditional finance advises against decision-making based on emotions and behaviors, stating that investors should be rational individuals capable of processing all information fairly and are expected to be more rational and risk-averse (Zhang, Chen, Rong, Wang, & Tan, 2022). However, rational investors focus on the risk associated with a particular security when deciding on an investment (Shefrin, 2008). The prospect theory suggests that cognitive and psychological behaviors cause investors to favor certain gains and occasionally make irrational choices (Kahneman & Tversky, 1979). In many instances, emotions, fears, and other psychological factors affect judgment and decision-making, leading investors to act in inconsistent or irrational ways (Moueed & Hunjra, 2020). The concept of behavioral finance challenges the rationality principle of traditional finance (Islam, 2012). Behavioral finance posits that emotions, biases, and cognitive limitations impact investors (Almansour & Arabyat, 2017). Academics have extensively explored the influence of

behavioral finance factors on investment decisions. Research has reported various behavioral finance factors affecting investment choices, such as cognitive biases, emotional biases, social influences, perceived risk, and individual personality traits (Ahmad, 2024; Lather, Jain, & Anand, 2020).

Young investors dominated more than 55% of the stock market in Indonesia, but the stock investment assets were only 35.82 trillion rupiah (T) in May 2024. This figure is lower compared to other age groups, where 31-40, 41-50, 51-60, and over 60-year-old groups have assets of 94.53, 155.19, 230.34, and 877.52 trillion, respectively (Indonesia Central Securities Depository, 2024). According to previous research, young investors are characterized as traders who engage in short-term buying and selling of shares (Barber & Odean, 2001; Chong, Ong, & Tan, 2021; Schraeder, 2016) tend to be risk-takers (Chong et al., 2021; Kannadhasan, 2015) show emotional behavior (Ady, 2019; Wang, Zhang, Wang, & Chen, 2020) possess low financial literacy, and demonstrate herding behavior by following financial planners (Soepriyanto & Limijaya, 2022). Perceived risk is an important determinant of risky investment decisions (Singh & Bhowal, 2010; Sitkin & Weingart, 1995). This variable plays an important role in investment decisions, especially among young investors who often lack experience (Kaban & Linata, 2024). Perceived risk describes the risk of financial assets based on concerns and past experiences (Ahmad & Shah, 2022). Weber, Blais, and Betz (2002) state that perceived risk affects investors' willingness to take risks. Beliefs, thoughts, and judgments connect to this. The portfolio composition influences choices, and each investor perceives risk differently (Wangzhou, Khan, Hussain, Ishfaq, & Farooqi, 2021). According to Cho and Lee (2006) perceived risk leads to more frequent transactions and decreases investments in the stock market. Hence, an increased perception of risk negatively impacts decision-making about investment in the stock market. Perceived risk forges investment strategies and portfolio choices.

Perpetual insight can generate the development of a more viable investment strategy (De Bondt & Thaler, 1985). Krkoska and Schenk-Hoppé (2019) pointed out that herding behavior is a significant risk factor that is often ignored in portfolio statistical methods and risk management. Perceived risk influences decision-making in the stock market, and herding behavior is driven by risk aversion, with the desire to minimize the risk of loss (Ahmed, Rasool, Saleem, Khan, & Kanwal, 2022). In this context, risk perception primarily influences investor behavior (Alam, Masroor, & Nabi, 2020).

Later research shows that herding behavior is expanding (Kurnianingsih, Kusuma, & Arifin, 2024). Jain, Walia, Kaur, and Singh (2022) declared that herding was the most noteworthy among the investor biases affecting investment decisions. The concept appears when investors go after other people's investment decisions instead of basing them on their analysis. The ownership of herding information identifies potential market risks and develops suitable investment strategies (Akbar, Oad Rajput, & Bhutto, 2019). This affects the risk level of investors but also makes the market inefficient and decreases the potential for diversification benefits (Omane-Adjepong, Paul Alagidede, Lyimo, & Tweneboah, 2021). Market participants often base investment decisions on the action of others rather than signals. This balance in behavior improves herd behavior, which can negatively impact financial stability during crises (Bogdan, Suštar, & Draženović, 2022).

Herding behavior can be triggered by a lack of financial literacy and social influence, where investors tend to imitate the decisions of other people in the Indonesian stock market (Hidayati, Alteza, & Winarno, 2022). Giannini, Rossa, Della, and DeLellis (2020) reported that social behavior could lead to herding, which subsequently undermined market efficiency and stability. Social referencing, or the tendency to rely on information from the environment, can also influence herding behavior (Kurnianingsih et al., 2024). Young investors follow investment decisions that appear popular in social circles (Kurnianingsih et al., 2024). Zhang, Nazir, Farooqi, and Ishfaq (2022) discovered that social media information, including rumors, is a significant component of external information in the stock market. Social interaction and herding have a negative but significant relationship with perceived risk (Moueed & Hunjra, 2020).

Literature on perceived risk and investor behavior is limited. Wang, Feng, and Zang (2024) reported that perceived risk factors have the greatest impact on investment attitudes. According to Jalari, Anwar, and Ardiansyah (2023) perceived risk negatively and significantly affects Sharia stock selection. Research demonstrate that investor

awareness significantly predicts both investor behavior and perceived risk attitudes. Investor awareness and perceived risk attitudes are positively correlated with stock market investor behavior (Surulivel, Selvabaskar, Nigama, & Chandrasekaran, 2018).

In developing and developed markets like Turkey and Ireland, there are strong and weak relationships between brand equity dimensions and intention to invest, with perceived risk playing a mediating role (Çal & Lambkin, 2017). Meanwhile, perceived risk and information overload partially mediate the effects of herding mentality and panic buying (Zuo & Yang, 2023). Perceived risk, benefits, herding behavior, and financial literacy are important variables to consider when assessing investment decisions (Cristofaro, Giardino, Misra, Pham, & Phan, 2022). Deka, Sharma, Agarwal, and Tiwari (2023) argue that perceived risk affects 1) equity investment decisions, 2) investor bias, and 3) ESG consciousness. Perceived risk and herding behavior can also partially mediate financial literacy in investment decisions (Rahyuda & Candradewi, 2023).

Investor sophistication affects risk and investor bias (Feng & Seasholes, 2005; Stålnacke, 2019; Talpsepp, 2011). However, there is limited literature on the role of this variable in investment fields. Previous research uses financial literacy, experience, and education as separate variables to investigate the effects of investor sophistication. Yadav, Yadav, and Hazarika (2022) defined 'investor sophistication' as having greater experience and knowledge, participating in more complex activities, and potentially possessing a higher net worth. Stålnacke (2019) states that sophistication is negatively related to investors' risk expectations. According to Feng and Seasholes (2005) investor sophistication and trading behavior can reduce behavioral bias. Prosad, Kapoor, and Sengupta (2015) observe that behavioral bias is dependent on trading sophistication. By contrast, investor sophistication can decrease the disposition effect (Talpsepp, 2011). Raut and Kumar (2024) found that financial literacy significantly modifies investors' perceived risk in their intention to trade online. Sabir, Mohammad, and Shahar (2019) showed that past investment experiences can mitigate herding behavior through financial literacy. Investors who cognitively evaluate past investment experiences can reduce herding bias behavior (Shantha, 2019). Meanwhile, investors without knowledge and experience may exhibit herding behavior (Mahmud & Tiniç, 2018). This study addresses the following questions: RQ1—What is the effect of social media influence on perceived risk? RQ2: What is the effect of social media influence on herding behavior? RQ3 - What is the effect of herding behavior on perceived risk? RQ4: How does herding behavior mediate the effect of social media influence on perceived risk? RQ5: How does investor sophistication moderate the effects of social media influence and herding behavior on perceived risk?

This study contributes to prospect theory and behavioral finance. It also contributes to millennial herding behavior and perceived risk, while other previous research uses other respondents as samples, such as employees (Singh & Bhowal, 2010) entrepreneurs (Forlani & Mullins, 2000) and stock investors with a wide range of investors ages (Cho & Lee, 2006; Deka et al., 2023; Hossain & Siddiqua, 2022). Previous research employs herding behavior as the independent or dependent variable, then it shows mixed results, so this study proposes another perspective on the role of herding behavior instead of as a factor that is directly affecting the perceived risk. It is mediating other factors in the perceived risk.

While prior studies regard herding behavior as the same factor, as another factor such as social influence, to impact the perceived risk of investors (Moueed & Hunjra, 2020) this study proposes a new insight that the herding behavior is influenced by other factors first before it can be a mediating variable. It captures social media influence before affecting perceived risk. Previous analyses have examined financial literacy, investor experience, and education as separate factors. This research integrates these competencies into a new variable, known as investor sophistication. In other prior studies, perceived risk in the online trading intention of investors is moderated by financial literacy (Raut & Kumar, 2024). However, this study provides a new approach to how the relationship between social media influence, herding, and perceived risk is not only moderated by financial literacy but by education and experience as well that is bundled as investor sophistication.

Social media influence significantly affects young investors' herding behavior, and perceived risk. Herding behavior can mediate the effect of social media influence on perceived risk. Investor sophistication moderates the effects of social media influence and herding behavior on perceived risk. The remainder of this paper is organized as follows. Section II summarizes previous research and hypotheses development. Section III outlines the research methodology, and Section IV presents the empirical results and discussion. Finally, Section V concludes the paper, identifies limitations, and suggests directions for future analyses.

## 2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

### 2.1. Prospect Theory

Kahneman and Tversky (1979) introduced prospect theory, which explored the psychological factors influencing financial decision-making. According to this theory, investors preferred perceived gains to minimize losses when faced with uncertain results, indicating the role of cognitive biases in shaping investment decisions. Thaler (1980) applied prospect theory to financial markets, stating that people act irrationally and make mistakes in investment decisions. Therefore, behavioral finance challenges traditional finance theory that assumes all investors are rational while in reality, some investors act irrationally, such as herding behavior, disposition effect and other biases.

Kahneman and Tversky (1979) in prospect theory stated that reference points are set with different values assigned to gains and losses. This assessment process starts from a specific reference point (Ahmad & Shah, 2022). In situations characterized by environmental uncertainty and complexity, individual investors are prone to herding behavior to minimize the risk of losses. This can reduce technical knowledge and reasoning abilities, leading to incorrect judgments. Perceived risk and herding behavior contribute to behavioral finance to understand the psychological influence on investor decisions (Lux, 1995). Prospect Theory, which states that people assess gains and losses relative to a reference point, helps explain the disposition effect (Weber & Camerer, 1998). To expand the theory, Singh, Adil, and Haque (2023) showed that bias is influenced by personality traits and risk tolerance. The theory can also be used to explain investor behavior in the securities market through the idea of risk perception (Hossain & Siddiqua, 2022).

### 2.2. Perceived Risk

According to Singh and Bhowal (2010) perceived risk is an important factor in decision-making. Perceived risk includes beliefs about potential gains and losses as well as subjective judgments about the nature and severity of the risk. The level of risk associated with a particular behavior is often viewed as the probability and consequences of adverse effects arising from it (Zhang et al., 2022). This perception is a deeply personal decision-making process, influenced by lifetime experiences and other factors (Robinson & Marino, 2015). In evaluating a financial instrument, individuals incorporate behavioral risk indicators and financial risk measures into the judgment process. Additionally, perceived risk significantly impacts behavioral finance. Forlani and Mullins (2000) reported substantial connections between perceived risk and behavioral bias. Perceived risk is a multifaceted concept that shapes decision-making by combining subjective judgments, significantly influencing behavioral finance. Since perceived risk plays an important role in behavioral finance and investment decision-making, it is necessary to know the factors related to it. Perceived risk in this research is an investor's preference for taking risks in stock investment.

### 2.3. Herding Behavior

Empirical research defines herding behavior using various methods, such as simultaneous trading (Lakonishok, Shleifer, & Vishny, 1992) trading by similarly informed investors (Froot, Scharfstein, & Stein, 1992) and imitating the actions of other investors (Chang, Cheng, & Khorana, 2000). Early research by Banerjee (1992); Bikhchandani, Hirshleifer, and Welch (1992) and Welch (1992) explains herding behavior using conformity theories. Banerjee (1992) argued that herding occurs when people follow the actions of others, even though private information suggests a

different course of action. Bikhchandani et al. (1992) reported that social uniformity leads to local conformity through sanctions for non-conformity, positive payoff externalities, conformity preferences, and communication. The informational cascade model shows people's tendency to follow the actions of others. From the theoretical perspectives of Banerjee (1992); Bikhchandani et al. (1992) and Welch (1992) people deliberately imitate the actions of others while disregarding private information. In herding, rational investors may start acting irrationally by relying on the judgments of others instead of making independent decisions (Kumar & Goyal, 2015). This is because of the unwillingness to take investment risks or lack of knowledge to invest (Islam, 2012). Herding behavior reflects the tendency of investors to follow others' actions, often disregarding their private information, driven by social conformity or lack of knowledge. This study explains herding behavior as investor behavior in making investment decisions by relying on other investors' decisions, market trends, investment experts' recommendations, and eloquent speakers.

#### *2.4. Social Media Influence*

The Social Influence Theory offers a structure for comprehending the impact of others' behavior, attitudes, and opinions on individuals. This theory provides an established basis for understanding individual social behaviors regarding identity. Social influence theory distinguishes between different types and levels of commitment, namely, compliance, identification, and internalization (Kelman, 1958). In this context, social media influence can be conceptualized as the collective emotions expressed by users of platforms towards company shares. The spread of investment success stories on social networks can explain stock market fluctuations (Yang, Mamun, Mohiuddin, Al-Shami, & Zainol, 2021). Communication through social media requires the use of online channels such as the Internet, Instagram, Facebook, and YouTube, as well as offline channels such as television programs, seminars, articles, various reports, and company information news on stock exchanges (Hassan Al-Tamimi & Anood Bin Kalli, 2009). Social Media Influence in this research is the influence of people (friends, investment experts, stock influencers, and bloggers in social media) affecting the investor decision.

#### *2.5. Investor Sophistication*

Investor sophistication has gained attention in the financial literature for explaining differences in investment behavior and outcomes among investors with different levels of knowledge, experience, and market understanding. This concept is closely associated with the tendency of more knowledgeable and sophisticated investors to make rational and informed decisions. Yadav et al. (2022) define investor sophistication as having greater experience and knowledge, participating in more complex activities, and possessing a higher net worth. Several factors contribute to this variable, including education, professional experience, investment experience, and access to financial information. Sophisticated investors typically make relatively large investments (Hornuf & Neuenkirch, 2017) as well as identify and analyze investment risk and opportunities more accurately to manage portfolios and make informed decisions. Sophisticated investors dedicate significant time and focus on investments and possess superior skills in analyzing investment-related data (Kalay, 2015). Investor sophistication in this research is the competency of investors including education, knowledge, experience, and information that investors possess.

#### *2.6. Social Media Influence and Perceived Risk*

The growth of social media trading groups can lead to cyber threats, such as hacking and phishing attacks, which jeopardize personal and financial information (Bizzi & Labban, 2019). Social and technological factors also influence perceived risk. Social media and investment forums can influence perceived risk and management. Social influence plays a large role in shaping the perceived risk of young investors (Hossain & Siddiqua, 2022). Sathya and Prabhavathi (2024) report the need to consider the effects of social media on perceived risk during investment decisions. Therefore,

social media is an important factor in determining risk as well as perceived risk. The more an investor engages in social media, the more it can increase investor perceived risk.

*H: Social Media Influence Affects Perceived Risk.*

### 2.7. Social Media Influence and Herding Behavior

Instead of depending on newspapers and conventional forms of analysis, people have access to a range of social media platforms to make informed investment decisions. Social media have transformed the way people communicate, access information, and make investment decisions. Therefore, the probability of investors participating in online trading increases because of the growing reliance on network connections driven by social media usage. The content of platforms can significantly influence investment behavior (Investments, 2015). The influence of social media is directly proportional to engagement in online herd behavior. Social trading platforms further intensify this tendency since people often instinctively replicate the trading decisions of the majority (Bizzi & Labban, 2019). Stock influencers' credibility has a substantial positive effect on herd behavior bias (Trisno & Vidayana, 2023). Suresh and Loang (2024) found that social influence causes rational herding. According to Rahayu, Rohman, and Harto (2021) herding behavior and social influence are connected through reasoning and emotions. Social influence drives this variable by serving as a reference when making investment decisions. Social media plays a pivotal role in fostering herding behavior, where social influence drives investors to follow majority decisions.

*H: Social Media Influence Affects Herding Behavior.*

### 2.8. Herding Behavior and Perceived Risk

The concepts of informational cascade and herd behavior have been used interchangeably in the literature. A cascade occurs when a continuous sequence of people disregards private information when making a decision. Herd behavior occurs when a continuous sequence of people possesses similar decisions but does not necessarily ignore private information (Çelen & Kariv, 2004). Perceived risk mediates the relationships between information cascade and decision-making (Wangzhou et al., 2021).

Herding behavior is driven by low-risk tolerance to minimize the possibility of losses (Ullah & Elahi, 2015) and this is related to perceived risk (Yu, Dan, Ma, & Jin, 2018). This variable has a negative and significant relationship with perceived risk (Moueed & Hunjra, 2020). Even though herding provides some protective benefits during periods of market stress, significant risk is compromising stability and efficiency. During the brief announcement period, investors may use herding to minimize uncertainty and investment risk (Chen, Kuo, & Yang, 2021). According to Houghton, Simon, Aquino, and Goldberg (2000) and Ishfaq, Maqbool, Akram, Tariq, and Khurshid (2017), behavioral bias directly influences perceived risk. Huang, Wu, and Lin (2016) identified a strong connection between herding behavior and risk-return considerations among institutional investors. Additionally, less affluent areas, where people perceive higher risk due to limited opportunities experience more herding behavior. Bekiros, Jlassi, Lucey, Naoui, and Uddin (2017) explored this variable concerning risk and uncertainty. Herding also positively influences the willingness to take risks (Duy Bui, Chi Le, Ngoc Quang, & Wong, 2021). Deka et al. (2023) reported that herding behavior had an impact on the perception of risk. The relationship between herding behavior and perceived risk varies, as it can increase risk aversion but in some cases heighten risk tolerance.

*H: Herding Behavior Affects Perceived Risk.*

### 2.9. Social Media Influence, Herding Behavior and Perceived Risk

Social behavior can lead to herding, compromising market efficiency and stability (Giannini et al., 2020). Social interaction and herding produce a significant and negative relationship with perceived risk (Moueed & Hunjra, 2020). In addition, social media influencers and opinion leaders can sway decisions through proof. A large number of people's perceptions of investing in a particular stock can create a sense of safety and reduce perceived risk. Fear

of missing out (FOMO) on potential gains can intensify herding behavior. Social media platforms increase FOMO by constantly showcasing the successes of others, causing them to underestimate risk in the pursuit of similar returns. Farivar, Yuan, and Turel (2016) suggested that social identification, habitual use, and herding behavior could distort the assessment of social commerce users and prioritization of risk in purchasing and participation decisions.

*H<sub>1</sub>: Social Media Influence affects Perceived Risk mediated by Herding Behavior.*

2.10. Investor Sophistication as a Moderator

Investors with higher levels of financial literacy are more capable of understanding and assessing the risk in investing (Almansour, Elkrggli, & Almansour, 2023). In this context, a lack of experience strongly influences perceived risk (Cohen, Etner, & Jeleva, 2008). Investors may follow herding behavior due to a lack of confidence in investment decisions or allurements by the successes of others (Nath & Brooks, 2020). Financial literacy also has a significant and negative effect on herding bias, proposing that investors with greater financial knowledge are less inclined to follow herding behavior (Trisno & Vidayana, 2023) but low-literate investors commonly rely on stockbrokers, friends, and relatives when making investment decisions.

In stock market scenarios, investors follow herding behavior due to a lack of confidence in judgment. The success of others may entice investors, tempting them to seize similar opportunities. Financial literacy has a significant and positive impact on investment decisions, herding behavior, and perceived risk (Rahyuda & Candradewi, 2023). Wangzhou et al. (2021) confirm that financial literacy weakens the negative effect of behavioral bias on investment decisions. According to Kim and Pantzalis (2003) less-sophisticated investors may underestimate risk. Investor sophistication plays a crucial role in moderating the relationship between social media influence and herding as well as the relationship between herding and perceived risk.

*H<sub>2a</sub>: Social media influence affects herding behavior moderated by investor sophistication.*

*H<sub>2b</sub>: Herding behavior affects perceived risk moderated by investor sophistication.*

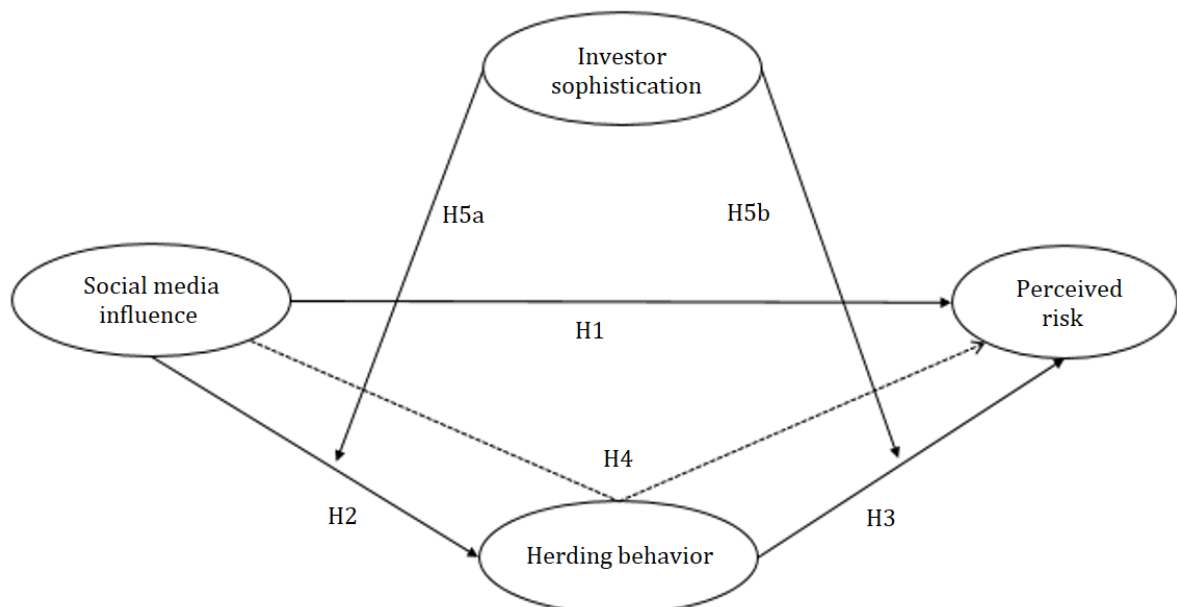


Figure 1. Conceptual framework.

Figure 1 illustrates four variables: Social Media Influence as an exogenous variable, Herding Behavior as a mediating variable, Perceived Risk as an endogenous variable, and investor sophistication as a moderating variable. Investor sophistication moderates the impact of social media influence on herding behavior and its impact on perceived risk. While herding behavior mediates the impact of social media influence on perceived risk.

### 3. RESEARCH METHODOLOGY

Data were collected from online questionnaires in Google Forms and were taken in November 2023, as the study wants to avoid biased opinions from the COVID-19 pandemic era. Furthermore, the data collection period could be regarded as a normal economic condition after the pandemic. The sample size consists of 344 Indonesian investors aged 30 years and below, with 1-year of experience in stock investment. The questionnaire consists of five sections. First section-demographic profile with ten questions (name, gender, age, status, latest education, monthly expenses, risk preferences, trading frequency, investment portion, experience). The second section-herding behavior with five questions. The third section-investor sophistication with four questions. The fourth section-social media influence with four questions and the last section-perceived risk with three questions. The questionnaire used a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire and the research objective have been clearly stated, respondents' attention and willingness have been asked, and it is also mentioned that all personal data and information related to respondents will always be kept confidential and only used for research purposes and will not be disseminated/used for other purposes. The questionnaire consists of two parts: the first part is about the demographic and psychographic profiles of the respondents, and the second is about all statements of indicators of all variables in this study.

This study analyzed the data using Structural Equation Modeling – Partial Least Square using SMART PLS 4.0. Hair et al. (2023) proposed a conceptual model using the reflective method proposed by Hair et al. (2023). Following the guidelines provided by Sarstedt, Hair Jr, and Ringle (2023) data were evaluated for internal consistency, factor reliability, convergent validity, and discriminant validity. Sarstedt et al. (2023) assessed the structural model and hypotheses after the conclusion of the confirmatory factor analysis stage and fulfillment of prerequisites. Next, they evaluate the predictive power of the proposed model using the PLS-Predict technique (Shmueli et al., 2019).

**Table 1.** Demographic profile.

Variables	Frequency	Percentage
Age (In years)		
18-21	55	16%
22-25	105	31%
>25-30	184	53%
Gender		
Male	218	63%
Female	126	37%
Monthly expenses (In million IDR)		
< 5	224	65%
5 to <10	94	27%
10 to < 15	15	4%
15 to < 25	8	2%
>= 25	3	1%
Education		
Junior high school	2	1%
Senior high school	76	22%
Associate's degree (Diploma 3)	33	10%
Bachelor	213	62%
Master	16	5%
Others	4	1%
Risk preference		
Aggressive	56	16%
Conservative	74	22%
Moderate	214	62%
Experience		
1 to < 2 years	188	54.7%
2 to < 5 years	145	42.2%
5 to < 10 years	10	2.9%
>=10 years	1	0.3%



The results and discussion sections provide more depth regarding the comprehensive protocol. The perceived risk (PR) was taken from Bodie, Kane, and Marcus (2021); Dimson, Marsh, and Staunton (2002) and Trang and Tho (2017) herding behavior (HB) was taken from Ahmad and Wu (2022); Ahmed et al. (2022); Jain, Walia, and Gupta (2019); Quang, Linh, Van Nguyen, and Khoa (2023) and Shang, Chen, and Chen (2013), investor sophistication (ISO) was taken from Xiao and Porto (2017); Bellofatto, D'Hondt, and De Winne (2018), and Yadav et al. (2022) social media influence (SMI) was taken from Bizzi and Labban (2019).

#### 4. RESULTS AND DISCUSSION

##### 4.1. Results

Based on Table 1, 53% of respondents were >25-30 and only 16% were 18-21 years old, respectively. Meanwhile, 63% and 37% of the respondents were female and male, respectively. Most respondents had expenses below 5 million per month. The level of education varies from junior high school to master's degree, with a bachelor's degree being the highest at 62%. Approximately 62% of young investors have moderate risk preferences. Meanwhile, 54.7% and 42.2% of investment experience are between 1 and <2 and 2 to <5 years, respectively.

Each construct indicator accurately measured intentions, resulting in reliable and valid research. This includes validity and reliability tests used to evaluate the outer model. Confirmatory factor analysis was performed after the normality test criteria were satisfied. Specific cut-off values were followed to ensure accurate analysis, including a composite reliability of 0.7, a loading factor between 0.4 – 0.7, and construct measures in line with the recommended thresholds (Hair et al., 2023). Table 2 shows that the composite reliability values, ranging from 0.759 (perceived risk) to 0.932 (social media influence), met the criteria for internal consistency reliability, with an indicator loading factor of 0.605 (HB3) to 0.893 (SMI2). Similarly, the convergent validity values ranged from 0.515 (perceived risk) to 0.774 (social media influence), confirming that the variables met the established criteria. From all indicators of four variables on average, SMI indicators have the highest loading factor, meaning they most strongly represent the construct (SMI). Social Media Influence has the highest CR, which means SMI is reliably measured and all indicators consistently represent it. It also has the highest AVE, which means it is accurately captured by its indicators, as it extracts substantial information from them.

Table 2. Normality and confirmatory factor analysis.

Indicators	Excess Kurtosis	Skewness	Loading	CR	AVE
HB1	-0.384	-0.010	0.745	0.866	0.566
HB2	-0.188	-0.054	0.740		
HB3	-0.062	-0.217	0.605		
HB4	-0.302	-0.150	0.843		
HB5	-0.055	-0.394	0.808		
ISO1	-0.441	-0.183	0.703	0.852	0.594
ISO2	0.109	0.045	0.861		
ISO3	0.325	-0.092	0.853		
ISO5	-0.091	-0.139	0.642		
PR2	-0.238	-0.373	0.613	0.759	0.515
PR3	-0.133	-0.254	0.704		
PR4	-0.422	-0.068	0.822		
SMI1	-0.320	-0.140	0.879	0.932	0.774
SMI2	0.015	-0.382	0.893		
SMI3	-0.168	-0.271	0.884		
SMI4	-0.243	-0.147	0.864		

Note: HB = Herding behavior; ISO = Investor sophistication; PR = Perceived risk; SMI = Social media influence. CR = Composite reliability (rho\_c); AVE = Average variance extracted.

The last step in confirmatory factor analysis, discriminant validity, is very important for figuring out how latent variables are latent. To evaluate the relationship, heterotrait-monotrait (HTMT) ratio of correlations

measure was used, particularly within invariance-based structural equation modelling. This method assesses the discriminant validity of instruments by analyzing HTMT ratios, with a common threshold value being 0.90 or lower (Henseler, Ringle, & Sarstedt, 2015). Table 3 shows that the HTMT ratio supports and validates the concept.

Table 3. Discriminant validity - Heterotrait-monotrait (HTMT) ratio.

Variables	HB	ISO	PR	SMI
HB				
ISO	0.379			
PR	0.669	0.563		
SMI	0.775	0.296	0.555	

Note: HB = Herding behavior; ISO = Investor sophistication; PR = Perceived risk; SMI = Social media influence.

Predictive power was evaluated to test the structural model and calculate the coefficient of determination ( $R^2$ ). This study used three recommended levels of  $R^2$  value;  $R^2$  values of 0.75 can be considered substantial, 0.50 is moderate, and 0.25 is weak (Hair et al., 2023). The  $R^2$  value of herding behavior is 0.491, and the perceived risk is 0.291. Bootstrapping was used with a one-tailed test and a subsample size of 5,000.

In Table 4, the structural model stated that social media influence positively affects herding behavior ( $\beta = 0.621$ ,  $p$ -value  $< 0.000$ ). Additionally, perceived risk was positively affected by herding behavior ( $\beta = 0.252$ ,  $p$ -value  $< 0.000$ ) and social media influence ( $\beta = 0.123$ ,  $p$ -value  $< 0.036$ ).

Mediation analysis was conducted on herding behavior. The results showed that the mediation of herding behavior in the relationship between social media influence and perceived risk was accepted ( $\beta = 0.156$ ,  $p = 0.000$ ). A moderating analysis was conducted for investor sophistication. The results showed that investor sophistication moderated the relationship between herding behavior and perceived risk ( $\beta = 0.112$ ,  $p = 0.004$ ). Additionally, the moderation analysis was accepted ( $\beta = 0.112$ ,  $p = 0.004$ ).

Table 4. Hypothesis testing results.

Hypothesis	B	STDEV	t-statistics	p-values
HB→PR	0.252	0.059	4.271	0.000
SMI→HB	0.621	0.035	17.620	0.000
SMI→PR	0.123	0.068	1.798	0.036
SMI→HB→PR	0.156	0.038	4.157	0.000
ISOxHB→PR	0.112	0.042	2.658	0.004
ISOxSMI→PR	0.112	0.042	2.647	0.004

Note: HB = Herding behavior; ISO = Investor sophistication; PR = Perceived risk; SMI = Social media influence.

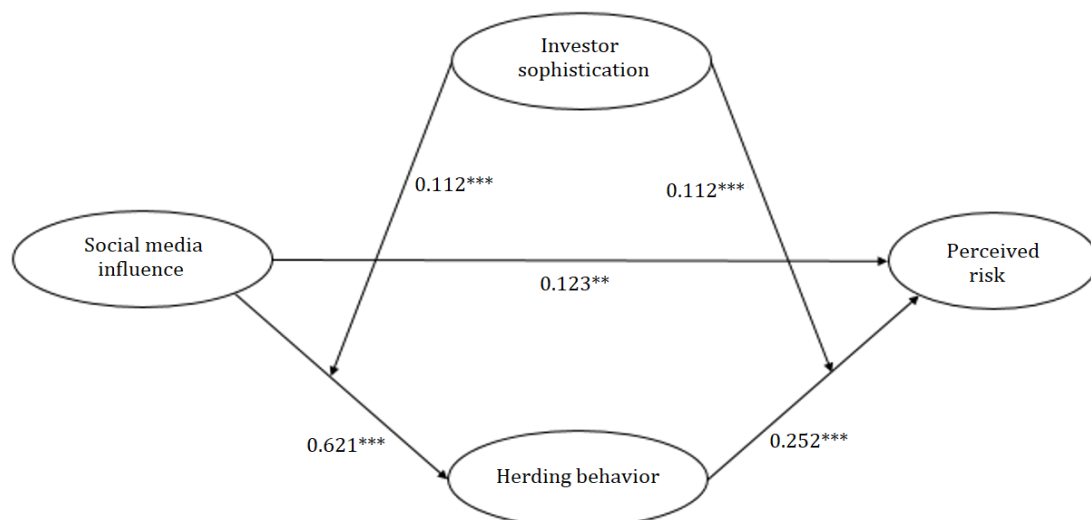


Figure 2. Research model.

Note: \*\*\*  $p$ -value  $< 0.001$ ; \*\*  $p$ -value  $< 0.05$ .

Figure 2 shows that social media influence has a positive and significant impact on perceived risk at a  $p$ -value  $< 0.05$  and on herding behavior at  $p$ -value  $< 0.001$ . Herding behavior has a positive and significant impact on perceived risk at  $p$ -value  $< 0.001$ . Investor sophistication can positively moderate (amplify) the impact of social media on herding behavior as well as the impact of herding behavior on perceived risk.

#### 4.2. Discussions

Social media influence has a positive and significant impact on perceived risk. It confirmed the first hypothesis that social media influence affects perceived risk. It implies that for millennial investors, the more they are influenced by social media, the more confused they become, and their understanding of risk becomes increasingly inaccurate. The more inaccurate their perception of investment risk, the further it deviates from the actual understanding of risk. This research supports the findings of Hossain and Siddiqua (2022) who stated that social influence played a large role in shaping perceived risk. Young investors often rely on social media for information and guidance to shape their perceived risks. For instance, social media platforms amplify herd behavior, whereby young investors follow trends without fully understanding risk. The vast amount of information available on social media can lead to confusion and misjudgment, which can distort perceived risk. Additionally, financial influencers can sway their opinions, potentially making young investors perceive investments as less risky. Social media often triggers emotional responses and clouded judgment and causes young investors to perceive risk differently.

Social media influence has a positive and significant impact on herding behavior. It confirmed the second hypothesis is that social media influence affects herding behavior. It implies that the more investors are influenced by social media, the more they will behave in herding. According to Bizzi and Labban (2019) social media is directly proportional to participation in online herding behavior. Trading platforms also amplify herding behaviors, as individuals instinctively mimic the decisions of the majority. Social media can significantly influence investment behavior because of the content encountered on these platforms (Investments, 2015). Young stock investors also influence herding behavior, as social media serves as their primary source of information and opinion. Yoon and Oh (2022) proposed that social media activity is the main factor that influences herding behavior. Zhou and Liu (2022) found that the rise and fall in Internet postings have unequal impacts on herd behavior, with an increase in Internet postings having a stronger influence. The rapid dissemination of market trends, opinions, and investment strategies can lead young investors to mimic the actions of others. This creates a bandwagon effect, where the desire to conform outweighs individual judgment, leading to herd behavior. The constant flow of information and the influence of social media personalities can amplify the effect since young investors may feel pressured to follow the crowd. However, herding behavior can be problematic, leading to misinformed investment decisions and contributing to market volatility. Social media can increase herding behavior by creating a feedback loop to distort market outcomes.

Herding behavior has a positive and significant impact on perceived risk. It confirmed the third hypothesis is that herding behavior affects perceived risk. It implies that the more investors behave in herding, the more they become unaware of risk practices; for example, they do not diversify their portfolio, hold risky stocks, and invest for a short period (trader). This was consistent with Yu et al. (2018) where herding behavior was related to a perceived risk. Deliberate herding tends to be inefficient, often marked by instability and unpredictability. This contributes to increased market volatility and poses a risk to the financial system (Bikhchandani & Sharma, 2000). According to Deka et al. (2023) herding behavior impacts on perceived risk. This variable can provide some protective benefits during periods of market stress but poses significant risks with the capacity to compromise stability and efficiency (Chen et al., 2021). Moueed and Hunjra (2020) reported that herding had a negative and significant relationship with perceived risk. Herding behavior, particularly in a market with prevalent information asymmetry, can significantly impact the perceived risk of young stock investors who follow the actions of others. This behavior created a collective bias, where perceived safety in numbers overshadows individual risk assessment, potentially

leading to poor investment decisions. Moreover, the tendency to conform to the actions of the majority reduces the incentives to conduct thorough research. The influence of herding behavior on perceived risk has been well documented in the literature, particularly in the context of developing markets, where investor education and access to reliable information may be limited.

Herding behavior can mediate the impact of social media influence on perceived risk. It confirmed the fourth hypothesis is that social media influence affects perceived risk mediated by herding behavior. It implies that the more investors engage in social media, the more they will behave in herding and consequently increase their perceived risk, which in this case they will underestimate risk. Herding behavior partially mediates social media influence on perceived risk because social media influence also significantly affects perceived risk directly. This finding is different from [Moueed and Hunjra \(2020\)](#) who stated herding behavior and social interaction have a negative and significant effect on perceived risk. In this context, herding behavior acts as a mediator between social media influence and perceived risk. Herding behavior is sometimes induced by social media, which increases the spread of investment trends and ideas. Observing others investing in a specific stock based on social media recommendations reduces perceived risk. Due to feedback loops created by this process, the impact of social media influence on perceived risk is amplified by increased herding behavior.

Investor sophistication can positively moderate the impact of social media influence on herding behavior. It confirmed the fifth hypothesis (5a) is that social media influence affects herding behavior moderated by investor sophistication. It implies that investor sophistication will strengthen the impact of social media influence on herding behavior. Investors in the stock market may be lured by the successes of others and prefer to capitalize on similar opportunities at the chance to make quick money ([Nath & Brooks, 2020](#)). A sophisticated investor with greater degrees of financial literacy, experience, and education is far more qualified to access social media content. When it comes to the way social media influences herding behavior, investor sophistication can be a component that amplifies this influence. Investors with greater experience might be better able to use data from social media. They possess the ability to evaluate the quality of information, spot market trends, and filter pertinent information. Thus, social media tends to have a greater favorable impact on herding behavior when proficiency is high. Investors with greater knowledge are able to move faster and in line with social media trends, which increases their propensity to imitate other investors' actions or follow market trends. High-skilled investors may become more prone to herding behavior as a result. Investor sophistication can positively moderate the impact of herding behavior on perceived risk. It confirmed the fifth hypothesis (5b) is that herding behavior affects perceived risk moderated by investor sophistication. It implies that investors sophistication will strengthen the impact of herding behavior on perceived risk. Herding behavior, perceived risk, and investment decisions are all significantly impacted by financial literacy ([Rahyuda & Candradewi, 2023](#)). The detrimental impact of behavioral bias on investment decisions was reduced by financial literacy ([Wangzhou et al., 2021](#)). To overcome bias, adequate training and education must be provided ([Ahmed et al., 2022](#)). It is possible that more experienced investors tend to lessen herding behavior, which lowers their sense of risk. They have a higher chance of comprehending the acceptable risks connected to an investment. Instead of following trends or group actions, which immediately lower perceived risk, they are able to estimate risk more realistically, measurably, and accurately based on facts and in-depth investigation. In general, more experienced investors are more confident in their ability to make judgments on their own. Because they believe they can access and control their own risks, their self-confidence enables them to avoid herding. Their perception of risk is generally more steady when herding has no effect on them. Investors can make more unbiased risk evaluations and be more critical of the information exposure.

## 5. CONCLUSIONS

In conclusion, social media has a significant impact on young stock investors' herd mentality and risk perception. Through herding behavior, the results show that social media influence directly affects perceived

danger. By diminishing and enhancing the influence of social media and herding behavior on perceived risk, investor sophistication also plays a significant moderating role. The impacts of social media on perceived risk can also be mediated by herding behavior. For stock investors and policymakers, it is essential to comprehend the relationship between social media influence, herding behavior, and perceived risk. Understanding the potential biases social media may create enables informed decision-making in this situation.

These results highlight that young investors must be able to think critically and be financially literate in order to examine the social media influence and refrain from basing their investing choices on herd mentality. Legislators need to develop ways to lessen social media's detrimental effects on financial markets. Policymakers can also provide training and education about social media usage and financial literacy; for example, workshops, e-books, and e-libraries. Financial educators should prioritize funding educational initiatives that raise the level of knowledge required to make wiser investment choices in light of these findings. In order to meet the unique issues of the digital age, financial institutions can also think about providing guidance or instructional materials. Knowledge of perceived risk can help design effective education programs. Financial literacy also changes perceived risk and helps investors make rational decisions. Good financial education reduces behavioral bias and improves investment decisions. Information on perceived risk-assisted financial companies designs products in line with the risk profiles of young investors. These customized products increased their participation in the financial markets. Understanding herding behavior could help regulators and market participants develop strategies to mitigate negative effects, such as promoting education and enhancing market transparency. This research provides a theoretical contribution to prospect theory, where perceived risk is influenced by internal and external factors, such as herding behavior and social media influence. Investor sophistication as a moderating factor contributes to financial literacy. Therefore, experience and education play a role in strengthening or weakening the relationship between social media influence, herding, and perceived risk.

This study used herding behavior as investor bias, and the relationship with social media influences perceived risk. Future research could also measure social influence and investor sophistication in a more detailed manner. The demographic profile was analyzed using multigroup analysis. In addition to herding behavior, other investor biases have been explored, such as overconfidence and disposition effects. Future research could investigate the role of investor sophistication in diverse contexts, such as different age groups, cultural backgrounds, or levels of market experience. Longitudinal research was used to track changes in the impact of social media influence as young investors gained more experience with the evolution of the digital landscape. Finally, interventions or educational strategies should be explored to reduce the negative effects of herding behavior and enhance the decision-making process.

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