





“Overconfidence bias among retail investors: A systematic review and future research directions”

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OVERCONFIDENCE BIAS AMONG RETAIL INVESTORS: A SYSTEMATIC REVIEW AND FUTURE RESEARCH DIRECTIONS

Abstract

This paper comprehensively evaluates the literature on retail investor overconfidence using a framework-based systematic approach to understand the various dimensions of overconfidence bias, its effect on investing choices, and market dynamics. A systematic review of 137 publications from the Scopus database have been done to detect the research trend concerning investor overconfidence bias from its inception. An integrated ADO-TCM framework has been employed to present a systematic analysis of the theory, context, and methodologies (TCM) employed in the reviewed studies. The ADO (Antecedents, Decisions, and Outcomes) framework thoroughly examines the antecedents, decisions, and results of investor overconfidence.

The study identified four broad sets of factors contributing to investor overconfidence, as found in the existing literature. These factors include demographic characteristics, personality traits of investors, their knowledge and experience, and the features of investments and investor types. The Prospect theory is the most popular theory in the literature, with much research using secondary data and experiment-based analysis. The prospective study directions, based on the gaps in the existing literature, are as follows: further investigation into the decision-making processes of overconfident retail and professional investors is a worthwhile subject. Future research may shift their focus from financial outcome variables to non-financial outcome variables such as the impact of investor overconfidence on individuals' stress levels, subjective financial well-being, and overall life happiness.

Keywords

investor overconfidence, ADO-TCM framework,
performance analysis, trading, cluster analysis,
bibliometric analysis

JEL Classification

G11, G41, G53

INTRODUCTION

Overconfidence in the financial arena remains an essential field of study in behavioral finance. The available literature has demonstrated the popularity and significance of overconfidence bias in investment and behavior (Benos, 1998; Kahneman & Riepe, 1998; Merkle, 2017; Nosić & Weber, 2010). Overconfidence is supreme faith in one's abilities (Odean, 1998a). Overconfidence is a form of cognitive bias in which an investor places greater emphasis on his or her knowledge, intuition, or strategy than is warranted by the available data or past results. Investor overconfidence can lead to underreaction and overreaction in stock prices (Daniel et al., 1998). Overconfident investors trade more frequently, and their trading expenses lower their returns (Barber & Odean, 2000; Odean, 1998b). In the financial context, overconfidence bias is critical in shaping investment decisions, risk assessment, and market dynamics. Overconfidence can play a negative role by underestimating risks (Odean, 1998a), inadequate portfolio diversification (Pak & Chatterjee, 2016), and ignoring professional advice (Hsu, 2022). Therefore, understanding and deconstructing the impact

of overconfidence is critical because it may lead to poor investment decisions, market bubbles, and, eventually, financial disasters (Glaser & Weber, 2010). When examining the influence of overconfidence on the trading behavior of investors, it becomes evident that it leads to diminished returns and affects the dynamics of the market. It is imperative to ascertain the underlying factors contributing to the manifestation of overconfidence bias.

1. LITERATURE REVIEW

By performing a co-citation analysis, the knowledge clusters pertaining to the literature on investor overconfidence were identified and literature has been divided into three clusters. This analysis operates under the assumption that the co-cited papers share a common theme (Tabash et al., 2023). This first cluster contributes to understanding the complex interplay between human psychology and financial decision-making. Articles in the first cluster examine the influence of behavioral biases in investor decision-making under uncertainty. Tversky and Kahneman (1974) laid the foundation for the study of decision-making in uncertain situations, where they demonstrated the three heuristics for gauging probability and generating predictions. Kahneman and Tversky (1979) presented a critical analysis of expected utility theory as a framework for risky decision-making and proposed an alternative model, “prospect theory,” that considers the psychological aspects of decision-making and provides a more precise description of how humans evaluate risky alternatives. Other papers in the cluster show how the disposition effect influences investment behavior (Odean, 1998a), and Baker and Nofsinger (2002) investigated common investment errors caused by an investor’s cognitive and emotional weaknesses and social factors influencing financial decisions. In subsequent research, researchers have identified three distinct overconfidence indicators: overestimation, over-placement, and over-precision. Over-precision has more durability than the other two forms of overconfidence, and its existence diminishes the extent of overestimation and overplacement (Moore & Healy, 2008). These papers contribute to understanding the complex interplay between human psychology and financial decision-making, providing valuable insights into the biases and behavioral factors that shape investment choices and market outcomes. Cluster 2 mainly discusses the impact of overconfidence on people’s trading behavior (Glaser & Weber, 2007; Grinblatt & Keloharju, 2009). Overconfidence can

manifest as excessive trading volumes and poor return on investment for retail investors (Barber & Odean, 2000). Investors who are overconfident in their abilities or who have a previous record of outperformance are more likely to make frequent trades (Glaser & Weber, 2007; Grinblatt & Keloharju, 2009) with increased volatility (Gervais & Odean, 2001). A couple of publications contained in this group also address the significance of financial literacy (Van Rooij et al., 2011) and self-awareness (Dorn & Huberman, 2005) for investors, as these attributes could help prevent overconfidence bias and risky behavior (Nosić & Weber, 2010). The third cluster focuses on overconfident traders’ impact on the financial market. Overconfidence resulting from excessive trading has been repeatedly linked to gender (women tend to be less overconfident), income, and formal education (Barber & Odean, 2001; Bhandari & Deaves, 2006; Odean, 1999). Overconfidence affects not only investment behavior but also the stock market. When traders are overconfident, they may trade more, resulting in increased market depth (liquidity) and more informative price signals (Benos, 1998; Odean, 1998b). Overconfidence may also increase market volatility and hinder market adjustment, and knowledgeable, overconfident traders may aggressively bring stock prices closer to actual values. (Odean, 1998b) Alternatively, noisy traders may push stock prices away from their actual values (Daniel et al., 1998). This compilation of scholarly articles provides valuable insights into the persistent impact of overconfidence on financial markets and decision-making when considered collectively. In summary, the process of investment decisions is influenced by psychological elements such as overconfidence, which in turn affects the trading behavior of investors and the overall financial market.

The purpose is to review and consolidate existing research on investor overconfidence, aiming to identify gaps, inconsistencies, and areas that require further investigation comprehensively and methodically.

2. METHOD

Systematic literature reviews are employed as a means of consolidating the information present in existing literature and identifying potential areas for further research. To explore the field, a bibliometric study is conducted which includes performance analysis, conceptual structure, and intellectual structure (Syed et al., 2023). Paul et al. (2017) proposed the Theories-Context-Methods (TCM) framework, while Paul and Benito (2018) produced the Antecedents-Decision-Outcome (ADO) framework.

This integrated framework is used in the analysis to identify gaps in the provided subject. Scopus was used to acquire the information since it has many double-blind peer-reviewed publications

published in high-impact factor journals. The final figure of 137 articles has been determined using a systematic approach, as illustrated in Figure 1. Post-screening, the data set was triangulated for data verification. Two researchers and a group of experts opined on the suitability of data. The present study uses Biblioshiny R software and VOSviewer software for bibliometric analysis.

Figure 2 represents the publication trends in research on investor overconfidence. Although 2023 was the most productive year, the field's research journey started in 2001. Less attention was paid to the overconfidence bias in the early research trends. However, overconfidence research in finance began to gain momentum in 2013, and since 2019, the number of papers published year has grown dramatically.

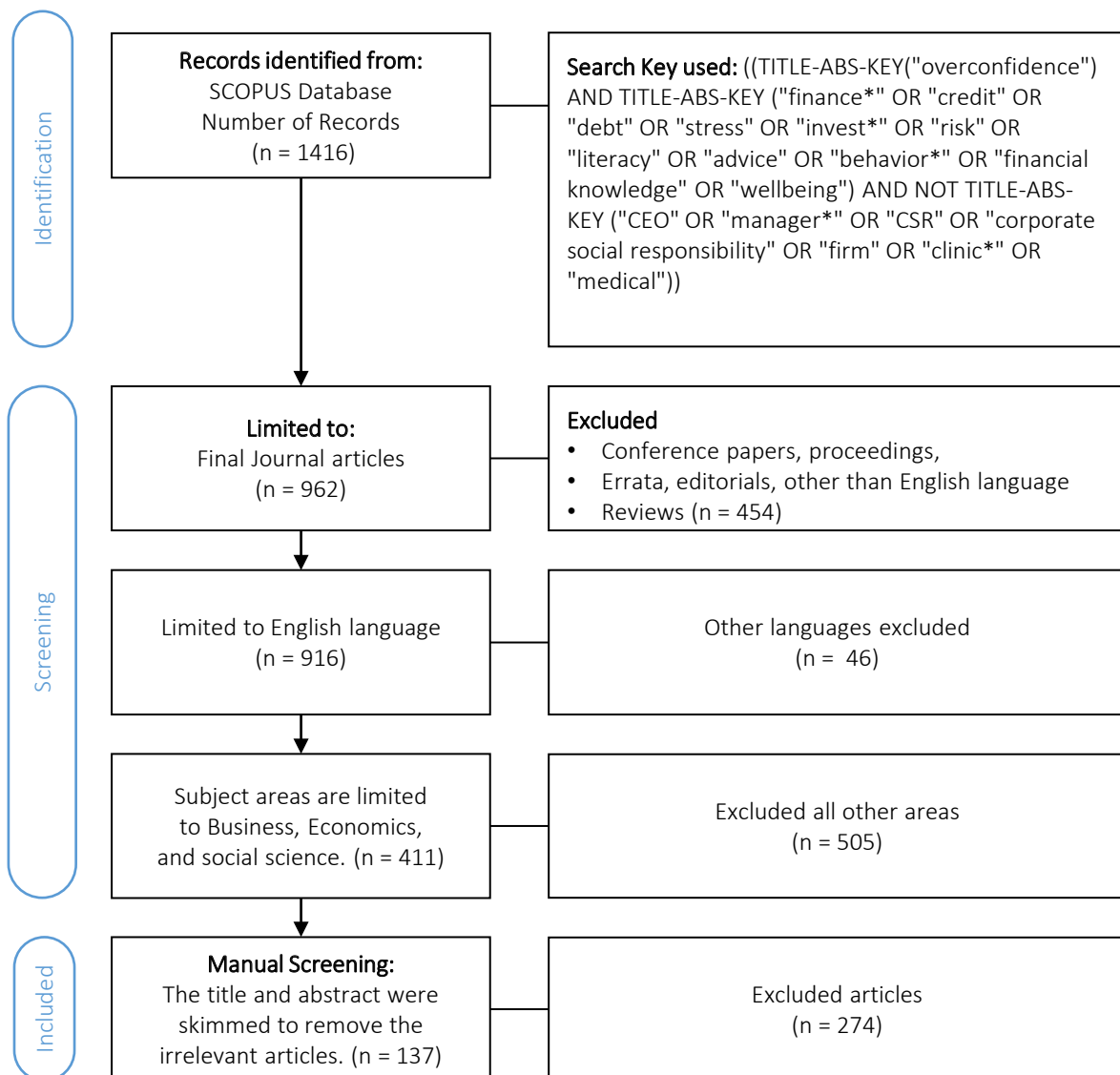


Figure 1. PRISMA diagram

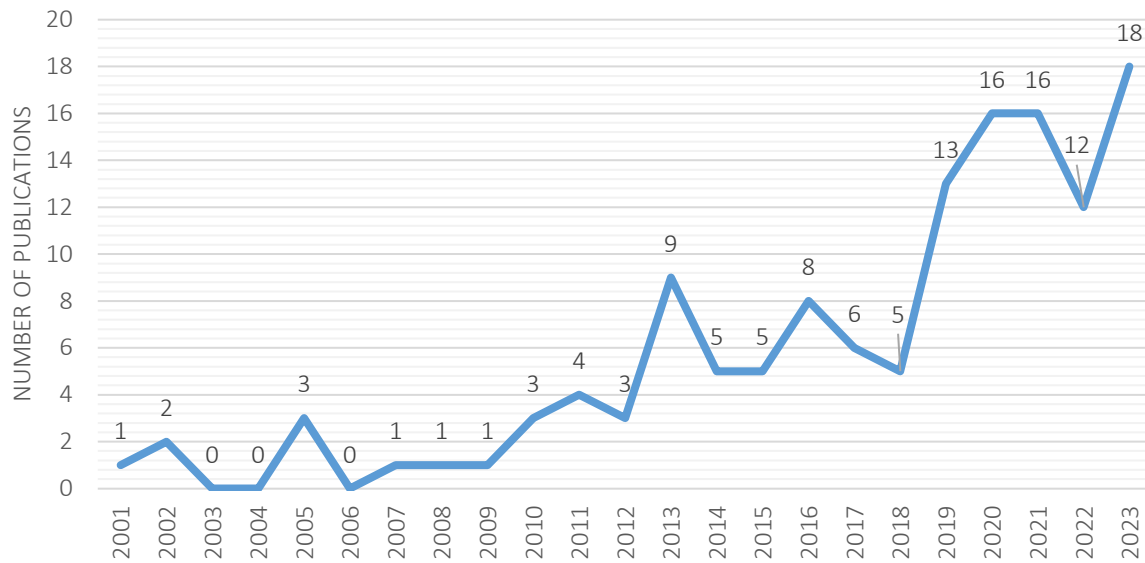


Figure 2. Publication trends

3. RESULTS AND DISCUSSION

This section discusses the primary data characteristics used for the current literature review. According to the retrieved Scopus dataset, the given field is developing at 14.04% per year, with a 19.7% international collaboration index and 21.73 average citations per document in literature. The 137 articles in the current review have 352 unique author keywords, representing 84 journals and 326 authors.

3.1. Most influential articles on overconfidence research

Table 1 provides insights into the most cited papers in this research domain. Topping the list is the paper titled “Judgmental Overconfidence, Self-Monitoring, and Trading Performance in an Experimental Financial Market” by Biais et al. (2005), boasting an impressive 215 citations. Following closely is the work of Deaves et al. (2009), who conducted an “Experimental test of the impact of overconfidence and gender on trading activity,” garnering 147 citations. Another noteworthy contribution comes from Nosić Weber (2010), with their research amassing 143 citations. Their paper, “How Riskily Do I Invest? The Role of Risk Attitudes, Risk Perceptions, and Overconfidence,” addresses critical aspects of the field. The prominence of all the papers listed in the table illustrates the enduring relevance of overconfidence in the

investment domain and its multifaceted dimensions explored by various scholars over the years. The study titled “How financial literacy and demographic variables relate to behavioral biases” holds the highest average citation count among papers in its field, indicating its potential to become the most cited work.

The central topics of discourse in the essential studies in Table 1 are discussions on calibration-based overconfidence bias and its impact on trading volume (Deaves et al., 2009; Pikulina et al., 2017) and risk behavior of investors (Breuer et al., 2014; Broihanne et al., 2014; Deaves et al., 2009; Nosić & Weber, 2010). Secondly, the overconfidence bias is subject to the influence of demographic characteristics, such as an individual’s gender, age (Baker et al., 2019), occupation (Menkhoff et al., 2013a), education, and investment experience (Mishra & Metilda, 2015). Literature provides empirical evidence and substantiated conclusions that males are more prone to overconfidence bias (Biais et al., 2005; Kumar & Goyal, 2016; Mishra & Metilda, 2015), and mixed findings on the effect of market experience and age on overconfidence bias (Menkhoff et al., 2013a; Mishra & Metilda, 2015).

3.2. Most influential authors

The identification of the most prominent authors on the subject has been facilitated through the utilization of four metrics: total citations, h-index, m-

Table 1. Leading articles on overconfidence research

| Paper Title | Total Citations | TC per Year |
|---|-----------------|-------------|
| "Judgmental overconfidence, self-monitoring, and trading performance in an experimental financial market" | 215 | 11.32 |
| "An experimental test of the impact of overconfidence and gender on trading activity" | 147 | 9.80 |
| "How riskily do I invest? The role of risk attitudes, risk perceptions, and overconfidence" | 143 | 10.21 |
| "Overconfidence and investment: An experimental approach" | 88 | 12.57 |
| "The dynamics of overconfidence: Evidence from stock market forecasters" | 87 | 6.21 |
| "Overconfidence, experience, and professionalism: An experimental study" | 68 | 6.18 |
| "How financial literacy and demographic variables relate to behavioral biases" | 68 | 13.60 |
| "Overconfidence, risk perception and the risk-taking behavior of finance professionals" | 62 | 6.20 |
| "Evidence on rationality and behavioral biases in investment decision making" | 62 | 7.75 |
| "Risk aversion vs. individualism: What drives risk-taking in household finance?" | 61 | 6.10 |
| "Overconfidence, overreaction and personality" | 59 | 5.36 |
| "A study on the impact of investment experience, gender, and level of education on overconfidence and self-attribution bias" | 58 | 6.44 |
| "Evaluation of behavioral biases affecting investment decision making of individual equity investors by fuzzy analytic hierarchy process" | 52 | 13.00 |
| "What factors affect behavioral biases? Evidence from Turkish individual stock investors" | 48 | 6.00 |

index, and total publications. Table 2 displays the top 15 authors arranged according to their total citations (TC). The author's h-index is regarded as a secondary criterion for determining the ranking of authors who possess the same count for TC. The M-index is used to highlight the contributions of newly established and emerging authors in the field. Deaves, Lüders, and Maciejovsky are well recognized as prominent authors in the discipline, with their research being frequently cited. In relation to the m-index, Rahman, Das, and Gerrans are emerging authors within the discipline with the potential to establish themselves as major figures in the future.

Table 2. Leading authors in overconfidence research

| Authors | TC | h_index | m_index | NP |
|---------------------------|-----|---------|---------|----|
| Deaves R | 234 | 2 | 0.133 | 2 |
| Lüders E | 234 | 2 | 0.133 | 2 |
| Maciejovsky B | 133 | 2 | 0.091 | 2 |
| Goyal N | 130 | 2 | 0.25 | 2 |
| Kumar S | 130 | 2 | 0.25 | 2 |
| Schmidt U | 93 | 2 | 0.182 | 3 |
| Alexandrova-Boshnakova MI | 49 | 1 | 0.077 | 1 |
| Gerrans P | 42 | 2 | 0.4 | 2 |
| Singh S | 42 | 2 | 0.333 | 2 |
| Chong L-L | 32 | 3 | 0.273 | 3 |
| Tan S-H | 32 | 3 | 0.273 | 3 |
| Rahman M | 32 | 2 | 0.5 | 3 |
| Das N | 29 | 2 | 0.5 | 2 |
| Abreu M | 20 | 2 | 0.333 | 2 |
| Akhtar F | 15 | 1 | 0.25 | 1 |

Note: TC: Total Citations, NP: Number of Publications.

3.3. Keyword analysis

Two methods have been used to carry out keyword analysis. Table 4 has been produced to focus on the most frequent keywords in the previous ten years, and a keyword map (Figure 3) depicting the top 50 keywords with at least two co-occurrences has been shown to illustrate the overall conceptual structure and to show the latest developments/keywords in the field. The map is valuable for recognizing major themes and emerging trends and comprehending the research landscape (Singh & Malik, 2022; Syed et al., 2023). In Figure 3 (Vos viewer output), the proximity of two terms represents the closeness of the keywords in the literature, and the size of the nodes represents their frequency. The strongly connected keywords with overconfidence bias are financial literacy, gender, disposition effect, investment, risk-taking, and trading activity.

Table 3 was prepared to highlight the latest developments in the field through author keywords used in the last ten years. The table exhibits all the author keywords duplicated within the sample papers included in the review.

3.4. Interrelation of overconfidence with other cognitive biases

Investment behavior is influenced by cognitive biases, leading investors to act contrary to financial and economic theories. These biases can skew judgment, alter risk perception, and lead to ac-

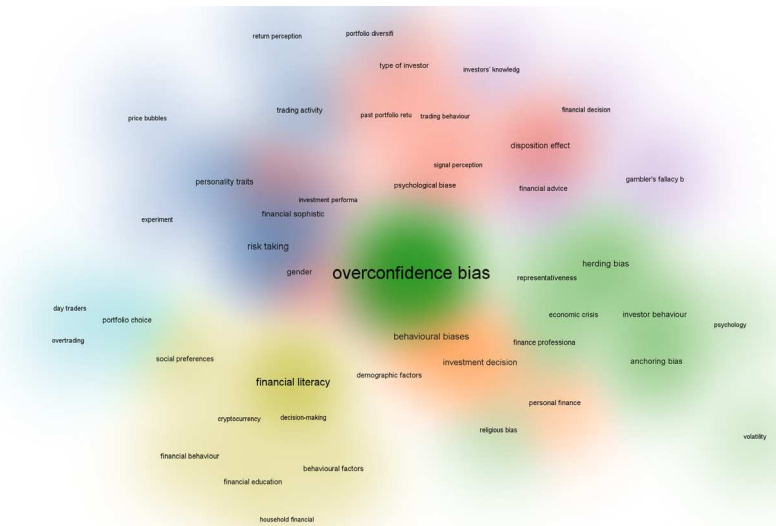


Figure 3. Keyword co-occurrence map

Table 3. Trends of author keywords in investor overconfidence in the last ten years (2014–2023)

| Author Keywords | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|--------------------------|------|------|------|------|------|------|------|------|------|------|
| Anchoring | 1 | | | | | 2 | 1 | 1 | | 2 |
| Behavioral Biases | | 2 | 1 | 2 | | 2 | 2 | 2 | 2 | 1 |
| Behavioral Factors | | | | | | 2 | 2 | 2 | 1 | |
| Behavioral Finance | | | | | 1 | 2 | 2 | 3 | 1 | 4 |
| Cognitive Bias | | | 1 | | | | | 1 | | |
| Covid-19 | | | | | | | | 1 | 1 | 1 |
| Cryptocurrency | | | | | | | | | 1 | 2 |
| Decision Making | | | | | | | 1 | 2 | | 1 |
| Demographic Variables | | | 1 | | 1 | 1 | 1 | | | 2 |
| Disposition Effect | 1 | 1 | 1 | | | 4 | | | | |
| Emerging Markets | | | 1 | | 1 | | | 2 | | 1 |
| Experience | | 1 | | | | 1 | | | 1 | |
| Experiment | | | 2 | | | 2 | 2 | | | |
| Financial Advice | | 1 | | | 1 | | | | 2 | 1 |
| Financial Behavior | | | | | | 2 | | | | |
| Financial Education | | | | | | 1 | | 3 | | |
| Financial Knowledge | | | | | | | | 1 | 1 | 1 |
| Financial Literacy | | 1 | 1 | 1 | 1 | 3 | 1 | 4 | 3 | 4 |
| Financial Risk Tolerance | | | | | 2 | 1 | 1 | | | 1 |
| Gender | | 1 | 1 | | | 1 | 1 | | | 1 |
| Herding Bias | | 1 | 1 | | | 1 | 1 | 3 | | 3 |
| Individual Investors | | 1 | 2 | | | 2 | 1 | 1 | 1 | 1 |
| Investment Performance | | | 1 | 1 | | | | 1 | 1 | |
| Investment Decision | | 1 | | | | | 3 | | 2 | 2 |
| Investor Behavior | 2 | | | | | | | 2 | | 1 |
| Loss Aversion | | | | | | 1 | | | | 2 |
| Mental Accounting | | | | | | 1 | | | 1 | |
| Optimism | | 1 | | | | | | | 1 | |
| Overestimation | | | 1 | 1 | | | | | | |
| Over precision | | | 1 | 1 | | | | | | |
| Personality Traits | | | 2 | | | 1 | 2 | 1 | | 1 |
| Psychological Biases | | | | 1 | | | | | 1 | 1 |
| Regret Aversion Bias | | | | | | | | 2 | | |
| Religiosity | | | | | | | 1 | | | 1 |
| Representativeness | | | | | | 1 | 2 | 1 | | |
| Risk Attitude | | | | | | | 1 | | | |
| Risk Aversion | 1 | | 1 | 1 | | 1 | | | | |
| Risk Perception | 1 | | | | | | | 1 | | |
| Risk Preferences | | | 1 | | | | | 1 | 1 | |
| Risk Taking | 2 | | | 1 | | | | 1 | | |
| Self-attribution Bias | | 1 | | | 1 | | | 1 | 2 | |
| Stock Market | | | | | | | 2 | | 1 | 1 |
| Trading Activity | 1 | | 1 | 1 | | 1 | 2 | | | |

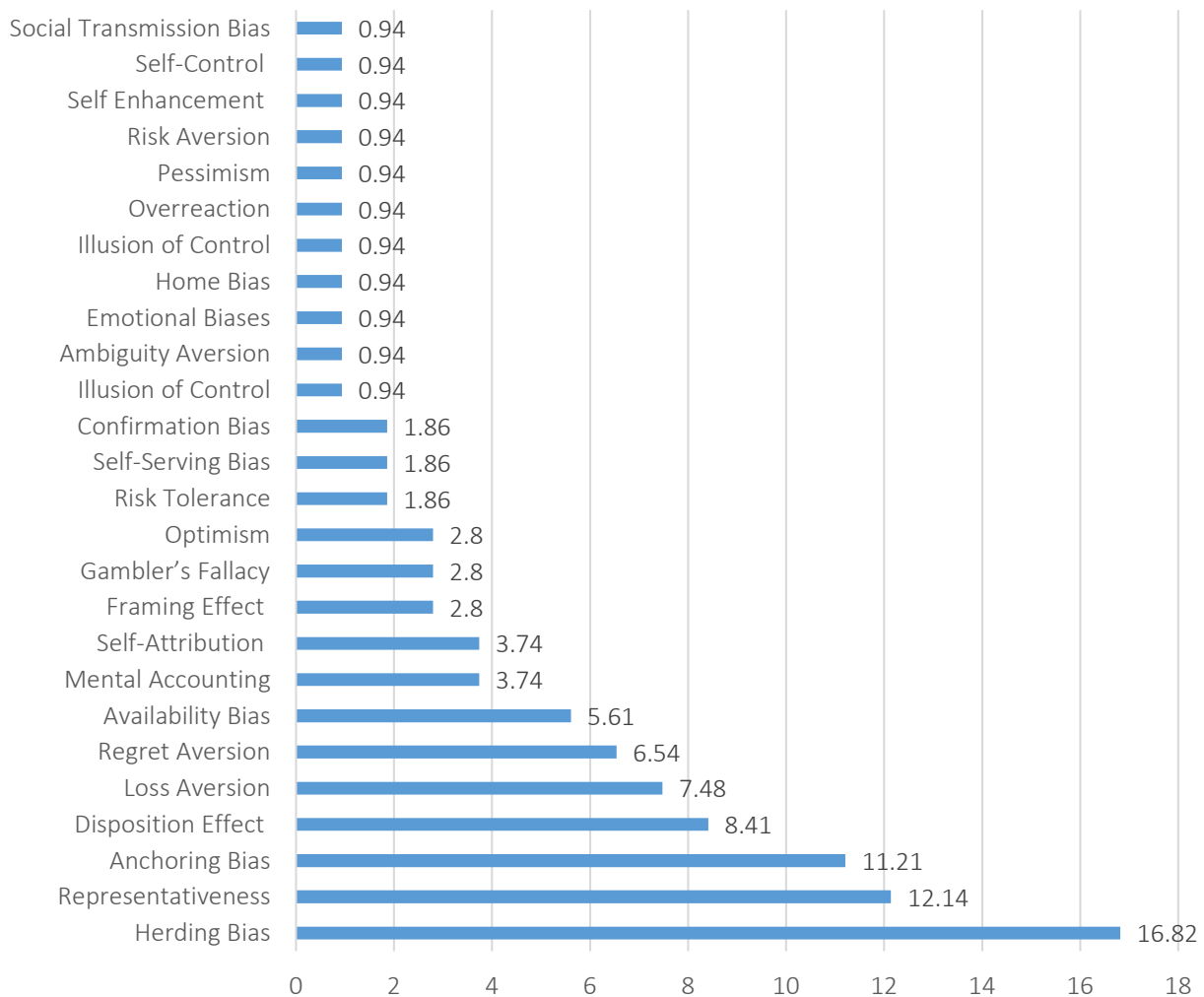


Figure 4. Percentage distribution of interrelated cognitive biases

tions not in the individual's best interests or the efficient market hypothesis. Overconfidence bias is one of the most significant cognitive biases affecting investment behavior. It is also deeply linked to other cognitive biases. Confirmation bias, self-attribution bias, the illusion of control, and optimism are predominant cognitive biases that can reinforce overconfidence bias. Figure 4 shows the percentage distribution of other interrelated 26 cognitive biases from the current review study on investor overconfidence. Retail equity investors are primarily influenced by herding bias, loss aversion bias, overconfidence bias, and regret aversion (Jain et al., 2019). According to Chen et al. (2007), 43% of investors show multiple biases; nevertheless, the study also shows that, while some biases have negative correlations with other biases, it is not always the case for one bias to influence another. However, the literature has sufficient evidence on the interrelationship between these biases, like

the disposition effect can be exacerbated by overconfidence (Chu et al., 2012).

3.5. Theories-context-methods (TCM) framework

This study used the TCM (Paul & Rosado-Serrano, 2019) framework to understand the theoretical underpinnings and the broader context of investor overconfidence while shedding light on its distinctive qualities. It begins by examining the theoretical landscape of overconfidence research, focusing on this discipline's commonly used theoretical foundations. Next, the geographical scope of overconfidence research is investigated, focusing on the nations where such studies have been conducted. The TCM framework has been presented in the three following paragraphs each representing theories used, context of the publications and methods used by the authors.

Ahmad and Shah (2020) have employed the heuristics theory to elucidate the cognitive processes by which individuals employ mental shortcuts and rules of thumb in financial decision-making. The seminal work of Tversky and Kahneman (1974) established a connection between heuristics and cognitive biases. Individual investment choices are influenced by one's disposition toward cognitive biases like loss aversion and regret aversion (Goyal et al., 2023). Loss aversion is the theoretical foundation for prospect theory, which explains why people react more strongly to losses than gains of equal magnitude. The foundation of many current asset pricing models, such as CAPM and APT, relies on Utility theory principles. However, Kahneman Tversky (1979) conducted experiments that presented evidence contradicting the Utility theory. Prospect theory explains how cognitive states substantially impact subjective decision-making (Waweru et al., 2008). The vital role of prospect theory has been very well explained in the studies under review, like they have widely recognized prospect theory to investigate the role of overconfidence in investors' behavior. The works under examination (Duy Bui et al., 2021; Sabir et al., 2019) provide thorough explanations of the significance of prospect theory. Other theories closely related to this field include behavioral finance theory and cognitive theory (Adel & Mariem, 2013; Grežo, 2021), which have been extensively utilized in this study area. The other two essential theories in this research domain are attribution bias theory and social learning theory. The theory of attribution bias states that overconfident persons may distort judgments by attributing their failures to outside forces and crediting their talents for their achievements (Czaja & Röder, 2020; Koo & Yang, 2018). When paired with overconfidence studies, it shows how humans tend to overestimate their knowledge and abilities, which can influence financial judgments.

The conditions and political or economic backdrop in which a study is conducted are called its context (Lim et al., 2021). This review uses countries and investment markets as a context to categorize the papers under discussion (Bhatia et al., 2021; Sharma et al., 2020). Table 4 displays the country contexts under which the

studies have been conducted. India, the USA, and Australia have taken the lead in exploring overconfidence research. Consequently, there is a call for other countries to expand their research efforts in financial overconfidence. There needs to be more cross-country research in this domain. This review reveals that most of the studies are conducted on the stock market except two studies on cryptocurrency (Alves, 2023; Osakwe et al., 2022) and one on the currency market (Oberlechner & Osler, 2012), indicating the scope of research on the crypto market, currency market, and other securities.

Table 4. Percentage distribution of overconfidence studies in the top 10 countries

| Country | Percentage Distribution |
|-----------|-------------------------|
| India | 12.71% |
| USA | 11.86% |
| Australia | 10.17% |
| Indonesia | 5.93% |
| Germany | 5.08% |
| Pakistan | 5.08% |
| Malaysia | 5.08% |
| China | 4.24% |
| Brazil | 2.54% |
| Taiwan | 2.54% |

Previous studies on investor overconfidence have utilized various approaches to understand this multifaceted issue comprehensively. Research using descriptive methods was conducted to highlight the prevalence and characteristics of overconfidence across various demographic groups in financial matters (Chen et al., 2022). Correlational research helped determine the links between overconfidence investing performance and risk-taking (Hassan et al., 2014). Several quasi-experimental studies examined the causal links between treatments or events and financial overconfidence (Piehlmaier, 2022). In contrast, experimental research lets researchers manipulate variables and assess their effects on participant overconfidence. Experimental analyses have dominated overconfidence research.

3.6. Antecedents in ADO framework

This section represents antecedents of overconfidence in ADO framework. Table 5 displays the

percentage distribution of the antecedents of investor overconfidence in the current review. The investigation identifies 44 distinct antecedents of investor overconfidence bias from the literature. The antecedents used in the studies under consideration are divided into three groups: antecedents related to the demographic characteristics of the investors, antecedents related to the investor's knowledge and experience, and antecedents related to investment features and investor type.

The investors' demographic characteristics are covered under this category. When it comes to their investment habits, male and female investors differ from one another. The difference in trading volume between male and female investors is caused by the tendency for male investors to regard themselves as more overconfident than their female counterparts (Jiang et al., 2020; Wilaiporn et al., 2021). Males likely exhibit a greater propensity than females to overstate their level of financial knowledge (Baker et al., 2019; Barber & Odean, 2001). It is generally believed that older adults are more likely to have overconfidence bias; one of the studies (Pak & Chatterjee, 2016) investigated the age-related increase in overconfidence and its impact on the retirement portfolio. Contrary to this, a negative association was established between age and overconfidence bias (Wilaiporn et al., 2021), and there was no association between age and overconfidence (Kansal & Singh, 2018) as the individual's capability may not depend on age. Thus, the relationship between age and overconfidence seems unclear (Menkhoff et al., 2013b). Education level is another critical demographic variable shaping the overconfidence of an investor, and overconfidence increases with education level (Bhandari & Deaves, 2006). Personality always plays a significant role in an individual's decision-making. Under risk and uncertainty, psychological factors can cause people to stray from rational decision-making processes by displaying cognitive biases (Kahneman & Tversky, 2013). Investors' psychological characteristics, or personality traits, influence their proclivity to display cognitive biases during the investing selection (Lin, 2011). Evidence from the literature supports the idea that personality is associated with overcon-

fidence (Suchanek, 2021). Overconfidence is common among persons with high levels of extraversion (Pan & Statman, 2013). Extraversion has a robust positive effect on overconfidence (Kleine et al., 2016).

The researchers identified a significant discrepancy in financial literacy levels between females and males (van Rooij et al., 2011). Similarly, Wilaiporn et al. (2021) established a negative association between financial knowledge, experience, income level, and overconfidence bias. The influence of trading and investment experience on the overconfidence bias has yielded varying outcomes. Some studies (Gervais & Odean, 2001; Menkhoff et al., 2013b) have reported a negative relationship between experience and overconfidence bias, whereas other studies (Baker et al., 2019; Bhandari & Deaves, 2006; Glaser & Weber, 2007) have reported a positive association; experienced people are more prone to overconfidence. According to Odean (1998), investors' overconfidence is correlated with their historical returns. Investors with previous investing successes tend to need more confidence (Gervais & Odean, 2001). The impact of past perceived portfolio gains on investors' overconfidence can be elucidated by their inclination to concentrate on their past portfolio returns (Merkle, 2017). However, they credit these favorable results to their personal investment expertise, experience, performance, and the quality of information available (Khan et al., 2017).

The changes and growth of the overconfidence bias can also be attributed to the profession of the investor and the investor. It is observed that intraday traders are more vulnerable to overconfidence (Prosad et al., 2015) as trade frequency has a positive impact on overconfidence.

Profession affects optimism and overconfidence (Prosad et al., 2015), and Menkhoff et al. (2013) have demonstrated significant variations between the overconfidence of a professional and typical individual investor. The study by Jaiyeoba et al. (2019) reveals that institutional and individual investors demonstrate similar psychological biases, such as overconfidence.

Table 5. Percentage distribution of the antecedents

| Antecedents | Percentage |
|----------------------------|------------|
| Age | 15.93 |
| Gender | 13.27 |
| Income | 8.85 |
| Financial Literacy | 6.19 |
| Personality Traits | 5.31 |
| Experience of Investor | 3.54 |
| Profession of Investor | 3.54 |
| Education level | 3.54 |
| Past Portfolio Returns | 2.65 |
| Expected return | 2.65 |
| Marital Status | 1.77 |
| Risk Attitude | 1.77 |
| Financial Education | 1.77 |
| Type of Investor | 1.77 |
| Investment Experience | 1.77 |
| Private Information | 1.77 |
| Diversification | 1.77 |
| Risk Perception | 0.88 |
| Frequency of Trade | 0.88 |
| Accuracy of predictions | 0.88 |
| Past Investment Experience | 0.88 |
| Investment Performance | 0.88 |
| COVID19 | 0.88 |
| Investment Expertise | 0.88 |
| Financial Advice | 0.88 |

3.7. Decision variables in the ADO framework

This section represents decision variables in overconfidence literature and is one of the constituents of the ADO framework. The decisions that investors make show how they act when they are affected by overconfidence bias. Table 6 displays the percentage distribution of the decision variables in the study. Overconfidence can reduce portfolio diversification and increase risky decision-making (Merkle, 2017). The presence of overconfidence in individuals' financial expertise leads to suboptimal financial decision-making, ultimately culminating in adverse personal financial outcomes. According to Breuer et al. (2014), a correlation exists between overconfidence and individuals' decision to invest in financially precarious assets. An overconfident investor may place a disproportionate amount of their capital in a few assets or industries because they are sure they have located profitable investments (Pak & Chatterjee, 2016). These individuals may engage in aggressive investment strategies by allocating a significant portion

of their portfolio to high-risk assets. The studies conducted by Barber and Odean (2000, 2001) and Odean (1999) yielded comparable findings, indicating that investors with excessive confidence tend to participate in extensive trading activities inside financial markets.

Table 6. Percentage distribution of the decision variables

| Decision Variables | Percentage |
|---------------------------|------------|
| Investment Decision | 27.27 |
| Risk Taking | 11.36 |
| Investment Behavior | 9.09 |
| Overtrading | 9.09 |
| Avoiding Financial Advice | 6.82 |
| Risky Investment | 4.55 |
| Decision in Crypto Assets | 4.55 |
| Portfolio Allocation | 4.55 |
| Number of Trades | 4.55 |
| Under Diversification | 4.55 |
| Savings Decision | 2.27 |
| Financial Behavior | 2.27 |
| Portfolio Turnover | 2.27 |
| Speculative Trading | 2.27 |
| Risk Propensity | 2.27 |
| Financial Decision | 2.27 |

Table 7. Percentage distribution of the outcome variables

| Outcome Variables | Percentage |
|--------------------------|------------|
| Trading Volume | 15.00 |
| Investment Performance | 15.00 |
| Reduction in Performance | 10.00 |
| Stock Price Bubbles | 10.00 |
| Forecast Accuracy | 10.00 |
| Market Outcomes | 5.00 |
| Returns | 5.00 |
| Financial Autonomy | 5.00 |
| Profit | 5.00 |
| Stock Investment Return | 5.00 |
| Income Earned | 5.00 |
| Trading Activities | 5.00 |
| Increase in Trading | 5.00 |

3.8. Outcome variables in the ADO framework

This section represents outcome variables in overconfidence literature and is one of the constituents of the ADO framework. Table 7 shows the percentage distribution of the outcome variables used in the studies under review. In the seminal work of Tversky Kahneman (1974), it was found that en-

hanced overconfidence among individual investors had a detrimental impact on stock markets, resulting in inadequate and unfavorable outcomes. The phenomenon of overconfidence has been observed to exert various impacts within the domain of trade. There are two primary observations about the impact of overconfidence on trading behavior. Firstly, it has been shown that overconfidence tends to increase the expected trading volume. Secondly, traders who exhibit overconfidence experience

a decrease in their predicted utility. This finding has been supported by Wilaiporn et al. (2021). Investors who are overly confident in their ability to time the market or choose winning stocks are prone to excessive purchasing and selling (Khan et al., 2016). Poor market timing can increase transaction costs and lower returns (Statman et al., 2006). The markets with overconfident investors have witnessed price bubbles and intense trading volumes (Michailova & Schmidt, 2016).

CONCLUSION

This hybrid systematic review uses bibliometric methods and content analysis to synthesize the vast financial overconfidence literature using the ADO-TCM framework. This review combines bibliometric and content analysis to better comprehend financial overconfidence research's important contributors, such as journals, authors, and publications. These analytical methods help one grasp overconfidence's many facets and financial decision-making implications. Furthermore, the review delves into the content analysis using the ADO-TCM framework, allowing for a systematic exploration of the prominent theories, geographical contexts, and methodological approaches employed in overconfidence research. By examining the theoretical underpinnings, geographic variations, and methodological innovations in this field, this study aims to provide a comprehensive overview that informs future research directions and practical applications.

Future research on overconfidence in financial decision-making should focus on further exploring and integrating various psychological and financial theories. Researchers should continue synthesizing and integrating psychological theories such as prospect theory, behavioral finance theory, heuristics theory, cognitive theory, and attribution bias theory. This interdisciplinary approach can provide a more holistic understanding of the factors contributing to investor overconfidence. In terms of study context (Table 4), this analysis found that most research comes from advanced nations and is based on a single nation. Future studies could concentrate on comparing overconfidence bias across countries. This will aid in investigating the impact of religious beliefs and cultural differences on overconfidence bias across countries. One can better grasp the global impact of overconfidence in financial decision-making if we conduct studies to identify the cultural factors contributing to this phenomenon. However, a promising opportunity also exists in exploring this phenomenon within the contexts of cryptocurrency, commodities, and currency markets. The review study reveals that the articles examined predominantly utilize classical statistical approaches, such as regression, ANOVA, and factor analysis, for data analysis. Furthermore, the literature is primarily dominated by experimental research. In the future, researchers can undertake big-data analytics using advanced techniques such as supervised and unsupervised machine learning and artificial neural network approaches to understand overconfidence bias better. More qualitative work (e.g., in-depth interviews, observations, discourse analysis, laddering techniques, and qualitative comparative analysis). To further clarify the causal relationship between ADO, this review calls for more longitudinal research along the life path of individuals.

Further investigation may be conducted to explore the impact of antecedents that have been relatively understudied in the existing body of literature. For example, an investigation may be undertaken to comprehend the changes in overconfidence amidst the economic downturn and geopolitical events like the Russia-Ukraine war. There is a need for more research to evaluate the impact of technologies, such as simulations and robo-advisors, on exacerbating or mitigating overconfident behavior. The data presented in Table 6 indicate that a significant proportion of the literature on overconfidence has employed

risky asset allocation and excessive trading as decision variables. The distinction between the decision-making processes of overconfident retail and professional investors is a worthy topic for further study. Another potential domain of inquiry pertains to examining decision variables influencing investors in the cryptocurrency and commodities market. According to Table 7, most of the reviewed articles mainly assessed the impact of overconfidence on investment returns and market volatility. The focus of future studies may move from financial outcome variables to non-financial outcome variables. This covers the consequences of investor overconfidence on their stress, subjective financial well-being, and life satisfaction.

Despite following the necessary protocol and conducting an exhaustive literature review, this study has certain limitations. First, only the SCOPUS database is used for bibliometric analysis research. In subsequent studies, investigators might look at articles sourced from single or numerous databases, such as Web of Science or EBSCO. Second, there is a possibility that particular research has been omitted due to the use of filters and keywords.

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