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Investor Sentiment and Market Dynamics : A Bibliometric Analysis of Behavioral Finance Research in the Digital Era

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ABSTRACT

This study presents a bibliometric analysis of global research on investor sentiment, a central construct in behavioral finance that examines how the collective psychology of market participants shapes asset prices and market dynamics. Drawing on 428 documents indexed in the Scopus database, the analysis employs VOSviewer to construct keyword co-occurrence, overlay, and density visualizations that map the intellectual structure, temporal evolution, and research intensity of the field. The findings show that investor sentiment and behavioral finance form the conceptual core of the literature, closely tied to established themes such as stock market behavior, market efficiency, volatility, and overconfidence. The overlay analysis reveals a marked thematic shift in recent years toward computational and data-driven approaches, including machine learning, sentiment analysis, natural language processing, and deep learning, reflecting the growing influence of digital technologies and social media data on sentiment measurement. Density analysis confirms that investor sentiment and behavioral finance remain the most intensively researched constructs, while machine-learning-based sentiment analysis constitutes an emerging frontier. Citation analysis further identifies the most influential publications shaping the field's development. Collectively, these findings provide a comprehensive map of investor sentiment research and highlight promising directions for future inquiry at the intersection of behavioral finance and digital analytics.

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A. INTRODUCTION

Investor sentiment refers to the collective beliefs and expectations of market participants about future cash flows and investment risks that are not fully justified by available fundamental information (Zhou, 2018). As a core construct of behavioral finance, investor sentiment challenges the traditional efficient market assumption that asset prices fully and rationally reflect fundamental value, proposing instead that waves of optimism and pessimism among investors can systematically drive prices away from their intrinsic levels (Mujtaba Mian & Sankaraguruswamy, 2012). This perspective has reshaped the way scholars understand market dynamics, positioning psychological and emotional factors alongside fundamental variables as legitimate drivers of price formation, trading volume, and volatility.

The theoretical foundations of investor sentiment research are deeply rooted in behavioral finance, a field that emerged in response to persistent anomalies that classical asset pricing models could not adequately explain (López-Cabarcos et al., 2020). Early empirical work demonstrated that sentiment proxies derived from trading behavior, mood indicators, and calendar effects could systematically predict stock returns, as illustrated by evidence on holiday and religious-calendar effects on trading activity (Białkowski et al., 2012) and by studies linking historical crisis and war events to abrupt sentiment-driven repricing of equities (Hudson & Urquhart, 2014). These contributions established that investor sentiment is not a peripheral anomaly but a persistent and measurable force shaping financial markets across time and geography.

Over the past decade, the digital era has fundamentally transformed how investor sentiment is measured and studied. The proliferation of social media platforms, financial news aggregators, and large-scale textual data has enabled researchers to move beyond traditional market-based sentiment proxies toward direct, high frequency measurement of investor mood using computational techniques (Bukovina, 2016). Advances in machine learning and natural language processing have further allowed scholars to extract sentiment signals from unstructured sources such as news articles, online forums, and even images, broadening the empirical toolkit available for sentiment research (Obaid & Pukthuanthong, 2022). This methodological evolution has produced a rapidly expanding and increasingly interdisciplinary body of literature spanning finance, accounting, computer science, and information systems.

Despite this growth, comprehensive bibliometric mapping of the investor sentiment literature that captures both its theoretical foundations and its digital-era transformation remains limited. Prior bibliometric studies of behavioral finance have offered useful overviews of the broader field (Paule-Vianez et al., 2020) and of its thematic evolution (Alam et al., 2025), yet a focused, large scale mapping of investor sentiment research that explicitly traces the shift toward computational sentiment measurement has not been fully established. This gap motivates a structured bibliometric investigation capable of revealing the field's intellectual core, its thematic clusters, and the trajectory of its development.

The present study addresses this gap through a bibliometric analysis of investor sentiment research indexed in Scopus, employing VOSviewer to generate network, overlay, and density visualizations of keyword co-occurrence. The study aims to identify the dominant thematic clusters within the literature, trace the temporal evolution of research themes from foundational behavioral finance concepts to digital era computational methods, and determine the most influential publications shaping the field. By mapping the intellectual structure of investor sentiment research, this study provides scholars and practitioners with a systematic understanding of how the field has developed and where future research is likely to advance.

B. RESEARCH METHOD

This study employs a bibliometric research design to systematically map the global research landscape on investor sentiment and its connection to market dynamics in behavioral finance. Bibliometric analysis offers an objective, quantitative, and reproducible approach for examining the structure and

evolution of a scientific field by analyzing publication patterns, citation relationships, and keyword co-occurrence networks, thereby reducing the subjectivity often associated with traditional narrative literature reviews. The research procedure comprised three sequential stages: data collection, data preparation, and bibliometric visualization and analysis.

Bibliographic data were retrieved from the Scopus database, chosen for its extensive and rigorously curated coverage of peer-reviewed publications in finance, economics, accounting, and information systems. The search was conducted using the keyword "investor sentiment" applied to article titles, abstracts, and keywords, without restricting document type or subject area, in order to capture the full breadth of theoretical, empirical, and computational contributions to the field. The retrieved dataset spans publications from 2006 to 2026, capturing both the foundational period of behavioral finance research on investor sentiment and its recent digital-era expansion.

Following extraction, the dataset was screened to remove records lacking essential bibliographic information required for co-occurrence analysis. The resulting dataset, comprising 428 documents exported from Scopus in RIS format, served as the analytical basis for the study. Bibliometric mapping was performed using VOSviewer, a software tool specifically designed to construct and visualize bibliometric networks based on keyword co-occurrence. A minimum co-occurrence threshold was applied to retain only keywords with sufficiently strong and meaningful associations, and the resulting network was examined through three complementary visualizations: the network map, depicting thematic clustering among keywords; the overlay map, illustrating the temporal evolution of research themes based on average publication year; and the density map, representing the relative concentration and intensity of research activity around each keyword node.

Citation analysis was additionally conducted to identify the most influential publications within the investor sentiment literature, ranked according to total citation counts as recorded in Scopus. This analysis complements the visualization-based findings by highlighting specific scholarly contributions that have most significantly shaped the intellectual trajectory of investor sentiment research. Together, these analytical procedures provide a multi-dimensional view of the field's conceptual structure, temporal dynamics, and most influential works.

C. RESULTS AND DISCUSSION

Keyword Co-Occurrence Analysis

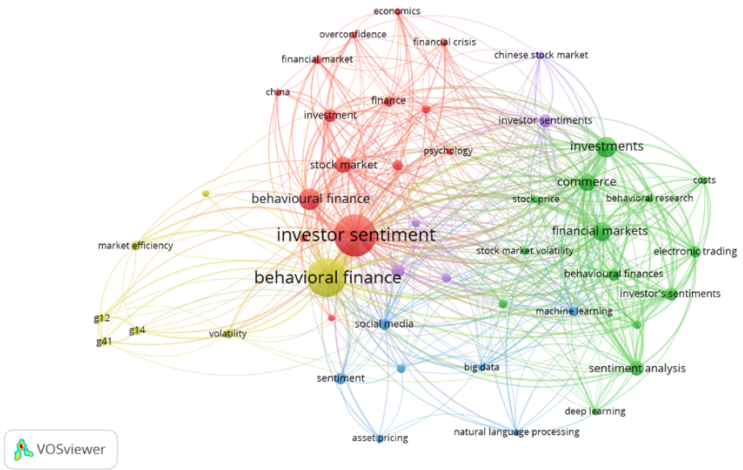

Figure 1. Network Visualization
Source: Data Analysis

Figure 1 presents the keyword co-occurrence network constructed from the investor sentiment dataset. The map reveals a densely interconnected structure organized into four major thematic clusters, distinguished by color, with node size reflecting keyword frequency and edge thickness reflecting the strength of co-occurrence between keyword pairs. Investor sentiment and behavioral finance occupy the most prominent and central positions in the network, confirming their status as the primary conceptual anchors of the field.

The red cluster, positioned in the upper region of the map, groups together economics, overconfidence, financial crisis, financial market, china, investment, finance, and stock market. This cluster represents the theoretical and macro-financial dimension of investor sentiment research, capturing studies that connect sentiment with behavioral biases such as overconfidence and with broader financial market conditions, including crisis episodes and country-specific contexts such as China (Hudson & Urquhart, 2014). The yellow cluster, centered on investor sentiment, behavioral finance, market efficiency, volatility, and sentiment, represents the foundational core of the literature, reflecting the field's origins in challenging the efficient market hypothesis and explaining return volatility through sentiment-driven trading behavior (Zhou, 2018).

The green cluster, located on the right side of the network, encompasses investments, commerce, financial markets, stock price, behavioral research, costs, electronic trading, behavioural finances, investor's sentiments, machine learning, and sentiment analysis. This cluster reflects the field's growing engagement with market microstructure, trading mechanisms, and increasingly, computational methods for extracting sentiment signals from financial and textual data (Obaid & Pukthuanthong, 2022). The blue cluster, situated at the bottom of the map, groups social media, big data, asset pricing, natural language processing, and deep learning, representing the most technologically driven segment of the literature, in which investor sentiment is measured through large-scale digital data sources and advanced computational techniques (Bukovina, 2016). Together, the four clusters illustrate that investor sentiment research bridges behavioral theory, market dynamics, and digital analytics within a single, tightly integrated knowledge structure.

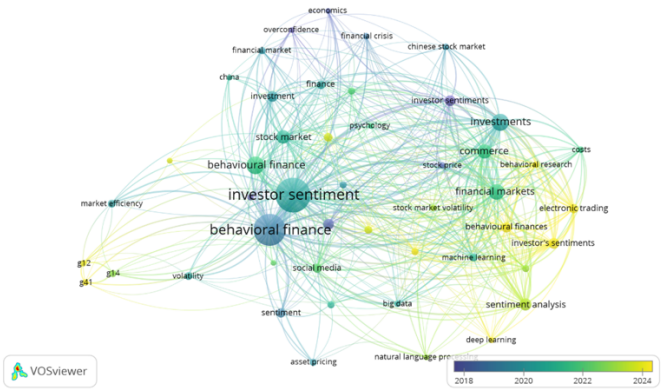

Figure 2. Overlay Visualization
Source: Data Analysis

Figure 2 presents the overlay visualization, in which node color indicates the average publication year of articles associated with each keyword, ranging from dark blue and purple (earlier years, around 2018 and before) to green and bright yellow (more recent years, 2022–2024). Keywords shown in darker blue-purple tones, including investor sentiments, psychology, overconfidence, and financial crisis, represent the field's earliest and most established research themes, consistent with foundational behavioral finance work linking sentiment with cognitive biases and crisis-driven market behavior (López-Cabarcos et al., 2020).

Keywords rendered in intermediate green tones, such as stock market, behavioural finance, investor sentiment, and social media, indicate themes that have remained consistently active throughout the

study period, reflecting the sustained centrality of core behavioral finance concepts even as the field has expanded. In contrast, keywords displayed in bright yellow, including machine learning, sentiment analysis, deep learning, electronic trading, and investor's sentiments, signal the most recently active research themes. This pattern demonstrates that investor sentiment research has undergone a pronounced thematic shift toward computational and digital-era methods, as scholars increasingly leverage artificial intelligence and large textual datasets to measure sentiment with greater precision and at higher frequency (Obaid & Pukthuanthong, 2022). The overlay map thus captures a clear evolutionary trajectory, from theory-driven behavioral constructs toward data-intensive, technology-mediated approaches to sentiment measurement.

This temporal progression also reflects a broader epistemological shift in investor sentiment research, from sentiment understood as a psychological construct measured indirectly through market proxies, toward sentiment measured directly through real-time textual and behavioral data. Early-stage themes related to psychological mechanisms and crisis contexts indicate that initial research focused on explaining anomalous market behavior through cognitive and emotional biases, while more recent themes signal a shift toward how sentiment can be measured and modeled with greater accuracy and speed through computational approaches. This suggests that future research is likely to continue developing at the intersection of behavioral finance and artificial intelligence.

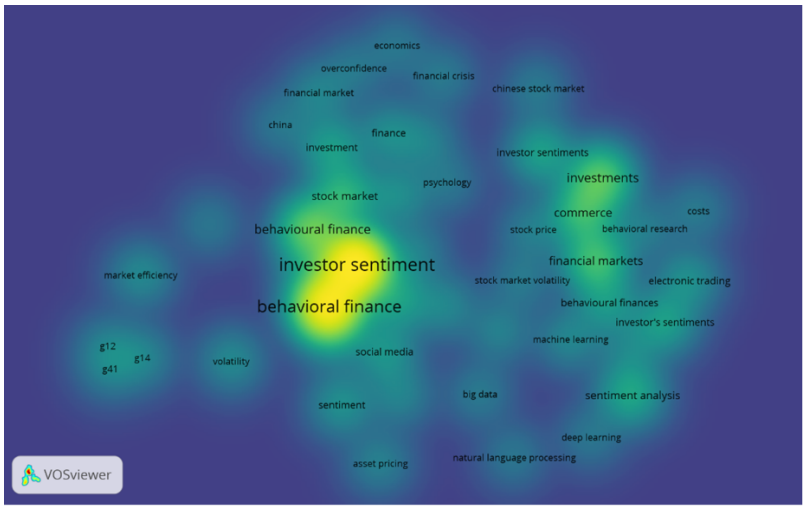

Figure 3. Density Visualization
Source: Data Analysis

Figure 3 presents the density visualization, in which bright yellow regions indicate the highest concentration of keyword co-occurrence and research intensity, while green and blue regions represent progressively lower density. The most intensively studied region of the literature is concentrated around investor sentiment and behavioral finance, confirming that these two constructs constitute the dominant intellectual core of the field and the principal lens through which most studies in the dataset are framed (Mujtaba Mian & Sankaraguruswamy, 2012).

Moderate density areas, shown in green, surround investments, financial markets, commerce, and sentiment analysis, indicating well-established but secondary research streams connecting investor sentiment with trading activity and computational sentiment measurement. The peripheral, lower-density regions, rendered in blue, include deep learning, natural language processing, asset pricing, and big data, suggesting that although these computational and data-driven themes are present in the literature, they remain comparatively emerging frontiers with considerable potential for future scholarly development (Bukovina, 2016).

Overall, the density map reinforces the patterns observed in the network and overlay visualizations, illustrating a field that remains anchored in its core behavioral constructs while gradually extending toward

computational and data driven territory. The contrast between the high-density core and the sparser periphery suggests that future research has substantial room to deepen the integration of investor sentiment with emerging analytical techniques, particularly in areas where theoretical grounding and computational methods have yet to be fully connected

Citation Analysis

Table 1. Most Cited Article

Citations	Author and Year	Title	Publication
277	(Ichev & Marinč, 2018)	Stock prices and geographic proximity of information: Evidence from the Ebola outbreak	International Review of Financial Analysis
275	(Mujtaba Mian & Sankaraguruswamy, 2012)	Investor sentiment and stock market response to earnings news	The Accounting Review
176	(Białkowski et al., 2012)	Fast profits: Investor sentiment and stock returns during Ramadan	Journal of Banking and Finance
174	(Gurdgiev & O'Loughlin, 2020)	Herding and anchoring in cryptocurrency markets: Investor reaction to fear and uncertainty	Journal of Behavioral and Experimental Finance
158	(Zhou, 2018)	Measuring investor sentiment	Annual Review of Financial Economics
158	(Hudson & Urquhart, 2014)	War and stock markets: The effect of World War Two on the British stock market	International Review of Financial Analysis
138	(Takeda & Wakao, 2014)	Google search intensity and its relationship with returns and trading volume of Japanese stocks	Pacific-Basin Finance Journal
129	(Obaid & Pukthuanthong, 2022)	A picture is worth a thousand words: Measuring investor sentiment by combining machine learning and photos from news	Journal of Financial Economics
121	(Jacobs, 2015)	What explains the dynamics of 100 anomalies?	Journal of Financial Economics
120	(Metawa et al., 2019)	Impact of behavioral factors on investors' financial decisions: case of the Egyptian stock market	International Journal of Islamic and Middle Eastern Finance and Management

Source: Scopus, 2026

Discussion

The findings of this bibliometric analysis offer a comprehensive portrait of investor sentiment research as a field that is simultaneously theoretically mature and rapidly transforming under the influence of digital technology. Across the network, overlay, and density visualizations, investor sentiment and behavioral finance consistently emerge as the dominant organizing constructs, confirming that the field's conceptual core remains firmly grounded in the behavioral challenge to market efficiency first articulated through studies of sentiment-driven mispricing and excess volatility (Zhou, 2018), (Mujtaba Mian & Sankaraguruswamy, 2012).

A central finding concerns the marked temporal shift toward computational and digital-era methods of sentiment measurement. The overlay visualization clearly shows that themes such as machine learning, sentiment analysis, deep learning, and natural language processing are among the most recently active in the literature, signaling that researchers are increasingly moving beyond market-based and survey-based sentiment proxies toward direct extraction of sentiment from unstructured digital data, including news text, social media posts, and even images (Obaid & Pukthuanthong, 2022). This evolution parallels the broader rise of big data analytics in social media and capital markets research (Bukovina, 2016)an d reflects the growing recognition that investor sentiment can now be observed with greater granularity and immediacy than traditional indices allowed.

The density visualization reinforces this interpretation by showing that while investor sentiment and behavioral finance remain the most intensively researched constructs, machine-learning-based sentiment analysis and natural language processing occupy peripheral but expanding zones of the literature, indicating substantial room for further theoretical and methodological development. This pattern is consistent with the field's gradual movement from documenting that sentiment affects markets toward explaining how sentiment can be measured, modeled, and operationalized using advanced computational tools.

The citation analysis adds further nuance by identifying the specific contributions that have most shaped the field's trajectory. The prominence of (Mujtaba Mian & Sankaraguruswamy, 2012) and (Ichev & Marinč, 2018) reflects sustained scholarly interest in how sentiment interacts with firm-specific information events, such as earnings announcements and external shocks, to amplify or dampen market reactions. The continued influence of (Białkowski et al., 2012) and (Hudson & Urquhart, 2014) underscores the enduring relevance of calendar-based and historical event sentiment studies, while the citation impact of (Obaid & Pukthuanthong, 2022) signals growing recognition of machine learning-based sentiment measurement as a frontier methodological contribution. Collectively, these works illustrate that investor sentiment research draws on a diverse methodological lineage, ranging from event-study and calendar-anomaly designs to cutting edge computational text and image analysis.

Theoretically, these findings suggest that investor sentiment research stands at an important inflection point. The convergence of established behavioral finance theory with machine learning, natural language processing, and social media analytics opens substantial opportunities for refining how sentiment is conceptualized and measured, while also raising new questions about the reliability, comparability, and interpretability of digitally derived sentiment indicators across markets and contexts. Addressing these questions represents a timely and important agenda for the continued development of behavioral finance scholarship in the digital era.

D. CONCLUSION

This study concludes that investor sentiment has become a mature and central construct in behavioral finance, with a literature that is both theoretically grounded and increasingly shaped by digital-era computational methods. Based on the bibliometric analysis of 428 Scopus-indexed publications, the

findings show that the field is organized around a tightly integrated core of investor sentiment, behavioral finance, stock market behavior, market efficiency, and volatility, while extending outward into market microstructure, computational sentiment measurement, and digital data sources.

The results further indicate that the field has expanded considerably beyond its original focus on documenting sentiment-driven mispricing, increasingly incorporating machine learning, sentiment analysis, natural language processing, and deep learning as tools for extracting and modeling investor sentiment from large-scale textual and social media data. This shift demonstrates that contemporary scholarship is progressively concerned not only with whether sentiment affects market dynamics, but with how sentiment can be measured more precisely, at higher frequency, and across a broader range of digital data sources.

The citation analysis confirms the lasting influence of foundational empirical contributions linking investor sentiment to earnings announcements, calendar anomalies, and historical market shocks, alongside the rising prominence of computational approaches to sentiment measurement. Overall, this study provides a systematic map of the intellectual structure, dominant themes, and emerging directions in investor sentiment research. Future studies are encouraged to further explore the integration of artificial intelligence, multimodal data sources, and cross-market comparative designs to deepen understanding of how investor sentiment shapes market dynamics in an increasingly digitalized financial environment.

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