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## **A BIBLIOMETRIC MAPPING OF BEHAVIORAL FINANCE RESEARCH AND DECISION-MAKING (2015-2025)**

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### **Abstract:**

*Behavioral finance has grown exponentially beyond classical biases into crises, digital assets, and sustainable investing, resulting in a fragmented literature that is difficult to synthesize into a narrative. This work presents a systematic bibliometric mapping of the intellectual, social and conceptual structures of the field. Based on 3,110 Q1 and Q2 articles indexed in Scopus between 2015 and 2025, we combine performance indicators with network analyses, using VOSviewer and the Bibliometrix R package. The analysis shows that there are six thematic groups: behavioral biases and decision-making, financial markets and crises, corporate governance and firm performance, digital finance and social commerce, technology and forecasting, and demographics and psychology. The international co-authorship is 76.17%, with intense collaboration in Asia, Europe, and North America. Although classical theories continue to hold a structurally central position, the field demonstrates a clear convergence with ESG investing, cryptocurrency markets, and financial behavior during the pandemic. The results reveal methodological monocultures and low cross-cluster connectivity, providing a data-driven basis for setting future research agenda priorities.*

**Key words:** *Behavioral finance, Investment decision-making, Bibliometric analysis, Scopus*

### **1. Introduction**

The growth in behavioral finance and investment decision-making has grown so fast that the boundaries of the field have become analytically contested. What began as a methodical record of cognitive deviations from rational choice (Kahneman and Tversky, 1979) has broken down into specialized discussions spanning cryptocurrency speculation

(Akhtaruzzaman et al., 2021), ESG-driven portfolio allocation (Hartzmark and Sussman, 2019), algorithmic trading psychology (Lo, 2017), and risk reassessment during crisis (Akerlof and Shiller, 2009). This expansion has created a literature that is both large in volume and conceptually diffuse: studies of classical heuristics now co-exist with analyses of machine-learning forecasts and social-media sentiment, often with no cross-citation or theoretical synthesis. The result is a structural fragmentation that cannot be synthesized appropriately by traditional narrative reviews.

The mapping of quantitative science offers a methodological answer to this fragmentation. Bibliometric analysis can be used to uncover the latent intellectual, social, and conceptual architectures that structure a discipline by treating authorship, citations, and lexical co-occurrences as network data (Donthu et al., 2021). However, there are still gaps in bibliometric portraits of behavioral finance. Previous studies are either temporally truncated, concluding before the COVID-19 pandemic and the explosion of sustainable-finance research; methodologically narrow, lacking quality stratification; or substantively misaligned, studying behavioral finance as an undifferentiated whole, instead of isolating its intersection with investment decision-making. Each of the articles by Abdulrasool and Othman (2020), Jain and Goyal (2024), Shaikh and Khan (2025) and Costa, Carvalho and Moreira (2019) provides valuable partial maps, but none can combine a rigorous Q1/Q2 journal-quality filter with a targeted search strategy that combines both themes across the entire 2015–2025 decade.

This paper uses bibliometric mapping to examine the evolution of the literature on behavioral finance and investment decision-making between 2015 and 2025. Through an analysis of publication and citation trends, top authors and institutions, and topic clusters, the paper provides a holistic view of how the field has evolved in response to crises, technological advancements and socioeconomic changes, in Q1 and Q2 Scopus indexed journals.

The research is driven by the broad question: ***"What are the relationships among the intellectual, social and conceptual foundations that underpin the field of behavioral finance and investment decision-making, and how have they evolved between 2015 and 2025?"***

In order to address this, we develop the following sub-questions:

- How have citation impact and research volume in behavioral finance changed over time?
- What authors, institutions, and countries have the highest scholarly influence and productivity?
- What does the co-authorship network reveal about local and global institutional collaborations in the field?
- What concepts and topics are most recognized in the literature?
- How have sustainability issues, technological advancements, and crises affected the direction of research in recent times?

Besides providing a comprehensive mapping of the field, the study's answers to these questions prepare the ground for a critical assessment of its future directions.

## **2. Literature review**

The advent of behavioral finance was a signal of a major paradigm shift in finance. Previous theories, including the efficient market hypothesis (EMH) (Fama, 1970), relied on the proposition that investors are rational and that prices reflect all available information, leaving little or no scope for market inefficiencies. However, a growing body of anomalies, bubbles and market inefficiencies challenged these claims. Prospect theory (Kahneman and Tversky, 1979) posits that individuals' evaluations differ from expected utility theory because they are loss averse and judge outcomes relative to a reference points. The theory laid the groundwork for behavioral finance by showing that individuals use heuristics and have limited cognitive capacities. Subsequent work on mental accounting, endowment effects and bounded rationality (Thaler, 1985; Tversky and Kahneman, 1983) demonstrated the influence of social and psychological forces on financial decision making and provided a more complete picture than rational theories.

Many empirical studies have identified the different biases that reflect these psychological processes in finance. Overconfidence is expressed in the tendency of investors to overestimate their abilities and predictive power and to over-trade, leading to worse performance (Odean, 1998). The disposition effect is a bias in investors' selling strategies: investors tend to sell stocks that have appreciated in value too quickly and hold on to stocks that have declined in value too long, which contradicts optimal portfolio theory (Shefrin and Statman, 1985). At the aggregate level, herding behavior helps to explain market movements as well as speculative bubbles and crashes, as collective sentiment overrides private information (Bikhchandani and Sharma, 2000; Christie and Huang, 1995). Other biases like representativeness and anchoring also play an important role in explaining investors' tendency to extrapolate past returns or to overweight salient but irrelevant information in forecasting returns (Barberis and Thaler, 2003). Such phenomena offer additional evidence of the influence of investor psychology on the market and that markets are not fully efficient.

In the past 20 years, psychological insights from behavioral finance have also been used to study sustainability, technological change and crises. The global financial crisis of 2008 demonstrated how systemic risk can be caused by the prevalence of cognitive biases and overconfidence (Akerlof and Shiller, 2009). COVID-19 offered a case study for examining the psychological factors that come into play during extreme uncertainty, with evidence of increased risk aversion, contagion effects and "flight to safety" in gold and cryptocurrency assets (Akhtaruzzaman et al., 2021; Conlon and McGee, 2020). Meanwhile, the rise of financial technology and digital assets has introduced new areas of research in psychology, such as algorithmic trading, use of robo-advisors and the speculative nature of Bitcoin (Lo, 2017; Adam et al., 2020; Corbet et al., 2019). A rich extension is the role of behavioral factors in sustainable investing, where social and individual psychology drive the demand for ESG assets (Hartzmark and Sussman, 2019). Consequently, the field has progressed well beyond its initial focus on individual psychology and now informs multidisciplinary responses to contemporary global challenges.

Bibliometrics has become crucial to map this rapidly growing body of knowledge into meaningful intellectual structures. Rather than relying on narrative reviews, quantitative mapping techniques enable researchers to discern leading authorships, collaboration structures and emergent themes. The Bibliometrix package (Aria and Cuccurullo, 2017) and VOSviewer (van Eck and Waltman, 2010) software programs are among the most popular for building science maps and network visualizations, and have been widely used within finance and management to map the intellectual foundations and thematic evolution of disciplines (Gaviria-Marin et al., 2018; Merigó and Yang, 2017). These methods are a significant innovation in literature synthesis (Donthu et al., 2021).

Existing bibliometric studies have started to uncover the intellectual and social networks of behavioral finance, but there remains considerable potential for a targeted, quality-stratified examination of the link between behavioral finance and investment decision-making over the last (and most disruptive) decade. Abduraseel and Othman (2020) presented an early quantitative overview of 967 Scopus-indexed behavioral finance articles from 2009-2019 using VOSviewer to map co-author networks and co-occurring keywords; however, their dataset ends before the COVID-19 crisis, lacks quality stratification, and conflates behavioral finance as a whole rather than focusing on its interaction with investment decisions. Jain and Goyal (2024) used Biblioshiny to study 110 Scopus articles from 2002-2022, but their very small sample, lack of quality filtering and lack of post-pandemic coverage lead to limited generalizability and thematic precision. Most recently, Shaikh and Khan (2025) mapped 870 studies of behavioral finance and risk (1987-2023), providing valuable evolution mapping and co-citation analysis; however, their focus on risk tolerance, their long historical time frame and their failure to filter by journal quality differ from the targeted, decade-specific analysis of the intersection of behavioral finance and investment decision-making. Costa, Carvalho and Moreira (2019) presented the first bibliometric picture of behavioral economics and behavioral finance as scientific fields, but their study precedes the pandemic, the boom in cryptocurrency markets, and the inclusion of artificial intelligence and ESG considerations in studies of investor behavior.

As such, a comprehensive bibliometric study that (i) focuses on the intersection of behavioral finance and investment decision-making through a targeted search strategy, (ii) incorporates stringent Q1/Q2 journal-quality filters to guarantee analysis of high-quality journals, (iii) spans the entire 2015-2025 decade including the post-pandemic shift in themes, and (iv) captures the emergence of digital assets, AI, fintech and sustainable finance as behavioral themes, does not exist. This paper addresses this gap by analyzing 3,110 Scopus-indexed Q1 and Q2 articles, offering targeted, rigorous and up-to-date mapping.

### **3. Methodology**

We performed a performance analysis and bibliometric mapping of the research domain "behavioral finance and investment decision-making." The workflow followed best practices for science mapping studies and included: (A) database selection and query design; (B) screening and eligibility; (C) journal-quality filtering (Q1/Q2); (D) performance indicators; and (E) network analyses using bibliometrix/Biblioshiny (Aria & Cuccurullo) and VOSviewer (van Eck & Waltman).

### **Data source and search strategy**

The following Advanced Search string (All fields scope), which was designed to simultaneously require (a) an investment/finance decision context and (b) behavioral/psychological constructs, was used to retrieve all records from Scopus:

**ALL FIELDS** (("behavioral finance" OR "behavioural finance" OR "investor psychology" OR "investment psychology" OR "financial decision\*" OR "investment decision\*" OR "investment behavior" OR "investment behaviour" OR "portfolio choice" OR "trading behavior" OR "trading behaviour" OR "stock market" OR "retail investor\*" OR "individual investor\*") **AND** ("cognitive bias\*" OR "emotional bias\*" OR overconfidence OR "loss aversion" OR herding OR "disposition effect" OR "mental accounting" OR "anchoring bias" OR "representativeness bias" OR "prospect theory" OR heuristic\*))

We later restricted to Scopus subject areas relevant to our field (Economics, Econometrics & Finance; Business, Management & Accounting; Social Sciences), limited the document type to articles, limited the language to English, and set the publication stage to Final in order to concentrate on the finance/management literature and prevent medical/clinical spillovers. The dataset snapshot used here covers 2015–2025. Screening counts at each stage are reported below.

### **Screening and eligibility**

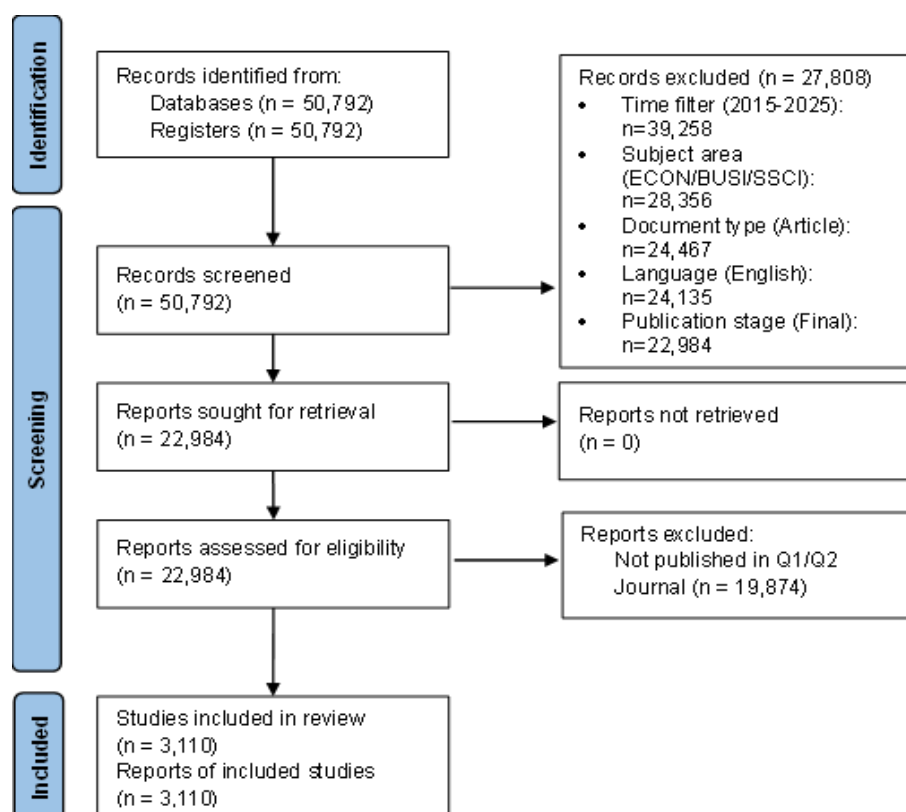
- Initial retrieval with the domain query: N = 50,792 records.
- Time filter (2015–2025): N = 39,258.
- Subject-area restriction (ECON/BUSI/SSCI): N = 28,356.
- Document type (Article): N = 24,467.
- Language (English): N = 24,135.
- Publication stage (Final): N = 22,984.
- After Q1/Q2 journal filtering and harmonization (see below), the analytical corpus contained 3,110 records

Because Scopus does not natively filter by quartile, we matched each record's Source title to SCImago Journal Rank (SJR) data and kept journals classified Q1 or Q2 in the relevant categories (Economics, Econometrics & Finance; Business, Management & Accounting). Operationally, we:

1. Exported Scopus results with Source title and full metadata (CSV).
2. Downloaded SJR journal lists (by subject category and year) and compiled a journal–quartile lookup.
3. Standardized journal names in both files (case-folding, trimming, punctuation normalization).
4. Merged Scopus ↔ SJR on Source title; retained rows with Quartile ∈ {Q1, Q2}.
5. Resolved residual mismatches manually (e.g., variant abbreviations) and deduplicated DOIs.

Keeping a broad, recent window (2015–2025) supports both trend detection and contemporary thematic mapping; restricting to articles and English ensures peer-reviewed

comparability and metadata completeness. A detailed visual representation of this process is provided in the figure I below (PRISMA 2020):



**Figure I.** Screening and Eligibility Protocol (PRISMA 2020 Workflow)

*Source:* Authors' own elaboration

In addition, the Author Keywords and Index Keywords were cleaned and standardized. Specifically, all terms were converted to lowercase; “behavioural finance” was harmonized to “behavioral finance”; “decision-making” to “decision making”; “cryptocurrencies” was unified to “cryptocurrency” and “humans” to “human” and extra spaces were removed.

### **Performance indicators (biblioshiny)**

We computed standard bibliometric indicators: annual production trend; top journals, authors, institutions, and countries; global and local citation counts; and reference statistics (e.g., total references in corpus). Where available in the dataset summary, we report growth dynamics and citation density (e.g., annual counts, average citations per publication by year).

### Structural indicators (VOSviewer)

We conducted bibliometric mapping through network visualizations, including co-occurrence analysis of authors and keywords, co-citation structures, and bibliographic coupling. In order to uncover the field's intellectual, conceptual, and social structures as well as thematic concentrations, cluster density visualizations were utilized. Through these analyses, we were able to identify patterns of collaboration between authors and nations as well as core, emerging, and peripheral research areas.

### 4. Results/findings

Our bibliometric collection includes 3,110 publications from 2015 to 2025 in 570 sources, including prestigious finance and management journals, as well as interdisciplinary journals in the fields of sustainability and energy economics. The dataset comprises an estimated 190,348 cited references, averaging 61.21 citations per article. This suggests both high scholarly impact and strong integration into related disciplines. The average publication age of 5.81 years suggests a mix of both mature and emergent research. In terms of authorship, 7,883 unique authors were involved, 250 of whom published single-authored articles. The average of 3.02 co-authors and 76.17% international co-authorship indicate that the field of behavioral finance is structurally collaborative and globally distributed. Table I gives an overview of the dataset.

**Table I.** Main Information About the Dataset

| <b>Description</b>              | <b>Results</b> |
|---------------------------------|----------------|
| Main information about data     |                |
| Timespan                        | 2015:2025      |
| Sources (journals, books, etc.) | 570            |
| Document type                   |                |
| Article                         | 3110           |
| Document average age            | 5.81           |
| Average citations per doc       | 61.21          |
| References                      | 190348         |
| Document contents               |                |
| Keywords plus (id)              | 900            |
| Authors keywords                | 2626           |
| Authors                         |                |
| Authors                         | 7883           |
| Authors of single-authored docs | 250            |
| Authors collaboration           |                |
| Single-authored docs            | 259            |
| Co-authors per doc              | 3.02           |
| International co-authorships %  | 76.17          |

*Source:* Biblioshiny output

The theoretical backgrounds and diversification of behavioral finance are reflected by the most cited works included in the dataset. Table II shows the top ten most cited works. Citation data are based on the Scopus "Cited by" field and represent the total number of citations an article had received in the Scopus global database at the time that the dataset was retrieved. There are two points that should be mentioned. To begin with, foundational contributions, including prospect theory, investor sentiment, and limits to arbitrage, remain structurally salient, implying that the field of study remains theoretically grounded, despite increasing its scope. Second, the existence of works on crowdfunding (Agrawal et al., 2015), AI chatbots (Adam et al., 2020), and big data analytics (Choi et al., 2018) indicates that the field has expanded to technology-mediated decision-making situations.

**Table II.** Summary Of Key Contributions in Behavioral Finance and Investment Decision Making

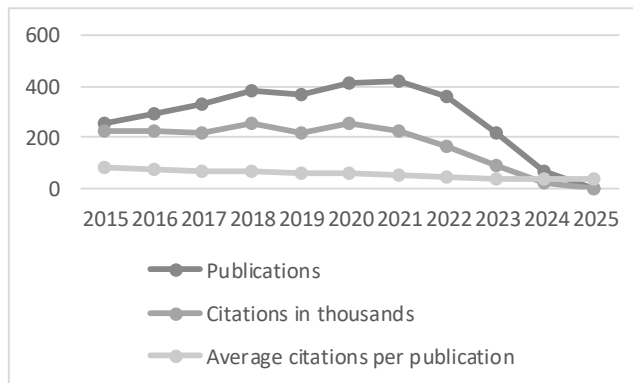
| STUDY                                       | TITLE                                                                            | KEY FINDINGS                                                                                                          | CITATIONS |
|---------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------|
| Agrawal, A.; Catalini, C.; Goldfarb, A.     | Crowdfunding: Geography, Social Networks, and the Timing of Investment Decisions | Examines crowdfunding platforms, showing that geography and social networks significantly shape investment decisions. | 725       |
| Adam, M.; Wessel, M.; Benlian, A.           | AI-based Chatbots in Customer Service and Their Impact on Decision-Making        | Finds that AI chatbots influence consumer trust and decision processes in financial and service contexts.             | 700       |
| Huang, D.; Jiang, F.; Tu, J.; Zhou, G.      | Investor Sentiment Aligned: A Powerful Predictor of Stock Returns                | Proposes a sentiment index strongly predictive of asset prices, showing sentiment-driven market movements.            | 697       |
| Akhtaruzzaman, M.; Boubaker, S.; Sensoy, A. | Financial Contagion during COVID-19 Crisis                                       | Demonstrates how the COVID-19 pandemic triggered strong financial contagion across global markets.                    | 695       |
| Hartzmark, S.; Sussman, A.                  | Do Investors Value Sustainability? A Natural Experiment Examining ESG Factors    | Provides evidence that sustainability salience increases investors' valuation of ESG-friendly stocks.                 | 670       |
| Thakor, A. V.                               | Fintech and Banking: What Do We Know?                                            | Reviews fintech literature, highlighting impacts on banking structure, regulation, and decision-making.               | 662       |
| Choi, T.M.; Wallace, S.; Wang, Y.           | Big Data Analytics in Operations Management                                      | Shows that big data analytics enhances operational and financial decision efficiency.                                 | 654       |
| Conlon, T.; McGee, R.                       | Safe Haven or Risky Hazard? Bitcoin during the COVID-19 Bear Market              | Tests Bitcoin's role during crises; finds mixed evidence on whether it functions as a safe haven.                     | 603       |

|                                            |                                                                                                            |                                                                                                                            |     |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-----|
| Bernile, G.;<br>Bhagwat, V.;<br>Rau, P. R. | What Doesn't Kill You Will<br>Only Make You More Risk-<br>Loving? Managerial<br>Experience and Risk-Taking | Shows that managers exposed to<br>crises take greater risks later,<br>influencing corporate investment<br>decisions.       | 587 |
| Stambaugh, R.;<br>Yu, J.; Yuan, Y.         | Arbitrage Asymmetry and<br>the Idiosyncratic Volatility<br>Puzzle                                          | Identifies limits to arbitrage and<br>explains persistent volatility<br>anomalies through asymmetric<br>investor behavior. | 542 |

*Source:* Scopus data (2015–2025), processed using Excel

These pioneering articles demonstrate how the study of behavioral finance has developed over time to address fintech, ESG, crises and digital platforms, yet remains well rooted in theories of investor psychology and decision-making under uncertainty.

### **Publications trend**



**Figure II.** Annual Publications and Citation Impact

*Source:* formed by the authors on the basis of data obtained from the Scopus database

Figure II shows the yearly research output in the field of behavioral finance and investment decision-making from 2015 to 2025. Overall, 3,110 publications were produced in this period, with a steady growth from 2015, reaching a peak of 421 in 2021, followed by a decline in subsequent years.

Instead of having one continuous growth pattern, two distinct periods can be distinguished in the trend. The growth in the output between 2015 and 2021 is steady, going from 259 to 421 publications, with an average annual increase of 8.4%, which is both indicative of the growing maturity of behavioral finance as a field of study, and also reflective of how responsive the field is to current events. The 2020-2021 spike coincides with the COVID-19 pandemic, which saw market instability resulting in a flurry of research on financial contagion, investor sentiment, and behavioral responses to crises. This peak is in line with historical trends of growth during market crises, when the gap between rational models and observed behavior becomes most evident.

The post-2021 fall needs to be treated with caution. Data were downloaded from Scopus in July 2025, implying that 2023-2025 publications are subject to typical lag effects,

with 2024-2025 especially affected (e.g., only 66 publications in 2024). As such, the post-2021 drop is likely an artifact of bibliometric lag, rather than a real decline in research activity. But even with lag effects, the post-2021 trend is likely a transition from explosive breadth, where financial responses to the pandemic drove publication output, to thematic consolidation, where researchers refine and elaborate theoretical mechanisms, and employ more robust research designs to answer fewer questions. This view is corroborated by the citation data: the average citations per article for work published in 2015-2018 are highest (85.9-67) in the dataset, suggesting early work in the sample has laid down much of the groundwork, while more recent work has yet to gain comparable citation impact.

### **Most relevant sources**

The source journals provide an overview of the publishing outlets that have been most active in the field of behavioral finance and investment decision-making from 2015-2025. Table III lists the top 20 journals with the largest numbers of published papers, their publishers and quartile rankings.

**Table III. Most Relevant Journals**

| <b>Source</b>                                                      | <b>Volume</b> | <b>Publisher</b>                | <b>Index</b> | <b>Quartile</b> |
|--------------------------------------------------------------------|---------------|---------------------------------|--------------|-----------------|
| Finance Research Letters                                           | 108           | Elsevier Ltd                    | Scopus       | Q1              |
| Management Science                                                 | 96            | INFORMS                         | Scopus       | Q1              |
| Journal of Finance                                                 | 80            | Blackwell Publishing Ltd        | Scopus       | Q1              |
| Review of Financial Studies                                        | 78            | Oxford University Press         | Scopus       | Q1              |
| Research in International Business and Finance                     | 77            | Elsevier Ltd                    | Scopus       | Q2              |
| International Review of Economics and Finance                      | 59            | Elsevier Inc.                   | Scopus       | Q2              |
| Journal of Business Ethics                                         | 53            | Springer Netherlands            | Scopus       | Q1              |
| Journal of Behavioral and Experimental Finance                     | 52            | Elsevier B.V.                   | Scopus       | Q2              |
| Strategic Management Journal                                       | 50            | Wiley                           | Scopus       | Q1              |
| Energy Economics                                                   | 48            | Elsevier B.V.                   | Scopus       | Q1              |
| Journal of Cleaner Production                                      | 45            | Elsevier Ltd                    | Scopus       | Q1              |
| Journal of International Financial Markets, Institutions and Money | 38            | Elsevier Ltd                    | Scopus       | Q2              |
| Resources Policy                                                   | 36            | Elsevier Ltd                    | Scopus       | Q2              |
| Journal of Management                                              | 33            | SAGE Publications               | Scopus       | Q1              |
| Accounting Review                                                  | 33            | American Accounting Association | Scopus       | Q1              |
| Accounting and Finance                                             | 33            | Blackwell Publishing            | Scopus       | Q1              |
| Small Business Economics                                           | 33            | Springer                        | Scopus       | Q1              |
| Journal of Financial and Quantitative Analysis                     | 32            | Cambridge University Press      | Scopus       | Q1              |
| Journal of Behavioral Finance                                      | 28            | Institute of Behavioral         | Scopus       | Q2              |

|                                               |    |                     |        |    |
|-----------------------------------------------|----|---------------------|--------|----|
| Review of Quantitative Finance and Accounting | 25 | Finance<br>Springer | Scopus | Q2 |
|-----------------------------------------------|----|---------------------|--------|----|

*Source:* formed by the authors on the basis of data obtained from the Scopus database

The concentration of output in *Finance Research Letters* (108 papers), *Management Science* (96), *Journal of Finance* (80), and *Review of Financial Studies* (78) confirms that behavioral finance has achieved legitimacy within the discipline's most selective outlets. This matters because it signals that behavioral research is no longer relegated to specialized or lower-tier journals but competes directly with traditional finance on its home terrain.

Equally, the prominence of *Journal of Cleaner Production*, *Energy Economics* and *Resources Policy* suggests that behavioral ideas have permeated sustainability and energy economics. This spread is no mere coincidence: behavioral theories, framing, salience, social norms, are portable analytical tools that can be applied to the study of ESG adoption, energy-market sentiment and green investing. The presence of general management and accounting journals (*Strategic Management Journal*, *Accounting Review*, *Small Business Economics*) also shows that behavioral finance has spilled beyond its origins into corporate governance, entrepreneurship and decision-making. The two-tier structure of elite finance plus interdisciplinary periphery implies the field is more important than it appears: behavioral ideas cross disciplinary boundaries even if the articles are published elsewhere.

### Most relevant authors

Table IV ranks the ten most influential authors by citation frequency within the corpus, together with their publication counts, affiliations, and countries.

**Table IV. Most Influential Authors**

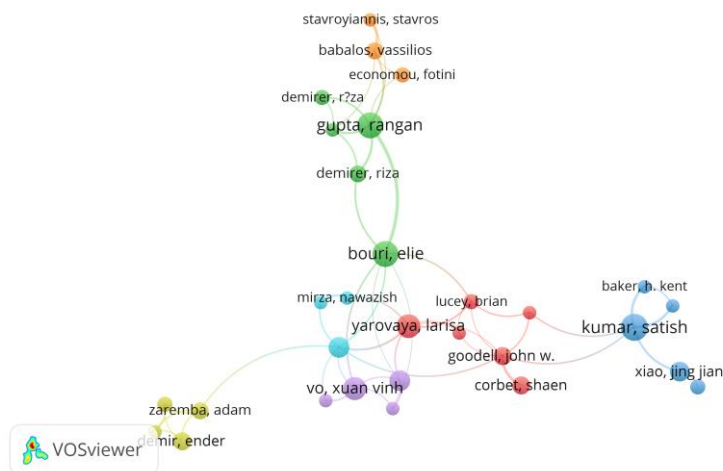
| Author             | #ofArts | Affiliations                               | Country              | Cited by |
|--------------------|---------|--------------------------------------------|----------------------|----------|
| Kumar, Satish      | 15      | Malaviya National Institute of Technology  | India                | 1228     |
| Bouri, Elie        | 14      | Holy Spirit University of Kaslik, Jounieh, | Lebanon              | 910      |
| Gupta, Rangan      | 14      | University of Pretoria                     | South Africa         | 869      |
| Yarovaya, Larisa   | 12      | Namal University                           | United Kingdom       | 1180     |
| Vo, Xuan Vinh      | 11      | University of Economics Ho Chi Minh City   | Vietnam              | 774      |
| De Massis, Alfredo | 11      | University of Bozen-Bolzano                | Italy                | 1263     |
| Yousaf, Imran      | 9       | Prince Sultan University                   | Saudi arabia         | 930      |
| Lee, Chien-Chiang  | 9       | City University of Macau                   | China                | 549      |
| Naeem, Muhammad    | 9       | United Arab Emirates University            | United Arab Emirates | 445      |
| Abubakr            |         |                                            |                      |          |
| Xiao, Jing Jian    | 8       | University of Rhode Island                 | United States        | 604      |

*Source:* formed by the authors on the basis of data obtained from the Scopus database

Patterns of influence are divided. Productivity leaders, Kumar (15 articles), Bouri (14), Gupta (14), build the empirical foundations of the field through extensive co-authorship networks and regular publication in regional and international journals. Citation leaders, De Massis (1,263 citations from 11 articles), Yarovaya (1,180 from 12), Yousaf (930 from 9), influence through research focus. De Massis's contributions to family business and organisational behavior, Yarovaya's contributions to financial contagion and cryptocurrency markets, and Yousaf's contributions to volatility spillovers and cross-market linkages show that influence is governed by the perceived importance of the research questions tackled, not the number of publications.

The geographic distribution is notable. The most prolific and highly-cited authors are based in Asia (India, Vietnam, China, Saudi Arabia, UAE), Europe (UK, Italy), and Africa (South Africa), with few North Americans (Xiao). This distribution turns the traditional core-periphery model of finance research on its head, where the US is usually the most-cited. The concentration implies that behavioral finance is a field in which emerging markets, higher volatility, institutional underdevelopment, and greater retail investor involvement, create the types of questions that are relevant to the rest of the world. Lebanon, South Africa, Vietnam, and Saudi Arabia are not on the periphery of this field; they are at the core of the field because their markets provide the settings for the biases and anomalies found in behavioral finance.

### Co-authorship network



**Figure III. Co-Authorship Network**

*Source: VOSviewer output*

In Figure III, we display the co-authorship network built using fractional counting, with a minimum of six publications per author. Seven clusters are apparent in the graph whose spatial position and connectivity can be interpreted beyond identifying the members.

The structure of the network indicates that behavioral finance is structured by methodological rather than institutional or geographic proximity. Cluster 1, organised around Larisa Yarovaya, Brian Lucey and John Goodell, bridges the UK, Ireland and the United States around research on financial contagion, crisis markets and global volatility. The transatlantic structure of this cluster suggests that crisis studies depend on access to multi-market data and common methodological approaches to measuring spillovers and tail dependence, which can be transferred across institutions.

Cluster 2, focused on Elie Bouri, Rangan Gupta, and Riza Demirer, spans the US, Africa, and the Middle East in applied finance and commodity markets. The US-Africa-Middle East triangle is unusual in finance research and indicates that commodity-market studies, oil, gold, agricultural futures, open new possibilities for collaboration that bypass traditional North Atlantic networks. Cluster 3, led by Satish Kumar, with Kent Baker and Jing Jian Xiao, focuses on behavioral biases, financial literacy and investor psychology. The makeup of this cluster, connecting India with the US, represents the global portability of psychometric measures and experimental designs.

Cluster 4 (Ender Demir, Adam Zaremba) is dedicated to emerging markets, and the behavioral finance of cryptocurrency, while Cluster 5 (Xuan Vinh Vo, Muhammad Abubakr Naeem, Walid Mensi, Syed Jawad Hussain Shahzad) is dedicated to herding, Islamic finance, and crisis episodes. In the network map, the closeness of Clusters 4 and 5 suggests that cryptocurrency research and Islamic finance research are close because of methodology, volatility models, regime-switching models, sentiment analysis, rather than because of research topics. Cluster 6 (Imran Yousaf, Nawazish Mirza) is focused on volatility spillovers and cross-market linkages, while Cluster 7 (Vassilios Babalos, Fotini Economou, Stavros Stavroyiannis) is focused on European markets and sustainable finance.

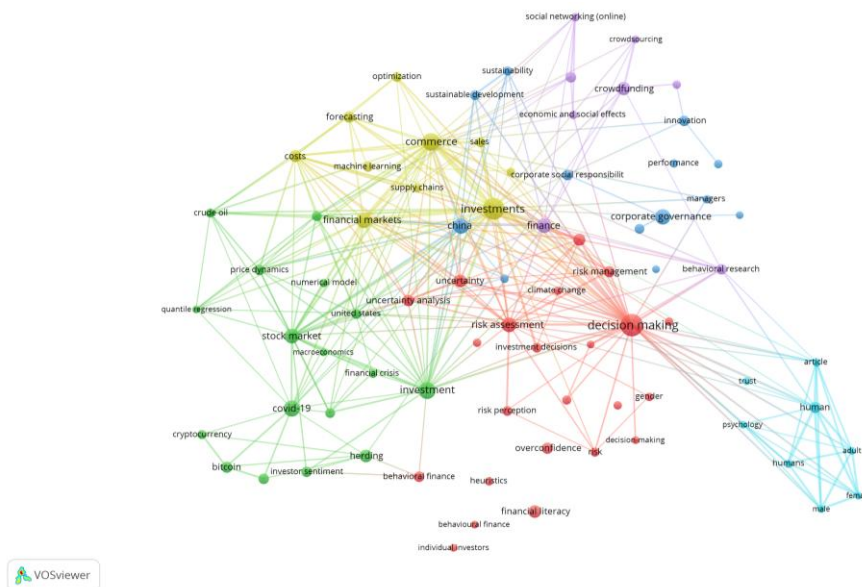
The striking feature of the network is the lack of inter-cluster links. The clusters are internally well connected, but not well connected with each other. This suggests that the field is intellectually fragmented: researchers working on cryptocurrency herding (Cluster 4) do not tend to work with colleagues working on ESG salience (Cluster 7), despite both using behavioral approaches to investment. Thus, despite the high international co-authorship rate, the field is intellectually fragmented, an insight that bibliometric analysis highlights but that is often concealed by narrative reviews.

### **Network visualization**

Figure IV presents the keyword co-occurrence network with a minimum threshold of 24 occurrences. The stricter filter isolates the field's conceptual core by excluding idiosyncratic or peripheral terms. The network organizes into six clusters whose spatial relationships reveal how behavioral finance structures its intellectual terrain.

Cluster 1 (red, 21 items) Behavioral Biases and Decision-Making. This is the research heartland of the field, comprising behavioral finance, decision making, prospect theory, risk assessment, risk perception, risk aversion, overconfidence, heuristics, financial literacy, economics, and uncertainty analysis. The centrality of this cluster and the large node sizes indicate that the most important concepts are traditional psychological terms.

That "risk perception", "risk aversion" and "uncertainty analysis" co-occur suggests that risk is not regarded as a unidimensional construct, but rather as a multidimensional construct that includes cognitive evaluation, emotional response, and measurement.



**Figure IV. Network Visualization**  
Source: VOSviewer output

Cluster 2 (green, 17 items): Financial Markets and Crises. This cluster includes stock market, financial crisis, Bitcoin, cryptocurrencies, COVID-19, crude oil, investor sentiment, financial markets, macroeconomics, herding, regression analysis, quantile regression, and price dynamics. The fact that it is close to Cluster 1 is theoretically relevant: it implies that classical biases are not studied in isolation but under crisis market conditions and/or with new assets. The presence of "regression analysis" and "quantile regression" in this cluster rather than in a methods cluster suggests that econometric observational studies are conceptually related to crisis and markets research and that this is a methodological monoculture in this thematic area.

Cluster 3 (blue, 13 items): Corporate governance and firm performance. This cluster contains corporate governance, agency theory, corporate social responsibility, family firms, managerial behavior, earnings management, sustainability, innovation and firm performance. It is placed between Cluster 1 (biases) and Cluster 4 (digital finance), which suggests that corporate governance bridges individual decision-making and firm performance. The inclusion of "sustainability" and "corporate social responsibility" confirms the evolution of ESG from niche to central concepts.

Cluster 4 (yellow, 9 items): Digital Finance and Social Commerce. This cluster includes commerce, finance, behavioral studies, entrepreneurship, crowdfunding, crowdsourcing, social media, social networking, and economic and social impacts of digital assets. The fact that it is far from the behavioral core (Cluster 1) indicates that digital finance is a work in progress: it is connected to the behavioral core but not yet fully



The density map is in Figure V with the color representing the co-occurrence of keywords. The hotter the color (red and yellow), the higher the density of published works; the colder the color (green and blue), the lower the density of published works but still significant.

The density map confirms the hierarchy we see in the cluster network. The highest density point, "decision making" and "investments", is the theoretical gravity center of the field, around which terms "risk assessment", "uncertainty", "behavioral finance", "overconfidence", "financial literacy" and "herding" orbit. This spot suggests that the field of behavioral finance has developed thematically around its core themes: after 40 years of study, not only are these terms widely used, but they also form a dense cluster that is a conceptual ecosystem.

There are three areas of secondary density. First, a secondary density spot that is warm but not hot is formed by terms related to financial markets and crises: "stock market", "COVID-19", "financial crisis", "Bitcoin", "cryptocurrency". This shows that crisis and digital assets research is important but not as conceptually dense as the classical bias research: these terms co-occur with each other and the core, but they are not yet fully integrated into a conceptual field. Second, "corporate governance", "sustainability" and "artificial intelligence" are tertiary density points that are warm but not hot and not strongly connected. This indicates that interdisciplinary applications, behavioral finance meets ESG, behavioral finance meets AI, are growing but not yet forming coherent research programs.

The coldest important area, "human," "gender," "male," "female," "psychology" and "trust" forms a separate cluster in the lower left. Its coolness does not mean that this zone is unimportant but rather that it is underdeveloped: these terms are sufficiently co-occurring to form an identifiable subfield, but they are not densely interconnected with the field's core. The density map thus confirms the network analysis: sociodemographic and psychological factors are structurally marginal, suggesting that they are either less important for financial decision making or, more likely, that the field has understudied the role of identity and social influences on financial behavior.

The density gradient from the core to the periphery has a normative implication. The classical biases of behavioral finance are so densely connected that it is difficult to be original in this area: any study of overconfidence or herding must inevitably cite a long list of studies and carve out a niche for itself. In contrast, the periphery, demographics, AI-mediated behavior, and cross-cultural diversity of biases, are less dense and so offer more room for formative research. The density map is therefore not just a descriptive but also a prescriptive tool for researchers identifying high-impact, low-density research opportunities.

## **5. Discussions**

The bibliometric analysis indicates that behavioral finance is in transition between anomaly documentation and a theoretically coherent, contextually aware science of financial decision-making. The rush to publish in 2020–2021 (421 articles) under the impact of the crisis can be seen as a reflection of one of the central ideas of Kahneman

and Tversky (1979): that psychological mechanisms are most evident in times of uncertainty and loss. The pandemic itself was a natural experiment, which applied the basic premises of prospect theory at a large scale. But the post-2021 contraction is an indication of theoretical maturation: the field is now shifting from the documentation of anomalies to the refinement of mechanisms, as in the overall history of behavioral economics. The fact that the theoretical foundation of the field was largely constructed before this point, and that contemporary scholarship is operating in narrower niches, indicates that the theoretical foundation of the field is now largely developed.

The six cluster structure is a conflict between conceptual coherence and thematic fracturing that is central to the original framing by Barberis and Thaler (2003). The gravitational center has shifted to studies of prospect theory and heuristics-and-biases, but the contexts of application have become extremely diverse. The positioning of biases towards crisis research in the network visualization is theoretically important: classical biases are now viewed as dynamic reactions to changes in market regimes, which is consistent with the adaptive markets hypothesis of Lo (2017), as opposed to fixed cognitive errors. However, the concentration of regression techniques in the crisis cluster reveals a methodological weakness. Observational econometrics can record the fact that herding is more pronounced during volatility spikes, but cannot easily separate actual psychological changes from rational behavior in response to changing information sets, a difference that was the very lifeblood of the Fama (1970) vs. Shiller (2000) debate that initially animated the discipline.

The 76.17% internationalization rate, which is spread over the clusters of Lebanon-South Africa-US and Vietnam-Saudi Arabia-China axes, calls into question traditional theories on knowledge production. Behavioral finance has developed into a methodological commons where portable instruments are used in place of shared data access. One way to understand this diffusion is using social learning theory (Bikhchandani and Sharma, 2000): with methods going global, researchers in emerging markets, where retail participation and institutional volatility provide natural laboratories in which to detect bias, gained a comparative advantage. The concentration of authors from India, Vietnam and Lebanon in the productivity ranking suggests the empirical centre of gravity has moved to markets where the efficient market hypothesis is severely tested. However, low between-cluster connectivity suggests segmentation into methodologically distinct specializations, rather than cumulative theory-building.

The marginalization of demographics and psychology in the network and density map is the most theoretically important finding. Despite decades of evidence of gender differences in risk-taking and cultural differences in trust, these variables remain structurally peripheral, defying the field's logic. If prospect theory's value function is universally applicable, demographic moderators should emerge as boundary conditions. The current structure suggests behavioral finance is "universalist" but also admits variation, yet fails to integrate it, and therefore has limited external validity.

Recent clusters of sustainability and cryptocurrency suggest theoretical stretching of the field's explanatory power. ESG factors and cryptocurrency markets are examples of "domain stretching", extending psychological constructs to new areas. But the density map shows these to be "warm but not hot" zones, which grow without attaining the conceptual

density of classical bias research. This is a danger of behavioral finance developing into an explanatory blanket over non-rational behavior without generating distinctive predictions for new areas. The theoretical issue associated with this is whether ESG preferences are typical social preferences in new assets or that sustainability is introducing new mechanisms of a genuinely novel kind, such as identity expression or moral licensing, which require further elaboration beyond prospect theory.

Of particular interest is the divide of the technology cluster with regard to the behavioral core and digital finance. Artificial intelligence and machine learning fall under operational forecasting as opposed to investor psychology, which implies that behavioral finance views algorithmic tools as methodological instruments rather than objects of analysis. This is a big theoretical omission. With the continued mediation of decisions by robo-advisors and AI-powered systems, the question of whether human biases persist, adapt, or transform in human-machine hybrid environments becomes pressing. The network suggests that behavioral finance is yet to come up with a theory of technological mediation to understand how heuristics operate when decision rights are distributed between human cognition and algorithmic processing.

These results place behavioral finance at a theoretical crossroads. Its classical core remains structurally central, affirming theoretical maturity. But the network's fragmentation, methodological monoculture and the peripheral status of demographic and technological themes indicate growth has exceeded integration. The shift from crisis-induced growth to consolidation suggests the next decade's contribution will be less about discovering new anomalies than addressing whether or not behavioral finance can offer an integrated framework that accommodates demographic diversity, technological mediation, and sustainability preferences, without compromising the parsimony that enabled prospect theory's success. The bibliometric evidence leaves this question open, and it will decide whether the field survives as a cohesive discipline or fragments into domain-specific applications sharing only a common history.

## **6. Conclusions**

The current study builds on previous bibliometric descriptions of behavioral finance using three analytical distinctions. First, unlike Abdulrasool and Othman (2020), Costa, Carvalho and Moreira (2019), and Shaikh and Khan (2025), who treat behavioral finance as undifferentiated or conflate it with risk tolerance, we isolate the intersection of behavioral constructs and investment decision contexts via specific search criteria. Second, we apply Q1/Q2 journal-quality filters, which map high-impact scholarly consensus. Third, our 2015–2025 window captures a complete theoretical cycle: post-GFC maturation, the COVID-19 crisis as a natural experiment of prospect theory on a macro-level, and post-2021 consolidation as digital assets, ESG, and AI became embedded in investment research. Previous research either terminates before the pandemic, uses small unstratified samples, or dilutes decade-specific dynamics within long historical frames.

We have three theoretically-based contributions. First, we identify a temporal bifurcation that questions the assumptions of linear growth. Crisis-driven expansion (2015–2021), peaking at 421 publications during COVID-19, followed by post-2021 consolidation,

operationalizes the core prospect theory tenet that psychological mechanisms intensify under uncertainty and loss. The pandemic was a disciplinary natural experiment, and the contraction signals a shift from anomaly documentation to mechanism refinement, which aligns with the adaptive markets hypothesis of Lo (2017). Normatively, the exploratory crisis-themed publication window has closed; the discipline is now rewarding theoretical precision.

Second, we theorize the 76.17% international co-authorship rate as a methodological commons rather than mere data-sharing. The geographic concentration of influential authors in Lebanon, Vietnam, South Africa and India inverts the traditional core-periphery model in finance research. Behavioral finance is based on portable instruments, sentiment dictionaries, experimental protocols, volatility models, that can travel across institutional contexts without shared data access. This operationalizes social learning theory (Bikhchandani and Sharma, 2000): as tools globalized, researchers in emerging markets, where retail participation and institutional volatility provide natural laboratories for bias detection, gained comparative advantage. Earlier research has mapped co-authorship in a descriptive manner; we explain why the empirical center of gravity has shifted to non-traditional locations.

Third, we identify structural blind spots that constrain the field's theoretical external validity. The keyword network places demographic variables (gender, age, trust) in a peripheral cluster with low connectivity to the behavioral core. This represents a theoretical contradiction: the value function of prospect theory is supposed to be universal; demographic moderators must appear as boundary conditions, rather than peripheral afterthoughts. It has always been the case that women tend to be more loss averse (Bucher-Koenen et al., 2021), and that cultural differences in trust influence portfolio allocation (Guiso, Sapienza and Zingales, 2008). The fact that they are marginalized means that behavioral finance operates under an implicit universalism which does not reject variation empirically but does not integrate it into the theory.

In the same vein, AI and machine learning are clustered around operational forecasting, as opposed to the behavioral analysis of investor psychology. As Barberis (2018) claims, technological innovation amplifies behavior; algorithmic trading and robo-advisory platforms can amplify herding and volatility spikes because they scale cognitive biases at machine speed. This structural decoupling suggests that the field lacks a theory of technological mediation, explaining how heuristics are maintained when decision rights are shared between human cognition and algorithms.

These findings are bounded by our Scopus Q1/Q2 restriction, which may exclude relevant regional research. Nevertheless, by moving beyond descriptive mapping to diagnostic structural analysis, we provide a foundation for integrating demographic diversity, technological mediation, and sustainability preferences into a coherent disciplinary framework.

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