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A Bibliometric Analysis on Overreaction and Underreaction of Investors

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Abstract

Investors significantly influence asset prices and market dynamics, but their tendency to misinterpret information can introduce inefficiencies. Recognising the need for comprehensive analysis to map the intellectual landscape and identify key research trends, this study conducts a bibliometric analysis of 141 publications from 1982 to 2022 using the Scopus database. A systematic literature review, ensuring comprehensive coverage, identifying research gaps, synthesising findings, minimising bias, and guiding future research, is emphasised. The analysis, performed with VOSviewer software, reveals a growing interest in investor behaviour, highlighting core themes such as Investor Sentiment, Momentum, Contrarian Strategies, and Market Anomalies. Co-occurrence analysis traces thematic progression, emphasising pivotal concepts like "overreaction," "underreaction," and "market efficiency." Less-explored areas like Trading Strategies, Long-term Performance, and Earning Revisions are noted. The findings offer a comprehensive view of the evolving landscape in investor behaviour research and suggest future research directions, including long-term behavioural patterns and cross-cultural studies.

Keywords: Asset Pricing, Bibliometric Analysis, Behavioural Finance, Market Anomalies, Market Efficiency

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Introduction

In the era of information and communication technology, information or news about any event taking place anywhere on the globe spreads at lightning speed throughout the world. Individuals also express their ideas and reactions to the event in real time via social media and social networking sources. In such an information-driven world, it's worth exploring for equity investors any such information or news about the stock market events which might influence stock returns. The nature of the information that floats around the stock market changes frequently and the volume of such information is also very high (Tversky, 1972). In addition to that, the level of investors' sophistication is also different from investor to investor. Thus, it may so happen that the investors are unable to fully process and analyse all the available information they receive, and they may respond to the information based on their own psychological set of characteristics and belief systems that they possess (Fabozzi, 2013). Investors' reactions to information about the stock market are broadly expressed in two ways, one is overreaction and another is underreaction. Underreaction and overreaction are the two families of pervasive regularities identified by empirical research in the area of behavioural finance. Overreaction and underreaction are psychological responses to the latest information rather than fundamental or technical in a stock market. Overreaction is when the stocks or assets become unreasonably over-bought or over-sold due to some emotional factors instead of fundamental factors. Similarly, underreaction is when the prices of the securities do not or marginally reflect the effect of the numbers of information prevailing in the market. The presence of underreaction evidence suggests that security prices demonstrate a tendency to underreact to news within time frames of up to one year. Consequently, the assimilation of news into prices occurs gradually, leading to positive autocorrelations in prices over these particular time periods (Brown & Harlow, 1988).

The presence of deviations from the efficient market hypothesis can be attributed to the behaviour and actions of investors in response to information. These deviations are particularly observed in the phenomena of overreaction and underreaction, which are examined within the framework of market efficiency tests. Overreaction transpires when decision-makers react excessively to new information, while underreaction entails insufficient responsiveness to news. The failure of investors to adequately react to information poses a significant challenge to the efficient market hypothesis (Jegadeesh & Titman, 1993). Efficient markets exhibit swift price adjustments in response to new information. Conversely, in inefficient markets, the speed of stock price adjustment varies based on the nature of the information and

prevailing market conditions. Investor overreaction refers to an exaggerated sense of optimism in investing that occurs in the initial stages following positive news, followed by subsequent corrections as the stock price gradually returns to its original value over time (DeBondt & Thaler, 1985). Keynes (1936) pointed out that certain seemingly insignificant investment information can have a profound impact on financial markets.

In recent years, several studies have compiled evidence of Overreaction and Underreaction of Investors. While these summaries offer insightful information in this field, a thorough analysis that addresses all the aspects of research works on the Overreaction and Underreaction of Investors is still needed. This study aims to comprehensively analyse and elucidate the evolving trends in published research concerning investors' reactions and their consequent impact on the market. It seeks to identify and map out the significant collaboration networks, key academic journals, influential articles, leading institutions, and countries contributing to the field of behavioural finance, with a particular focus on investor misreactions. By examining these elements, the research intends to uncover the intellectual and influential frameworks surrounding the phenomena of investor overreaction and underreaction. This exploration provides a foundational understanding of the dynamics at play within the academic community and highlights the key contributors and emerging hubs of research activity.

The significance of this research lies in its potential to significantly enhance our understanding of the scholarly landscape in behavioural finance, thereby promoting more effective research collaborations and the refinement of financial theories related to investor behaviour. By providing detailed insights into the behavioural aspects of market reactions, the study offers practical implications for investors, financial analysts, policymakers, and institutions. It informs better decision-making processes, contributing to more stable and efficient financial markets. Furthermore, this research can help identify gaps in current knowledge, suggesting areas for further investigation and development. Ultimately, the findings aim to reduce market volatility driven by irrational behavior and support the development of strategies to mitigate adverse economic impacts, thereby fostering a more predictable and resilient financial environment. Considering this, the study attempts to map the field's intellectual structure by achieving the following research objectives:

- To reveal the developing patterns in published research regarding investors' reaction and their impact on the market.

- To detect the prominent collaboration structures, influential academic journals, articles, institutions, and nations in the field of behavioural finance and specifically on investors' misreactions.
- To determine the intellectual and influential framework surrounding the overreaction and underreaction of investors.

This study utilized bibliometric analysis to achieve the aforementioned research objectives. Bibliometric analysis is a quantitative method used to study and evaluate scientific literature through statistical analysis of citation patterns and publication characteristics (Bornmann & Leydesdorff, 2014; Leydesdorff & Welbers, 2011). It involves the measurement of the quantity and quality of publications and the citation relationships between them. This approach can be used to map the development of research fields, identify key contributors, and determine the impact of specific publications on the field (Bornmann & Leydesdorff, 2014). It is used to evaluate the influence of research in academia. For instance, the more a study is cited by others, the more significant it is considered. Additionally, the study uses a variety of bibliometric tools to map the literature and derive insightful information on the chronological trends of publications, the most influential authors, top journals, and important studies. This distinctive combination of data analysis methods not only conducts a critical assessment of the body of literature but also offers greater insights to understand the limitations and identify research gaps. The initial section presents a conceptual framework that focuses on the overreaction and underreaction of investors. Subsequent sections outline the literature search methods and techniques employed to conduct the study, followed by the presentation of results and interpretations from the analysis. The paper concludes with a discussion of future research opportunities in this field.

Literature Review

Overreaction and Underreaction

The relationship between stock prices and new information has been explored through different approaches over the years. Empirical research has yielded three perspectives. The first perspective aligns with the efficient market hypothesis, stating that market prices, on average, accurately reflect all available information about a firm, suggesting that the price is right (Fama, 1970). The second response is that even if a connection exists between prices and economic values, it is not very significant. The market features a lifetime of its own. In the words of John Maynard Keynes, prices are driven by 'animal spirits.' The third perspective, which receives substantial

support from empirical research in behavioural finance, can be linked with Isaac Newton's law of universal gravity: "What goes up must come down." Applied to financial markets, this law implies that over time, prices tend to revert to their intrinsic value. These three perspectives on asset valuation have different implications for money management, particularly in the short run. The "price-is-right" perspective suggests that an indexing strategy is optimal since it is difficult to outperform the market. The "animal-spirits" view, on the other hand, places emphasis on technical analysis and considers the study of investor sentiment to be crucial (Pring, 1991). The third perspective suggests that one should opt for value investment strategies and seek fundamental analysis. It is to be noted that two out of the three perspectives recommended that one must pay careful attention to human behaviour as far as price movement in the financial market is concerned (DeBondt & Thaler, 1987).

How does the stock price react to a piece of news? The answer depends on how the future earnings and investors' perceptions about the company are influenced by the news. There are always two influences. The first influence pertains to the immediate impact of news, taking into account the information already incorporated into the price. The second influence is determined by how the news alters the cognitive frame of investors. Occasionally, even a seemingly insignificant piece of news can trigger a significant shift in investors' cognitive frame, leading to a substantial price reaction. Financial analysts make predictions about the upcoming scenarios in the financial market by utilising the pieces of information available to them. How do these people make these predictions? Financial forecasts about share prices, earnings, etc., are made on the basis of recent past information. Amateur investors find it difficult to predict or project anything greatly different from the apparent trend, even if their projection is an over-optimistic forecast or groundless confidence. Kahneman and Lavallo (1994) termed such practices as the "inside view" of forecasting. These types of forecasts generally overreact to the facts that appear prominent in a narrow frame and underreact to the facts which are more important as far as returns are concerned. In contrast, "the outside view" of the forecast extends attention to genuine information like statistics or the fundamentals of the company (Kaestner, 2006). Even if the investors have access to genuine information, they often ignore them. Non-Bayesian forecasting results from the representativeness heuristic. The representativeness heuristic is a psychological bias where the investors under uncertainty are subject to believe that the remarkable performance of a firm in the past is representative of the common or general performance that the firm will carry on with it into the future to generate the same performance. Such heuristics cause judgment errors among investors. An example of how representativeness biases affect

judgment in the financial market has to do with the long-term inferior performance of the IPOs and the so-called 'next' syndrome. All the investment bankers find it attractive to sell IPOs as the 'next' Microsoft or the 'next' Intel, especially the start-up companies that are small in size and do not have a long historical earning background. This example goes the same with the notion that "many firms go public near the peak of industry-specific fads" (Ritter, 1991).

DeBondt and Thaler (1985) conducted an empirical study to prove that overreaction affects stock market prices. The study contrasted the general notion of investing where the investors show excessive optimism with the firms bearing a higher P/E ratio and pessimism with the firms with a lower P/E ratio. The study was conducted using data from all the firms listed on the New York Stock Exchange since 1925. Stock prices were analysed, and returns were calculated for a period of 85 months. Based on the returns, two portfolios were created: the 'Winner Portfolio', consisting of the top 35 stocks, and the 'Loser Portfolio', comprising the bottom 35 stocks. The returns of these portfolios were then analysed over the next 60 months.

The findings align with the overreaction hypothesis, which suggests that portfolios of previous "losers" tend to outperform portfolios of past "winners." After a 36-month period following portfolio formation, the losing stocks exhibited approximately 25% higher returns compared to the winners, despite the winners being considered riskier. The portfolio of the 35 New York Stock Exchange (NYSE) stocks that performed poorly in the past performed the best, outperforming the former winners. On average, the difference between the performance of the two portfolios was 8% per annum. The Winner-Loser Effect is the first asset pricing anomaly predicted by the behavioural theory of finance. The cause of such an effect is a generalized overreaction. The mental frame or the cognitive process of the investors sometimes confuses attractive companies with attractive investments since traders detect imaginary trends in the stock returns. Sometimes, many investors unknowingly generalise the past earning trends into the future thereby causing further overreaction. Many investors tend to associate well-run firms with favourable investment opportunities, indicating a potential stock market overreaction. This behaviour parallels how voters often elect politicians based on the current state of the economy or overall social development. Consequently, companies experiencing rapid growth or those featured prominently in business magazines are perceived as excellent investment options. On the other hand, firms that report losses in their reports are less preferred by the investors. Shefrin and Statman (1997) examined the most reputed companies as ranked by Fortune Magazine. Their analysis revealed an inverse

correlation between the reputation of a company and the ratio of book value to market value of equity. This finding suggests that highly-reputed companies tend to be overpriced, indicating poor stock market performance. Conversely, companies that are less favoured by investors often outperform these reputed companies.

Materials and Methods

In this study a bibliometric approach has been adopted that employs quantitative tools for analysing bibliographic and bibliometric data (Zupic & Čater, 2015). Unlike traditional systematic literature reviews, a bibliometric analysis is better suited to explore domains with a vast amount of bibliographic and bibliometric information. The conceptual framework of bibliometric analysis, rooted in scientometrics, offers a structured and quantitative approach to studying the scholarly literature on a specific topic (Glänzel & Moed, 2002). Through the utilization of bibliometric techniques like citation analysis, co-citation analysis, and keyword analysis, researchers can gain valuable insights into the development of a research field, identify key contributors, and detect emerging research trends (Ellegaard & Wallin, 2015). These techniques enable the mapping of citation networks and identification of influential publications, allowing for the assessment of research impact and knowledge diffusion within a specific discipline (Small, 1973). It provides a valuable tool for identifying knowledge gaps and potential future research directions (van Eck & Waltman, 2017). By analysing co-citation networks and keyword co-occurrence, researchers can identify clusters of related topics and explore the interconnections between different research areas (Rafols et al., 2010). This framework aids in understanding the intellectual structure of a research field, guiding researchers to important literature, and informing interdisciplinary collaborations (Chen et al., 2012; Leydesdorff & Rafols, 2009).

Moreover, bibliometric analysis plays a crucial role in research evaluation and policy-making. It provides quantitative evidence of research productivity, impact, and collaboration patterns, assisting funding agencies and institutions in decision-making processes (Bornmann & Marx, 2013). Additionally, it facilitates the assessment of research trends and societal impact, contributing to evidence-based policy formulation and strategic research planning (Waltman & van Eck, 2013). It offers a systematic and quantitative approach to studying scholarly literature. By employing various techniques, it enables the exploration of research evolution, key contributors, and emerging trends. This framework serves as a valuable tool for identifying knowledge gaps, guiding future research directions, and informing research evaluation and policy-making processes.

This study follows the four-step process outlined by Donthu et al. (2021) for conducting bibliometric reviews. These steps include (1) defining the scope and objectives of the review, (2) selecting suitable techniques of analysis, (3) collecting relevant data for analysis, and (4) conducting the analysis and presenting the findings. This study primarily aims to explore the intellectual landscape of research on investor overreaction and underreaction in the stock market through a bibliometric analysis. The focus is on investigating publication trends related to articles, journals, authors, institutions, and countries in this field of study. The study utilises a variety of bibliometric analysis methods to uncover the framework of overreaction and underreaction of investors in the stock market. Bibliometric analysis techniques are adept at handling extensive datasets (Donthu et al., 2021), and they also assist in detecting publication trends, identifying emerging topics, and visualising thematic progression. This enables both retrospective and prospective analyses of future research directions (Ciampi et al., 2021; do Prado et al., 2016; Kumar et al., 2021; Pattnaik et al., 2021). Based on the recommendations of Donthu et al. (2021), the study employed a performance analysis of the review corpus, employing bibliometric techniques such as co-citation analysis, and co-occurrence analysis. Co-citation analysis is adept at identifying the foundational concepts (Klavans & Boyack, 2010; Small, 1973) and also advantageous for elucidating the themes within the body of knowledge (Andersen, 2019; Waltman et al., 2010). Co-occurrence (or co-word) analysis is beneficial for revealing the topical trajectories of the research (Andersen, 2019; Cheng et al., 2016; Pattnaik et al., 2020; Zupic & Čater, 2015).

To ensure comprehensive coverage of peer-reviewed finance research, the study chose to gather data from Scopus. Scopus was selected due to its extensive database, which encompasses a wide range of scholarly publications in the field (Pattnaik et al., 2020), surpassing other databases like Web of Science (Gorraiz & Schloegl, 2008). In accordance with recent literature reviews (Garg & Tiwari, 2021; Mustak et al., 2021; Toorajipour et al., 2021), the study utilises a comprehensive set of search terms. The search terms employed in this study are specifically tailored to the research area, reflecting the nature of bibliometric analysis. These search strings are designed to function as keywords, effectively retrieving the necessary dataset from the database (Costa et al., 2019; Goodell et al., 2021; Singh, 2021). Table 1 demonstrates the systematic approach which has been employed to generate a final corpus of 141 articles published between 1982 to 2022. Following the research works of Toorajipour et al. (2021) and Goyal and Kumar (2020), the study used an extensive range of search terms by using Boolean operators (OR, AND, etc.) Data obtained from databases like Scopus may occasionally contain inaccurate bibliometric and

bibliographic information due to the referencing of the primary research in subsequent publications (Baker et al., 2020). Therefore, the study acknowledges the potential for inaccurate evaluation when processing such records without data cleaning. To mitigate this issue, the research conducted data cleaning by examining the references. This approach allowed for an effective exploration of the bibliometric and bibliographic data, visualisation of the findings, and interpretation of the results, aligning with the recommendations of Donthu et al. (2021) and Zupic and Čater (2015).

Table 1: Search Criteria and Article Selection

Filtering Criteria	**Reject**	**Accept**
Search criteria		
Search engine: Scopus		
Search Date: 21st September 2022		
Search term: "Overreaction* and Underreaction*" OR "Overreaction* and Underreaction* of Investors*" OR "Overreact* of Investor*" OR "Underreact* of Investor*" OR "Misreaction* of Investors*" OR "Overreaction* and Underreaction* of Investors* in Stock Market*" OR "Overreaction* and Underreaction*" AND "Stock Market*"		189
Subject Area: "Economics, Econometrics and Finance", "Business, Management and Accounting", "Social Sciences", "Decision Sciences", "Psychology", and "Arts and Humanities"	12	177
Document Type: "Articles" and "Reviews"	9	168
Source Type: Journal	5	163
Article Selection		
Language screening: Include documents in English only	2	161
Erroneous records screening: Include documents with valid author information only	11	150
Content screening: Include articles if ''Titles, abstracts, and keywords'' indicate relevance to the scope of the study.	9	141

Note: The table shows the methodical process used to select the final group of 141 papers for analysis. The generation of the search terms was conducted through collaborative brainstorming among the authors, comprising experts in the subject matter and research methodology.

Source: Compiled with data extracted from the Scopus database

Bibliometric analysis has gained substantial attention from researchers in recent times due to its capacity to analyse extensive data sets over extended periods, as well as its compatibility with a range of software tools, including Bibliometrix R,

Bibexcel, Gephi, VOSviewer, SciMat, among others. In this study, bibliometric analysis on 141 articles was conducted by using VOSviewer Software after following a manual screening procedure.

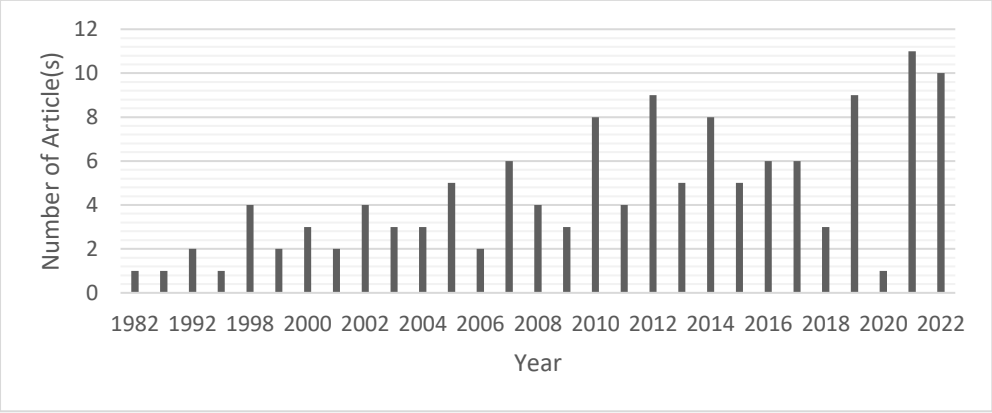
Results

Performance Analysis of Overreaction and Underreaction of Investors

Publication Trend in Chronological Order

Figure 1 showcases the historical progression of publications in the field of Investors' overreaction and underreaction. It presents the total number of research papers published annually from 1982 to 2022. Over time, there has been a notable increase in the number of research publications each year, starting from 1 in 1982 and reaching 11 in 2021, as indicated by the statistical data. From 2005 onwards, this widespread is mostly perceptible. The number of papers published between 1982 and 2004 was a few only. The interest of the researchers in this subject has grown over time.

Figure 1: Chronological Publication Trend



Source: Compiled with data extracted from the Scopus database

Figure 1 shows that starting from 2019, about 10 research papers have been published annually with a notable exception in 2020, during which publication activities were adversely affected by the pandemic. The number of publications reached its highest level in 2021 (11). Additionally, 10 publications have already been published in the first three quarters of 2022. Therefore, it can be concluded that the growth of the publication is expected to follow the same trend in the future, too. Therefore, the topic continues to be promising in the field of research.

Top Authors, Institutions, and Countries

Table 2 lists the top authors in the field of research, along with their institutions and nations at the time of authoring. Hong. H, who has 1715 citations, is by far the most significant and prominent author, followed by Stein J. C., who also has 1715 citations. Galariotis E.C, Wong W. K, Maor M and Simpson M.W., who have three publications, are the most productive authors in terms of publications. The Graduate School of Business, University of Chicago, and Harvard University, Cambridge are the two universities with the highest influence overall, with 4188 and 2090 citations, respectively. The Graduate School of Business, University of Chicago, and Emerging Markets team, Netherlands, are the most productive organisations in terms of publications, with two publications each. The United States leads all other nations in terms of intellectual contributions in this field of research, with 59 papers and the most citations (7694). Netherlands, the country second in the list, has only 282 citations and 6 publications.

Top Journals in the Field of Research

Table 3 contains the main finance journals that are involved in publishing research papers on the Overreaction and Underreaction of Investors. The two most significant journals in terms of citations are the Journal of Financial Economics and the Journal of Finance, with 4680 and 2510 citations, respectively. At the same time, the Journal of Financial Economics (6), Journal of Finance (5), Journal of Banking & Finance (5), and Applied Financial Economics (5) are the two most active journals in terms of publications.

The distribution of publication productivity over various time periods reveals a recent upward trend in the volume of publications on the subject of this review. Impressively, according to the Australian Business Deans Council (ABDC) 2012 Journal Quality List, more than 72% of the key journals for publishing papers related to Overreaction and Underreaction of Investors have rankings of "A*" or "A." This shows that prestigious journals are open to publishing research papers on the field of the study. These patterns predict that in the future the number of research papers on this particular topic will increase due to the fact that prestigious journals are emphasising academic interest in the area of the study.

Top articles on Overreaction and Underreaction of Investors

Table 4 lists the articles on overreaction and underreaction of investors that have received the most citations. With 2098 citations, the article authored by Fama (1998) is the most significant and important article in Scopus, followed by Barberis

Table 2: Top Authors, Institutions, and Countries in the Field of Research in Overreaction and Underreaction of Investors.

TC	Authors	TP	TC	Institution	TP	TC	Country	TP
1715	Hong H.	2	4188	Graduate school of business, Uni of Chicago	2	7694	United States	59
1715	Stein J.C.	2	2090	Harvard University, Cambridge	1	282	Netherlands	6
137	Bloomfield R.	2	1002	Dept. of Indust. Eng. & per. res., Columbia University	1	210	Germany	14
117	Van Der Hart J.	2	677	Cornell University, USA	1	204	Singapore	3
117	Van Dijk D.	2	219	Dept of Economics, Harvard University, Cambridge	1	198	Australia	8
80	Galariotis E.C.	3	219	Harvard Business School, USA	1	121	Israel	3
75	Libby R.	2	219	National Bureau of Economic Research, Cambridge	1	115	UK	12
75	Nelson M.W.	2	197	College of comm & bus. Admin., USA	1	108	Hong Kong	7
74	Wong W.K.	3	197	Nanyang Business School, Singapore	1	84	Greece	3
73	Epstein L.G.	2	156	University of Minnesota, USA	1	59	China	10
73	Noor J.	2	138	Yale university	1	53	Canada	4
73	Sandroni A.	2	117	Emerging Markets Team, Netherlands	2	45	France	3
53	Maor M.	3	113	Dept of Finance, University of Illinois, USA	1	43	Spain	5
51	Lam K.	2	105	Dept of Eco, Uni of Groningen, Netherlands	1	40	Taiwan	6
34	Liu T.	2	105	Johnson Grad. School of Management, USA	1	17	India	6
33	Simpson M.W.	3	98	Eberhard Karls Universität Tübingen, Germany	1	17	Malaysia	2
31	Schiereck D.	2	98	University of Technology, Sydney, Australia	1	16	Saudi Arabia	3
21	Caginalp G.	2	98	Universität Erfurt, Germany	1	5	Pakistan	4
21	Desantis M.	2	92	Dept. Of Quantitative Research, Netherlands	1	3	Brazil	3
18	Wang J.	2	92	Econometric Institute, Netherlands	1	3	South Korea	2

Notes: TC = Total Citations. TP = Total Publications. The research constituents (i.e., author, institution, country) appear according to total citations in this table

Source: Compiled with data extracted from the Scopus database

Table 3: Top Journals in This Field of Research

Journal	TC	TP	ABDC Rank	Year wise Publication				
				1982-1990	1991-1999	2000-2008	2009-2017	2017-2022
Journal of Financial Economics	4680	6	A*		2	2	1	1
Journal of Finance	2510	5	A*		1	2		2
Management Science	1077	2	A*			2		
Pacific Basin Finance Journal	219	3	NA			2	1	
Journal of Empirical Finance	190	2	A			1	1	
Journal of Economic Behavior and Organization	86	2	A*		1		1	
Journal of Banking and Finance	85	5	A			1	3	1
Review of Financial Studies	65	2	A*			1		1
Applied Financial Economics	62	5	B			3	2	
Journal of Business Research	56	3	A				1	2
European Journal of Finance	52	2	A			1	1	
Quarterly Review of Economics and Finance	52	3	B			3		
Journal of Behavioral Finance	49	3	A				2	1
Review of Quantitative Finance and Accounting	45	3	B			1	2	
Contemporary Accounting Research	30	2	A*			1		1
Financial Review	29	2	A	1	1			
International Review of Economics and Finance	26	3	NA				1	1
Research in International Business and Finance	24	4	B			1	2	1
Review of Behavioral Finance	23	2	B				1	1
Journal of International Financial Markets, Institutions and Money	16	2	A			1	1	

Notes: ABDC = Australian Business Dean Council 2022 Journal Ranking List; TC = Total Citations; TP = Total Publications; Journals appear in order of the total citations

Source: Compiled with data extracted from the Scopus database

Table 4: Top articles on Overreaction and Underreaction of Investors

Authors and Year	Title	Journal	TC
Fama E. F. (1998)	Market efficiency, long-term returns, and behavioral finance	Journal of Financial Economics	2098
Barberis N., Shleifer A., Vishny R. (1998)	A model of investor sentiment	Journal of Financial Economics	2090
Hong H., Stein J.C. (1999)	A unified theory of underreaction, momentum trading, and overreaction in asset markets	Journal of Finance	1715
Lee C.M.C., Swaminathan B (2002)	Price momentum and trading volume	Journal of Finance	677
Abarbanell J.S., Bernard V.L. (1992)	Tests of analysts' overreaction/ underreaction to earnings information as an explanation for anomalous stock price behavior	Journal of Finance	440
Cohen R.B., Gompers P.A., Vuolteenaho T. (2002)	Who underreacts to cash-flow news? Evidence from trading between individuals and institutions	Journal of Financial Economics	219
Kang J., Liu M.-H., Ni S.X (2002)	Contrarian and momentum strategies in the China stock market: 1993-2000	Pacific-Basin Finance Journal	197
Li J., Yu J. (2012)	Investor attention, psychological anchors, and stock return predictability	Journal of Financial Economics	156
Shiller R.J. (1999)	Human behavior and the efficiency of the financial system	Handbook of Macroeconomics	138
Poteshman A.M (2001)	Underreaction, overreaction, and increasing misreaction to information in the options market	Journal of Finance	113
Leeflang P.S.H., Wittink D.R. (1996)	Competitive reaction versus consumer response: Do managers overreact?	International Journal of Research in Marketing	105
Baur D.G., Dimpfl T., Jung R.C. (2012)	Stock return autocorrelations revisited: A quantile regression approach	Journal of Empirical Finance	98

Authors and Year	Title	Journal	TC
Bloomfield R., Hales J. (2002)	Predicting the next step of a random walk: Experimental evidence of regime-shifting beliefs	Journal of Financial Economics	92
Van der Hart J., Slagter E., Van Dijk D. (2003)	Stock selection strategies in emerging markets	Journal of Empirical Finance	92
Massey C., Wu G. (2005)	Detecting regime shifts: The causes of under- and overreaction	Management Science	75
Amir E., Ganzach Y. (1998)	Overreaction and underreaction in analysts' forecasts	Journal of Economic Behavior & Organization	68
Caskey J.A. (2009)	Information in equity markets with ambiguity-averse investors	The Review of Financial Studies	64
Cooper M.J., Jackson III W.E., Patterson G.A. (2003)	Evidence of predictability in the cross-section of bank stock returns	Journal of Banking and Finance	54
Cowgill B., Zitzewitz E. (2015)	Corporate prediction markets: Evidence from Google, Ford, and Firm X	The Review of Economic Studies	49

Notes: TC = Total citations

Source: Compiled with data extracted from the Scopus database

et al. (1998) with 2090 citations. Fama (1998) proposed the Efficient Market Hypothesis which postulates that beating the market is impossible, and the prices are the true reflectors of the available market information. Further, it holds that all the investors are rational in the market and have access to all the available information. Barberis et al. (1998) presented a model that depicts how the investors' belief system works based upon relevant and irrelevant market information. This model explains that investors' psychological and cognitive processes make them react to information, but they give different levels of importance to it. That is, the weight and strength of a piece of information influence the decision-making process of the investors, and based on the weightage to the information, the investors overreact or underreact. Hong et al.(2000) clearly explained the concept of underreaction in financial markets, allowing other researchers to build on it and conduct further studies.. Similarly, other authors in this list have also contributed a lot in developing the theoretical framework underpinning the concepts of overreaction and underreaction of investors in the financial markets.

Intellectual and Influence Structure of Research on Overreaction and Underreaction of Investors

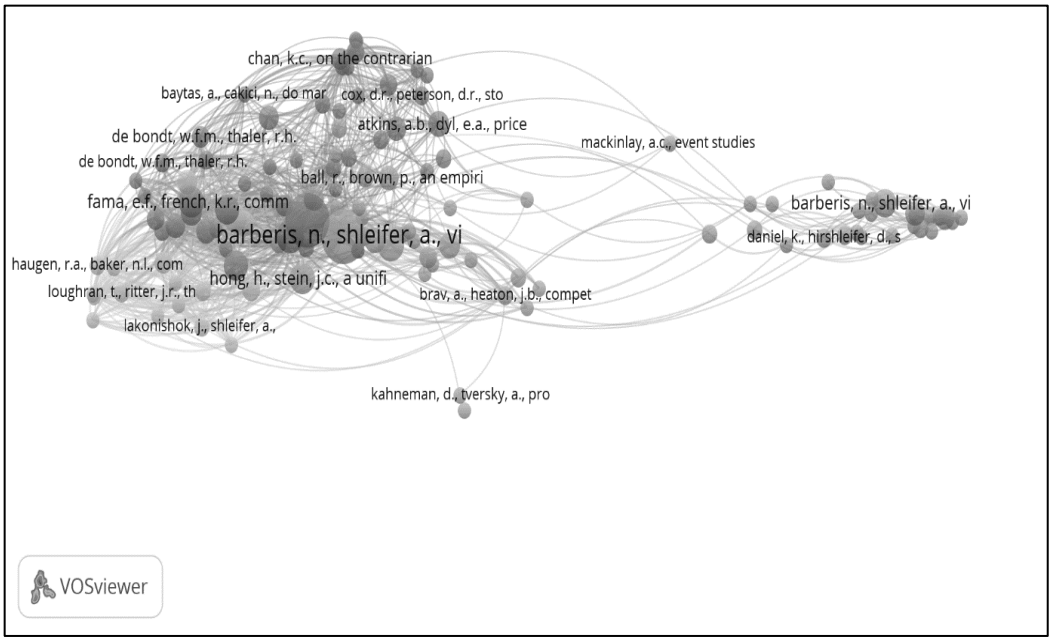
Knowledge Foundations Through Co-Citation Analysis:

Co-citation analysis is a bibliometric technique utilised to establish connections between scholarly documents by examining the frequency with which they are cited together by other documents. This method enables the identification of relationships and patterns among the cited works, providing insights into the intellectual structure of a research field. According to White and McCain (1998), co-citation occurs "when two or more documents are cited in the same third document." Co-citation analysis examines patterns of co-citation to identify clusters that share common themes or ideas and can provide insight into the intellectual structure of a field of study (Small, 1973). Figure 2 displays the co-citation map of references cited at least seven times by articles in the review corpus.

The co-citation analysis of co-cited references related to research on Overreaction and Underreaction of investors is structured around five fundamental clusters: Investors' sentiment, Overreaction and Underreaction (represented by red node); Winner and loser portfolio in the investment and returns (represented by green node); Momentum and contrarian strategies (represented by blue node); Market Anomalies (represented by yellow node); and Market Efficiency (represented by purple node). The largest foundational cluster pertains to Investors' sentiment, Overreaction and Underreaction (represented by the red node). It is noteworthy that the most frequently

cited reference in this cluster is "A model of investor sentiment " authored by Barberis et al. (1998). The authors proposed a model to explain the impact of investor sentiment on stock prices. The authors argued that investors often rely on heuristics and biases rather than rational analysis when making investment decisions, leading to the mispricing of assets. The paper presents empirical evidence to support the model and discusses potential implications for financial markets and the economy. The work of Jegadeesh and Titman (1993) titled "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency" the most cited work in the second cluster represented by green node provides empirical evidence suggesting that short-term momentum trading strategies generate abnormal returns in the stock market. The authors argue that this finding challenges the efficient market hypothesis and has implications for investment strategies. The other works of research also shed light on various aspects of the research topic such as momentum and contrarian strategy, various market anomalies, market efficiency, etc.

Figure 2: Co-Citation of References Cited by Articles on Overreaction and Underreaction of Investors



Note: Figure 2 illustrates a co-citation map, where each node represents a cited reference. Node size reflects the degree of local citations. The links between nodes depict co-citations, with link thickness representing the intensity of co-citation.

Source: Prepared using VOSviewer with the help of data extracted from the Scopus database.

Thematic Progression Through Co-Occurrence Analysis

This section utilizes co-occurrence analysis to present the thematic progression of research on overreaction and underreaction of investors in the field of Finance from 1982 to 2022. VOSviewer software, which considers author keywords as representations of intellectual topics in scholarly articles, is employed for the analysis. By combining author keywords, this analysis can uncover emerging trends in thematic progression and significant advancements in the field of research. Table 5 displays the most commonly used keywords in the field from 1982 to 2022.

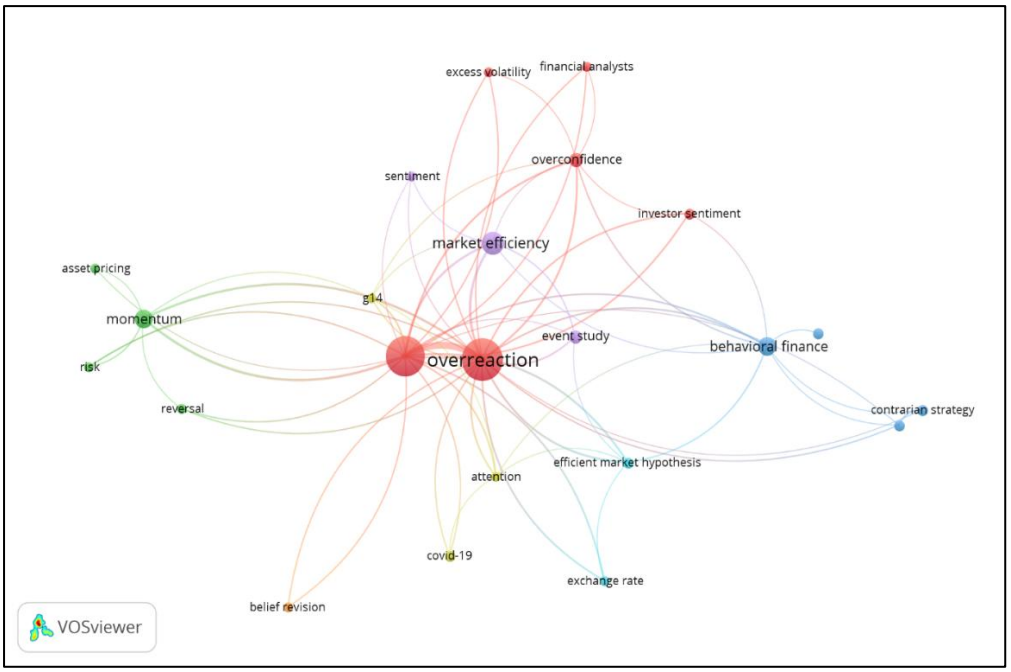
Table 5: Major Keywords Used in Research on Overreaction and Underreaction of Investors

Keywords	Occurrences	Keywords	Occurrences
Overreaction	53	Excess Volatility	3
Underreaction	49	Exchange rate	3
Market Efficiency	16	Financial Analyst	3
Momentum	10	Belief Revision	3
Behavioural Finance	10	Reversal	3
Overconfidence	6	Asset Pricing	3
Event Study	5	Sentiment	3
Efficient Market Hypothesis	4	Behavioural Model	2
Investors Sentiment	4	Earning Revisions	2
Momentum Strategy	4	Value	2
Contrarian Strategy	4	Bias	2
Covid-19	4	Volume	2
Overreaction & Underreaction	4	Long term performance	2
Attention	3	Money Supply	2
Risk	3	Trading Strategies	2

Source: Compiled with data extracted from the Scopus database

Table 5 reveals that the most frequently occurring keyword in the field of overreaction and underreaction of investors is "Overreaction," appearing 53 times. Following closely is "Underreaction," a counterpart of overreaction, with 49 occurrences. The context of market efficiency tests involves exploring the phenomena of overreaction and underreaction. "Market Efficiency" is the next prominent keyword, with 16 occurrences. "Momentum" is also a prominent keyword, with a total of 10 occurrences. “Behavioural Finance” and “Overconfidence” are the other major keywords used by the researchers, counting occurrences of 10 times and 6 times, respectively. The emerging themes based on author keywords in the field of research include event study, efficient market hypothesis, Investors’ sentiment, momentum strategy, contrarian strategy, etc.

Figure 3: Network Visualisation of Co-Occurrence of Keywords



Source: Prepared using VOSviewer with the help of data extracted from the Scopus database

Figure 3 presents a network visualization of co-occurrence analysis of author keywords. Initially, a default minimum occurrence value of 5 was set, which identified 7 out of 414 keywords. However, the resulting image was too complex to comprehend. Increasing the minimum occurrence value could result in too few keywords being presented. Thus, a minimum occurrence value of 3 was found to be the best, resulting in 23 keywords, 7 clusters, 65 links, and total link strength of 180. The resulting image, shown in Figure 3, presents each cluster as a theme, with descriptions provided below.

Cluster 1: Investors' sentiment, overreaction and underreaction. The cluster has been highlighted in red and is primarily characterized by the keyword "Overreaction," which appears 53 times, followed by "Underreaction" with 49 occurrences. Other noteworthy keywords in this cluster include "Investors' Sentiment," "Overconfidence," "excess volatility" and "Financial Analysts". The cluster is based on investors' sentiment and eventual or gradual overreaction or underreaction as investors tend to base their investment decisions on heuristics and biases rather than rational analysis. This approach can result in the mispricing of assets (Jegadeesh, 1990).

Cluster 2: Asset pricing, momentum and risk reversal. The cluster highlighted in green is primarily associated with the keywords "Momentum" (10 occurrences) with other significant keywords such as "Asset Pricing" and "Risk Reversal". The cluster holds that the asset pricing and momentum literature seeks to explain the nature, causes, and implications of this anomaly for investors, asset managers, and policymakers. Stocks of firms with higher quality tend to have higher returns and lower risk compared to those with lower quality. Investors tend to under-price stocks of high-quality firms and over-price stocks of low-quality firms. Thus, it is important to consider firm quality when making investment decisions because the markets may not always be efficient in pricing assets (Sehgal & Pandey, 2021).

Cluster 3: Momentum and contrarian strategy. Cluster 3 is represented by the colour 'blue' and is primarily characterised by the keyword "Behavioural Finance", which appears most frequently (10 occurrences), followed by "Contrarian Strategy," "Momentum Strategy," and "Overreaction and Underreaction". Momentum and contrarian strategies are two commonly studied investment approaches in the field of behavioural finance. The momentum strategy involves buying assets that have recently performed well, while the contrarian strategy involves buying assets that have recently performed poorly. Both approaches exploit behavioural biases that are pervasive in financial markets, such as herding, overconfidence, and anchoring. Empirical research has found that these strategies can generate abnormal returns but also pose risks such as market volatility and liquidity constraints. Understanding the behavioural foundations of these strategies is crucial for investors and asset managers seeking to identify profitable trading opportunities and manage portfolio risk (Jegadeesh & Titman, 1993).

Cluster 4: Uncertainty and volatility of the market. This cluster is represented by yellow and has "Covid 19" and "attention" as major keywords. This cluster represents how the market was affected due to the pandemic. The COVID-19 pandemic has significantly impacted the global stock market, leading to increased volatility and uncertainty. Research by Baker et al. (2020) found that the pandemic has caused the largest global economic shock since the Great Depression, with sharp declines in stock prices and increased market volatility. Another study by Al-Awadhi et al. (2020) examined the impact of COVID-19 on stock market returns in the Gulf Cooperation Council (GCC) countries and found a significant negative relationship between the number of COVID-19 cases and stock market returns. Despite government interventions, such as stimulus packages and quantitative easing, the long-term impact of the pandemic on the stock market remains uncertain.

Cluster 5: Financial market and investors' sentiment. A violet line has been used to mark this particular cluster, which consists of only three keywords: "Market Efficiency" (16), "Event Study" (5) and "Sentiment" (3). Market efficiency stands out as the central concept within this cluster, while event study, market sentiment, etc. serve as a notable component of the broader discipline of market efficiency in behavioural finance. This is indicated by their respective frequencies of occurrence.

Cluster 6: Efficient market hypothesis. This cluster is represented by a sky blue line and has the Efficient market Hypothesis as the broad constituent of this cluster with four occurrences along with the exchange rate which has three occurrences in this cluster. The cluster postulates that the efficient market hypothesis posits that financial markets are efficient, implying that asset prices consistently reflect all available information. This hypothesis is rooted in the belief that market participants' competition fosters efficient pricing, ensuring that any new information is swiftly integrated into the market price. EMH has been the subject of much debate and criticism in the finance world (Fama, 1970).

Cluster 7: Belief revision. An orange line has been used to mark this cluster with only a single keyword, namely Belief Revision, with three occurrences. Massey and Wu (2005) examined the impact of belief revision on the under- and overreaction of financial markets during regime shifts. They argued that a better understanding of belief revision could provide insights into how market participants can anticipate and respond to these shifts, ultimately leading to more efficient markets.

Discussion

The work of DeBondt and Thaler (1985) titled "Does the Stock Market Overreact?" examined the phenomenon of overreaction and underreaction in financial markets. The study challenged the efficient market hypothesis, which suggests that financial markets are perfectly efficient and that stock prices reflect all available information accurately. Overreaction refers to the tendency of investors to overestimate the impact of recent negative news or events on a stock's future performance. Underreaction, on the other hand, refers to the tendency of investors to underestimate the impact of positive news or events on a stock's future performance. Their research had a significant impact on the field of behavioural finance, which explores how psychological biases and cognitive errors influence investor behaviour and market outcomes. The study contributed to a growing body of evidence challenging the notion of market efficiency and highlighting the role of investor sentiment and behavioural factors in shaping stock market movements.

In this study, a bibliometric analysis is utilised to investigate the development of the field related to overreaction and underreaction of investors. Notably, since 2010, there has been a significant surge in publications on this topic. The study's findings reveal that Hong H. stands as the most cited author, with a total of 1715 citations. Among institutions, the Graduate School of Business, University of Chicago, emerged as the most dominant, accumulating 4188 total citations. Furthermore, the review corpus demonstrates a wide geographical dispersion, highlighting the fastest-growing nations based on highly influential publications. The United States, Netherlands, Germany and Singapore emerge as the frontrunners in terms of contributing impactful research in this field. The study conducted a thorough analysis to identify the top journals in the field, with The Journal of Financial Economics emerging as the most cited journal. Among the most influential articles, Market efficiency, long-term returns, and behavioural finance by Fama (1998) ranked first in terms of citations. Through co-citation analysis of references, the study revealed significant connections between research on overreaction and underreaction of investors with topics such as efficient market, behavioural biases, efficient market hypothesis, market volatility etc. Additionally, the study identified six thematic clusters within the research domain. These clusters encompassed themes like investors' sentiment, asset pricing, momentum and contrarian strategy, market efficiency, uncertainty, belief revision etc., which were identified as the most dominant themes. Lastly, the study identified 'Overreaction' and 'Underreaction' as the most prominent keywords within the review corpus, followed closely by 'Market Efficiency'. These keywords reflect the primary focus and content of the research in this field.

The study identifies influential work in behavioural finance, paving the way for future research on review-based papers and content analysis in the field. This analysis allows researchers to examine key themes, theories, and methodologies, facilitating the development of comprehensive reviews to synthesize existing knowledge, identify research gaps, and propose new directions for investigation. Future research on investor overreaction and underreaction should focus on several key areas to advance understanding in financial markets. Long-term Analysis of Behavioural Patterns is essential to uncover the persistence and evolution of these phenomena across various market cycles and economic conditions. Additionally, more in-depth studies on Behavioural Biases and Cognitive Errors, such as confirmation bias, loss aversion, and herding behaviour, will provide a clearer picture of the underlying causes. Comparative Cross-Country and Cross-Cultural Studies can reveal how local market characteristics and cultural factors influence investor behaviour, offering

insights into the universality versus specificity of these behaviours. Furthermore, assessing the Profitability of Investment Strategies, specifically contrarian and momentum strategies, in different market conditions and geographies can shed light on their effectiveness and associated risks.

Research should also explore the Information Dissemination and Market Efficiency through social media, news outlets, and other channels, and its impact on market efficiency and investor reactions. The role of Technological Advancements, such as algorithmic trading and artificial intelligence, in shaping market behaviour warrants thorough investigation to inform regulatory frameworks and trading strategies. Behavioural interventions aimed at mitigating biases through educational programs, decision aids, and regulatory changes are crucial for improving investor decision-making processes. Detailed event studies and market sentiment analysis help examine specific events and their impact on market behaviour. Integrating these analyses with financial theories, such as market microstructure and asset pricing models, provides a more comprehensive understanding of market dynamics. Lastly, examining the Impact of Global Crises, such as the COVID-19 pandemic, on investor behaviour and market reactions will offer valuable insights into how crises-induced uncertainty and volatility influence overreaction and underreaction patterns, and market recovery post-crisis.

The paper attempts to make significant contributions to the field of behavioural finance, particularly in the context of investor overreaction and underreaction. Through a comprehensive bibliometric analysis, it identifies six thematic clusters that dominate the literature: investors' sentiment, asset pricing, momentum and contrarian strategies, market efficiency, uncertainty, and belief revision. A major focus of the paper is the impact of the COVID-19 pandemic on the global stock market, which it demonstrates through an analysis of increased volatility and uncertainty during the period. The paper also highlights the most influential publications and authors in the field, such as Fama's work on market efficiency and the behavioural model proposed by Barberis, Shleifer, and Vishny. Additionally, the study sheds light on the geographical dispersion of impactful research, noting that the United States, Netherlands, Germany, and Singapore are leading contributors. The paper concludes by suggesting future research directions, including long-term studies of investor behaviour, cross-cultural analyses, and the role of information dissemination in mitigating biases for more efficient markets. These contributions provide valuable insights into the current state of behavioural finance and outline important avenues for future exploration.

Conclusion

Bibliometric analysis on overreaction and underreaction of investors reveals a growing interest in this topic among researchers. The analysis highlights the increasing trend in publications over the years, indicating the continued relevance and importance of this topic. Co-citation analysis reveals that works of Fama (1998) and Barberis et al. (1998) remain as the seminal works in this area, while the analysis suggests that behavioural finance theories are gaining prominence in explaining overreaction and underreaction phenomena. Co-occurrence analysis further identifies various research themes and potential avenues for future research, such as the impact of social media on investor behaviour, the influence of market sentiment on overreaction and underreaction, and the role of corporate disclosures in mitigating or exacerbating these biases. The analysis also reveals a growing interest in using investment strategies to investigate and mitigate these phenomena, as evidenced by the increasing number of publications in this area.

Overall, this study suggests that there are still ample opportunities for future research in the area of overreaction and underreaction of investors. As financial markets become more complex and globalized, there is a need for a deeper understanding of these biases to help investors make better-informed decisions. Future research could explore how these biases affect different types of investors, how they interact with other market inefficiencies, and affect asset pricing and portfolio performance.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

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