

# The Development of Research on Investor Sentiment in Emerging and Frontier Markets with the Bibliometric Method

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## ABSTRACT

In line with the development of behavioural finance in developed markets, research on investor sentiment has increased in recent years. The primary purpose of this study is to investigate the development of research on investor sentiment in emerging and frontier markets. This study will help researchers understand the interest of authors and journals in finding appropriate coordinators and future research topics in this research field. Using bibliometric analysis, we assessed 508 documents between 1999 and 2020 located in the Scopus database. The results show that publications on investor sentiment in emerging and frontier markets grew steadily in the 21<sup>st</sup> century. "Herding behaviour" is the most prominent research theme in this area. In the following years, return predictability, principal component analysis, investor attention, and economic policy uncertainty with asymmetric effects are the dominant topics that have reshaped research on investor sentiment in emerging and frontier markets.

**Keywords:** Investor sentiment, Emerging and Frontier markets, Bibliometrics, Science map.

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## INTRODUCTION

*Investor sentiment* is one of the most recent and prominent research themes in behavioural finance that challenges the theoretical pillars of neoclassical finance.<sup>[1,2]</sup> Until recently, many prestigious journals have published papers related to this field, such as the Journal of Finance, the Journal of Banking and Finance, the Review of Financial Studies, the Journal of Financial Economics, and the Economic Modelling. Among these studies, many of them confirm the significant roles of investor sentiment in explaining cross-sectional stock returns,<sup>[3-5]</sup> stock volatility,<sup>[6,7]</sup> or supporting asset pricing models.<sup>[8-10]</sup> However, while efficient markets and the theory of asset pricing are the solid theoretical foundations of neoclassical finance, the theoretical foundations of behavioural finance, including investor sentiment, are still controversial. As a result, academia is witnessing an increasing number of studies on investor sentiment to gain knowledge and provide empirical evidence on the roles of investor sentiment in finance in general and the stock market in particular.

Studies on investor sentiment focus on two directions. In the first direction, researchers prove the direct effects of investor sentiment on decisions, such as representativeness heuristic, availability bias, anchoring, overconfidence, and gambler's fallacy.<sup>[11-13]</sup> In the second direction, researchers attempt to examine the aggregate effect of investor sentiment on stock returns. They measure investor sentiment by survey data,<sup>[14]</sup> text of media data,<sup>[15,16]</sup> or market data.<sup>[17-19]</sup> Regardless of the direction of research, studies on behavioural finance, including investor sentiment, have mainly been conducted in developed countries. Studies on investor sentiment in emerging and frontier markets have mainly appeared from 2015 onwards.<sup>[2]</sup> However, recent evidence suggests that different characteristics between developed and emerging, and frontier markets lead to differences in the performance of investor sentiment among these markets.<sup>[20,21]</sup> For example, emerging markets are more strongly influenced by sentiment than developed markets, especially sentiment relating to herding behaviour.<sup>[21]</sup> In addition, some emerging and frontier markets are different from developed markets in terms of "the lack of synchronization in transactions", "the dominance of individual investors", "regulations on information documents are not strict", and "regulations are not developed".<sup>[20]</sup> Equity markets in emerging and frontier countries are different from those in developed markets in terms of "stock lending permitted" and "short sales permitted", which



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are significant causes of irrational behaviours.<sup>[22]</sup> The trading mechanism in secondary emerging and frontier markets is also less efficient than in developed markets,<sup>[23]</sup> implying these markets have more anomalies in these markets,<sup>[24]</sup> which behavioural finance can explain. In the new global economy, when emerging and frontier markets have become attractive to domestic and foreign investors from developed markets, behavioural finance is increasingly important for investment decisions.

The increasing amount of scientific literature on *investor sentiment in emerging and frontier markets* in recent years requires a study to review the development of this research area. To the authors' knowledge, although several studies have been carried out on mapping research on behavioural finance, no single study exists that focuses on investor sentiment on the frontier and emerging markets. Several papers defined the intellectual structure of behavioural finance, which is the general topic of investor sentiment.<sup>[1,2]</sup> These studies used the data set extracted from the Web of Science.

To sum up, although several papers have been carried out on mapping research on behavioural finance,<sup>[1,2]</sup> these papers have studied behavioural finance and investor sentiment in general. To the authors' knowledge, little attention has been paid to investor sentiment on the frontier and emerging markets. However, emerging markets are more strongly influenced by sentiment than developed markets.<sup>[21]</sup> Therefore, this paper will offer an in-depth analysis of the publication trends, structure characteristics (including social, intellectual, and conceptual structure), and potential themes relating to this topic. In other words, the main aim of this paper is to provide a map of studies on the topic of investor sentiment in emerging and frontier markets. The key research questions of this paper are:

**RQ1.** What is the scientific production and performance regarding investor sentiment on emerging and frontier markets?

**RQ2.** What are the structural characteristics of research on investor sentiment in emerging and frontier markets?

**RQ3.** What are the evolutionary trends in research on investor sentiment in emerging and frontier markets?

This study explored the Scopus database and employed bibliometric analysis with the VOS viewer software.

The primary contribution of this study is to provide an in-depth analysis of studies on investor sentiment, especially those in emerging and frontier markets. Researchers can use this result to guide future research topics on investor sentiment in emerging and frontier markets. Moreover, researchers can know the interest of authors and journals interested in investigating investors' sentiment on emerging and frontier stock markets to find appropriate coordinators.

The remaining part of the paper proceeds as follows: Section 2 introduces the data and methods. Section 3 shows the results,

and there are three parts in Section 3 to answer the three research questions relating to scientific production and performance, structure characteristics, and evolution prediction. Section 4 discusses the results and gives several explanations for the research results. Section 5 finally wraps up with concluding remarks.

## MATERIALS AND METHODS

### Data collection

This paper uses data from the Scopus database. "Scopus is a source-neutral abstract and citation database curated by independent subject matter experts."<sup>[25]</sup> Until January 2020, Scopus has a massive database with 23,452 peer-reviewed journals, 294 trade publications, over 852 book series, and more than 9.8 million conference papers in science technology, medicine, social science, and arts and humanities.<sup>[25]</sup>

Two keywords are selected to identify the documents related to our topic: "investor sentiment" and "emerging and frontier markets". To not omit relevant documents, alternative search terms of "investor sentiment" were used for search queries. These relevant keywords are "trader sentiment", "market sentiment", "investor behaviour", and "trader behaviour". If we now turn to the location, we employed the FTSE's classification to identify emerging and frontier markets. The report by FTSE Russell in 2021 lists 24 emerging markets and 30 frontier markets. The names of 44 emerging and frontier markets were selected in the search queries. Concerning the timeline, we terminated our search period at the end of 2020. We only selected publications written in English. Thus, the following string query was used on the Scopus database:

TITLE-ABS-KEY ((investor OR trader OR market) AND (sentiment OR behavior OR behaviour) AND ((emerging AND frontier AND market\*) OR "Brazil" OR "Czech Republic" OR "Hungary" OR "Malaysia" OR "Mexico" OR "South Africa" OR "Taiwan" OR "Thailand" OR "Turkey" OR "Chile" OR "China" OR "Colombia" OR "Egypt" OR "India" OR "Indonesia" OR "Kuwait" OR "Pakistan" OR "Philippines" OR "Qatar" OR "Romania" OR "Russia" OR "Saudi Arabia" OR "UAE" OR "Bahrain" OR "Bangladesh" OR "Botswana" OR "Bulgaria" OR "Côte d'Ivoire" OR "Croatia" OR "Cyprus" OR "Estonia" OR "Ghana" OR "Iceland" OR "Jordan" OR "Kazakhstan" OR "Kenya" OR "Latvia" OR "Lithuania" OR "Malta" OR "Mauritius" OR "Morocco" OR "Nigeria" OR "Oman" OR "Palestine" OR "Peru" OR "Republic of North Macedonia" OR "Serbia" OR "Slovak Republic" OR "Slovenia" OR "Sri Lanka" OR "Tanzania" OR "Tunisia" OR "Vietnam"))

Search results for all articles containing the above-related terms, we found 3629 results. Then, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) is a helpful approach to avoid publication bias of systematic reviewers.<sup>[26]</sup> The steps of PRIMA are described in Figure 1. We filter 3629

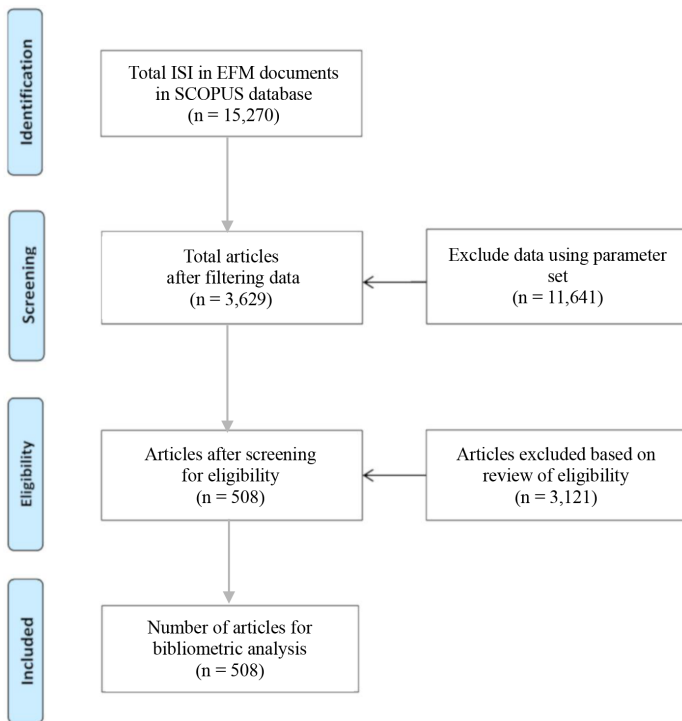


Figure 1: PRISMA diagram.

studies and exclude irrelevant subjects such as business and management, marketing, tourism, neuroscience, and health. As this study focuses primarily on the development of research related to investor sentiment, the broader fields of economics, or other areas, are exclusion criteria. In the final step, 508 documents, including books, book chapters, and journal articles, were retrieved for final analysis.

**Data analysis**

This paper adopted the bibliometric analysis, which includes performance analysis and science mapping, to answer the three research questions.

Firstly, the performance analysis was used to answer the first question relating scientific production of authors, journals, and countries in this research field. We used the number of documents to investigate the growth of the field, the number of citations to identify the most cited documents, the most productive countries, and both indicators to show the top authors and sources of this field.

Secondly, to answer the second question relating to the structure characteristics of literature and evolutionary trends in this research field, this paper used science mapping, including the co-author, co-citation, and co-occurrence analysis. The idea behind the co-author analysis is to group researchers who collaborated with others and then map a network to find the social structure of the research.<sup>[27]</sup> The co-citation analysis is based on the idea that there are relationships between studies

that cited the same publication.<sup>[28]</sup> These relationships imply research themes, which are connected to establish the intellectual structure of the research field; however, emerging themes cannot be found by this method.<sup>[29]</sup> To solve this problem, researchers can use the co-occurrence analysis with the commonality of words or phrases.<sup>[30]</sup> By counting paired data with some relation, this paper can determine linkages among research themes and find the conceptual structure of the research.

Finally, the combination of answers to the first question and the second question will provide the answer to the third question on the evolution of the research topic. Descriptive statistics and co-occurrence analysis of keywords were conducted for this question.

**RESULTS**

**Scientific production and performance**

*The number of publications*

The bibliometric analysis method produced the results of 508 scientific documents between 1999 and 2020, which relate to the research area of investor sentiment in emerging and frontier markets. These documents include articles, books, book chapters, and conference papers. They are mainly articles, accounting for 94.69 percent. Figure 2 shows a growing body of literature on investor sentiment in emerging and frontier markets. The year 1999 was selected as the first year of the analysis phase because it is the first year that Scopus’s database recognizes two articles published on this topic. The two first papers are “An empirical investigation of under-pricing in Chinese IPO” published by Su and Fleisher in 1999 about the differences in domestic and foreign investor sentiment;<sup>[31]</sup> and “Economic influence on rights issue announcement behaviour in Malaysia published by Salamudin *et al.* in 1999 about the good new hypothesis.<sup>[32]</sup> The average annual growth rate of the number of scientific works in this research field is 20.69 percent, implying an average of 5.63 publications per year. Figure 2 depicts the number of publications during the period 1999 - 2020. In the first phase of 10 years, the number

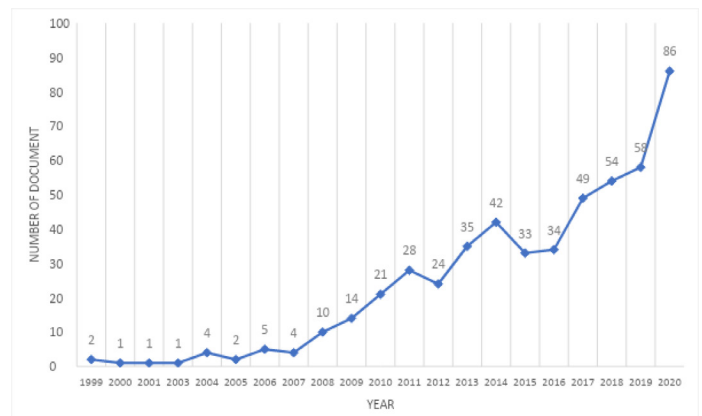


Figure 2: Number of publications 1999-2020.

of scientific works is minimal. However, the second half of the study period witnessed a rapid increase in the number of studies published, accounting for 91.34 percent of all documents.

### Analysis of important authors

One thousand nineteen authors published in the field of investor sentiment in emerging and frontier markets. Regarding the productivity of authors, it can be seen from Table 1 that authors having the most citations are not authors with the greatest number of articles. To be more detailed, Chang E., Cheng J., and Khoara A., who were the most citations, had only one article on this research topic in the Scopus database, but their work was cited 489 times. Other authors, including Feng L., Seasholes M., Chen CD., Fleisher B., He W., and Ma C., had publications with high citations, but the number of research papers is not significant. However, in Demirer R.'s case, although his first publication was in the second half of the research period (in 2010), he has been an influential author following Chang, Cheng, and Khorana with 282 citations. Demirer R. has also been the most productive author in this research area, with six articles at an average of 47 citations per article. Demirer R.'s articles mainly discussed herding behaviour, market efficiency, return dispersion, and crude oil price in emerging markets.

### Analysis of important journals

Turning to journals, 158 journals published research on Investor Sentiment in Emerging and Frontier markets. About half (51 percent) of the journals started publishing relevant articles in 2014–2020. “Journal of Banking and Finance” is the most-cited journal, which had a total of 731 citations, even though only eight articles were published in this journal (Table 2). Among eight

articles, the article “An Examination of herd behavior in equity markets: an international perspective” by Chang *et al.* in 2000 had over half of this journal's total citations on this topic.<sup>[21]</sup> The most productive journal is the “Pacific basin financial journal” with 25 published documents in Scopus. This journal is also ranked second place in terms of citations, with 545 citations. The second number of publications is “Emerging markets finance and trade” with 23 documents. It is also considered relevant to the research topic because it links to many other journals publishing on this topic.

In addition, Table 2 also illustrates that several journals have recently become interested in this research criterion with more than three published documents. For example, “Review of Behavioural Finance” (7 publications since 2018), “Journal of Asian Finance, economics and business” (4 publications since 2018), and “International journal of managerial finance” (4 publications since 2018).

### Analysis of important articles

We ranked the most-cited documents to find the ten most influential studies in Table 3. The study with the most citations is “An Examination of herd behaviour in equity markets: an international perspective” by Chang *et al.* (2000).<sup>[21]</sup> This article was cited 489 times, more than three times as many as the following. This study compares the herding behaviour between developed and emerging markets. The finding of this paper is that there is no evidence proving the existence of herding behaviour in developed markets. However, herding becomes more apparent in two developing markets.<sup>[21]</sup> The most surprising aspect of the data is that half of the ten most frequently cited articles are on the topic of herding (Table 3).

**Table 1: Authors’ scientific production and performance.**

Authors with the most citations				Authors with the most articles			
Author	No. Citation	No. Publications	1 <sup>st</sup> published year	Author	No. Citation	No. Publications	1 <sup>st</sup> published year
Chang, Eric	489	1	2000	Demirer, Riza	282	6	2010
Cheng, Joseph	489	1	2000	Ahmad, Zamri	63	6	2012
Khorana, Ajay	489	1	2000	Burdekin, Richard	95	5	2008
Demirer, Riza	282	6	2010	Li, Chun-an	58	5	2008
Feng, Lei	162	2	2004	Chang, Chiao	20	5	2011
Seasholes, Mark	162	2	2004	Lu, Yang-Chen	19	5	2013
Chen, Chun-Da	151	3	2010	Zhang, Haoran	81	4	2014
Fleisher, Belton	149	1	1999	Nartea, Gilbert	77	4	2013
He, William	149	1	2014	Li, Youwei	66	4	2017
Ma, Chuanchan	149	1	2014	Phan, Anh	65	4	2016

**Table 2: Journals' scientific production and performance.**

Source	Total citation	1 <sup>st</sup> published year	Source	Number of publications	1 <sup>st</sup> published year
Journal of banking and finance.	731	2000	Pacific basin finance journal.	25	1999
Pacific basin finance journal.	545	1999	Emerging markets finance and trade.	23	2008
International review of economics and finance.	323	2006	International review of economics and finance.	13	2006
Emerging markets finance and trade.	219	2008	Investment management and financial innovations.	11	2007
Journal of Asian economics.	173	2009	Journal of behavioral and experimental finance.	9	2015
Journal of finance.	146	2004	Qualitative research in financial markets.	9	2012
International review of financial analysis.	142	2010	Review of pacific basin financial markets and policies.	9	2005
Energy economics.	136	2017	China finance review international.	9	2011
Journal of behavioral and experimental finance.	129	2015	Applied financial economics.	9	2008
Journal of economic behavior and organization.	126	2010	Journal of banking and finance.	8	2000

## Analysis of important countries

To study the country distribution of publications, it can be seen from Table 4 that studies on Investor sentiment in Emerging and Frontier markets focus mainly on Taiwan and China, with 114 documents and 105 documents, respectively. However, the Chinese market continued to report growth in publications compared to Taiwan. Some of the new nations considered in recent years are Brazil, Saudi Arabia, and Sri Lanka. In addition, research in emerging and frontier markets was also placed in comparison with several developed markets, notably the United States, the United Kingdom, and Australia. For example, when researching investor sentiment in China, 19 published documents studied the United States, and 07 published documents studied the United Kingdom simultaneously.

## Structure characteristics

### Social structure

The co-author analysis was used to identify research groups and the relationships among these groups. Data analysis shows that the average number of co-authors per document is 2.52. Table 1 and Figure 3 present that most clusters represent collaborating authors grouped around the most productive researchers on the research topic, for instance, Demirer R., Ahmad Z., and Chang C. (Figure 3a). However, the relationship among these groups before 2016 is not clear. The research group with Demirer R. is the most complicated, with many participants publishing in

different periods. This can be explained by the fact that Demirer R. is from the United States, so it is helpful for him to establish a vast network with scientists in emerging and frontier countries to research these markets.

We use another slice to see the collaboration between the most significant research groups (Figure 3b). Before 2016, research groups did research independently, but groups have become increasingly interrelated. It is noted that Xiong X., who appeared around 2019, plays a crucial role in connecting research groups.

### Intellectual structure

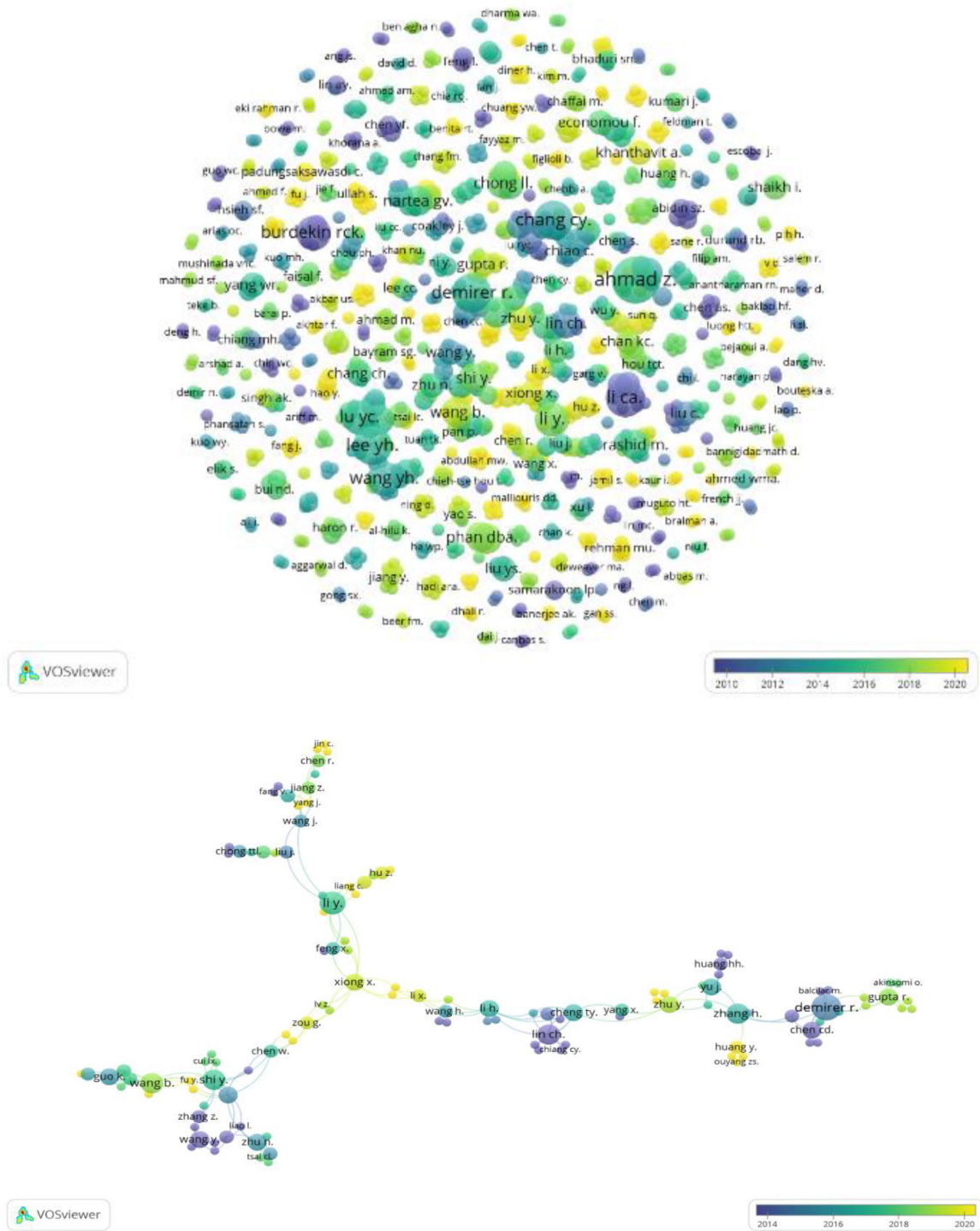
Next, we use the co-citation analysis to cluster a map of scientific literature formed by publications cited in 508 documents. The purpose of co-citation analysis is to examine the main themes behind research on investor sentiment in emerging and frontier markets. This method figured out 149 studies that have at least five citations. These studies were divided into four clusters, representing our research themes. As shown in Figure 4, there are four main research themes:

#### Investor behaviour (Green cluster)

This theme mainly contains theoretical and review papers. Studies on this theme focus on sentiment that directly affects investors' decisions and irrational investors' actions on the stock market. As mentioned in the introduction, this is the first direction on this topic. Several key behavioural patterns are irrational decision

**Table 3: List of the most cited documents.**

Author	Title	Keywords	Journal	Total citations
Chang E., Cheng J., Khorana A.	An examination of herd behavior in equity markets: An international perspective	Equity return dispersion; G15; Herd behavior; International capital markets; International finance.	Journal of Banking and Finance	489
Yao J., Ma C., He W. P.	Investor herding behaviour of Chinese stock market	Chinese stock markets; Investor herding; Market efficiency.	International Review of Economics and Finance	149
Su D., Fleisher BM	An empirical investigation of underpricing in Chinese IPOs	Asymmetric information; China; Initial public offerings; Seasoned equity offerings; Signaling equilibrium.	Pacific Basin Finance Journal	149
Feng L., Seasholes M.	Correlated Trading and Location		Journal of Finance	130
Demirer R., Kutan A., Chen C.	Do investors herd in emerging stock markets? Evidence from the Taiwanese market	equity return dispersion; herd behavior; non-linear and state space models; Taiwan stock exchange.	Journal of Economic Behavior and Organization	118
You W., Guo Y., Zhu H., Tang Y.	Oil price shocks, economic policy uncertainty and industry stock returns in China: asymmetric effects with quantile regression	Asymmetric effects; economic policy uncertainty; oil price shocks; quantile regression; stock markets.	Energy Economics	110
Lao P., Singh H.	Herding behaviour in the Chinese and Indian stock markets	Herding; market efficiency.	Journal of Asian Economics	89
Balcilar M., Demirer R., Hammoudeh S.	Investor herds and regime-switching: evidence from gulf Arab stock markets	Dispersion shocks; gulf Arab stock markets; herding; Markov-switching.	Journal of International Financial markets, Institutions and Money	84
Wang M., Qiu C., Kong D.	Corporate social responsibility, investor behaviors, and stock market returns: evidence from a natural experiment in China	Chinese stock market; corporate social responsibility; emerging markets; event study; financial performance; investors' behaviors; stock markets.	Journal of Business Ethics	84
Chiang Y., Hirshleifer D., Qian Y., Sherman A.	Do investors learn from experience? evidence from frequent IPO investors		Review of Financial Studies	74



**Figure 3a:** Figure 3b: Science mapping: co-author: 1019 authors, each has at least a document.

making under conditions of risk,<sup>[33]</sup> noise trading,<sup>[34]</sup> buying winners and selling losers,<sup>[35]</sup> and holding losing assets too long and selling gaining assets too soon.<sup>[36,37]</sup> However, these papers mainly suggested cognitive error and emotional biases that influence investors' decisions. However, investor sentiment was not considered a "systematic factor" that directly affected the stock market returns in these studies.

**Investor sentiment and Market outcomes (Red cluster)**

In this research theme, researchers attempt to measure investor sentiment and evaluate its impacts on market performance, including stock prices and stock returns. Investor sentiment on this theme can be an aggregated index<sup>[3]</sup> or a parsimonious model,<sup>[38]</sup> or direct and indirect investor sentiment.<sup>[39]</sup> Although

investor sentiment was performed in various forms in these studies, they tended to agree that sentiment has a vital role in prices<sup>[40]</sup> and returns.<sup>[3]</sup>

**Herding and Stock price (Blue cluster)**

Studies in this theme focus on one of the elements of investor sentiment, herding behaviour: how to measure it and evaluate its impacts on the stock price. Many controversies are surrounding this research question. On the one hand, some researchers found no evidence that herding is essential in explaining stock returns.<sup>[41,42]</sup> On the other hand, others said that herding speeds the price-adjustment process<sup>[43]</sup> and significantly correlates with stock returns' volatility.<sup>[7]</sup> Moreover, institutional herding influences stock price more considerably than individual herding does.<sup>[44,45]</sup>

**Herding behaviour and Market conditions (Yellow cluster)**

In this theme, studies attempt to find evidence of herding behaviour in various market conditions and its impacts. Many researchers failed to find herding evidence in periods of market stress or crisis.<sup>[41,42,46]</sup> However, in some periods, researchers still

find herding behaviour and it is more pronounced in the bull market.<sup>[47]</sup>

This finding was unexpected and suggests that the “herding behaviour” accounts for two out of four clusters. It can thus be suggested that “herding” was observed to be the most popular element related to investor sentiment in emerging and frontier markets.

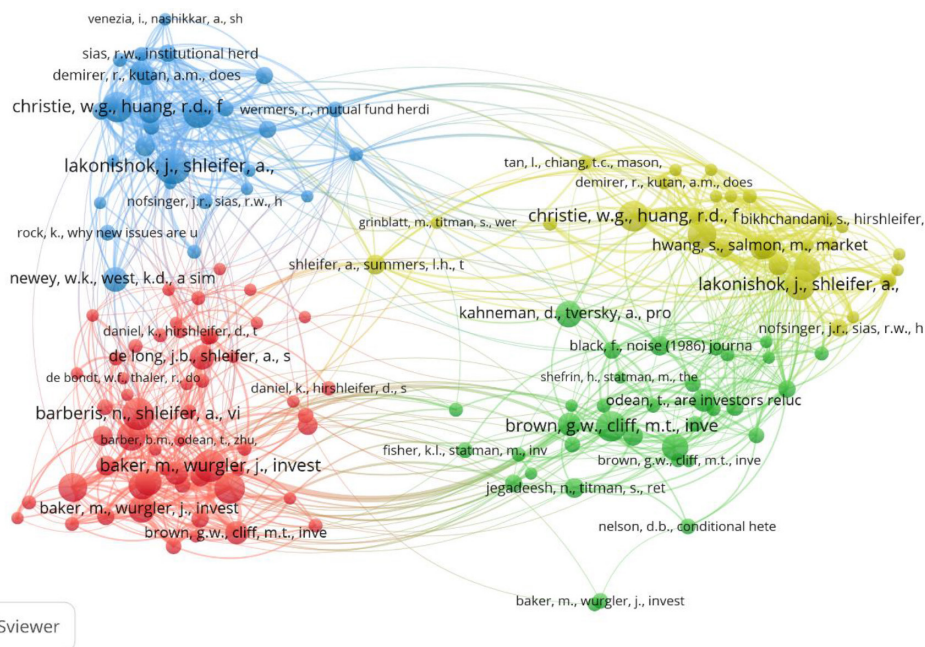
**Conceptual structure**

The previous section provides a map of the research themes covered in the literature; this section focuses more deeply on the general topics currently under discussion. The co-occurrence analysis was adopted to trace the development of the research area.

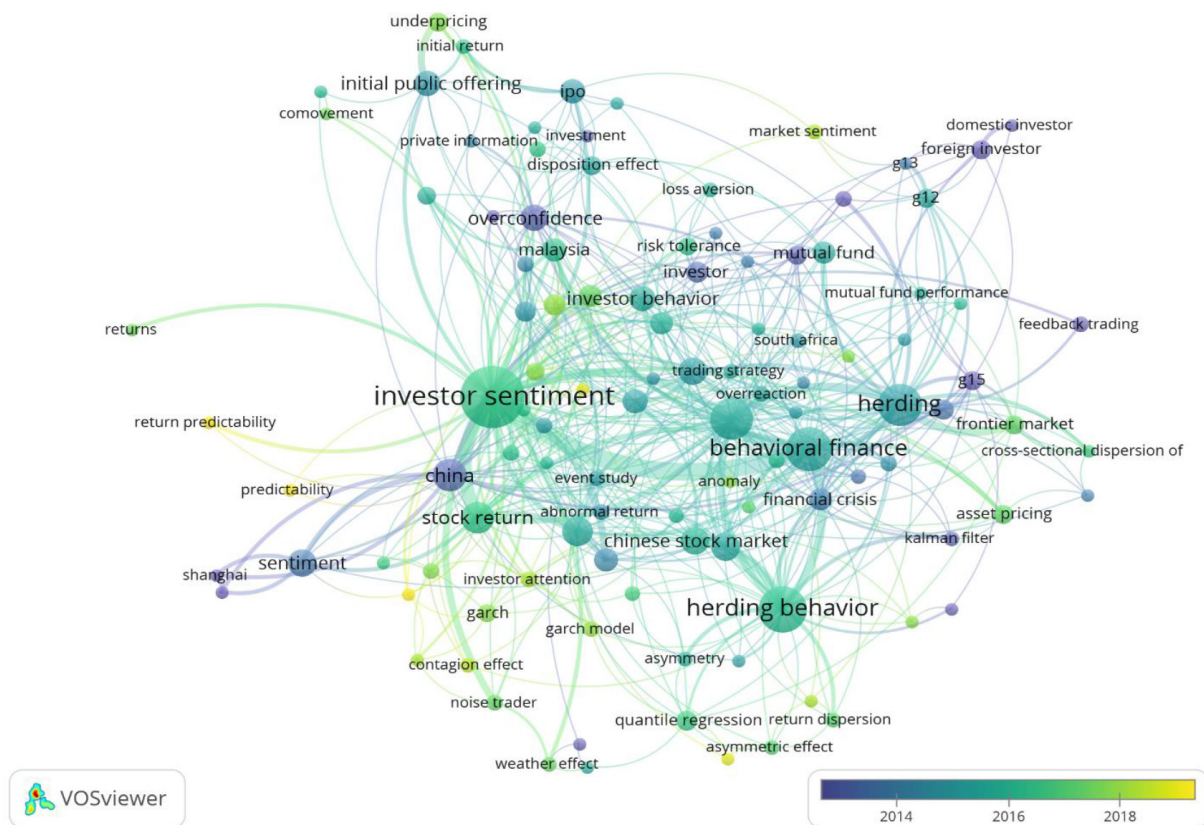
The most co-occurrence words together with the word “investor sentiment” (89 occurrences) are herding behaviour” (48 times), “behavioural finance” (40 times), “herding” (40 times), “emerging market” (37 times), “China” (22 times) and “stock return” (21 times). This result agrees with the findings from the co-citation analysis that “investor behaviour”, “market outcomes” and “herding” are unique research themes in the literature. It can be seen from Figure 5, most of the documents with the above keywords were published between 2015 and 2017. Besides the above keywords, some other keywords, including “overreaction”, “risk”, “tolerance”, “loss aversion”, “disposition effect”, “overconfidence”, are all different elements of irrational investor sentiment. However, research topic relating to “investor sentiment” has witnessed new research directions, which are discussed in the next section.

**Table 4: List of the most cited documents.**

Country	Number of publications
Taiwan	114
China	105
US	77
India	42
Malaysia	39



**Figure 4:** Science mapping: co-citation: 149 documents, each has at least 5 citations.



**Figure 5:** Science mapping: co-occurrence keywords: 110 author keywords, each has at least three times.

## The evolution prediction

As can be seen from Figure 5, new researchers can understand the future research direction of investor sentiment in emerging and frontier markets. In terms of research trends from 2018 onwards, we recognize some of the new research themes are recently interested by researchers:

### Return predictability

(interconnected with “investor sentiment”, “China”): Scientists not only observe sentiment as irrational behaviour on the stock market but also evaluate its ability to predict security returns.<sup>[48-50]</sup> In these studies, investor sentiment is considered as an essential factor added in asset pricing models of neoclassical finance. It is also noted that research using investor sentiment as a factor to predict stock returns is mainly on the Chinese stock market. Further work is therefore recommended in other emerging and frontier markets.

### Principal component analysis

(interconnected with “sentiment index”, “news sentiment”, “stock return”, “stock market volatility”, “India”): This method is frequently used in studies to construct a sentiment index. This method has been widely employed in research on investor sentiment in developed markets since the first time.<sup>[3]</sup> It tends to be replaced by

the machine learning technique with news sentiment. However, this method is relatively new in studies in emerging and frontier markets. Therefore, there is abundant room for further progress in constructing a sentiment index in these markets.

### Investor attention

(interconnected with “sentiment index”, “India”): Limits on attention are considered as one of two main reasons for irrational behaviour on the stock market (together with constraints of short sales).<sup>[37]</sup> Within the information era, when investors easily access information about companies (whether active or passive), “investor attention” can be considered as “investors’ demand for information” that is driven by investor sentiment.<sup>[51]</sup> Moreover, investor attention is positively related to risk aversion and negatively related to investors’ overconfidence.<sup>[51]</sup>

### Economic policy uncertainty

(interconnected with “stock market”, “asymmetric effect”): Economic policy uncertainty relates to the uncertainty in the government’s policies which contain terms about the economy.<sup>[52]</sup> Researchers evaluate the asymmetric effects of sentiment on the stock market in various conditions.<sup>[53]</sup> In the opposite direction, the uncertainty premium in stock price is also concerned with different market sentiments.<sup>[54]</sup>

## DISCUSSION

An initial objective of this study was to scientific production and performance of research on investor sentiment in emerging and frontier markets. The results show that although the first publications on this research topic were published in 1999 in journals covered in the Scopus database, the number of papers has only begun to witness a significant growth rate since 2010. In the last ten years, the documents on this topic accounted for 91.34 per cent of the total documents over the 20 years. A possible explanation for these results may be the growing attention of scientists in emerging and frontier countries to this research criteria. Regarding the production and performance of authors and journals in this research area, Chang, Cheng, and Khorana have the highest number of citations, even though they had only one publication on this topic. This article is “An examination of herd behaviour in equity markets: an international perspective” with the topic of “herding behaviour”. Demirer is the author with the highest number of documents, followed by Ahmad and Chang. Collaborating authors are also grouped around these most productive researchers. “Journal of Banking and Finance” is the most-cited journal, which had a total of 731 citations. This proves the influence and prestige of this journal in the research field of investor sentiment. However, there were merely eight articles published in this journal. This inconsistency may be since this journal owned the most cited by Chang *et al.* in 2000. The most productive journal is the “Pacific basin financial journal”, with 25 published documents in Scopus; it is also the first journal published on this topic. Five out of ten most cited articles were about “herding behaviour”, indicating that this is possibly the most research interest in investor sentiment in emerging and frontier markets. Turning to the most studied countries, China and Taiwan appear the most on documents. Some new countries that have recently been considered interesting research subjects are Brazil, Saudi Arabia, and Sri Lanka.

On the second question, the structural characteristics of research on investor sentiment in emerging and frontier markets. *Firstly, in terms of the social structure*, this study found that most clusters represent collaborating authors grouped around the most productive researchers. Moreover, although “old” research groups worked independently, “new” generations of authors have contributed to collaborating with both “old” and “new” research groups. *Secondly, in terms of intellectual structure*, this study provides four research themes of most interest in emerging and frontier markets: Investor behaviour, Investor sentiment and Market outcomes, Herding and Stock price, and Herding behaviour and Market conditions. It is noted that “herding behaviour” is the most prominent theme. This is confirmed in the results of “co-citation analysis” and “co-occurrence analysis”. *Thirdly, in terms of conceptual structure*, this study finds some research topics that are of interest and developed in the future: “Return predictability of investor sentiment” and “Construct

an investor sentiment index”. This result can be compared with the result of the co-citation analysis, which shows that “Investor sentiment and Market outcomes” are one of four main research themes. Thus, the impacts of investor sentiment on the movements of asset prices are the theme that is not only prominent up to now but also developed in the future. Additionally, “Investor attention” and “Economic policy uncertainty with asymmetric effects” are emerging themes. This finding corroborates the ideas that “Attention” is the emerging theme in behavioural finance.<sup>[1]</sup>

The third question was about the evolution of the research on investor sentiment in emerging and frontier markets. It can be concluded that this research field has developed for about 20 years, especially in the last ten years. Up to now, “Herding behaviour” is the dominant irrational behaviour of investors in emerging and frontier markets. This is explained by the fact that in emerging and frontier markets, individual investors account for a relatively large proportion compared to institutional investors. However, this group of investors tends to have limited knowledge and financial capacity. Therefore, individual investors’ decision depends on other influential investors, even though individual investors do not know details about those influential investors and the reason those influential investors are selling or buying. Another explanation is that many emerging markets are in Eastern countries, so the popularity of the topic “Herding behaviour” can partly be explained by the influence of Eastern culture on collective action. The differences between Eastern and Western cultures in terms of collectivism and individualism lead to cognitive and behavioural biases of Eastern investors.<sup>[55]</sup> They further emphasized that Asian countries have a perfect background for studying behavioural finance. Collectivity is one of the most fundamental values in Eastern culture. Although collectivism has many positive points, it leads to the fact that the individual’s consciousness is often destroyed.<sup>[56]</sup> This is the cause of anchoring actions and individuals with great influence or confidence in decision-making if the stock does not receive recommendations from other investors in the social network. However, researchers have paid more attention to return predictability by investor sentiment and relationships between investor sentiment with other dimensions of the economy. These findings further support the idea that the aggregate effect of investor sentiment on market performance is ambiguous and is of particular financial concern.<sup>[24]</sup> Regarding location, studies have focused on not only China and Taiwan but other countries in both Asia and South America.

## CONCLUSION

Since the introduction of prospect theory by Kahneman and Tversky in 1979, behavioural finance, including investor sentiment, has become an increasingly popular research topic. The present study was designed to provide an in-depth analysis of studies on investor sentiment, especially those in emerging and

frontier markets. It was shown that since 2010, there has been a rapid increase in the number of studies published. “Journal of Banking and Finance” is the most-cited journal, and “Pacific basin financial journal” is the most productive journal. Thus, authors need to pay attention to these journals when researching investor sentiment in emerging and frontier markets. In addition, there are four main research themes: “Investor behaviour”, “Investor sentiment and Market outcomes”, “Herding and Stock price”, and “Herding behaviour and Market conditions”. Both the results of “co-citation analysis” and “co-occurrence analysis” indicate that “herding” is currently the most prominent research theme. This can be explained by the limited financial capacity of the large group of individual investors and the cultural influence in emerging and frontier markets. One of the more significant findings to emerge from this study is that future research regarding “Return predictability of investor sentiment”, “Construct an investor sentiment index”, “Investor attention”, and “Economic policy uncertainty with asymmetric effects” would be worthwhile in emerging and frontier markets. Regarding location, there is a shift in research subjects from China and Taiwan to Asia and South America. Researchers can use this result to guide future research topics on investor sentiment in emerging and frontier markets. In other words, considerably more work will need to be done to determine the relationship between investor sentiment and market performance in these countries.

This study has a few limitations. First, we have only collected and analysed the data from Scopus-indexed English documents. This leads to the results presented, which currently need to depict the complete picture of this research area. Second, within the scope of this study, we are only interested in the characteristics of Investor sentiment in Emerging and Frontier Markets in general, without comparing the features between Investor Sentiment in Emerging Markets and Frontier Markets or making comparisons between different regions, e.g., Asia and Europe or Asia and Africa. Therefore, we recommend that scholars continue to research by expanding data collection sources (e.g., Web of Sciences, Lens, Scholar Google) or analysing and comparing market characteristics according to different regions of the world.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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