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# What is going on with studies on financial speculation? Evidence from a bibliometric analysis

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## ABSTRACT

In the context of increasing concerns about financial stability, the different forms of speculation and their study are gaining importance. In the last decade, concern has grown in analysing the impact of speculation forms in the extreme events that can occur in financial markets. The most important recent line of study is the development of the speculation scenarios and the possible incorporation of new ones, the strategy of traders and investors is one of the most important dimensions in the spontaneous generation of high risk in speculation that can suffer markets. Therefore, it becomes a necessary task to measure the amount and level of academic work that has been carried out on speculations and the different forms and trends that may have been throughout the years. Therefore, the main objective is to clarify the current state of speculation, carrying out a bibliometric analysis of the diverse topics. 2642 research papers published between 1971 and 2021 have been analyzed based on the Web of Science Core Collection (WoS) results, identifying publications and co-authorship among the most recognized authors, the countries with the highest percentage of scientific production, the most prominent citations, the most influential journals, and the co-occurrence of keywords. In summary, this study explores new lines of investigation through the measurement and observation of the academic articles until date, which objective is highlighting the new relevant speculation situations, such as the short squeeze in ‘meme stocks’, detection of short selling strategies using the High-Frequency trading, extreme volatility in cryptocurrencies and commodity price shocks.

## 1. Introduction

Speculation has been a hidden risk in financial markets that could appear at specific moments causing struggles for private agents and public institutions to regulate the markets with the target to mitigate its effects and reduce future opportunities to speculate. In the past, the main terms of speculation were the bubbles created around the ‘tulip mania’ (Garber, 1989; Haykir & Yagli, 2022). Currently, the speculation events and their forms have grown, there are no longer only speculative bubbles, but also trading strategies such as short selling, speculative attacks in foreign exchange markets, and extreme volatility momentum, among others (Erler et al., 2015; Karmaziene & Sokolovski, 2022; Vasconcelos & Júnior, 2023). During all these years, financial markets have evolved considerably in emerging new assets like cryptocurrencies (Auer & Tercero-Lucas, 2022). Investors’ behaviour, price manipulation, market crashes,

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high volatility, and bubbles have been the subject of study by many authors for many years. We can find academic articles that refer to speculation from more than one century ago, but also from a few days ago (Xiao & Wang, 2022). Efficiency in markets, constraints, bear markets followed by a long etcetera have been studied (Goldstein & Yang, 2019; Caballero & Simsek, 2020; Conlon & McGee, 2020).

At present, speculation, more specifically the strategy of short-selling, is undergoing many changes derived from the legal regulations to which they are subject (Engelberg et al., 2018; Kizys et al., 2021). In recent years, short-selling has become a recurrent strategy of many traders and funds around the world with only one conviction and target to get fast profit in bear markets (Ziadat et al., 2022). At this point, many academic authors have focused in the last years on studying the behavior of these kinds of agents as well as the working of the markets when occurs specific events to generate more information for public financial institutions to impose and create new regulations and controls (Alves et al., 2016; Zabavnik & Verbič, 2021). Speculation has an impact factor of 47,46, considering the main journals on economics and finance that are included in the Web of Science Core Collection.

This research aims to directly address the gap in the academic literature concerning speculation and its impact on financial markets, as speculation poses significant dangers that require thorough investigation. Speculative activities have been known to cause market bubbles, manipulations, and crashes, which can result in severe economic disruptions for both private agents and public institutions. Understanding the underlying dynamics of speculation and its various forms, including the widespread strategy of short-selling, is essential to devise effective regulatory measures and mitigate potential risks. Given the ever-evolving landscape of financial markets, where new assets like cryptocurrencies have emerged, there is an urgent need to explore and analyze the behavior of speculative agents and the implications of their actions. The effects of speculation can extend beyond individual market players, impacting overall market stability, efficiency, and even broader economic conditions. By shedding light on the intricacies of speculation and its associated risks, this research will provide valuable insights for policymakers, financial institutions, and investors, enabling them to make informed decisions and safeguard the integrity of financial markets. Through this comprehensive approach, we will pinpoint the significant scientific aspects and contributors who have shaped the understanding of speculation in financial markets (Boyd et al., 2018; Simsek, 2021). As such, we aim to delve into this aspect to provide a comprehensive understanding of how speculative practices have evolved over time. We ask the following questions:

**RQ#1:** What is the current publication trend, most influential articles, and journals in speculation?

**RQ#2:** What is the intellectual structure of current research?

In this analysis, we try to analyze and highlight the main factors that have been studied in the academic literature on these subjects. Herewith, we will be able to identify the main lines of research carried out by the predecessor authors in the field of speculation and its behavior and effects on the stability of financial markets to shape the possible future lines of research (Merigó et al., 2016; Popli et al., 2022; Goodell et al., 2023; Kumar et al., 2020). In order to carry out this study, a set of quantitative and qualitative articles have been analyzed, using different methodologies and bibliometric tools. The bibliometric techniques have two main characteristics, on one hand, the performance analysis of the different articles, and secondly, the schemes and maps of the different factors and scientific actors related to all the actors of the study (Noyons et al., 1999; Kumar, Sahoo, et al., 2022; Kumar, Sharma, et al., 2022). To do this, different aspects are studied to assess the impact of citations in scientific publications through the different related factors. Given that the scientific mapping and the analysis of the actors are complementary studies, they will be used jointly to approximate all these lines of study in the most precise way. It can be revealed that this study allows us to reliably observe all the most notable scientific aspects and actors that have helped to explore speculation in financial markets (Boyd, Harris, & Li, 2018; Simsek, 2021). So, we ask:

**RQ#3a:** What are the themes associated with a particular line of research?

**RQ#3b:** What are the potential areas for future research?

Our paper brings significant contributions to the study of financial speculation. Firstly, it offers a foundational understanding of the essential elements explored in the academic literature on speculation and its impact on financial markets. By delving into these key factors, scholars can gain comprehensive insights into the dynamics and implications of speculative practices (1st benefit). Secondly, our analysis empowers researchers to judiciously adopt or adapt existing review procedures, protocols, and nomenclatures to suit the specific contexts of their financial speculation studies. For instance, by selecting and developing a well-defined review nomenclature and reporting on review considerations and steps more succinctly, scholars can enhance the precision and relevance of their research in this domain (2nd benefit).

Consequently, our pragmatic guide serves as a foundational resource for researchers exploring financial speculation and its various aspects, providing essential preparation and understanding for conducting literature reviews in this field (3rd benefit). By leveraging this foundational knowledge, scholars can make well-informed review decisions and shape their research approaches effectively. Although our pragmatic guide complements advanced philosophical guides, it stands as a valuable resource for scholars delving into the intricacies of financial speculation and its behavior and effects on market stability.

This article has been arranged with the following structure. Section 2 explains the formal aspects of the methodology used to prepare the said article, mainly highlighting the execution of the bibliometric analysis. Section 3 presents the main results of the factor performance analysis and scientific mapping of the literature published in recent years about speculation and its different forms. Section 4 shows a development of the future research lines pulled out from the findings of the study. Finally, Section 5 makes a description of the conclusions of the analysis carried out will be made.

## 2. Methodology

To carry out this article, bibliometric analysis has been carried out to collect the quantitative values, breaking down the existing literature in the different indexed reference sources. In this case, the study has been carried out using the academic articles provided by the Web of Science Core Collection (WoS) (Durán-Sánchez et al., 2017). The WoS belongs to the Clarivate Analytics holding that brings together different databases, which allows us to obtain more truthful and contrasted information. The different databases that are part of the WoS are the Science Citation Index Expanded (SCIE), where the most prestigious science and technology publications and journals are collected, as well as the Social Science Citation Index (SSCI), whose content is made up of the main publications and journals of social sciences, and finally, the Emerging Source Citation Index (ESCI) where we will find journals and articles of Science and technology and social sciences with projection to enter the category of Journal Citation Reports (JCR) (Gaviria-Marin et al., 2019; Vizuite-Luciano et al., 2023; Wang & Chen, 2010). As mentioned, the WoS will be used to carry out this article since it is the source with the largest number of high-impact journals, even so, it should be noted that there are also other databases, like Google Scholar, Emerald Insight, and Scopus, among others (Adriaanse & Rensleigh, 2013; Bakkalbasi et al., 2006).

The literature review of bibliometric papers in finance covers several studies that utilize bibliometric analysis to explore different topics within the finance domain. Zhang et al. (2019) examine green finance, highlighting its conceptual ambiguity and providing insights into its research trends. Goyal and Kumar (2021) conduct a systematic review of financial literacy, identifying major themes and suggesting potential areas for future research. Jalal et al. (2021) analyze cryptocurrency literature, identifying key streams of research and illustrating collaboration patterns among authors and institutions. Goodell et al. (2021) present an overview of AI and ML research in finance, revealing clusters of application and research directions. The meta-literature review by Carè and Weber (2023) focus on financial market integration, identifying research streams and proposing future research directions. Patel et al. (2022) conduct a bibliometric review of blockchain adoption in banking and finance, mapping influential aspects and future research agendas. Finally, Boubaker et al. (2023) describe a systematic review of 818 articles on the impact of COVID-19 on global finances with bibliometric methodology, identifying four distinct themes and proposes future research directions. These studies employ bibliometric analysis to provide valuable insights into different finance-related topics and guide future research efforts in their respective areas.

The bibliometric method is highly suitable for conducting a comprehensive review of studies in financial speculation and addressing the research questions at hand. Firstly, it allows us to analyze the current publication trend, identify the most influential articles, and determine the prominent journals in the field. By systematically gathering and analyzing publication data, we can gain valuable insights into the evolving landscape of speculative research and track the impact of seminal works. Unlike traditional systematic literature reviews, a bibliometric review offers the advantage of handling vast amounts of data. To conduct our review, we follow the four-step procedure outlined by Donthu et al. (2021) and widely used by other works (Goodell et al., 2021): (1) defining the review's aims and scope, (2) selecting appropriate analysis techniques, (3) collecting data for analysis, and (4) conducting the analysis and presenting the findings. This approach ensures a comprehensive and structured examination of the relevant literature in our domain of interest.

Secondly, the bibliometric approach enables us to uncover the intellectual structure of current research on financial speculation. Through co-citation and co-occurrence analyses, we can identify the key themes and connections among different studies, providing a holistic view of the underlying concepts and relationships within the field (Kraus et al., 2022; Lim et al., 2022). This understanding of the intellectual structure helps to contextualize the research landscape and identify gaps or potential areas for further exploration (Agarwal et al., 2023; Kumar et al., 2019; Saha et al., 2023).

Regarding the specific research questions, the bibliometric analysis can answer them comprehensively (Goodell, Kumar, Lahmar, & Pandey, 2023; Mukherjee, Kumar, Pandey, & Lahiri, 2023). For instance, the examination of co-cited articles and journals can reveal the most influential works and the prevailing research directions in financial speculation, providing insights into the current state of knowledge and the impact of various contributions (Question 1). Furthermore, by mapping the co-occurrence of keywords and analyzing clusters of related terms, we can identify the themes associated with different lines of research, shedding light on the dominant topics within financial speculation and potential areas for future investigations (Question 3a and 3b).

The sample has been obtained through the database Web of Science Core Collection, in order to obtain all the existing attributes with the highest possible reliability. To observe these topics more generically, it has been indicated that all articles that have at least one of the following topics are accepted:

- Short selling: when an investor borrows a share, sells it on the open market, expects to buy it back later for less money, and generates a profit margin with the strategy (Alves et al., 2016).
- Short squeeze: is shaped if a stock increases its price and short sellers decide to cover their short positions or are forced to do so using margin calls. As these short sellers buy the stock, the price rises, potentially creating a situation in which more shorts have to cover (Allen et al., 2021).
  - Speculative bubbles: these events are a sudden increase in the price of an asset, asset class, or industry due to mere speculation, not facts. It often happens when there is an overestimation of factors that may raise asset values, including growth projections and price appreciation (Phillips et al., 2015).
  - Speculative attacks: occur in the foreign exchange markets when speculators attack the currency of a country attempting to maintain a fixed or pegged exchange rate. If the country does not hold enough foreign currency reserves to buy enough of its domestic currency, the attack can result in the peg failing (Alaminos et al., 2023; Erler et al., 2015).
  - Short positions: created when a trader sells a security, either to repurchased it first, or cover it later at a lower price (Greppmair et al., 2022).

- Stock market crashes are sudden and substantial drops in stock prices (Alaminos et al., 2022).
- Bear markets: when a market experiences prolonged price decline. It typically describes a condition in which securities prices fall 20% or more (Conlon & McGee, 2020).
- Commodity price shocks: when the prices for commodities have drastically increased or decreased over a short period (Dube & Vargas, 2013)
- Sovereign debt default: the failure or refusal of the government of a sovereign state to pay back its debt in full when due (Alaminos et al., 2019).
- Flash crash: a sudden and drastic drop in the price of a security or other asset, sometimes caused by human or computer error (Demirer et al., 2019).
- Price manipulation: artificial inflation or deflation of the price of a security (Azad et al., 2014).

Fig. 1 explains the features and steps of our bibliometric analysis using the SPAR-4-SLR Protocol (Paul et al., 2021; Vizuete-Luciano et al., 2022) through the identification of the research field, the acquisition of the relevant data, the filters applied to get a precise search, and the evaluation of results detailed in this study.

In the same way, the sample has been refined by the type of documents that are allowed, only articles, articles under review, letters, and notes have been accepted. Likewise, due to its many existing categories, limits have been established to focus the study on the field

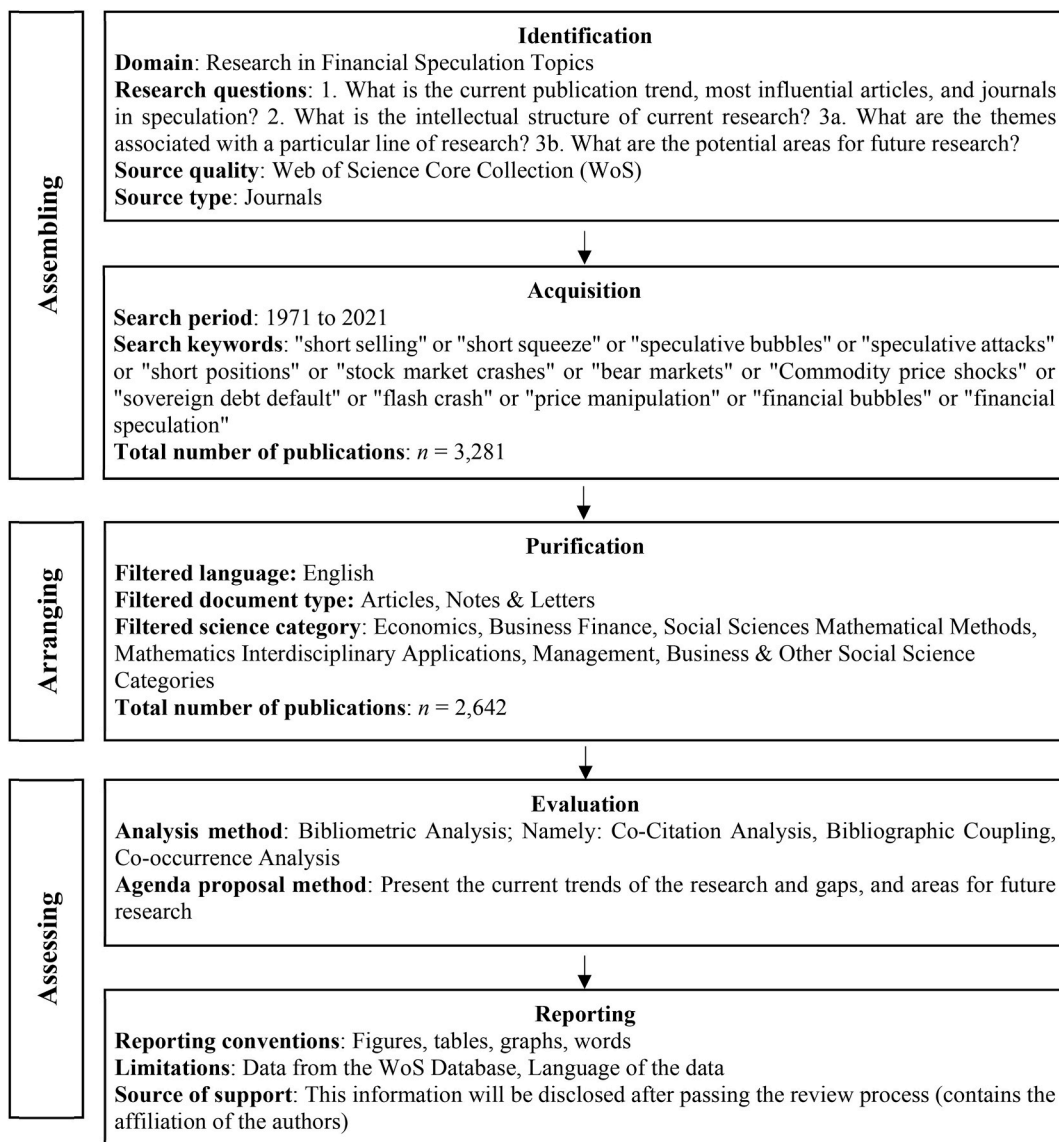


Fig. 1. Procedure of the study based on the SPAR-4-SLR Protocol.

of speculation, the articles that belong to at least one of these categories have been shown, Economics, Business Finance, Social Sciences Mathematical Methods, Mathematics Interdisciplinary Applications, Management, Business & Other Social Science Categories. Furthermore, documents after the date 12/31/2021 have been excluded Due to most of them being in revision are in process of being published, so the impact and real relevance they have cannot be known.

The main techniques proposed to carry out bibliometric studies are several according to the different authors (Cobo et al., 2015; Donthu et al., 2021; Merigó et al., 2018). Some propose the use of quantitative analysis for the study of literature, although, in recent years, there is a growing trend for the use of scientific mapping for bibliometric studies. The use of the two proposed techniques provides us with greater rigor and precision when analyzing the different aspects of the study in this article (Cobo et al., 2012; Waltman et al., 2010).

Different indicators have been used to carry out this study and undertake the performance analysis in the most precise way. The main and best-known information factors are the number of publications and the number of citations that these publications receive, although much more information is also extracted from the databases (Kong et al., 2020). Through the databases, indices have been generated to measure the influence of citations in academic articles published by an author, for example, we find the h-index, one of the main indicators used in the academic environment to assess the influence of the articles from a citation threshold h. Other benchmarks have not been used, for example, the i10-index and g-index (Bornmann et al., 2009; Norris & Oppenheim, 2010). The influence of different authors, journals, and universities, and populations have been studied. In the case of universities, two rankings have been used to measure the category of the university, the Academic Ranking of World Universities (ARWU) and the Quacquarelli Symonds World University Ranking (QS) (Baier Fuentes et al., 2021).

To observe more precisely the entire bibliographic structure of the articles and the topics mentioned, scientific mapping has been used, which will allow to observe the different connections existing in the study environment of science (Cobo et al., 2014; López Belmonte et al., 2020; Van Raan, 2014). Different software allows us to carry out bibliometric studies, for instance, the VOSviewer tool has been used for the elaboration of science mapping of this study (Purwayadi, 2020; Van Eck & Waltman, 2010).

Given that the study is obtained through previous publications, the data used during this article might suffer small modifications that alter the result over time, especially for those articles published recently (Auer & Tercero-Lucas, 2022).

### 3. Bibliometric performance

#### 3.1. Publications and citation structure

The first articles that were published about financial speculation were published at the beginning of the 70s. During the last decade of the 20th century, only 182 articles were published. However, in the first decade of the 21st century, the article number doubled, and from there on we find a growing production of academic articles on this subject, which continues this trend to date, reaching 324 publications in 2021. In Fig. 2, we can see the evolution of the publication of articles over time.

In the figure we can see the turning point beginning in the year 2012, coinciding with the global financial crisis after the bankruptcy

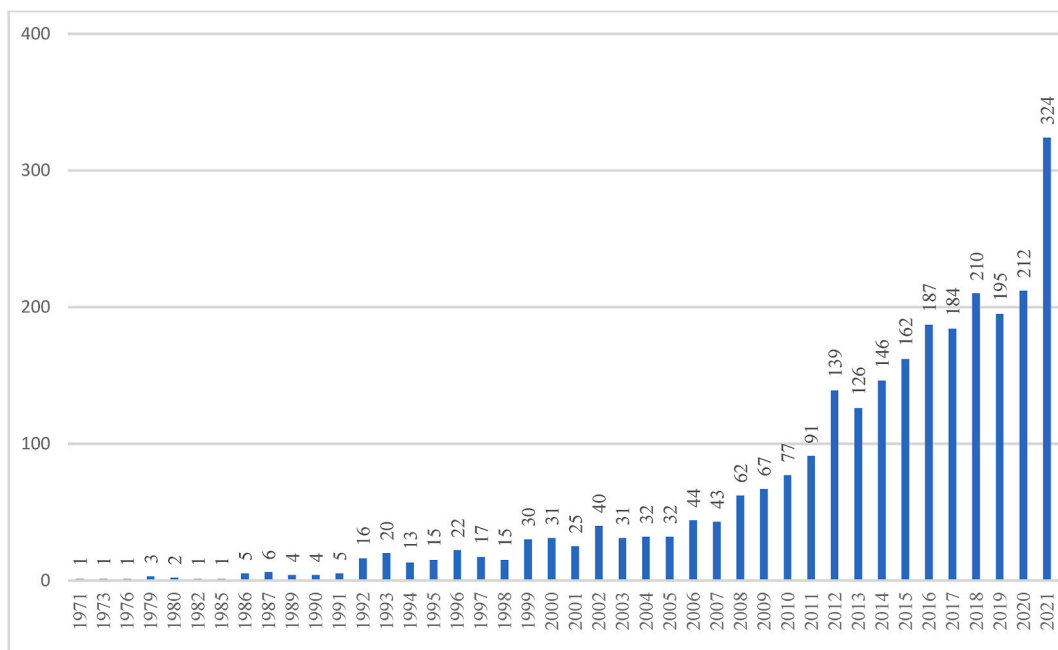


Fig. 2. Annual number of papers published by year.

of Lehman Brothers and the concern about the stability of the financial markets and institutions. This event produced an increase in the production of articles during the next few years, later in the year 2016. In 2016, the elaboration and production of academic articles, concerning the rising of crypto assets, especially cryptocurrencies such as Bitcoin, were relaunched, being a growing line of research. Observing the number of citations that these articles obtain, we realise how the first articles from the end of the '90s and the beginning of the 2000s did not have a great impact on the scientific community. Although a few papers were relevant as a solid base for the future flow of production, such as papers of Login and Solnik (2001) and Scheinkman and Xiong (2013). The articles that were produced during the decade of the 2010s, on the other hand, have been better recognized by the scientific community, proving that the development of practical implications of these papers has been highly efficient. Since 2013, articles with a greater flow of citations were produced, for example, in 2015, Cheah and Fry (2015) produced an article that currently has a total of 538 citations. From 2014 onwards, articles of greater impact began to be produced, accumulating values above 500 citations per year, which can be related to the increasing publication of academic articles about the topics dealt with. Through the above, it is possible to answer part of RQ1, where the interest in this subject and the number of publications is growing over time. Furthermore, all this can be seen more clearly in Table 1, with the compilation of the data, years with no publications have been excluded and possible citations have been added to the adjacent year. The data from the beginning of 2020 onwards does not yet reflect its full potential due to the short space of time it has, but the growing evolution is already observed of the research line.

### 3.1.1. Influential papers

As seen above, there are many articles referring to the concepts studied, these articles have been cited by different authors in

**Table 1**  
Annual citation structure on Speculation topics.

Year	TP	TC	≥100	≥50	≥20	≥10	≥5	≥1
1971	1	0	0	0	0	0	0	0
1973	1	0	0	0	0	0	0	0
1976	1	1	0	0	0	0	0	1
1979	3	3	0	0	0	0	0	3
1980	2	0	0	0	0	0	0	0
1982	1	12	0	0	0	0	1	5
1985	1	28	0	0	0	0	1	10
1986	5	12	0	0	0	0	1	3
1987	6	14	0	0	0	0	0	6
1989	4	49	0	0	0	0	3	16
1990	4	32	0	0	0	0	3	10
1991	5	33	0	0	0	0	2	10
1992	16	41	0	0	0	0	1	20
1993	20	61	0	0	0	0	3	23
1994	13	60	0	0	0	0	1	33
1995	15	62	0	0	0	0	1	33
1996	22	100	0	0	0	0	6	35
1997	17	91	0	0	0	0	3	46
1998	15	146	0	0	0	2	5	50
1999	30	179	0	0	0	2	8	64
2000	31	217	0	0	0	2	12	73
2001	25	254	0	0	0	1	16	70
2002	40	294	0	0	0	3	13	98
2003	31	386	0	0	0	7	15	104
2004	32	397	0	0	0	4	20	122
2005	32	500	0	0	1	5	29	133
2006	44	658	0	0	1	16	22	147
2007	43	709	0	0	1	14	30	162
2008	62	945	0	0	2	19	41	207
2009	67	1112	0	1	4	20	46	223
2010	77	1326	0	0	8	25	44	258
2011	91	1474	0	1	4	23	71	283
2012	139	1995	0	3	11	35	65	337
2013	126	2288	0	3	10	40	79	392
2014	146	2688	0	2	11	54	96	471
2015	162	3146	0	2	17	57	111	518
2016	187	3367	0	2	24	48	121	596
2017	184	3500	0	3	21	58	139	645
2018	210	4200	0	4	26	79	143	712
2019	195	5459	1	7	38	75	187	862
2020	212	6550	1	8	42	104	210	987
2021	324	13779	2	15	87	242	460	2146
Total	2642	125395	4	51	308	935	2009	9914
Percentage	100.00%	100%	0.03%	0.39%	2.33%	7.07%	15.20%	74.99%

TP = total publications, TC = total cites, ≥XXX = accumulated cited by article produced in the year.

different Finance, Economics, Business, and Management journals. It is very important to know the most relevant articles on this subject, to be able to advance in the line of research following the dynamics marked by the authors. To answer part of RQ1, Table 2 has been created, which shows the 50 most cited articles collected by the Web of Science Core Collection, where the articles that have had the greatest impact on this subject can be seen. We will find the title of the publication, the authors, the year of publication, the total number of citations (TC), and the average number of citations per year (C/Y).

**Table 2**

Top 50 most cited articles on speculation topics.

Rank	Title	Author/s	Year	TC	C/Y
1	Extreme correlation of international equity markets	Longin, F.; Solnik, B.	2001	1142	51.91
2	Overconfidence and speculative bubbles	Scheinkman, J.A.; Xiong, W.	2003	819	40.95
3	Constraints on short-selling and asset price adjustment to private information	Diamond, D.W.; Verrecchia, R.E.	1987	725	20.14
4	International asset allocation with regime shifts	Ang, A.; Bekaert, G.	2002	688	32.76
5	Leading indicators of currency crises	Kaminsky, G.; Lizondo, S.; Reinhart, C.M.	1998	547	21.88
6	Speculative bubbles in Bitcoin markets? An empirical investigation into the fundamental value of Bitcoin	Cheah, E. T.; Fry, J.	2015	538	67.25
7	Is a finance-led growth regime a viable alternative to Fordism? A preliminary analysis	Boyer, R.	2000	471	20.48
8	Explosive behavior in the 1990s nasdaq: when did exuberance escalate asset values?	Phillips, P. C. B.; Wu, Y.; Yu, J.	2011	468	39.00
9	Short sales, institutional investors and the cross-section of stock returns	Nagel, S.	2005	426	23.67
10	Testing for multiple bubbles: historical episodes of exuberance and collapse in the s&p 500	Phillips, P. C. B.; Shi, S.; Yu, J.	2015	401	50.13
11	Has the business cycle changed and why?	Stock, J.H.; Watson, M.W.; Gali, J.; Hall, R.E.	2003	400	20.00
12	Short interest, institutional ownership, and stock returns	Asquith, P.; Pathak, P.A.; Ritter, J.R.	2005	377	20.94
13	Commodity Price Shocks and Civil Conflict: Evidence from Colombia	Dube, O.; Vargas, J. F.	2013	369	36.90
14	Short-sale constraints and stock returns	Jones, C.M.; Lamont, O.A.	2002	337	16.05
15	Efficiency and the bear: Short sales and markets around the world	Bris, A.; Goetzmann, W. N.; Zhu, N.	2007	330	20.63
16	Pitfalls in testing for explosive bubbles in asset prices	Evans, G.W.	1991	327	10.22
17	Short-Sale Strategies and Return Predictability	Diether, K. B.; Lee, K. H.; Werner, I. M.	2009	322	23.00
18	Contagion and trade - Why are currency crises regional?	Glick, R.; Rose, A. K.	1999	317	13.21
19	Contagious currency crises: First tests	Eichengreen, B.; Rose, A.; Wyplosz, C.	1996	317	11.74
20	Rational contagion and the globalization of securities markets	Calvo, G. A.; Mendoza, E. G.	2000	308	13.39
21	Stock market crashes, precursors and replicas	Sornette, D.; Johansen, A.; Bouchaud, J. P.	1996	288	10.67
22	Institutional Investors and the Informational Efficiency of Prices	Boehmer, E.; Kelley, E. K.	2009	287	20.50
23	What caused the Asian currency and financial crisis?	Corsetti, G.; Pesenti, P.; Roubini, N.	1999	273	11.38
24	Dating the timeline of financial bubbles during the subprime crisis	Phillips, P. C. B.; Yu, J.	2011	256	21.33
25	A simple framework for analysing bull and bear markets	Pagan, A. R.; Sossounov, K. A.	2003	254	12.70
26	Short-Selling Bans Around the World: Evidence from the 2007-09 Crisis	Beber, A.; Pagano, M.	2013	252	25.20
27	Commodity currencies	Chen, Y. C.; Rogoff, K.	2003	252	12.60
28	Price manipulation in the Bitcoin ecosystem	Gandal, N.; Hamrick, J. T.; Moore, T.; Oberman, T.	2018	248	49.60
29	Short Selling and the Price Discovery Process	Boehmer, E.; Wu, J.	2013	245	24.50
30	A food regime analysis of the 'world food crisis'	Mcmichael, P.	2009	245	17.50
31	Price Efficiency and Short Selling	Saffi, P. A. C.; Sigurdsson, K.	2011	244	20.33
32	Intrinsic bubbles - the case of stock-prices	Froot, K. A.; Obstfeld, M.	1991	244	7.63
33	Short-selling prior to earnings announcements	Christophe, S. E.; Ferri, M. G.; Angel, J. J.	2004	236	12.42
34	Stock-price manipulation	Allen, F.; Gale, D.	1992	235	7.58
35	Securities lending, shorting, and pricing	Duffie, D.; Garleanu, N.; Pedersen, L. H.	2002	234	11.14
36	The dynamics of stochastic volatility: evidence from underlying and options markets	Jones, C. S.	2003	222	11.10
37	From value at risk to stress testing: The extreme value approach	Longin, F. M.	2000	220	9.57
38	Sparse and stable Markowitz portfolios	Brodie, J.; Daubechies, I.; De Mol, C.; Giannone, D.; Loris, I.	2009	216	15.43
39	Negative bubbles and shocks in cryptocurrency markets	Fry, J.; Cheah, E. T.	2016	213	30.43
40	A specification test for speculative bubbles	West, K. D.	1987	210	5.83
41	Short Sellers and Financial Misconduct	Karpoff, J. M.; Lou, X.	2010	208	16.00
42	Testing for Speculative Bubbles in Stock Markets: A Comparison of Alternative Methods	Homm, U.; Breitung, J.	2012	207	18.82
43	The Flash Crash: High-Frequency Trading in an Electronic Market	Kirilenko, A.; Kyle, A. S.; Samadi, M.; Tuzun, T.	2017	203	33.83
44	Deep neural networks, gradient-boosted trees, random forests: Statistical arbitrage on the S&P 500	Krauss, C.; Xuan, A. D.; Huck, N.	2017	201	33.50
45	Balance sheets, the transfer problem, and financial crises	Krugman, P.	1999	199	8.29
46	Speculative bubbles, crashes and rational-expectations	Blanchard, O. J.	1979	198	4.50
47	Options, short sales, and market completeness	Figlewski, S.; Webb, G. P.	1993	197	6.57
48	Betting on trends - intuitive forecasts of financial risk and return	Debondt, W. F. M.	1993	191	6.37
49	Cognitive Dissonance, Sentiment, and Momentum	Antoniou, C.; Doukas, J. A.; Subrahmanyam, A.	2013	188	18.80
50	Identifying bull and bear markets in stock returns	Maheu, J. M.; Mccurdy, T. H.	2000	188	8.17

The article “Overconfidence and speculative bubbles”, is one of the most cited to date, accumulating a total of 819 citations, this article was very relevant in the understanding of speculative bubbles since it proves that agents pay prices higher than the value of the expected future dividends since they expect to be able to sell soon at a price that will exceed this dividend margin. This is the most common cause to generate a significant bubble in asset prices even when small differences in beliefs are sufficient to create a trade. Nevertheless, the most cited article is “Extreme correlation of international equity markets”, As demonstrated with the theory of extremes we reject the null hypothesis of multivariate normality for the negative tail, but not for the positive tail, meaning that the correlation between markets is not related to the volatility of the market itself, but to the market trend. Correlation increases in bear markets, but not in bull markets, this article has 1142 citations since its publication in 2001. Nagel published the article ‘Short sales, institutional investors and the cross-section of stock returns, which was the first one in deepening the behavior of short-sellers. They found that short-selling restrictions are tied to stocks with little institutional ownership. Due to institutional constraints, most professional investors simply never sell short and therefore cannot trade against the premium on shares they do not own. It is important to note that both the topics, authors, and journals where they were published continue to be highlighted throughout the study. Finally, it should also be noted that these articles are the ones with the highest citation ratio per year, which shows that they continue to be of high value to the scientific community and are a reference in their lines of research related to speculation and financial markets. Most recently, Cheah and Fry developed an article of great academic value for the study of speculative bubbles in Bitcoin markets with the final target to determine the fundamental (real) value of this cryptocurrency, getting 538 citations until now.

### 3.1.2. Leading authors on topics

Next, we present Table 3 where we find the 25 main authors with publications in the field of financial speculation. You can see the name of the author and the organization they represent, likewise, we find the total articles (TP) that they have only with these topics, the total citations (TC) of these articles, the h-index calculated for those publications, and the ratio of citations per article. The organization that appears in the last one notified was published in the database of the Web of Science Core Collection.

It should be noted that Sornette, D. is the author with 49 articles published and with the highest number of citations overall, with a h-index of 22. Followed by Blau, B.M., who has 14 articles with a h-index of 8. Phillips P. C. B., with only 7 articles, is the one with the highest citation rate, with 170.88 citations per article. There is a significant dispersion in the number of citations among the authors, as reflected in the differences in the TC/TP ratio. Although the organizations that these authors investigate are diverse, most of the organizations belong to the United States, the United Kingdom, and China.

### 3.1.3. The most productive and influential institutions

Institutions from all over the world collaborate and study speculation, it is an important line of research that is present in many disciplines, for this reason in the following Table 4 institutions from all over the world are represented. In it, we can find the ranking of the 30 institutions that have made the greatest number of contributions in these disciplines in recent years. This table has different indicators, the total paper (TP), the total citations (TC), the h-index of the institution (H), and the ratio of total citations by total articles (TC/TP). A counter has also been provided to see the number of articles greater than 100, 50 or 10 citations. Finally, the valuations of the institutions have been taken according to the prestigious and international rankings of institutions, the first being the Academic

**Table 3**  
Top 25 Leading authors in speculation.

Rank	Authors	Organization	TP	TC	H.index	TC/TP	≥100	≥50	≥10
1	Sornette, D.	University of California System	49	1542	22	31.47	3	5	22
2	Blau, B. M.	Utah System of Higher Education	14	202	8	14.43	0	0	8
3	Gupta, R.	University of Pretoria	11	149	8	13.55	0	0	8
4	Alexander, G. J.	University of Minnesota Twin Cities	10	146	6	14.60	0	1	3
5	Shi, S. P.	Macquarie University	9	576	7	64.00	1	1	4
6	Su, C. W.	University of Karachi	9	194	6	21.56	0	1	5
7	Bohl, M. T.	University of Munster	8	208	8	26.00	0	2	4
8	Brooks, C.	University of Reading	8	136	6	17.00	0	0	5
9	Chen, J.	Yunnan University of Finance & Economics	8	60	4	7.50	0	0	2
10	Kumar, A.	University of Delhi	8	70	5	8.75	0	0	4
11	Phillips, P. C. B.	Yale University	8	1367	6	170.88	4	1	1
12	Chan, K. C.	Shanghai Business School	7	79	5	11.29	0	0	3
13	Della Posta, P.	Beijing Normal University	7	31	4	4.43	0	0	0
14	Flood, R. P.	International Monetary Fund	7	295	5	42.14	1	1	3
15	Mohamad, A.	International Islamic University Malaysia	7	31	3	4.43	0	0	0
16	Protter, P.	Columbia University	7	226	5	32.29	0	2	2
17	Reed, A. V.	University of North Carolina Chapel Hill	7	404	7	57.71	1	2	3
18	Rosser, J. B.	James Madison University	7	58	4	8.29	0	0	3
19	Zhou, W. X.	East China University of Science & Technology	7	290	6	41.43	1	0	5
20	Balcilar, M.	Eastern Mediterranean University	6	79	4	13.17	0	0	4
21	Boulton, T. J.	University System of Ohio	6	86	4	14.33	0	1	0
22	Chang, H. L.	Ling Tung Univ	6	150	5	25.00	0	1	4
23	Chen, S. S.	National Taiwan University	6	315	4	52.50	2	0	1
24	Fletcher, J.	University of Strathclyde	6	6	2	1.00	0	0	0
25	Jain, A.	Rochester Institute of Technology	6	105	3	17.50	0	1	1



**Table 4**  
The most productive and influential institutions.

Rank	Organization	Country	TP	TC	H	TC/TP	≥100	≥50	≥10	ARWU	QS
1	University Of London	England	65	1473	16	22.66	3	4	19	201–300	125
2	Columbia University	United States	43	2685	23	62.44	7	9	16	8	22
3	Eth Zurich	Switzerland	41	755	17	18.41	1	1	20	21	9
4	London School Economics Political Science	England	31	1044	12	33.68	3	2	9	151–200	56
5	University Of California Los Angeles	United States	31	1593	19	51.39	6	5	12	14	44
6	University Of Geneva	Italy	29	565	14	19.48	1	1	15	60	125
7	Harvard University	United States	28	2429	16	86.75	9	2	7	1	5
8	University Of Sydney	Australia	27	254	8	9.41	0	2	5	69	41
9	Macquarie University	Australia	26	786	9	30.23	2	1	6	201–300	195
10	University Of Melbourne	Australia	25	361	11	14.44	0	0	13	33	33
11	University Of North Carolina	United States	23	707	14	30.74	1	4	14	29	102
12	Yale University	United States	23	2690	17	116.96	8	3	6	11	18
13	Cornell University	United States	22	870	13	39.55	2	3	9	12	20
14	University Of Oxford	United States	22	400	9	18.18	1	0	8	7	4
15	New York University	United States	21	1984	16	94.48	6	5	7	27	39
16	Princeton University	United States	21	2420	15	115.24	8	0	9	6	16
17	Renmin University Of China	China	20	142	6	7.10	0	0	4	601–700	601–650
18	University Of Cambridge	United States	20	374	8	18.70	1	0	5	3	2
19	University Of Manchester	England	20	349	11	17.45	0	0	13	35	28
20	University Of Minnesota Twin Cities	United States	20	627	12	31.35	2	2	8	40	185
21	University Of Pennsylvania	United States	20	1703	13	85.15	4	3	8	15	13
22	Massachusetts Institute Of Technology	United States	19	1407	13	74.05	5	3	6	4	1
23	Northwestern University	United States	19	859	15	45.21	3	2	11	34	32
24	University Of California Berkeley	United States	19	1315	11	69.21	3	4	6	5	27
25	Chinese University Of Hong Kong	Hong Kong	18	216	8	12.00	0	0	6	101–150	38
26	Monash University	Australia	18	225	8	12.50	0	1	6	80	57
27	Universite Paris Cite	France	18	779	10	43.28	1	0	9	13	69
28	City University Of Hong Kong	Hong Kong	17	380	9	22.35	0	3	6	151–200	54
29	Singapore Management University	Singapore	17	1145	8	67.35	2	1	4	–	561–570
30	Duke University	United States	16	948	12	59.25	2	5	5	32	50

Ranking of World Universities (ARWU) and the Quacquarelli Symonds World University Ranking (QS). In this way, it will be possible to observe if the most prestigious institutions dedicate time and effort to carry out research in this area.

As observed, the main institution and the one that has contributed the most literature in this field is the University of London with a total of 65 published articles and 1473 citations, followed by Columbia University, with 43 articles and more than 2000 citations. Next, we find a group of universities in Asia-Pacific that have carried out various studies of great value. Such as, the University of Sydney with 27 articles and a h-index of 8, Macquarie University with 26 articles and 2355 citations, and ETH Zurich with 41 articles, an h-index of 17, and a citation ratio of 18.41 from the European side. Even so, another main institution in this field is Yale University, not only because of the number of articles published, which has 23, but also because of their importance, given that it has a ratio of 116.96 citations per article.

Within the top 30, it stands out that 53.33% of the institutions that appear are from the United States, this reflects the importance of financial speculation for the private and public institutions of the American society. Additionally, the other 46.67% is made up of universities from the United States, but we also find different institutions from Europe, China, and Australia.

According to the ranking of the Academic Ranking of World Universities, the list has 23 institutions in the top 100 and 20 of these in the top 50 in the world. This indicates the importance and relevance of these topics. Likewise, the ranking provided by Quacquarelli Symonds World University Ranking coincides with the previous index, in which 23 institutions are in the top 100 of the world. It should be noted that MIT is considered the 4th best institution in the world by ARWU and that the QS values it as the number 1 institution in its ranking, also we can find Harvard University which is considered the number 1 by ARWU and 5 by QS. This data is very noteworthy given that they are the institution with the highest number of publications and citations within this line of research.

### 3.1.4. The most productive and influential countries

Now we are going to study the 25 most influential countries and where the greatest number of contributions have been made.

**Table 5**  
Publications classified by continents.

R	Supreregions	TP	TC	H	TC/TP	Population	TP/POP	TC/POP
1	North America	1111	35872	94	32.29	500.465.94	2.219.93	71.677.21
2	Europe	1021	21847	64	21.40	1.431.604.96	713.19	15.260.49
3	Asia	757	9920	45	13.10	3.699.168.19	204.64	2.681.68
4	Oceania	219	3964	28	18.10	25.739.26	8.508.40	154.005.98
6	Latin America	67	939	12	14.01	303.725.03	220.59	3.091.61
5	Africa	65	867	15	13.34	368.836.58	176.23	2.350.63

Observe that there are many more countries that have published articles on this subject, highlighting the national and international importance of these matters. The country from which the different authors of the article are is considered as the country of production, different indicators have been used in the same way as in Table 4, adding new indicators such as the total population of the country, according to data from the World Bank Group and also a ratio of Total Papers to the Population (TP/POP) and Total citations to the Population (TC/POP).

The results of Table 5 and Fig. 3 show the great diversity of countries that are making publications in this line of research, although the total number of countries that publish under these Topics extends to 109 countries, from 5 continents. The country with the highest production of articles is the United States with a total of 1849 articles and a h-index of 96, followed by China with 1811 articles, 35,953 citations, and a h-index of 85. These two countries lead the list and they are very far from the rest, considering the next country is England with a total production of 471 articles, and with a h-index of 56. If we consider the efficiency of the publications measured in citations, we find that Singapore, which has 41 publications, has a citation ratio of 46.88 citations per article, a very high value. New Zealand is the next country with the highest ratio, with a value of 37.74 citations per article. On the other hand, the ratio of citations per population highlights China, which has 363 articles and a h-index of 31.

In Table 5, a comparison has been made by continents, as expected North America is the continent with the highest production of articles with a total of 1111 articles and a h-index of 94, followed by Europe with 1021 articles. Oceania has an intermediate level of production in comparison with the strongest regions, but on the contrary, it is the supra region with the highest proportion of articles per number of inhabitants.

### 3.2. Science mapping

The methodology most currently used to carry out bibliometric analysis is science mapping, which allows us to graphically observe the connections between the different interlocutors of scientific publications. This way, we can complement the analytical performances with a structured, visual and dynamic methodological model. Next, we will observe the different bibliometrics mappings carried out with the actors worked on in the previous sections, the connections between the different authors, the main academic journals, the countries that have carried out the most studies in these lines of research, and the most used keywords will be represented. As mentioned in the methodology, the VOSviewer program has been used to develop the graphs presented below. This tool allows us to create analysis by citations, co-citations, co-occurrences, and bibliographic coupling. Citations and co-citations allow us to see the relationship between the different articles that appear. The relationships establish the duality of citations within the same article, each one belonging to a different journal, therefore, in the mapping only the data of the two cited articles will appear and not of the article that it cites. The graphical representation of co-citation will show the most cited articles and their connections. Finally, the co-occurrence map allows us to observe all those terms that are closest in a sentence or text, with this we will be able to observe which descriptors are repeated and the connections they have.

We now show the current intellectual structure (RQ 2), through the analysis of authors, institutions, and countries. First, we are going to visualize the most co-cited authors, this will allow us to see the academics that appear repeated more often and what connections they have with the rest of the experts in the field. For this, it has been established that they must have at least 20 citations and take the 100 most representative authors. In Fig. 4, we can identify how two main groups of authors coexist, specifically, it can be seen how the authors from American universities are found together in red and blue blocks and the main authors from other regions, mainly Europe, are found on the other side. Opposite of the green and yellow blocks. The proximity between the sources denotes a greater relationship between the authors and the sources. Noteworthy is the author Fama, E.F. from the University of Chicago, being the

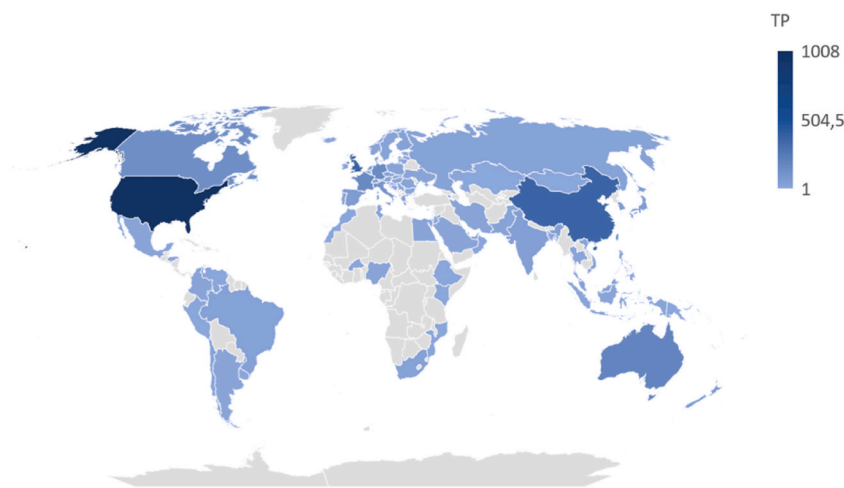


Fig. 3. World map of total production by countries.

Source: Own elaboration employing Australian Bureau of Statistics, GeoNames, Geospatial Data Edit, Microsoft, Navinfo, OpenStreetMap

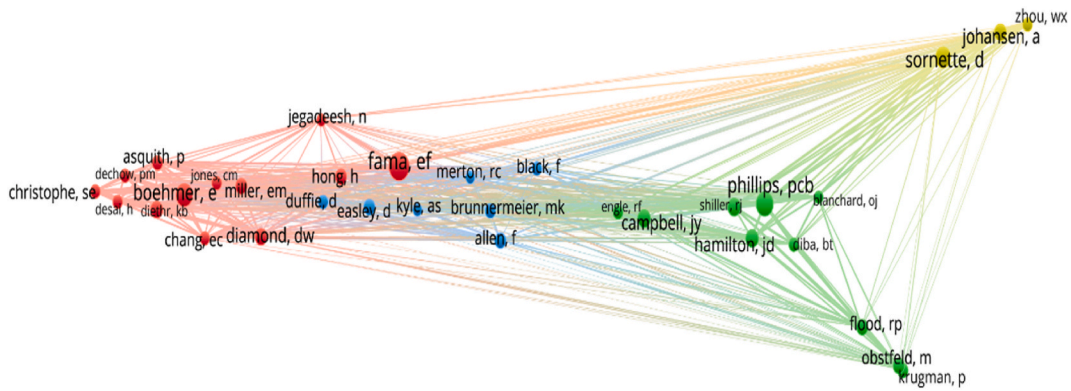


Fig. 4. Co-citations of authors cited on Speculation.

author with the highest number of citations within these two blocks, and on the other hand, we find Sornette, D., a professor at ETH Zurich that appears in the yellow block. To explain these connections, in Fig. 5, a bibliographic coupling of institutions has been prepared where we find the main relationships between institutions, so we can detect if there is a connection between the authors and the institutions. In order to represent the institutions, they must have carried out at least 10 articles in common and only the 200 most representative institutions will be represented. Examining the figure, we see that the universities collaborate with the closest ones geographically. In the same way, it can be seen that the connections are quite weak, which indicates that there are few inter-institutional works. In Fig. 6, a bibliographic coupling by countries has been carried out, where the 25 countries with the most connections are shown, and the most connected countries are the United States, England, and China. It seems logical to understand that being the countries that have published the most articles and having all the institutions in the country with a greater number of connections. Also, it can be seen how European countries are more oriented toward relations among themselves, and the United States, on the contrary, has strong connections with Asia and Oceania countries such as China, Australia, and New Zealand.

Another very important factor is to look at the co-cited journals, this allows us to answer part of RQ1 and to look at the main sources of information of the articles and where we can find the most prominent articles, therefore the most important journals in this subject. The Co-citation mapping performed looks at more than 1000 journals, it has been limited to those with more than 20 co-citations, resulting in the 30 most important journals that can be seen in Fig. 7. We also find journals of great value and high quality, such as the Journal of Finance, Journal of Financial Economics, Journal of Banking and Finance, Econometrica, Journal of Political Economy, Physica A: Statistical Mechanics and its Applications, Journal of Economic Dynamics and Control, and Journal of Accounting and Economics. On the other hand, we have checked the growth of several emerging journals in this area in the last decade such as the Journal of Empirical Finance, International Review of Economics & Finance and European Journal of Finance. This diversity of

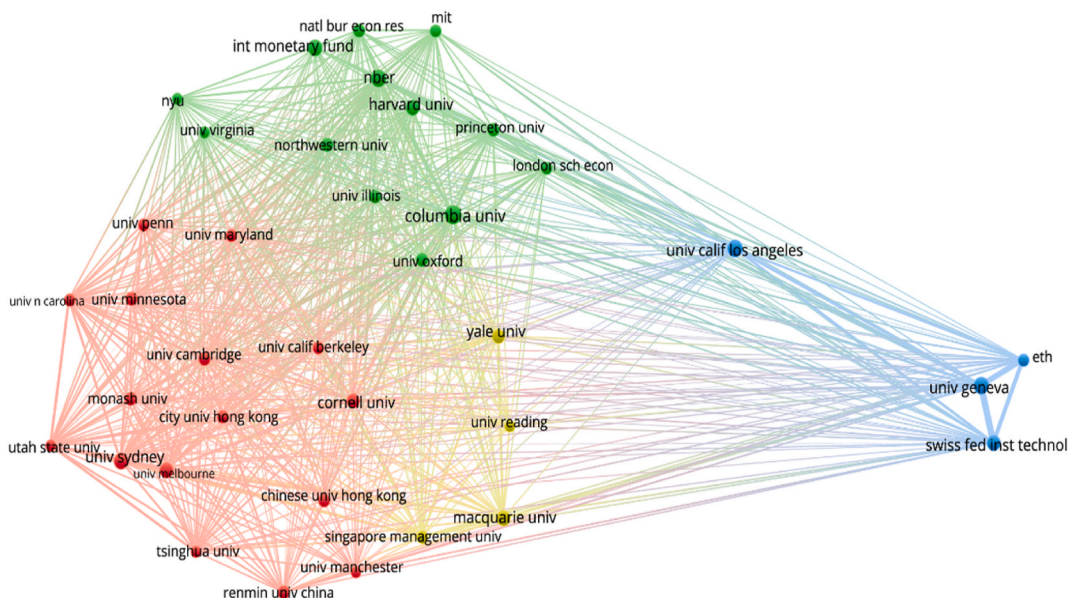


Fig. 5. Bibliographic Coupling of Institutions publishing.

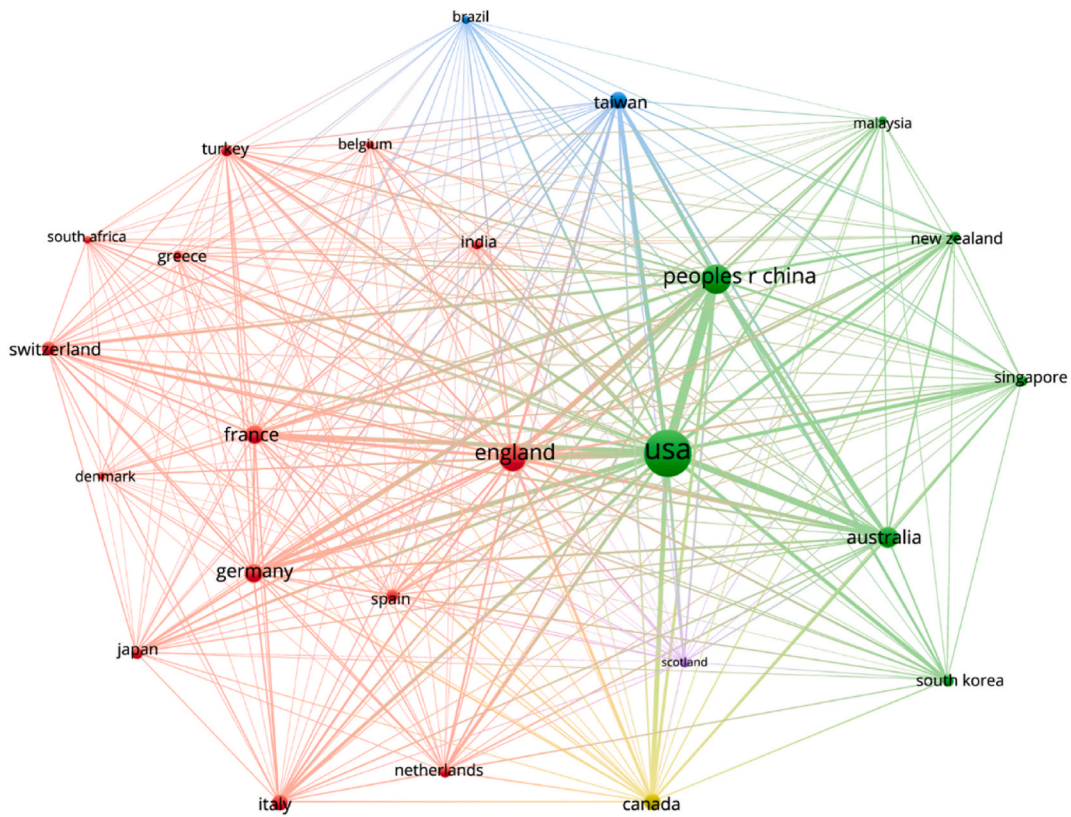


Fig. 6. Bibliographic Coupling of Countries publishing.

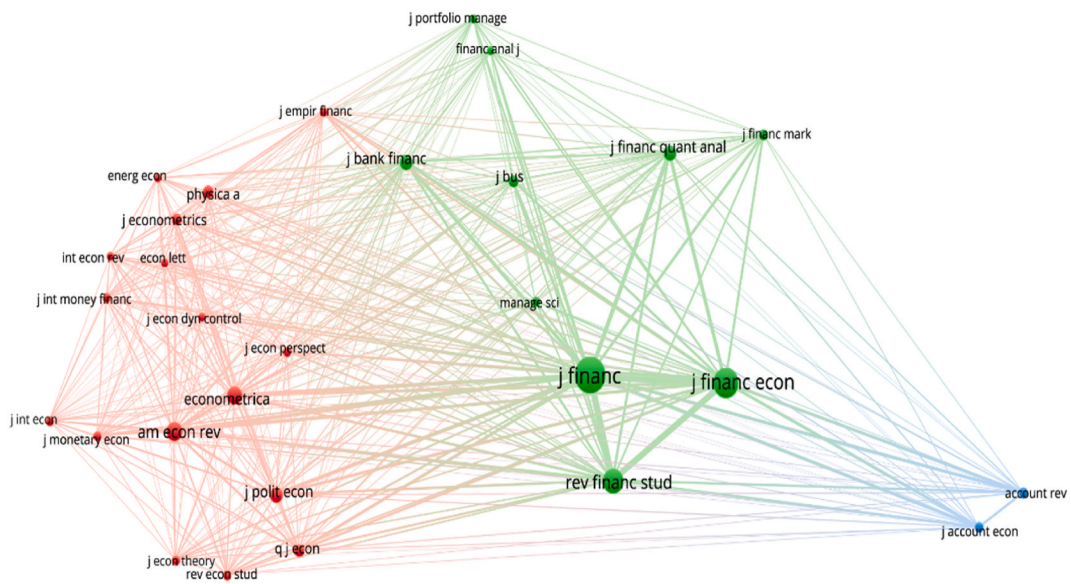


Fig. 7. Co-citation of journals.

economic and financial journals show that speculation topics have importance in any spectrum of the area and publish both in theoretical and empirical journals.

Finally, Fig. 8 shows the most related keywords, with this we will be able to discover the most treated topics within the framework of financial speculation, and we will see all those lines of research that have not yet been treated. In order to carry out this study, we

created a map of the co-occurrence of the 300 most repeated keywords, with a minimum of 20 occurrences, thus all the keywords that appear can be defined as valid, used, and significant. That said, how could it be otherwise, the main topics used are Market, Information, and Risk. These words respond to a part of RQ3, in which the most studied topics to date are brought together, while at the same time prove the significance of the potential risks that can cause speculation events and the dealing of information in the market as a key point in the effective development of these kinds of scenarios. Next, to complete the answer to RQ3, we should point out how different thematic blocks are being exploited in these current years, presenting possible future trends in research on speculation in finance. In green, we see short selling, a hot topic related to speculation situations lived in financial markets, and how it has generated a new little world around this topic with similar or connected topics such as restrictions, short sales, constraints, and short sellers. In red, we find other factors that have been widely represented in the speculation field from the earliest times until nowadays, turning all generalist terms around the main point about bubbles, such as expectations, stock market, and volatility, also related to empirical issues like models, time-series, and tests reveal that the importance of econometric models in the study of speculation and more specifically in research about bubbles. Speculative attacks and currency crises appear in a more isolated spectrum (yellow block) showing as a more independent research line after checking its connections with other significant terms since it had a solid development in the 90's decade, and at the same time, has an important link with keywords like a model, equilibrium, and price. This is due to the focus of the works that deal with currency crises and their speculative consequences, focusing on formulating models with a macroeconomic theoretical explanation of the equilibrium of the economy. Moreover, the keywords that appear in blue show less interdependence and work better as a 'bridge' between the block of jobs related to bubbles (in red) and the jobs that develop short-selling moments (in green). Finally, there are some keywords in both blue and purple with a greater distance from the rest and with a low level of occurrences, such as flash crisis, price manipulation, and investor sentiment. This could show as issues with low importance or a scarce development of articles about these concerns until the current years.

#### 4. Future research lines

The proposal of future research lines related to financial speculation is of utmost significance, as it opens up new dimensions for understanding and managing speculative practices. One compelling avenue for exploration is the study of information disclosure, where researchers can delve into the impact of information dissemination on speculative activities. Understanding how information flows affect market dynamics and the behavior of speculative agents can lead to valuable insights for market regulation and investor decision-making.

Another crucial line of future research lies in exploring market efficiency, examining the role of speculation in asset pricing and

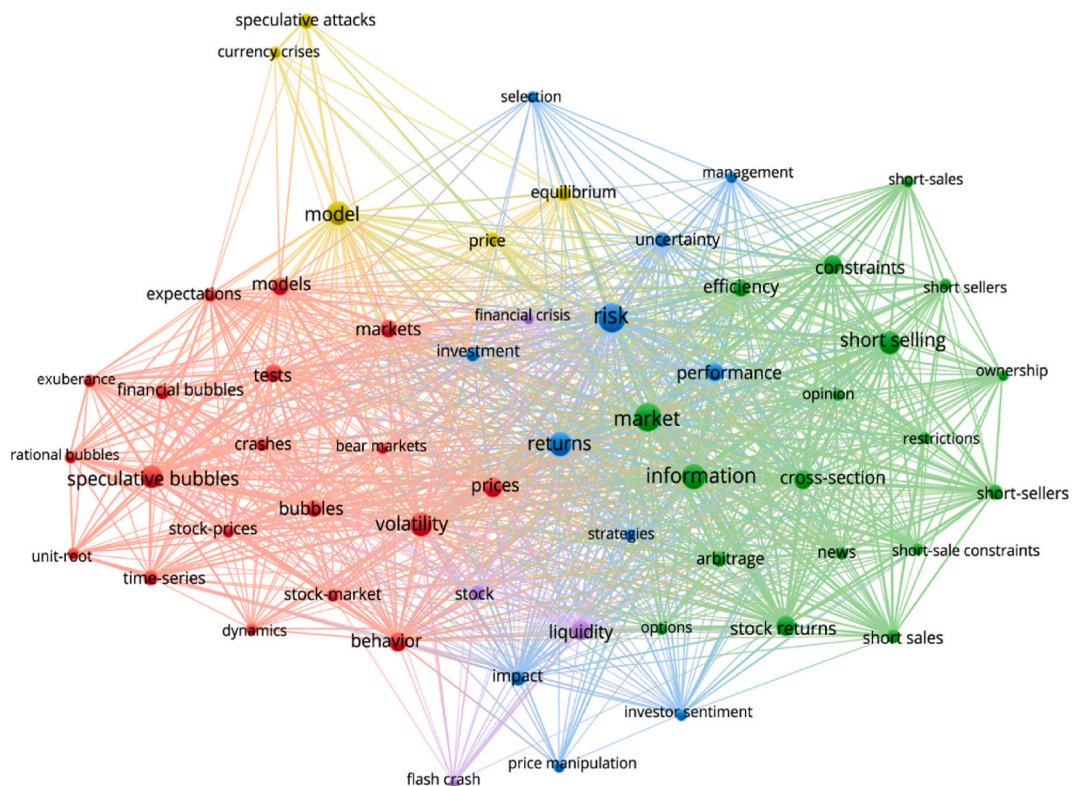


Fig. 8. Co-occurrence of keywords.

market performance. Understanding this relationship can contribute to ongoing debates about the implications of speculative behavior for market stability and investor welfare. Moreover, analyzing the impact of speculation on market efficiency, price discovery, and market liquidity can inform the development of strategies that enhance market transparency and foster efficient capital allocation. Additionally, studying the influence of speculative activities on market volatility and investor herding behavior can aid in designing risk management tools and policies to mitigate excessive volatility and maintain stable financial markets. Overall, this research can yield valuable insights for policymakers and market participants in their efforts to ensure well-functioning financial markets.

Price manipulation is indeed an intriguing area that demands thorough investigation. The intricate study of price manipulation in financial markets can unlock essential insights, not only for regulators but also for market participants. Uncovering the underlying mechanisms and implications of price manipulation can help in identifying and mitigating such manipulative practices, fostering fair and transparent market conditions. By gaining a comprehensive understanding of the dynamics of price manipulation, researchers can shed light on potential vulnerabilities within market structures, thereby paving the way for designing more robust and resilient financial systems. Furthermore, an in-depth exploration of price manipulation can provide valuable feedback on the effectiveness of existing regulatory measures, enabling regulators to refine their policies and address any shortcomings in the current framework. Additionally, investigating price manipulation can contribute to a broader understanding of market integrity and investor confidence, ultimately fostering an environment of trust and confidence in financial markets.

The emergence of new strategies and assets in financial markets has brought about unique challenges and opportunities for research. The study of short-selling, short squeezes, cryptocurrencies, volatility, and investor behavior represents fertile ground for scholars to explore the impact of these elements on market dynamics and stability. Investigating how these strategies and assets interact with speculative activities can offer valuable insights for investors, policymakers, and financial institutions.

As financial markets continue to evolve, researchers should focus on studying constraints and exploring ways to manage volatility control. Examining how market constraints impact speculative behavior and studying effective measures for managing market volatility can aid in creating robust and resilient financial systems. Additionally, research on the treatment of information and financial regulatory mechanisms can contribute to enhancing market transparency and investor protection, ensuring that speculative practices are regulated effectively.

The study of commodity price shocks is particularly intriguing, considering the limited competition in this area of research. By delving into the causes and consequences of commodity price shocks, researchers can identify key factors that trigger speculative activities and their implications for financial markets and economies. Moreover, the current geopolitical events surrounding Ukraine and Russia have magnified public interest in this aspect, further highlighting its relevance and potential for future investigation.

In conclusion, the proposal of these future research lines offers an exciting path for understanding the complexities of financial speculation and its impact on market stability and efficiency. By delving into these areas of investigation, researchers can contribute to shaping a more robust and informed approach to managing speculative practices and ensuring the integrity and resilience of financial markets.

Future research questions can be proposed through the possible future lines of research mentioned above:

**FRQ#1:** How does information disclosure impact speculative activities in financial markets, and what are the implications for market regulation and investor decision-making?

**FRQ#2:** What is the relationship between speculation and market efficiency, and how does speculative behavior affect asset pricing, market performance, and capital allocation?

**FRQ#3:** How can market regulators effectively detect and prevent price manipulation, and what are the underlying mechanisms and implications of such manipulative practices on market transparency and integrity?

**FRQ#4:** What are the implications of speculative activities on market volatility and investor herding behavior, and how can risk management tools and policies be designed to mitigate excessive volatility?

**FRQ#5:** How do new strategies and assets, such as short-selling, short squeezes, cryptocurrencies, and investor behavior, interact with speculative activities, and what are their impacts on market dynamics and stability?

**FRQ#6:** What are the key constraints that impact speculative behavior, and how can effective measures be developed to manage market volatility and foster resilient financial systems?

**FRQ#7:** How can the treatment of information and financial regulatory mechanisms be improved to enhance market transparency and protect investors from misleading information?

**FRQ#8:** What are the causes and consequences of commodity price shocks, and how do they trigger speculative activities in financial markets?

**FRQ#9:** How can policymakers address the implications of geopolitical events, such as the Ukraine War, on commodity markets and their potential impact on market stability?

## 5. Conclusions

Speculation is a key factor for society and represents a lot of lines of research that are in full development and growing exponentially. In recent years the number of publications has increased and it is a topic of interest for the most prestigious journals. Speculation in financial markets is a widely used study tool to understand a given scenario that can destabilize the markets and is reflected in the number of publications and citations they receive. This is why by conducting a bibliometric analysis through performance analysis and scientific mapping is so important. It allows us to observe the literature and the different avenues of research that this subject provides us. Likewise, it allows us to observe which authors are the most influential and which journals are the most

relevant within the subject. To do this, data from the Web of Science Core Collection database has been used. This study confirms the great potential of this area of research and the great interest it should generate for the most prestigious journals.

The main results obtained demonstrates the growing trend in the creation of articles with these concepts and the great acceptance it has in the academic environment, given that it has a high number of citations. We can find articles published from more than 100 countries, which identify the level of globalization in this field of research. Speculation is a relevant issue for all countries and cities on the planet. Also, we find a large number of authors who write articles on these subjects. The main countries from which these articles have been produced are those with the largest population and the greatest confluence of speculation events, which is the case of the United States, the United Kingdom, and China although there are also other countries with large production or with high-value articles, such as, Australia, New Zealand or Taiwan. The scientific mapping of the publications with topics has given us important advances to develop new lines of research. To develop this work, the VOSViewer program has been used. With this, it has been possible to reflect the most cited and outstanding authors in the articles used, we can find highly prestigious academics such as Eugene Fama and Didier Sornette, both of whom have extensive academic careers in the topics under study. It has also been possible to observe the main journals that are sources of information on this subject, highlighting mainly the Journal of Finance, Journal of Financial Economics, Review of Financial Studies, and Physica A: Statistical Mechanicals and its Applications, among others.

Regarding the institutions related to the study of topics in financial speculation, we observe that over the time, there has been an important presence of universities of great international reputation such as Harvard, MIT, Princeton, Yale or the University of Geneva, in the academic preoccupation with these topics. But in the last decade, the pressure to deal with these lines has increased from Chinese and Australian universities of recognized importance such as the University of Melbourne, the University of Sydney, the Chinese University of Hong Kong, and the Renmin University of China.

The analysis provides several key insights into the research on financial speculation. The most treated topics in the field include Market, Information, and Risk, underscoring the importance of risk assessment and the role of information in speculative scenarios. Short selling emerges as a prominent contemporary topic, linked to related themes like restrictions, constraints, and short sellers. The enduring focus on bubbles is evident through keywords like expectations, stock market, and volatility, as well as empirical aspects like models and time-series analysis. Speculative attacks and currency crises form a distinct research line, with a strong connection to macroeconomic models and equilibrium. Some keywords act as bridges between bubble-related research and studies on short-selling moments. Additionally, keywords with limited occurrences, such as flash crisis, price manipulation, and investor sentiment, may indicate areas of lesser importance or limited development until recent years. This comprehensive analysis sheds light on the diverse and evolving landscape of research on financial speculation.

#### Author statement

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#### Data availability

Data will be made available on request.

#### References

- Adriaanse, L. S., & Rensleigh, C. (2013). Web of science, Scopus and Google scholar: A content comprehensiveness comparison. *The Electronic Library*, 31(6), 727–744. <https://doi.org/10.1108/EL-12-2011-0174>
- Agarwal, S., Pandey, R., Kumar, S., Lim, W. M., Agarwal, P. K., & Malik, A. (2023). Workplace incivility: A retrospective review and future research agenda. *Safety Science*, 158, Article 105990.
- Alaminos, D., Fernández, S. M., Neves, P. M., & Santos, J. A. C. (2019). Predicting sovereign debt crises with fuzzy decision trees. *Journal of Scientific and Industrial Research*, 78(11), 733–737.
- Alaminos, D., Salas, M. B., & Fernández-Gámez, M. A. (2022). Forecasting stock market crashes via real-time recession probabilities: A quantum computing approach. *Fractals - Complex Geometry, Patterns, and Scaling in Nature and Society*, 30(5), 1–16.
- Alaminos, D., Salas, M. B., & Fernández-Gámez, M.A. (2023). Quantum Monte Carlo simulations for estimating FOREX markets: A speculative attacks experience. *Humanit Soc Sci Commun*, 10, 353.

- Allen, F., Haas, M. D., Nowak, E., & Tengulov, A. (2021). Market efficiency and limits to arbitrage: Evidence from the Volkswagen short squeeze. *Journal of Financial Economics*, 142(1), 166–194.
- Alves, C., Mendes, V., & DaSilva, P. P. (2016). Analysis of market quality before and during short-selling bans. *Research in International Business and Finance*, 37, 252–268.
- Auer, R., & Tercero-Lucas, D. (2022). Distrust or speculation? The socioeconomic drivers of U.S. Cryptocurrency investments. *Journal of Financial Stability*, 62, Article 101066.
- Azad, A. S. M. S., Azmat, S., Fang, V., & Edirisuriya, P. (2014). Unchecked manipulations, price–volume relationship and market efficiency: Evidence from emerging markets. *Research in International Business and Finance*, 30, 51–71.
- Baier Fuentes, H., Merigó Lindahl, J. M., Miranda, L., & Martínez López, F. J. (2021). Strategic planning research through fifty years of long-range planning: A bibliometric overview. *Strategic Management*, 26(1), 3–25. <https://doi.org/10.5937/StraMan2101003B>
- Bakkalbasi, N., Bauer, K., Glover, J., & Wang, L. (2006). Three options for citation tracking: Google scholar, Scopus and web of science. *Biomedical Digital Libraries*, 3(1), 1–8. <https://doi.org/10.1186/1742-5581-3-7>
- Bornmann, L., Mutz, R., & Daniel, H. D. (2009). Do we need the h index and its variants in addition to standard bibliometric measures? *Journal of the American Society for Information Science and Technology*, 60(6), 1286–1289. <https://doi.org/10.1002/asi.21016>
- Boubaker, S., Goodell, J. W., Kumar, S., & Sureka, R. (2023). COVID-19 and finance scholarship: A systematic and bibliometric analysis. *International Review of Financial Analysis*, Article 102458.
- Boyd, N. E., Harris, J. H., & Li, B. (2018). An update on speculation and financialization in commodity markets. *Journal of Commodity Markets*, 10, 91–104.
- Caballero, R. J., & Simsek, A. (2020). A risk-centric model of demand recessions and speculation. *Quarterly Journal of Economics*, 135(3), 1493–1566.
- Caré, R., & Weber, O. (2023). How much finance is in climate finance? A bibliometric review, critiques, and future research directions. *Research in International Business and Finance*, 64, Article 101886.
- Cobo, M. J., Chiclana, F., Collop, A., de Ona, J., & Herrera-Viedma, E. (2014). A bibliometric analysis of the intelligent transportation systems research based on science mapping. *IEEE Transactions on Intelligent Transportation Systems*, 15(2), 901–908. <https://doi.org/10.1109/tits.2013.2284756>
- Cobo, M. J., López-Herrera, A. G., Herrera-Viedma, E., & Herrera, F. (2012). ScimAT: A new science mapping analysis software tool. *Journal of the American Society for Information Science and Technology*, 63, 1609–1630. <https://doi.org/10.1002/asi.22688>
- Cobo, M. J., Martínez, M. A., Gutiérrez-Salcedo, M., Fujita, H., & Herrera-Viedma, E. (2015). 25 years at knowledge-based systems: A bibliometric analysis. *Knowledge-Based Systems*, 80, 3–13. <https://doi.org/10.1016/j.knsys.2014.12.035>
- Conlon, T., & McGee, R. (2020). Safe haven or risky hazard? Bitcoin during the covid-19 bear market. *Finance Research Letters*, 35, Article 101607.
- Demirer, R., Leggio, K. B., & Lien, D. (2019). Herding and flash events: Evidence from the 2010 flash crash. *Finance Research Letters*, 31, 43–47.
- Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285–296. <https://doi.org/10.1016/j.jbusres.2021.04.070>
- Dube, O., & Vargas, J. F. (2013). Commodity price shocks and civil conflict: Evidence from Colombia. *The Review of Economic Studies*, 80(4), 1384–1421.
- Durán-Sánchez, A., Del Río-Rama, M. C., & Álvarez-García, J. (2017). Bibliometric analysis of publications on wine tourism in the databases Scopus and WoS. *European Research on Management and Business Economics*, 23, 8–15. <https://doi.org/10.1016/j.iedeen.2016.02.001>
- Engelberg, J. E., Reed, A. V., & Ringgenberg, M. C. (2018). Short-selling risk. *The Journal of Finance*, 73(2), 755–786.
- Erlar, A., Bauer, C., & Herz, B. (2015). To intervene, or not to intervene: Monetary policy and the costs of currency crises. *Journal of International Money and Finance*, 51, 432–456.
- Garber, P. M. (1989). Tulipmania. *Journal of Political Economy*, 97(3), 535–560.
- Gaviria-Marin, M., Merigó, J. M., & Baier-Fuentes, H. (2019). Knowledge management: A global examination based on bibliometric analysis. *Technological Forecasting and Social Change*, 140, 194–220. <https://doi.org/10.1016/j.techfore.2018.07.006>
- Goldstein, I., & Yang, L. (2019). Good disclosure, bad disclosure. *Journal of Financial Economics*, 131(1), 118–138.
- Goodell, J. W., Kumar, S., Lahmar, O., & Pandey, N. (2023). A bibliometric analysis of cultural finance. *International Review of Financial Analysis*, 85, Article 102442.
- Goodell, J. W., Kumar, S., Lim, W. M., & Pattnaik, D. (2021). Artificial intelligence and machine learning in finance: Identifying foundations, themes, and research clusters from bibliometric analysis. *Journal of Behavioral and Experimental Finance*, 32, Article 100577.
- Goyal, K., & Kumar, S. (2021). Financial literacy: A systematic review and bibliometric analysis. *International Journal of Consumer Studies*, 45(1), 80–105.
- Greppmair, S., Jank, S., & Smajlbegovic, E. (2022). On the importance of fiscal space: Evidence from short sellers during the COVID-19 pandemic. *Journal of Banking & Finance*, 106652.
- Haykır, O., & Yagli, I. (2022). Speculative bubbles and herding in cryptocurrencies. *Financial Innovation*, 8, 78. <https://doi.org/10.1186/s40854-022-00383-0>
- Jalal, R. N., Alon, I., & Paltrinieri, A. (2021). A bibliometric review of cryptocurrencies as a financial asset. *Technology Analysis & Strategic Management*. Latest Articles.
- Karmaziene, E., & Sokolovski, V. (2021). Short-selling equity exchange traded funds and its effect on stock market liquidity. *Journal of Financial and Quantitative Analysis*, 57(3), 923–956.
- Kizys, R., Tzouvanas, P., & Donadelli, M. (2021). From COVID-19 herd immunity to investor herding in international stock markets: The role of government and regulatory restrictions. *International Review of Financial Analysis*, 74, Article 101663.
- Kong, L., Liu, Z., & Wu, J. (2020). A systematic review of big data-based urban sustainability research: State-of-the-science and future directions. *Journal of Cleaner Production*, 273, Article 123142. <https://doi.org/10.1016/j.jclepro.2020.123142>
- Kraus, S., Breier, M., Lim, W. M., Dabic, M., Kumar, S., Kanbach, D., et al. (2022). Literature reviews as independent studies: Guidelines for academic practice. *Rev Manag Sci*, 16, 2577–2595.
- Kumar, S., Sahoo, S., Lim, W. M., Kraus, S., & Bamel, U. (2022). Fuzzy-set qualitative comparative analysis (fsQCA) in business and management research: A contemporary overview. *Technological Forecasting and Social Change*, 178, Article 121599.
- Kumar, S., Sharma, D., Rao, S., et al. (2022). Past, present, and future of sustainable finance: Insights from big data analytics through machine learning of scholarly research. *Annals of Operations Research*, 1–44.
- Kumar, S., Sureka, R., & Colombage, S. (2020). Capital structure of SMEs: A systematic literature review and bibliometric analysis. *Management Review Quarterly*, 70, 535–565.
- Kumar, S., Tomar, S., & Verma, D. (2019). Women's financial planning for retirement: Systematic literature review and future research agenda. *International Journal of Bank Marketing*, 37(1), 120–141.
- Lim, W. M., Kumar, S., & Ali, F. (2022). Advancing knowledge through literature reviews: 'what', 'why', and 'how to contribute'. *Service Industries Journal*, 42(7–8), 481–513.
- López Belmonte, J., Segura-Robles, A., Moreno-Guerrero, A. J., & Parra-González, M. E. (2020). Machine learning and big data in the impact literature. A bibliometric review with scientific mapping in web of science. *Symmetry*, 12(4), 495.
- Merigó, J. M., Cancino, C. A., Coronado, F., & Urbano, D. (2016). Academic research in innovation: A country analysis. *Scientometrics*, 108, 559–593. <https://doi.org/10.1007/s11192-016-1984-4>
- Merigó, J. M., Pedrycz, W., Weber, R., & de la Sotta, C. (2018). Fifty years of information sciences: A bibliometric overview. *Information Sciences*, 432, 245–268. <https://doi.org/10.1016/j.ins.2017.11.054>
- Mukherjee, D., Kumar, S., Pandey, N., & Lahiri, S. (2023). Is offshoring dead? A multidisciplinary review and future directions. *Journal of International Management*, 29(3), 101017.
- Norris, M., & Oppenheim, C. (2010). The h-index: A broad review of a new bibliometric indicator. *Journal of Documentation*, 66(5), 681–705. <https://doi.org/10.1108/00220411011066790>
- Noynons, E. C., Moed, H. F., & Luwel, M. (1999). Combining mapping and citation analysis for evaluative bibliometric purposes: A bibliometric study. *Journal of the American Society for Information Science*, 50(2), 115–131. [https://doi.org/10.1002/\(SICI\)1097-4571\(1999\)50:2<115::AID-ASIS>3.0.CO;2-J](https://doi.org/10.1002/(SICI)1097-4571(1999)50:2<115::AID-ASIS>3.0.CO;2-J)



- Patel, R., Migliavacca, M., & Oriani, M. (2022). Blockchain in banking and finance: Is the best yet to come? A bibliometric review. *Research in International Business and Finance*, Article 101718.
- Paul, J., Lim, W. M., O' Cass, A., Hao, A. W., & Bresciani, S. (2021). Scientific procedures and rationales for systematic literature reviews (SPAR-4-SLR). *International Journal of Consumer Studies*, 45(4). <https://doi.org/10.1111/ijcs.12695>. O1–O16.
- Phillips, P. C. B., Shi, S., & Yu, J. (2015). Testing for multiple bubbles: Historical episodes of exuberance and collapse in the S&P 500. *International Economic Review*, 56(4), 1043–1078.
- Popli, M., Ahsan, F. M., & Mukherjee, D. (2022). Upper echelons and firm internationalization: A critical review and future directions. *Journal of Business Research*, 152, 505–521.
- Purwayadi, T. (2020). Systematic mapping of performance assessment research: Bibliometric study with vosviewer. *Advances in Social Sciences Research Journal*, 7(9), 151–161. <https://doi.org/10.14738/assrj.79.8984>
- Saha, S., Das, R., Lim, W. M., Kumar, S., Malik, A., & Chillakuri, B. (2023). Emotional intelligence and leadership: Insights for leading by feeling in the future of work. *International Journal of Manpower* (ahead-of-print).
- Simsek, A. (2021). The macroeconomics of financial speculation. *Annual Review of Economics*, 13, 335–369.
- Van Eck, N., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 84(2), 523–538. <https://doi.org/10.1007/s11192-009-0146-3>
- Van Raan, A. F. (2014). In *Advances in bibliometric analysis: Research performance assessment and science mapping bibliometrics Use and Abuse in the Review of research performance* (pp. 17–28), 87.
- Vasconcelos, C. S., & Júnior, E. H. (2022). Forecasting exchange rate: A bibliometric and content analysis. *International Review of Economics & Finance*, 83, 607–628. <https://doi.org/10.1016/j.iref.2022.09.006>
- Vizuete-Luciano, E., Guillén-Pujadas, M., Alaminos, D., & Merigó-Lindalh, J. M. (2023). Taxi and urban mobility studies: A bibliometric analysis. *Transport Policy*, 133, 144–155.
- Vizuete-Luciano, E., Güzel, O., & Merigó, J. M. (2022). *Bibliometric research of the pay-what-you-want topic*. forthcoming: *Journal of Revenue and Pricing Management*.
- Waltman, L., Van Eck, N. J., & Noyons, E. C. (2010). A unified approach to mapping and clustering of bibliometric networks. *Journal of Informetrics*, 4(4), 629–635. <https://doi.org/10.1016/j.joi.2010.07.002>
- Wang, C. C., & Chen, C. C. (2010). Electronic commerce research in latest decade: A literature review. *International Journal of Electronic Commerce Studies*, 1(1), 1–14. <https://doi.org/10.7903/ijecs.898>
- Xiao, J., & Wang, Y. (2022). Macroeconomic uncertainty, speculation, and energy futures returns: Evidence from a quantile regression. *Energy*, 241, Article 122517. <https://doi.org/10.1016/j.energy.2021.122517>
- Zabavnik, D., & Verbić, M. (2021). Relationship between the financial and the real economy: A bibliometric analysis. *International Review of Economics & Finance*, 75, 55–75. <https://doi.org/10.1016/j.iref.2021.04.014>
- Zhang, D., Zhang, Z., & Managi, S. (2019). A bibliometric analysis on green finance: Current status, development, and future directions. *Finance Research Letters*, 29(C), 425–430.
- Ziadat, S. A. (2022). Oil shocks and equity returns during bull and bear markets: The case of oil importing and exporting nations. *Resources Policy*, 75, Article 102461. <https://doi.org/10.1016/j.resourpol.2021.102461>