COVID-19 and finance scholarship: A systematic and bibliometric analysis

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A B S T R A C T

COVID-19 has posed unprecedented challenges to global finances because of its unparalleled global scope, with both concomitant shocks as well as the likely altering of risk assessments and forecasts for the foreseeable future. As the effects of COVID-19 on financial markets and institutions have been widely addressed by various literature, we systematically synthesize this literature. Through a comprehensive search process, we extract and review 818 articles. Appling bibliometric methods, we explore the trends among various research constituents involved in the field. Using multi-dimensional scaling, we identify the intellectual structure of research in the domain and outline four distinct themes. We also identify the evolution and shifts in research within the short span of three years since the inception of COVID-19. Through detailed content analysis, various future research directions are proposed.

1. Introduction

In the brief three years since the onset of the COVID-19 pandemic, finance scholars have been vigorously, perhaps incessantly, investigating its impacts on all aspects of financial systems. We offer a bibliometric analysis of this literature. Through a systematic process, we extract and review 818 articles. Then, using bibliometric methods, we identify the trends among various research constituents involved in the field. Using multi-dimensional scaling, we identify the intellectual structure of research in the domain, outlining four distinct themes. We also highlight the evolution and shifts in research within the domain of the financial impacts of COVID-19 through detailed content analysis and propose various future research directions.

We are motivated not just by the volume and multifaceted nature of finance scholarly output involving COVID-19, but also because of the potential for COVID-19 to foundationally change economies and financial systems for the longer term. COVID-19 has posed unprecedented challenges to global finances because of its unparalleled global scope, with both immediate shock and subsequent altering of risk assessments and forecasts for the long term.

Perhaps, the COVID-19 pandemic caused a greater financial crisis compared to the global financial crisis of 2007–2008. The pandemic severely disturbed the financial ecosystem, from personal finances to financial markets and the real worldwide economy. During the initial three years of the crisis, the global economy manifested sharp shifts. For instance, the Japanese stock market dropped more than 20% compared to its December 2019 level (Vishnoi & Mookerjee, 2020). The Financial Times Stock Exchange 100 index had its largest one-day fall since 1987—more than 10%, in March 2020 (Zhang, Hu, & Ji, 2020). In India, the Sensex index, reflecting the Bombay Stock Exchange, dropped 13% on a single day in March 2020, the largest single-day fall since 1991 (Mandal, 2020).

As noted by Goodell (2020), COVID-19 will likely not just have a short-term impact on financial systems but will likely reshape many foundational components of financial systems. Economies may have suffered from government anti-COVID stringency measures (Ashraf & Goodell, 2022), but in the longer run, there may be a seminal change in the mental outlooks of investors and policymakers. According to Goodell (2020), prior to COVID-19, there was little consideration by investors of the risks of catastrophic, yet survivable, global economic shocks. In the future, post-COVID-19, there may be more consideration by markets of signals of possible global catastrophic, but survivable, events. However, this question begs future research. Does COVID-19 significantly change financial planning for the long term? It is too early to say. However, it is

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important now for the finance scholarly community to begin to take the scope of what has been learned from COVID-19.

Because of its global scope and its multifaceted impacts on so many financial aspects, COVID-19 affords an unprecedented opportunity not just to study what happened to financial systems during COVID-19, or to investigate what permanent impacts on financial systems and actors have occurred because of COVID-19, but also to revisit existing theories of finance, including its foundational theories. Has what we thought we knew about finance been confirmed by COVID-19? or has the pandemic, in some ways, led to outcomes that necessitate altering or adjusting financial theories that were previously accepted? Regardless of the answers to these questions, COVID-19 prompts investigation. It prompts the re-visiting of almost every research context in finance.

The pandemic's dramatic economic and financial impact attracted large interest from academics right from the year of the outbreak. Literature has appeared from various geographical areas discussing the impact of COVID-19 on many economic and financial areas, such as financial markets, economic policies, stock market volatility, stock market returns, investor sentiments, uncertainty, Fintech, and sustainability.

This article aims to sketch the diverse research on the COVID-19 pandemic and finance to outline the intellectual structure of research in this area. Through bibliometric analysis, we identify consolidations in this largely fragmented body of research to facilitate future researchers to better locate and position their knowledge contributions.

Using author keyword co-occurrence analysis, we derive various themes and clusters of research on the impact of COVID-19 on financial systems. This research contributes to the literature by using qualitative and quantitative analyses. First, we offer an overview of the various research constituents of the research area through quantitative bibliometric analyses. We also apply the multidimensional scaling (MDS) methodology to explore the intellectual structure of the impact of COVID-19 on the finance domain. Qualitatively, we conduct textual analysis to identify themes. Textual analysis is the process of extracting meaningful value from textual data to better understand the content of the research domain (Hofmann and Chisholm, 2016), and visualization represents the content of the research domain in a visual form.

The goal is to understand the content and characteristics of existing research in the domain and provide future research directions for scholars by exploring the existing research set in finance regarding COVID-19.[1] Following similar comprehensive reviews using bibliometric analysis (Donthu et al., 2021; Goodell, Kumar, Lim, & Pattnaik, 2021; Kumar, Sureka, Lim, Kumar Mangla, & Goyal, 2021; Rao et al., 2021b; Sureka, Kumar, Colombage, & Abedin, 2021), this study seeks an answer to the following series of research questions (RQs):

RQ1. What is the publication trend of the impact of COVID-19 on finance research?

RQ2. What are the most impactful articles in the field of the impact of COVID-19 on finance research?

RQ3. What are the top sources publishing about the impact of COVID-19 on finance research?

RQ4. Who are the authors and countries contributing to the fields of the impact of COVID-19 on finance research and what are the collaboration patterns among them?

RQ5. What are the knowledge clusters and functional themes in the intellectual structure of the impact of COVID-19 on finance research?

RQ6. What opportunities are available for future research on the impact of COVID-19 on finance?

The rest of the article is structured as follows. Section 2 presents the research context and methodology. Section 3 presents the results of the performance analysis. Sections 4 and 5 detail the results of science mapping and future research directions. Section 6 concludes.

2. Research context and methodology

The present review is an integration of two review technologies: a systematic literature review (SLR) (Tranfield, Denyer, & Smart, 2003) and a bibliometric analysis (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021). A systematic literature review is guided by a review protocol that details the actions and steps taken in a review, thereby ensuring transparency and replicability (Lim & Weissmann, 2021). However, the qualitative nature of SLR, as with all qualitative reviews, allows for interpretation bias (MacCoun, 1998). While not strictly qualitative research, as defined and outlined, for example, by Creswell and Poth (2016), systematic analysis as an initial stage of the review process leads to developing research questions. Ultimately the forming of such questions entails interpretive bias. However, such biases are defensible given the explicitness of the process.

There are various studies using bibliometric methods to gain useful insights from the extant literature and draw directions for future research. The method is now increasingly employed for exploring the intellectual structure of research fields. For example, Donthu et al. (2021) use bibliometric analysis to map the *electronic word-of-mouth* research. Baker, Kumar, Pandey, and Srivastava (2022) reviewed the *Review of Accounting Studies* corpus and provide the types of research published during various periods. Sureka et al. (2021) explore 50 years of research on *capital budgeting practices* using bibliometrics and proposed various research frontiers based on the gaps in the literature. In the same vein, Goodell et al. (2021) use a bibliometric approach to provide an overview of artificial intelligence (AI) and machine learning (ML) research in finance. Bibliometric methods have been widely used irrespective of the scientific disciplines. The literature argues that bibliometric approaches facilitate studying a research field's evolution and thematic structure through various citation statistics and bibliometric indicators (Valtakoski, 2019).

Moreover, the quantitative aspect of bibliometrics eliminates the author bias. Thus, following previous works such as Cancino, Merigó, Coronado, Dessouky, and Dessouky (2017); Mora, Bolici, and Deakin (2017); Donthu, Kumar, Pandey, Pandey, & Mishra, 2021a; Donthu, Kumar, Ranaweera, Sigala, & Sureka, 2021b; Mulet-Forteza, Genovart-Balaguer, Merigó, & Mauleon-Mendez, 2019, Baker et al. (2022); Donthu et al. (2021) and Kumar et al. (2021) this study explores the major trends and the intellectual structure of the COVID-19 and finance research. As an accompaniment to SLR, bibliometrics, empowered by technology, accommodates large corpora of data and is an objective form of review. Bibliometric methods involve extracting data from online scientific databases such as *Web of Science* and *Scopus*, with the use of quantitative statistical tools such as *Bibexcel, Gephi, VOSViewer,* and *Bibliometrix-R to* analyze and report a scientific field of knowledge (Donthu et al., 2021; Mukherjee, Kumar, Donthu, & Pandey, 2021). Data retrieval and filtering follow the steps of SLR to ensure transparency, replicability, and authenticity. We then apply bibliometric analysis to this sample. We follow Mukherjee et al. (2021); Mukherjee, Lim, Kumar, and Donthu (2022) in applying the bibliometric method. Fig. 1 presents the mapping of the research objectives and the tools used to achieve them.

2.1. Search term and database selection

Following SLR methodology, relevant studies reflecting investigations involving COVID-19 in finance scholarship are retrieved

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[1] Khan et al. (2022) identify four literature clusters for bibliometric studies in finance: 1) those focusing on assessments of literature in trending topics; 2) analysis of papers that employ emerging econometric techniques; 3) studies grouped around particular fundamental topics; and 4) studies focused on retrospective celebration of single well-known finance journals.
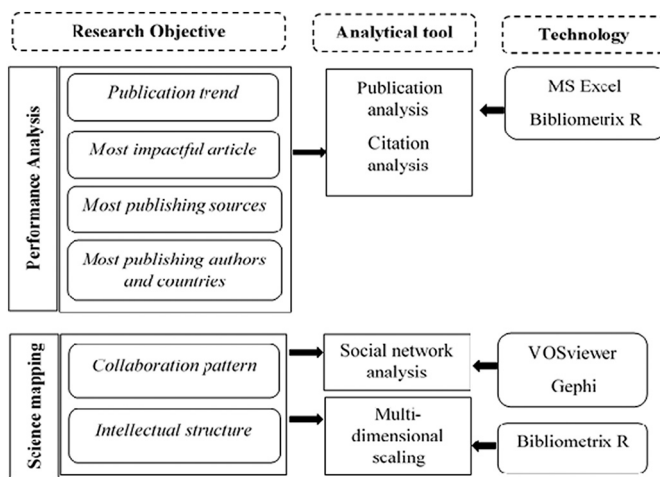
Fig. 1. Research objective and analytical structure of the paper.

from the *Web of Science* (WoS) database. WoS is one of the largest databases in terms of journal coverage, providing quality bibliographic data (Waltman, 2016). Therefore, this database suits the requirements of our bibliometric analysis.

Multiple iterations of keyword searches are conducted towards reaching the final search string and dataset. Initially, we searched the keyword string ('COVID-19' and 'financial market'). Results are then critically evaluated to obtain other relevant keywords concerning COVID-19 and finance. After piloting this same process multiple times, a comprehensive search string was finalized. This string is (('COVID 19' or 'COVID-19' or 'SARS' or 'corona virus' or 'pandemic' or 'SARS–CoV–2') and ('finance' or 'capital market' or 'financial market*' or 'accounting' or 'banking' or 'stock market*')).

This string was processed in the WoS core collection at the end of May 2022, providing 3043 studies. The inclusion or exclusion of an article depends on the criteria that the article must have any pairing of both a COVID-19 and a finance keyword in the title, abstract, author keywords, or in KeywordPlus (keywords assigned by WoS). Results are then refined under two broad conditions. First, considering the inception of COVID-19 was in 2020, studies published between 2020 and 2022 are selected. Second, given the scope of the study, articles and reviews are refined to the relevant Web of Science categories, such as economics or business finance, resulting in 818 documents, including 810 articles, two proceeding papers, and six review articles.

2.2. Bibliometric analysis method, indicators, and software

Bibliometric analysis is an objective and statistical way of analyzing bibliographic data of a group of literature (Donthu et al., 2021; Kumar, Sureka, & Colombage, 2020; Tomar, Kumar, & Sureka, 2021). It explores the major trends among the research constituents (author, institute, country, journal) of a subject corpus through science mapping, exploring shifts and developments in the knowledge body, and evaluating the scientific quality of relevant publications (Donthu et al., 2021; Kumar et al., 2020; Kumar et al., 2021; Sureka et al., 2021).

The bibliometric analysis includes two broad types of analysis: performance analysis and science mapping. Performance analysis is also a common practice in SLRs (Donthu et al., 2021). Despite being descriptive in nature, performance analysis provides an updated overview of the research field's progression. It also offers insights into which journals or authors publish intensely in the field and who are highly cited by the scientific community, thus facilitating quality tracing of publications.

Science mapping includes the study of the collaboration patterns and intellectual structure within the scientific field of study (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011). Studying collaboration

patterns provides insights into the social structures working in a field towards a better understanding of the research (Crane, 1969).

As an investigation of intellectual structure and an important part of the bibliometric review, this analysis focuses on the content of publications and scientifically maps relationships between publications through citations and keywords. It explores the inter-relationships among the publications through the analysis of direct citations and cross-citations and groups them into clusters to identify established and emergent research themes or sub-themes (Schildt & Mattsson, 2006). It thus helps find various themes within the research field (Andersen, 2019), which further guides the proposition of future research directions.

We undertake a comprehensive outlook of the research on the impact of COVID-19 on finance by undertaking performance analysis and science mapping. However, instead of using citation indicators like bibliographic coupling and co-citation, we focus on the relationship between authors' keywords to explore the thematic clusters. Our reasoning for this is that our corpus, the impact of COVID-19 on finance, is only two and half years old, with more than 41% of the 818 related articles not cited more than once. Thus, considering that citations grow with time (Hajjem, Harnad, & Gingras, 2006), we opt for MDS analysis of author keywords to explore the intellectual structure of the corpus. Free and open-access computer software such as *Histcite*, *VOSviewer*, *Gephi*, *CitNetExplorer*, and *Bibliometrix-R* are available to conduct bibliometric analysis, each with its proper competencies and restrictions (Garfield, 2009; Van Eck & Waltman, 2010).

Gephi is used to identify collaboration patterns to generate graphical networks of the contributing authors and countries. The initial bibliographic dataset is analyzed using *VOSviewer*, with the graph dataset also obtained from *VOSviewer* in '.NET' format, visualized in *Gephi*. *Gephi* offers a user-friendly interface with various filtering abilities to ease the clarity of the analysis and provide better network visualization (Bastian et al., 2009a). Further, the intellectual structure of the corpus is explored with *Bibliometrix-R* to facilitate using MDS for data clustering.

3. Results of performance analysis

3.1. Most cited publications

Citation count is an accepted method to determine the influence and popularity of research in the scientific community (Ding & Cronin, 2011). Thus, the citation counts of publications concerning the impact of COVID-19 on finance are analyzed. The most influential article in the field is Zhang et al. (2020)'s "Financial markets under the global pandemic of COVID-19," which has been cited 640 times. It discusses the uncertainties and risks introduced in the global financial markets due to the COVID-19 pandemic. Also well cited is Goodell (2020)'s "COVID-19 and finance: Agendas for future research," with 462 citations. Based on earlier literature, the article offers an overview of the possible impacts of COVID-19 on financial markets and institutions.

The next most cited article is Sharif, Aloui, and Yarovaya (2020)'s "COVID-19 pandemic, oil prices, stock market, geopolitical risk, and policy uncertainty nexus in the US economy: Fresh evidence from the wavelet-based approach," with 435 citations, followed by Al-Awadhi, Alsaifi, Al-Awadhi, and Alhammadi (2020)s, "Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns" with 414 citations. Table 1 presents the list of most cited articles discussing the impact of COVID-19 on financial markets. The table also suggests that the journals *Finance Research Letters, Journal of Behavioral and Experimental Finance, and International Review of Financial Analysis* have published the most impactful articles in this field.

3.2. Most prolific sources

Table 2 shows the most prolific sources hosting COVID-19 on financial market research. The table offers a count of articles (TP)

Table 1

Impactful articles on COVID-19 and Finance.

Article	Source title	Article focus	TC
Zhang, DY; Hu, M; Ji, Q (2020)	*Finance Research Letters*	Financial market	640
Goodell, J.W. (2020)	*Finance Research Letters*	Finance (Review)	462
Sharif, A; Aloui, C; Yarovaya, L (2020)	*International Review of Financial Analysis*	Stock market, oil prices, and geopolitical risk	435
Al-Awadhi, AM; Alsaifi, K; Al-Awadhi, A; Alhammadi, S (2020)	*Journal of Behavioral and Experimental Finance*	Stock market	414
Corbet, S; Larkin, C; Lucey, B (2020)	*Finance Research Letters*	Gold and cryptocurrencies	248
Ali, M; Alam, N; Rizvi, SAR (2020)	*Journal of Behavioral and Experimental Finance*	Financial market	226
Phan, DHB; Narayan, P.K. (2020)	*Emerging Markets Finance and Trade*	Stock market	219
Mazur, M; Dang, M; Vega, M (2021)	*Finance Research Letters*	Stock market	191
Haroon, O; Rizvi, SAR (2020)	*Journal of Behavioral and Experimental Finance*	Financial market	185
Zaremba, A; Kizys, R; Aharon, DY; Demir, E (2020)	*Finance Research Letters*	Stock Return volatility	184
Ashraf, B.N. (2020)	*Journal of Behavioral and Experimental Finance*	Financial market	182
Altig, D; Baker, S; Barrero, JM; Bloom, N; Bunn, P; Chen, S; Davis, SJ et al. (2020)	*Journal of Public Economics*	Economic uncertainty	180
He, PL; Sun, YL; Zhang, Y; Li, T (2020)	*Emerging Markets Finance and Trade*	Chinese stock market	175
Topcu, M; Gulal, OS (2020)	*Finance Research Letters*	Emerging stock markets	169
Hepburn, C; O'Callaghan, B; Stern, N; Stiglitz, J; Zenghelis, D (2020)	*Oxford Review of Economic Policy*	Climate change	159
Shen, HY; Fu, MY; Pan, HY; Yu, ZF; Chen, YQ (2020)	*Emerging Markets Finance and Trade*	Firm performance	156
Albulescu, CT (2021)	*Finance Research Letters*	financial market volatility	128
Ding, WZ; Levine, R; Lin, C; Xie, WS (2021)	*Journal of Financial Economics*	Corporate immunity	118
Baek, S; Mohanty, SK; Glambosky, M (2020)	*Finance Research Letters*	stock market volatility	104
Narayan, PK; Phan, DHB; Liu, GQ (2021)	*Finance Research Letters*	Stock returns	100
Salisu, AA; Ebuh, GU; Usman, N (2020)	*International Review of Economics and Finance*	Oil prices and stock market	98
Shehzad, K; Liu, XX; Kazouz, H (2020)	*Finance Research Letters*	Global financial crisis	95
Salisu, AA; Vo, XV (2020)	*International Review of Financial Analysis*	Stock returns	94
Okorie, DI; Lin, BQ (2021)	*Finance Research Letters*	Stock market	91
Mishra, AK; Rath, BN; Dash, AK (2020)	*Emerging Markets Finance and Trade*	Financial market	91

TC = total citation.

published by journals in this domain and the total citations (TC) by these articles. In total, 818 publications come from 166 journals. Among these, *Finance Research Letters* hosts 86 publications that have attracted 3558 citations. Having the highest number of publications and citations suggests *Finance Research Letters* as the most productive and influential source of research in the field.

The next most prolific sources for research in this field include

Table 2

Most prominent sources publishing on Covid19 and Finance.

Sources	TP	TC	AJG	ABDC	IF
Finance Research Letters	86	3558	2	A	9.848
Research in International Business and Finance	43	332	2	B	6.413
International Review of Financial Analysis	37	945	3	A	8.235
Economic Research-Ekonomska Istrazivanja	35	196	–	–	3.080
Emerging Markets Finance and Trade	34	1074	2	B	4.859
Accounting Auditing and Accountability Journal	33	190	3	A*	4.893
Applied Economics Letters	31	175	1	B	1.287
Applied Economics	27	76	2	A	1.916
North American Journal of Economics and Finance	25	91	2	B	3.136
Energy Economics	21	138	3	A*	9.252
Journal of Behavioral and Experimental Finance	18	1210	1	A	8.222
Financial Innovation	17	165	–	–	6.793
Economic Analysis and Policy	16	228	1	B	4.444
International Review of Economics and Finance	16	197	2	A	3.399
Accounting and Finance	14	71	2	A	2.473
International Journal of Finance and Economics	14	43	3	B	1.634
International Journal of Islamic and Middle Eastern Finance and Management	13	24	1	B	2.853
Global Finance Journal	12	111	2	A	2.853
Journal of Banking and Finance	12	88	3	A*	3.539
Journal of International Financial Markets Institutions and Money	12	49	3	A	4.217

TP = total publications, TC = total citations, AJG = Academic Journal Guide rating, ABDC = Australian Business Deans Council ranking, IF = 2-year impact factor by clarivate analytics.

Research in International Business and Finance, with 43 publications and 332 citations, followed by the *International Review of Financial Analysis,* with 37 publications and 945 citations. Note that all these prolific sources listed in Table 2 are either *Academic Journal Guide* (AJG) indexed, Australian Business Deans Council (ABDC) rated (A*, A, or B), and have impact factors. The topic was largely hosted by top-quality journals, suggesting the importance and urgency of the domain in the scientific field.

3.3. Most publishing authors

Considering the count of total publications, Table 3 presents the list of the most prolific authors on the impact of COVID-19 on financial markets research. The contribution of 818 publications on the impact of

Table 3

Prominent authors.

Authors	Publications	Citations	Citations per publication
Vinh Vo Xuan	14	189	13.50
Paresh Kumar Narayan	11	461	41.91
Afees A Salisu	11	360	32.73
Shaen Corbet	10	493	49.30
Elie Bouri	10	200	20.00
Sang Hoon Kang	10	43	4.30
Yang Hou	8	190	23.75
Yang Hu	8	190	23.75
Les Oxley	8	190	23.75
Syed Jawad Hussain Shahzad	8	99	12.38
Walid Mensi	8	35	4.38
Adam Zaremba	7	271	38.71
Toan Luu Duc Huynh	7	205	29.29
Muhammad Abubakr Naeem	7	110	15.71
Mohammad Kabir Hassan	7	71	10.14
Imran Yousaf	7	45	6.43

COVID-19 on financial markets has come from 1875 authors, among which the most prolific author in the field is Vinh Vo Xuan, who has 14 publications with 189 citations. Next comes Paresh K. Narayan with 11 publications, followed by Afees A. Salisu with 11 publications. Paresh K. Narayan is also the most impactful author in the field, with 460 citations for his research on the impact of COVID-19 on financial markets. However, in the case of citations per publication, Shaen Corbet leads the list with 49.30 cites per publication with ten articles.

3.4. Most publishing countries

Among the list of countries most publishing on the impact of COVID-19 on financial markets, China leads with 184 publications, followed by the United States with 166 publications. China shares high collaboration links with the United States (21 collaborations), Austria (14 links), and Pakistan (14 links). However, the highest collaboration ties are observed between the United States and the United Kingdom, with 23 links. Table 4 presents the list of countries most publishing on the impact of COVID-19 on financial markets, and it also lists the pair of countries most collaborating. It is observed that research on the domain has come from across all geographical regions, including Asia, America, Europe, and Africa, consistent with global concern regarding COVID-19.

4. Results- science mapping

4.1. Identifying collaboration patterns through social network analysis

Collaborations facilitate the exchange of intellectual content and ideas, which engenders innovative research (Kumar et al., 2021). Collaboration patterns among the contributors to the impact of COVID-19 on financial research are explored to shed light on the degree and form of collaborations between various authors and countries. The analysis of collaboration trends provides insights into the social network of scholars researching a similar domain (Donthu et al., 2021).

Table 4
Prominent countries and most collaborating country pairs.

Most contributing countries			Most collaborating country pairs		
Countries	TP	%	From	To	Collaboration links
China	184	22.49	United States	United Kingdom	23
United States	166	20.29	China	United States	21
United Kingdom	99	12.10	China	Australia	14
Australia	95	11.61	China	Pakistan	14
France	62	7.58	United Kingdom	France	14
Pakistan	52	6.36	Australia	Vietnam	13
Italy	49	5.99	Ireland	New Zealand	13
Vietnam	44	5.38	United Kingdom	Italy	11
Canada	38	4.65	Pakistan	Malaysia	10
Germany	36	4.40	Australia	New Zealand	9
India	33	4.03	China	United Kingdom	9
Ireland	31	3.79	France	Russia	9
Spain	29	3.55	Pakistan	Saudi Arabia	9
Turkey	29	3.55	Vietnam	Korea	9
Malaysia	26	3.18	Australia	Canada	8
New Zealand	25	3.06	China	Vietnam	8
South Korea	25	3.06	France	Tunisia	8
Japan	23	2.81	France	Vietnam	8
Saudi Arabia	23	2.81	Korea	Oman	8
United Arab Emirates	23	2.81	Tunisia	Saudi Arabia	8

Thus, this study explores the collaboration network among the authors and countries publishing in this field using *VOSviewer* and *Gephi*. This study uses *VOSviewer* and *Gephi* software to visualize the co-authorship network connections for the mapping analysis (Bastian et al., 2009b; Van Eck & Waltman, 2017). *VOSviewer* was used to assess the communities between authors publishing on COVID-19 and finance scholarship. The software begins by creating a similarity matrix based on the co-authorship of authors in each article. The co-authorship measures are used to calculate the association strength among the authors, which is further used as an input for the Newman and Girvan (2004) modularity function. The nodes (authors) are placed in a community with the highest modularity. The same process is repeated in the iterations till it reaches its highest modularity (Van Eck & Waltman, 2017). Further, the degree of eigenvector centrality was used to find the author's relative importance. An author's eigenvector centrality is calculated on the basis of an author's connection to other highly connected authors that provide a measure for his/her relative importance. Note that this part of the study focuses on authors having at-least four publications in the field and participating in a relevant author group with more than two authors. On average, there are about three co-authors for the documents in our sample. Table 5 summarizes prominent author groups, while Figs. 2 and 3 illustrate the co-authorship networks among authors and countries.

4.1.1. Author group 1

This is the largest group of authors working on the impact of COVID-19 on financial markets research. Elie Bouri leads this group, with authors sharing collaborative links with 35 other authors. This author has 10 publications in the field. Sang Hoon Kang and Xuan Vinh Vo are the next most prominent authors in this group. The authors in this group share common areas of research interest, such as risk management and energy finance. This might be the possible reason for them to form a scientific community. The authors in this group come from different Asian countries. Author Syed Jawad Hussain Shahzad has the highest eigenvalue centrality in the group, indicating his central role in this author group. The group mainly focuses on issues related to connectedness, with other topics relating to the US equity sector, the Chinese sector, dynamic connectedness, stock return connectedness, policy uncertainty, crude oil market, volatility, and spillovers. Occasionally, it also discusses the BRICS stock markets and VIX.

4.1.2. Author group 2

The second largest group has Shaen Corbet as the central part of the group. The author shares collaboration ties with 33 other authors. Yang Hu, Les Oxley, Yang Hou, and Brian Lucey are prominent group members. Les Oxley, with the highest eigenvalue centrality, plays a key role in this author group. The authors generally share geographic affiliations from New Zealand and Australia, highlighting their forming network. Authors in this group have a common inclination towards cryptocurrency and commodity market research. It mostly focuses on contagion, risk, cryptocurrency, gold, oil prices, bitcoin, clean energy, crude oil, connectedness, futures, informativeness, and stock index futures. Corbet et al. (2020b) ("The contagion effects of the COVID-19 pandemic: Evidence from gold and cryptocurrencies") is the most impactful work of this group, with 248 citations.

4.1.3. Author group 3

This group of authors is led by Adam Zaremba, who has seven publications on the impact of COVID-19 on financial markets and shares co-authorship links with 20 other authors. He also earns the highest eigenvalue centrality among this group. The authors in the group have affiliations from institutions belonging to Poland, England, Turkey, and Israel. Also, they share a common research interest in financial markets and asset pricing, suggesting that the multi-country research focus leads to collaborative research among scholars. The authors mostly work on the impact of government interventions and policies regarding COVID-

Table 5

Summary of prominent author's groups COVID-19 and finance research.

Author group	Author	Total link strength	Total publications	Eigenvector centrality	Geographical focus	Topic
	Elie Bouri,	35	10	0.008		
	Sang Hoon Kang	31	10	0.033		
	Xuan Vinh Vo	28	10	0.175		
	Syed Jawad Hussain Shahzad	25	8	0.339		
	Walid Mensi	23	8	0.039		
	Tareq Saeed	11	3	0.159	Lebanon, Vietnam, South Korea,	Stock return connectedness, volatility,
1	Seong-Min Yoon	10	4	0.281	Dubai, and Saudi Arabia	spillovers.
	Shaen Corbet	33	10	0.000		
	Yang Hu	29	8	0.019		
	Les Oxley	29	8	0.082		
	Yang Hou	22	6	0.003		Contagion effect, cryptocurrency, gold, oil
2	Brian Lucey	17	5	0.053	New Zealand, Australia, Ireland	prices.
	Adam Zaremba	20	7	0.096		
	Renatas Kizys	18	6	0.013		
	Ender Demir,	17	6	0.006		Government policy, financial immunity,
3	David Y Demir	14	5	0.000	Poland, England, Turkey, Israel	stock volatility.
	Paresh Kumar Narayan	18	10	0.033		
	Qiang Gong	10	4	0.014		
	Dinh Hoang Bach					Stock price, stock market returns, Japanese
4	Phan	8	4	0.000	Australia, China	Yen, supply chain, oil prices.
	Zaghum Umar	13	6	0.056		
	Imran Yousaf	13	7	0.188	The United Arab Emirates, Portugal,	Faith-based investments, stock return,
5	Mariya Gubareva	9	4	0.003	Pakistan	volatility

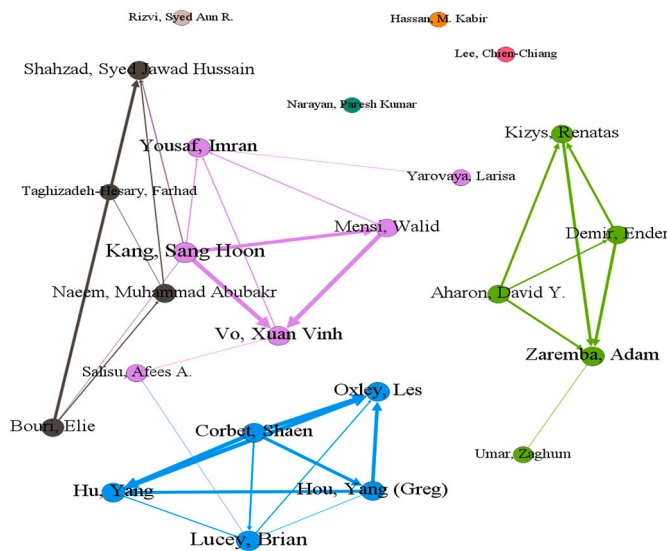**Fig. 2.** Author collaboration network of COVID-19 and finance scholarship.

Fig. 3. Country collaboration network of COVID-19 and finance scholarship.

19 on the financial markets, specifically stock prices, returns, and volatility. This group also addresses financial factors influencing immunity against the financial impacts of COVID-19 for various actors.

4.1.4. Author group 4

Paresh Kumar Narayan is the most connected and prominent author in the group sharing links with 18 other authors. He is a prominent pillar in this author group with the highest eigenvalue centrality. He is affiliated with Monash University, Australia. Other prominent authors of this group are Qiang Gong, Dinh Hoang Bach Phan, Chun-Ping Chang, and Neluka Devpura. Most of the authors in this group belong to Australia and China and have a common interest in finance, financial markets, and financial econometrics. However, their research focuses on various geographical areas, including Japan, Indonesia, Australia, and cross-country studies. The group mostly provides empirical evidence on the impact of COVID-19 on stock returns, currency, supply chains, oil
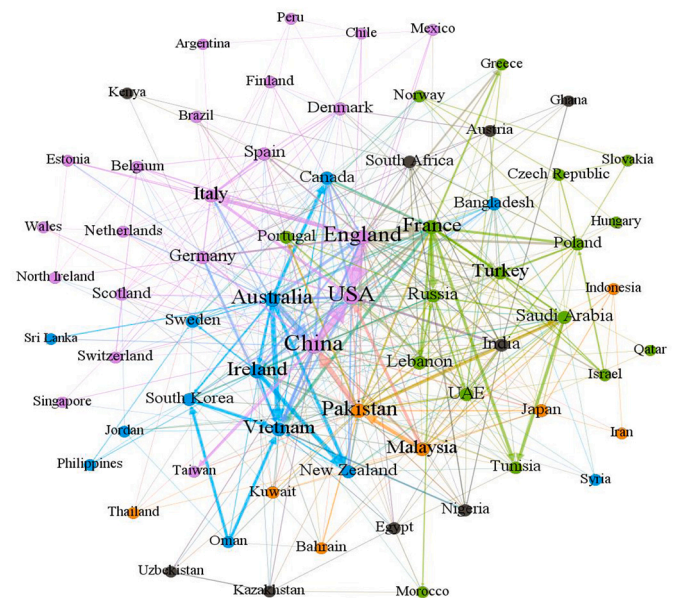
price predictability, and bond return predictability.

4.1.5. Author group 5

Author group 5 is diverse because the authors in this group share strong connections with several other groups. This group has produced a large volume of research on prominent aspects regarding the impact of COVID-19 on financial markets. Zaghum Umar and Imran Yousaf are both important leaders of this group. Regarding geographical focus, this group of authors reflects a diversity of nationalities, mostly from the United Arab Emirates, Portugal, and Pakistan. The group's major focuses regard contagion, ethics, connectedness, price shocks, portfolio selection, crude oil, stock markets, volatility spillovers, linkages, bitcoin, and herding behavior.

5. Intellectual structure analysis with multi-dimensional scaling

During the early 1980s, the workers at the École des Mines and the CNRS in Paris first developed co-word analysis to investigate the structure of co-occurrence relations as part of the bibliometric analysis (Tijssen & Van Raan, 1989). Similar to co-citation analysis (Small & Griffith, 1974), the co-word analysis investigates the co-occurrence of words from abstracts, titles, and author keywords.

The degree of words' co-occurrence suggests a field's research structure by highlighting connections among its research topics (Cambrosio, Limoges, Courtial, & Laville, 1993; Ding, Chowdhury, & Foo, 2001). Thus, to unpack the intellectual structure and the interrelationships between research topics in COVID–related finance scholarship, a co-word analysis of author keywords is used, employing multidimensional scaling (MDS). The underlying reason for using author keywords is that they are an excellent indicator of an article's content and fundamental theme (Comerio & Strozzi, 2019; Kumar et al., 2020; Strozzi, Colicchia, Creazza, & Noè, 2017) (Donthu et al., 2021; Kumar, Rao, Goyal, & Goyal, 2022).

Further, MDS is used to visually map the structures of co-word analysis of author keywords. MDS is a multivariate data analysis approach widely used in bibliometric studies of various co-occurrence data (Tijssen and Raan 1989). It is a dimensionality reduction technique that aims to find the data structures by shortening the research objects of a multidimensional space to a low-dimensional space by measuring the distance between research objects (Chiu and Pan, 2014) and then classifying them into groups.

MDS either uses co-word frequencies (Ci) or indirect measures such as Inclusion indexing Iij or Jaccard indexing Jij. MDS facilitates exploring and interpreting the underlying structure of (dis)similarities (^{s}ij) between items i and j. Proximities (^{s}ij) are estimated in terms of Euclidean space using the linear regression: dij = a + b ^{s}ij + e, where a and b are constant, and e is an error term (Tijssen and Raan 1989). The MDS structure is characterized as a set of coordinates in a low-dimensional Euclidean space wherein each point is a keyword. A smaller distance between a particular keyword and other keywords signifies a higher degree of relative dis(similarity), while a larger distance represents a lower degree of relative dis(similarity) (Tijssen and Raan 1989).

MDS uses an iterative procedure to analyze all the linkages between all pairs of keywords until convergence between both groups of values is reached. Consequently, this method compares proximities with estimations of distances (Tijssen and Raan 1989). This makes MDS provide an optimal geometrical solution to represent the total structure of data in a low-dimensional space wherein the position of keywords reflects their structure and the strength of their relations. Words with higher co-occurrence are placed closer to each other on the map, thus forming clusters representing research themes (Jaworska & Chupetlovska-Anastasova, 2009; Tijssen & Van Raan, 1989).

We apply MDS to map the intellectual structure of the impact of COVID-19 on finance research. We use the R software bibliometrix package (Aria & Cuccurullo, 2017) to perform MDS analysis, where the input file is the bibliographic data retrieved from WoS. Four distinct research themes were obtained through MDS analysis. Fig. 4 shows the conceptual structure map, while Fig. 5 presents the dendrogram obtained with MDS analysis.

5.1. Market uncertainty and volatility

The largest research cluster underpinning the impact of COVID-19 on finance regards stock market uncertainty. This cluster discusses the impact of the pandemic on stock markets, including how COVID-19 has made markets less predictable and riskier. This cluster is concerned with market uncertainty and volatility in stock prices. Zhang et al. (2020) article is the most influential work in this domain. The article maps the patterns of country-specific risks in global financial markets. Topics explored as a part of this research theme include stock market reaction to the COVID-19 outbreak in terms of volatility. Major market impacts of COVID-19 included decreased oil prices,[2] increased gold prices, higher stock market volatility, and many changes to the nature of co-movements among asset classes. Scholars explore the impact of COVID-19 on the stock market of various countries such as China (Liu, Huynh, & Dai, 2021), Canada (Xu, Chen, Zhang, & Zhao, 2021) and India (Rao et al., 2021a). This large cluster focuses on the impacts of the pandemic on global financial markets worldwide. However, little emphasis has yet been made on factors influencing the recovery of markets as the pandemic abates, suggesting several future research avenues.

One aspect of future review studies would be to distinguish between papers that describe what happened during COVID and papers that offer an empirical analysis of consideration of how COVID has caused permanent change going forward. Goodell (2020) notes that prior to COVID-19, that were notable studies on pandemics and their potential economic costs, but markets did not price in this risk. Will they now? (e.g., Yarovaya, Brzeszczyński, Goodell, Lucey, & Marco Lau, 2022).

5.2. Contagion, connectedness, and spillovers

The next cluster deals with issues of contagion and connectedness among asset classes. Considering Bekaert, Hodrick, and Xiaoyan Zhang (2009) and others, asset classes, become more correlated during economic downturns. It is not surprising that COVID-19, given its unprecedented magnitude, would inspire new investigations. This cluster highlights changes to the interconnectedness of asset classes and highlights spillovers, co-movements, and changes in dependencies. It explores how COVID-19 drives market volatility and oil price spillovers (Harjoto, Rossi, Lee, & Sergi, 2021; Liu et al., 2021; Hung and Vo, 2021). Scholars explore the impacts of COVID-19 on markets in various ways. Sharif et al. (2020) studied the connectedness between the COVID-19 pandemic, oil prices, the stock market, geopolitical risk, and policy uncertainty for the US economy. Mensi et al. (2022) discuss the network connectedness between gold, crude oil, and the Chinese stock market. Apostolakis, Floros, Gkillas, and Wohar (2021) explore the connectedness of financial stress and economic policy uncertainty with Brent oil. From a financing supply side perspective, this cluster also subsumes articles on the impact of the COVID-19 pandemic on bank lending (e.g., Çolak & Öztekin, 2021).

5.3. Investor behavior and government policy: Changes and impact

The third underlying research cluster involves the changes in investor behavior and government policies due to the outbreak of COVID-19 and its impact on the financial and commodity markets. This is a large cluster in terms of co-words wherein one part of the cluster focuses on behavioral finance aspects involving topics such as investor sentiments, faith-based investments, investor herding, institutional investor, overconfidence, emotion, and investor psychology (Sherif, 2020; Kizys et al., 2021; Apergis, 2022; Huynh, Foglia, Nasir, & Angelini, 2021; Poretti & Heo, 2022). The other aspect of the cluster deals with financial market reactions to government policy stringency responses to COVID-19 and concomitant interactions with investor sentiment.

Prominent issues addressed in this stream involve the impact on global supply chains (Free & Hecimovic, 2021) and the impact of government policy interventions on the stock market (Aharon & Siev, 2021; Ortmans & Tripier, 2021). This stream highlights a shift in the behavior of investors and governments across countries towards the financial

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[2] Corbet, Goodell, and Günay (2020), in their study of co-movements around the sudden plunge of WTI oil to negative values, suggest that geopolitical factors were also very significant factors for this precipitous decline.
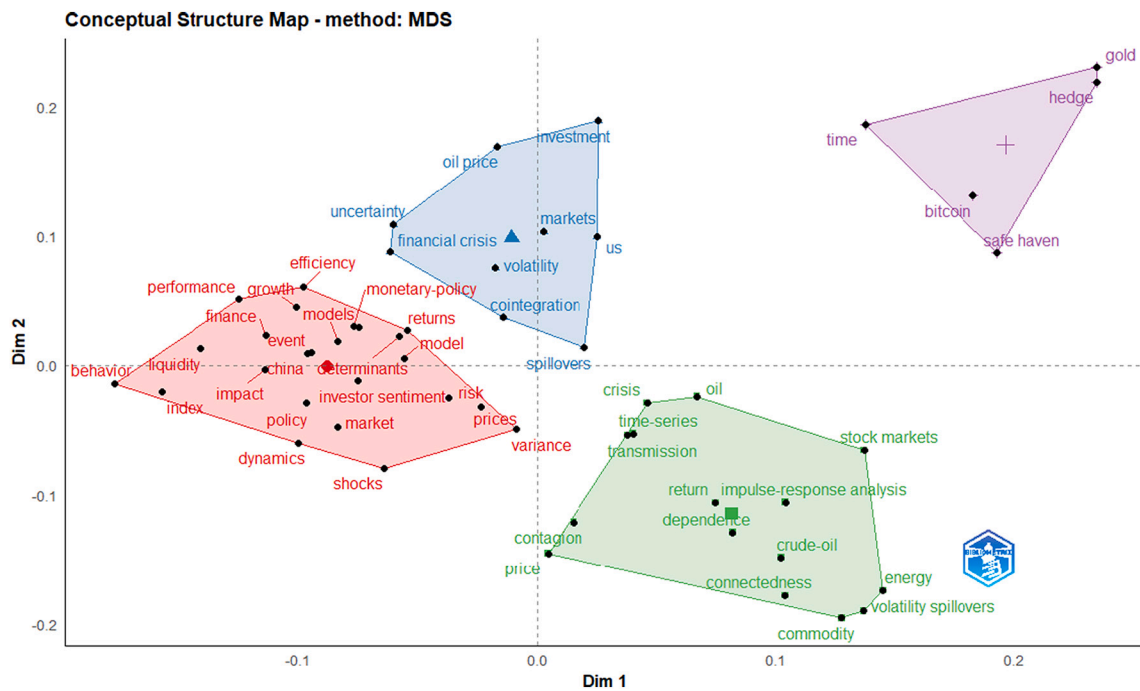
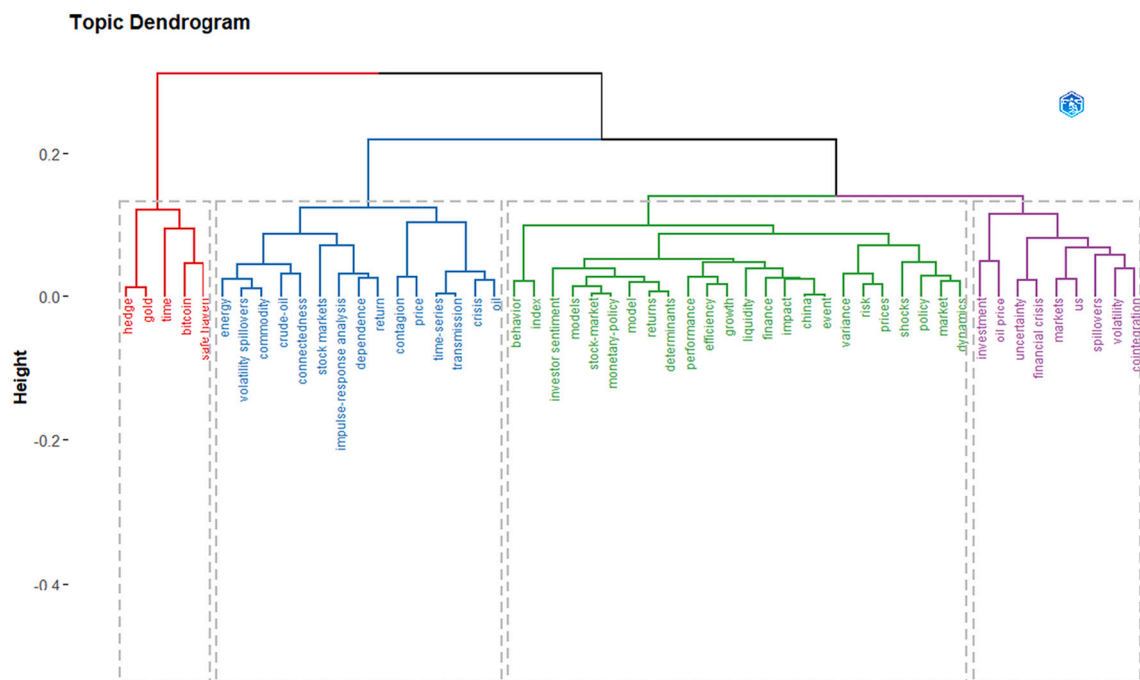**Fig. 4.** Conceptual structure map of COVID-19 and finance scholarship.

Fig. 5. Topic dendrogram of COVID-19 and finance scholarship.

markets, raising several potential research avenues and developments in the field. For instance, which investor personality type has been more influenced by COVID-19?

5.4. Safe-haven assets

The fourth and smallest cluster concerns the impact of COVID-19 on alternative investment instruments such as cryptocurrencies, gold, and crude oil, particularly regarding investigations of possible safe-haven assets. This cluster focuses on topics such as portfolio diversification,

roles of cryptocurrencies, hedge assets, gold, and cryptocurrency (Shahzad, Bouri, Rehman, & Roubaud, 2022; Akhtaruzzaman, Boubaker, Lucey, & Sensoy, 2021; Corbet et al., 2020a; Rubbaniy, Khalid, & Samitas, 2021), impact and connectedness of currency exchange rates and stock markets, on the safe heaven assets and instruments (Tanin, Sarker, & Brooks, 2021; Mensi et al., 2022), hedging uncertainty with cryptocurrencies (Koutmos, King, & Zopounidis, 2021), and roles of cryptocurrencies in stock markets (Jiang, Wu, Tian, & Nie, 2021). This cluster evaluates assets and investment instruments other than stocks under extreme circumstances. However, the smaller size of this frontier

indicates that research in this area is comparatively less evolved. There is a sample scope of research regarding investors' propensity towards these safe heaven investments, their determinants, volatility, and returns.

6. Topic trends over three years

Author keyword frequency is studied over three years (2020, 2021, and 2022) to explore shifts and developments in the field of impacts of COVID-19 on finance. Fig. 6 shows the trending topics over these three years. The following subsections describe the topics and the shifts in the research trends during the three years of COVID-19 and finance research.

6.1. Topics published in 2020

During the outbreak year of COVID-19 (2020), research began with issue dealing with household finance, public finance, financial well-being, risk, unemployment, and global fear. The covered topics include financial market risk, bank risk, geopolitical risk, systematic risk, idiosyncratic risk, risk behavior, risk management, predictability, economic uncertainty, financial stress index, fiscal policy, public debt, and market liquidity (Zhang et al., 2020; Goodell, 2020; Sharif et al., 2020; Al-Awadhi et al., 2020; Corbet et al., 2020; Ali, Alam, & Rizvi, 2020; Phan & Narayan, 2020).

Zaremba, Kizys, Aharon, and Demir (2020), referring to statistics of 67 countries, discusses if government interventions focusing on stopping the spread of COVID-19 affect stock market volatility. Likewise, using data from 77 countries, Ashraf (2020) examine the expected impact of government actions on stock market returns. Lemieux, Milligan, Schirle, and Skuterud (2020), in a study of the Canadian labor market, reveal that COVID-19 brought a 32% decline in aggregate weekly work hours and a 15% decline in employment. Among risk-focusing literature, Sharif et al. (2020) analyze the connectedness between COVID-19 spread, geopolitical risk, and stock market volatility. Country-specific risk, or systematic risk, in the global market due to the spread of COVID-19 is mapped by several articles including Zhang et al., (2020);

Mishra, Rath, & Dash, 2020 and Rizwan, Ahmad, and Ashraf (2020).

6.2. Topics published in 2021

Research on the impact of COVID-19 on finance reflects new concerns in 2021. Along with topics stated in 2020, 2021 mainly focuses on the financial market. Research in this year covers a wide range of issues involving the impact of COVID-19 on the stock market and cryptocurrencies. The most discussed issues include volatility, bitcoin, gold, oil, contagion, investor sentiment, China, stock returns, volatility spillovers, connectedness, hedging, and hedging effectiveness (Mazur, Dang, & Vega, 2021; Narayan, Phan, & Liu, 2021; Bouri, Cepni, Gabauer, & Gupta, 2021; Fahlenbrach, Rageth, & Stulz, 2021; Padhan & Prabheesh, 2021; Akhtaruzzaman et al., 2021). Mazur et al. (2021) investigate the performance of the US stock market during the crash of COVID-19, whereas Rahman, Amin, and Al Mamun (2021) investigate the response of the Australian stock market. Liu et al. (2021) study the Chinese stock market.

6.3. Topics published in 2022

In 2022, research in COVID-19 and finance displays a major drift in intellectual content and pattern. Research in 2022 focuses on the diversification of portfolios and exploiting conditions of COVID-19 to test cryptocurrencies as diversifiers. The topics focused on in 2022 include diversification, volatility, accounting, bitcoin, green bonds, stock returns, hedging, sustainability, volatility spillover, green finance, and safe heaven (Carnegie et al., 2021; Samitas, Kampouris, & Polyzos, 2022; Szczygielski, Charteris, Bwanya, & Brzeszczyński, 2022; Shahzad et al., 2022; Dong, Hou, Lin, & Zhang, 2022).

Smales (2022) investigates investor attention, measures of uncertainty and market dynamics of cryptocurrencies. Wen, Tong, & Ren (2022) provide a spillover effect comparison between gold and bitcoin prices on the oil and stock markets during COVID-19. Similarly, numerous studies in 2022 focus on the cryptocurrency market and green finance. Thus, it could be inferred that most-recent research addresses banking and accountability aspects of finance concerning COVID-19, the
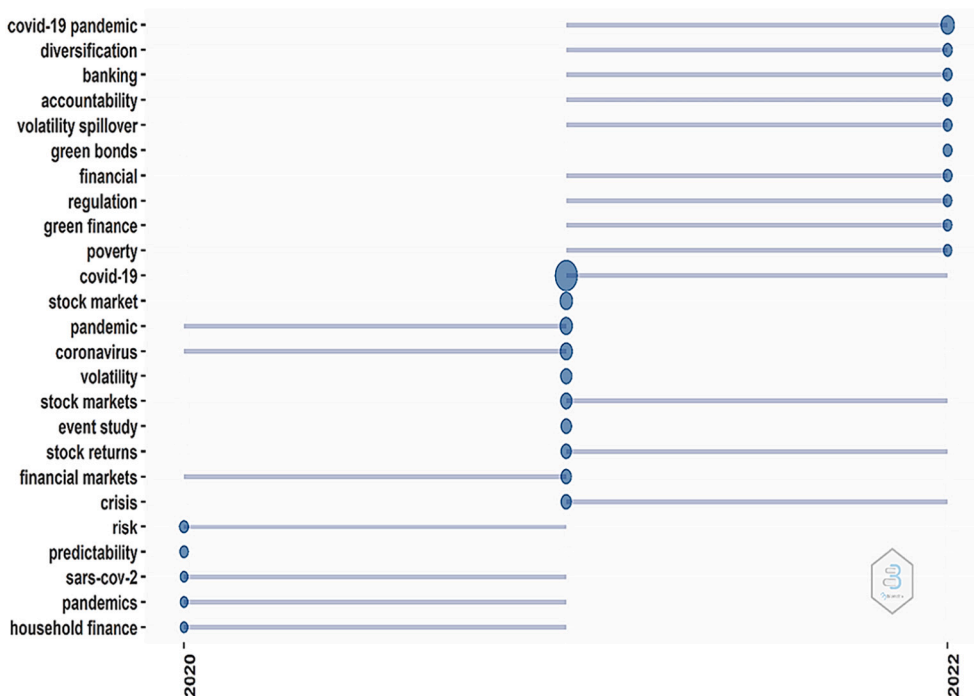

Fig. 6. Topic evolution graph for impact on COVID-19 and finance research.

various aspects of cryptocurrency, and aspects of sustainability, green bonds, and green finance. This highlights the field's emerging research frontiers.

7. Research in top-tier journals

The above section discusses the research topics mostly published in the COVID-19 and finance scholarship corpus over three years. This section focuses on the themes published in top-tier journals. Here we used the Chartered Association of Business Schools (CABS) *Academic Journal Guide* ranking and consider journals with 3, 4, or 4* ratings, such as the *Journal of Finance, Journal of Financial Economics, Review of Financial Studies, Journal of Financial and Quantitative Analysis,* etc. The study uses the CABS ranking because it is a widely adopted policy tool for staffing in business schools (Hussain, 2011; Kelly, Morris, & Harvey, 2009) and is commonly used by researchers in scientific documents (Kumar et al., 2020; Tüselmann, Sinkovics, & Pishchulov, 2016). In total, 32 top-tier journals with a 3-star or higher ABS ranking have published on COVID-19 and finance scholarship, contributing 161 publications.

The keyword co-occurrence analysis of these 161 publications reveals interesting aspects. Looking into the topics published in these top-tier journals shows that in 2020 the high-quality journals mostly focused on scientific management; accountability, productivity, governance, global financial crisis, contagion, exchange rate, google search, investor attention, predictability, crude-oil market, futures, informativeness, public information, news, integration, investor sentiment, and unrealistic optimism, behavior. This shows a difference in the research focus published in the top-tier journals and the whole sample. Concerning the COVID-19 and finance corpus, the most occurred themes are public finance, financial well-being, risk, and unemployment (see Section 6.1).

However, in 2021 the topics published in top-tier journals are closely similar to those of other journals. Seventy-nine articles addressed COVID-19 and finance published in CABS 3 or higher journals. These articles mostly address return volatility, trading volume, liquidity, futures markets, transmission, dynamic connectedness, volatility spillovers, safe haven, and crude oil. Apart from the mentioned topics, high-quality journals also published on issues relating to impulse-response analysis, short-selling bans, institutional investors, tourism demand, corporate social responsibility, diversification, taxation, countercyclical risk-aversion, and national culture (Fernandez-Perez, Gilbert, Indriawan, & Nguyen, 2021; Huynh et al., 2021; Iwanicz-Drozdowska, Rogowicz, Kurowski, & Smaga, 2021).

The topics published in top-tier journals in 2022 include risk disclosures, collective responsibility, cultural trauma, crisis accounting, legitimacy theory, ethics, dialogic accounting, household accounting, counter-accounting, social theory, behavioral economics, portfolio diversification, regulatory environment, carbon trading price, energy-intensive industries, financial contagion, intensity, cryptocurrency, bitcoin, google search volume, fintech revolution, fintech-enabled services, green bonds, and gambling finance (Bordo and Duca, 2022; Carnegie et al., 2021; Uddin, Yahya, Goswami, Lucey, & Ahmed, 2022). These topics reflect an inclination of the top-tier journals towards contemporary research issues.[3]

8. Discussion and future research directions

The ultimate goal of a review article is to identify gaps in the literature and suggest future research directions. With a detailed understanding of the evolution and shifts in the thematic structure of COVID-19 and finance scholarship, this study proposes the following directions

for the upcoming field scholars. It shall contribute to the development of this scientific field.

8.1. Financial inclusion, environmental sustainability, and economic growth post-COVID-19

The COVID-19 pandemic arguably will have a long-term impact on energy and environmental policies. Many policy goals will concomitantly require greater financial inclusion, particularly from the bottom of the pyramid. Such inclusion will be influenced by economic, political, and technological factors. Thus, future research needs to consider theoretical and practical aspects of financial inclusion in economic sustainability. Therefore, we pose the following research questions-

- *How does COVID-19 impact firms' financial inclusion and energy efficiency policies?*
- *How does COVID-19 impact the economic and regulatory policies contributing to financial inclusion for sustainable development goals?*
- *Is there a difference in firms' intention towards sustainable finance pre- and post-COVID-19?*
- *How does financial inclusion promote a green environment?*

8.2. Increase in retail investing during COVID-19

The economic downturn resulting from social distancing during COVID-19 spurred a flood of new retail investors into the stock market (Zheng, Li, Huang, & Chen, 2022). According to a survey by Charles Schwab Corporation, these new investors have a median age of 35, with more than 50% being millennial, 22% being gen X, 16% being gen Z, and 11% being baby boomers. This raises several potentially interesting and fruitful research questions for future research:

- *What were the antecedents to the increase in retail investing during COVID-19?*
- *What is the impact of spontaneous retail trading on personal and household finance during post-COVID-19?*
- *How do the retail investing patterns between generations of millennials, gen X, gen Z, and baby boomers differ during and post-COVID-19?*
- *What psychological process underpins retail investors' decisions depending on the generation during COVID-19?*
- *How has COVID-19 influenced investors' behavioral aspects?*

8.3. Fintech market growth and sectoral performance during COVID-19

Increased use of financial technologies has provided households and businesses with greater access to more efficient financial services. The outbreak of the COVID-19 crisis and concomitant social distancing restrictions engendered the adoption of Fintech among firms and households. However, Fintech's rapid growth, as all rapid technological growth, also brought disruption, especially new risks to financial stability. Thus, the following research questions are proposed to encourage new research in this area:

- *How has COVID-19 influenced the fintech market growth?*
- *What is the relationship between COVID-19, fintech market growth, and sectoral market performance?*
- *Does COVID-19 impact the black market and shadow finance?*
- *How cybersecurity and consumer protection could be ensured in the fintech ecosystem?*
- *How did financial and economic regulation during COVID-19 influence the use of Fintech?*

8.4. MSMEs, fintech services, and COVID-19

Financial technologies have also provided faster and cheaper financial services than traditional banking, facilitating micro, small, and

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[3] Ashraf, El Ghoul, Goodell, and Guedhami (2022) highlight that COVID-19 offered an opportunity to deepen understanding of the role of culture in finance.

medium-sized enterprises (MSMEs) to remain economically viable during and post COVID-19. They have also aided in financing and capitalizing funds during the pandemic with digital lending, digital capital raising, and Fintech credit. This ease of financing is reflected in higher debts in MSME capital structures post-COVID-19. This calls for several potential areas of research and points out the following research questions:

- *How did access to fintech influence MSME financial performance, corporate performance, firm value, and profitability during (and post) COVID-19?*
- *How do digital capital-raising and credit influence MSME capital structure post-COVID-19?*
- *How do changes in the technological environment affect the changes in business model financing options among firms post-COVID-19?*

8.5. Financial and digital literacy during COVID-19

Financial literacy is important for managing personal finances, taking investment decisions, and avoiding financial problems (Chen & Volpe, 1998). Literature evidence that financial literacy reduces the odds of being financially fragile, including during COVID-19 (Chhatwani & Mishra, 2021). Moreover, as current financial markets adapt to new market instruments such as cryptocurrencies and technological advancements such as Fintech, financial-digital literacy is becoming more important. Thus, future research may pursue the following research questions:

- *How does COVID-19 encourage financial and digital literacy among households and firms?*
- *How does financial and digital literacy impact personal finance during and post-COVID-19?*
- *Does financial and digital literacy influence investment instruments choice during COVID-19?*

9. Conclusions

We undertake a bibliometric review of scholarly papers involved with the intersection of finance and COVID-19. As noted by Goodell (2020), COVID-19 will likely not just have a short-term impact on financial systems but will likely reshape many foundational components of financial systems. Economies may have suffered from government anti-COVID-19 stringency measures,[4] but in the longer run, there may be a seminal change in the mental outlooks of investors and policymakers. According to Goodell (2020), prior to COVID-19, there was little consideration by investors of the risks of catastrophic, yet survivable global economic shocks. There may be, although this is arguably not yet confirmed by research. Does COVID-19 significantly change financial planning for the long term? It is too early to say. However, it is important now for the finance scholarly community to begin to take the scope of what has been learned from COVID-19.

Additionally, COVID-19 will likely alter risk assessments and forecasts for the foreseeable future because of its unprecedented global scope. Moreover, because of its global scope and its multifaceted impacts on so many financial aspects, COVID-19 affords an unprecedented opportunity not just to study what happened to financial systems during COVID-19 and not just to investigate what permanent impacts on financial systems and actors have occurred because of COVID-19, but also to revisit existing theories. Has what we thought we knew about finance been confirmed by COVID-19, or has the pandemic, in some ways, led to outcomes that necessitate altering or adjusting financial

theories that were previously accepted? In any case, regardless of the answers to these questions, COVID-19 prompts investigation. It prompts the re-visiting of almost every research context in finance.

We first systematically review and then offer a bibliometric analysis of the literature produced by scholars working at the intersection of finance and COVID-19. Through a comprehensive search process, we extract and review 818 articles. Appling bibliometric methods, we explore the trends among various research constituents involved in the field. Using multi-dimensional scaling, we identify the intellectual structure of research in the domain and outline four distinct themes. We also identify the evolution and shifts in research within the short span of three years since the inception of COVID-19. Through detailed content analysis, various future research directions are proposed.

With a combination of systematic and bibliometric analysis, we identify the trends among various research constituents. Performance analysis highlights the prominent journals, authors, and countries contributing to COVID-19 and finance research. We identify various research themes through science mapping analysis. Detailed investigations of these themes highlight various areas of concern that deserve more attention, and we propose research questions for future investigations. This study will help scholars, policymakers, and practitioners understand the impacts of COVID-19 on financial systems and motivate future research.

Author statement

The authors assert that this project is a genuine collaboration of all authors and that this work is not published or under consideration elsewhere.

Data availability

Data will be made available on request.

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[4] Ashraf and Goodell (2022) find that government-imposed stringency measures are associated with negative economic outcomes in the short run and positive outcomes in the longer term.

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