A Systematic Review of Stock Market Responses to COVID-19 and Future Research Agendas

Md Azizur Rahman
Department of Finance & Banking, University of Malaya, Kuala Lumpur, Malaysia
Department of Business Administration, Daffodil International University, Dhaka, Bangladesh
E-mail: azizur1510@gmail.com
ORCID iD (0000-0002-5672-4230)

Roni Bhowmik
School of Business, Guangdong University of Foreign Studies, Guangzhou, China
Department of Business Administration, Daffodil International University, Dhaka, Bangladesh
Lancashire School of Business & Enterprise, University of Central Lancashire, Lancashire, UK
E-mail: roni@amss.ac.cn
ORCID iD (0000-0001-8664-8286)

Md. Saiful Islam
Department of Finance & Banking, National University, Gazipur, Bangladesh
E-mail: saiful5108@nu.edu.bd
ORCID iD (0000-0001-5355-6334)

Md. Abul Kalam Azad (Corresponding author)
Department of Business and Technology Management, Islamic University of Technology
Board bazar, Gazipur 1704, Bangladesh
Email: kalam@iut-dhaka.edu

Abstract:

Worldwide, the COVID-19 pandemic has significantly influenced stock markets in different dimensions. This paper examines the stock market responses to COVID-19 recently and explores future research agendas. This study considers both bibliometric methods and systematic literature reviews with PRISMA guidelines. In the bibliometric part, we found that authors from China or Chinese collaborations make the highest contributions regarding the number of publications, country-wise corresponding authorship, and countries' collaboration network. However, China or Chinese collaboration papers tend to be lower in terms of the average citation score of publications compared to other top publishing countries. Second, literature review reveals that COVID-19 has positively and negatively affected global stock markets. Finally, we discuss some prospective research agendas, which clarifies the direction of future studies. Universities, organisations, and

researchers in this field can use these helpful reviews to do research and learn more about future research agendas.

Keywords: COVID-19; SARS-CoV-2; stock market; systematic literature review; SLR; bibliometric.

Author Bio

Md Azizur Rahman is a PhD candidate in the Department of Finance at the University of Malaya with the Yayasan Khazanah Scholarship. He is an Assistant Professor of Finance at the Daffodil International University. He won the silver prize in the international 'Research Flash Talk Competition-2022' organised by the University of Malaya. He has more than 12 years of teaching experience in various reputed universities in Bangladesh. He has published over 24 papers on finance, green innovation, and carbon pricing policy. Besides, he has presented at least 10 conference papers and won four best paper awards at various international conferences.

Roni Bhowmik joined the School of Business, Guangdong University of Foreign Studies, China as an Associate Professor in Finance. He has completed his doctoral thesis at the University of the Chinese Academy of Sciences, Chinese Academy of Sciences, China. Dr. Bhowmik received the prestigious CAS-TWAS President Fellowship for pursuing his Ph.D.. He has around 10 years of teaching experience at the undergraduate and graduate levels, where he taught various finance courses. Previously he held positions like Associate Professor, Senior Lecturer, and Lecturer at several educational institutions in Bangladesh, China, and UK. During his professional career as a researcher, Dr. Bhowmik has published 22 peer-reviewed articles in SCI, SSCI, and SCOPUS-indexed journals.

Md. Saiful Islam is an academician who is currently working as an Assistant Professor at the Department of Finance and Banking, Faculty of Business Administration, National University, Gazipur, Bangladesh. He has completed MBA and BBA in Finance from the University of Chittagong, Bangladesh. He also accomplished a career-demonstrating consistent success as an educator at the higher education level with excellent teaching and coordination skills at both postgraduate and undergraduate levels in the areas of finance, banking, business statistics, and business mathematics over the last eight years. He has an excellent track record in assuring student success and has published 16 peer-reviewed articles in indexed journals.

Md. Abul Kalam Azad is Professor in the Department of Business and Technology Management (BTM), Islamic University of Technology (IUT), a subsidiary organ of Organisation of Islamic Cooperation (OIC), Gazipur, Bangladesh. Prof. Azad completed his PhD from University of Malaya, Malaysia. Prof. Azad has been awarded with IIUC Merit scholarships, Chancellor Award, Vice Chancellor Award, University of Bedfordshire Merit Scholarship, Bright Spark scholarship

for PhD, Best Professor of Business Award by the institution CMO Asia, Star group, World HRD Congress and South Asian Partnership Summit & Business Excellence Award-2017 and Best Student of IIUC-DC in 2008. Until now, he has published more than 78 research articles, book chapters and review papers including journals with ABS ranking 3*.

1. INTRODUCTION

Stock market performance can be affected by anything from a tiny corporate announcement to something as disastrous as COVID-19. The global financial market's reaction to COVID-19 was rather severe compared to other infectious illness pandemics, including HIV/AIDS, SARS, Ebola, avian flu, and swine flu (S. R.Baker et al., 2020). Due to the World Health Organization's (WHO) announcement of a pandemic, the increase in COVID-19 infections has immediately impacted the capital markets. For example, the first six-month market index of the Nifty50, the Dow Jones, the Hang Seng, and the SSE Composite fell 23.57%, 15.33%, 8.29%, and 3.96%, respectively (Kaur & Saxena, 2020).

There is a common notion that COVID-19 harms market returns (Cao et al., 2020; Costola et al., 2020; Harjoto et al., 2020; Liu et al., 2020; Xu, 2020), whereas some studies concluded with a positive impact (Aslam et al., 2020; Bai et al., 2020; Li et al., 2020; Okorie & Lin, 2020; Waheed et al., 2020). Interestingly, some researchers came up with mixed results, mainly focusing on sectoral or cross-countries (Alam et al., 2020; Baek & Lee, 2020; He et al., 2020; Huo & Qiu, 2020; Mazur et al., 2020; Narayan et al., 2021). Consequently, these conflicting results from empirical investigations compel us to undertake this SLR. We want to be as detailed as possible on how COVID-19 can affect the global stock market.

Recently, authors focused on a mixed-methods evaluation incorporating bibliometric and scientometric techniques. Meanwhile, relatively few recent attempts have been conducted to create a comprehensive map of stock market-related literature. For instance, Chen and Yang (2021) and Wang and Ngai (2020) work on cross-market volatility spillovers and event study methodology in business research, respectively, with bibliometric methods. At the same time, Lin and Su (2020) work to reveal the interaction between oil and stock markets with scientometric analysis. Likewise, Somanathan and Rama (2020) endeavored to identify predictive models in the emerging stock

market estimation with a mixed literature review. Thus, we aim to provide a panoramic view of stock market literature before and following COVID-19. We asked this study question: "How much does COVID-19 cause bibliometric changes in the literature on the stock market?" We use the exact keywords and measurement thresholds as prior studies to examine bibliometric shifts before and after the COVID-19 pandemic, which is a crucial distinction from previous research. To further emphasize the significance of COVID-19 and its effect on the stock market return, we provide a visual representation of the existing literature mapping.

A systematic literature review aims to provide a comprehensive, detailed, balanced synthesis of evidence on a specific topic of interest (Ampatzoglou et al., 2015). In this view, Bhowmik and Wang (2020) conducted SLR on market volatility and GARCH family models. In contrast, Delle Foglie and Panetta (2020) studied SLR in the Islamic stock market compared with the conventional one. Given the importance of the COVID-19 phenomenon, we also focus on another research question, i.e., "How does COVID-19 affect the global stock market?" Hence, this study will help us better understand why there isn't a lot of research on SLR that focuses on COVID-19 and the stock market.

Until now, few authors conducted literature reviews about the stock market, but not many used the PRISMA guidelines for the SLR method. For instance, Spanos and Angelis (2016) worked on SLR and revealed the statistically significant relation between firms' stock prices and information security events. Another recently published SLR was conducted by Delle Foglie (2020) in a comparative study of Islamic and conventional stock market literature. Unlike previous SLRs, we propose a thorough analysis of the sample literature's future research agenda. At this point, we posed a new research question: "What are the key future research challenges identified for further exploration of this effect?"

This study reviewed the stock market-related literature in organizations to achieve the following goals: (a) to demonstrate changes in publication patterns in the Scopus database between the "before COVID-19" and "during COVID-19" eras using bibliometric analysis; (b) a review of "Stock Market Response to COVID-19" published articles in the Web of Science and Scopus databases were conducted to address aspects that had not been addressed in previous studies; (c)

to explore future research plans, especially the stock market's response to the COVID-19 pandemic, to find the best way to deal with pandemic threats to the stock market in the future.

The main scientific value of our study is to contribute to future research on how COVID-19 has changed the research focus to measure the effects of the pandemic on the stock market reaction and future research hot spots. In particular, the bibliography section of this study looks at and compares the changes in scientific research hubs before and during the COVID-19 period in terms of geographic regions, collaborations between authors' institutions and countries, and research hotspots in the field of stock market research. Additionally, this study clarifies the effects of COVID-19 in various markets individually (by classifying both single-country and multi-country studies in developed and developing regions), as well as categorizing the databases used and the methodologies employed in the SLR section. Also, we give a detailed analysis of the future research scope suggested in the sample literature, which would help the researchers with stock market returns and other issues. We believe that these study avenues help us better understand the relationship between the COVID-19 pandemic disaster and the stock market's response, which will aid us in handling future crises of a similar kind.
The remaining section of this study is split into "Data Sources and Method," "Findings Analysis," and "Conclusion."

2. DATA SOURCES AND METHOD

Systematic Literature Review aims to make a scientific literature synthesis with predefined steps, an unbiased search strategy, and a framework for mapping knowledge to influence future research trends. Subsequently, as followed by Salvatore et al. (2022), we employ a standardized approach, explicitly the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), to maximize transparency, reproducibility, and quality of results.

2.1 Search Strategy

Three specific research questions directly guide our search protocol. Pre-literature surveys and research questions drive us to select "searching keywords." We select the keywords such as “COVID” and “Stock Market” based on recent studies such as Ambros et al. (2020); Smales (2021) for Covid-related literature and Lin and Su (2020); Spanos and Angelis (2016) for stock market

literature. In the next step, we focused on the Web of Science and Scopus databases, two of the largest bibliometric databases of peer-reviewed journals, to find published literature.

2.2.1 Search Strategy for Bibliometric Analysis of the Literature

Our first research question also led us to find the bibliometric changes in the stock market literature due to the COVID-19 epidemic. To find bibliometric changes, we separated our literature search into two different periods, which we defined as "before COVID-19" and "during COVID-19." To visualize the changes in literature, we set a goal to cover as much literature as possible for both periods. Our search for "during COVID-19" was limited to papers appearing in published between January 1, 2020, and February 15, 2021. This is because the end of our search period was the same time the WHO approved two essential vaccines for emergency use: Pfizer/BioNTech and AstraZeneca/Oxford. However, we consider the "before COVID-19" literature period to open only to the end of 2019.

Web of Science (WOS) and Scopus are two of the most popular databases used for bibliometric analysis because of the reliability of their data (Fontoura & Coelho, 2020; Iscaro et al., 2021). Compared to Scopus, the records retrieved from WoS are more consistent and standardized (Bartol & Mackiewicz-Talarczyk, 2015; Fontoura & Coelho, 2020; Ikra et al., 2021; Mehdi & Sarma, 2022). Nevertheless, the Scopus database, which has a broader data coverage than the WOS database, has more stringent methodological standards for database coverage (Salim et al., 2019) and is often recognized as the most credible source for reflecting academic research (Valenzuela et al., 2017).

It indexes, among other things, more than 15,000 periodicals, about 265 million web pages, and 18 million patents (Aldieri et al., 2019). Scopus was chosen as our consulting database for bibliometric hotspot analysis because it is comprehensive, comprises one of the most significant numbers of qualitative scientific works, and indexes only the most cited journals in each discipline (Aldieri et al., 2019; Ammirato et al., 2020; Baker et al., 2020). We conducted a search that started with COVID-19 and stock market-related phrases in all possible Scopus database search areas (title, abstract, and keywords).

2.1.2 Search Strategy for Systematic Literature Review (SLR)

As mentioned, our literature analysis was split into bibliometric hotspot changes caused by the COVID pandemic and SLR interpretation of COVID-stock market literature with a future research agenda. In the case of SLR, this study evaluates the scientific research papers published in the WOS and Scopus databases. We found 76 published records in WOS and 130 records in the Scopus database. In the searching stage, we were concerned about Jackson and Kuriyama's "English-language bias" or "Tower of Babel bias"(Jackson & Kuriyama, 2019). However, we discovered just two publications published in Spanish (1.27 percent of all published papers), and we disregarded them due to our inability to comprehend their significance. Finally, we combined all the records found in the WOS and Scopus databases and selected them for the next stage of the screening process.

2.2 Main Information

Based on the obtained sample references, we first conducted a series of descriptive analyses to provide an overview of the extensive research on stock market volatility to date using a COVID-19 pandemic impact framework. Table 1 shows the main information from sample references in the WOS and Scopus databases. According to Table 1, the highest number of scientific publications appeared in China during COVID-19. This study has been divided into two sections. We visualized the informational changes in stock market literature through the bibliometric methodology. We used the 'Boolean search' technique by encoding keywords (Baker et al., 2020; Lin & Su, 2020) to search for stock market literature both before and during the COVID-19 pandemic. Then, we separate our COVID-19 records by adding Covid-related words ("COVID-19" OR "SARS-CoV-2" OR "COVID-19 Pandemic" OR "COVID Pandemic" OR "Novel Coronavirus" OR "Coronavirus pandemic" OR "Covid") and limiting the year to 2020–2021. Table 1 also shows how many records were published from 1910 to 2019 ("before the COVID-19 period") and from 2020 to 2021 ("during the COVID-19 pandemic period").

Table 1. Main Information

DOCUMENTS PARTICULARS	Pre-COVID-19	During COVID-19	
	Scopus	Scopus	WOS
Timespan	1910:2019	2020:2021	2020:2021
Sources (Journals, Books, etc.)	2505	73	49
Documents	22610	130	76
Average years from publication	12.3	0.838	1
Average citations per document	24.53	4.523	4.118
Average citations per year per doc	1.749	2.277	2.782
DOCUMENT TYPES			
Article	22610	120	53
Article; Early Access	0	0	21
Editorial Material	NI	1	2
Conference Paper	NI	6	0
Review	NI	3	0
DOCUMENT CONTENTS			
Keywords Plus (ID)	11562	245	113
Author's Keywords (DE)	26602	337	224
AUTHORS			
Authors	27918	352	211
Author Appearances	50656	385	220
Authors of single-authored documents	4461	14	13
Authors of multi-authored documents	23457	338	198
AUTHORS COLLABORATION			
Single-authored documents	5932	17	14
Documents per Author	0.81	0.369	0.36
Authors per Document	1.23	2.71	2.78
Co-Authors per Documents	2.24	2.96	2.89
Collaboration Index	1.41	2.99	3.19
Corresponding Author's Countries	108.00	33	32
Country Scientific Production	121.00	45	39
Corresponding Author's Country	USA (3742)	CHINA (29)	China (16)
Country Scientific Production	USA (9315)	China (39)	China (30)
Most Cited Countries	USA (200643)	CHINA (117)	China (75)

Source: Output of Biblioshiny and Authors' compilation

N.B.: NI=Not Identified

2.3 Screening Protocol

We think a screening method is needed to make a fair framework and make the literature more similar. However, research questions and related literature led us to choose searching keywords. Figure 1 displays the whole flow chart of the PRISMA technique for SLR, including the two-stage record screening protocol. In Stage 1, there are three steps, such as (1) setting the search limits with keywords, (2) finding and identifying the search string, and (3) choosing the time period for the search.

Stage 2 is known as an "Exclusion Stage" that contains six steps as follows: (1) minimize duplication of records to merge information from the WOS and Scopus databases; (2) like Abdullah et al. (2020), "editorial," "editorial material," "review," and "proceeding" are excluded to improve homogeneity; (3), only limited papers are published in English; (4), references are omitted when managing the entire paper fails; (5), articles where the word "covid" is mentioned but not directly investigated; and (6), also exclude those considered cryptocurrency issues due to their unequal global acceptability and legitimacy. Finally, we selected 125 published peer-reviewed papers for this SLR.

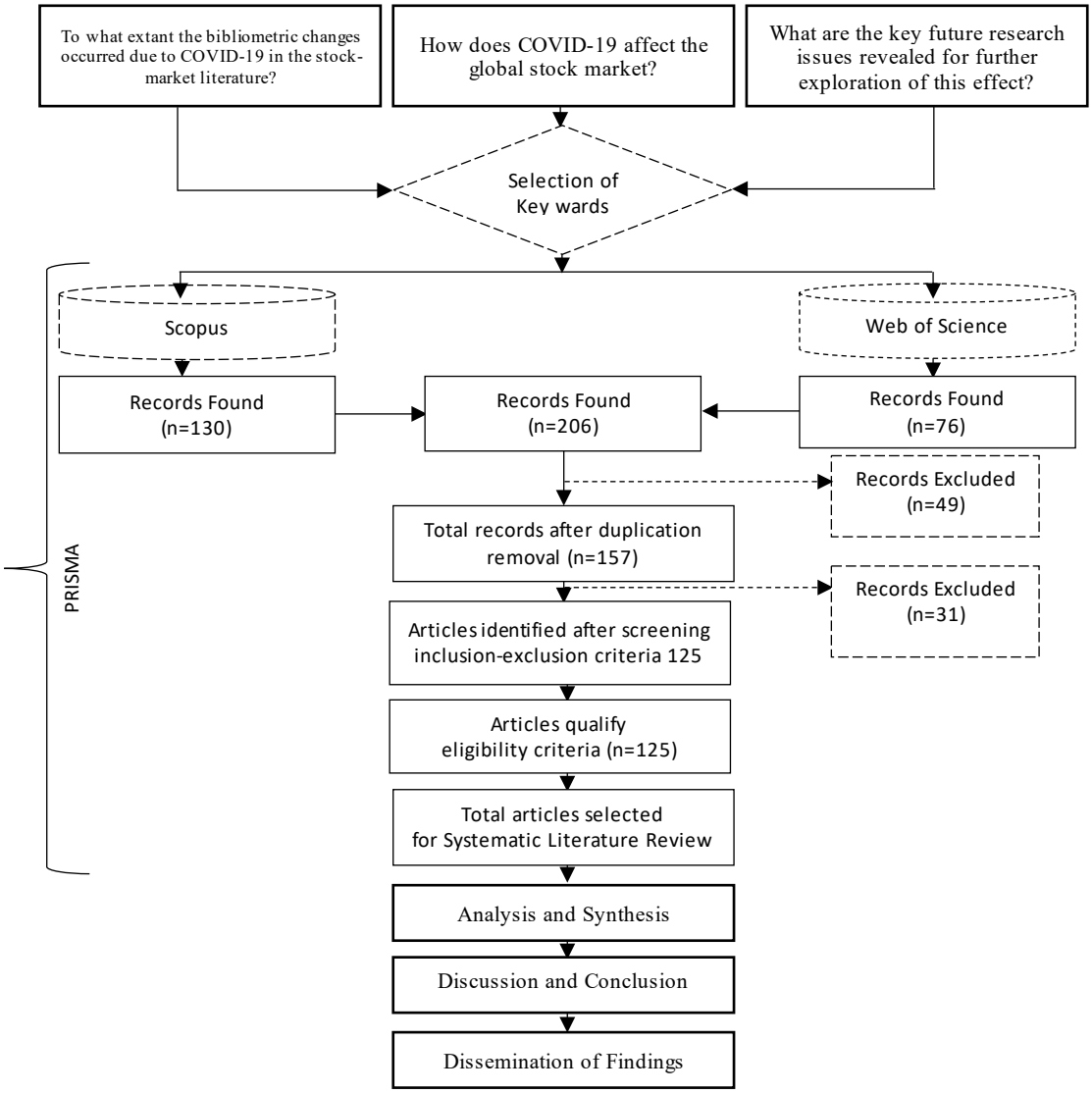

Figure 1. Study flow diagram (PRISMA figure)

3. FINDINGS ANALYSIS

3.1 Bibliometric Changes Occurred due to COVID-19

3.1.1 Countries participations

We visualized the contribution from different countries, which are critical actors in this field, with changes in publication patterns over time. Table 2a shows the top 20 countries' contribution role in stock market literature before and during COVID-19. Europe and Asia have the highest appearance in this field's top 20 performer countries as a continental representation. The USA was the leading contributing country before COVID-19 (from 1910-2019) in every aspect, with 9315

publications (TP), 3742 cited publications (NCP), 200643 total citations (TC), and 53.62 article/citation (AAC) respectively, and China was in the second position. However, the scenario changed during the COVID-19 period when China replaced the USA and took the highest contributing place in almost every aspect.

Moreover, South Africa was the only country representing the African continent before COVID-19, while Nigeria became the only country from Africa during the COVID-19 era in the top 20 performing countries. Furthermore, Canada was featured in the top 20 contributing countries before the COVID-19 segment but did not exist during the COVID-19 part of the top 20 countries. Overall, China is a top-publishing nation to examine the influence of the COVID-19 outbreak on stock market returns in 2020–21. However, in terms of average article citations (AAC), China continues to trail behind other leading publishing nations "during COVID-19" and "before COVID-19."

Table 2a. Top 20 countries' participation

Before COVID-19						During COVID-19					
Country	**Continent**	**TP**	**NCP**	**TC (Rank)**	**AAC**	**Country**	**Continent**	**TP**	**NCP**	**TC (Rank)**	**AAC**
USA	AMERICA	9315	3742	200643 (1)	53.62	China	ASIA	70	29	117 (1)	4.03
China	ASIA	4992	2143	28906 (2)	13.49	USA	AMERICA	23	8	54 (4)	6.75
UK	EU	2700	1177	25889 (3)	22.00	Australia	AUS	15	7	42 (5)	6.00
Australia	AUS	1519	716	15085 (4)	21.07	Pakistan	ASIA	14	1	23 (7)	23.00
India	ASIA	1359	498	4578 (13)	9.19	Portugal	EU	11	2	8 (11)	4.00
Germany	EU	1339	650	11792 (6)	18.14	Malaysia	ASIA	11	4	4 (13)	1.00
France	EU	1124	365	8697 (7)	23.83	Nigeria	AFRICA	8	3	2 (14)	0.67
South Korea	ASIA	1020	529	7231 (9)	13.67	Poland	EU	7	3	41 (6)	13.67
Iran	ASIA	1015	422	1883 (27)	4.46	Turkey	EU	7	1	14 (9)	14.00
Canada	AMERICA	866	358	12114 (5)	33.84	Spain	EU	6	2	18 (8)	9.00
Italy	EU	861	361	8226 (8)	22.79	Czech Republic	EU	6	2	1 (18)	0.50
Malaysia	ASIA	827	363	3033 (18)	8.36	United Kingdom	EU	5	2	64 (3)	32.00
Japan	ASIA	713	304	3675 (16)	12.09	Kuwait	ASIA	3	1	83 (2)	83.00
Spain	EU	689	114	5753 (12)	19.18	France	EU	3	2	12 (10)	6.00
Greece	EU	630	296	5852 (11)	19.77	Brazil	AMERICA	3	2	2 (15)	1.00
Turkey	EU	626	297	4291 (14)	14.45	Germany	EU	3	3	1 (19)	0.33
Indonesia	ASIA	518	152	468 (46)	3.08	Oman	ASIA	2	1	5 (12)	5.00
Brazil	AMERICA	512	172	2788 (19)	16.21	Hong Kong	ASIA	2	1	2 (16)	2.00
South Africa	AFRICA	461	235	1891 (26)	8.05	Singapore	ASIA	2	1	2 (16)	2.00
Netherlands	EU	419	167	3808 (15)	22.80	Romania	EU	1	1	1 (20)	1.00

TP- Total Publications, NCP- Number of Cited Publications, TC- Total Citations, AAC- Average Article Citations

Source: Output of Biblioshiny and Authors' compilation

3.1.2 Impact of country-wise corresponding author's

Table 2b shows the countries where the top stock market researchers worked before COVID-19 (from 1910 to 2019) and during COVID-19 (2020 and 2021). Intriguingly, before the COVID-19 era, the United States led China by a wide margin regarding the number of connected authors, but the situation was reversed during the COVID-19 period. Typically, countries with more associated authors have more publications. China is rising fast in this field, notably in research on the influence of SARS-CoV-2 on the stock market.

Table 2b. Countries most affiliated by stock market researchers from 1910 to 2021

Before COVID-19						During COVID-19					
Country	**Art**	F_q	**SCP**	**MCP**	**MCPR**	**Country**	**Art**	F_q	**SCP**	**MCP**	**MCPR**
USA	3742	0.228	3012	730	0.20	CHINA	29	0.29	19	10	0.35
China	2143	0.130	1726	417	0.19	USA	8	0.08	3	5	0.63
UK	1177	0.072	829	348	0.30	Australia	7	0.07	4	3	0.43
Australia	716	0.044	490	226	0.32	India	6	0.06	5	1	0.17
Germany	650	0.040	512	138	0.21	Malaysia	4	0.04	3	1	0.25
Korea	529	0.032	402	127	0.24	Germany	3	0.03	2	1	0.33
India	498	0.030	455	43	0.09	Nigeria	3	0.03	2	1	0.33
Iran	422	0.026	400	22	0.05	Poland	3	0.03	1	2	0.67
France	365	0.022	251	114	0.31	Brazil	2	0.02	1	1	0.50
Malaysia	363	0.022	295	68	0.19	Czech Republic	2	0.02	1	1	0.50
Italy	361	0.022	263	98	0.27	France	2	0.02	1	1	0.50
Canada	358	0.022	241	117	0.33	Japan	2	0.02	1	1	0.50
Japan	304	0.019	249	55	0.18	Morocco	2	0.02	1	1	0.50
Spain	300	0.018	241	59	0.20	New Zealand	2	0.02	2	0	0.00
Turkey	297	0.018	245	52	0.18	Portugal	2	0.02	0	2	1.00
Greece	296	0.018	217	79	0.27	Saudi Arabia	2	0.02	0	2	1.00
Hong Kong	245	0.015	144	101	0.41	Spain	2	0.02	1	1	0.50
South Africa	235	0.014	191	44	0.19	Thailand	2	0.02	2	0	0.00
Brazil	172	0.011	150	22	0.13	UK	2	0.02	1	1	0.50
Netherlands	167	0.010	118	49	0.29	Bangladesh	1	0.01	0	1	1.00

Art=Articles, F_q =Frequency, SCP=Single Country Production, MCP= Multiple Country Production, MCPR= MCP_Ratio

Source: Output of Biblioshiny and Authors' compilation

3.1.3 Countries' collaboration network

Figure 2a shows the network of countries where authors who studied the stock market before and during the COVID-19 pandemic have connections. According to figure 2a, before COVID-19,

i.e., from 1910 to 2019, the country-wise contributors affiliated with the USA, China, and the UK were central to the collaboration network, while Australia, Canada, and some countries from the European zone, including France, the Netherlands, Germany, and Greece, also significantly contributed. Aside from China, countries like Malaysia, Korea, Japan, India, and Hong Kong in Asia and Brazil, Chile, and Colombia in Latin America, also appear significantly.

Also, Nigeria, Tunisia, South Africa, and Egypt represent the African continent. The USA collaborates well with China, the UK, and Canada, with 386, 244, and 162 publications in the co-authors' collaboration network. The USA has the highest collaboration with 77 countries, followed by the UK, China, and Australia, with 70, 57, and 53 nations in the country-wise network. As a result, the United States has taken a significant leadership role in the stock market by publishing articles and collaborating with many nations before COVID-19.

In comparison, as per figure 2b, China, Australia, India, and Pakistan play a central role in the collaboration network during COVID-19. The USA also has a significant role in collaborative publications with China and Australia. Figure 2b also shows strong evidence that China plays a vital role in the publication collaboration network to explore the relationship between COVID-19 and stock market return during the first year of COVID-19. Finally, the country's collaboration map established that the USA and China were significant contributors before and during COVID-19.

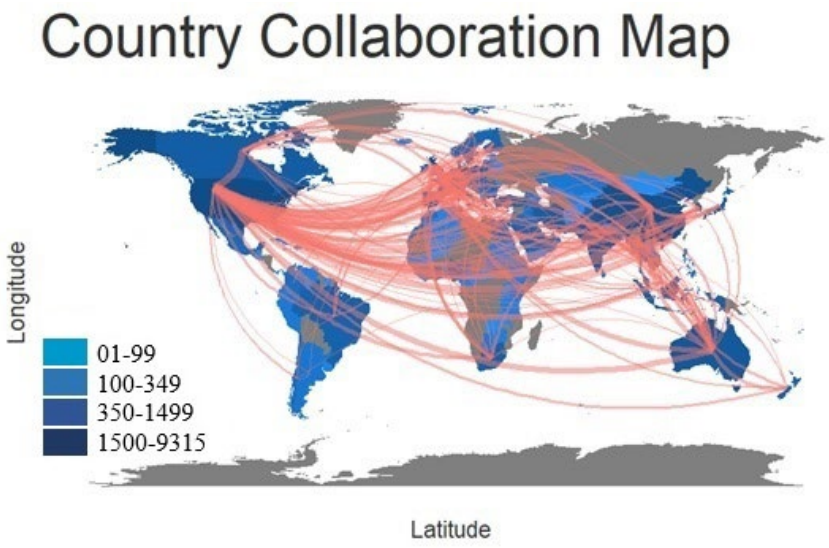

Figure 2a. Country collaboration network for co-authors in the field of market studies before COVID-19

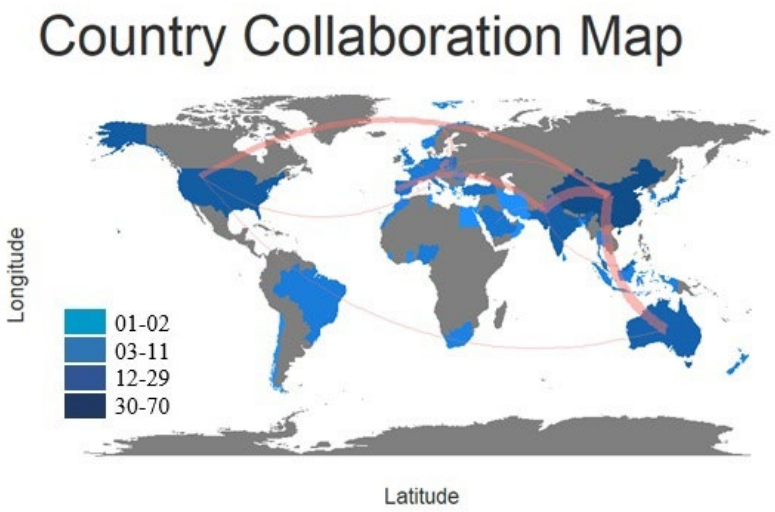

Figure 2b. Country collaboration network for co-authors in the field of market studies during COVID-19

Source: Output of Biblioshiny and Authors' compilation

NB.: This figure presents the network of countries affiliated with authors with at least 05 co-authorship links as a threshold.

3.1.4 Institutional co-authors network

Figure 3a exhibits the institutional collaboration networks that authors in this area were a part of before the COVID-19 pandemic. Interestingly, the institutions are significantly represented as central contributors to the country's collaboration network. For instance, the University of California, Stanford University, University of Texas, Colombia University, and Boston University represent the USA, while Monash University and Deakin University represent Australia. The University of Pretoria, South Africa, also has an essential role in the institutional network. As a result, institutions from the United States had the most significant impact on the collaboration network of institutions before COVID-19.

In comparison, several institutions appeared in the institutional collaboration network during COVID-19, illustrated in Figure 3b. We found four separate networks with a combination of 12 institutions when we used 05 co-authorship links as a threshold (i.e., minimum edge of 05). Institutions such as Zhongnan University of Economics and Law in China and Deakin University in Australia appear in the network jointly to publish papers. We found China has a well-known country-wise collaboration. Institutions such as the University of Presov, University of Stavanger,

Institute of Economic Research, and Nicolaus Copernicus University from Slovakia, Norway, and Poland appear prominently in the network. Likewise, the University of Cassino and Southern Lazio in Italy and Pepperdine University in the USA have another separate network. Three institutes from Portugal also create another impactful connection in the network. Although some countries are affiliated with a central network and visible in the institutional collaboration network, others are not. Therefore, key institutions in collaboration networks are unlikely to appear the same as country-wise collaboration networks during COVID-19.

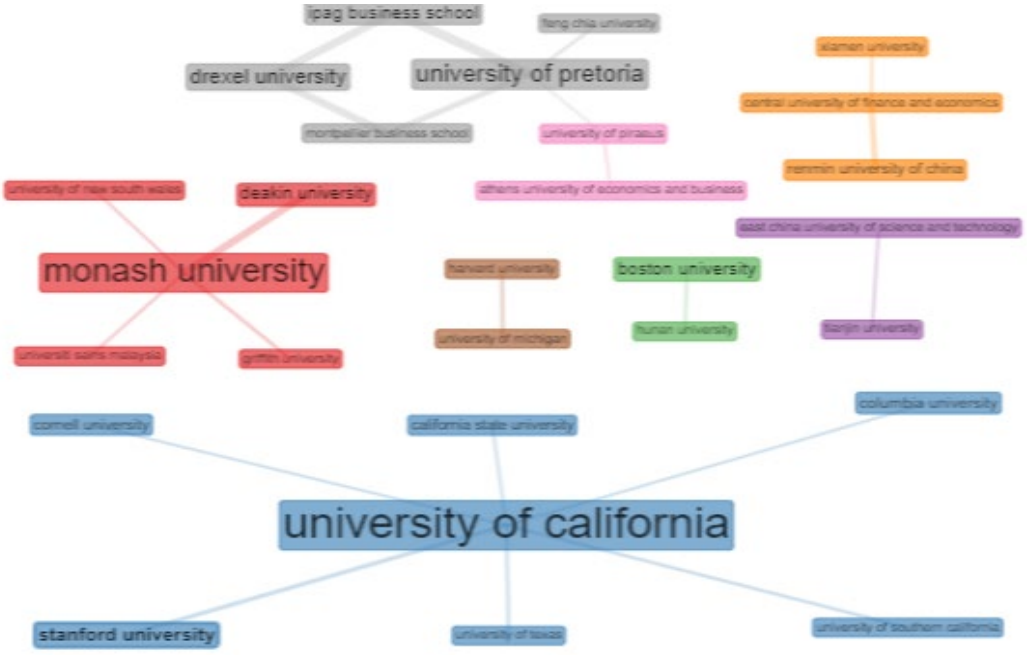

Figure 3a. Institutional collaboration networks before COVID-19

Figure 3b. Institutional collaboration networks during COVID-19

3.1.5 Source details before and during SARS-CoV-2

We intend to measure the change in journals' involvement in paper publications before and during the SARS-CoV-2 pandemic. More specifically, we want to identify the scientific reputation of journal publishing papers in this field. Table 3 lists the top 10 articles published in journals in the area of the stock market from 1910 to 2021. We believe that most researchers should increase the journal's impact factor and scientific reputation. Generally, the impact factor is used to assess a journal's comparative significance within the respective field and quantify the cited journal in a specific period. However, we consider the total number of publications when selecting a list of journals as we have compared bibliometric changes, especially those of "contributing journals," before and during the SARS-CoV-2 pandemic.

With 664 publications, Physica A: Statistical Mechanics and Its Applications tops the list, followed by Applied Financial Economics, Journal Of Banking And Finance, The Journal Of Finance, Applied Economics Letters, and Applied Economics, with 487, 435, 391, 287, and 282 publications, respectively. Expectedly, most of the listed journals in Table 3 represent the leading finance and economics journals before SARS-CoV-2. According to WOS journal citation reports 2019, most journals (60%) belong to "Q1" as per the "Journal Impact Factor Quartile," indicating that most journals have a high impact in this field and a high scientific reputation. On the other hand, during the SARS-CoV-2 pandemic, only two journals were listed in "Q1," with 30 percent of journals not existing in the journal citation report on the web of science. Additionally, the average age of published journals before the SARS-CoV-2 pandemic was 41 years. Only 13.6 years old are the publishing journals during the SARS-CoV-2 pandemic, meaning that all listed journals before the SARS-CoV-2 pandemic are older than journals listed during the SARS-CoV-2 pandemic. Moreover, highly scientifically recognized journals are yet to be emphasized to explore the impact of SARS-CoV-2 on the stock market. Therefore, this bibliometric overview and SLR will help future studies reveal the precise relationship between the SARS-CoV-2 and its effects on stock market volatility.

Table 3. Top 10 publishing journals and their scientific reputation before and during SARS-CoV-2

	Source	NP	R_k	TC	R_k	h_i	g_i	m_i	JIF	EFS	JIF_Q	PY_S	AGE
BEFORE COVID-19	Physica A: Statistical Mechanics and Its Applications	664	1	13885	4	56	81	1.806	2.924	0.030	Q2	1991	30
	Applied Financial Economics	487	2	7797	11	41	63	1.323	NA	NA	NA	1991	30
	Journal of Banking and Finance	435	3	19317	3	71	115	1.578	2.269	0.015	Q1	1977	44
	The Journal of Finance	391	4	84830	1	191	378	4.976	6.813	0.043	Q1	1946	75
	Applied Economics Letters	287	5	2604	37	26	38	0.929	0.752	0.004	Q4	1994	27
	Applied Economics	282	6	2822	33	26	36	0.500	1.103	0.007	Q3	1970	51
	International Review of Financial Analysis	257	7	5634	14	39	61	1.300	2.497	0.004	Q1	1992	29
	Journal of Financial Economics	256	8	58348	2	120	241	2.500	5.731	0.052	Q1	1974	47
	Journal of Financial and Quantitative Analysis	249	9	12045	5	58	103	1.036	2.707	0.010	Q1	1966	55
	Pacific Basin Finance Journal	233	10	4956	16	36	56	1.385	2.382	0.002	Q1	1996	25
DURING COVID-19	Finance Research Letters	24	1	125	1	7	10	3.5	3.527	0.004	Q1	2004	17
	Applied Economics Letters	6	2	8	13	2	2	1.0	0.752	0.004	Q4	1994	27
	Emerging Markets Finance and Trade	5	3	83	3	3	5	1.5	1.214	0.002	Q3	2002	19
	Journal of Behavioral and Experimental Finance	4	4	94	2	2	4	1.0	1.145	0.003	Q3	2014	7

International Review of Financial Analysis	3	5	65	4	1	3	0.5	2.497	0.004	Q1	1992	29
Research in International Business and Finance	3	6	44	5	1	3	0.5	1.801	0.002	Q2	2004	17
International Journal of Environmental Research and Public Health	3	7	35	6	1	3	0.5	2.849	0.062	Q2	2017	4
Journal of Asian Finance, Economics, and Business	3	8	13	10	2	3	1.0	NA	NA	NA	2018	3
Methodsx	3	9	0	28	0	0	0.0	NA	NA	NA	2018	3
Review of Asset Pricing Studies	2	10	33	7	2	2	1.0	NA	NA	NA	2011	10

R_k = Rank, TC=Total Citations, NP=Number of Publications, h_i=h-index, g_i-g-index, m_i=m-index, JIF= Journal Impact Factor, JIF_Q= JIF Quartile, PY_S= PY_start
EFS=Eigen factor Score

Source: Output of Biblioshiny and Authors' compilation

3.1.6 Overview of author's keywords before and during the SARS-CoV-2 pandemic

In bibliometric analysis, high-frequency author's keywords are always necessary to understand the key emphasized research and search topic area. Table 4 shows the 20 most commonly used keywords before and during the SARS-CoV-2 pandemic. Expectedly, the search-related keywords are at the top of the list of words that appear. For instance, "stock market" and "COVID-19" related words are highly used in table 3. Before the SARS-CoV-2 pandemic, "volatility," "market efficiency," "financial crisis," "corporate governance," and "forecasting" were also significantly used by the authors as keywords, indicating that these issues are fundamentally adjacent to a stock market study. Whereas "investor sentiment," "google trend," and "investor attention" are strongly linked to the relationship between the SARS-CoV-2 pandemic and stock market studies during the pandemic period.

Table 4. The twenty highest frequency Author's Keywords.

Before SARS-CoV-2 Pandemic		**During SARS-CoV-2 Pandemic**	
Words	**Occurrences**	**Words**	**Occurrences**
Stock Market	1003	COVID-19	80
Stock Returns	757	Coronavirus	21
Volatility	622	Stock Market	21
Stock Markets	543	Stock Markets	12
Financial Markets	434	Event Study	9
Emerging Markets	409	Pandemic	9
Market Efficiency	405	Volatility	6
Event Study	357	Investor Sentiment	5
Stock Prices	338	Financial Markets	4
Financial Crisis	295	Google Trends	4
Cointegration	290	Investor Attention	4
Corporate Governance	281	Sars-Cov-2	4
GARCH	268	Stock Market Returns	4
Asset Pricing	263	Stock Market Volatility	4
Liquidity	262	Stock Price	4
Econophysics	203	Stock Returns	4
Stock Price	195	Abnormal Return	3
China	190	China	3
Monetary Policy	183	COVID-19 Pandemic	3
Forecasting	178	Emerging Markets	3

Source: Output of Biblioshiny and Authors' compilation

3.2 The Impact of COVID-19 on the Global Stock Market

3.2.1 Data Frequency

Considering the data frequency, we found different timeframes from high-frequency (hourly) data to monthly data, depicted in Figure 4. According to the figure, most studies have considered daily data. Perhaps most studies look at the stock market return with the number of daily COVID-19-infected cases or the daily death rate.

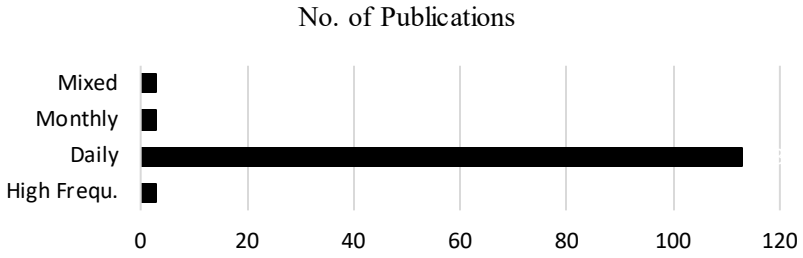

Figure 4. Timeframes used in each publication

3.2.2 Data type

We found six data sets used in the literature: time series, panel, cross-sectional, questionnaire, correlational, and others presented in Figure 5. However, approximately 80% of the data sets are time series and panel data. Few authors used questionnaire survey data to investigate behavioural issues along with COVID-19 and the market returns.

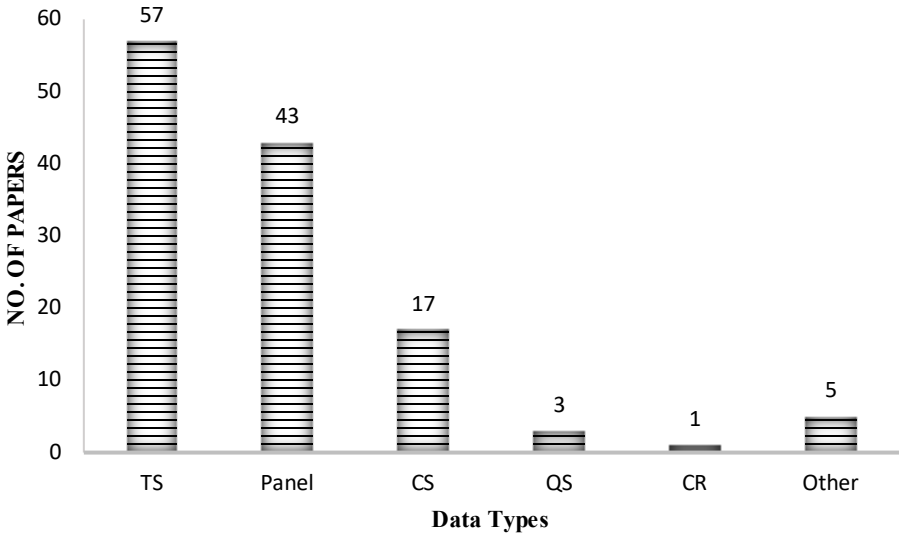

Figure 5. Commonly applied data types
N.B.: TS=Time Series, CS=Cross Section, QS=Questionnaire Survey, CR=Correlational

3.2.3 Global stock market impact of COVID-19

The impact of COVID-19 on the stock market has been classified based on the nature of the study, the country's economic status, and the degree of effect, which is illustrated in table 5. The investor's confidence level and the spread of COVID-19 cases were influenced simultaneously, affecting the stock market return (e.g., negative, mixed, and positive). The results revealed that 45 out of 125 reviewed papers emphasize individual countries. Among them, 42.22% are negatively affected, followed by the mixed and positive effects of 35.55% and 22.22%, respectively.

Adverse incidences or events that occur internally or externally enhance volatility in the market. In the case of individual countries, we found that 20 out of 125 articles concluded with negative findings. Many authors found an adverse market reaction to the worsening country's COVID-19 scenario (e.g., daily increasing confirmed cases or death rate). However, mixed evidence is found in some studies where authors emphasized the multi-sectoral of an individual country. The figure is 16 papers out of 125. Researchers show that the tourism industry is the most affected sector than petroleum, real estate, food, and beverage; alternatives occurred in the pharmaceuticals and IT sectors.

Surprisingly, nine empirical papers revealed the positive impact of COVID-19 in the respective markets in the case of individual countries. The literature showed that more awareness, social distancing, health testing, and government stimulus packages worldwide, such as reduced interest rates, resulted in positive effects. We suspect the trust between the government and citizens also affects the relationship between COVID-19 and the stock market. Nonetheless, we did not find any relevant studies and left this scope for future researchers. More studies also need to measure the COVID-19 effect on respective markets.

Table 5. The COVID-19 effect on the developed and developing region

I (Art_N)	*AT* (Art_N)	*CES*	*Country Name*	*Effects* (P_{ID})
Stock-Covid (46)	Multiple (31)	C^r	EU	Positive (75)
				Negative (13, 46, 71, 75)
			Global	Positive (20, 72, 92)
				Negative (14, 17, 27, 33, 38, 40, 52, 67, 68, 70, 77, 79, 94)
				Mixed (30, 56, 107)
			Czech Republic, Hungary, Poland	Negative (22)
			US, China, UK, Japan	Positive (25)
			USA, Spain, Italy, France, Germany, UK, China, Romania	Mixed (47)
			India, Switzerland, Taiwan, Brazil	Negative (93)
			US, Spain, Italy, Germany, UK	Positive (104)
			G20	Negative (108)
			Africa	Negative (113)
			Canada & US	Negative (122)
	Individual (15)	D^d	Australia	Mixed (6, 89)
			US	Mixed (23, 24, 86)
		D^g	Brazil	Negative (114)
			China	Negative (49)
				Mixed (35, 55, 61)
			India	Negative (31)
				Mixed (7)
			Pakistan	Positive (119)
			Turkey	Negative (43)
			Vietnam	Negative (15)
Stock-Covid-Other issues (80)	Multiple (43)	C^r	Global	Positive (3, 90)
				Negative (19, 29, 42, 45, 48, 54, 101, 103)
				Mixed (4, 11, 18, 26, 41, 53, 57, 120, 124)
			GCC	Positive (2)
			MENA	Positive (8)
			UK & USA	Mixed (12)
			USA, UK, Germany, France, Spain, Italy	Mixed (28, 60)
			Czechia, Hungary, Poland, Slovakia	Negative (36)
			Asia-Pacific region	Mixed (62)
			Asia	Negative (87)

			Africa	Positive (63)
			BRICS	Mixed (66)
			US & China	Negative (76)
			China & Asian	Negative (78)
			Vietnam & Taiwan	Mixed (81)
			Oil exporting countries	Positive (95)
			G20	Positive (98)
			G7 & G20	Negative (110)
			EU	Mixed (117)
			24 countries (Emerging market)	Negative (100)
			26 countries (Emerging market)	Negative (116)
	Individual (37)	D^d	Australia	Mixed (97)
			Italy	Positive (65)
			Japan	Positive (88)
			UK	Mixed (106)
			US	Positive (59, 99, 102)
				Negative (83, 85, 118)
				Mixed (10, 109, 115)
		D^g	China	Positive (16, 125)
				Negative (9, 96, 105, 121, 123)
				Mixed (112)
			India	Negative (39, 51)
			Malaysia	Negative (32)
				Mixed (74)
			Nigeria	Negative (64, 91)
			Thailand	Negative (58, 69)

I= Covered Issue in the Respective Study, AT= Article Types, Art_N= No. of Articles, CES= Country's Economic Status, C^r = Cross country study, D^d = Developed, D^g =Developing, P_{ID}= Paper ID

*Note: *Mixed here sector-wise classified, where some sectors show positive, and some negative.; PaperId placed in Table S2 in Supplementary Documents*

3.2.4 Statistical approaches

We critically examined the selected 125 papers to identify the statistical research approaches used to investigate the effects of Sars-Cov-2 on the stock market. In Figure 6, six different kinds of research approaches have been classified. The GARCH family models, regression models, event studies, statistical analysis, multiple research approaches, and other literature are used in 18, 41, 18, 12, 13, and 23 articles studied (*see more details of commonly used research approaches in Table S1 in Supplementary Documents*). For the benefit of the capability to analyze time-series data and the structured nature of the historical stock prices of different objects, most researchers used regression, event study, and GARCH family models. Those models are frequently used in the

literature to analyze stock market efficiency, return volatility, spillover outcomes, and investors' attention to the unpredicted changes during Sars-Cov-2. Consequently, it is observed that regression and econometric models have been considered the primary research approaches in this field.

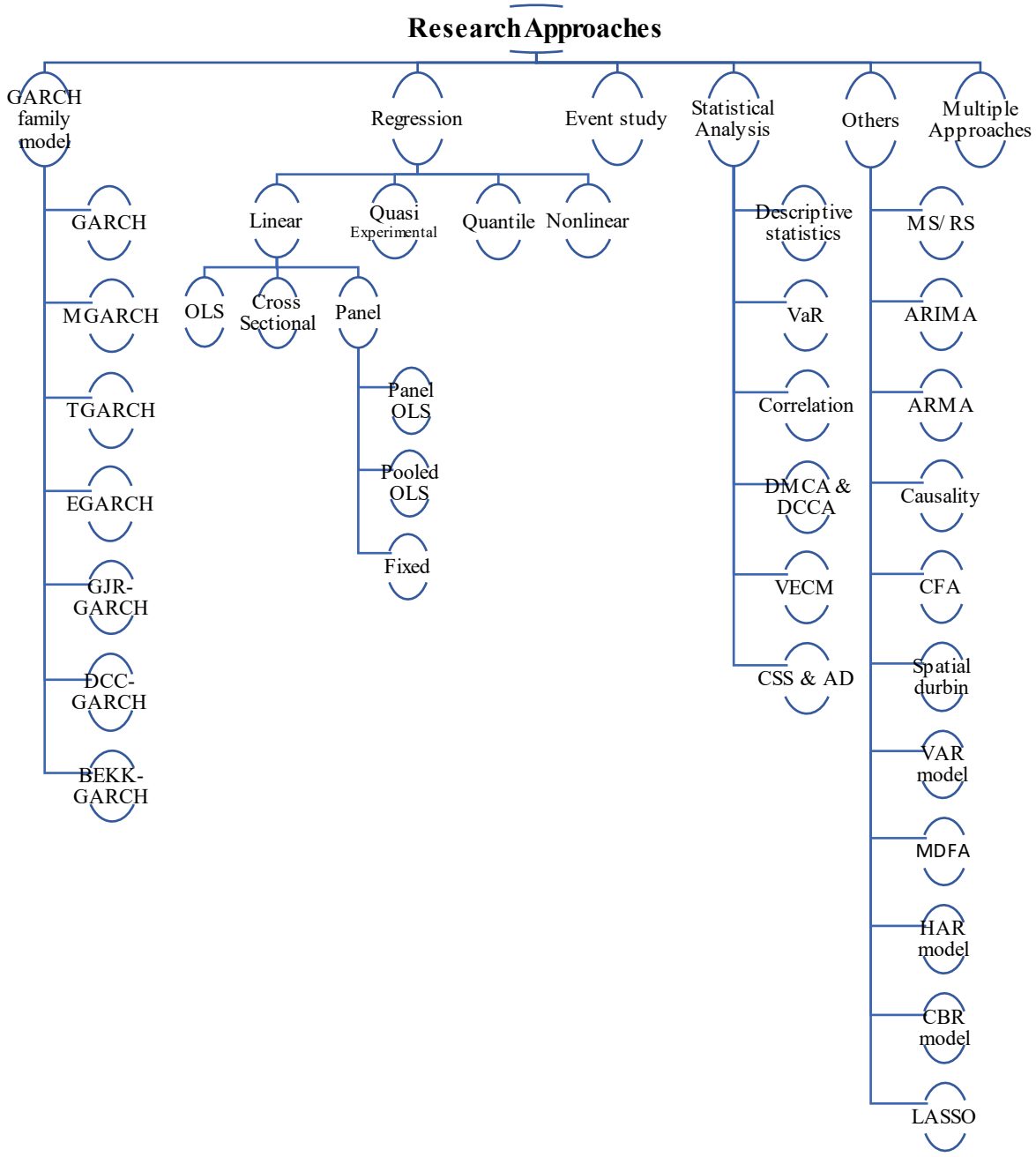

Figure 6. Commonly used research approaches

N.B.: "Multiple research approaches" means more than one research approach is used in a single paper. "LASSO" means Least Absolute Shrinkage and Selection Operator, MS/ RS means Markov switching / Regime switching.

3.2.5 Commonly used databases

We provide a variety of datasets used to collect COVID-19 data, historical stock market data, and other data we have taken from the sample articles *(see the detailed market reaction in Appendix A.2)*. A total of 72 different databases (56 for the market and 16 for COVID-19) were used in the sample papers. We identified eight significantly used databases, such as "Investing.com" and "Datastream," used in 10.05% of studies. Yahoo Finance received 8.22%, Bloomberg received 5.94%, CSMAR received 4.11%, WHO received 5.48%, “Our World in Data” received 4.57%, and the Johns Hopkins Coronavirus Resource Center received 4.11% *(see paper-wise used databases in Appendix A.2)*. Researchers are more inclined to use the database in the case of COVID-19 if it is simple to access. In addition, we classified the used databases according to their accessibility, namely as paid, unpaid, and limited access. An overview that used access got 59.82% of its information from data that was available to the public, 29.22% from data that wasn't available to the public, and only 10.96% from limited sources of extra data.

3.3 Future Research Opportunities

The analysis of the future research agenda provides a clear pathway for future researchers. This section's main contribution is to list all possible future research opportunities (hereafter FRO) mentioned in the sample papers. We identified that more than 52% of articles (66 out of 125) explain FRO during full-text analysis. According to the nature and similarities of the FROs discussed, we classify these studies into two broad categories, "Stock-Covid" and "Stock-Covid with additional concerns," and then eight other categories, as seen in Figure 7. Firstly, many authors recommend a wide range of time covered in the future to highlight the impact of COVID-19 on market returns. Out of 66 papers, 24 mentioned "wider time coverage" for the future research agenda. For example, Just and Echaust (2020) noted that pre-pandemic coverage could be an excellent prospective study. In contrast, Harjoto et al. (2020) posited a comparative periodical survey, i.e., the market's past and present performance comparison. Secondly, a wide range of data coverage (WRDC) is also remarked as a potential FRO in 17 papers. Li et al. (2020) argued that the present situation with other market changes due to COVID-19 quantifies the scenario while predicting European market volatility. On the contrary, Abdeldayem and Al Dulaimi (2020)

referred to a comprehensive representation of respondents, such as investors and specialists, to bring exciting results.

Thirdly, we found that several researchers employed econometric models with proposed changes to quantify the effects of COVID-19 or ensure that the findings were more reliable. For instance, several proposed issues are identified in the sample papers, such as fractional integration or non-linear structures for structural breaks (Cristofaro et al., 2020), several cross-sectional tests, and the instrumental variables approach (Gu, 2020). Besides, some authors also suggest advanced methods, namely a comparison of the "SutteARIMA" method with Neural Networks (Ahmar & del Val, 2020) and 'Artificial Intelligence Algorithms (AI algorithms)' explicitly dynamic programming, genetic programming. Also, combining convolutional neural networks with the LSTM network (Stifanic et al., 2020) emphasized the impact of COVID-19 on other issues on the market.

Fourth, some authors observed that comparative studies between different types of firms, such as small and medium enterprises and publicly traded companies, could yield more meaningful results. They also thought that cross-sectoral studies, not just time series analysis, could help us learn more about this problem. Fifth, WRPC has been suggested in some papers, especially those working on COVID-19 and stock market relation with herding behaviour (Dhall & Singh, 2020), investors' attention (Shear et al., 2021), and sentiment (Lee et al., 2020), respectively. Sixth, governments announced many fiscal and monetary policy changes to keep socio-economic activities alive that can be potential FRO, which we found significant. Seventh, behavioural finance issues, such as customer and investor loyalty, affect enterprises' sensitivity to excessive market shocks like COVID-19 (Albuquerque et al., 2020). Likewise, Alexakis et al. (2021) posited that the market intensity of lockdown measures and determinants (such as social trust and related transaction costs, social security, capital costs, and political stability) needs to be studied in depth in the future. Eighth, wide-ranging macroeconomic indicators such as macroeconomic policy responses and a country's level of development (Thorbecke, 2020). Besides these, some individual vital issues are combined in 'others' in Figure 7.

Future researchers can attempt this COVID-19 and stock market issue with extended time, data, methods, measuring proxies, and multi-sectoral analysis. Also, we firmly believe that broader

issues like behavioural finance issues, government acts or policies, and macroeconomic factors should be emphasized in the future.

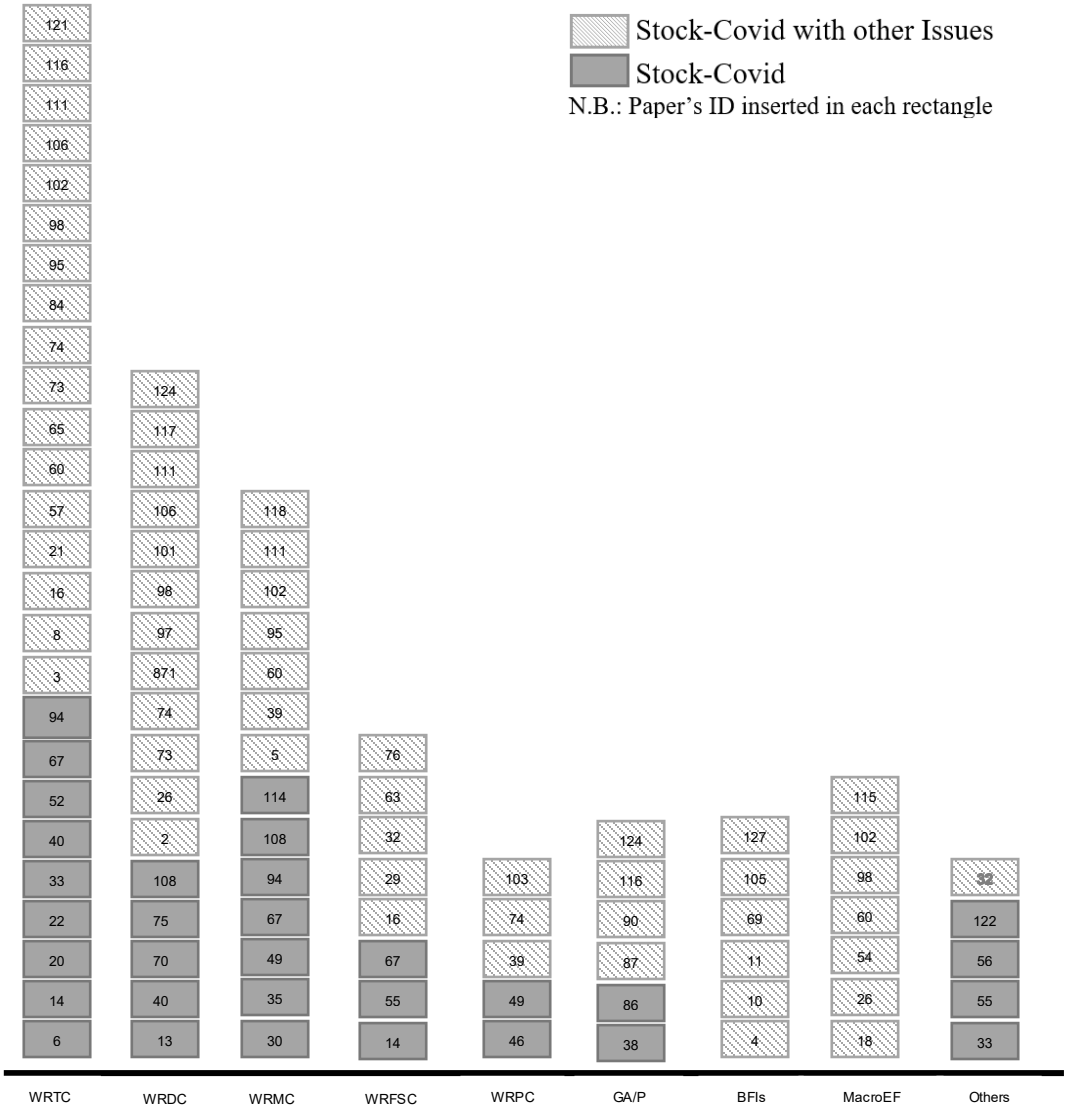

Figure 7. Future research opportunities

N.B.: WRTC-Wide range of time coverage; WRDC-Wide range of data coverage; WRMC-Wide range of methodological coverage; WRFSC-Wide range of firm and sectorial coverage; WRPC-Wide range of proxy coverage; GA/P-Government acts/policies coverage; BFIs-Behavioral Financial Issues; MacroEF-Macroeconomics factors.

Source: Authors compilation based on sample references

4. CONCLUSION

Through bibliometric analysis and literature review, this research examined how the COVID-19 pandemic influenced the stock market literature. In addition, it illustrated how the pandemic directly affected the stock market and the research agenda for future researchers. In bibliometric literature mapping, this study used 22610 journal articles from the Scopus database between 1910 and 2019. We concentrated on 125 papers published in the WOS and Scopus-indexed journals. We used the "Biblioshiny package" for bibliometrics methodology and the PRISMA flow diagram for SLR.

Regarding bibliometric changes caused by COVID-19, we found that China has somehow surpassed the United States in terms of the total number of publications, the number of corresponding authors by country, and the number of countries working together. However, the average article citation (AAC) score of papers published by Chinese collaborators or correspondent authors in stock market-related fields is still lower than that of other leading paper-publishing nations. This study also showed that country-by-country collaboration during COVID-19 is unlikely to include key institutions in collaboration networks. We also found that the age of journals published during COVID-19 was significantly lower than those published before COVID-19.

We classified the databases used for the stock market and COVID-19-related data based on paid, unpaid, and limited excess. We were surprised that about 60% of the papers used publicly available data in their studies. Also, we found that about 90% of the documents used daily data to determine the real effects of COVID-19 on each stock market. Time-series and panel data were used in 46 and 34% of papers, respectively. As a result, regressions, event studies, and GARCH family models are often used as research methods in the literature. Experts thought COVID-19 had hurt markets worldwide in many ways, not just stock market returns. We find it intriguing that the stock market has responded positively and negatively to COVID-19, and that various research has reached opposite results. These studies reached a mixed conclusion because the authors looked at many different sectors or geographical regions.

We notice that many authors have used COVID-19 to discuss a wide range of issues that directly or indirectly affect stock market returns and have made suggestions for future research. After

reading all the full articles, we noticed that about half of the published papers (66 out of 125) discussed the potential future research agenda. As an individual research goal, this study looked at the future research agenda analysis suggested in the sample literature. As indicated by the authors, we have classified some dimensions of future research opportunities. First, there is a wide range of time and data coverage, with most authors suggesting that periodic coverage, such as pre-epidemic comparisons, and higher geographic coverage, especially in cross-country analyses, may lead to better results in the future. Second, based on various methodological approaches, some papers have suggested that advanced econometric modelling techniques such as instrumental variable methods, machine learning with neural networks, and artificial intelligence algorithms may be methodological hotspots in the near future.

Third, a panel-based phenomenological study, instead of cross-sectional or time-series analysis, is a better way to show how the pandemic has affected the stock market significantly. For example, COVID-19 has different effects on small, medium, and large or listed enterprises based on specific characteristics of the firms. Forth, comprehensive coverage of behavioural finance issues such as herding behaviour, investor reaction, and sentiment provides a better market response during pandemic crises, which may provide a better solution for future pandemic crises. Fifth, it might be a good idea to look into how government programs and policies change during pandemics and how the market reacts to these changes. Therefore, in the future, researchers can use sophisticated econometric modelling and big data analysis to study the effects of COVID-19 and how the stock market reacted to it to give investors and policymakers the best advice on how to handle future pandemics.

The dominating portion of the study has focused on COVID-19 and its influence on the stock market, as reported in both WOS and Scopus databases, and we have studied almost every published article. However, we did identify some conventional constraints, and since those studies did not satisfy our inclusion criteria, we excluded them from our analysis. We will keep these issues in mind for future research. Also, the study period was considered between the first declaration of the COVID-19 case and the approval of two vaccines (Pfizer/BioNTech & AstraZeneca/Oxford) for emergency use by WHO up to February 15, 2021. Historically, the stock market's reaction varies with different types of news. For this reason, we presume that the approval of vaccines might have another new degree of impact on the global stock market. Finally, we only

emphasize published papers. However, integrating the proceeding paper, book chapter, editorial material, and meeting abstract may provide exciting conclusions.

Finally, these findings provide helpful insights for researchers searching for stock market-related sources and references, particularly in the bibliographic analysis section. The conceptual plan based on SLR presented here provides a comprehensive profile of these areas of knowledge, including the global stock market response to COVID-19, the application of methodological approaches, the classification of data sources, and future research opportunities and investigations for optimal use of future research.

References

Abdeldayem, M. M., & Al Dulaimi, S. H. (2020) 'Investors' herd behavior related to the pandemic-risk reflected on the GCC stock markets', *Zbornik Radova Ekonomskog Fakultet au Rijeci*, Vol. 38 No.2, pp.563-584 https://doi.org/10.18045/zbefri.2020.2.563

Abdullah, A., Emery, C. R., & Jordan, L. P. (2020) 'Neighbourhood collective efficacy and protective effects on child maltreatment: A systematic literature review', *Health & Social Care in the Community*, Vol. 28 No.6, pp.1863-1883 https://doi.org/10.1111/hsc.13047

Ahmar, A. S., & del Val, E. B. (2020) 'SutteARIMA: Short-term forecasting method, a case: Covid-19 and stock market in Spain', *Science of the Total Environment*, Vol. 729 No., pp.6 https://doi.org/10.1016/j.scitotenv.2020.138883

Alam, M. M., Wei, H., & Wahid, A. N. M. (2020) 'COVID-19 outbreak and sectoral performance of the Australian stock market: An event study analysis', *Australian Economic Papers*, Vol. No., pp. https://doi.org/10.1111/1467-8454.12215

Albuquerque, R., Koskinen, Y., Yang, S., & Zhang, C. D. (2020) 'Resiliency of Environmental and Social Stocks: An Analysis of the Exogenous COVID-19 Market Crash', *Review of Corporate Finance Studies*, Vol. 9 No.3, pp.593-621 https://doi.org/10.1093/rcfs/cfaa011

Aldieri, L., Carlucci, F., Vinci, C. P., & Yigitcanlar, T. (2019) 'Environmental innovation, knowledge spillovers and policy implications: A systematic review of the economic effects literature', *Journal of Cleaner Production*, Vol. 239 No., pp.10 https://doi.org/10.1016/j.jclepro.2019.118051

Alexakis, C., Eleftheriou, K., & Patsoulis, P. (2021) 'COVID-19 containment measures and stock market returns: An international spatial econometrics investigation', *Journal of Behavioral and Experimental Finance*, Vol. 29 No., pp. https://doi.org/10.1016/j.jbef.2020.100428

Ambros, M., Frenkel, M., Huynh, T. L. D., & Kilinc, M. (2020) 'COVID-19 pandemic news and stock market reaction during the onset of the crisis: evidence from high-frequency data', *Applied Economics Letters*, Vol. No., pp. https://doi.org/10.1080/13504851.2020.1851643

Ammirato, S., Felicetti, A. M., Raso, C., Pansera, B. A., & Violi, A. (2020) 'Agritourism and sustainability: What we can learn from a systematic literature review', *Sustainability*, Vol. 12 No.22, pp.9575

Ampatzoglou, A., Ampatzoglou, A., Chatzigeorgiou, A., & Avgeriou, P. (2015) 'The financial aspect of managing technical debt: A systematic literature review', *Information and Software Technology*, Vol. 64 No., pp.52-73 https://doi.org/https://doi.org/10.1016/j.infsof.2015.04.001

Aslam, F., Mohmand, Y. T., Ferreira, P., Memon, B. A., Khan, M., & Khan, M. (2020) 'Network analysis of global stock markets at the beginning of the coronavirus disease (Covid-19) outbreak', *Borsa Istanbul Review*, Vol. 20 No., pp.S49-S61 https://doi.org/10.1016/j.bir.2020.09.003

Baek, S., & Lee, K. Y. (2020) 'The risk transmission of COVID-19 in the US stock market', *Applied Economics*, Vol. No., pp. https://doi.org/10.1080/00036846.2020.1854668

Bai, L., Wei, Y., Wei, G., Li, X., & Zhang, S. (2020) 'Infectious disease pandemic and permanent volatility of international stock markets: A long-term perspective', *Finance Research Letters*, Vol. No., pp. https://doi.org/10.1016/j.frl.2020.101709

Baker, H. K., Kumar, S., & Pattnaik, D. (2020) 'Twenty-five years of Review of Financial Economics: A bibliometric overview', *Review of financial economics*, Vol. 38 No.1, pp.3-23

Bartol, T., & Mackiewicz-Talarczyk, M. (2015) 'Bibliometric Analysis of Publishing Trends in Fiber Crops in Google Scholar, Scopus, and Web of Science', *Journal of Natural Fibers*, Vol. 12 No.6, pp.531-541 https://doi.org/10.1080/15440478.2014.972000

Bhowmik, R., & Wang, S. Y. (2020) 'Stock Market Volatility and Return Analysis: A Systematic Literature Review', *Entropy*, Vol. 22 No.5, pp.18 https://doi.org/10.3390/e22050522

Cao, K. H., Li, Q., Liu, Y., & Woo, C. K. (2020) 'Covid-19's adverse effects on a stock market index', *Applied Economics Letters*, Vol. No., pp. https://doi.org/10.1080/13504851.2020.1803481

Chen, J., & Yang, L. (2021) 'A bibliometric review of volatility spillovers in financial markets: knowledge bases and research fronts', *Emerging Markets Finance and Trade*, Vol. 57 No.5, pp.1358-1379 https://doi.org/https://doi.org/10.1080/1540496X.2019.1695119

Costola, M., Iacopini, M., & Santagiustina, C. R. M. A. (2020) 'Google search volumes and the financial markets during the COVID-19 outbreak', *Finance Research Letters*, Vol. No., pp. https://doi.org/10.1016/j.frl.2020.101884

Cristofaro, L., Gil-Alana, L. A., Chen, Z., & Wanke, P. (2020) 'Modelling stock market data in China: Crisis and Coronavirus', *Finance Research Letters*, Vol. No., pp. https://doi.org/10.1016/j.frl.2020.101865

Delle Foglie, A., & Panetta, I. C. (2020) 'Islamic stock market versus conventional: Are islamic investing a 'Safe Haven' for investors? A systematic literature review', *Pacific-Basin Finance Journal*, Vol. 64 No., pp.29 https://doi.org/10.1016/j.pacfin.2020.101435

Delle Foglie, A. P., I. C. (2020) 'Islamic stock market versus conventional Are islamic investing a 'Safe Haven' for investors? A systematic literature review', *Pacific-Basin Finance Journal*, Vol. 64 No., pp.29 https://doi.org/10.1016/j.pacfin.2020.101435

Dhall, R., & Singh, B. (2020) 'The COVID-19 Pandemic and Herding Behaviour: Evidence from India's Stock Market', *Millennial Asia*, Vol. 11 No.3, pp.366-390 https://doi.org/10.1177/0976399620964635

Fontoura, P. T. G., & Coelho, A. F. M. (2020) 'Social responsibility in supply chain: Bibliometric analysis and literature review', *Global Business and Economics Review*, Vol. 23 No.3, pp.257-279 https://doi.org/10.1504/GBER.2020.110020

Gu, J. (2020) 'Risk assessment on continued public health threats: Evidence from China's stock market', *International Journal of Environmental Research and Public Health*, Vol. 17 No.20, pp.1-29 https://doi.org/10.3390/ijerph17207682

Harjoto, M. A., Rossi, F., Lee, R., & Sergi, B. S. (2020) 'How do equity markets react to COVID-19? Evidence from emerging and developed countries', *Journal of Economics and Business*, Vol. No., pp. https://doi.org/10.1016/j.jeconbus.2020.105966

He, P. L., Sun, Y. L., Zhang, Y., & Li, T. (2020) 'COVID-19's Impact on Stock Prices Across Different Sectors-An Event Study Based on the Chinese Stock Market', *Emerging Markets Finance and Trade*, Vol. 56 No.10, pp.2198-2212 https://doi.org/10.1080/1540496x.2020.1785865

Huo, X., & Qiu, Z. (2020) 'How does China's stock market react to the announcement of the COVID-19 pandemic lockdown?', *Economic and Political Studies*, Vol. 8 No.4, pp.436-461 https://doi.org/10.1080/20954816.2020.1780695

Ikra, S. S., Rahman, M. A., Wanke, P., & Azad, M. A. K. (2021) 'Islamic banking efficiency literature (2000–2020): a bibliometric analysis and research front mapping', *International Journal of Islamic and Middle Eastern Finance and Management*, Vol. 14 No.5, pp.1043-1060 https://doi.org/10.1108/IMEFM-05-2020-0226

Iscaro, V., Castaldi, L., & Buccino, G. (2021) 'Networked business incubators: A systematic literature review', *Global Business and Economics Review*, Vol. 25 No.3-4, pp.331-354 https://doi.org/10.1504/GBER.2021.118708

Jackson, J. L., & Kuriyama, A. (2019) 'How often do systematic reviews exclude articles not published in English?', *Journal of general internal medicine*, Vol. 34 No.8, pp.1388-1389 https://doi.org/doi: 10.1007/s11606-019-04976-x

Just, M., & Echaust, K. (2020) 'Stock market returns, volatility, correlation and liquidity during the COVID-19 crisis: Evidence from the Markov switching approach', *Finance Research Letters*, Vol. 37 No., pp. https://doi.org/10.1016/j.frl.2020.101775

Kaur, H., & Saxena, S. (2020) 'Stock market sensitiveness: Impact of epidemic or pandemic', *European Journal of Molecular and Clinical Medicine*, Vol. 7 No.8, pp.2861-2870 https://www.scopus.com/inward/record.uri?eid=2-s2.0-85098509810&partnerID=40&md5=722b808f908ff714577d13d1775b747a

Lee, K. Y.-M., Jais, M., & Chan, C.-W. (2020) 'Impact of covid-19: Evidence from malaysian stock market', *International Journal of Business and Society*, Vol. 21 No.2, pp.607-628 https://doi.org/https://doi.org/10.33736/ijbs.3274.2020

Li, Y., Liang, C., Ma, F., & Wang, J. Q. (2020) 'The role of the IDEMV in predicting European stock market volatility during the COVID-19 pandemic', *Finance Research Letters*, Vol. 36 No., pp.7 https://doi.org/10.1016/j.frl.2020.101749

Lin, B., & Su, T. (2020) 'Mapping the oil price-stock market nexus researches: A scientometric review', *International Review of Economics & Finance*, Vol. 67 No., pp.133-147 https://doi.org/10.1016/j.iref.2020.01.007

Liu, M., Choo, W. C., & Lee, C. C. (2020) 'The Response of the Stock Market to the Announcement of Global Pandemic', *Emerging Markets Finance and Trade*, Vol. 56 No.15, pp.3562-3577 https://doi.org/10.1080/1540496X.2020.1850441

Mazur, M., Dang, M., & Vega, M. (2020) 'COVID-19 and the march 2020 stock market crash. Evidence from S&P1500', *Finance Research Letters*, Vol. No., pp. https://doi.org/10.1016/j.frl.2020.101690

Mehdi, M. M., & Sarma, T. R. (2022) 'Systematic review on performance and growth drivers of SMEs', *Global Business and Economics Review*, Vol. 27 No.3, pp.324-351 https://doi.org/10.1504/gber.2022.125753

Narayan, P. K., Gong, Q., & aliahmed, H. J. (2021) 'Is there a pattern in how COVID-19 has affected Australia's stock returns?', *Applied Economics Letters*, Vol. No., pp. https://doi.org/10.1080/13504851.2020.1861190

Okorie, D. I., & Lin, B. (2020) 'Stock markets and the COVID-19 fractal contagion effects', *Finance Research Letters*, Vol. No., pp. https://doi.org/10.1016/j.frl.2020.101640

S. R.Baker, N.Bloom, S. J.Davis, K.Kost, M.Sammon, & T.Viratyosin. (2020) 'The Unprecedented Stock Market Reaction to COVID-19', *Review of Asset Pricing Studies*, Vol. 10 No.4, pp.742-758 https://doi.org/10.1093/rapstu/raaa008

Salim, N., Ab Rahman, M. N., & Abd Wahab, D. (2019) 'A systematic literature review of internal capabilities for enhancing eco-innovation performance of manufacturing firms',

Journal of Cleaner Production, Vol. 209 No., pp.1445-1460 https://doi.org/10.1016/j.jclepro.2018.11.105

Salvatore, F. P., Milone, M., Resta, E., Di Dio, C., & Logroscino, G. (2022) 'Economic evaluations of diagnostic process and neuropsychological assessment of dementia: a systematic review', *Global Business and Economics Review*, Vol. 26 No.4, pp.365-402 https://doi.org/10.1504/GBER.2022.123273

Shear, F., Ashraf, B. N., & Sadaqat, M. (2021) 'Are investors' attention and uncertainty aversion the risk factors for stock markets? International evidence from the covid-19 crisis', *Risks*, Vol. 9 No.1, pp.1-15 https://doi.org/10.3390/risks9010002

Smales, L. A. (2021) 'Investor attention and global market returns during the COVID-19 crisis', *International Review of Financial Analysis*, Vol. 73 No., pp.101616

Somanathan, A. R., & Rama, S. K. (2020) 'A Bibliometric Review of Stock Market Prediction: Perspective of Emerging Markets', *Applied Computer Systems*, Vol. 25 No.2, pp.77-86 https://doi.org/10.2478/acss-2020-0010

Spanos, G., & Angelis, L. (2016) 'The impact of information security events to the stock market: A systematic literature review', *Computers & Security*, Vol. 58 No., pp.216-229

Stifanic, D., Musulin, J., Miocevic, A., Segota, S. B., Subic, R., & Car, Z. (2020) 'Impact of COVID-19 on Forecasting Stock Prices: An Integration of Stationary Wavelet Transform and Bidirectional Long Short-Term Memory', *Complexity*, Vol. 2020 No., pp.12 https://doi.org/10.1155/2020/1846926

Thorbecke, W. (2020) 'The Impact of the COVID-19 Pandemic on the U.S. Economy: Evidence from the Stock Market', *Journal of Risk and Financial Management*, Vol. 13 No.10, pp.32 https://doi.org/10.3390/jrfm13100233

Waheed, R., Sarwar, S., Sarwar, S., & Khan, M. K. (2020) 'The impact of COVID-19 on Karachi stock exchange: Quantile-on-quantile approach using secondary and predicted data', *Journal of Public Affairs*, Vol. 20 No.4, pp. https://doi.org/10.1002/pa.2290

Wang, Q., & Ngai, E. W. (2020) 'Event study methodology in business research: a bibliometric analysis', *Industrial Management & Data Systems*, Vol. No., pp. https://doi.org/. https://doi.org/10.1108/IMDS-12-2019-0671

Xu, L. (2020) 'Stock Return and the COVID-19 pandemic: Evidence from Canada and the US', *Finance Research Letters*, Vol. No., pp. https://doi.org/10.1016/j.frl.2020.101872

Appendix

Table A.1. A historical overview of world epidemics and stock market

Period	Name of Infectious Diseases	No. of People Killed	Market Name	Market Changes
1918-1920	Spanish Flu	40 million	U.S market	- 7%
1957-1958	Asian Flu	1-2 million	Dow Jones Industrials Average	- 19.4%
2003	SARS	774	The S&P 500	- 12.8%
2009-2010	Swine flu	18449	The S&P 500	- 18.72%
2013-2014	Ebola	11325	The S&P 500	- 5.9%
2015-2016	Zika	76	The S&P 500	- 12.03%
2020*	COVID-19	1.67 million	The S&P 500	- 31%

*Note: *report on 18 December, 2020* *Source: Dow Jones Market Data*

Table A.2. Frequently used databases in COVID-19 & stock market Literature

Database	Sources	P/ U	Articles ID No.
STOCK MARKET RELATED			
AQR Capital Management	https://www.aqr.com/Insights/Datasets	P	97
Baidu Index	http://index.baidu.com/v2/index.html#/	U	123, 126
Bank of England	https://www.bankofengland.co.uk/report/2020/monetary-policy-report-financial-stability-report-may-2020	U	12
Bank of International Settlements	https://www.bis.org/statistics/index.htm	U	87
Bayan Investment Company	http://www.bayaninvest.com/?lang=en	U	2
Bloomberg	https://www.bloomberg.com/professional/product/reference-data/	P	4, 9, 15, 23, 24, 34, 52, 53, 60, 62, 98, 101, 106
Bombay Stock Exchange	https://www.bseindia.com/index.html	U	7, 31, 93
Brazilian Stock Exchange	http://www.b3.com.br/pt_br/	U	93, 95, 114
Budapest Stock Exchange	https://bse.hu/	U	22
Caldara and Iacoviello GPR index	https://www.matteoiacoviello.com/gpr.htm#data	U	102

Cboe Global Markets, Inc. (Cboe)	https://www.cboe.com/tradable_products/vix/	U	12, 65, 120
Central Bank of Nigeria	https://www.cbn.gov.ng	U	91
CMIE	https://www.cmie.com/kommon/bin/sr.php?kall=wprdesc&page=prowessiq_desc	L	39
COMPUSTAT Capital IQ North America Daily database	https://www.spglobal.com/marketintelligence/en/?product=compustat-research-insight	P	85
CRSP	http://www.crsp.org/	P	23
CSMAR	https://cn.gtadata.com/	P	49, 55, 61, 77, 78, 112, 121, 125, 126
Datastream	https://www.refinitiv.com/en/product-logins	P	8, 10, 13, 16, 21, 25, 29, 36, 47, 63, 66, 71, 81, 86, 88, 89, 90, 94, 102, 103, 115, 124
Decision Maker Panel	www.decisionmakerpanel.com	U	12
Economic Policy Uncertainty	http://www.policyuncertainty.com/	U	12, 25, 75, 102, 120
EURO STOXX 50	https://www.stoxx.com/index-details?symbol=SX5E	U	48
Federal Reserve Bank of Philadelphia	https://www.philadelphiafed.org/surveys-and-data/real-time-data-research	U	12
FRED Economic Data ST. Louis FED	https://fred.stlouisfed.org/	U	3, 23, 24, 99, 100, 115
Ghana Stock Exchange	https://gse.com.gh/	U	113
Google Trends	https://trends.google.com/trends/?geo=US	U	103, 109, 110
iFinD	https://www.51ifind.com/index.php?c=index&a=iFinDPC	P	105
Indonesia Stock Market	https://www.idx.co.id/en-us	U	84
Investing.com	https://uk.investing.com/about-us/	L	11, 17, 18, 19, 32, 38, 43, 56, 68, 74, 76, 77, 78, 79, 87, 91, 92, 95, 100, 108, 113, 116
Karachi Stock Exchange	https://www.psx.com.pk/	U	119
Kenneth R. French - Data Library	http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html	U	23, 24, 85

Macrotrends	https://www.macrotrends.net/charts/energy	U	87
MENAFN	https://menafn.com/index.aspx	U	2
MSCI	https://www.msci.com/end-of-day-data-country	U	54, 70
NASDAQ	https://www.nasdaq.com/	U	107
NetEase Finance	https://money.163.com/#f=endnav	P	126
Nigeria Stock Exchange	http://www.nse.com.ng/	U	64
Nikkei 225 Index	https://indexes.nikkei.co.jp/en/nkave/	U	48
OECD	http://www.oecd.org/economic-outlook/	U	59
Oxford-Man Institute's Realized Library	https://realized.oxford-man.ox.ac.uk/data	U	82, 83
Prague Stock Exchange	https://www.pse.cz/en	U	22
RavenPack	https://www.ravenpack.com/	P	4
RESSET	http://www.resset.cn/endatabases	P	49, 72, 78
S&P Global	https://www.spglobal.com/en/	P	26, 48, 65, 68, 73, 95, 109
Sina Finance	http://vip.stock.finance.sina.com.cn/mkt/	P	125
Singapore Exchange Limited	https://www.sgx.com/	U	58
Stock Exchange of Thailand	https://www.set.or.th/set/mainpage.do?language=en&country=US	U	58
STR	https://str.com/data-solutions/census-database	U	14
Switzerland Stock Exchange	https://www.six-group.com/en/products-services/the-swiss-stock-exchange.html	U	93
Sydney C Ludvigson	https://www.sydneyludvigson.com/macro-and-financial-uncertainty-indexes	U	12
Taiwan Stock Exchange	https://www.twse.com.tw/en/	U	93
TCMB (Türkiye Cumhuriyet Merkez Bankasi)	https://www.tcmb.gov.tr/wps/wcm/connect/en/tcmb+en	U	43
TEJ	https://www.crunchbase.com/organization/taiwan-economic-journal-tej	U	81
Trading Economics	https://tradingeconomics.com/	U	41, 42
U.S. Energy Information Administration (EIA)	https://www.eia.gov/	U	90, 95
Warsaw Stock Exchange	https://www.gpw.pl/	U	22
Wind	https://www.wind.com.cn	P	35, 72, 96
Yahoo Finance	https://finance.yahoo.com/	U	5, 11, 20, 30, 31, 41, 57, 63, 67,

			75, 79, 87, 95, 104, 111, 116, 117, 122
COVID-19 RELATED			
BBC	https://www.bbc.com/news/world-us-canada-52701420	U	59
Centers for Disease Control and Prevention (CDC)	https://www.cdc.gov/	U	102
COVID-19 Dashboard the Govt. of Vietnam	https://ncov.vncdc.gov.vn/pages/viet-nam-1.html	U	15
DGA of Thailand	https://data.go.th/dataset/covid-19-daily	U	69
European Center for Disease Control and Prevention	https://www.ecdc.europa.eu/en	U	104, 118
National Bureau of Statistics of China	http://www.stats.gov.cn/english/	U	49
Nigeria Center for Disease Control	https://ncdc.gov.ng/	U	64, 91
Our World in Data	https://ourworldindata.org/history-of-our-world-in-data	U	4, 6, 8, 47, 69, 79, 87, 91, 94, 103
Oxford Covid-19 Government Response Tracker	https://github.com/OxCGRT/covid-policy-tracker	U	18, 62
Pharmaceutical technology	https://www.pharmaceutical-technology.com/	U	45
The Johns Hopkins Coronavirus Resource Center	https://coronavirus.jhu.edu/map.html	U	8, 17, 18, 19, 23, 24, 27, 41, 111
Thomson Reuters RavenPack	https://coronavirus.ravenpack.com/	U	28
Worldometers	https://www.worldometers.info/	U	9, 32, 45, 62, 76
World Bank	https://wits.worldbank.org/	L	11
World Health Organization	https://covid19.who.int/	U	22, 38, 54, 64, 65, 74, 83, 90, 91, 94, 107, 119

*Note: *U here publicly available no required payment; *P here not publicly available for this reason required payment; *L here a limited excess, sometimes premium or advance access required payment.*

Source: Authors' Compilation