

“Bibliometric analysis of stock market performance throughout the COVID-19 outbreak”

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BIBLIOMETRIC ANALYSIS OF STOCK MARKET PERFORMANCE THROUGHOUT THE COVID-19 OUTBREAK

Abstract

The major event of the emergence of the infectious disease COVID-19 has changed the perspective and behavior of investors in the stock market. This study aims to analyze the determinants of the research roadmap cluster in the field of capital market performance. Analysis was conducted on manuscripts published in Scopus-indexed publications from 2020 to the end of 2021. Using the search engine software Publish or Perish (PoP), 400 manuscripts were obtained. Furthermore, manuscripts with high credibility were selected through double-blind review and journal categories. The results of the extraction of 240 article titles and their abstracts using VOSviewer revealed that the determinants of the research roadmap in the stock market during the COVID-19 outbreak were divided into four clusters, namely: 1) an increase in cryptocurrencies such as bitcoin due to the spillover of oil and gold prices; 2) international stock market response and behavior; 3) major stock market performance results such as stock returns and equity; and 4) changes in stock market dynamics in the form of volatility and investor attention.

Keywords

COVID-19 outbreak, stock market performance, research roadmap cluster, Publish or Perish, VOSviewer

JEL Classification

G01, G14, G15

INTRODUCTION

The COVID-19 pandemic was a major event that swept across the world throughout 2020 until this study was reported. Unlike the SARS or Ebola outbreaks, which only hit locally in certain countries, the COVID-19 outbreak disrupted all aspects of human life in almost all countries in the world. Various efforts have been made by many parties to return conditions to normal as before. This great event and all the efforts that have been made are documented by researchers in almost all countries. In 2020, for example, the Scopus data base recorded 3,511 manuscripts identified in various publications, such as articles, conference papers, editorials, letters, reviews, and short surveys (Hamidah et al., 2020). The fields of health and economics are the most documented (Hamidah et al., 2020).

The impact of COVID-19, which was initially felt immediately and is a health emergency, quickly led to an economic crisis. The economic crisis, in the end, has an impact on investors' negative perception of stock investment. They are pessimistic that their investments will produce optimal stock returns. The academic community's efforts to document the economic crisis and investor perceptions appear in the academic landscape regarding stock market performance research during the COVID-19 outbreak. This effort will be more useful if the academic landscape becomes a guide in the form of a clustered roadmap.

This study is based on the efforts made by the academic community in researching the performance of the capital market during the COVID-19 outbreak. The publication of hundreds of scientific manuscripts discussing market reactions due to the COVID-19 outbreak prompted this study to identify the determinants of the stock market research roadmap during the COVID-19 pandemic. This study is important to strengthen the research roadmap that is useful for future research. Future researchers will find it easier to develop and build research novelties thanks to the clustered research roadmap.

1. LITERATURE REVIEW

Fama et al. (1969) established the event study approach, which is a valuable strategy for examining the consequences of unexpected occurrences (Fama et al., 1969). It is a strong statistical tool that was created to assist researchers in exploring the financial impacts of company changes in finance, accounting, and economics. This tool may be used by researchers to assess whether «abnormal» stock returns occur as a result of the announcement of specific events, choices, or actions. Event study approaches are gaining traction in academia and have now spread to nearly all business disciplines, including management, marketing, operations management, and management information systems (MIS) (Wang & Ngai, 2020).

The event study approach was developed to explore the impact of unexpected occurrences on stock prices. A typical event study entails estimating a market model for each business in the sample and then determining the corresponding anomalous returns (Wang & Ngai, 2020). According to the efficient-market hypothesis, these extraordinary returns might represent the stock market's reaction to the advent of the expected event.

The event study approach has a wide range of applications in business. Initially introduced in finance and accounting research, the event study technique was intended to explore market responses to specific occurrences. Previous studies have revealed that major events trigger investor sentiment, resulting in stock market reactions represented by stock price volatility (stock returns or abnormal returns). Several previous studies have identified major events that cause market reactions, such as environmental damage (Alsaifi et al., 2020; Guo et al., 2020), climate change (Gallego-Álvarez et al., 2014), disasters (Kowalewski & Śpiewanowski, 2020), news coverage (Li, 2018), political events

(Shanaev & Ghimire, 2019), and pandemic disease (Al-Awadhi et al., 2020a; Chaudhary et al., 2020; Chen et al., 2007; Ichev & Marinč, 2018).

Bibliometrics is a valid method for evaluating quantitative and qualitative changes in research activity throughout time (Xie et al., 2020). It makes advantage of literary databases, as well as literature metrology features. It has become a prominent means of offering insight into specialized topics of inquiry. A highly referenced manuscript is often evaluated by a large number of peers and experts. Similarly, other studies have assessed the influence of papers in their respective fields of study. As a result, bibliometric research have advanced in a variety of scientific domains. It is useful to find the most-cited papers that have made significant contributions to the scientific area.

This study aims to analyze the determinants of the research roadmap cluster in the field of capital market performance.

2. METHODOLOGY

Bibliometrics is a method used to map themes or areas of a research study by calculating the production, distribution, and use of recorded information. Several empirical methods commonly used by bibliometrics are co-citation analysis and bibliographic coupling. The first mentioned method is carried out by analyzing the number of citations of a scientific article document for a certain period of time after being published by a journal. The last mentioned method is the visualization of the network of relationships between authors, publishers, journals, and so on.

The current study analyzes bibliographic data obtained from the Scopus database, where Scopus is the world's largest ranking of journals, book series,

conferences, and proceedings based on document citations. Scopus also provides a database of abstracts and citations from the most peer-reviewed research literature in the fields of business, management, and accounting.

This research started an online search for suitable keywords on February 15, 2022, using Publish or Perish (PoP) software. To determine the source of the article, journals indexed by the Scopus database were selected and the keywords «stock market performance» and «COVID-19» were entered. The results obtained are 400 manuscripts for the publication years 2020–2021. Furthermore, this research refines the search results by filtering papers that meet the criteria. First, articles that fall into the category of book series, conferences, and proceedings were excluded from the research sample. Second, articles containing the term «market» but not referring to «shares» or «capital» were excluded from the study sample. The results obtained 240 articles suitable for analysis. The search results were further refined with Mendeley references to accommodate article characteristics such as title, author, and abstract.

VOSviewer is used to evaluate 240 articles that have been saved in *.ris file format. The titles and abstracts of the articles were extracted using the full counting method so that they become terms that are interconnected with one another. The results of the evaluation of interconnected terms will be visualized in the form of networks, overlays, and density.

Table 1. Refinement of search results

Category	Number of documents
Initial search results	400
Book series, conferences, and proceedings	(86)
Not-relevant terms to the stock market	(74)
Total	240

3. RESULTS AND DISCUSSION

Figure 1 shows the number of stock market-related articles, which grows every quarter throughout the COVID-19 epidemic. The number of publications in the first quarter of 2020 was only 8 articles then reached 56 in the last quarter of 2020, seven times more than the number of articles in the first quarter. The end of the 2021 quarter reached 240, four times more than the number of articles in 2020. The rapid increase over the last two years demonstrates that the important COVID-19 event is at the core of research that has attracted scholars' interest.

This study selected a sample of 240 articles by 725 authors. Figure 2 presents the authors who contributed to more than one article. Salisu A. A., the most prolific writer, contributed eight articles in two years during the COVID-19 pandemic. All of his articles are themed around investment behavior during the COVID-19 pandemic, such as the relationship between commodity price returns and the global fear index (Salisu, Akanni, et al., 2020), negative oil returns and stocks during the pandemic (Salisu, Ebu, et al., 2020). Several

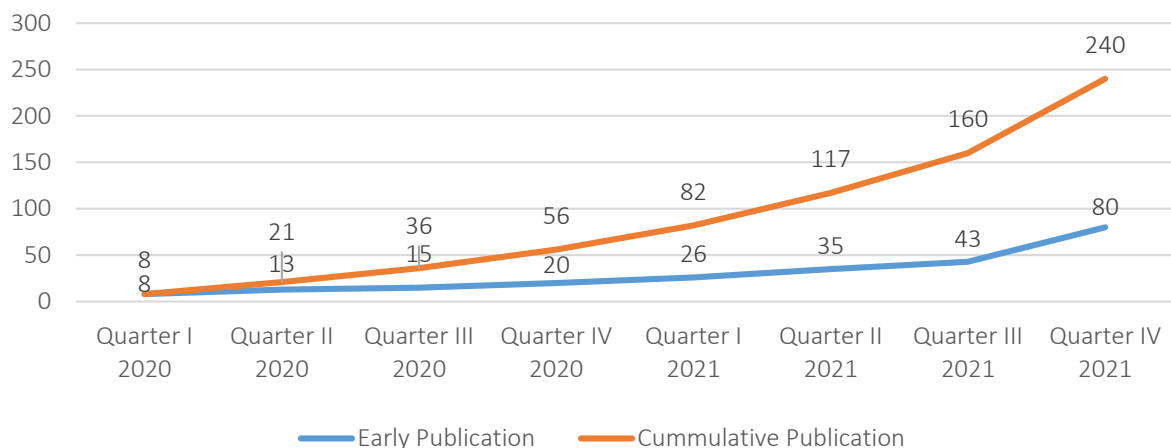


Figure 1. The number of articles on the topic of “The stock market throughout the COVID-19 pandemic” published in Scopus indexed journals from 2020 to 2021

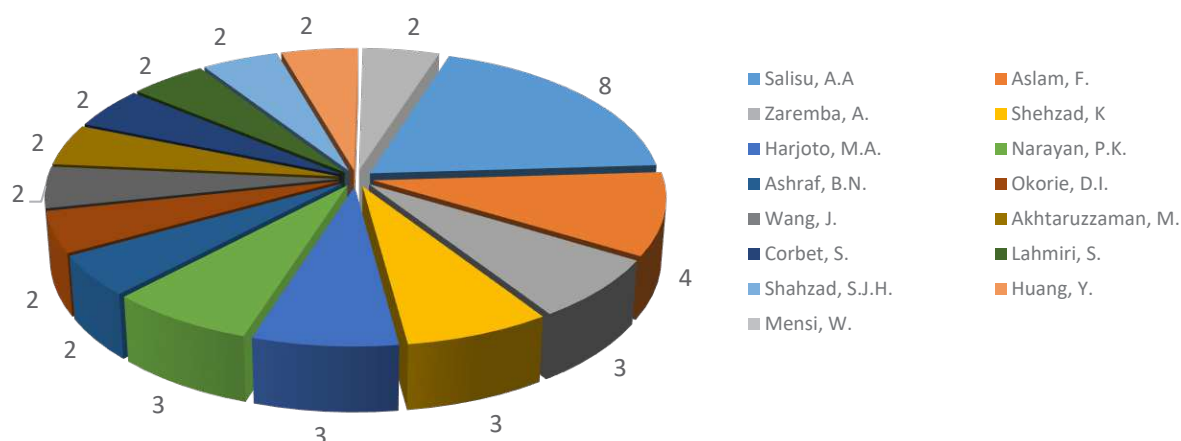


Figure 2. Pie diagram of the top 15 most productive authors on the topic of “The stock market throughout the COVID-19 pandemic” published in Scopus indexed journals from 2020 to 2021

conclusions from his research stated that defensive stocks provide a good hedge for the uncertainty caused by the pandemic (Salisu, Raheem, et al., 2020), the potential for the gold market to become a safe haven during a pandemic (Salisu et al., 2021), the emerging market stock markets are more vulnerable to the uncertainty of pandemics and epidemics than developed country stock markets (Salisu, Sikiru, et al., 2020).

This study reviews 240 articles identified as cited 5619 times according to the number of citations from the Scopus database collection. Table 2 shows the 13 highest-cited academic articles, each cited more than 100 times. The article with the title «COVID-19 pandemic, oil prices, stock market, geopolitical risk, and policy uncertainty nexus in the US economy: Fresh evidence from the wavelet-based approach» (Sharif et al., 2020) garnered the first highest citation of 327 times. The article written by Sharif explains the condition of stock market oil prices, geopolitical risks, and US economic policies due to the spread of COVID-19.

The second most cited article (309 times) was «Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns: Impact of the COVID-19 virus on stock market returns» written by Al-Awadhi et al. (2020). The results of his investigations into the Chinese capital market concluded that the announcement of deaths caused by COVID-19 had a negative effect on stock returns (Al-Awadhi et al., 2020b).

The article courtesy of Corbet et al. (2020), which was cited 212 times, documented the investigations carried out into the Chinese financial market. The results show that the enormous financial stress resulted in the major Chinese stock markets and bitcoin having a strong volatility relationship (Corbet, Hou, et al., 2020). These results support the validity of developing new financial products in mainstream portfolio design (Corbet, Hou, et al., 2020).

The fourth and fifth most cited articles were written by Baker et al. (2020) with 194 citations and Phan et al. (2020) with 184 citations. The two authors reveal the same topic, namely the stock market reaction and the focus being studied. The two articles examine the impact of government policies related to restrictions on commercial activities and voluntary social distancing caused by the spread of COVID-19, triggering stock market reactions (Baker et al., 2020; Phan & Narayan, 2020).

This study reviews the academic journals identified as the most productive in publishing articles related to the stock market and COVID-19. Table 3 presents information on the top 8 academic journals discussing the stock market during the COVID-19 pandemic. Finance Research Letters is the first and most productive journal (46 articles), followed by Investment Management and Financial Innovations (IMFI) as the second most productive top journal. IMFI has 20 articles published between 2020 and 2021. Reviews of interna-

Table 2. Academic articles with the most citations (> 100 times)

Rating	Title (Authors, Year)	Cites	Journal
1	"COVID-19 pandemic, oil prices, stock market, geopolitical risk and policy uncertainty nexus in the US economy: Fresh evidence from the wavelet-based approach" (Sharif et al., 2020)	327	"International Review of Financial Analysis"
2	"Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns" (Al-Awadhi et al., 2020a)	309	"Journal of Behavioral and Experimental Finance"
3	"The contagion effects of the COVID-19 pandemic: Evidence from gold and cryptocurrencies" (Corbet et al., 2020)	212	"Finance Research Letters"
4	"The unprecedented stock market reaction to COVID-19" (Baker et al., 2020)	194	"Review of Asset Pricing Studies"
5	"Country Responses and the Reaction of the Stock Market to COVID-19 – a Preliminary Exposition" (Phan & Narayan, 2020)	184	"Emerging Markets Finance and Trade"
6	"Financial contagion during COVID-19 crisis" (Akhtaruzzaman et al., 2021)	162	"Finance Research Letters"
7	"Infected Markets: Novel Coronavirus, Government Interventions, and Stock Return Volatility around the Globe" (Zaremba et al., 2020)	154	"Finance Research Letters"
8	"The COVID-19 outbreak and affected countries stock markets response" (H. Liu et al., 2020)	151	"International Journal of Environmental Research and Public Health"
9	"Feverish stock price reactions to COVID-19" (Ramelli & Wagner, 2020)	143	"Review of Corporate Finance Studies"
10	"COVID-19's Impact on Stock Prices Across Different Sectors – An Event Study Based on the Chinese Stock Market" (He et al., 2020)	132	"Emerging Markets Finance and Trade"
11	"Economic impact of government interventions during the COVID-19 pandemic: International evidence from financial markets" (Ashraf, 2020)	129	"Journal of Behavioral and Experimental Finance"
12	"The impact of COVID-19 on emerging stock markets" (Topcu & Gulal, 2020)	123	"Finance Research Letters"
13	"COVID-19 and the march 2020 stock market crash. Evidence from S&" (Mazur et al., 2021)	116	"Finance Research Letters"

tionally reputed journals show that researchers in the academic community respond quickly to major events such as COVID-19.

Table 3. The most constructive scientific journals related to this study (2020–2021)

Rating	Journal	Total Article	Cites
1	"Finance Research Letters"	46	1675
2	"Investment Management and Financial Innovations"	20	520
3	"International Review of Financial Analysis"	12	518
4	"Research in International Business and Finance"	9	83
5	"Journal of Behavioral and Experimental Finance"	8	558
6	"Applied Economics Letters"	7	75
7	"Emerging Market Finance and Trade"	5	448
8	"Financial Innovation"	5	41

34 countries or regions contributed 240 articles, as well as research objects. Table 4 presents the eight most productive countries, publishing more than 5 articles on the stock market during the COVID-19 outbreak. China is the country that contributed the most with 20 research articles. Based on the

review of the 20 articles, the characteristics that affect stock market outcomes (return/abnormal returns) in China during the COVID-19 outbreak were identified, such as information content (Dias et al., 2020; Huo & Qiu, 2020; Sun et al., 2021), investor sentiment (Liew, 2020; Sun et al., 2021), stock portfolio (Broadstock et al., 2021; Sun et al., 2021), risk mitigation (Corbet, Hou, et al., 2020; Z. Liu et al., 2021), and asymmetric return spillovers (Chien et al., 2021; Mensi et al., 2021).

Table 4. The most productive countries published articles on this study

Rating	Country/Region	Total Article	Cites
1	China	20	1254
2	Europe	18	1120
3	United State	15	967
4	Asia	13	876
5	Spain	10	569
6	India	7	311
7	Africa	6	301
8	Italy	6	293

This study uses the VOSviewer application to extract 240 article titles and their abstracts. As a result, 4,572 terms were obtained, 3 of which are terms that occur the most, namely COVID-19 (oc-

currences = 831; relevance = 1.39), pandemic (occurrences = 354; relevance = 0.90), and stock market (occurrences = 342; relevance = 0.70). These results indicate that the title of this paper is very relevant based on the extract of 240 articles. The analysis of the results of the term extract by default must meet the threshold of 152 with a minimum occurrence rate of 10. The results depend on the most relevant terms desired. By default, 60% of the most relevant terms will be selected, so that 91 (152 * 60%) of the most relevant terms will appear. The VOSviewer provides visualization of the results of the overall extract, referred to as the network visualization, the overlay visualization, and the density visualization, as shown in Figures 3 to 5.

Figure 3 shows the clusters in each evaluated topic area. Items that are included in one cluster are connected to each other. Each cluster is marked by a colored circle. Sequentially, there are 5 clusters from 1 to 5. The first cluster (the red circle) has the most items (30 items). There are several items that have a very strong relationship, such as gold, spillover, oil, cryptocurrency, bitcoin, contagion effect, Islamic stock and the global financial crisis. These items lead to topics of discussion related to the global financial crisis during the COVID-19 pandemic, namely the increasing use of cryptocurrencies such as bitcoin as a result of the spill-

over of gold and oil prices. There is also the term «contagion effect» from the global financial crisis, namely the increase in Islamic stocks as an alternative to conventional stocks.

The second cluster (green circle) has 25 items where there are the most total links, namely responses. The items in this cluster mention many countries in the world that are involved in the research object, such as the Chinese stock market, Europe (or European stock market), the United States or USA, France, Japan, Germany, Italy, and the international stock market. Other items that are interconnected with each other are the coronavirus, economic crisis, behavior, expectations, and growth. This cluster hints at the topics of articles discussing the response and behavior of the international capital market to the economic crisis caused by the Corona virus.

Cluster 3 (16 items) and Cluster 4 (15 items) have nearly cognate items. The items with the most total links are performance (546 links in cluster 3) and stock returns (861 links in cluster 4). Items in clusters 3 and 4 indicate research topics that address measures of capital market performance. Cluster 3 reveals the stock market performance through items such as abnormal returns (227), equity (203), and equity market (268). Meanwhile,

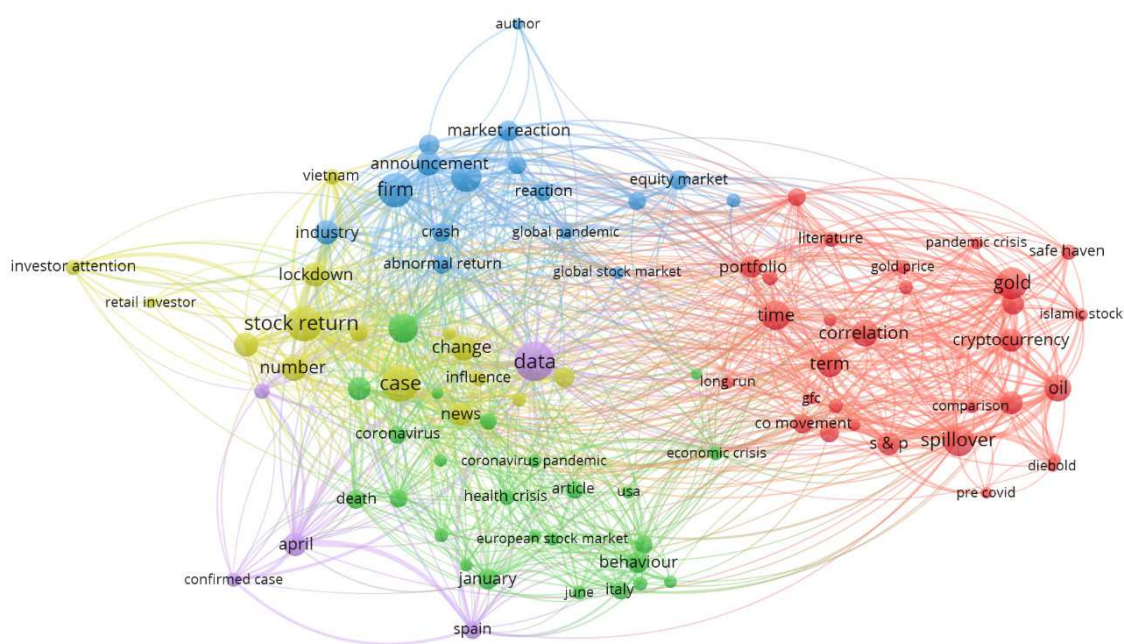


Figure 3. Network visualization on the Scopus database of “The stock market throughout the COVID-19 pandemic”

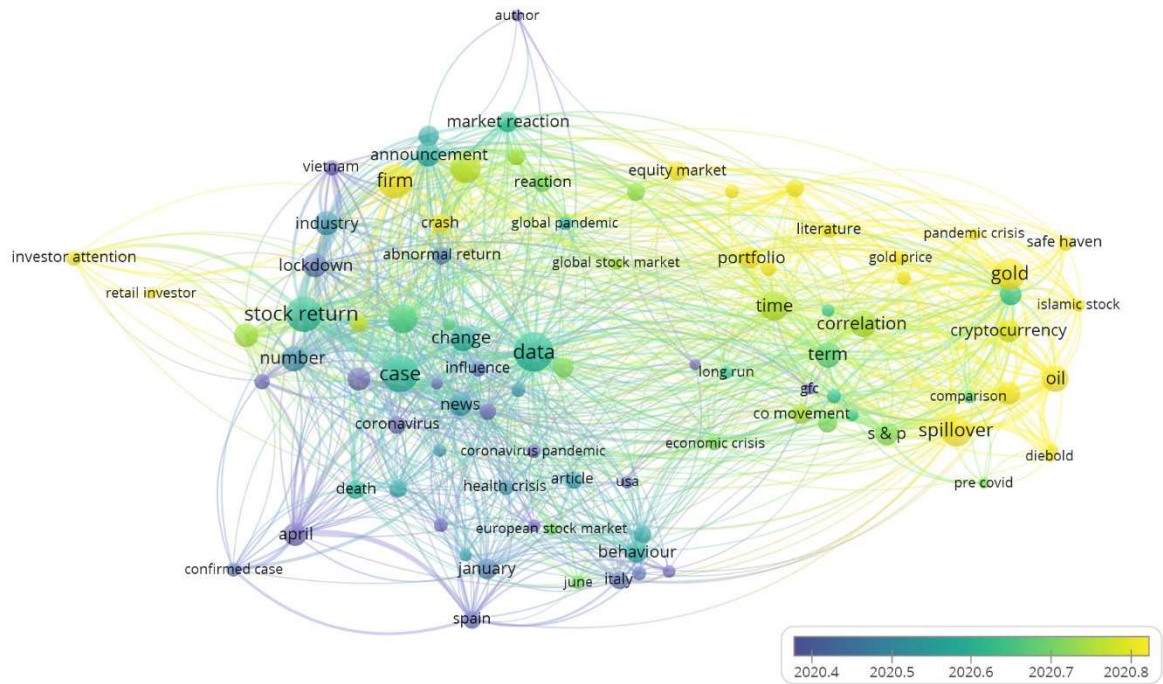


Figure 4. Overlay visualization on the Scopus database of “The stock market throughout the COVID-19 pandemic”

terms that are appropriate to the topic being discussed include items such as «reaction» (248) or «market reaction» (372), «performance» (546), and «negative impact» (288). Cluster 4 has items related to the dynamics of changes in the stock market, namely, change, volatility, and investor attention.

While the last cluster has items that do not meet the topic being reviewed.

Figure 4 shows the research topic items discussed from 2020 to 2021. The blue circles represent capital market research at the start of the COVID-19

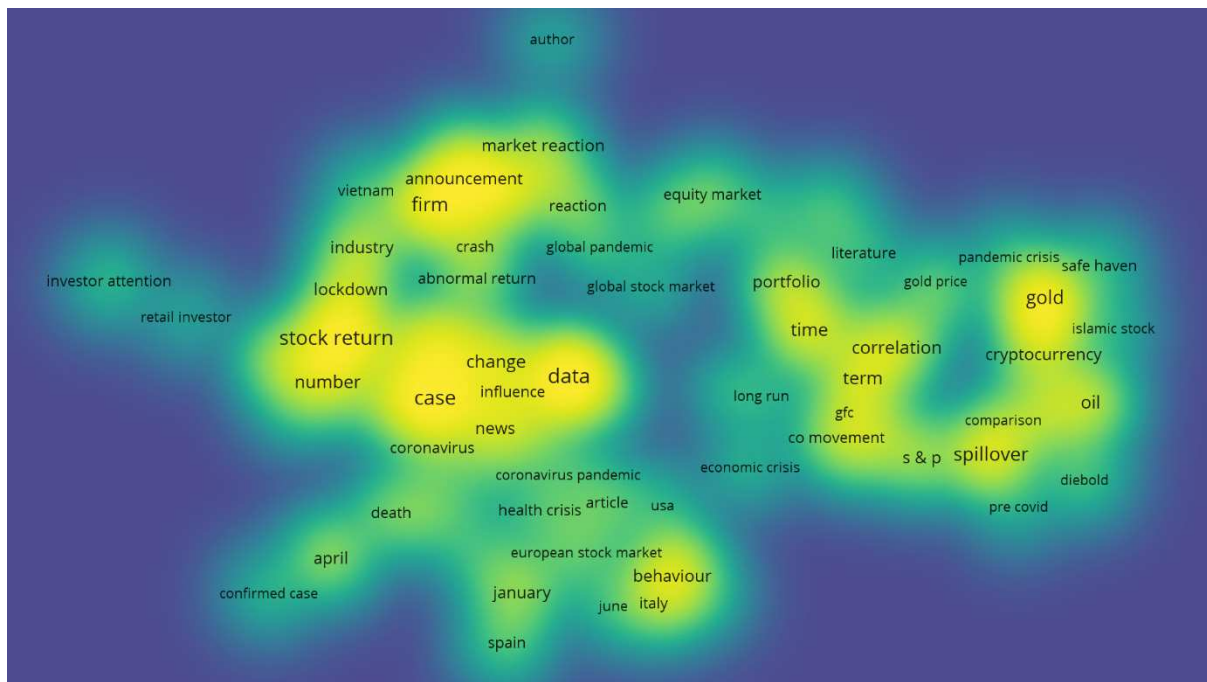


Figure 5. Density visualization on the Scopus database of “The stock market throughout the COVID-19 pandemic”

pandemic. While the yellow circle represents the latest research at this time. The study reviewed 240 articles, evenly distributed between 2020 and 2021. However, the number of articles published was not the same in each quarter. The end of 2020 and the beginning of 2021 saw the highest density of publications during COVID-19.

Figure 5 shows the density of publications. The brightest color indicates the number of published articles related to the theme presented by the item that appears. The items in the bright colored area are extracted from 240 titles and their abstract keywords.

CONCLUSION

This study aims to analyze the determinants of the research roadmap cluster in the field of stock market performance. A total of 400 manuscripts in the field of stock market performance published in 2020 – the end of 2021 and indexed based on the Scopus database have been collected. The criteria for the manuscripts reviewed are limited to manuscripts in the form of scientific articles published by reputable international journals. The reason is that the double-blind review process that is applied makes scientific articles have high reliability and validity. After determining several criteria that did not meet the requirements, such as book chapters, seminar proceedings, conferences, and discrepancies with the chosen theme, 240 articles were ready for review.

This study reviews 240 scientific articles and groups them based on characteristics such as the number of the most productive authors (achieved by Salisu, AA.) and the highest number of citations (achieved by Sharif A with 327 citations in the International Review of Financial Analysis), the journal that publishes the most articles related to the topic. Topic-specific research (achieved by China).

The results of the extraction of 240 article titles and their abstracts using VOSviewer form a research roadmap into four clusters. The first cluster is the increase in cryptocurrencies such as bitcoin, due to the spillover effect of oil and gold prices due to the global financial crisis due to the COVID-19 pandemic. The second cluster is the response and behavior of the international stock market, especially in developed countries facing the economic crisis caused by the COVID-19 pandemic. The third cluster is the main stock market performance outcomes, such as stock returns and equity. The last cluster is the dynamic changes in the stock market in the form of volatility and investor attention.

AUTHOR CONTRIBUTIONS

Conceptualization: Zulfikar Zulfikar.
 Data curation: Zulfikar Zulfikar.
 Formal analysis: Zulfikar Zulfikar.
 Funding acquisition: Zulfikar Zulfikar.
 Investigation: Zulfikar Zulfikar.
 Methodology: Zulfikar Zulfikar.
 Project administration: Zulfikar Zulfikar.
 Resources: Zulfikar Zulfikar.
 Software: Zulfikar Zulfikar.
 Supervision: Zulfikar Zulfikar.
 Validation: Zulfikar Zulfikar.
 Visualization: Zulfikar Zulfikar.
 Writing – original draft: Zulfikar Zulfikar.
 Writing – review & editing: Zulfikar Zulfikar.

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