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Bibliographic coupling of documents: An analysis of articles published in the derivative market

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Abstract

This article gives a bibliographic analysis of relevant publications in the area of the derivative market. The goal of this study is to scientifically assess research trends in the area of the derivative market using bibliometric analysis. Using the themes generated here, the direction for the future scope of research work has also been discussed. The data were collected from the Scopus database using specified search criteria. In this study, VOS Viewer and Microsoft Excel were used to assess co-authorship and citation patterns. To give an in-depth comprehension of the bibliographic pattern of literature in the derivative market, bibliometric coupling of documents, journals, and countries was also incorporated in this study. This is the first research to investigate the bibliometric relationships between pieces of literature in the derivative market.

Keywords: Literature Review; Bibliometric Analysis; Bibliographic Coupling; Derivative Market; Futures and Options

1. Introduction

The global "derivative market" grew rapidly over the last ten years. Derivatives provide necessary functions like market efficiency, underlying asset deal price discovery, and risk management through hedging, to name a few. The future path of research work has also been explored in this context. A derivative is a financial instrument that derives its value from an underlying asset (Hull & Basu, 2017). The underlying asset can be equity, currency, commodities, or interest rate. Although derivatives were initially intended to be risk management tools, the majority of individuals now use them to make speculative gains, which further increases their popularity. The daily growth in derivatives trade volume is evidence of the importance of derivatives. Bibliometric papers summarize large quantities of bibliometric data to present the state of the intellectual structure and emerging trends of a research topic or field (Donthu et al., 2021). The goal of this study is to identify and synthesize relevant literature in the area of derivative markets, comprehend recent research advancements in the field, and to lay a solid foundation for future derivative market research. The following research questions will help the study accomplish its goal.

- RQ1: What have been the most influential researches in the area of derivative markets?
- RQ2: What are the most important subjects and issues in the derivatives market scholarly literature?

This study has mainly three contributions. First, to the best of the knowledge of the author, this is the first study that has explicitly done a bibliographic coupling of documents in the area of the derivative market. Second, this study provides a network analysis using VOS Viewer (Van Eck & Waltman, 2010) which gives important insights while identifying themes. The analysis of bibliographic data extracted from the Scopus citation database using VOS Viewer

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provides a set of analyses like the bibliographic coupling of authors, sources and country. And finally, this study makes an incremental contribution to the literature on finance, especially in the derivative market.

The rest of the article is organized as follows. A review of the literature is presented in Section 2. Section 3 covered the data and methodology. The final result of data analysis and network analysis using VOS viewer tools are both described in Section 4. The explanation of the bibliographic coupling and network visualization using VOS viewer software are included in Section 5's general discussion. The article is concluded in Section 6 with a discussion of the potential areas for future research in the derivatives market.

2. Literature review

In the last 40 years, derivatives have become increasingly important in finance. Futures and options are actively traded on many exchanges throughout the world (Hull & Basu, 2017). A derivative is a generic term referring to forwards, futures, options and swaps (S.S.S. Kumar, 2015). Bibliometric analysis is a popular and rigorous method for exploring and analyzing large volumes of scientific data. It enables us to unpack the evolutionary nuances of a specific field, while shedding light on the emerging areas in that field (Donthu et al., 2021). Bibliometric evaluations of issues linked to the derivative market have been performed in the past. Stock Market Prediction: Perspective of Emerging Markets was the subject of a bibliometric investigation by Somanathan & Rama, (2020). The research is based on Web of Science, Scopus, and JSTOR databases. The key finding is that the real phenomena affecting stock market sectors are varied and, as a result, generalization is limited. Sankar & Kavitha, (2015) brings out with the results of a bibliometric analysis of the journal titled "Journal of Emerging Market Finance". The study focused on the number of articles, authorship patterns, the average number of references per article, article length, paper per author and authors per paper, number of cited documents, citation per year, citation per paper and author, and the year-by-year distribution of H index, G index, HG, HI, and AWCR. S. Kumar et al., (2020) presents a complete analysis of the Journal of Emerging Market Finance's major trends and theme structure (JEMF). The findings imply that the number of publications and citations every year at JEMF is on the rise. Baker et al., (2021) used bibliometrics to give a 40th anniversary retrospective on the Journal of Futures Markets (JFM). The number of publications and citations in the Journal increased significantly each year, with authors from the United States accounting for the majority of the contributions. Commodities, volatility, trading, hedging, arbitrage and pricing, forecasting volatility, and credit default swaps are among the Journal's key themes, according to bibliographical coupling. Kaur & Goel, (2021) aims to provide a quantitative and thorough summary of research on market efficiency, price discovery, and volatility in commodity futures markets. The researchers employed a combination of bibliometric and network analysis approaches to classify and analyze the literature in order to uncover important patterns and themes in the subject. Based on a bibliometric analysis, Kim & Kim, (2021) investigates the historical evolution of Journal of Derivatives and Quantitative Studies (JDQS) between 2002 and 2020. To examine JDQS's diverse views utilizing the patterns of citations, keywords, and authors in JDQS's articles, the study uses performance analysis, bibliographic analysis, cluster analysis, regression analysis, and comparison analysis. Zulfikar, (2022) conducted a study to analyze the determinants of the research roadmap cluster in the field of capital market performance. The research was based on articles published in Scopus-indexed journals between 2020 and 2021. The results of extracting 240 article titles and abstracts with VOS Viewer revealed that the determinants of the research roadmap in the stock market during the COVID-19 out-break were divided into four clusters: 1) an increase in crypto currencies 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) change in the research roadmap in the stock market. Another study of Choihil et al., (2022) examines 30 years of academic research on herd behaviour in financial markets. The Web of Science database was chosen to collect bibliographic data and give numerous bibliometric indicators, such as the number of citations, publications, and authors, as well as to visualize the similarities using bibliometric approaches. The findings demonstrate a huge increase in herd behaviour studies, particularly in the aftermath of the subprime mortgage crisis.

No bibliometric studies specifically pertinent to derivative markets have yet been conducted, according to a review of the literature on the subject. It is important to find out which areas of the derivative market have more and less study because they are diverse markets that interact with a variety of products and contain a variety of underlying markets. The author has therefore discovered a research gap that served as the motivation for the present study. This research is being done to understand the themes that make up the market and its constituent parts as well as to explain the performance and pattern of publications on derivative markets. The objective of the current work is justified because the current research differs from earlier ones in a number of ways.

3. Methodology

The data extracted from Scopus database was used to conduct the analysis for this study. The bibliometric analysis primarily employs three knowledge structures: the conceptual structure, which identifies major themes and trends; the social structure, which explains author, institution, and country interactions; and the intellectual structure, which explains how an author's work influences others (Aria & Cuccurullo, 2017). VOSviewer and Microsoft Excel are used to conduct the network analysis. VOS viewer makes it simple to understand bibliometric maps.

3.1. Data source

The dataset has been extracted from Scopus. In search criteria the following search string was applied – *TITLE-ABS-KEY(equity AND derivatives AND market) OR TITLE-ABS-KEY(futures AND option AND market) AND TITLE-ABS-KEY(hedging) OR TITLE-ABS-KEY(trading)) AND (LIMIT-TO (DOCTYPE,"ar"))*. As a result of this search, the Scopus database returned 858 results. This resulted in the dataset for doing bibliometric analysis in the area of derivative market. The search was made on 10th April 2022 by choosing only research articles that were published until the search date.

4. Results

The findings have been discussed in the three sections.

- Bibliographic coupling of sources,
- Bibliographic coupling of country, and
- Bibliographic coupling of documents.

4.1. Bibliographic coupling of Sources

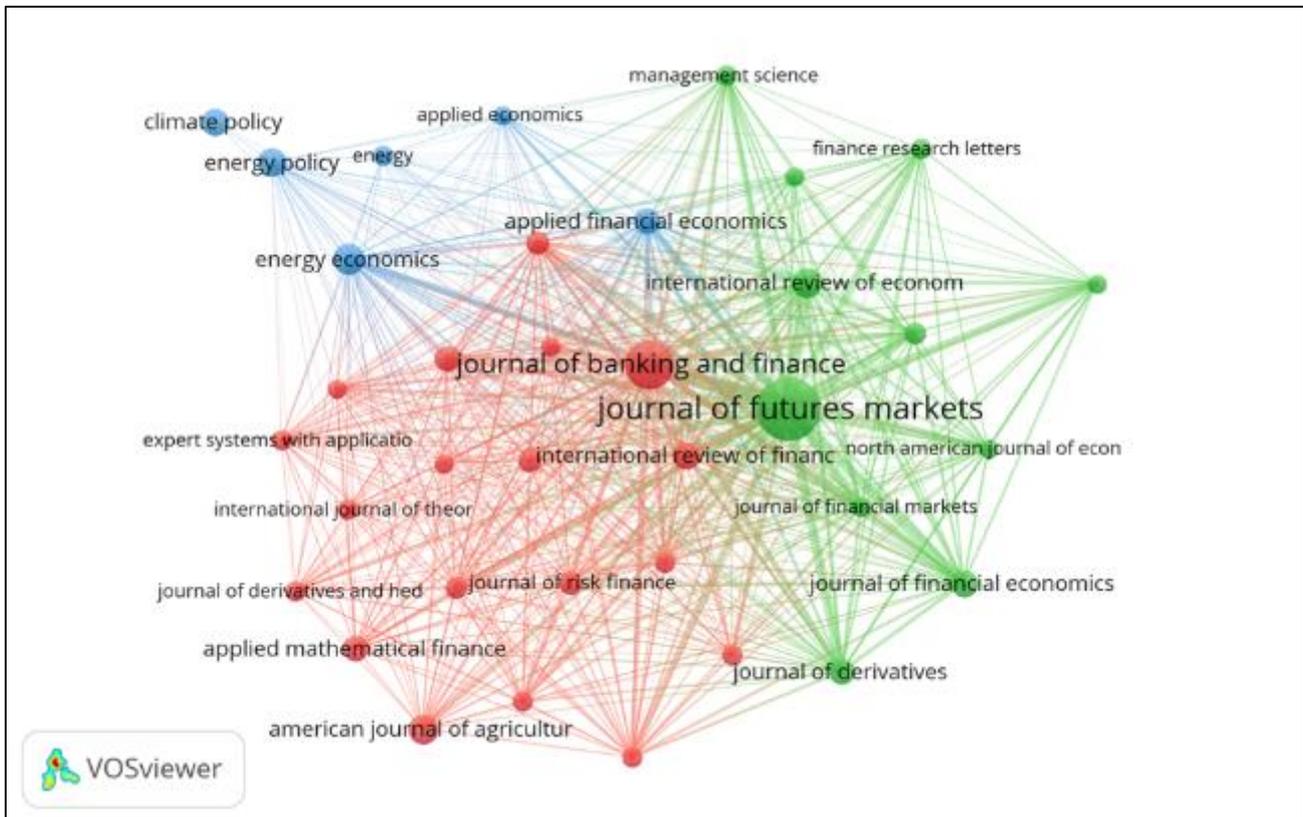


Figure 1 Bibliographic coupling of journals

Bibliographic coupling between two sources (journals) increases when there is a greater number of common references between their publications. In this case, only those sources have been picked up which has at least five publications. The

count of citations for a publication was however kept to the default value of zero. With such criteria, out of 401 sources 36 sources were obtained. VOSviewer calculates the total link strength of the bibliographic coupling links for each source. The sources in the final graph were chosen based on total link strength (TLS) (Van Eck & Waltman, 2022). The nodes which are closer to each other have publications that are co-cited together. The result has been shown in figure 1.

The Journal of Futures Market is the source or journal with the most publications (60 articles), with a total link strength of 54512. The Journal of Banking and Finance comes next, with 35 publications and a total link strength of 4236. A total of three clusters with red, green, and blue colours were obtained. The first cluster (red) contains 19 journals with a total of 167 documents.

The second cluster (green) contains 11 sources and 134 documents, while the third cluster (blue) contains only 6 journals and 58 documents. The blue cluster contains sources that are primarily associated with the field of energy derivatives. Journals such as Energy Economics, Applied Financial Economics, Energy Policy, Climate Policy, and others are examples.

4.2. Bibliographic coupling of Country

A country/region collaboration network is constructed by VOS viewer, a tool for science mapping, to clearly study the cooperative relations between the connected countries/regions of publications from 1969 to 2022. Only countries with minimum 3 documents have been considered for analysis however the minimum number of citations for a country was kept to the default value of zero. With such criteria, out of 88 countries 43 met the threshold. The total strength of bibliographic coupling links with other countries will be calculated for each of the 43 countries, and the countries with the greatest link strength will be chosen by VOSviewer. Figure 2 illustrates the outcome.

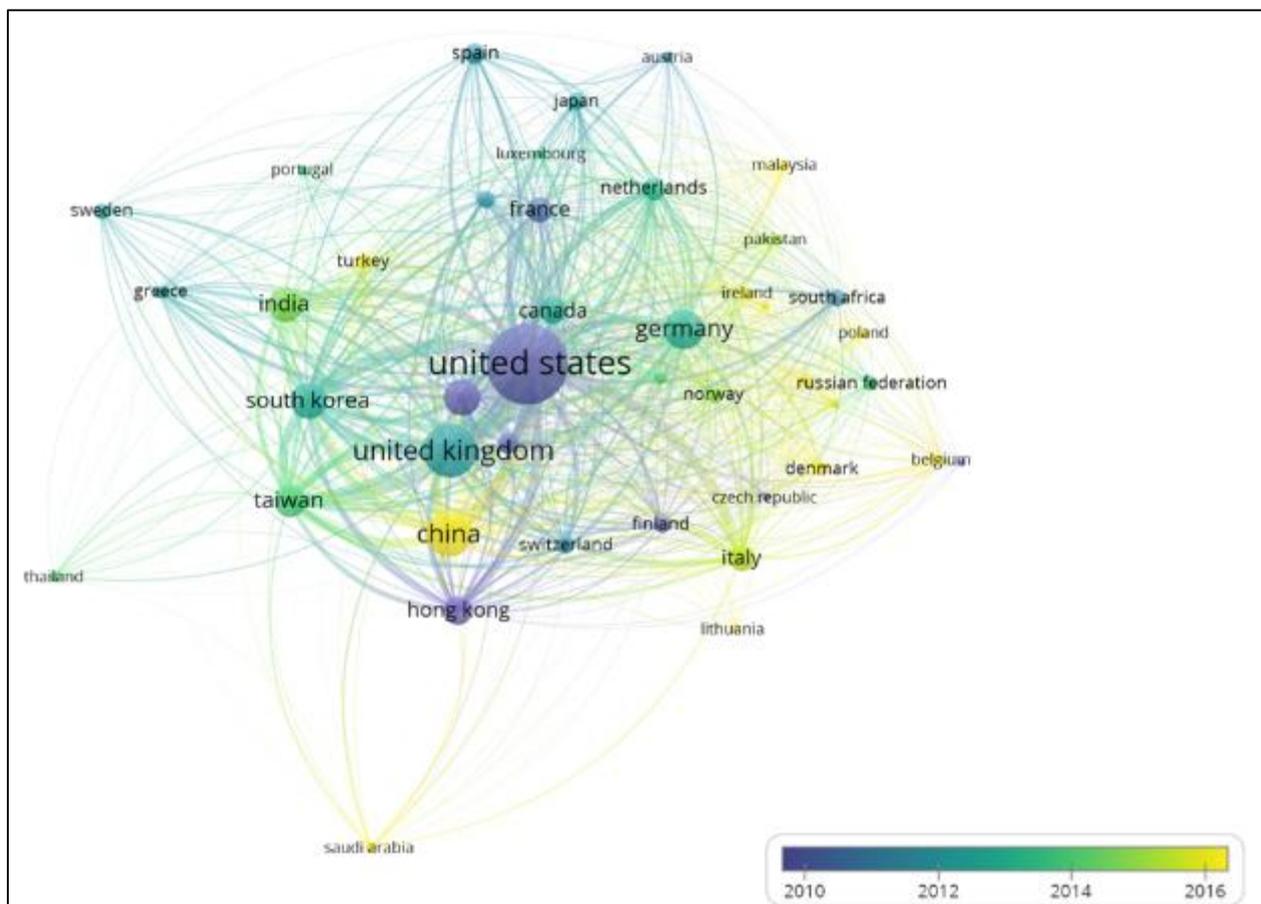


Figure 2 Bibliographic coupling overlay visualisation county/region collaboration network

There are totally 88 countries, which are divided into 4 clusters with 800 links and a total link strength of 90546. Figure 5 depicts an *overlay visualisation* (Van Eck & Waltman, 2022) of country collaboration on research items discussed

between 1976 and 2022. The size of the node represents the number of publications, and the links represent the collaboration relationship between the two countries connected (Wang et al., 2020). Furthermore, the thicker the link, the greater the collaboration between the connected two countries. The color of the node represents average publication year. The blue circles represent derivative market research from 2010 and earlier, the green circle represents the average publication year of 2014, and the yellow circle represents the most recent research at this time. The average publication year and strength of research collaboration of selected countries are given in table 1.

Table 1 Country Collaboration with Average Publication Year

Country	Average Publication Year	No. of Documents	Links	Total Link Strength
United States	2009	257	42	38825
France	2010	26	40	3493
South Africa	2011	12	39	1324
United Kingdom	2012	111	42	19984
Germany	2013	63	42	6867
India	2014	49	40	6310
Italy	2015	25	42	6077
Saudi Arabia	2016	5	22	423
China	2017	83	41	14975
Ireland	2018	4	37	714

(Source: Author)

According to Table 1 the most cooperative countries in derivative market research are the United States, United Kingdom, China, Germany, India and France. The united states leads the research relating to derivative market with highest number of documents and total link strength, followed by UK and China. The average publication year of the United States is 2009, which may be due to a higher number of publications in the early periods. China's average publication year is 2017, with 83 documents, while India's average publication year is 2015, with 49 documents. Ireland and Malasia both began research initiatives recently, with only four and three publications respectively in 2018.

4.3. Bibliographic coupling of Documents

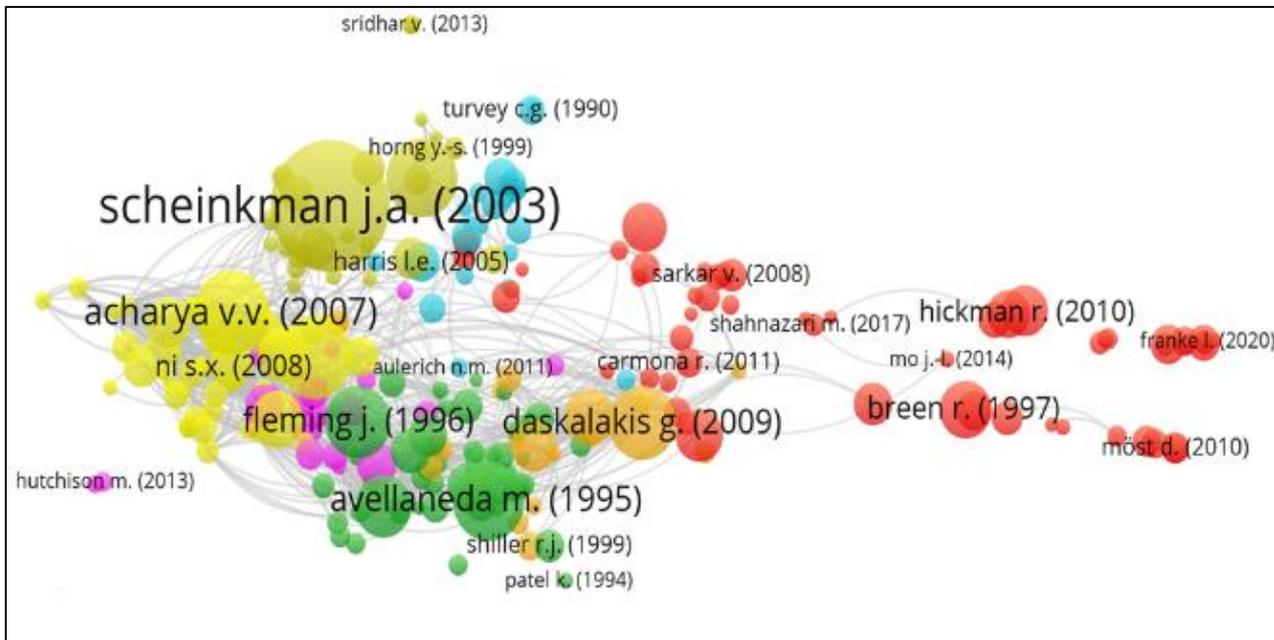


Figure 3 Bibliographic coupling of Documents

The most common analysis in bibliometrics is citation analysis. It employs citation counts as a measure of similarity between documents, authors, and journals. Citation analysis can be decomposed into *bibliographic coupling* and *co-citation analysis* (Aria & Cuccurullo, 2017). Two articles are said to be bibliographically coupled if at least one cited source appears in the bibliographies or referencelists of both articles (Kessler, 1963). The central themes among articles in each cluster are discovered using bibliographic coupling of documents (Baker et al., 2021).

The minimum number of citations of a document published by an author was set at 10 in order to conduct the analysis. 301 documents out of 858 met the criteria. Some of the documents in the preceding set are not connected to one another, and the target set of connected items contains 256 documents. A total of 10 clusters were obtained, but to simplify the clustering result and make the analysis easier, the minimum cluster size was set to 20 and the clustering was updated. Finally, 256 documents, 7 clusters and 4028 links with total link strength of 7375 were obtained. The final result is depicted in Figure 3.

Each cluster has been assigned a theme, a description of which is provided below:

4.3.1. Cluster 1: Climate Policy and Energy Derivative

This cluster has been highlighted in red. This cluster contains 55 articles published between 1997 and 2020. Simply looking at this cluster, we can see that the documents in it are mostly unrelated, as the distance between items is greater in this cluster than in others. The majority of the studies in this cluster are concerned with carbon emission trading and hedging against climate policy risks. *"Risk Reconfiguration and Stratification"* (Breen, 1997) is the most cited article in this cluster, with 153 citations and a link strength of 11. However, the most recent and widely cited article is *"Environmental integrity of international carbon market mechanisms under the Paris Agreement"* (Schneider et al., 2018). One important finding from this cluster is that there has recently been an increase in research in the area of carbon emission trading and energy derivatives. This cluster's hot topics include carbon pricing, carbon emissions, carbon trading, climate policy, and so on.

4.3.2. Cluster 2: Volatility Forecasting and Options Trading

This cluster has been market in green colour. This cluster contains 54 studies between 1986 and 2017. The majority of the studies in this cluster are concerned with implied volatility, volatility forecasting and options trading. *"Pricing and hedging derivative securities in markets with uncertain volatilities"* (Avellaneda & Levy, 1995) is the most cited article in this cluster, with 296 citations 55 links and a total link strength of 65. The second most cited study is *"Trading costs and the relative rates of price discovery in stock, futures, and option markets"* (Fleming et al., 1996). However, recent and widely cited article in this cluster is *"Hedging with temporary price impact"* (Bank et al., 2016). *Options price modelling* (Muzzioli & Baets, 2016), *Equity assets Volatility modelling* (Maciel et al., 2016), *Modelling and trading the U.S. implied volatility indices* (Psaradellis & Sermpinis, 2016) and *Volatility Forecasting Using Financial Statement Information* (Sridharan, 2015) are the recent studies in this cluster.

4.3.3. Cluster 3: Informed Trading and Price discovery in Derivative Market

This cluster has a yellow colour scheme and contains 47 documents published between 1996 and 2020. This cluster contains studies about information flow and price discovery in derivative market. *"Insider trading in credit derivatives"* (Acharya & Johnson, 2007) is the most influential article in this cluster. Other notable study in this cluster is *"The Information in Option Volume for Future Stock Prices"* (Pan & Poteshman, 2006). Another new topic in this cluster is *"Noise traders, mispricing, and price adjustments in derivatives markets"* (Ryu & Yang, 2019). Other interesting topics studied in this cluster include *Intraday price formation* (Ryu, 2011), *Expiration day effect* (Alkebäch & Hagelin, 2004), *Mispricing of index options* (Brailsford & Hodgson, 1997), *Informed trading* (Ahn & Ryu, 2008) and *Market micro structure* (Tse, 1999).

4.3.4. Cluster 4: Trading behaviour and Market information

This cluster is olive yellow in colour and contains 27 documents from 1999 to 2019. This cluster includes studies relating to market information and derivative trading behaviour. The most cited article in this cluster is *Overconfidence and Speculative Bubbles* by Scheinkman & Xiong, (2003) with 852 citations. Followed by *The theory of Financial intermediation* (Allen & Santomero, 1998) with 305 citations. Other important studies in this cluster are; *Have financial markets become more informative?* of Bai et al., (2016), and *Gambling Preferences, Options Markets, and Volatility* (Blau et al., 2016). Other recent studies in this cluster are: *Informed Options Trading Prior to Takeover Announcements: Insider*

Trading? by Augustin et al., (2019); *Time Will Tell: Information in the Timing of Scheduled Earnings News* by Johnson & So, (2018), and *What Does Risk-Neutral Skewness Tell Us About Future Stock Returns?* By Stilger et al., (2017).

4.3.5. Cluster 5: The Interaction Between Derivative Trading and Spot Market Volatility

This pink-highlighted cluster contains 27 documents published between 1993 and 2018. One of the most cited study discussing the relationship between implied volatility of options and realised volatility of underlying future is *The predictive power of implied volatility: Evidence from 35 futures markets* (Szakmary et al., 2003). Other important articles in this cluster discuss, *Volatility persistence and trading volume in an emerging futures market* (Pati & Rajib, 2010), *modelling conditional volatility* (Karmakar, 2005), and *the impact of energy derivative on crude oil market* (Fleming & Ostdiek, 1999).

4.3.6. Cluster 6: Risk Management and Hedging with Commodity Futures and Options

This blue cluster contains 24 articles on price risk hedging with commodity futures and options published between 1986 and 2012. The most influential studies in this clusters is “*Production Hedging and speculative decisions with options and futures*” (Lapan et al., 2013) with 67 citations. Other important study in this cluster includes “*Management of climate risks in agriculture – will weather derivatives permeate*” (Musshoff et al., 2011) having 53 citations. Other major discussion topics in this cluster include production risk management (Sakong et al., 2013), currency hedging (Wong, 2003), hedging non-linear risk exposure (Broll et al., 2001), and so on.

4.3.7. Cluster 7: Pricing and Valuation of Commodity Futures and options

This cluster is highlighted in orange. This cluster includes 22 documents that were published between 1997 and 2017. Most influential study in this cluster is “*Modeling CO2 emission allowance prices and derivatives: Evidence from the European trading scheme*” by Daskalakis et al., (2009). This paper examines three main markets for emission allowances within European Union Emission Trading Scheme and developed an appropriate framework for the pricing and hedging of emission futures and options on emission futures. *Pricing and Hedging Spread Options* by (Carmona & Durrleman, 2003) is the second most cited article in this cluster. Latest studies in this clusters discussed topic like *Price Jump Models for VIX Derivatives* (Li et al., 2017), *Pricing and hedging of derivatives in contagious markets* (Kokholm, 2016) and *Humps in the volatility structure of the crude oil futures market* (Chiarella et al., 2013).

Table 2 Clusterwise Analysis of Bibliographic Coupling of Documents

Sl. No.	Cluster	Sub Themes	Research Gap in the Area
1	Climate Policy and Energy Derivative	Carbon emission trading (Uctug et al., (2014) Carmona & Hinz, (2011)) Carbon Risk (Abadie et al., (2017), de Cian & Massimo, (2012)) Power Derivatives (Aïd et al., 2013)	Pricing and modelling of emission allowances, as well as risk management due to climate policy uncertainty, are areas where more research is needed.
2	Volatility Forecasting and Options Trading	Implied Volatility (Psaradellis & Sermpinis, 2016), Volatility Forecasting (Avellaneda & Levy, (1995), Maciel et al., (2016)) , Options Trading (Frijns et al., 2010)	Behavioural biases of derivative traders, particularly option traders need more research focus as the area where research is less
3	Informed Trading and Price discovery in Derivative Market	Expiration day effect (Alkebäch & Hagelin, (2004), Bollen & Whaley, (1999)) Information content in options Volume (Pan & Poteshman, (2006) Kang & Park, (2008), Hu, (2014)), Price discovery (Booth et al., (1999), Hsieh et al., (2008), Hu, (2014))	The scope for future research is exist in the areas like; leading information role of implied volatility in options market; as well as Volatility based options trading strategies
4	Trading behaviour and Market information	Trading behaviour (Scheinkman & Xiong(2003), Pennings(2002)), Mispricing of securities (Chen et al., (2009) Chung et al., (2012)),	The relation between price informativeness and option trading performance can be studied in future

		Market information (<i>Bai et al., (2016) Johnson & So (2018)</i>)	
5	The Interaction Between Derivative Trading and Spot Market Volatility	Derivative trading and Market Volatility (<i>Chevallier & Pen (2011), Drimbetas et al., (2014), Kyriacou & Sarno, (1999)</i>), Conditional Volatility (<i>Karmakar, (2005), Fong & See (2001)</i>), Implied Volatility (<i>Szakmary et al., (2003), Davidson et al., (2001)</i>), Volatility Forecast (<i>Donaldson & Kamstra (2005), Pati & Rajib(2010) Bentes (2015)</i>)	There is scope for conducting new researches on the structural relationship between options trading and market volatility
6	Risk Management and Hedging with Commodity Futures and Options	Risk Management (<i>Adam-Muller & Panaretou, (2005), Mohan, (2007)</i>), Production Hedging (<i>Lapan et al., (2013), Wong, (2011), Sakong et al., (2013)</i>)	New studies can be conducted to analyse the hedging role of options in comparison to futures in order to determine which instrument (options or futures) is better for hedging.
7	Pricing and Valuation of Commodity Futures and options	Option Valuation (<i>Dempster et al., (2008), Carmona & Durrleman, (2003)</i>), Derivative Pricing Models (<i>Andersen (2010), Daskalakis et al.,(2009)</i>)	Pricing of multi-commodity options or spread options; and Volatility smile Modelling and pricing of options are the areas where scope for further research is more

(Source: Authors)

5. Discussions

The bibliometric analysis shows that the most cited article is “Overconfidence and speculative bubble” by *Scheinkman & Xiong,(2003)* with 852 citations. The bibliometric coupling of documents identified seven central themes in seven clusters. The cluster named “*Climate Policy, and Energy Derivatives*” includes studies related to carbon emission trading and hedging against climate policy risks. Pricing and modeling of emission allowances, as well as risk management due to climate policy uncertainty, are areas where research gap is identified by the analysis. The second cluster entitled “*Volatility Forecasting and Options trading*” provides research contributions in the area of implied volatility forecasting, and options trading. The behavioural biases of derivative traders, particularly option traders need more research focus as there is a research gap pointed by this study. *Informed Trading and Price discovery in derivative market* is the third cluster which deals with research on information flow and price discover of derivative securities. In this cluster the scope for further research exists in the areas like; leading information role of implied volatility in options market; as well as Volatility based options trading strategies. The fourth cluster named as “*Trading behaviour and Market information*” contributes studies relating to market information and behavior of derivative traders. Future research into the relationship between price informativeness and option trading performance is possible in this cluster. The cluster named “*Interaction between Derivative Trading and Spot Market Volatility*” discusses the relationship between implied volatility and options trading. By examining the cluster it was found that there is scope for conducting new researches on the structural relationship between options trading and market volatility. The sixth cluster includes the studies relating to the *Risk Management and Hedging with Commodity Futures and Options*. The research gap in this area is to analyze the hedging role of options in comparison to futures in order to determine which instrument (options or futures) is better for hedging. The last cluster “*Pricing and Valuation Commodity Futures and options*” contain research documents relating to options valuations and derivative pricing models. These are the areas where most of the researches in derivative market were concentrated. The Pricing of multi-commodity options or spread options; and Volatility smile Modeling and pricing of options are the areas where scope for further research is more.

6. Conclusion and future scope of research work

This study conducted a bibliometric analysis of derivative market literature based on Scopus database. The bibliographic coupling is used to examine various elements such as publishing and citation patterns, keywords, author partnerships, and country collaborations. The analysis shows that in the subject of derivative market research, seven themes have emerged as a result of bibliographic coupling of documents. This article adds a significant piece of work to

an existing body of knowledge pertaining to the derivative market. To my knowledge, this is the first paper to examine the bibliometric linkages of literatures in derivative market.

The analysis indicates that in the field of derivative market research has happened in seven themes as identified through bibliographic coupling of documents. The literature review revealed that *Information content in options implied volatility and trading volume, carbon trading and energy derivatives*, etc., are the new topic of research in the field of derivative market. The publications reviewed here have assisted in identifying the key research gaps and highlighted future study directions, particularly with relation to empirical research on options trading strategies, the area where research is very rare. Future lines of research could also incorporate, for example, the research to analyse the informational content of options trading volume in the Indian stock market or the effectiveness of volatility-based trading strategies in options. Another area for further research may be the study to examine the effect of covid-19 pandemic on derivative trading activity on exchanges in India.

There are some limitations of this current study. Derivative market has a broad dimension that includes equity derivatives, commodity derivatives, foreign exchange derivatives, interest rate derivatives swaps, etc., a complete discussion on them has been kept outside the scope of this study. This study consider derivative market as a whole and there is a scope for bibliometric study in each specific area of derivative market such as a bibliometric study on commodity derivatives or can be conducted in future. Another limitation is that this study is conducted based on information extracted from Scopus database only. Other databases like Web of Science, Dimensions, Google Scholar, etc., could also be used for extraction of data in future studies. The keyword search could be modified to include additional keywords so that more publications relevant to this field are included in the study. For an in-depth grasp of the study domain, the Science mapping should be supplemented with abstract reading and manual selection of articles, followed by intensive reading of the full text. So, a Systematic literature review and a meta-analysis of the field could be taken up by researchers in the future.

Compliance with ethical standards

Disclosure of conflict of interest

The authors have no conflicts of interest to declare. All authors have seen and agree with the contents of the manuscript and there is no financial interest to report. We certify that the submission is original work and is not under review at any other publication.

Author Contribution statement

The authors confirm their contribution to the paper as follows:

Study conception and design: Subeesh V. K. and Liya K. Data collection: Subeesh V.K.; analysis and interpretation of results: Subeesh V. K. Draft manuscript preparation: Subeesh V.K and Liya K.. All authors reviewed the results and approved the final version of the manuscript.

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