

Article

The Six Decades of the Capital Asset Pricing Model: A Research Agenda

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Abstract: This paper re-examines the presence of the Sharpe–Treyner–Lintner–Mossin capital asset pricing model (CAPM) in the finance literature and is accompanied by a bibliometric summary analysis. The popular model is in its sixth decade; we summarized the relevance of the CAPM using publication and citation trends, as well as identifying its most prolific and impactful contributors. This paper is based on a systematic review of the literature and was completed with the help of various bibliometric techniques. During the study process, we presented a map of various themes and areas of the CAPM and its evolution. Our findings indicate that the extant literature on this topic (the cost of capital, asset pricing, portfolio, risk management, beta, systematic risk, and value premium) is based on the principles and assumptions of the CAPM. We are considering suggestions on the future use, trend, and direction of the CAPM, based on our summary of thematically developed clusters.

Keywords: capital asset pricing model (CAPM); bibliometric; systematic literature review research agenda



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1. Introduction

The capital asset pricing model (CAPM) of Sharpe (1964), Treynor (1999), Lintner (1965a, 1965b), and Mossin (1966) rightfully occupies a central place in the asset pricing literature. Not surprisingly, an enormous research effort has been devoted to the testing of the CAPM over the past six decades due to its relatively simple and effective framework. The model is not only used to study the returns on shares but is also used for various conventional and non-conventional asset classes: USA painting (Agnello 2016); the oil market (Adekunle et al. 2020); credit market assets (Hwang et al. 2010); the real estate market (Coşkun et al. 2017); etc. No model is without its criticisms and the CAPM is subject to various limitations and challenges. To overcome such limitations, the CAPM has taken various forms in the last six decades of its journey: international CAPM (Black 1974; Stulz 1981), the inter-temporal capital asset pricing model (Merton 1973), expectile CAPM (Hu and Zheng 2020), and downside CAPM (Rutkowska-Ziarko et al. 2022), etc. The CAPM is changing in terms of its face and utilization across sets of literature in the field of finance; thus, providing a future direction for research has become of prime importance. The current study is an opportunity for the development of respective research fields. This study revolves around the following key ideas related to articles published with the keywords ‘CAPM’ in the last six decades:

- KI 1. The growth and pattern of publications and citations since its inception;
- KI 2. The detail provided by contributors and their affiliated institutions and countries to the related articles;
- KI 3. The frequency of article citations;
- KI 4. A detailed study of the most prominent themes and ideas published;

- KI 5. Details of a research agenda for future studies.

As suggested by Kraus et al. (2022), literature reviews can serve as a starting point for larger research projects. Literature reviews also present an understanding of a domain, providing a theoretical underpinning for empirical research. This review correspondingly provides an investigation into research conducted with the keyword 'CAPM', using this to present its current status and to suggest future directions. The explained key concerns of the research are answered systematically using bibliometric analysis tools. The rest of the paper has been structured in the following sections. Section 2 discusses the methodology used, while Section 3 presents the description of the data analysis. Sections 4 and 5 present the co-authorship, bibliographic coupling, and keyword analysis. Section 6 concludes by summarizing the findings, along with future directions, and Section 7 offers considerations for the implications, limitations, and future directions of this study.

2. Materials and Methods

Bibliometric analysis is a well-known research methodology in library and information sciences that uses published data and constructs meaningful summaries by quantifying the material. Otlet (1934) first explained the term bibliometric (bibliométrie) as "the measurement of all aspects related to the publication and reading of books and documents"; the credit of being the pioneer in the statistical analysis of bibliographic data is claimed by Pritchard (1969). A bibliometric study helps to identify intellectual contributions in the scientific field (Hota et al. 2019). A broad range of evidence for such a bibliometric study is available in a peer-reviewed journal's published data as a primary source of standardized information (Baker et al. 2020; Gil-Doménech et al. 2020). A bibliometric study is divided into two major nodes, initially explained in the literature of Kessler (1963). A bibliographic couple, as a common source of intelligence, is generated if two publications refer to one or more shared literature items. The literature in question cites two or more publications and each cited publication receives a co-citation. Co-citations represent the intellectual congruence and similarities in sources. Some frequently used bibliometric tools include the analysis of authorship and keywords as co-authorship and co-occurrence analyses (Peters and Van Raan 1991; Callon et al. 1983; Ravikumar et al. (2015)). A bibliometric study also includes measures for productivity, with two dimensions: the number of publications and the influence through citations (Svensson 2010). Some other tools investigate each document according to citation count per publication and the h-index Alonso et al. (2009). The methodology is widely accepted for quantitative research in various domains (Ellegaard and Wallin 2015), including financial management Zupic and Cater (2015).

A structured bibliometric methodology was used in the current study to achieve the following objectives in line with the identified key ideas:

Objective 1: to examine the systematic growth pattern of publications and citations within the subject area since its inception;

Objective 2: to explore the contributions and characteristics of authors, affiliated institutions, and related countries;

Objective 3: to perform a detailed thematic analysis of the published articles and predict the future based on this.

The bibliometric study method has been improved with the empirical establishment of a hypothesis related to future trends related to the presence of the CAPM in research.

Ho. *There is no significant linear trend for the number of publications in the CAPM-related area.*

Ha. *There is a significant linear trend for the number of publications in the CAPM-related area.*

The research used bibliographic data to provide the significance of elements like the number of publications, the number of citations, authors' frequency, and contributing institutions and countries. The most prominent themes emerging from the publications were highlighted using keyword co-occurrence analysis and co-authorship analysis. The intellectual level of documents was revealed by analyzing keywords and network designing, primarily using "VOSviewer" software and the "Tableau" visual analytics tool. The

software was the primary logical instrument in the study of document citation, co-author networking, country networking, co-citation, and keyword search (Van Eck and Waltman 2009).

The data for the current bibliographic study were collected from the Scopus database using the keyword set (“Capital* Asset* Pricing* Model*” OR “CAPM*”) (keywords correspond to the research title, abstract, and/or keywords of the article), and were published up to May-2023.

The Scopus database is considered to be the most suitable and most extensive available dataset for academic study (Bartol et al. 2014). The Scopus database is utilized for a variety of purposes: it is one of the most comprehensive databases of peer-reviewed academic literature; it is one of the most easily available databases containing the most recognized finance publications; it has extensive search capabilities, as well as bibliometric analysis tools such as exporting bibliographical data based on user requirements; and compared to other options such as Web of Science, it includes a substantial quantity of publications to fulfil the purposes of this study. Figure 1 explains the research design used in the study through a detailed flow chart. This visual representation explains the research’s sequential and systematic approach, displaying each stage of the process from data collection to sorting, analysis, and interpretation. By following this well-structured research design, the study aimed to ensure rigor, reliability, and validity in the findings, ultimately contributing to the credibility and significance of the research outcomes.

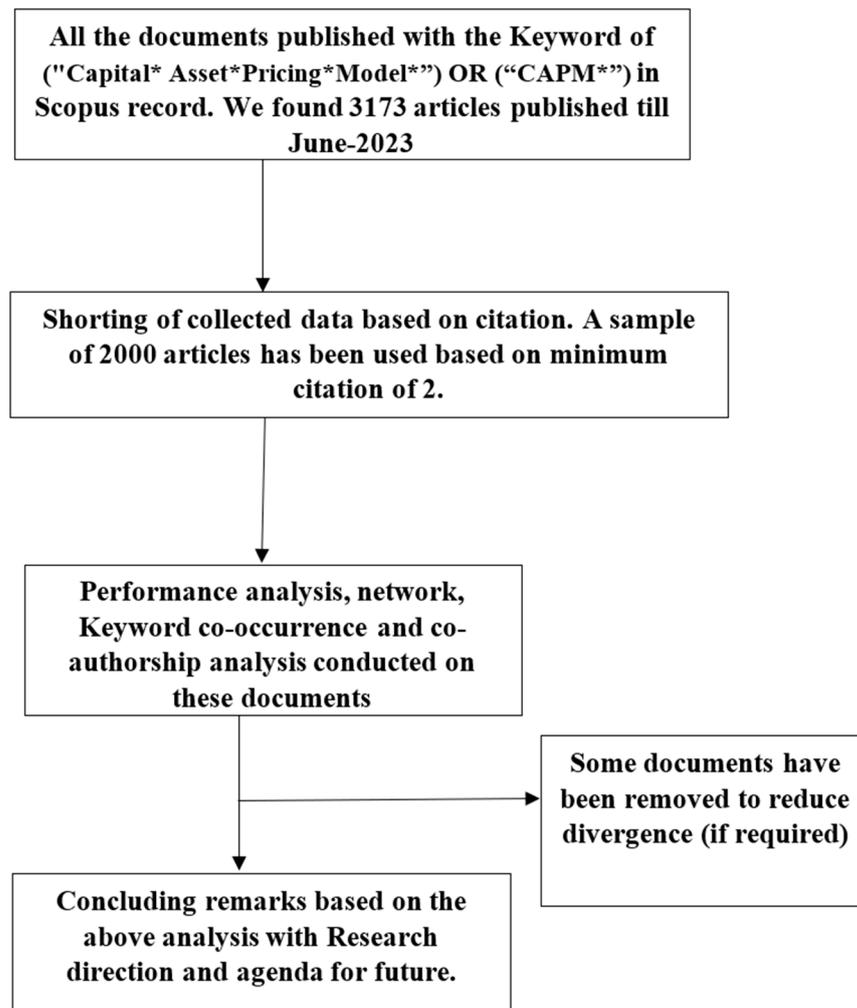


Figure 1. Design flow of the current study (author’s own processing).

3. Description of the Data Collected

We found 3173 articles available in the Scopus database, with the selected keywords TITLE-ABS-KEY (capital AND asset AND pricing AND model OR capm) AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "cp") OR LIMIT-TO (DOCTYPE, "re")), up until June-2023. These articles were sorted based on their citations from the year 1972 until June-2023. We created a final sample of 2000 articles, with the elimination of articles with one or less than one citation.

The trend to use the CAPM from its inception showed exponential growth until 2021 for "number of publications" and until 2020 for "count of citations". The maximum number of articles was 171, published in 2020, with the maximum annual citations being 133 in the same year. The average annual publication number was nearly 61, with nearly 0.76 annual citations per article during our study period and sample, as explained in Figure 2. The wide acceptance of the CAPM as a fundamental model in finance can be easily explained via the participation of authors across the globe. Authors from 128 different countries have been contributing to the domain, and nearly 75% of the total contributions come from authors from 52 countries, with a minimum document number of five. Nearly 52% of contributions come from the top 10 countries, as shown in Figure 3 below. The maximum number of contributions comes from those of US affiliation, with a total of 738 articles and a total citation number of 42,694. The authors with Chinese affiliation come in second position, with a total contribution of 271 and 9739 citations. These numbers indicate a dominance of US-based authors in the field.

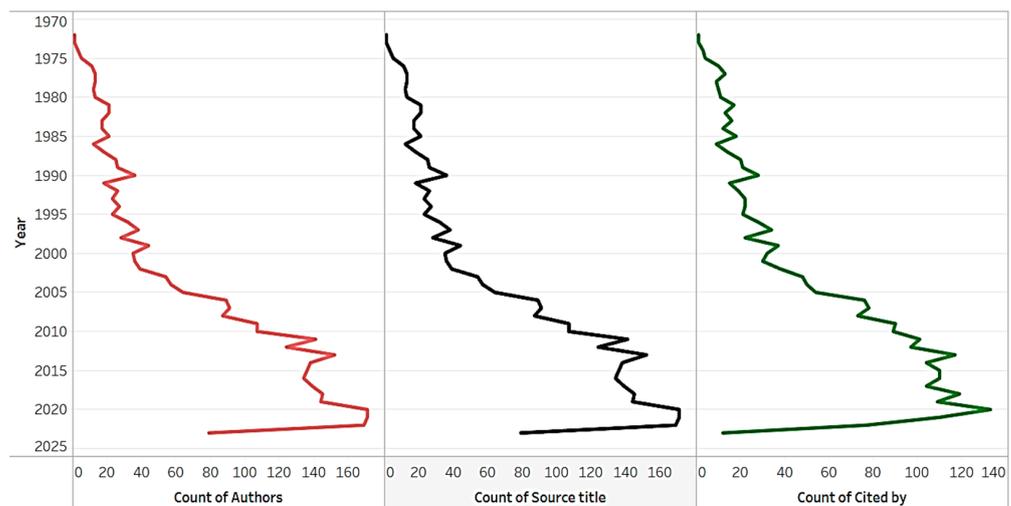


Figure 2. Annual trends in publications (distinct author count, number of titles, and count of citations using Tableau) (author’s own processing).

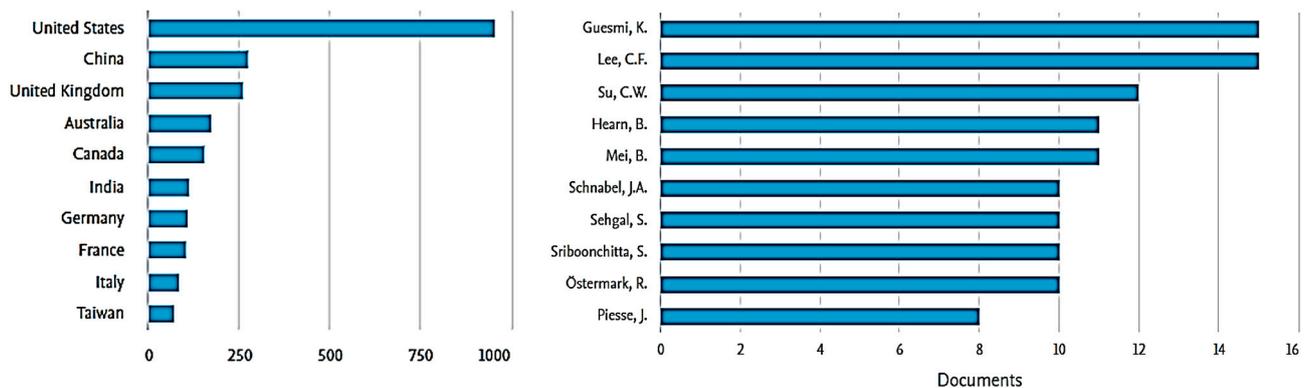
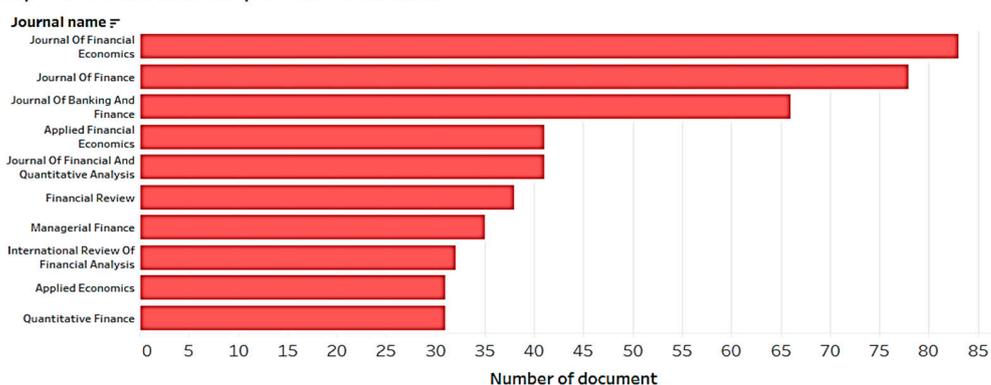


Figure 3. Top 10 countries/authors and their contributions (author’s own processing).

Guesmi Khaled, from the Paris School of Business, France, and Lee Cheng Few from Rutgers University–New Brunswick, New Brunswick, US, are the highest contributing authors, with 15 articles each.

In terms of journal and subject-wise analysis of the keywords, as shown in Figure 4 below, we found that the “*Journal of Financial Economics*” has a maximum publication number of 83 documents, followed by the “*Journal of Finance*” with 78 documents. Below, Figure 4 explains a list of the top 10 journals in the field. Although the CAPM is considered to be the fundamental model in the field of economics, finance, and business management, we found that the model is used in 25 different subject areas. Even subject areas like agriculture and energy have good contributions, as shown in Figure 4 below. We have found the presence of the CAPM even in the subject areas of healthcare, immunology, and microbiology. This clearly indicates the wide acceptance of the CAPM in the academic universe.

Top 10 Journals as per contribution



Subject Wise Contribution

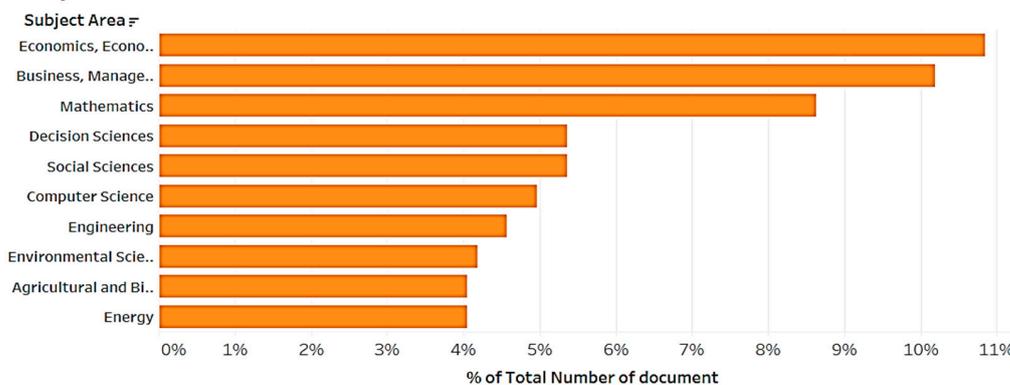


Figure 4. List of top 10 journals and subjects based on contributions with the help of Tableau (author’s own processing).

The strong influence of the journal can also be supported by an increasing trend in the data of citations per cited publication.

4. Performance Analysis

The determination of the performance of a fundamental model in finance research can be easily justified by the acceptance trend, citation trend, and impactful publications. In this section, we present an analysis of the publications, citations, and network analysis, showing the relative performance.

Guesmi, Khaled, from the IPAG Business School, France, has the highest number of contributions of 15 documents, followed by Lee, Cheng-Few, from Rutgers University, the United States, with 15 documents. The total citations to date are 64,696, with an average citation score of 32 per article and 1269 citations per year in the selected sample and year.

Table 1 provides a list of the 15 most cited publications in the field, along with their annual citation indexes. Rolf W. Banz (1981) has had the maximum number of citations of 2520 since its publication, while Graham and Harvey (2001) have had the most effective citation score with 113 citations per year (C/Y score) since its publication date.

Table 1. Top 15 most cited articles (author’s own processing).

Year	Citation Count	Authors’ Full Names	Title	Source Title	C/Y
1981	2520	Banz, Rolf W.	<i>The relationship between return and market value of common stocks</i>	<i>Journal of Financial Economics</i>	60
2001	2482	Graham, John R.; Harvey, Campbell R.	<i>The theory and practice of corporate finance: Evidence from the field</i>	<i>Journal of Financial Economics</i>	113
1976	1402	Black, Fischer	<i>The pricing of commodity contracts</i>	<i>Journal of Financial Economics</i>	30
2005	1190	Acharya, Viral V.; Pedersen, Lasse Heje	<i>Asset pricing with liquidity risk</i>	<i>Journal of Financial Economics</i>	66
1979	1172	Breeden, Douglas T.	<i>An intertemporal asset pricing model with stochastic consumption and investment opportunities</i>	<i>Journal of Financial Economics</i>	27
2007	1121	Lambert, Richard; Leuz, Christian; Verrecchia, Robert E.	<i>Accounting information, disclosure, and the cost of capital</i>	<i>Journal of Accounting Research</i>	70
2001	1035	Hirshleifer, David	<i>Investor psychology and asset pricing</i>	<i>Journal of Finance</i>	47
1998	1002	Fama, Eugene F.; French, Kenneth R.	<i>Value versus growth: The international evidence</i>	<i>Journal of Finance</i>	40
2006	752	Barro, Robert J.	<i>Rare disasters and asset markets in the twentieth century</i>	<i>Quarterly Journal of Economics</i>	44
1997	735	Brav, Alon; Gompers, Paul A.	<i>Myth or reality? The long-run underperformance of initial public offerings: Evidence from venture and non-venture capital-backed companies</i>	<i>Journal of Finance</i>	28
2004	711	Fama, Eugene F.; French, Kenneth R.	<i>The Capital Asset Pricing Model: Theory and Evidence</i>	<i>Journal of Economic Perspectives</i>	37
1981	706	Reinganum, Marc R.	<i>Misspecification of capital asset pricing. Empirical anomalies based on earnings’ yields and market values</i>	<i>Journal of Financial Economics</i>	17
2011	669	Cochrane, John H.	<i>Presidential Address: Discount Rates</i>	<i>Journal of Finance</i>	56
1976	653	Galai, Dan; Masulis, Ronald W.	<i>The option pricing model and the risk factor of stock</i>	<i>Journal of Financial Economics</i>	14
2000	617	Henry, Peter Blair	<i>Stock market liberalization, economic reform, and emerging market equity prices</i>	<i>Journal of Finance</i>	27

4.1. Author and Collaboration Study

The collaborative study between authors in the field explains the level of concentration and distribution of research ideas. The universe of the CAPM is highly diversified and well spread in terms of authorship, whereby only 38 authors from different affiliations show a co-authorship link strength of two and more, and the number of authors reduces to 23 with a limited co-authorship link strength of five, as shown in Table 2 below.

A low value for the co-authorship link strength indicates a very high level of acceptability of the CAPM, as the research idea is neither promoted by a limited number of authors nor a set of authors from the same organization.

Table 2. Top 15 high co-authorship link strengths (author’s own processing).

Sr. No.	Author	TD	TC	TLS
1	Su, Chi-Wei	12	357	21
2	Sriboonchitta, S.	15	69	17
3	Umar, M.	11	263	17
4	Lee, A.C.	10	55	16
5	Qin, M.	8	313	16
6	Tao, R.	5	187	14
7	Lee, C.F.	15	72	13
8	Guesmi, K.	15	122	11
9	Tsai, C.-M.	5	16	10
10	Chanaim, S.	7	39	9
11	Autchariyapanitkul, K.	5	36	9
12	Chen, H.-Y.	6	34	8
13	Teulon, F.	8	54	7
14	Hearn, B.	11	155	6
15	Yamaka, W.	9	20	6

Note: TP = total publications; TC = total citations; TLS = total link strength.

The co-author network explains an author’s association with others and the authorship pattern, as shown in Figure 5. There are 26 clusters dividing 566 contributing authors by network linkage using VoSviewer network software. The size of the node in the network reflects the number of collaborations with other nodes in the network. These clusters are created based on a linking network with the highest link of 38 items. The density of the links shows the strength of association between two nodes, i.e., a denser link between two nodes signifies a higher number of collaborations. The web reveals the growing collaboration and quality of collaboration among authors in the field.

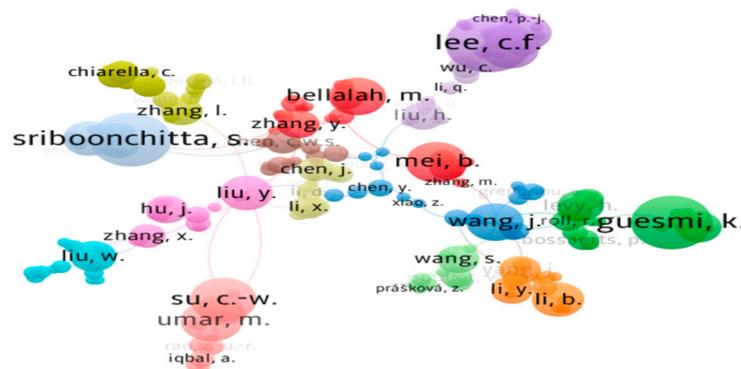


Figure 5. Co-authorship network visualization using VOSviewer (26 clusters) (author’s own processing).

Figure 6 reveals the co-authorship coupling among the authors’ affiliated countries. The CAPM model has wide acceptability, with authorship from more than 120 countries in the last six decades. To study the clustering effect of co-authorship with a limitation of a minimum of three documents from the country, a total of 61 qualified items with three clusters are shown in the network coupling diagram made using VoSviewer. The US shows a maximum link strength of 299, followed by the UK with a link strength of 177, and China with a link strength of 113. The three clusters have groups of 26, 22, and 13 countries, respectively.

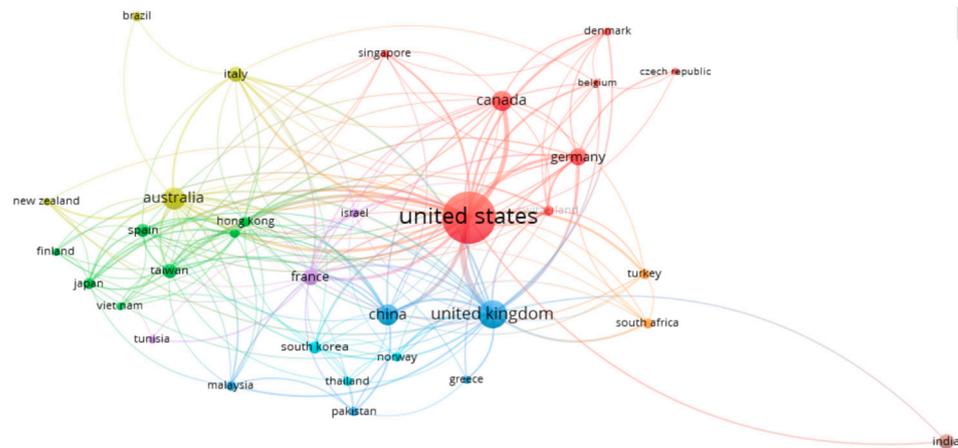


Figure 6. Co-authorship countries’ network visualization using VOSviewer (3 clusters) (author’s own processing).

The diagram showing the co-authorship coupling among the authors’ affiliated institutions explains the relationships among contributing institutions, shown in Figure 7. Co-authorships in scientific documents are the formal way of having intellectual or scientific collaborations among scholars (Acedo et al. 2006). The coupling relation explains the existence of two clusters with a total of 131 institutions with different geographical locations. Cluster 1 has a group of 121 institutions, dominated by the NBER (National Bureau of Economic Research), US, with a link strength of 27. Cluster 2 has a group of 10 institutions, dominated by the CEPR (Centre for Economic Policy Research), UK, with a link strength of 22. The study reveals a stronghold of the CAPM as the keyword in the research of these institutions and shows high reach in every part of the globe.

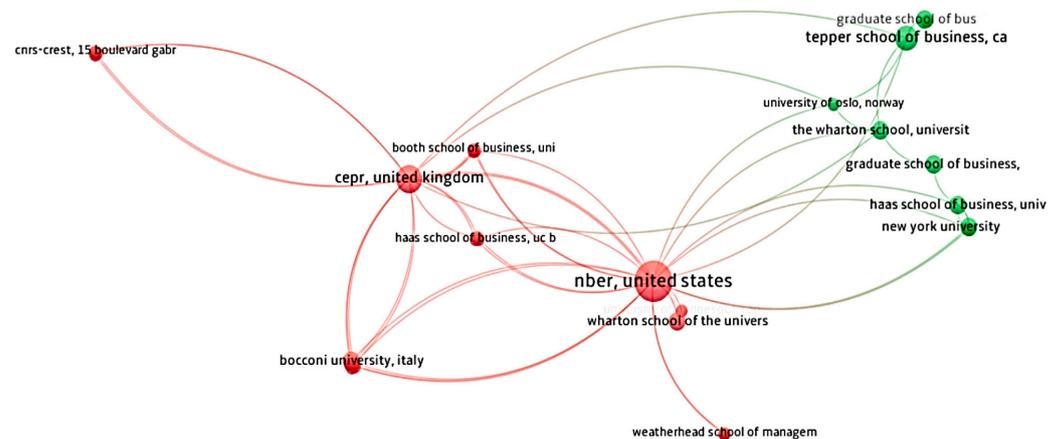


Figure 7. Co-authorship organization network visualization using VOSviewer (2 clusters) (author’s own processing).

4.2. Keyword Coupling Study

Comerio and Strozzi (2019) explained the importance of the keyword co-occurrence study as an adequate explanation of the publication themes and trends in the research domain. The keyword coupling for “CAPM” and “Capital Asset Pricing Model” explains the strength and linkage of the words in other finance-related domains. The keyword coupling study based on the author’s keyword with the minimum frequency of five divides all qualified documents into 10 clusters with two hundred eighty-seven keywords. In Figure 8, clusters are presented in different colors, along with the dimensions of the bubble representing the level of a keyword’s connectedness. The “CAPM” and “Capital Asset Pricing Model” keywords have a combined link strength of 1033.

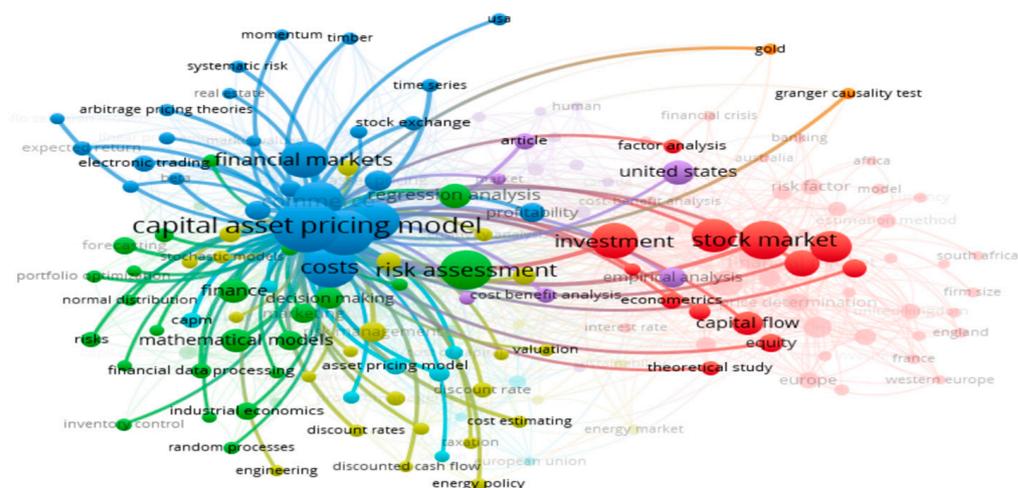
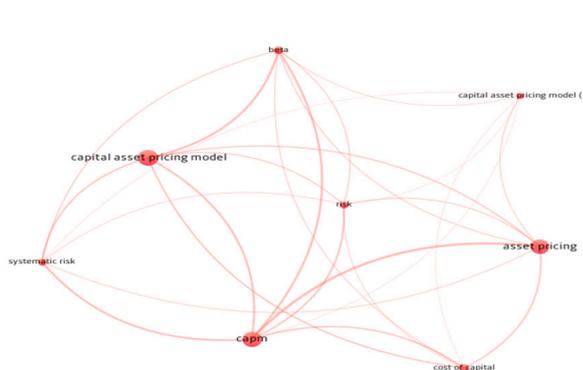


Figure 8. Co-occurrence keyword network with a frequency of 5 using VOSviewer (10 clusters) (author’s own processing).

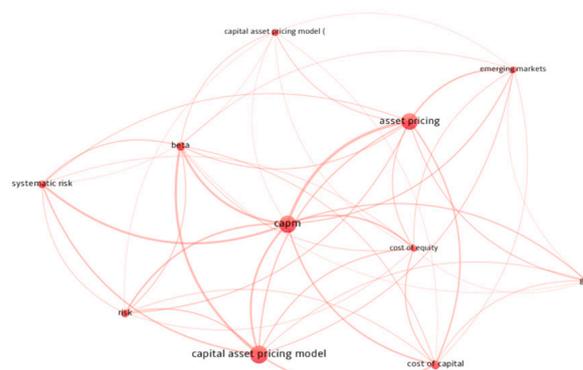
Clusters 1 and 2, with forty-nine keywords each, dominated the publication data in the areas of asset pricing and investment. The importance of the CAPM as the center of the portfolio and asset pricing research has been proven by this keyword coupling study. Research areas like cost of capital, asset pricing, portfolio, risk management, beta, systematic risk, value premium, and many more have direct links with the CAPM.

5. Discussion and Future Trends

The current bibliometric study confirms the acceptance and growth of the CAPM in the finance research area. The CAPM keyword has entered its sixth decade and is used in various research fields and to promote different ideas. Figure 9, a keyword network with different frequency levels, shows the strength of keywords in the domain research. The CAPM has been used with nearly 5349 keywords at least once in the available sets of the literature. There were 110 research ideas that used the CAPM at least 10 times in the sample used for the study. Similarly, we can analyze the strength of the CAPM with other keywords and research items according to the frequency of usage from the data given below in Figure 9.

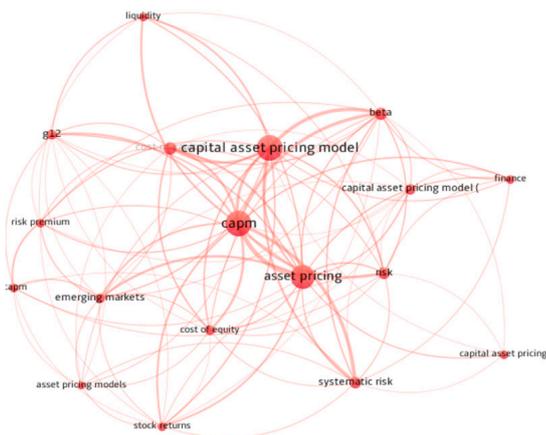


With frequency of 50 (8 items; 1 cluster)

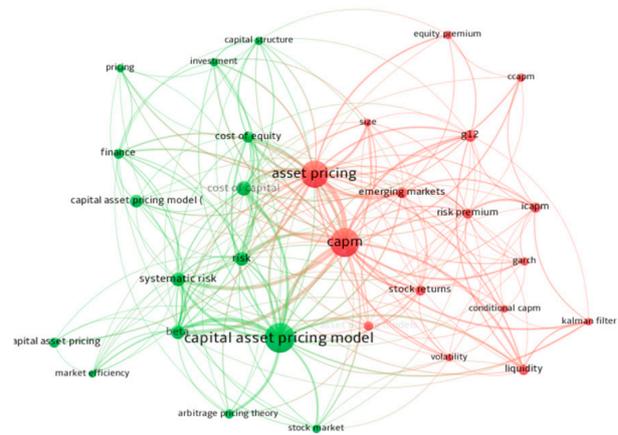


With frequency of 40 (11 items; 1 cluster)

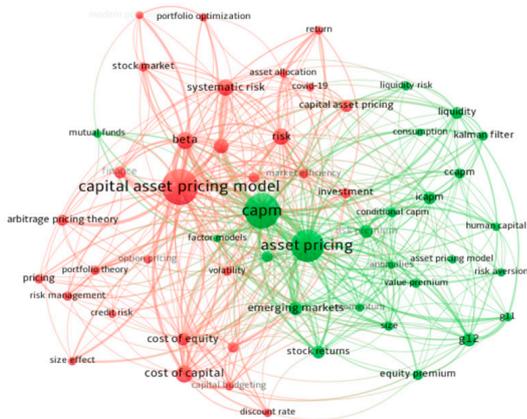
Figure 9. Cont.



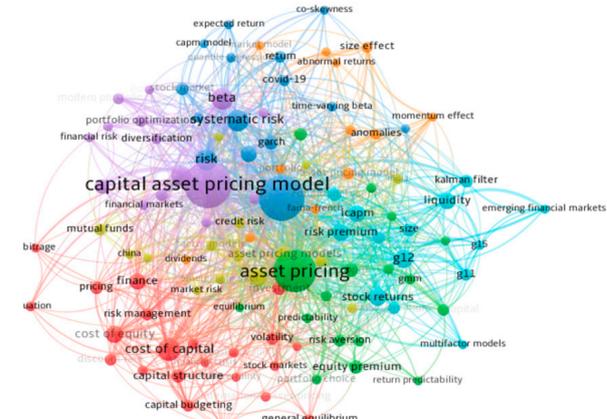
With frequency of 30 (18 items; 1 cluster)



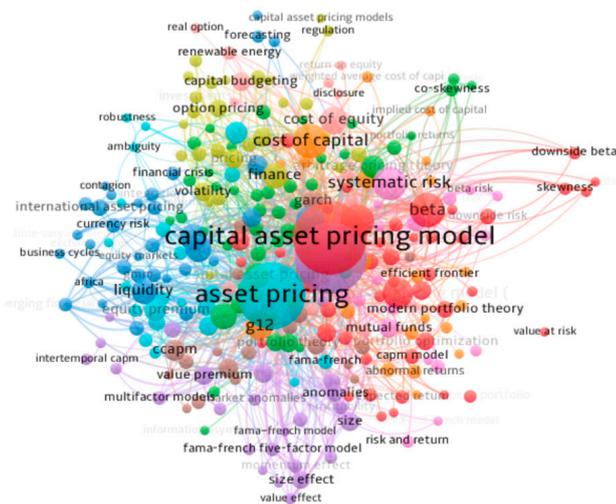
With frequency of 20 (31 items; 2 clusters)



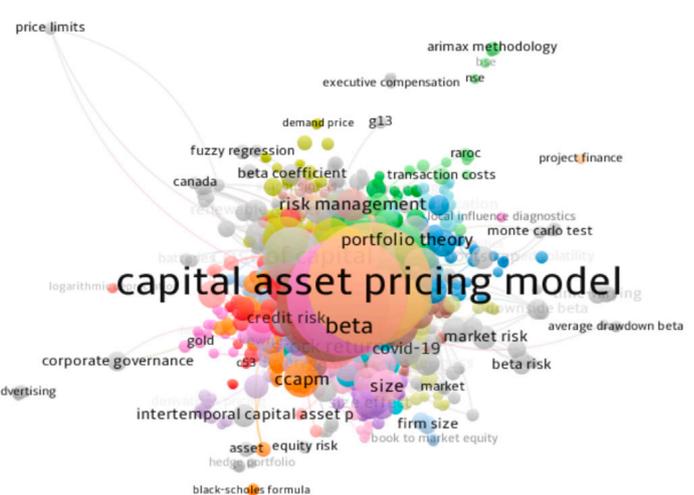
With frequency of 15 (54 items; 2 clusters)



With frequency of 10 (110 items; 7 clusters)



With frequency of 5 (287 items; 10 clusters)



With frequency of 1 (5349 items; 35 clusters)

Figure 9. Keyword network with different frequency levels using VOSviewer (author’s own processing).

The publication and research trend of the CAPM shows the dominance of five journals in the last six decades, as shown in Figure 10. One can obviously see the increase in the number of documents in the “Applied Finance and economic journal” between 2008 and 2014; similarly, the “Journal of Banking and Finance” shows spikes during the early years between 1974 and 1984 and later in the years from 2014 onwards. These journals neither show consistent growth nor downfall in the field. Silver (2012) supports trend analysis to

examine upward, downward, or cyclical movements in indicators in such cases based on historical data.

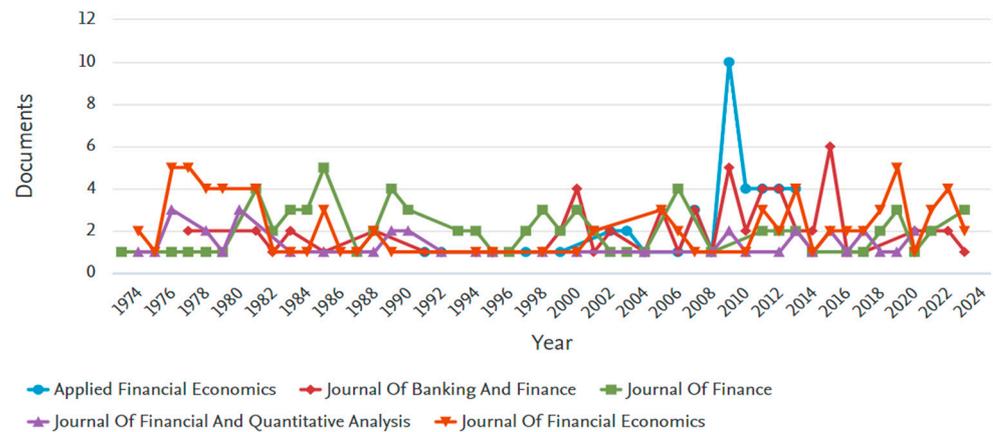


Figure 10. Year-wise publications in top 5 contributing journals in the field (author’s own processing).

A linear trend model was computed for a distinct count of titles (actual and forecasted) in a given year. The model may be significant at $p \leq 0.05$. The factor of the forecast indicator may be significant at $p \leq 0.05$. The p -value statistics helped us to reject the null hypothesis (H_0) and accept the alternative hypothesis (H_a), “There is significant linear trend for number of publications with the CAPM related area”, which helped us to achieve Objective 3 of the study. The outcome of the model, as outlined in the Appendix A, indicates a positive future trend in this research area. In outcome of forecasted trend line presented in Figure 11, we found a downfall in the number of annual publications in the last few years, good growth for the future is being seen in terms of numbers.

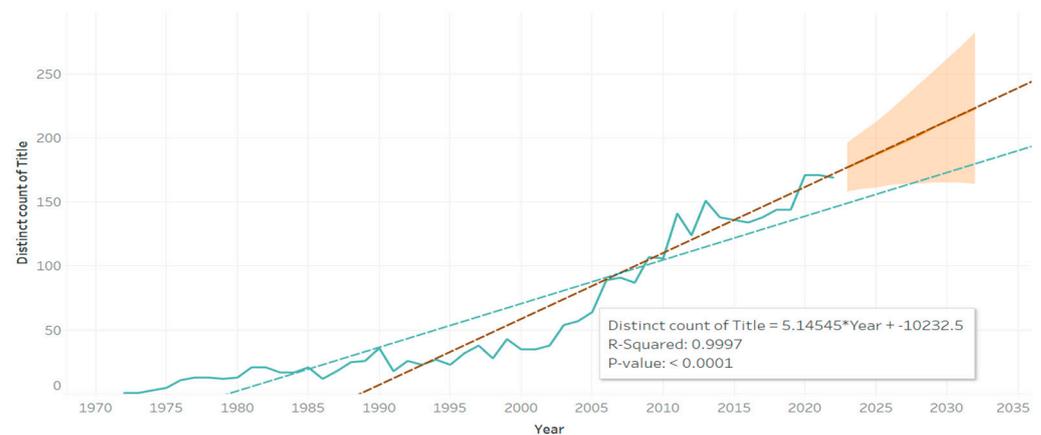


Figure 11. Future trends of research in the field (using Tableau) (author’s own processing).

6. Conclusions

The result of the current bibliometric study confirms the acceptability and growth of the CAPM in the finance research area in the last six decades. The study helps to provide some meaningful insights for academicians, researchers, reviewers, and editorial board members about the research trend and contribution of the CAPM. The CAPM has been used in various research in different subject areas with increasing recognition by scholars of different institutions and countries. The study findings suggest that the primary research area for the CAPM is to be used in publishing original empirical research of a high quality from the financial sector. This is attracting high-quality research work from researchers from various domains, like cost of capital, asset pricing, portfolio, risk management, beta, systematic risk, value premium, and many more.

The data available from Scopus reveal the growth in citations and geographical penetration, but the research area is still dominated by authors from the US, UK, China, and Australia.

The study used various techniques to examine the impact of the CAPM since its inception between 1972 and 2023. The study highlighted development in both publications and citations to measure productivity and reputation. Over time, the CAPM has transitioned from focusing on promoting and developing systematic risk and portfolio management research to a broader array of mainly the economics and econometrics categories. The findings suggest that quantitative research with essential words related to the cost of capital, capital structure, emerging market, asset pricing, and value premium dominates publications. The bibliographic coupling of articles established by the NBER (National Bureau of Economic Research) from the US and the CEPR (Centre for Economic Policy Research) from the UK are the top two contributing institutions.

An analysis of the evolution of new research in the area of finance and its relation with the CAPM explains its bright future. The result of the trend analysis is in favor of the CAPM and its acceptability in the research domain, even in the upcoming future. The p -value-statistics-based rejection of the null hypothesis (H_0) supports the relevance of the CAPM as an important research topic in the domain in the future.

7. Implications, Limitations, and Future Directions

This study has put forward and achieved three objectives to streamline the implications: Objective 1 helped to identify the trends in article publications over time and their key influence, along with the citation dynamics; Objective 2 provided a detailed analysis of the collaborative networks and research productivity to shed light on the global acceptance of the CAPM within the subject area; and Objective 3 aimed to provide the significant breakthroughs within the subject area, offering valuable insights into the intellectual landscape and the major future research directions.

By achieving these objectives, the study contributes valuable knowledge about the subject area's evolution, the contributions of various stakeholders, and the prevailing themes and ideas that have influenced its development. The current study based on the utilization and importance of the CAPM in the finance literature demonstrates the relevance of the concept in research, mainly in the fields of investment management, portfolio management, return, and risk aspects. Using the bibliometric method of highlighting the changes in the CAPM, the outcome can be used by researchers and academicians in the field to set their research agendas and plan their course delivery. The research outcome can also be suitable for professionals in the field of asset management to decide upon their dependency on the CAPM or any fundamental asset pricing model. Although the frequency of the CAPM usage in the literature has shown a downward trend in the last few years, the concept is still valid and helpful for the development of new portfolio management strategies. Additionally, the findings can serve as a foundation for future research agendas, inform decisions in academia, policy, and industry related to the fundamental investment model, contribute to the body of knowledge, and foster evidence-based decision making for stakeholders.

While our research has yielded valuable insights, it is essential to acknowledge some limitations that may have influenced the findings. The primary limitation lies in the selection of research articles for our study. We only considered 2000 articles out of a total of 317,300 available in the subject area. This sampling constraint could potentially introduce a bias in the results and limit the generalizability of our findings to the entire population of published articles.

To address the limitations mentioned above and enhance the robustness of the study, future research in this area can explore the following directions: the inclusion of all published articles, and extending the use of the model to other related studies or subject areas can be beneficial to the field and can advance one's understanding of the subject area. Ad-

ditionally, such efforts will strengthen the credibility and applicability of research findings in diverse contexts.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Appendix A.1. Trend Lines Model

A linear trend model was computed for a distinct count of titles (actual and forecasted) in a given year. The model may be significant at $p \leq 0.05$. The factor of the forecast indicator may be significant at $p \leq 0.05$.

Model Formula:	Forecast Indicator \times (Year + Intercept)
Number of modeled observations:	61
Number of filtered observations:	0
Model degrees of freedom:	4
Residual degrees of freedom (DFs):	57
SSE (sum squared error):	17,334
MSE (mean squared error):	304.105
R-Squared:	0.940849
Standard error:	17.4386
p -value (significance):	<0.0001

Appendix A.2. Analysis of Variance

Field	DF	SSE	MSE	F	p -Value
Forecast indicator	2	10,184.821	5092.41	16.7456	<0.0001

Appendix A.3. Individual Trend Lines

Panels		Color	Line	Coefficients					
Row	Column	Forecast Indicator	p -Value	DF	Term	Value	StdErr	t-Value	p -Value
Distinct count of titles	Year	Estimate	<0.0001	8	Year	5.87273	0.0340151	172.651	<0.0001
					Intercept	-11,710.3	68.9656	-169.798	<0.0001
Distinct count of titles	Year	Actual	<0.0001	49	Year	3.13231	0.178921	17.5067	<0.0001
					Intercept	-6198.77	357.314	-17.3482	<0.0001

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