

# Asset pricing and Factor investing: Bibliometric Analysis Overview (1993-2022)

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## Abstract

This paper presents a bibliometric analysis of relevant asset pricing and Factor investing publications. The article utilizes a bibliometric approach and, in doing as such, considers measures, for example, but not restricted to h-index, annual publications, citation structure, total citations, citation per publication ratio, most productive authors, institutions, and countries, and keyword analysis.

**Keywords:** Bibliometric analysis, Asset pricing, Factor investing, VOSviewer

## Introduction

In terms of research content, asset pricing is the core of modern financial theory and is also one of the significant vital research areas. By the early 20th century, financial experts have put forth many theories and models. Each model has been extensively tested and applied from the single Factor to the multi-factor model, and financial experts have also discovered the new model. Huo Qiuju (2020) Using listed businesses in the ASM as a sample, we observed that there is a scale premium in China's capital market and that it is more pronounced in small companies, suggesting a direction for the enhancement of the CAPM model, namely, to add the scale premium factor. Sharpe (1964) and Lintner's (1965) Mean-variance CAPM were proposed. The CAPM model explains how the price of a security is determined by its risk or how a balanced price is generated. Since the proposed asset pricing model, the academic community has presented other price models. Fama, French (1993) The FTFM, which was generally acknowledged by the academic community and became the research model for the multi-factor Pricing Model, was proposed. Consequently, the academic community's CFFM, FFFM, and QFM are the predominant pricing models in the current financial business. After years of expansion, China's securities market has steadily become an influential capital market. More and more researchers began to focus on the ASM, and empirical research on the applicability of pricing models in the ASM is being conducted to investigate the application of these models in the ASM and design a more suitable pricing model for the ASM. (DeGeorge, Patel, & Zeckhauser, 2005). This study primarily contributes to four different areas. First, to the best of the author's knowledge, this is the first study that has explicitly done a bibliometric analysis in combination with asset pricing and Factor investing. Second, this is the first study that has expressly done a bibliometric study of The choice to integrate them was made since it seemed to be relevant because one body of research within CAPM specifically discusses the motivational aspect of a manager and how it motivates them to engage in earnings management.

## Conceptual background

EU theory says people want to smooth future spending by balancing current expenditure and savings (Von Neumann and Morgenstern, 1944). The savings accumulated at time  $t$  are invested to maximise or stabilise future consumption, but risk scares investors. Risk affects the discount rate and helps investor's price assets. Risk definition and quantification are debated (Roy, 1952; Libby and Fishburn, 1977). In economics, the risk is the dispersion of expected returns, measured by variance or standard deviation. Markowitz's mean-variance optimisation theory justifies utilising standard deviation in finance (1952). The theory assumes quadratic utility and normal returns. Investors can maximise their EU by maximising a portfolio's anticipated returns for a given level of variation or by minimising the portfolio's variance for a given level of expected returns. Markowitz (1959) provides MPT to create a mean-variance efficient portfolio. Diversification reduces investor risk. MPT identifies two risks: market volatility (systemic risk) and firm-specific concerns (idiosyncratic risk). Systematic risk is an external issue that all market-operating enterprises cannot manage. Diversification eliminates the idiosyncratic risk. Therefore, only systematic/market risk should be rewarded. Sharpe (1964) proposes an equilibrium model for a competitive (frictionless) market where investors are mean-variance optimizers.

## The capital asset pricing model

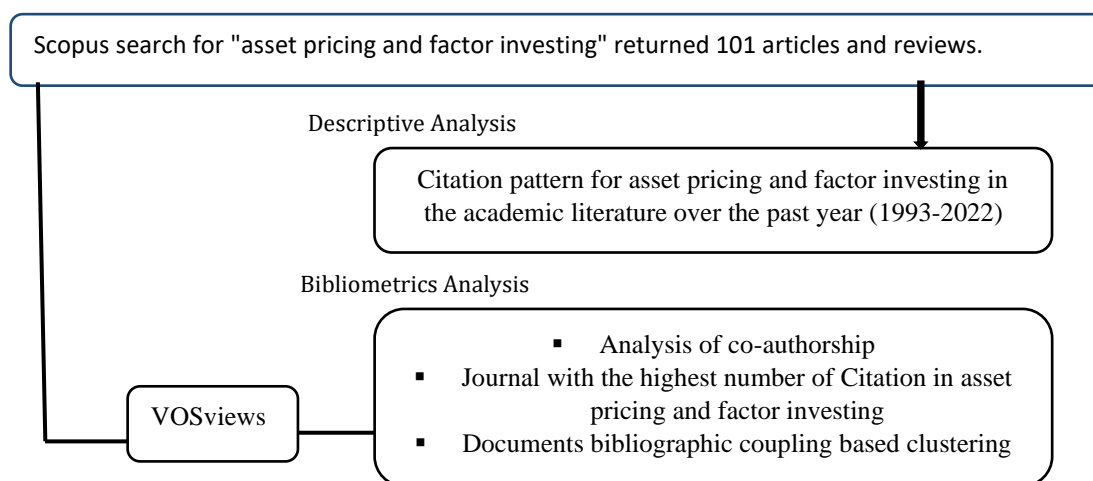
Sharpe (1964) and Lintner introduced and refined the CAPM (1965). The CAPM is a single-factor model that only incorporates systematic risk (beta) and promises to describe all cross-sectional variations in stock returns. It offers a steeper security market line (SML) with proportionally larger returns for increasing market risk. The risk-return trade-off given by the CAPM sounds logical, but it has significant drawbacks. Few research (Fama et al., 1969; Blume, 1970; Fama and MacBeth, 1973) supported the CAPM model, but others revealed inconsistent results (Black, 1972; Black et al., 1972; Merton, 1973; Ross, 1976). Contrary results largely reject the model, indicating that the positive association between market risk ( $\beta$ ) and average return is too flat. Positive (negative) anomalous intercepts for lower (higher) beta portfolios indicate higher (lower) risk-adjusted returns to riskier equities.

Cross-sectional effects in stock returns are shown by the common anomalies that go against the CAPM. Banz (1981) shows that the size of a company affects cross-sectional returns. He also says that the CAPM is wrongly set up because small companies have higher risk-adjusted returns and large companies have lower risk-adjusted returns. The B/M effect is found by Stattman in 1980 and Rosenberg et al. in 1985. Their results show that stocks with higher (or lower) B/M ratios have higher (or lower) risk-adjusted cross-sectional returns. Fama and French (1992) also show that the size effect and the value effect are very real in the cross-sections of stock returns. They use this information to create a three-factor asset pricing model in 1993. The three-factor model is an extension of the CAPM. It adds two new factors: the small size minus the big size effect and the high value minus the low-value effect. When De Bondt and Thaler (1985) look at the market overreaction hypothesis, they find that in the long run, losers can do better than winners. Using a portfolio horizon of 36 months, they show that stocks that have lost in the past do better than stocks that have won in the past by almost 25% per year on average.

## Research Methodology and Data

This study used the Scopus database for analysis. Scopus and Web of Science (WoS) have just happened the most used and reliable databases for scientific publications. Although WoS is considered a proven data source, Scopus was recently developed into a popular database analysis (Merig et al., 2020). There are few bibliographic studies. The first supports using the WoS database in Scopus because it lists future releases. 1900 while Scopus has been since 1966 (Paule-Vianez et al., 2020). This study used Scopus as a history of both scientific disciplines, resulting in no articles or data points lost. The field of research is not old. After first searching for "asset pricing" as the primary keyword for "title, abstract, keywords," the database returns item 101 with access to data from the Scopus database for 29 years, without Quotation.

## Documents screening and bibliographical data retrieval

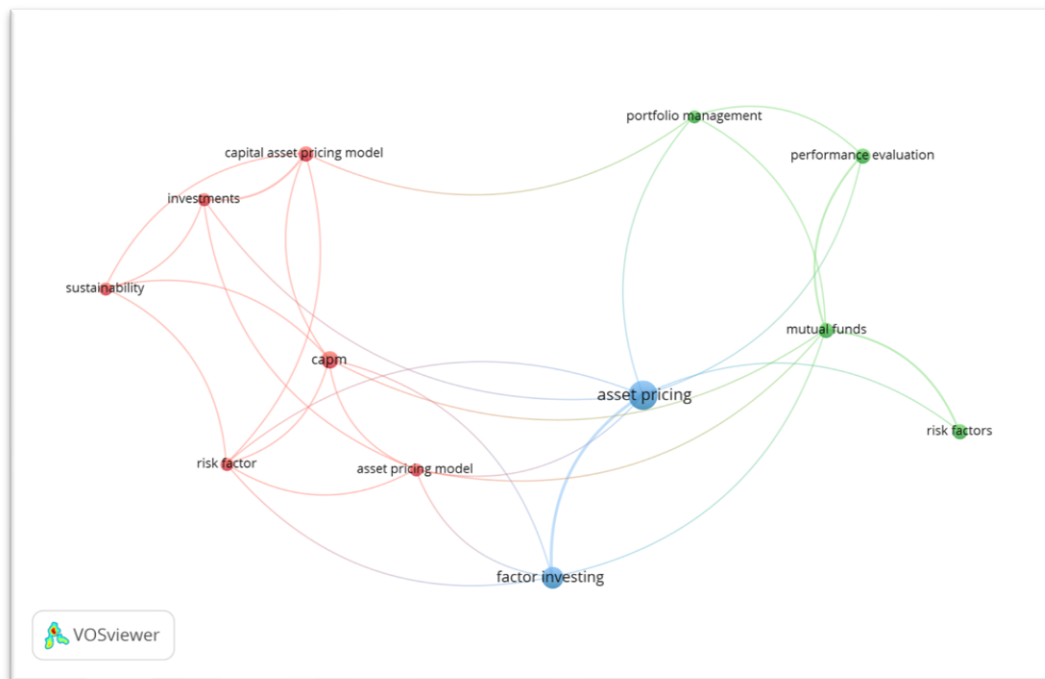


## Network Visualisation of Data through VOS viewer

In the following subsections, network analysis of co-occurrence of keywords, and bibliographic coupling of sources and authors have been carried out.

## ANALYSIS OF CO-OCCURRENCE OF KEYWORDS

Similar terms were aggregated before analysis. The default minimum keyword occurrence in a publication was 5. 258 of 4557 keywords matched. But the crowded image prevents useful analysis. The minimal keyword occurrence was preserved at 1. Too much minimum occurrence risked leading to too few keywords. The minimum keyword occurrence of 14 was optimal.



**Figure: Network Visualization of Co-occurrence of Keywords (Vosviewer)**

Each cluster has been identified by a theme the description of which is given below:

### Cluster 1: Asset Pricing model and CAPM

This cluster has been highlighted in red for your convenience. Next to the keyword "Asset pricing and factor investing", "Asset pricing model" has been found a total of 100 times, making it the most prominent keyword of this cluster. Following closely after in second place is the keyword "CAPM," which appears 43 times in total. "Investments," "risk factor," and "sustainability" are three other prominent keywords that are associated with this cluster. The concept that asset price might cause a CAPM to deviate from its intrinsic value is one of the significant ideas that come from this cluster. Another concept stemming from this cluster is how asset investor behaviour can lead to momentum chasing or volatility financial market recent research has shown that asset pricing can be obtained from social media by conducting a textual analysis of posts.

### Cluster 2: Mutual Funds and Performance Evaluation

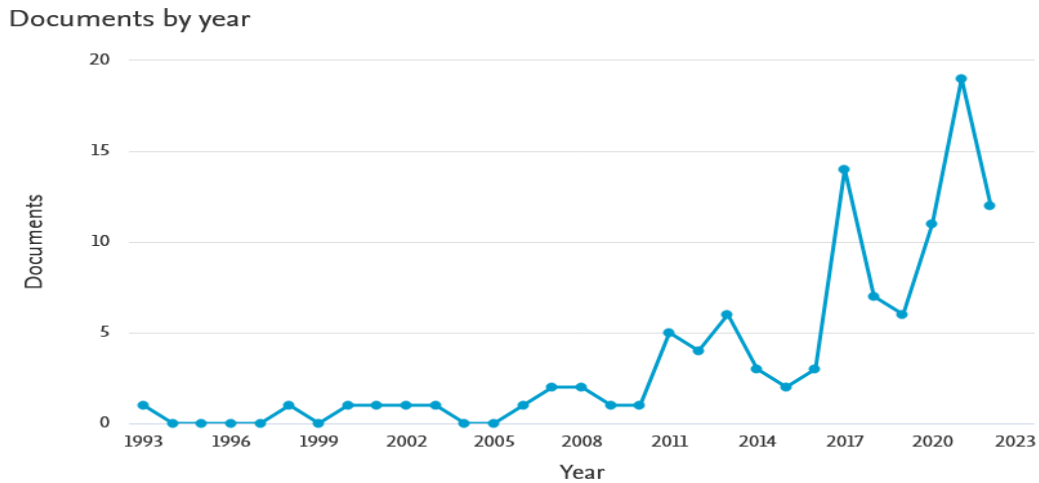
The lines in the colour green have been used to illustrate this cluster. The keyword "Mutual fund" appears the most frequently (60) and has the highest overall link authority (90). After this, the phrase "performance evaluation" has been provided as the following keyword (62 occurrences). The phrases "portfolio management" and "risk factors" are also very important keywords.

### Cluster 3: Asset pricing and factor investing

The line shown in dark blue colour has been used to explain this cluster, the keywords asset pricing, and factor loading appear to be the most prominent keywords used by many authors

### Analysis of the Result

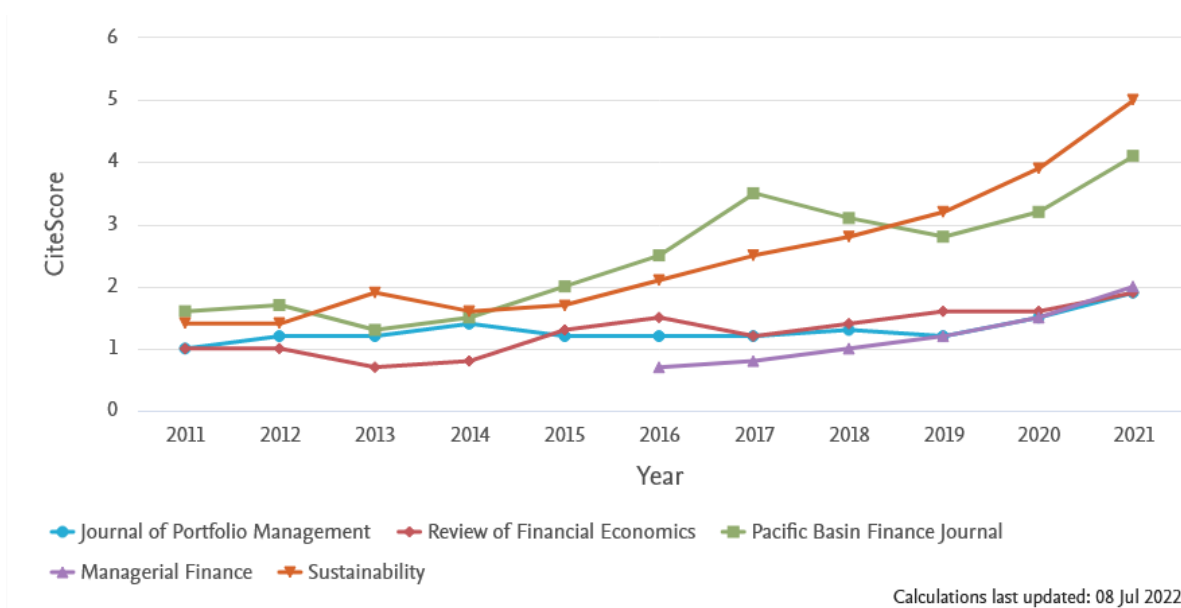
The Graph has been shown below:



**Figure: Document by Year Source: Scopus websites**

As is shown in the graph, the growth of the publication in the title of the asset pricing including factor loading has been started from the year 2008 to 2020 and 2023.

**Cite Score Publication by Year**



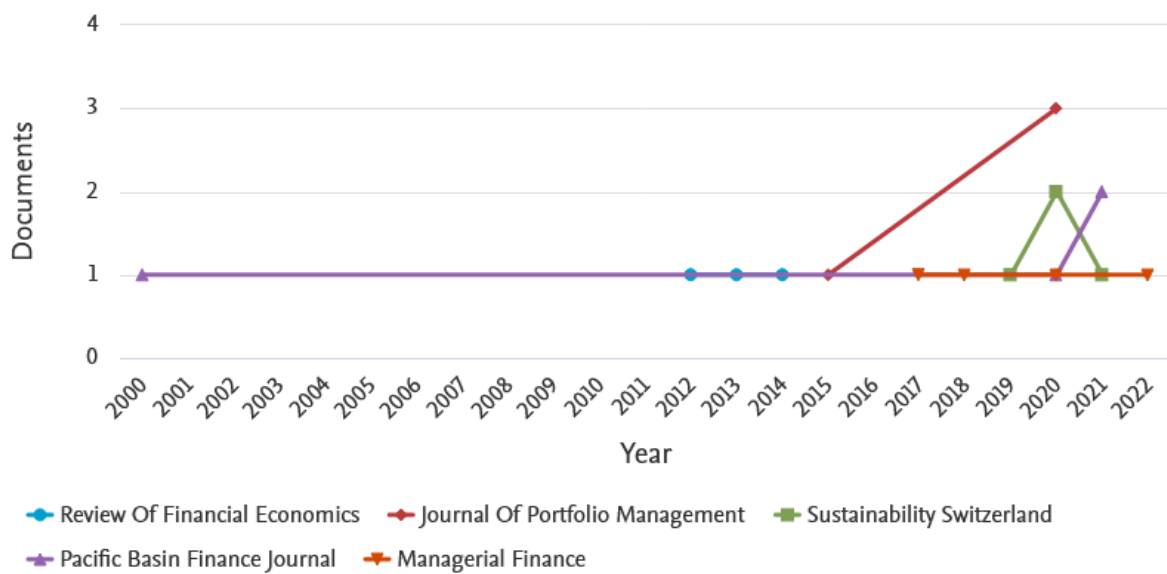
**Figure: Cite Score Publication by Year**

Source: Scopus websites

Sustainability has shown the most cites core followed by Pacific Basin Finance Journal and Review of financial economics and so on.

Source ↑	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
Journal of Portfolio Management		1	1.2	1.2	1.4	1.2	1.2	1.2	1.3	1.2	1.5	1.9
Review of Financial Economics		1	1	0.7	0.8	1.3	1.5	1.2	1.4	1.6	1.6	1.9
Pacific Basin Finance Journal		1.6	1.7	1.3	1.5	2	2.5	3.5	3.1	2.8	3.2	4.1
Managerial Finance						0.7	0.8	1	1.2	1.5	2	
Sustainability		1.4	1.4	1.9	1.6	1.7	2.1	2.5	2.8	3.2	3.9	5

**Table 1: Cite Score Publication**

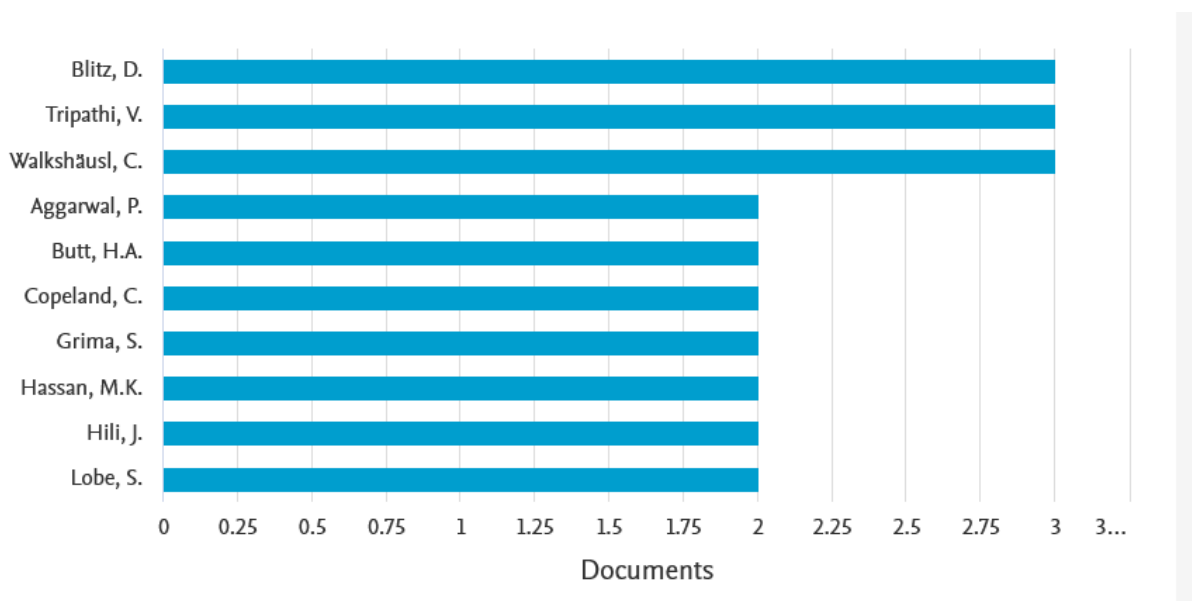


**Figure: Document Per year by Source**

Source ↑	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
Review of Financial Economics		1	1	0.7	0.8	1.3	1.5	1.2	1.4	1.6	1.6	1.9
Journal of Portfolio Management		1	1.2	1.2	1.4	1.2	1.2	1.2	1.3	1.2	1.5	1.9
Sustainability		1.4	1.4	1.9	1.6	1.7	2.1	2.5	2.8	3.2	3.9	5
Pacific Basin Finance Journal		1.6	1.7	1.3	1.5	2	2.5	3.5	3.1	2.8	3.2	4.1
Managerial Finance						0.7	0.8	1	1.2	1.5	2	

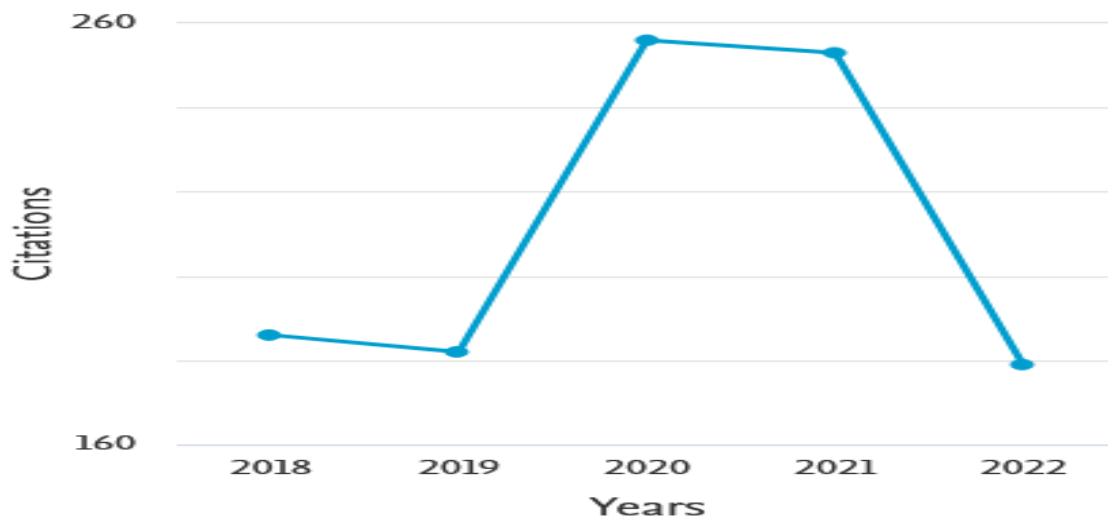
**Table: Document Per year by Source**

This table shows the document per year by source as it is increasingly carried out from 2011 to 2021 which reflects that asset pricing is a hot topic for research in finance.

**Document by Author****Figure: Document by Author****Co-citation analysis**

- Most-cited documents

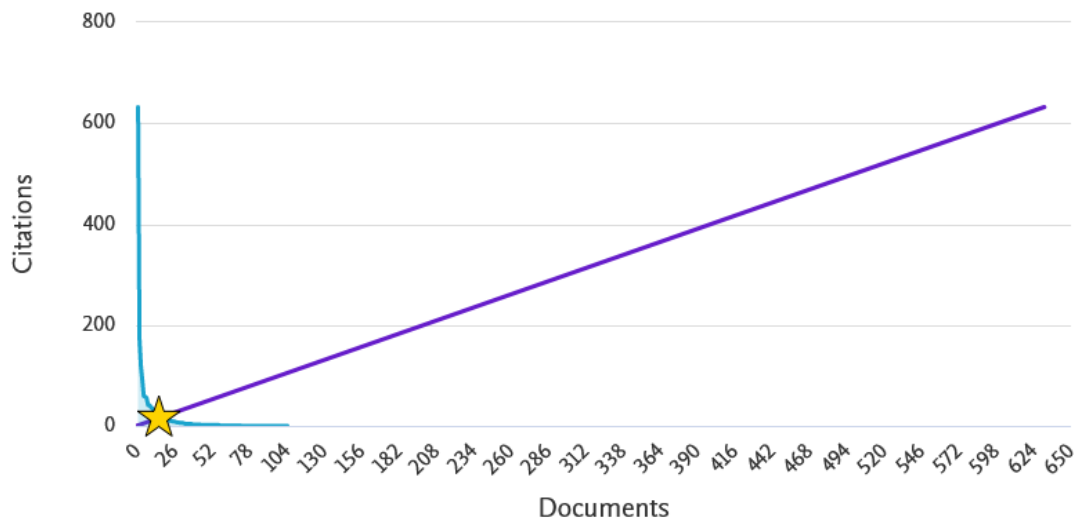
In academia, citations are used as a way to measure how important an article, author, or journal is. People think that authors of highly cited articles are important in their research fields, and journals are ranked by how often their articles are cited. Citations are seen as feedback from the academic audience, and they show how good an article is and what it adds to a certain field.



Source: Scopus websites

These documents *h*-index

16

Of the documents considered for the *h*-index, 16 have been cited at least 16 times

Source: Scopus websites

Co-citation analysis was introduced by Small (1973) and Pilkington and Liston-Heyes (1999). At least two papers co-cite when a third piece cites both. This interlinking reveals the articles' shared knowledge base. Co-citation analysis finds pertinent studies in the growing literature. Using co-citation analysis, a researcher can find relevant material. This can help a new researcher locate the research frontier. Co-citation analysis lets authors locate other authors with whom they could cooperate, which was previously impossible owing to lack of awareness. Co-citation analyses reveal past and current trending research themes. We build a VOSviewer file for co-citation analysis the average path length between nodes is 1.908 and the average clustering coefficient is 0.256, demonstrating the nodes' entire neighbourhood.

Cluster-based studies of asset pricing research categorize the total study into multiple dimensions of extant literature, but all of these subareas must be viewed together. Clusters of articles show the evolution of asset pricing research; together, they complete the picture. Cluster 4 criticizes the most recognized single-factor asset pricing model (CAPM) and reveals its statistical inadequacies, paving the way for a multifactor explanation of cross-sectional average returns. Cluster 3 shows cross-sectional anomalies have anomalous returns. The cluster uses momentum- and reversal-based investment strategies to capture unusual returns. Cluster 2 advocates multifactor asset pricing models and documents their improved performance compared with cross-sectional returns. Cluster 1 generalizes multifactor asset pricing models worldwide. These models' international empirical tests show various cross-country premiums

### Conclusion, limitations, and directions for future research

As a significant area of financial theory and practice, asset pricing theory is a vital part of the financial and investing community. Even though it has been studied a lot and more papers are being written about it, the recent increase in papers shows how deep and useful asset pricing theory is. Consequently, this study will evaluate the history of asset pricing theory and identify future research areas. For purpose of better understanding the current state of asset pricing theory and the potential directions in which it could go, this study examined 3,007 documents from the Scopus database that were published over 48 years (1973–2020). These documents were culled from an extensive literature review and bibliometric analysis. Asset pricing research is mostly funded by contributions from the United States, the United Kingdom, Australia, and other countries in North America and Europe. Karolyi (2016) concluded that there was a lack of research from emerging nations on asset pricing, and this finding is consistent with our study. Following Robert Faff on the list of most prominent asset pricing researchers

are the following authors: Fama; French; Harvey; Peterson; and Yuming Li. Results show that these authors are from developed countries, which shows that asset pricing is influenced by their country's capital markets. Developed countries dominate asset pricing research.

Asset pricing study includes CAPM, liquidity, momentum, equity premium, market efficiency, and international asset pricing. Keyword co-occurrence and page rank analysis show that CAPM criticism, multidimensional risk-return explanation, momentum, and other cross-sectional effects, market frictions and stylized facts, and international asset pricing are five different clusters, each representing a vital sub-area of asset pricing research and the overall frontier of asset pricing theory.

These discoveries are essential for future researchers. It may help them analyze asset pricing studies and suggest new options to pursue by linking the sub-fields highlighted in this study. In relevant sections of the publication, the study summarises existing asset pricing studies, which could be helpful to future scholars.

The findings may also help policymakers determine resource allocation in asset price sectors with a positive trend. Overall, the article's insights are useful for researchers at different stages of their careers, from doctoral students (who want a broad overview of asset pricing to guide their work) to senior researchers (who want to publish authoritative literature reviews and look for involved research avenues).

In terms of future research directions, our study firstly shows that significant work has already been done in developed countries and that emerging areas have not been adequately covered. Consequently, more rigorous and relevant approaches can be used in the future to study market frictions such as information inefficiency, leverage limits, concerns with micro and macro market structure, and stylized facts like more skewed stock returns and more volatility. As a result, undertaking asset pricing research in emerging countries will yield new insights into asset pricing theory, which will ultimately enrich the body of knowledge

As a result of the increased cross-border movement of money, we now live in a globally interconnected society where investing presents new cross-border issues. Foreign political and economic stability has a direct impact on international investment and opens up new avenues for asset pricing research in the international market. An additional way to better understand investor mood and its effect on asset prices is to use behavioral finance rather than simply expanding the number of mathematical models. To further understand how price discovery methods affect asset values and the beliefs of heterogeneous investors, more experimental investigations are needed. In addition, because severe events occur on a regular basis in the financial markets, investors' asymmetric responses to these events affect the cross-sectional explanation of predicted stock returns (Barro, 2006). To put it another way, research shows that investors are more concerned by sudden drops in price than they are about the daily fluctuations in their portfolio values.

This type of behavior by investors reveals an increased concern about catastrophic risk (Huang et al., 2012). In spite of this, the study's keyword analysis and other bibliometric statistics demonstrate that the paradigm of risk has not changed significantly over time. Asymmetric risk aversion can be better understood by examining more appropriate definitions of asymmetric risk, such as downside risk, tail risk, catastrophic risk, and other forms of asymmetric risk. Another potential trend for asset pricing research is to focus on market inefficiencies, micro-market structure difficulties, the creation of nested multifactor asset pricing models, and the inclusion of more effective approaches.

Although the study gives some interesting results connected to existing asset pricing research and suggests some future research possibilities, there are significant limits to the findings. The study's main restriction is that it only looked at articles published in the top 50 financial and economic journals since 1973. This time frame was deliberately selected to capture the most important papers in the discipline while also minimizing the clutter caused by a large number of minor publications. Some suggest that deleted papers could bring new insights into the current asset pricing research.

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