Trend Analysis of Journal of Finance Based on Web of Science Database

Shidi Liang*
School of business, Sichuan University, Chengdu, China

*Corresponding author e-mail: liangshidi@stu.scu.edu.cn

Abstract. Web of Science is a website which provides subscription-based access to multiple databases that provide comprehensive citation data for many different academic disciplines. Based on the Web of Science database, this paper used Citespace and Bibliometric to analyze the research articles published by Journal of Finance in recent ten years. Through the co-occurrence analysis, keyword analysis and trend analysis of the papers published by Journal of Finance, we can be more familiar with the use function of such measurement tools, which can help us explore the research status, research hotspots and future research directions in different fields to understand the research changes and improve the system construction.

Keywords: Web of Science, Citespace, Bibliometric, Journal of Finance

1. Introduction
Journal of Finance is an official journal of the American Institute of finance, which covers almost every field of financial research. This journal is one of the most cited journals in financial and economic field.

In this paper, Citespace and Bibliometric are used to visually analyze the published papers of Journal of Finance from 2010 to 2020. This article will also be introduced from the following four aspects:

a) Through Bibliometric to count the number of papers published in Journal of Finance every year.

b) Through Citespace to count the authors and main institutions of papers published in this field, determine the cooperation of Journal of Finance by using the co-occurrence network.

c) Through Citespace to study the co-occurrence of keywords, and then cluster the keywords to find out the main hot spots and trends of the papers published by the Journal of Finance.

d) Through Bibliometric analysis of Journal of Finance research hotspots to determine the future development trend.

2. Research Framework

2.1. Data Sources
This study aims to make a systematic, comprehensive and objective visual analysis of the papers published by Journal of Finance through Bibliometric software. Web of Science is a website which...
enables the user to acquire, analyze, and disseminate database information in a timely manner. Therefore, Web of Science database is selected as the retrieval database in this paper.

Search conditions: Taking Journal of Finance as the research object, 759 relevant literatures were retrieved from 2010 to 2020. Record and copy the retrieved literature, delete the duplicate literature, and set the type as article, and finally 727 valid documents will be obtained.

2.2. Research Methods
Taking the Journal of Finance published in the Web of Science database from 2010 to 2020 as the research object, this paper uses Citespace and Bibliometric to visually analyze the literature.

Citespace can present four types of visualization maps: the first is the co-occurrence knowledge network map of authors, research institutions and countries; the second is the co-citation relationship between references and authors; the third is keywords and terms; the fourth is research fund. Citespace can be used to study important scholars, research institutions, hot topics and research trends in a certain field, and show the sudden surge of new research topics within a specific time frame in a visual way. Bibliometric is an r-environment software package developed by Dr. arie, which can be used for quantitative and visual analysis of scientific literature, which includes the source, author, conceptual structure and social structure of the research object.

Using Citespace and Bibliometric at the same time can solve the problems more quickly and effectively to help us make a better visual analysis of Journal of Finance.

3. Statistical Analysis of Papers Published by Journal of Finance

3.1. Time Analysis of Literature Output
The annual distribution of literature is an important dimension of Bibliometric analysis, which can reflect the development degree and trend of the major financial fields covered by the journal to a certain extent.

In this study, it should be noted that the deadline of included literature is July 15, 2020, so the number of literature in 2020 is not the total number. It can be seen in Figure 1 that the number of papers included in journals has decreased, but the research on papers has begun to develop in the direction of depth, lean and high quality, and its innovation and breakthrough are also constantly developing.

![Figure 1. Change and linear prediction of Journal of Finance from 2010 to 2020](image)

3.2. Main Researchers, Institutions and Their Cooperation
Through the analysis of high-yield paper authors and high-yield research institutions, we can find out the popular authors and research institutions of journals to better understand the activity law and research scope of the famous researchers' institutions.

In order to explore the influential authors in Journal of Finance published papers, run Citespace, set the time span as "2010-2020", timeslice as "1", nodetype as "Author" and "Top N=50". The top three influential authors are shown in Table 1.

| Rank | Author | Publication Year |
|------|--------|-----------------|
| 1    |       |                 |
| 2    |       |                 |
| 3    |       |                 |
Table 1. Distribution of authors' influence and highly cited papers in Journal of Finance

| Number | Author          | h-index | Number of published | Times cited |
|--------|-----------------|---------|---------------------|-------------|
| 1      | STULZ RM        | 6       | 6                   | 148         |
| 2      | TITMAN S        | 5       | 8                   | 398         |
| 3      | BOLTON P        | 5       | 6                   | 226         |
| 4      | WEISBACH MS     | 5       | 6                   | 200         |
| 5      | ACHARYA VV      | 5       | 9                   | 107         |

As can be seen from Table 1, the most influential authors are Stulz, Rene m, who published six articles from 2010 to 2020. Among these articles, "This time is the same: using bank performance in 1998 to explain bank performance during the recent financial crisis" [1] published in 2012 has been cited the most, up to 148 times. Titman Sheridan, the second most influential group, published eight articles. Among these articles, "Individualism and momentum around the world" [2] was cited most frequently, up to 398 times. Bolton is the third most influential author, Patrick's article "The credit ratings game" [3] has been cited 226 times. Weisbach, Michael S, the most frequently cited article "The credit ratings game" [4] is proved that the vast majority of cross-border M & A involve private companies outside the United States. Acharya, viral V has published nine articles, of which the most cited article is "Leverage, more hazard, and liquidity" [5].

Through the co explicit analysis of the author, it is found that the common nodes N=65, the network E=18, and the network is obviously less than the nodes, indicating that the author's research is relatively scattered. Through Bibliometric quantitative analysis tool, we can see that there are mainly two cooperative groups (with Titman, Sheridan and Weisbach, Michael S as the center).

Figure 2. Co-operation of authors of Journal of Finance from 2010 to 2020

Running Citespace, setting the time span as "2010-2020", timeslice as "1", and selecting "institution" for nodetype, we can get the institutional co-occurrence knowledge network map with node N = 52, network E = 107, density = 0.0807. As can be seen from Figure 3, the largest institutions are the National Bureau of economic research, followed by the University of California system and so on.

The larger the node is, the more papers will be sent. The number of connections indicates that the cooperation between institutions is close. As the number of networks in the graph of institutional co-occurrence knowledge network is obviously less than that of nodes, we can draw the conclusion that academic cooperation among institutions is relatively scattered.
3.3. Analysis of the Number of Papers Issued by Each Country

By analyzing the number of papers published in different countries, it can be found that the countries publishing articles in Journal of Finance are relatively single. Running Citespace with time span of "2010-2020", timeslice of "1" and nodetype of "country" can obtain the national network knowledge co-occurrence map with node N = 3, network E = 2 and density = 0.06667.

It can be seen from Figure 4 that the United States has the largest number of nodes, followed by the United Kingdom and China. This shows that the research progress in the financial field of the United States is far more than that of other countries.

3.4. Analysis of CO Cited Literatures

The citation frequency of literature can reflect its classical degree and influence to a certain extent. Generally, the contents and viewpoints of the high cited literatures are often used to carry out the next research. Running Citespace with time span of "2010-2020", timeslice of "1" and nodetype of "reference" can obtain the knowledge co-occurrence map of CO cited literature with node N = 1066, network E = 2949 and density = 0.0045. It can be seen from Figure 5 that there is a close relationship between the co citations.
Among them, Petersen Ma's article "Estimating standard errors in finance panel data sets: comparing approaches" [6] published by Petersen MA in 2009 has been cited 43 times. Secondly, MK. Brunnermeier's article "Market liquidity and funding liquidity" [7] published in 2009 was cited 30 times. The third one was the article "A five factor asset pricing model" [8] published by Fama EF in 2015, which was cited 24 times. The fourth article is "The sequences of mortgage credit expansion: evidence from the U.S. mortgage default crisis" [9] published by MIA a. The fifth is the article "Asset pricing with liquidity risk" [10] published by Acharya w in 2005, which has been cited 16 times.

Figure 5. Analysis of Journal of Finance Co cited literatures from 2010 to 2020

4. Analysis on Research Hotspots of Journal of Finance

4.1. Keyword Analysis

Through the visual analysis of high-frequency keywords, we can identify the hot issues in the field of journal research. The higher the intermediary centrality of keywords is, the more connections between other keywords are, and the more important the domain research is. Among the high-frequency keywords published by Journal of Finance, the most concerned one is that the frequency of occurrence of "risk", followed by "market" and "return".

Citespace is used to cluster the keywords in literature. The time span is set as "2010-2020", timeslice is set as "1", nodetype is selected as "keyword" and selection criteria is set as "Top N% = 10%.

We can also know that the research hotspots of Journal of Finance in 2010-2020 mainly focus on two categories. The first one is mainly described by keywords such as "risk" and "market"; the second one is described by keywords such as "strategy" and "maintenance".
4.2. Theme Trend Analysis
According to the evolution process of the discipline, the development trend of the discipline can be identified and judged. As can be seen from Figure 7, the focus of research has gradually shifted from the characteristics of financial instruments to the corresponding investment and price returns. Research topics have gradually shifted from external and investment to internal and return.

Figure 6. Keyword clustering analysis results of Journal of Finance papers

Figure 7. Topic evolution of Journal of Finance papers from 2010 to 2020

5. Analysis of Research Direction
Through the above statistical analysis of research content and research trend, the future research direction is studied. It can be seen from Figure 8 that the research prospect of risk and investment is relatively broad. Decision making has not played an important role in the development of this field, and the research of market and quality is also in a relatively marginal field.

Figure 8. Analysis on research fields of Journal of Finance papers
Emergent words are the key words that appear suddenly in a certain research stage, which can be used to reflect the research trend of journals in a certain period of time. This paper analyzes the hot words in Journal of Finance to further explore the research frontier in this field.
Run Citespace, select "keyword" for nodetype, set other parameters the same as the above research hotspot parameters, and perform burst value (burstness) for keywords value operation, we can get the keyword emergence period table, select the mutation words in the last five years, as shown in Table 2.

Table 2. Highlights of hot words in Journal of Finance papers

| Key word          | Strength | Begin | End   |
|-------------------|----------|-------|-------|
| Impact            | 2.9691   | 2016  | 2018  |
| Dynamics          | 3.2625   | 2017  | 2018  |
| Expectation       | 5.4526   | 2018  | 2020  |
| Expected return   | 3.0039   | 2018  | 2020  |
| Financial market  | 2.617    | 2018  | 2020  |

6. Conclusion

Based on Web of Science database, this paper uses Citespace and Bibliometric methods to visually analyze 727 papers published in financial journal from 2010 to 2020.

Since 2010, the number of papers published by scholars has declined, but the quality of research papers have been continuously improved. Through CiteSpace co-occurrence analysis, we can see the cooperation between authors, institutions and citation literature. Through the Bibliometric analysis, we can see that the papers has shifted from external and investment to internal and return, and the hot topics currently focus on risk and investment but we should also pay attention to the relevant information of financial risk supervision and investment in the future.

It is hoped that the research results of this paper can provide valuable reference information for us to use measurement tools, and help us understand the changes in the financial field to determine the research direction in the future.

References

[1] Fahlenbrach, R., R. Prilmeier and R.M. Stulz, {This Time Is the Same: Using Bank Performance in 1998 to Explain Bank Performance during the Recent Financial Crisis}. {JOURNAL OF FINANCE}, 2012. {67}(6): p. {2139-2185}.

[2] Chui, A.C.W., S. Titman and K.C.J. Wei, {Individualism and Momentum around the World}. {JOURNAL OF FINANCE}, 2010. {65}(1): p. {361-392}.

[3] Bolton, P., X. Freixas and J. Shapiro, {The Credit Ratings Game}. {JOURNAL OF FINANCE}, 2012. {67}(1): p. {85-111}.

[4] Erel, I., R.C. Liao and M.S. Weisbach, {Determinants of Cross-Border Mergers and Acquisitions}. {JOURNAL OF FINANCE}, 2012. {67}(3): p. {1045-1082}.

[5] Acharya, V.V. and S. Viswanathan, {Leverage, Moral Hazard, and Liquidity}. {JOURNAL OF FINANCE}, 2011. {66}(1): p. {99-138}.

[6] Petersen, M.A., {Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches}. The Review of Financial Studies, 2008. 22(1): p. 435-480.

[7] Brunnermeier, M.K. and L.H. Pedersen, {Market Liquidity and Funding Liquidity}. The Review of Financial Studies, 2008. 22(6): p. 2201-2238.

[8] Fama, E.F. and K.R. French, A five-factor asset pricing model. Journal of Financial Economics, 2015. 116(1): p. 1 - 22.

[9] Mian, A. and A. Sufi, The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis. 2009. p. 1449-1496.

[10] Acharya, V.V. and L.H. Pedersen, Asset pricing with liquidity risk. Journal of Financial Economics, 2005. 77(2): p. 375 - 410.