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Research Article

Understanding Corporate Borrowings Literatures: A Systematic Literature Review and Bibliometric Approach

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ABSTRACT

Corporate borrowings being a significant driver of firm's performance and value, have garnered the attention of scholars across the globe. Further, efforts have also been exerted by the scholar community to analyse its determinants as well as its effect on firm performance and value. In this context, this study aims to explore the key areas, most influential authors, widely used keywords, most studied countries and also suggests future research directions in the field of corporate borrowings. This study has used a systematic literature review methodology and bibliometric analysis with a sample of 708 studies taken from both Scopus and Web of Science database over the period from 1994 to 2022. Though these studies have been attempted throughout the world but majority of countries are the new participant in the field of corporate borrowings. The sluggish growth of literature in this field is due to lack of collaboration, focus on cross-country analysis, inter-industry comparison and focus on small firm. Further, the study reveals that though some areas like Capital structure, Debt maturity and Corporate debt have been amply addressed but areas like Cost of debt, Credit risk, Debt structure, Environmental, Social & Governance (ESG), Economic Policy Uncertainty (EPU), Information asymmetry, Corporate bonds and Ownership structure have been given very least attention which can be studied as a future research agenda.

Keywords: Corporate Borrowings, Corporate Debt, Systematic Literature Review, Bibliometric Analysis, Cluster Analysis, Scopus, Web of Science

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INTRODUCTION

Financial resources are the basic requirement for commencement, carrying on and survival of any business. The financial resources for the business can be acquired from the owner of the business in the form of equity or from the outsiders in the form of borrowings. The financial resources, be they borrowings or equity and their strategic implementation have a significant bearing on the company's performance.[1] Each source of financial resources caries cost to the company and dictates the application of such resources. In a friction free market as stated by Modigliani & Miller,[2] there is no difference in the choice between equity and debt as far as the management's objective of firm value maximization is concerned. However, the market in reality grapples with lot of frictions thereby creating a wedge between the equity and borrowings. Corporate borrowing is a crucial source of finance and gaining growing popularity. But the management must carefully consider this option when making financial decisions as it brings tax shield benefits and magnifies return to the equity shareholder as well as brings costs in the form of fixed charges, bankruptcy and financial distress. It means borrowings involve both benefits and costs which in turn can elevate or dampen the firm value. On the other hand, though equity is the owner's capital and does not bring fixed charges for the firm but it carries higher degree of risk and higher cost of fund thereby puts an ambivalent effect on firm value. Hence, financial managers face challenges in balancing the need for value maximization and the choice of sources of funds for the business. Further, in recent times, the responsibility of financial managers to operate in a socially and environmentally responsible manner[3] redefines the nexus of the sources of funds with firm performance and value. Therefore, recognizing the importance of borrowings in business sustainability, in the last two decades researchers have given significant attention to analyze various factors that affect corporate borrowings and their relationship with firm performance.

Though, a significant number of researches have been undertaken across the globe concerning corporate borrowings, there is no such work has been made to synthesize all those studies. The very objective of synthesizing these studies is to give a full picture of the exiting literature on corporate borrowings and its connected dimensions so as to develop a thorough understanding about the extent to which the development of existing literature has reached. Further, this synthetization helps in identifying the unexplored

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dimensions of corporate borrowings which can be taken up as a future research area so that new insights on this field can be added to the existing knowledge base.

So, this paper aims at conducting a depth review of studies on corporate borrowings by making a Systematic Literature Review (SLR), Bibliometric Analysis and Content Analysis to find out some Queries (Q) for further research agenda. In doing so, this paper tries to answer the following queries:

Q.1: What is the current publication trend in the field of corporate borrowings?

Q.2: Which countries and institutions are most active in this research field?

Q.3: Which are the most influential journals in this field?

Q.4: Who are the most influential authors and what is the authorship pattern of worldwide research output?

Q.5: Which themes of corporate borrowings are most popular among the researchers?

Q.6: Which areas of corporate borrowings require more attention from researchers?

Due to widespread research in this field, this paper attempts to analyse and find the gap in the field of corporate borrowings. This study also gives a comprehensive knowledge about earlier literatures on corporate borrowings. This study is a novel attempt and different from other work because no study has been conducted on this topic. Further, considering both Scopus and Web of Science database makes this study a comprehensive one. This study holds the potential to assists the researcher in gaining an in-depth knowledge on the field of corporate borrowing for the future studies.

The subsequent sections of this paper deals with the literature review succeeded by methodology, analysis, conclusion and future research directions.

METHODOLOGY

In this study, we have used a mix of bibliometric analysis, SLR and content analysis. SLR is scientific, transparent and imitable process. It is superior to traditional narrative reviews[4] in various ways such as better quality of review process and results,[4-6] curtail bias and errors,[7] strong validity of the process as its steps are replicable at the time of review,[8] offers data synthesis and literature mapping of a specific research topic,[4] and it

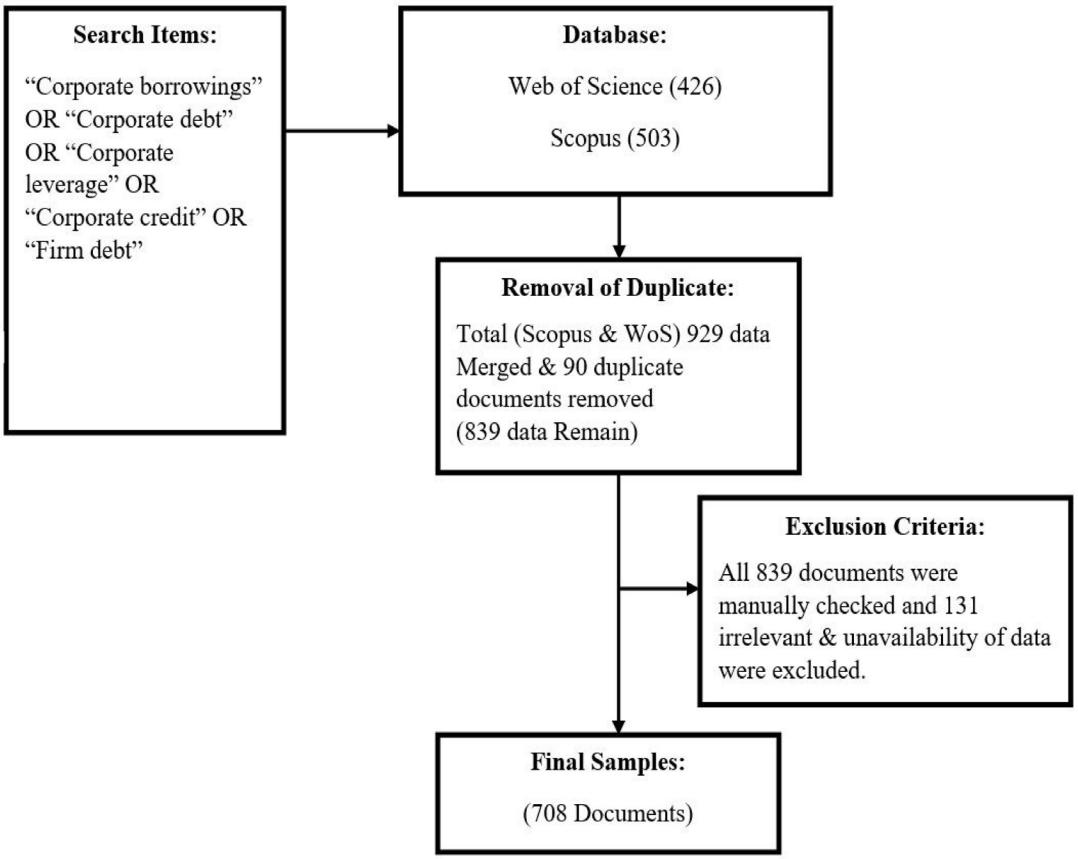

Figure 1: Data extraction process.

also provides an outline that incorporates existing knowledge to academics and practice.[4,7] SLR also reduces bias through comprehensive literature searches of published and unpublished documents and by providing an audit trail of the reviewer's decisions, procedures and conclusions.[9] In the context of review of studies, SLR allows to categorized a large number of data and determine a framework to establish the main trends in existing studies.[9]

The bibliometric analysis is a popular and attentive method for explaining and mapping the cumulative scientific knowledge and evolutionary nuances of a specified fields by analysing large volumes of unstructured data in precise ways.[10-13]

In this paper, our methodology has been divided into two parts: first comprises of identifying, reading and understanding significant papers; second comprises of bibliometric examination and visualization of the selected papers. Figure 1 describes the data extraction process.

Database, keywords and search strategies

Data are extracted from Scopus and Web of Science database which are reputed, trusted and largest databases for publications and citation of literature. According to Gonzalez & Gonzalez,[14] in the field of social science, Scopus is a popular index having 14,000 publications related to finance themes. Scopus categorises 14 types of documents and sources. Further, social science citation index of Web of Science is also world's leading scientific and technical journals that contains over 3,400 journals.

Earlier very few studies have conducted bibliometric analysis which are indirectly connected to corporate borrowings. Additionally, earlier studies have used data of either Scopus or Web of Science database. So, this paper has a novel attempt to systematically review the literature on corporate borrowings taking data from both Scopus and Web of science database which have made this research more comprehensive. The data has been collected from both database over the period from 1994 to 2022. The appropriate search terms "Corporate borrowings" OR "Corporate debts" OR "Corporate leverage" OR "Corporate credit" OR "Firm debts" from Title, Abstract, Author keywords have been used which resulted into 426 documents from Web of Science and 503 documents from Scopus after applying all relevant filters. Then both data were combined and 90 duplicates have been removed with the help of 'R-studio' software package, thereby leading to 839 documents. All the 839 documents are manually reviewed and 131 documents, including 62 documents with missing keywords, are found irrelevant and hence excluded. Finally remaining 708 documents are taken as the final sample for analysis.

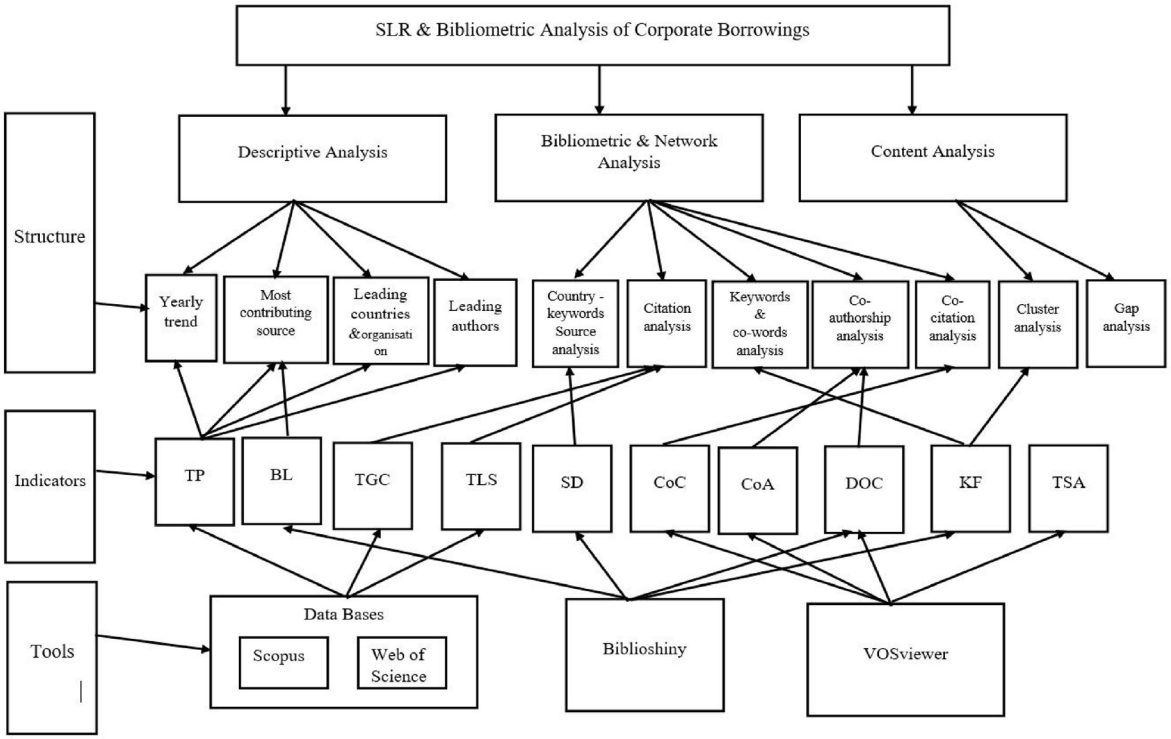

Figure 2: Research structure of this study. TP=Total production, TGC=Total global citation, TLC=Total local citation, SD=Sankey diagram, CoC=Co-citation count, CoA=Co-authorship count, DOC=Degree of centrality, KF=Keywords frequency, TSA=Thematic structure analysis, BL=Bradford's law.

Software and methods of analysis

After shortlisting 708 documents, we have used biblioshiny (a web-interface of R-studio software) and VOSviewer (a bibliometric mapping and visualization software tool) for analyzing the analytical structure of the study. Figure 2 illustrates the analytical structure of research.

ANALYSIS AND FINDINGS

Descriptive analysis

The analysis identified 708 documents (both Scopus and Web of Science) published during 1994 to 2022 of which all are articles and published in English language. The 708 documents have 1487 authors and 1915 author's keywords. Table 1 provides all other basic information about the bibliographic data used in this analysis.

Table 1: Main information of the bibliographic collection.

Description	Results
Time Span	1994-2022
Documents	708
Sources	262
Annual growth rate %	17.48
Average years from publication	7
Average citations per documents	21.04
References	27031
Authors	1487
Author's keywords	1915
Authors of single-authored documents	113
Co-authors per document	2.45
International co-authorships %	19.07

Annual growth trend of publication

To examine publication trend in the field of corporate borrowings, we analysed annual growth trend of publication. Figure 3 shows the annual publication growth in corporate borrowings literature. Total 708 documents have published in this field. In 1994, the first document was published. Till 2003, single digit documents have been published and there is no document in 2004. In 2005, publication has grown up moving to double digit number and it continued. The trend demonstrates that from 2019, the area of corporate borrowings has attracted the researcher and it has received continuously increased publication. The probable reason behind this increased trend is the financial and liquidity imbalances in corporate world during COVID-19. According to Ding W *et al.*,[15] the corporate debt conditions, both long-term and short-term, have been amplified as compared to pre-2020. Similarly, Umar Z *et al.*[16] demonstrate that bonds issued by the financial sector were more resilient or better able to withstand liquidity crunch during periods of financial stress compared to corporate and sovereign securities. So, it reveals that the COVID-19 pandemic has impacted the corporate debt which has attracted the researchers. Further, we separated the growth period of corporate borrowings into three parts such as initial stage (1994-2004) having 32 documents, pre-expansion stage (2005-2016) having 259 documents and expansion stage (2017-2022) having 417 documents.

Leading countries on corporate borrowings

Table 2 shows that the corporate borrowings have attracted the research from top 25 countries. USA, UK, China and Germany are the top contributor in the field of corporate borrowings having

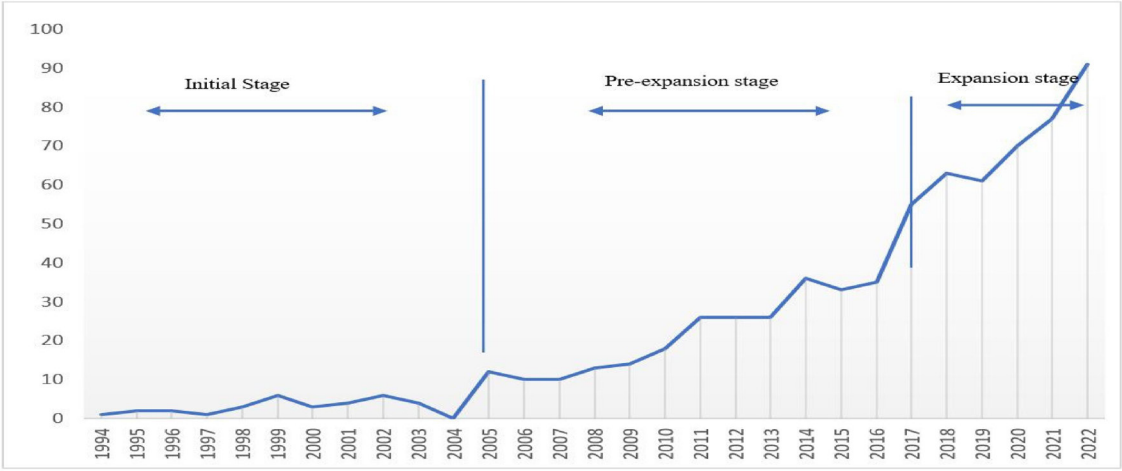

Figure 3: Annual growth trend of publication.

Table 2: Leading countries on corporate borrowings.

Sl. No.	Country	Frequency	% of Contribution	Total Citations	Average Article Citations	CACD
1	USA	389	29%	7177	46.60	154
2	UK	179	13%	1098	16.39	67
3	China	107	8%	619	10.86	57
4	Germany	93	7%	462	15.40	30
5	Spain	65	5%	367	11.84	31
6	France	58	4%	265	13.25	20
7	Italy	50	4%	195	9.75	20
8	Australia	46	3%	223	11.15	20
9	Canada	37	3%	1514	84.11	18
10	Switzerland	36	3%	341	37.89	9
11	Portugal	32	2%	173	21.63	8
12	South Korea	26	2%	73	5.21	14
13	Belgium	25	2%	90	12.86	7
14	India	23	2%	39	3.25	12
15	Netherlands	22	2%	87	17.40	5
16	Vietnam	22	2%	13	2.60	5
17	Indonesia	21	2%	17	1.70	10
18	South Africa	20	1%	55	7.86	7
19	Chile	16	1%	116	16.57	7
20	Japan	15	1%	94	13.43	7
21	Malaysia	13	1%	26	4.33	6
22	Turkey	13	1%	60	8.57	7
23	Brazil	12	1%	156	17.33	9
24	Sweden	12	1%	46	15.33	3
25	Czech Republic	11	1%	14	3.50	4

CACD= Corresponding author country's documents.

29%, 13%, 8% and 7% of contribution respectively. Further, maximum countries' contribution ranges between 2% to 5%. In fact, 8 countries having their contribution of 1% or less than 1% and 13 countries' contribute 2% to 5%. It means the majority of countries are the new participant in this field and India is one of them. So, we can say that it is one of the scopes in those countries to conduct research in this field. Additionally, in case of citation, Canada is the leading country and 2nd is USA which shows that these country's work has got wide acknowledgement in the field of corporate borrowings and on the basis of Corresponding author USA, UK and China are top countries to initiate this work. This analysis reveals that majority of countries including India have a wide scope for research in the field of corporate borrowings. This information is also visualized in Figure 4.

Leading institution working in corporate borrowings

On the basis of our dataset, total 1046 institutions have worked on corporate borrowings. Table 3 shows that University of Barcelona, University of Chicago, University of Glasgow, University of Warwick and University of Zurich are the most active institutions in the field of corporate borrowings among top 15 producing 9 articles each. Maximum number of institutions are situated in USA and UK which are the most active countries in this field.

Top Contributing Journals

Table 4 shows the top 15 productive journals and among them, Journal of Financial Economics and Journal of Corporate Finance are the most productive journals by publishing 82 articles in the field of corporate borrowings which is around 37% among top 15 journal's publication. Journal of Banking and Finance, International Review of Financial Analysis and Applied Economics are almost same productive journals by publishing 16,

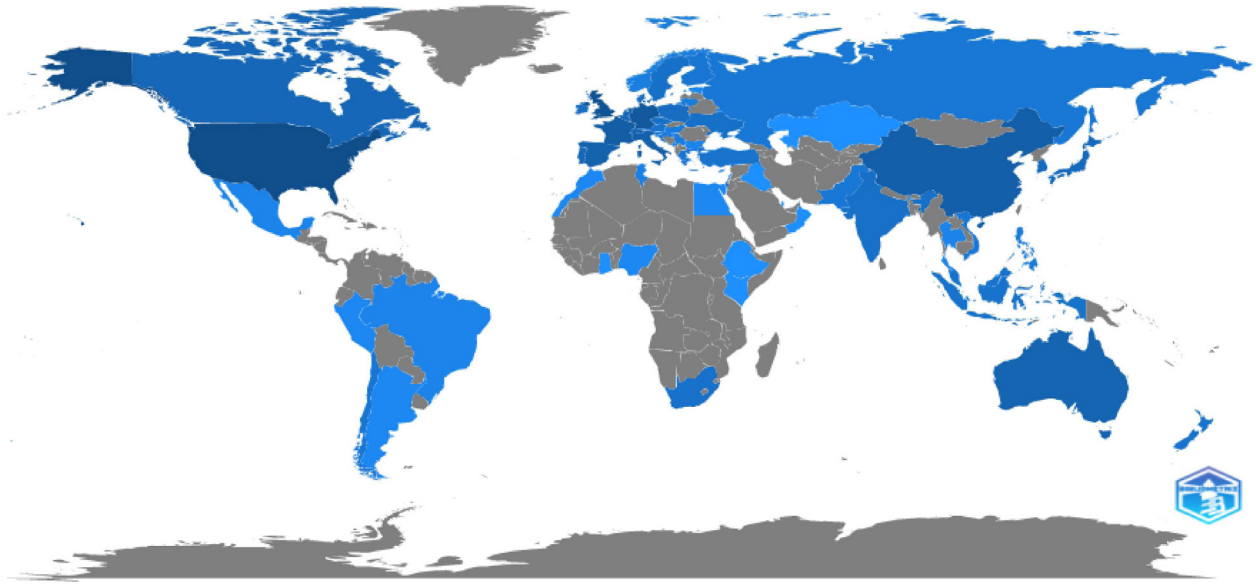

Figure 4: Leading country in corporate borrowings.

Table 3: Leading institution working on corporate borrowings.

Sl. No.	Affiliation	Country	No. of Articles
1	University of Barcelona	Spain	9
2	University of Chicago	USA	9
3	University of Glasgow	UK	9
4	University of Warwick	UK	9
5	University of Zürich	Switzerland	9
6	International Monetary Fund	USA	8
7	Northwestern University	USA	8
8	University of North Carolina	USA	8
9	University of Oviedo	Spain	8
10	Ho Chi Minh City Open University	Vietnam	7
11	University of Hannover	Germany	6
12	McGill University	Canada	6
13	London Business School	UK	6
14	Brescia University	USA	6
15	University of British Columbia	Canada	6

15 and 15 articles in the position of 3rd, 4th and 5th among the top 15 journals in this field. To find the trendy journal, we analyzed Figure 5 and found that though Journal of Financial Economics and Journal of Corporate Finance are the oldest journals (since 1994) but Journal of Financial Economics still trending in publication in this area. After 2004, Journal of Corporate Finance is a growing journal in this area and after 2008, some journal like Journal of Banking and Finance, International Review of Financial Analysis and Applied Economics are giving more interest in corporate borrowings field.

Identification of core journals through Bradford's law

Bradford's law is a pattern that estimates the exponentially diminishing returns of looking for references in scientific journals. Samuel C. Bradford initially introduced it in 1934. Generally, it is used to find the 'core' journal in a discipline. According to Alabi G,[17] "if the journals containing articles on a given subject are arranged in descending order of the number of articles they carried on the subject, then successive zones of periodicals containing the same number of articles on the subject form the simple geometric series 1: n: n^2: n^3 where 'n' is a

Table 4: Most contributing journal.

Sl. No.	Sources	NP	TC	SPY	h-index	Publisher	ABDC Ranking	SCS	JIF	ISSN
1	Journal of Financial Economics	44	5242	1996	273	Elsevier	A*	9.7	8.24	0304-405X
2	Journal of Corporate Finance	38	1447	1994	109	Elsevier	A*	5.4	5.11	0929-1199
3	Journal of Banking and Finance	16	552	1996	172	Elsevier	A*	5.2	3.54	0378-4266
4	International Review of Financial Analysis	15	155	2012	69	Elsevier	A	7.2	8.23	1057-5219
5	Applied Economics	15	4580	2012	91	Taylor and Francis	A	2.8	1.92	0003-6846
6	European Financial Management	11	343	1995	68	Wiley-Blackwell	A	3	2.29	1354-7798
7	Review of Quantitative Finance and Accounting	11	107	1998	46	Springer	B	2.6	2.29	0924-865X
8	European Journal of Finance	11	59	2008	39	Taylor and Francis	B	3	1.9	1351-847X
9	Finance Research Letters	11	67	2010	62	Elsevier	B	9.3	9.84	1544-6123
10	Review of Finance	9	272	2010	67	Oxford Academic	A*	9.2	5.06	1572-3097
11	Journal of Money Credit and Banking	9	190	2011	113	Wiley-Blackwell	A*	2.2	1.96	0022-2879
12	Managerial Finance	9	44	2008	41	Emerald	B	2.4	1.29	0307-4358
13	International Review of Economics and Finance	8	85	2002	59	Elsevier	A	3.9	3.39	1059-0560
14	Journal of International Economics	8	89	2008	143	Elsevier	A*	5.1	3.71	0022-1996
15	Journal of International Money and Finance	8	73	2001	101	Elsevier	A	3.9	2.76	0261-5606

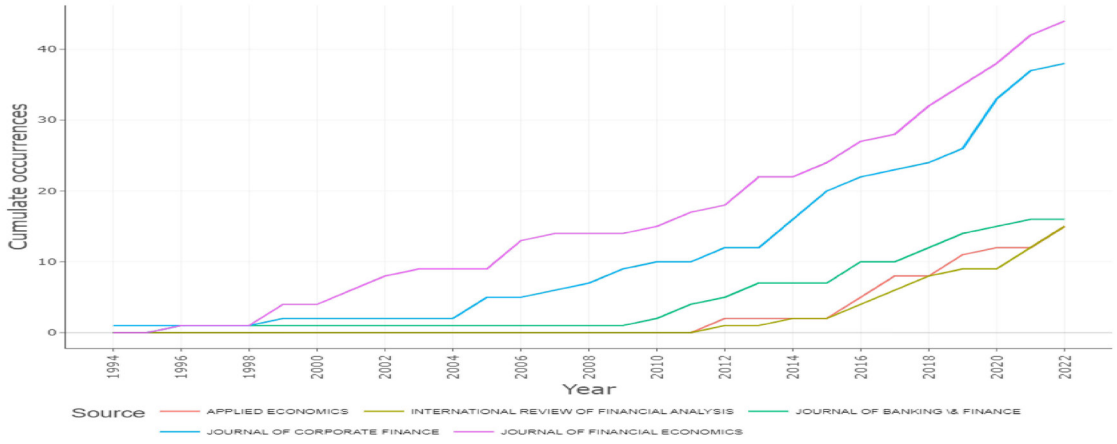

Figure 5: Growth of journals over time.

multiplier". In this article, to identify the core journal in the area of corporate borrowings, we have used Bradford's law through Biblioshiny software and the result is exhibited in Figure 6. The figure shows that Journal of Financial Economics, Journal of Corporate Finance, Journal of Banking and Finance and Applied Economics are top 4 journals in the field of corporate borrowings. As one of the top platforms for the corporate borrowings area, these journals can be recommended and targeted for publication.

Leading authors working on corporate borrowings

As per the information provided in Table 1, in the area of corporate borrowings, 1487 authors have worked with a structure of 113

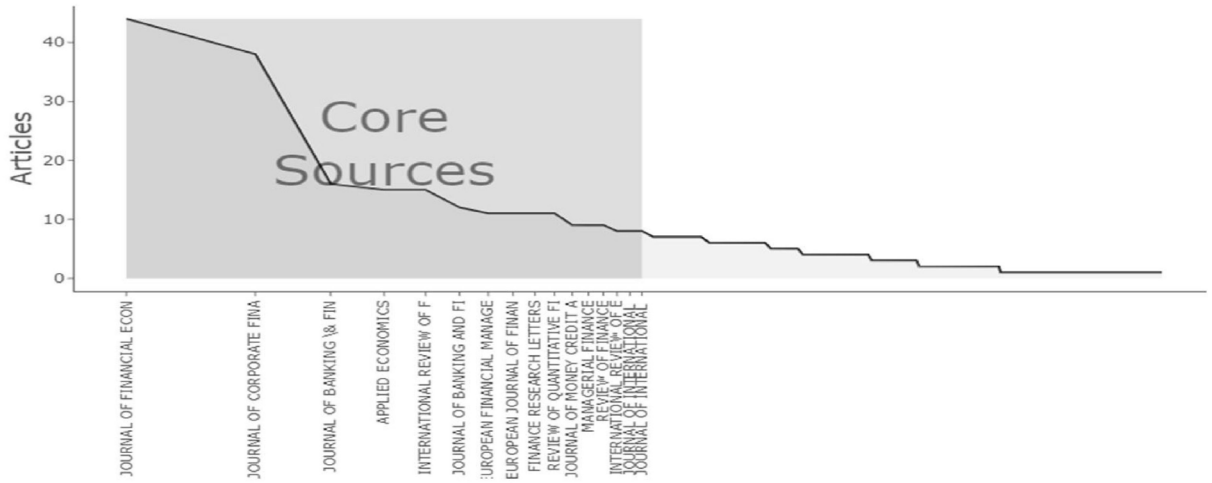

Figure 6: Core journals as per Bradford's law.

Table 5: Leading authors working on corporate borrowings.

Authors	DP	h-index	g-index	m-index	TC	PY-start
Faff R	5	4	5	0.5	104	2016
Wang C	5	3	5	0.429	51	2017
Arena M	4	4	4	0.286	125	2010
Boubaker S	4	4	4	0.444	150	2015
Chen H	4	4	4	0.286	188	2010
Hackbarth D	4	4	4	0.222	387	2006
Kraft P	4	3	4	0.273	189	2013
Tan K	4	3	4	0.3	104	2014
Gomez-puig M	3	3	3	0.333	25	2015
Gonzalez V	3	3	3	0.25	93	2012
Goyal V	3	3	3	0.12	1038	1999
Guney Y	3	3	3	0.167	155	2006
Ignacio P J	3	3	3	0.3	61	2014
Morellec E	3	3	3	0.13	391	2001
Paudyal K	3	3	3	0.167	153	2006
Roszbach K	3	3	3	0.158	53	2005
Sosvilla-Rivero S	3	3	3	0.333	25	2015
Terra P	3	3	3	0.231	90	2011
Yang J	3	3	3	0.429	47	2017
Agliardi E	2	2	2	0.125	29	2008

DP-Document Published, TC= Total Citation, PY-Start= Publication Year Start.

single author documents and 1374 multi author documents. Table 5 depicts the top 20 contributing authors in this area and it reveals that 'Faff R' and 'Wang C' are the highest contributing authors by publishing 5 articles each followed by 'Arena M', 'Boubaker S', 'Chen N', 'Hackbarth D', 'Kraft P' and 'Tan K' having 4 articles each. 'Goyal V' is an earliest author who started work on this field in 1999 and he is having a highest citation of 1038. 'Morellec E' is the second earliest author who started the work in 2001 and is having the second highest citation of 391. On the basis of h-index, the top 5 authors are having the same numbers except second one and in the g-index, top 2 authors are having highest numbers. The h-index is a strong estimator of the total impact of a scientist's contribution on a research field.[18] While g-index, as said by Hirsch JE,[18] is the relationship between published articles and their level of citation.

Figure 7 indicates highly producing authors on corporate borrowings over time. The line represents author's timeline, the size of the bubble is proportional to the number of documents published and the colour intensity of the bubble is proportional to the total citation received by the document. In line with Table 5, the Figure 7 also indicates that 'Goyal V' is the highest cited author among the top contributing authors and 'Hung M' is long-time author in this area.

Authors productivity as per Lotka's law

This law details the regularity of authors' productions on a specific field. It is also called 'the inverse square law of scientific productivity'.[19] Generally, it explains the relationship between authors and the number of documents they produce. Coile RC[20] proved that 'the applicability of Lotka's law to humanities and to map librarianship may have misinterpreted Lotka's law and have concluded inaccurately that the law applies to these fields'. This law is frequently used to analyze different subjects including social network analysis,[21] business ethics,[22] and financial risk.[23] Lotka's law states the common pattern in the distribution of authorship and publication productivity. The Table 6 shows that a small number of authors have written a large number of papers and a large number of authors have written only a few papers. The relation is expressed as:

$$xn.yx=c$$

Where y_x is the number of authors making x contributions to the subject. Further, n and c are the two constants to be estimated for the specific set of data.[24] The frequency distribution of scientific productivity as per Lotka's law is shown in Figure 8. The Table 6 describes that among the total 1487 authors, 87% of them have contibuted by publishing only one paper, around 11% authors produced only two paper and less than 2% of authors have published three paper or more. It shows that majority of authors i.e, 87% are new authors in this field. Thus, we can assure that

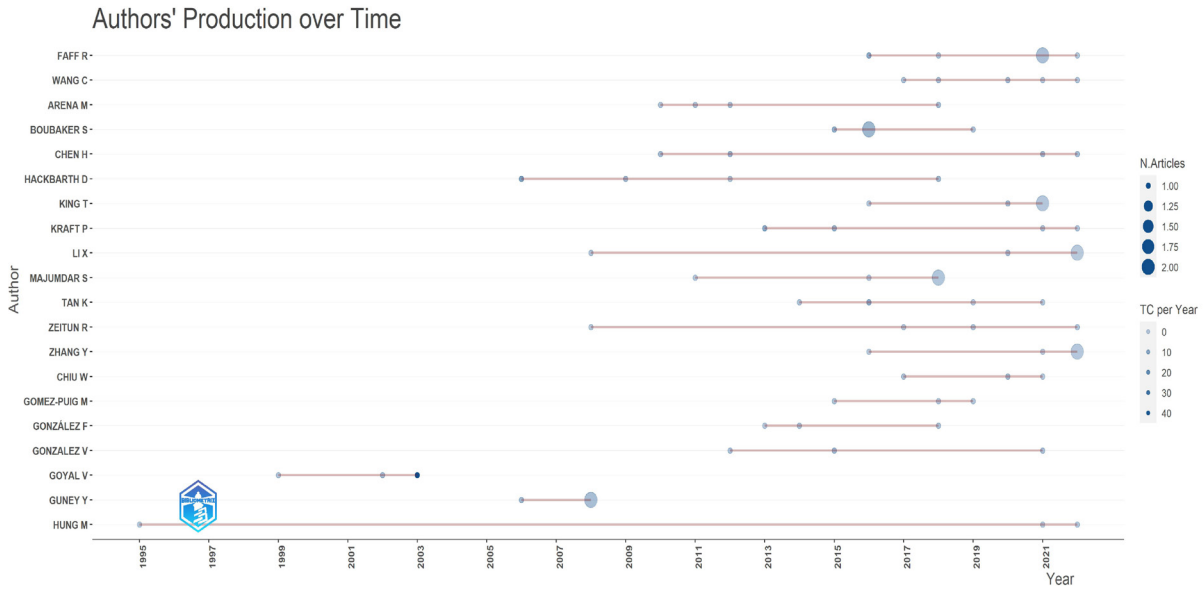

Figure 7: Top author's production over time.

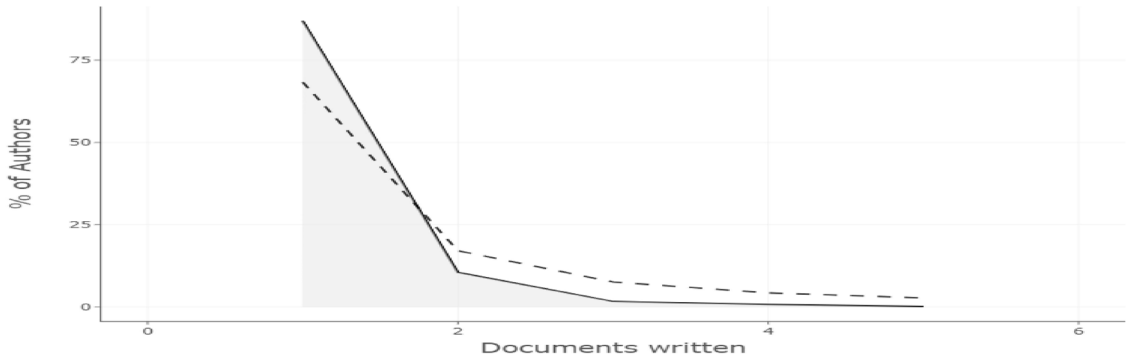

Figure 8: Authors productivity as per Lotka's law.

there is a lot of scope for research on corporate borrowings area as a steady author.

Most relevant documents on corporate borrowings

Table 7 shows the top 15 relevant documents on the basis of local citation out of 708 documents. Citation indicates a document's popularity and influence within the scientific community.[25] Global citations are the total number of times an article has been cited in other works, including research in different field and Local citations indicate the citaion of an article within the network.[26] Table 7 states that 'Custodia C., 2013' document is the most relevant document. The paper title is "Why are US firms using more short-term debt?" which is published in 'Journal of Financial Economics' in 2012. Basically, the paper has attempted to examine why long-term debt with maturity period more than 3 years has decreased in USA during 1976 to 2008. The author found that decreasing of long-term debt is maximum among small firms. Further, the author found that a higher degree of information asymmetry is responsible for the decrease in usage of longer-term debt. Overall, the paper says that size of firm, age of firm and infromation asymmetry affect the corporate borrowings.

Table 6: Authors Productivity as per Lotka's law.

Documents written	No. of Authors	Proportion of Authors
1	1293	0.87
2	156	0.105
3	25	0.017
4	11	0.007
5	2	0.001

Table 7: Most relevant documents on corporate borrowings.

Sl. No.	Paper	DOI	Year	Local Citations	Global Citations	LC/GC Ratio (%)	Normalized Local Citations	Normalized Global Citations
1	Custodio C, 2013, J Finance Econ	10.1016/j.jfineco.2012.10.009	2013	14	157	8.92	17.33	3.50
2	Hackbarth D, 2006, J Finance Econ	10.1016/j.jfineco.2005.10.003	2006	12	253	4.74	4.80	2.48
3	Antoniou A, 2006, E Finance Manag	10.1111/j.1354-7798.2006.00315.x	2006	10	92	10.87	4.00	0.90
4	Krishnaswami S, 1999, J Financ Econ	10.1016/s0304-405x(98)00059-2	1999	8	212	3.77	3.69	1.37
5	Kirch G, 2012, J Corp Financ	10.1016/j.jcorpfin.2012.05.004	2012	7	65	10.77	18.20	2.05
6	Parrino R, 1999, J Financ Econ	10.1016/S0304-405X(99)00015-X	1999	5	128	3.91	2.31	0.83
7	Borensztein E, 2013, J Bank Financ	10.1016/j.jbankfin.2013.07.006	2013	5	89	5.62	6.19	1.98
8	Bedendo M, 2015, J Corp Financ	10.1016/j.jcorpfin.2015.04.006	2015	5	56	8.93	9.71	2.06
9	Ben-Nasr H, 2015, J Corp Financ	10.1016/j.jcorpfin.2015.10.001	2015	5	81	6.17	9.71	2.99
10	Oikonomou I, 2014, Finan Rev	10.1111/fire.12025	2014	4	147	2.72	9.60	7.58
11	Krishnamurthy A, 2018, Rev Financ	10.1093/rof/rfx053	2018	4	77	5.19	12.60	6.49
12	Firth M, 2008, J Corp Financ	10.1016/j.jcorpfin.2008.08.002	2008	3	150	2.00	9.75	6.94
13	Cronqvist H, 2012, J Financ Econ	10.1016/j.jfineco.2011.08.005	2012	3	189	1.59	7.80	5.96
14	Fischer T, 2014, Math Financ	10.1111/j.1467-9965.2012.00526.x	2014	3	16	18.75	7.20	0.83
15	Borisova G, 2015, J Financ Econ	10.1016/j.jfineco.2015.06.011	2015	3	137	2.19	5.82	5.05

Three-field analysis through Sankey diagram

Figure 9 shows the three-field plot for the country, keywords and journal. Sankey diagram has been used to visualize how these three fields interact. According to Stasko & Ward,[27] Sankey diagrams are frequently used to represent the movement of materials or energy throughout various networks and processes and now it is being used in other domain also.[28] The size of the rectangular boxes in this graph corresponds to the frequency of occurrence. So, we can say that USA is the active country in this domain and their maximum focused theme is 'capital structure' and 'corporate debt' and these themes have dominated in Journal of Financial Economics and Journal of Corporate Finance. UK is the second leading country focusing on 'capital structure', 'cridit risk', 'corporate debt' and 'debt maturity'. Major countries including India have less focus in 'debt structure', 'debt financing', and 'corporate leverage' theme which paves a scope for research on these themes.

Citation network analysis

Citation network analysis is a technique for measuring the relative importance of an article by counting how many times it has been cited in other works. Using VoSviewer software, we have formed a threshold to analyse most cited document. In the threshold, we have taken atleast 50 citations of an article and found 67 articles for the analysis which is presented in Figure 10. The outcome shows that Frank *et al.*[29] is the most cited document in the area of corporate borrowings and Duffie & Lando[30] is the second highly cited document in this field.

Co-authorship analysis

To analyze the author's collaboration in the corporate borrowings field, we analyzed the author's collaboration network. According to Singh G *et al.*,[31] collaboration among researchers is a representation of their intellectual relationship in scientific research. In this context, Figure 11 identifies that out of 1487 authors, there are only 10 collaborations among the authors. 'Wang C', 'King T', 'Chiu W', 'Ignacio PJ' and 'Prevost A' have a large collaboration in this field of corporate borrowings and 'Guney Y', 'Paudayal K' and 'Antoniou A' is the second largest group in this field. Remaining collaborations consist of two authors. Thus, we can consider that corporate borrowings domain research collaboration confined to few authors.

Keyword co-occurrence analysis

Keywords in an article indicate the logical explanation of the content of the document. Two keywords of an article are said to co-occur if they both occur in other articles.[32] According to Christensen *et al.*,[33] the relationship between two keywords is expressed by their link, which is represented by a numerical value and it is assumed that higher the number, stronger the link. In this analysis, we have taken those keywords which are having at least five time occurrence (the default setting of VoSviewer software) in other work. In our dataset, 1945 authors' keywords are there. Out of this, only 85 keywords meet the threshold limit. Figure 12 shows that 'Capital structure' has garnered the interest of researchers. Similarly, other keyword's occurrence and their link strength are given in Table 8.

Co-citation analysis and clustering

Co-citation is the frequency of two article cited together by other.[34] Co-citation analysis is applied to identify linkages between articles. This strategy is based on the idea that when two publications are cited in other articles, they are more likely to have similar research backgrounds. To highlights the intellectual structure of articles, the co-citation analysis is a well-known analysis in the bibliometric network.[14,35-38]

Further, the aim of cluster analysis is to organize a collection of articles into groups where the articles are more similar to one another than to those in other groups. Cluster analysis helps to identity collaboration patterns and interrelation among a co-citation analysis. According to Bellenguez C *et al.*,[39] an iterative approach called the 'Louvain algorithm' is used to find the number of partitions that will optimize the 'Modularity Index'. It is the default cluster building algorithm in Biblioshiny. According to this algorithm, we found 2 clusters in the area of

Table 8: Keyword co-occurrence analysis.

Keywords	Occurrences	Total Link Strength
Capital structure	162	189
Corporate debt	75	74
Debt maturity	65	99
Leverage	52	75
Cost of debt	40	40
Credit risk	33	28
Debt	30	51
Corporate leverage	29	33
Corporate governance	27	48
Investment	24	42
Financial crisis	22	42
Emerging markets	21	45
G32	16	27
Debt structure	16	21
Corporate bonds	15	24
Trade-off theory	14	31
Agency costs	13	24
Panel data	12	26
Pecking order theory	12	26
Information asymmetry	12	23

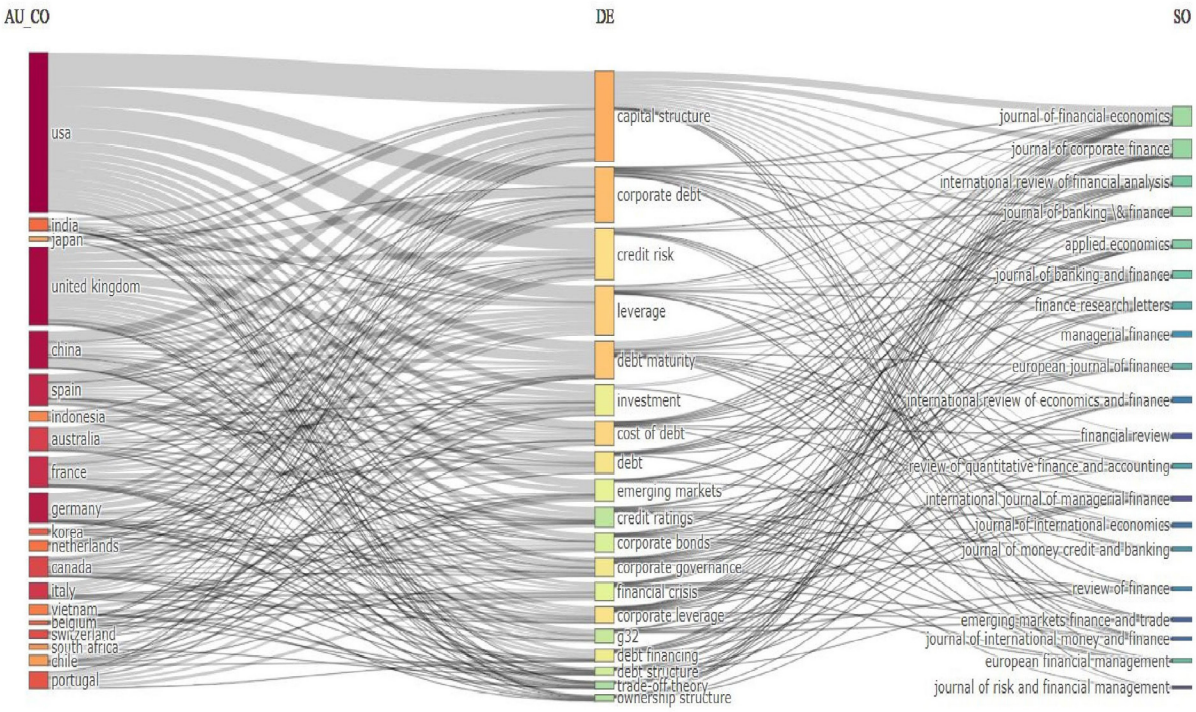

Figure 9: Three-field analysis through Sankey diagram.

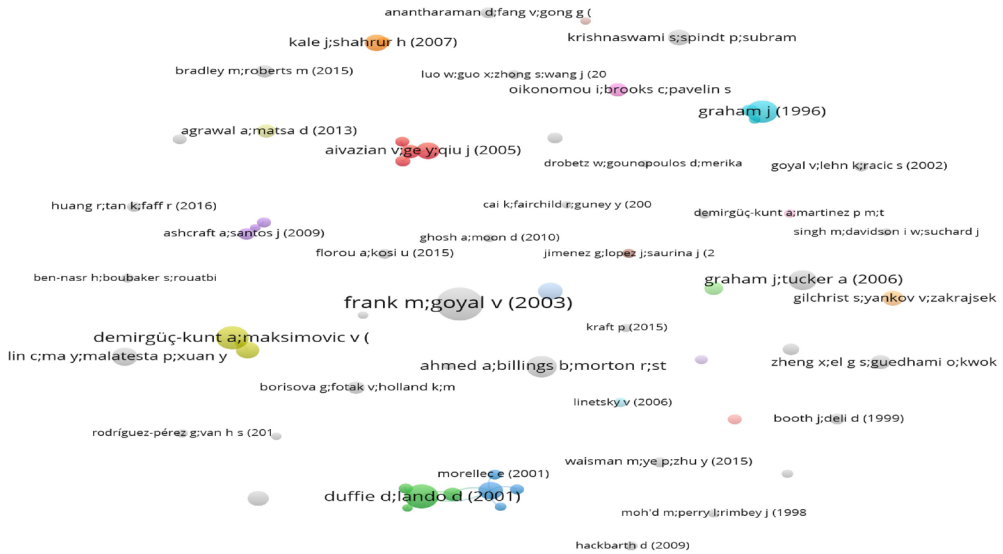

Figure 10: Citation network analysis.

corporate borrowings. Cluster 1 is comprising of 21 documents and cluster 2 is the largest cluster having 28 documents.

Content analysis

We conducted a content analysis of two clusters obtained from citation analysis to determine the intellectual structure of research on corporate borrowings. We identified the top 10 central papers in each cluster to determine the research emphasis of each cluster. These papers provide an overall explanation of each cluster. Xu K *et al.*[40] suggests that the 'PageRank' algorithm can be utilized to determine the intellectual structure of research. Specifically, in a co-citation network, the 'PageRank' algorithm considers two factors: the number of times a research paper is co-cited with other research papers (popularity measure) and the number of times it is co-cited with highly co-cited papers (prestige measure). To determine the lead papers in each cluster, we used Biblioshiny software to calculate 'PageRank'. Table 9

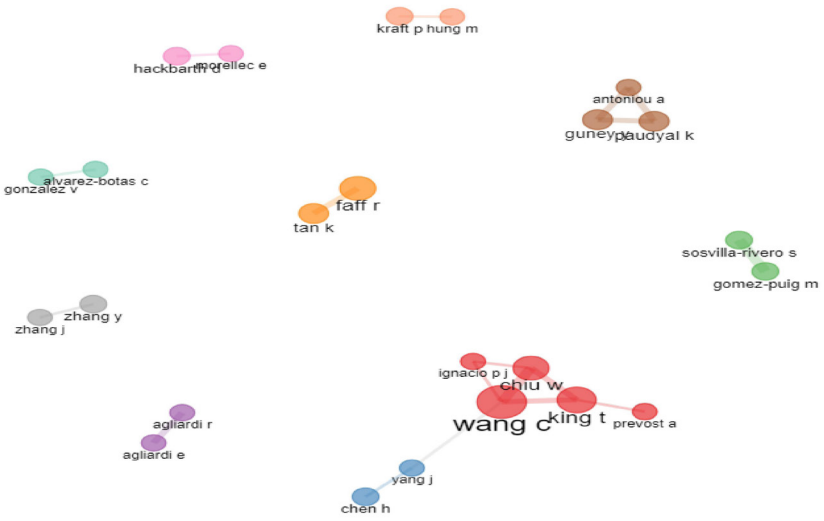

Figure 11: Co-authorship analysis.

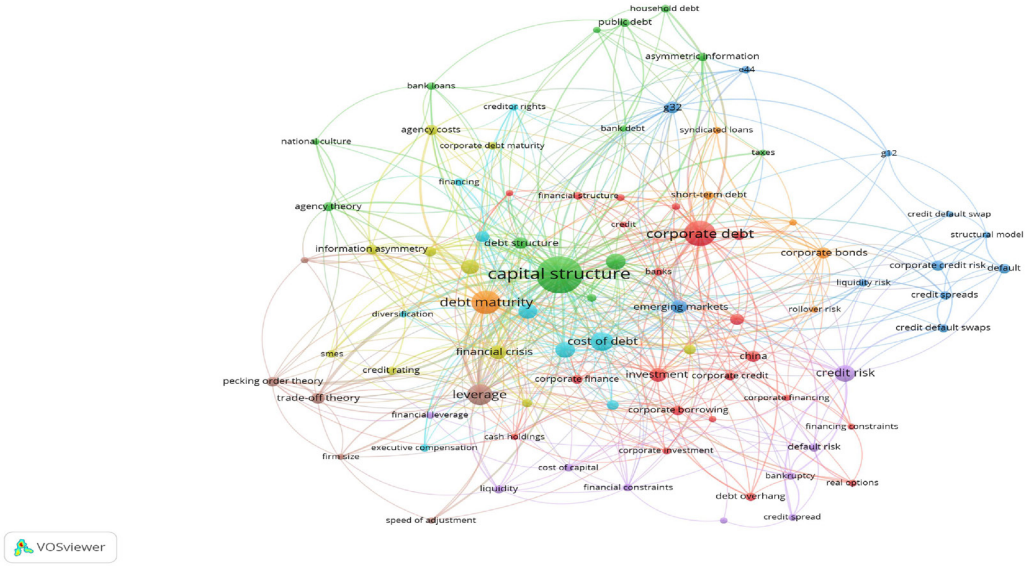

Figure 12: Keyword co-occurrences network analysis.

provides a detailed narrative of 20 articles (10 from each cluster) based on their content.

Cluster 1: Capital structure and corporate borrowings

The first cluster of 21 articles has centered around the impact of firm's capital structure on financial performance. This cluster comprises of studies that examine empirical evidence and how it relates to corporate finance decisions in the real world. Authors[41-44] argued that differences in financial intermediation, institutional structures governing bankruptcy and debt renegotiation leads to corporate debt in capital structure across the globe. Concurrently, Leland HE[45] examined that the value of debt and its optimal capital structure are closely connected and one cannot be understood fully without considering the impact of the other. According to Modigliani & Miller,[2] the cost of capital can be used for rational decision making and Lamont *et al.*[46] highlighted that the concept of financial constraint and unconstraint conditions for the firm is based on the cost differential between external and internal financing. Another viewpoint is that to determine optimal capital structure of a firm, both amount and maturity of the debt must be considered.[47]

Table 9: Lead papers of corporate borrowings clusters and its page rank.

Cluster 1			Cluster 2		
Author	**DOI**	**Page Rank**	**Author**	**DOI**	**Page Rank**
Titman S. 1988	DOI: 10.1111/j.1540-6261.1988.tb02585.x	0.036189072	Myers S.C. 1977	DOI: 10.1016/0304-405X(77)90015-0	0.045403297
Myers S.C. 1984	10.3386/w1393	0.032774088	Merton RC 1974	DOI: 10.2307/2978814	0.035168617
Rajan R.G. 1995	DOI: 10.1111/j.1540-6261.1995.tb05184.x	0.030813697	Barclay MJ 1995	DOI: 10.1111/j.1540-6261.1995.tb04797.x	0.025562976
Jensen Mc 1976	DOI: 10.1016/0304-405X(76)90026-X	0.029463009	Stohs MH 1996	https://www.jstor.org/stable/2353370	0.023271196
Leland HE 1994	DOI: 10.1111/j.1540-6261.1994.tb02452.x	0.026041016	Jensen MC 1986	https://www.jstor.org/stable/1818789	0.021569257
Modigliani F. 1958	https://www.jstor.org/stable/1809766	0.024915591	Guedes J 1996	DOI: 10.1111/j.1540-6261.1996.tb05227.x	0.019960296
Leland HE 1996	DOI: 10.1111/j.1540-6261.1996.tb02714.x	0.024124811	Flannery MJ 1986	DOI: 10.1111/j.1540-6261.1986.tb04489.x	0.018276727
Harris M. 1991	DOI: 10.1111/j.1540-6261.1991.tb03753.x	0.023922165	Myers SC 1984	DOI: 10.1287/inte.14.1.126	0.018124541
Diamond D.W. 1991	DOI: 10.1111/j.1540-6261.1991.tb04620.x	0.022109066	Johnson SA 2003	DOI: 10.1093/rfs/16.1.0209	0.016726101
Frank M.Z. 2009	DOI: 10.1111/j.1755-053X.2009.01026.x	0.019925166	La Porta 1998	DOI: 10.1086/250042	0.014026977

Cluster 2: Determinants of corporate borrowings

Cluster 2 is the largest cluster with 28 articles. These articles mostly emphasize on the determinants of corporate borrowings. Information asymmetries[48] is one of the major determinants of corporate borrowings. It means that if insiders within a company, who have access to more information and insights about the company's operations and prospects than the general public, decide to issue securities (such as stocks or bonds), they are more likely to issue securities when the market perceives the company to be overvalued. This is because insiders can take advantage of their superior knowledge to earn profit from the high prices that outside investors are willing to pay for the securities.[49] According to Myers SC,[50] amount and maturity of debt liabilities are the operative determinants which affect the growth opportunities and leverage risk. So, companies should assess their financial position, market conditions and growth prospects to determine the appropriate amount and maturity of debt. Debt financing can be an effective tool for reducing conflicts between managers and shareholders in firms with large free cash flows. By using debt to finance investments, companies can limit the amount of free cash flow available to managers and align their interests with those of shareholders.[51] Overall, this cluster highlights the importance of careful consideration and management of corporate borrowings by taking various factors into account that can impact a company's financial position, risk profile and growth opportunities.

Roadblocks to current research

With this in-depth analysis of corporate borrowings literatures, we identify many factors that restrict research in this field despite of its continuing growth.

Lack of academic cooperation

Cooperation among researchers enhances the effectiveness of researchers, lowers the cost of conducting research and facilitates the flow of information.[52] From co-authorship analysis, we identified that there are few authors collaboration in this field. So, to make it an internationally recognized framework, international cooperation is highly desired.

Lack of focus on cross-country

According to active or leading country analysis, only some specific developed countries such as the USA, UK, etc. have frequent focus in this field. This is because, lower interest rate in advanced economies have encouraged the borrowings (IMF, 2015).

Lack of concentration on cross-firm comparison

Multi-firms datasets are preferred by certain researchers in order to generalise the study on corporate borrowings across corporate sector. However, industries may vary according to ownership, size of firm, different product and services and other characteristics. Hence, borrowings on specific sector firms require additional focus because of their different investment strategy and financing patterns. Further, there is also deficiency in debts comparison among firms from different sectors like manufacturing sector and service sector etc. which can help in making comparative studies.

Lack of focus on smaller firms

In maximum economy, the SMEs sector is most dynamic and makes a significant contribution to GDP. In India's socio-economic growth, SMEs play a vital role which generate nearly 8% of GDP.[53] So far, only few studies have concentrated on borrowings of small firms.

CONCLUSION AND FUTURE RESEARCH DIRECTION

According to studies, corporate borrowing is a crucial element of financial management that provides required capital for establishing the business, sustaining the operations, expanding business prospects, managing their cash flow requirements etc. The evaluation of the ideal capital structure and the valuation of debt are closely linked.[45] Based on the current study, it appears that despite the worldwide involvement of authors in the field, their relationships with each other are similar and limited to those within their respective countries or regions. In essence, the authors network within the field are characterized by a lack of diversity and international cooperation. Furthermore, this study has recognized the most impactful and prestigious research works in this discipline, which possess a significant influence beyond what their worldwide and local citations may indicate. Through keyword co-occurrence analysis, it is observed that scholars concentrate on certain topics such as capital structure, debt maturity, corporate debt, etc. and among these, the concept of 'capital structure' has gained the most attention. However, the findings also highlight a significant vacuum in the exploration of areas such as information asymmetry, Environmental, Social & Governance (ESG) and Economic Policy Uncertainty (EPU) aspects concerning corporate borrowings. Further, examining the dynamics of information asymmetry and how it affects corporate borrowings decisions can provide important insights for managing the corporate risk. Similarly, analysing how EPU affects corporate borrowings behavior can provide a nuance understanding of how external economic factors influence financing decisions. Furthermore, integrating ESG factors in the conversation about corporate borrowings can contribute to the growing emphasis on sustainable financial management. By considering these underexplored areas, future studies can contribute to a more comprehensive understanding about corporate borrowings.

This research has multiple significant contributions to the field of corporate borrowings. Firstly, it investigates the growth trend in this area by analyzing the yearly publications and contributions made by authors, countries and institutions. Secondly, it identifies the most influential studies in this field and uncovers the prominent themes and intellectual structure through co-occurrence and co-citation analysis. This helps the researchers to avoid stagnation and enables the field to move forward. Thirdly, this study uses both bibliometric analysis and systematic literature review methods to thoroughly and impartially investigate the literature related to corporate borrowings. Moreover, it identifies various obstacles that hinder the development of knowledge in this field.

Our research utilized bibliometric analysis and systematic literature review to provide a comprehensive understanding of borrowings in the corporate world. However, it is important to acknowledge that our study has limitations. Firstly, it only considers articles published from 1994 to 2022. Secondly, the choice of keywords is based on the definition of corporate borrowings and it is possible that new keywords may emerge in future.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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