

Article

A Bibliometric Analysis of Borrowers' Behavior

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Abstract: Understanding borrowers' behavior is essential in making lending decisions, strengthening financial inclusion, and alleviating poverty. This research adopts a bibliometric approach to provide an overview of the borrower's behavior relative to the selected literature. Bibliometric analysis quantifies the impact and quality of scientific production. This study reviewed 989 articles obtained from SCOPUS and published from 1987 to 2023. Data were cleaned, formatted, and analyzed using VOS viewer (1.6.19) and the R-Bibliometrix package. The research established an increased interest in borrowers' behavior among scholars. Nonetheless, it is overshadowed by studies in lending behavior, microfinance, banking, peer-to-peer lending, and fintech. The scholarly focus is mainly on the supply side of the credit industry with little regard to demand-side dynamics, such as borrowers' decision-making processes, which can affect the performance of credit facilities. This study recommends that further studies on credit facility demand-side dynamics should be carried out to understand the drivers of borrowers' decisions.

Keywords: borrowers' behavior; financial behavior; lending decisions; poverty alleviation; financial inclusion; sustainable development goals



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1. Introduction

Understanding borrowers' behavior is essential in both developed and developing countries since access to credit enhances economic growth at both micro- and macro-economic levels. This study utilizes a bibliometric approach to examine borrowers' behavior and proposes an exploration of demand-side borrowing dynamics to understand the borrowers' behavior and decision-making process. This study investigates the publication trend to understand the evolution of the field over time. In addition, it identifies prolific scholars, journals, articles, and countries to recognize key contributors and geographical patterns, which adds depth to the understanding of borrowers' behavior in the scholarly landscape. Lastly, the research explores future study directions, which steers the trajectory of scientific inquiry in borrowers' behavior. The research findings can be generalized to individual borrowers, but other borrowers, such as companies and partnerships, may exhibit different behaviors.

Credit allows borrowers to access resources with a promise to pay the principal amount and interest over an agreed-upon period (Goel and Rastogi 2023). Credit is a prerequisite for economic development as it finances production, capital formation, and consumption (Timsina 2014). Basyal (2009) postulated that extending credit to the private sector generates employment opportunities, inculcates economic growth, supports informal activities, and strengthens economic competitiveness. Therefore, credit remains a central requirement for spurring economic development.

Borrower behavior is a component of financial behavior as it affects the planning, management, and control of financial resources from either an individual or a broader

perspective. At an individual level, [Rahman et al. \(2021\)](#) assert that financial behavior is the management of personal savings, budget, and expenditure. On the other hand, [Garman \(n.d.\)](#) stated that, from a broader perspective, financial behavior entails wider concepts related to savings behavior, investment and expenditure behavior, and credit usage.

Sustainable development goals cannot be achieved without financial inclusion. Sustainable development and financial inclusion have positive implications for economic and social growth ([Ozili 2022](#)). Financial inclusion ensures firms and people are linked to mainstream financial institutions and the formal financial sector ([Koomson et al. 2023](#); [Hua et al. 2023](#); [Cavoli and Gopalan 2023](#); [Oanh et al. 2023](#); [Xi and Wang 2023](#)). In developing economies, the majority of people are unbanked and lack access to financial institutions. Consequently, achieving sustainable development is a far-fetched dream that compromises the needs of present and future generations. Credit access has a direct effect on the achievement of United Nations Sustainable Development Goals ([Kara et al. 2021](#)). Thus, access to credit is a central component of financial inclusion and sustainable development.

Borrowers' behavior is a critical determinant of access to credit, which has a direct effect on sustainable development. Even though access to credit is not mentioned in the UN's Sustainable Development Goals (SDGs), it can facilitate the achievement of multiple goals ([Kara et al. 2021](#)). It can help to achieve SDG 1, eliminating extreme poverty, by enabling people to access finance and fund income-generating investments, acquire housing, access education, and learn new skills ([Ozili 2022](#)). In addition, it can help achieve SDG 2, reducing hunger and promoting food security, by providing finances to farmers that enable them to acquire resources and invest in knowledge to increase crop production. Other SDGs include SDGs 3, 4, 5, 6, 7, 8, and 9 by helping households and individuals to meet medical costs, invest in education opportunities, finance water projects and energy systems, increase innovation, and entrepreneurial activity, promote full and productive employment, and support innovation, respectively.

Banks and other lenders examine borrowers' behavior extensively when making lending decisions to quantify and determine risk. Risk perception is an outcome of accumulated experience between a specific borrower and lender ([Pavlou and Gefen 2004](#)). Therefore, borrowers' histories are a critical determinant of default risk. Nonetheless, there are multiple aspects of borrowers' behavior that contribute to understanding their decision-making process. They include loan application behavior ([Ladouceur et al. 2011](#)), loan selection behavior ([Lukas and Nöth 2019](#)), loan repayment behavior ([Morvinski and Shani 2022](#)), financial literacy and awareness ([Galariotis and Monne 2023](#)), risk perception and risk-taking behavior ([Nguyen-Trung et al. 2023](#)), social and cultural factors ([Osei-Tutu and Weill 2023](#)), psychological factors ([Dezso and Loewenstein 2012](#)), digital behavior ([Tang et al. 2023](#)), repeat borrowing ([Tian and Wu 2023](#)), and default and delinquency behavior ([Juma and Mathuva 2023](#)).

Loan application is a highly controlled process that requires individuals to provide critical pieces of information that help lenders make lending decisions. Organizations have a pre-defined lending cut-off at the loan screening stage, which is informed by the information provided at the application stage ([Rawate and Tijare 2017](#)). To underscore the importance of the application stage, [Sindhuraj and Patrick \(2023\)](#) postulated that careful examination of applicant status lowers the default rate. On the other hand, borrowers loan repayment and defaulting behavior can be determined by examining both soft and hard data. While many studies have focused on the importance of hard data, existing literature exemplifies the benefits of soft or non-traditional features in predicting default. According to [Sindhuraj and Patrick \(2023\)](#), considering soft data in equal measure as hard information reduces information asymmetry and helps to assess borrower creditworthiness more accurately and post-disbursement behavior. Hard data are any information that is quantifiable, accurately collected, and easily disseminated. In contrast, soft data are any additional information that can be obtained through in-depth interviews and other checks to aid in credit appraisal ([Rawate and Tijare 2017](#)). The borrowers' behavior at the loan application stage has not been extensively researched. Nonetheless, socioeconomic

variables, such as service quality, bank distance, education, and service characteristics significantly affect credit adoption (Dey et al. 2023). Moreover, risk perception, perceived value, and working capital have a moderate mediating effect on credit adoption and borrower satisfaction. Therefore, borrowers' behavior at the loan application stage is determined by their individual and socioeconomic factors. Enhancing either of these factors can have a greater effect on the borrowers' behavior.

Loan selection entails choosing the credit option that suits an individual. According to Madeira (2023), it is determined by both observable and unobservable factors. The observable factors include the motives behind the loan, labor income risk, demographic characteristics, education, and income. On the other hand, unobservable characteristics entail random effects and the lender type of choice.

Examining borrowers' behavior is essential to understanding their decision-making process and helping lenders identify potential default risk. This study seeks to map the intellectual structure of the borrower's behavior by addressing the following research questions:

RQ1: *What are the publication trends in borrowers' behavior using bibliometric analysis laws?*

RQ2: *What are the most prolific scholars, articles, journals, and countries contributing to borrowers' behavior?*

RQ3: *What are the research directions for future research?*

This research is organized into five sections. The first section has provided background on borrowers' behavior. In the second section, we will explain the study materials and methods. The third section will present the results of this study. The fourth section will discuss the findings, and the fifth section will draw conclusions from the key findings and provide recommendations for future studies.

2. Materials and Methods

This research will draw data from SCOPUS. SCOPUS is the most widely used and reliable source for scientific publications in the economic and social sciences because it has a broader coverage and citation count (Falagas et al. 2008). The Bibliometrix R package was used to carry out network analysis.

The key words “borrowers AND behavior OR decision OR psychology OR habits OR preferences OR attitudes OR motivation” occurring at any place—title, keywords, or abstract—were used to extract publications from SCOPUS. They were limited to business, decision making, lending behavior, banking, microfinance, or finance, or consumption behavior. Only studies published in English were considered to enhance relevance. All studies, irrespective of the year of publication, were included to help in identifying the history of the subject. The exact research keyword combination was:

TS = ((borrowers) AND (behavior) OR TITLE-ABS-KEY (decisions) OR TITLE-ABS-KEY (psychology) OR TITLE-ABS-KEY (habits) OR TITLE-ABS-KEY (preferences) OR TITLE-ABS-KEY (attitude)) AND (LIMIT-TO (SUBJAREA, “econ”) OR LIMIT-TO (SUBJAREA, “busi”) OR LIMIT-TO (SUBJAREA, “deci”)) AND (LIMIT-TO (LANGUAGE, “english”)) AND (LIMIT-TO (EXACTKEYWORD, “lending behavior”) OR LIMIT-TO (EXACTKEYWORD, “banking”) OR LIMIT-TO (EXACTKEYWORD, “credit provision”) OR LIMIT-TO (EXACTKEYWORD, “microfinance”) OR LIMIT-TO (EXACTKEYWORD, “finance”) OR LIMIT-TO (EXACTKEYWORD, “consumption behavior”)). The search methodology is illustrated in Figure 1.

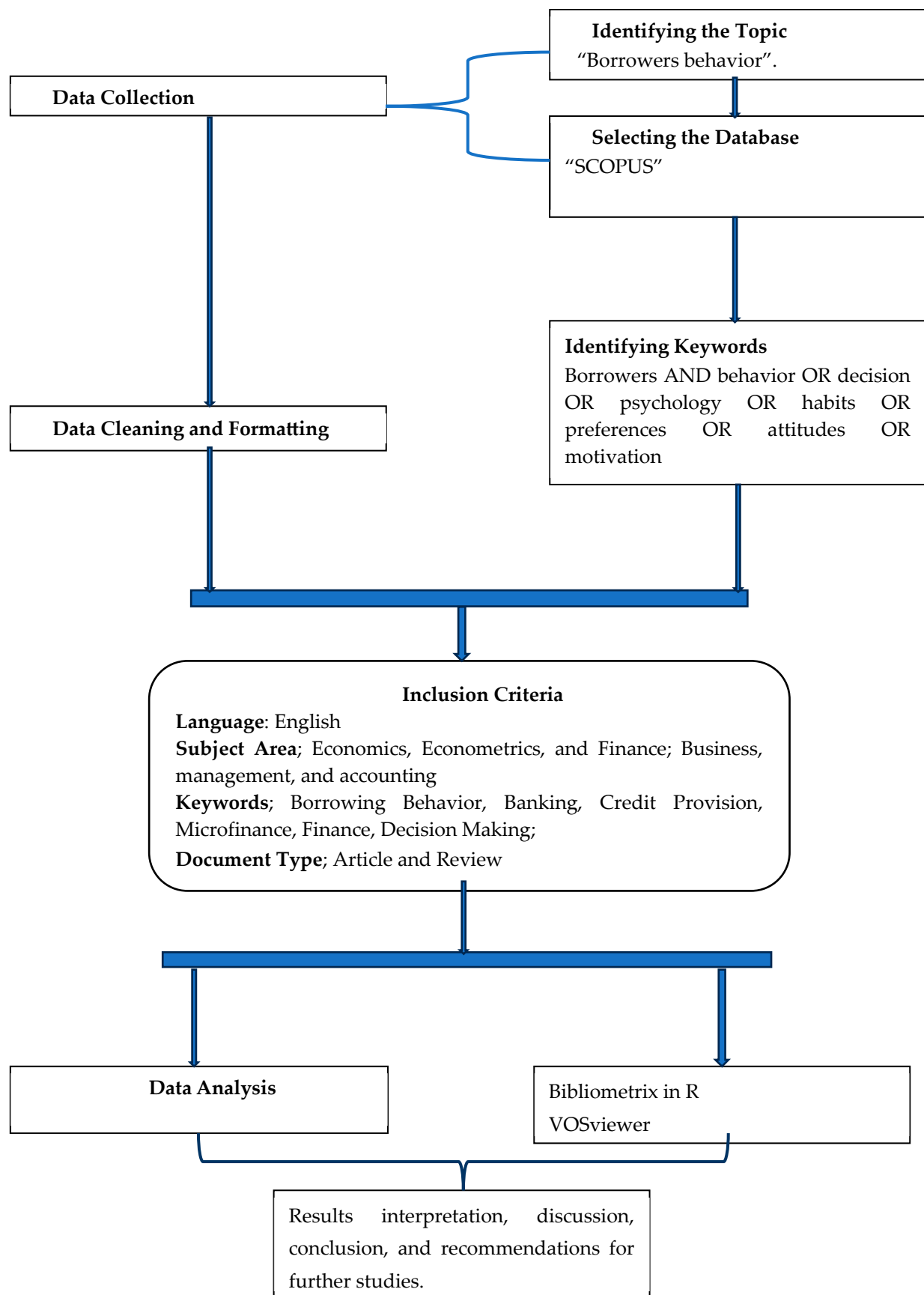


Figure 1. The search methodology.

Data

The search result returned 1082 documents. However, after limiting the search to include only articles and reviews, the search result returned 989 documents. Table 1 shows the search results.

Table 1. Number of Articles Considered for Analysis.

Terms that have been searched are “borrowers AND behavior OR decision OR psychology OR habits OR preferences OR attitudes OR motivation” Limited to Business or decision making or lending behavior or banking, or micro-finance, or finance, or consumption behavior, and English.	
Article	967
Conference	77
Paper Review	29
Book Chapter	8
Book	1
Total	1082

Limit to document type as “Article and “Review”	
Article	961
Review	28
Total	989

3. Results

The results have been discussed under three subsections: publication and citation structure, list of the most influential publications, and network analysis of leading publishers and publications.

3.1. Scientific Production Trend

The research sought to establish the annual scientific output from 1987 to 2023. The results are shown in Figure 2.

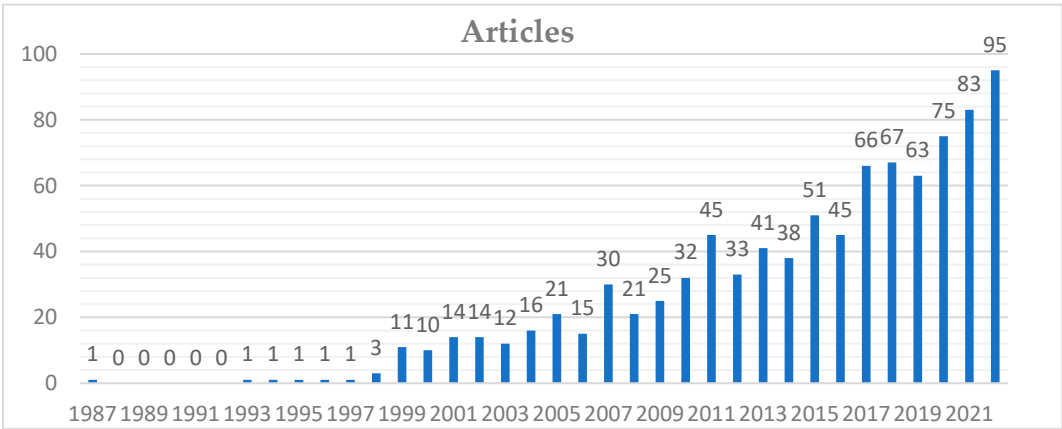


Figure 2. Annual scientific production over time (Articles).

According to Figure 2, there was a static trend in publications from 1987 to 1997, with at least 1 document and zero publications from 1988 to 1992. The trend changed in the next few decades. From 1998 on, there was a rapid increase in publications related to borrowers’ behavior. The highest production recorded was in 2022. This trend implies that the area has continuously gained interest among researchers. The research finding aligns with other

studies related to behavioral finance, such as [Costa et al. \(2017\)](#), who established an increase in annual scientific production.

Annual scientific production growth using Price Law

The price law was formulated by Derek Solla Price to describe productivity distribution in numerous fields. The law states that a significant contribution in a given discipline is made by a small number of contributors. This principle is central in bibliometric analysis as it shows the concentration of productivity, aids in resource allocation, enables research evaluation, and helps to identify key contributors to the academic discipline. We run an exponential growth curve to estimate growth over time, and the results are shown in Figure 3 below.

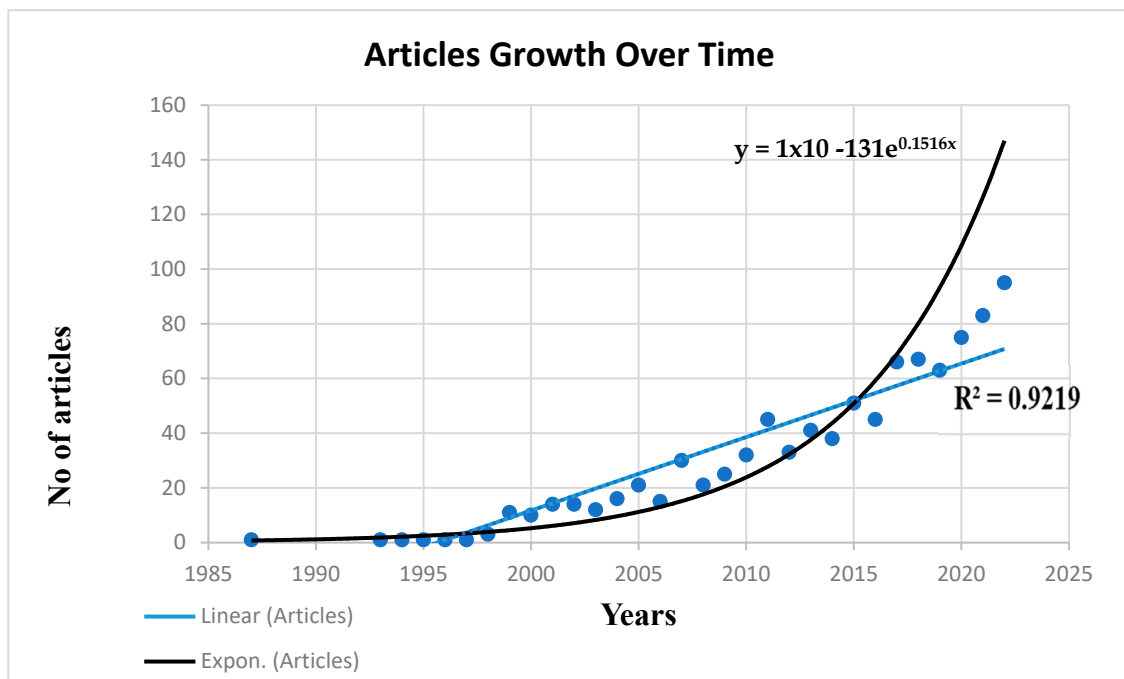


Figure 3. Annual growth over time.

The results show a growth value (0.1516) over time. The model's $R^2 = 0.9219$ indicates a high goodness of fit, as it explains 92.19% of the data variability. These findings support the results in Figure 3, which showed growth over time. Therefore, articles on borrowers' behavior have increasingly been published, and the area has attracted interest over time.

Further examination of journal listings from 1988, when the first article was published, to 2022 supports the findings on the rapid increase in publications, as shown in Figure 4.

The leap in publications from 1987 can be attributed to the establishment of numerous journals focusing on development economics, such as the Journal of Development Economics, the European Economic Review, and Applied Economics, among others. The World Development Organization has also intensified research on borrowers' behavior in its quest to address economic disparity and poverty in emerging economies relative to sustainable development goals. In addition, it can be attributed to multiple economic events, such as the debt crisis, structural adjustment programs, economic liberalization, poverty alleviation, and global trade and development, that the world has been experiencing since the beginning of 1980s. Examining cognitive biases and their effect on decision making gained traction in 1980s and 2000s ([Røpke 2005](#)).

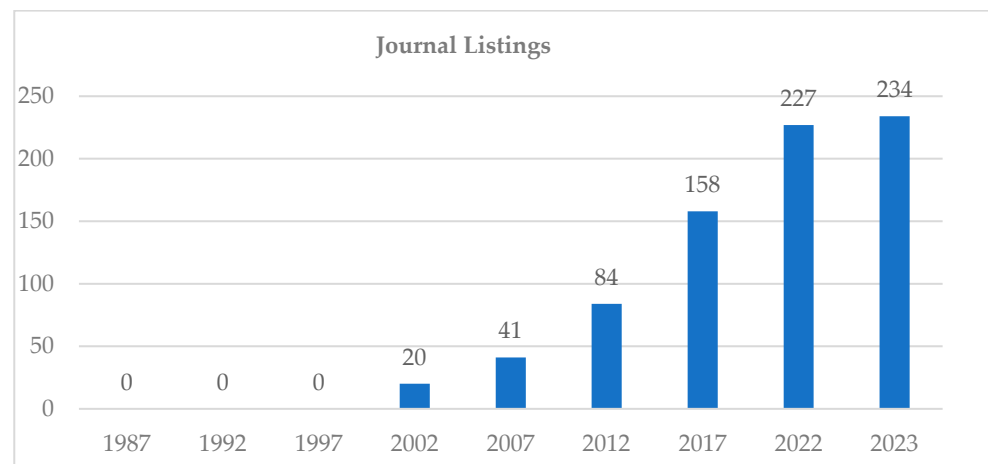


Figure 4. Journal listings over time.

Journal Listing Using Bradford's Law

Bradford's law was developed in 1934 by Bradford and is widely used to examine the output of scientific journals. The law states that "if scientific journals are arranged in order of decreasing productivity of articles on a given subject, they may be divided into a nucleus of periodicals more particularly devoted to the subject and several groups or zones containing the same number of articles as the nucleus" (Bradford 1934). Table 2 below shows the top 20 core sources based on Bradford's law.

Table 2. Top 20 core sources based on Bradford's law.

Source	Rank	Freq	Cum. Freq	Zone
Applied Economics	1	54	54	Zone 1
Journal of Development Economics	2	53	107	Zone 1
World Development	3	46	153	Zone 1
Applied Economics Letters	4	21	174	Zone 1
Economic Notes	5	20	194	Zone 1
European Economic Review	6	20	214	Zone 1
Management Science	7	20	234	Zone 1
International Journal of Finance and Economics	8	18	252	Zone 1
Electronic Commerce Research and Applications	9	16	268	Zone 1
Economic Journal	10	15	283	Zone 1
International Journal of Social Economics	11	15	298	Zone 1
Applied Financial Economics	12	14	312	Zone 1
Economic Development and Cultural Change	13	12	324	Zone 1
Journal of Banking and Finance	14	12	336	Zone 1
Journal of Economic Surveys	15	12	348	Zone 2
Journal of International Economics	16	12	360	Zone 2
Journal of the Operational Research Society	17	11	371	Zone 2
Review of Economic Studies	18	11	382	Zone 2
Oxford Economic Papers	19	10	392	Zone 2
Empirical Economics	20	9	401	Zone 2

The results show that among the top 20 journals, 15 are related to economics, 3 to finance, 1 to management, and 1 to development. One is a multidisciplinary journal. Upon further examination of the top sources, we established that the majority of the sources cover financial inclusion, poverty alleviation, credit distribution, and financial behavior, which is in tandem with the scope of borrowers' behavior. In addition, the journals are mainly in economics, finance, management, and development, which cover borrowers' behavior. Nonetheless, even though borrowers' behavior is closely related to finance, only one finance-related journal has published articles related to borrowers' behavior.

Articles Distribution According to Bradford's Law

The research examined the distribution of articles in the three zones to determine whether it adheres to Bradford's law. The results are shown in Table 3.

Table 3. Summary of article distribution according to Bradford's law.

Journals			Articles		
	N	%		N	%
Zone 1	14	4.72973	Zone 1	336	33.97371
Zone 2	56	18.91892	Zone 2	329	33.26593
Zone 3	226	76.35135	Zone 3	324	32.76036
	296			989	

The above findings show that Zone 1 had a minimum of 14 journals, which increases fourfold in zone 2. Similarly, the journals in zone 3 are fourfold more than those in zone 2. The distribution of articles across the three zones implies that each zone had about 329 articles, or 33% of the articles. These findings are in tandem with Bradford's law, which posits that zones should have a roughly equal distribution of articles, and a few core journals contain the majority of articles. Therefore, the distribution of articles across different sources aligns with Bradford's law.

Prolific Scholars, Articles, Journals, and Countries

Examining prolific scholars, articles, journals, and countries helps to identify influential research, benchmark research productivity, track research trends, and highlight global perspectives on the distribution of research resources and knowledge.

Prolific Scholars

This study sought to examine the most prolific scholars based on the number of publications and H-index. The results are shown in Figure 5 below.



Figure 5. The most relevant authors across the period.

Li Y has eight publications, authored individually or coauthored with other scholars. Agarwal S., Lensik R., Liu C., Wydick B., Xia Y., and Zhang Y. have made six publications each, while Chen X., Chowdhury PR., and Hermes N. have five publications. A review of their scholarly work shows that analysis of borrowers' behavior requires a multidisciplinary approach. For instance, Li Yinguo and Xia Yufei, though experts in computer science, have collaborated with other scholars to develop models that predict borrowers' behavior. The authors' research output shows that addressing biases in borrowers' decisions can help alleviate poverty. Agarwal Sumit, Bruce Wydick, and Chowdhury focus mainly on household finance, poverty alleviation, and economic growth. This further shows a close relationship between borrowers' behavior, household finance, poverty alleviation, and economic growth.

Source Local Impact Using the H-index

The H-index is a single indicator introduced in 2005 to measure the quantity of scientific output of a given researcher. According to Hirsch (2005), "A scientist has index H if H of his or her N_p papers have at least H citations each and the other ($N_p - h$) papers have less or equal H citations each". It is an effective measure since it combines measures of impact and quantity, characterizes researchers' scientific output objectively, and outperforms other single measures.

The results show that seven authors had an H-index of 5, while three had 4 (see Table 4). These findings imply that the top seven authors have published five papers, and each paper has been cited at least five times by others. Similarly, the authors with an H-index of 4 have published four papers and been cited at least five times by others. Though scholars such as Li Y. have published more papers than Agarwal S., as shown in Figure 5, both have the same H-index, which implies that Agarwal has received more citations despite publishing fewer papers than Li Y.

Table 4. The H-index of the top ten authors.

Authors	H. Index
Agarwal S	5
Lensink R	5
Li Y	5
Liu C	5
Mcintosh C	5
Thomas LC	5
Wydick B	5
Chen X	4
Chomsisengphet S	4
Chowdhury PR	4

Most Cited Articles

Further review of the most cited articles globally can help to identify influential research, measure research impact, understand research trends, benchmark research quality, identify pioneering researchers, and inform research strategies. Table 5 shows the topmost cited articles globally.

Publications by Berger AN are among the most cited. However, they were published earlier compared to other scholars, such as Gomper P., whose studies have gained great interest over time. The most-cited article by Berger AN examined relationship lending and the importance of "soft" information to the loan officer, who acts as a repository of the soft information. On the other hand, Diamond DW article explores lenders' relationship-specific skills with borrowers and their impact on liquidity, while Berger's AN second article examines relationship lending, growth in non-core funding, and off-balance-sheet guarantees as the main drivers of crises. These studies underscore the importance of understanding soft information and relationships in the borrower-lender decision-making process. Even though institutions have developed mechanisms to determine borrowers' credit worthiness,

“soft” information is mainly overlooked and plays a critical role in the decision-making process. Other most-cited studies focus on consumer credit scoring metrics, fintech, rational herding, credit risks, home biases, group lending, cultural differences, herding behavior, and crowdfunding campaigns. These themes are prevalent at both the household and firm levels and have a great impact on the decision-making process. Therefore, the top cited articles show a rising interest in the roles and effects of soft information in financial decisions.

Table 5. Top 20 most-cited articles on borrowers’ behavior.

Rank	Paper	Title	Total Citations
1.	Berger AN, 2002	Small business credit availability and relationship lending: the importance of bank organizational structure.	886
2.	Diamond DW, 2001	Liquidity risk, liquidity creation, and financial fragility: a theory of banking	683
3.	Berger AN, 2013	How does capital affect bank performance during financial crises?	678
4.	Hand DJ, 1997	Statistical Classification Methods in Consumer Credit Scoring: a Review.	575
5.	Gomber P, 2018	On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services	532
6.	Zhang J, 2012	Rational Herding in Microloan Markets	523
7.	Thomas LC, 2000	A survey of credit and behavioral scoring: forecasting financial risk of lending to consumers	520
8.	Mian A, 2013	Household balance sheets, consumption, and the economic slump	484
9.	Chodorow-Reich G, 2014	The Employment Effects of Credit Market Disruptions: Firm-level Evidence from the 2008–9 Financial Crisis.	427
10.	Ghatak M, 1999	The economics of lending with joint liability: theory and practice	409
11.	Hermes N, 2011	Outreach and Efficiency of Microfinance Institutions	392
12.	Dimitras AI, 1996	A survey of business failures with an emphasis on prediction methods and industrial applications	386
13.	Altman EI, 2007	Modeling Credit Risk for SMEs: Evidence from the U.S. Market	348
14.	Lin M, 2016	Home Bias in Online Investments: An Empirical Study of an Online Crowdfunding Market	336
15.	Emekter R, 2015	Evaluating credit risk and loan performance in online peer-to-peer (P2P) lending	329
16.	Ghatak M, 1999	Group lending, local information, and peer selection	307
17.	Burtch G, 2014	Cultural differences and geography as determinants of online prosocial lending.	278
18.	Iyer R, 2016	Screening Peers Softly: Inferring the Quality of Small Borrowers	260
19.	Lee E, 2012	Herding behavior in online P2P lending: An empirical investigation	255
20.	Lukkarinen A, 2016	Success drivers of online equity crowdfunding campaigns.	254

Productivity of Authors Based on Lotka’s Law

The research used Lotka’s law to examine the productivity of authors. The law was proposed by Lotka in 1926 to test the frequency distribution of scientific output. The law states that “The number of authors making n contributions is $1/n^2$ of those making one,

and the proportion of contributors making a single contribution is 60%. Table 6 shows authors productivity based on Lotka's law.

Table 6. Productivity of authors based on Lotka's law.

Documents Written	N. of Authors	Proportion of Authors
1	1697	0.871
2	171	0.088
3	42	0.022
4	24	0.012
5	7	0.004
6	6	0.003
8	1	0.001

The results show that 87.1% of the researchers studying borrowers' behavior had written a single document. This finding contradicts Lotka's law, which expects 60% of the authors to have one publication. Therefore, this study's data deviated from the assumption made by Lotka's law.

Most prolific Sources (Journals)

The research sought to establish the most prolific journals using the H-index. Similar to articles, the H-index is used to show the quality of a journal (Mingers et al. 2012). It is robust to extreme values and poor data, easy to understand and compute, and a good measure of the overall impact of a journal. The higher the h-index, the higher the quality of the journal. Table 7 shows the h-index of the top ten journals.

Table 7 shows that the top three journals in borrowers' behavior were Management Science, Applied Economics, and World Development, with H-indexes of 278, 278, and 208, respectively. The journal with the lowest h-index is Economic Development and Cultural Change, with a H-index of 80. These metrics imply that the top 10 journals have a high impact, as evidenced by their high H-index. Moreover, all the top 10 journals are ranked Q1 in SCIMAGO.

Table 7. H-index of the top ten journals.

Journal	H_INDEX	SCIMAGO Ranking
Management Science	278	Q1
Applied Economics	278	Q1
World Development	208	Q1
Economic Journal	179	Q1
Journal of Development Economics	160	Q1
Review of Economic Studies	158	Q1
European Economic Review	142	Q1
Journal of Economic Surveys	105	Q1
Electronic Commerce Research and Applications	91	Q1
Economic Development and Cultural Change	80	Q1

Countries Production Over Time

Countries production over time helps to assess the research performance and productivity of different countries in a given field based on the affiliation of the authors. In addition, it shows the research trends and patterns in a country's research output. The research sought to establish countries' production over time, and the results are shown in Figure 6.

In terms of countries, the United States has the largest number of publications on borrowers' behavior, as shown in Figure 6. Between 1987 and 1997, China, Germany, Italy, the United Kingdom, and the United States of America had almost equal but fewer publications. This trend continued until 2000, when the USA and the United Kingdom published more scientific papers compared to other countries. Since then, the USA has

published more articles than other countries, as scholars' interests were drawn towards understanding borrowers' behavior to enhance access to credit. This finding is in line with [Costa et al. \(2017\)](#) and [Paule-Vianez et al. \(2020\)](#), who observed that the USA has been leading in scientific production in behavioral finance. The rise in scientific production in the USA can be attributed to industrial deregulation in the 1980s, after the introduction of the depository institutions deregulation and monetary control act of 1982. Policymakers and researchers' interests were drawn to examine the impact of these changes on borrowers' behavior. On the other hand, developing countries are missing since none appear among the countries with the largest publications.

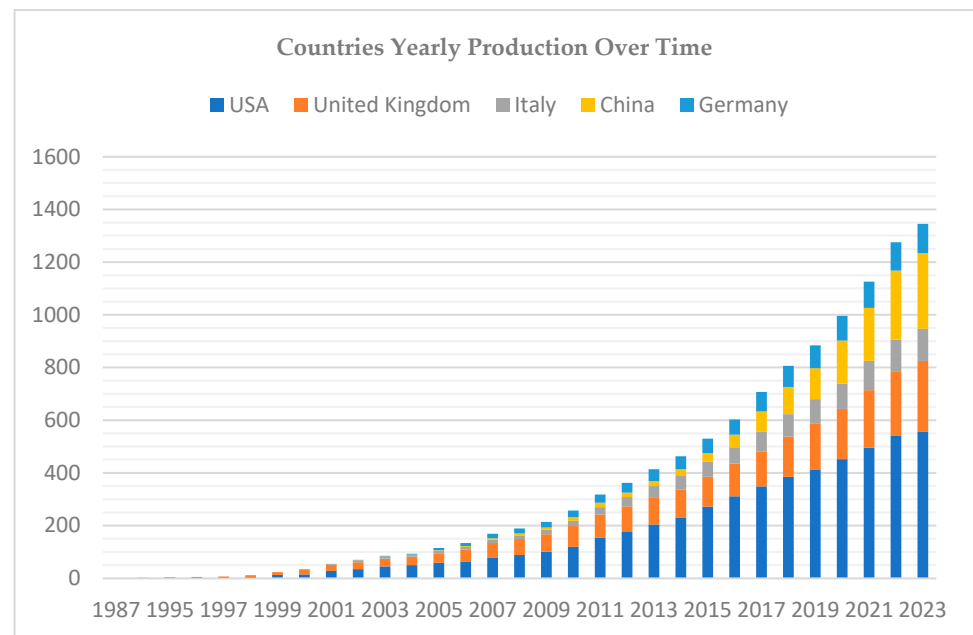


Figure 6. Countries Yearly Production Over Time.

3.2. Conceptual Structure and Network Analysis

In this section, word cloud, keyword frequency, network analysis of co-occurrence of keywords, and bibliographic coupling of sources and authors have been undertaken.

Word Cloud

Word cloud is a text visualization tool that shows common words within the researcher's area of study. Frequently used words appear bigger, while less used words appear smaller ([Cooshna-Naik 2022](#)). Figure 7 shows frequent keywords in borrowers' behavior.

Figure 7 shows that lending behavior and credit provision are the main keywords of interest among the analyzed publications examining borrowers' behavior. In addition, banking, finance, microfinance, financial market, financial system, interest rate, risk assessment, and financial crisis are other notable words that attracted attention. This shows a strong interdependence between notable keywords and borrowers' behavior. The two main keywords aforementioned, lending behavior and credit provision, appeared 365 and 279 times, respectively. Banking came close with a frequency of 239, as shown in Table 8. The banking sector examines borrowers' behavior before availing credit, which defines their lending behavior and explains the relationship between the key terms and borrowers' behavior. The behavior of the borrowers, such as saving, history of paying credit, and earnings, is critical when creditors are evaluating and determining the borrowers' default risk.

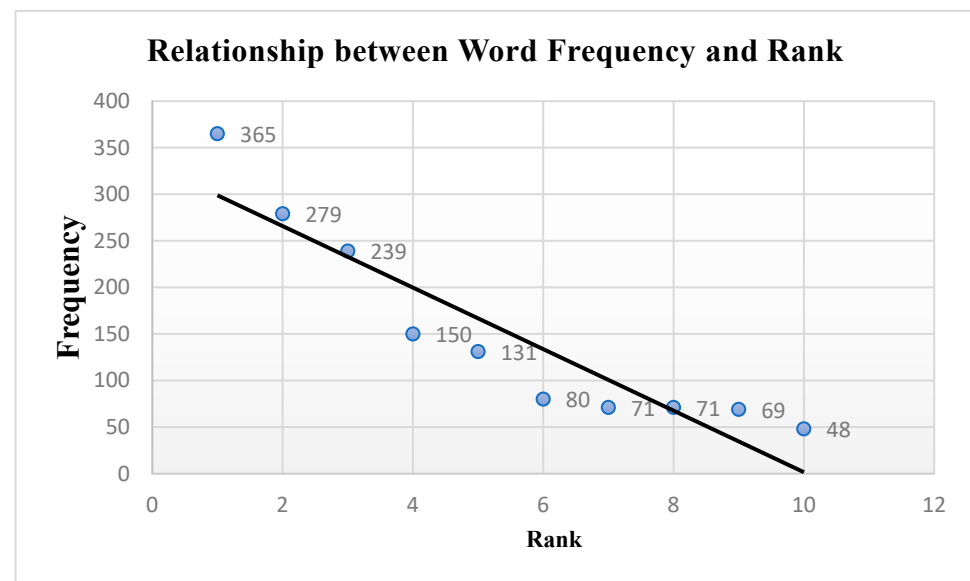


Figure 8. Relationship between frequency and Rank.

Analysis of Co-occurrence of Keywords

Co-occurrence network visualization shows the connexion of key texts centered on their combined occurrence. Prior to analysis, similar keywords were combined. The publication keyword was set to the default value of 5.212 key terms met the criteria; nonetheless, it was not possible to do meaningful analysis since the resulting image was cluttered. Consequently, the minimum co-occurrence of keywords was constantly increased by 1 until the best outcome was achieved. The best outcome was attained at the value of 12, which resulted in 31 items, 5 clusters, 162 links, and 452 total link strengths, as shown in Figure 9.

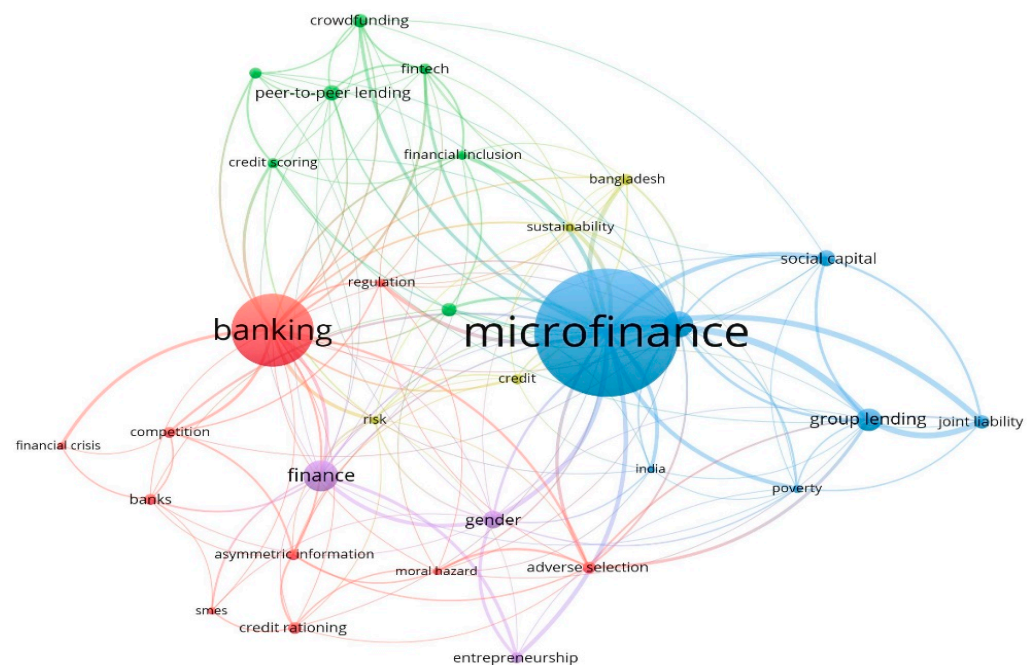


Figure 9. Analysis of the co-occurrence of words.

Cluster 1, marked in red, has banking as the keyword with 121 occurrences, followed by adverse selection with 19 occurrences. Other keywords in this cluster are asymmetric information, moral hazard, credit rationing, competition, banks, and small and medium enterprises. The key idea that can be derived from this cluster is how the banking sector

gender, micro-credit, group lending, peer-to-peer lending, social capital, crowdfunding, and credit risk. The top ten sources of scientific information on borrowers' behavior are the Journal of Development Economics, World Development, Applied Economics, Management Science, Electronic Commerce Research and Applications, European Economic Review, Applied Economic Review, International Journal of Finance and Economics, and Economic Notes.

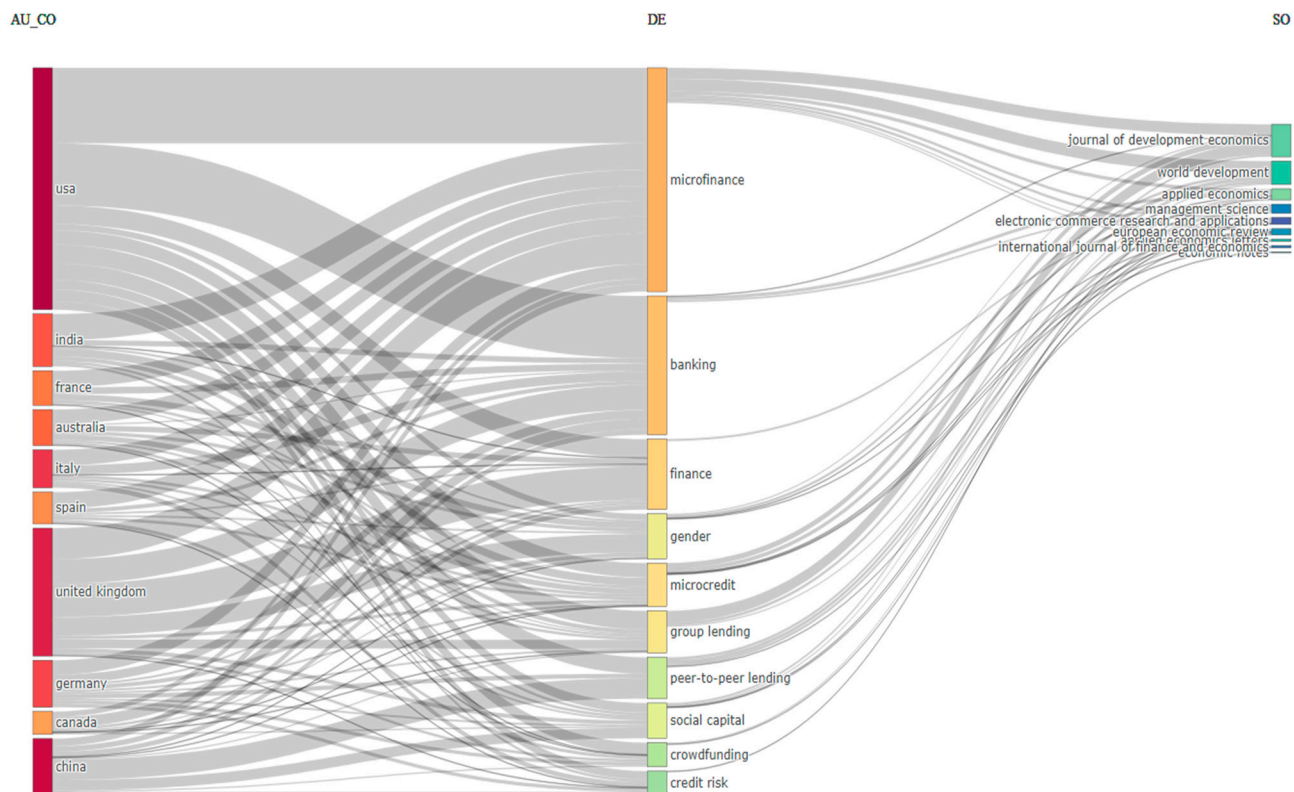


Figure 11. Three-field plot analysis of borrowers' behavior.

4. Discussion

Understanding borrowers' behavior is an integral part of credit assessment. Access to credit is a prerequisite to poverty alleviation and financial inclusion in developing and underdeveloped countries (Singh and Singh 2023). This paper adopted a bibliometric analysis approach to examine the trend in scientific studies related to borrowers' behavior. A total of 989 studies and reviews were obtained from SCOPUS and used in the analysis.

A review of publications and citation structure shows a static publication trend from 1987 to 1997. Nonetheless, there was a drastic increase in scientific publications on borrowers' behavior as financial inclusion and poverty alleviation gained interest among scholars, and journals on development economics and applied economics were established. During this period, the World Bank and other global financial bodies laid a greater emphasis on poverty alleviation. The United States is the leading country in scientific studies on borrowers' behavior, which can be attributed to financial innovations in the 1980s that led to the introduction of new products such as adjustable-rate mortgages, credit cards, and securitization. On the other hand, China has been at the forefront in the fight against poverty and achieving financial inclusion for its citizens (Lee et al. 2023). It is worth noting that only developed countries have intensified studies of borrowers' behavior, and developing countries are notably missing among the top 10 countries.

The most relevant scholars for conducting scientific research on borrowers' behavior are Li and Agarwal, who are in different areas of study (computer science and economics, respectively). Nonetheless, Berger is the most influential scholar with the highest citations.

Their scholarly work underscores the importance of a multidisciplinary approach to understanding the role of borrowers' behavior in the decision-making process. The top ten articles on borrowers' behavior and decision-making process focus on credit availability, consumer credit scoring, lending behavior, fintech, microlending, rational herding, and peer-to-peer lending. Network analysis of the co-occurrence of keywords established that banking and adverse selection, peer-to-peer lending, micro-finance, sustainability, and finance were the key words. On the other hand, the bibliographic coupling of sources established that The Journal of Development Economics and The Journal of applied economics had the greatest contribution to the research of borrowers' behavior. Others, such as economic surveys, applied economics letters, technological forecasting, and Operational Economics Research had minimal link strength. Notably, journals of behavioral finance and finance-related studies are missing since journals related to economics are predominant. This finding implies that borrower's behavior is not widely and adequately researched in finance, despite being a key component in credit lending decisions.

The USA's dominance in borrowers' behavior studies is further evidenced by a three-plot analysis comprising the top 10 countries, keywords, and sources. Others include India, France, Australia, Italy, Spain, the United Kingdom, Germany, Canada, and China. Micro-finance is the most dominant keyword, while the Journal of Development Economics, World Development, and Applied Economics are at the top of the list of the most influential journals.

Research Limitation

There are multiple limitations associated with this research. Firstly, the data were obtained only from Scopus. Secondly, the data obtained was limited to the keywords keyed into the research query. Thirdly, the keywords were selected based on heuristic trials, which creates the possibility of accidentally neglecting essential keywords.

5. Conclusions

Relative to the research questions, the research indicates that the scholarly work on borrowers' behavior has attracted interest among scholars over time. A discernible trend emerges indicating that the publications on borrowers' behavior are mainly in economics and applied economics journals, showcasing a sustained interest in economics over the passage of time. Interestingly, finance journals have not given the subject much attention, which implies that it can be explored further.

Looking at the global picture, developed countries continue to lead in studies examining borrowers' behavior. The most influential scholars are from the United States and China, which also rank highly in publications. This shows that economic powerhouses are making a significant contribution towards understanding the behavior of borrowers and their decision-making process. On the other hand, developing countries are lagging behind in studies related to borrowers' behavior.

It is also evident that borrowers' behavior has not attracted much attention, as it is overshadowed by studies in lending behavior, micro-finance, banking, peer-to-peer lending, and fin-tech. The focus is mainly on the supply side of the credit industry with little regard to demand-side dynamics, such as borrowers' decision-making processes, which can affect the performance of credit facilities. Therefore, there is a need to examine how people decide to borrow instead of only how money is given out.

Poverty alleviation cannot be achieved without financial inclusion since it enables people to access credit and capital, save and build assets, mitigate risk, facilitate remittances, enhance productivity, and empower marginalized groups. Therefore, there is a need to closely examine demand-side dynamics in the financial system to enhance financial inclusion.

Research collaboration between scholars in developed and developing economies can help eliminate scholarly disparities between continents. This collaboration can help identify borrowers' behavior across different economies.

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