



## A Bibliometric Analysis of Consumer Price Index (CPI) from 1999-2022 Using VOSviewer

Zeeshan Ali<sup>1</sup>, Toqeer Hassan<sup>2</sup>, Hafiz M. Rizwan Khan<sup>3</sup>, Nadia Nasir<sup>4</sup>

<sup>1</sup> M.Phil. Scholar, Department of Commerce & Finance, Superior University, Lahore, Pakistan.  
Email: [zeeshanali18101996@gmail.com](mailto:zeeshanali18101996@gmail.com)

<sup>2</sup> M.Phil. Scholar, Department of Accounting & Finance, Superior University, Lahore, Pakistan.  
Email: [thassan0078@gmail.com](mailto:thassan0078@gmail.com)

<sup>3</sup> M.Phil. Scholar, Department of Commerce & Finance, Superior University, Lahore, Pakistan.  
Email: [hafiarizwankhan@gmail.com](mailto:hafiarizwankhan@gmail.com)

<sup>4</sup> Associate Professor, Quality Circle Head of Management and ICT, Faculty of Business and Management Science, Superior University, Lahore, Pakistan. Email: [nadia.nasir@superior.edu.pk](mailto:nadia.nasir@superior.edu.pk)

### ARTICLE INFO

### ABSTRACT

#### Article History:

Received: May 10, 2023  
Revised: June 28, 2023  
Accepted: June 29, 2023  
Available Online: June 30, 2023

#### Keywords:

Consumer Price Index (CPI)  
Bibliometric Analysis  
VOS viewer  
Scopus Data Base  
Authors Keyword  
Co-occurrence

#### Funding:

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

The Consumer Price Index (CPI) tracks changes in consumer prices on a monthly basis. One of the most widely used indicators of inflation and deflation is consumer price index. The analysis for this research study is done for the period of 23 years and data is taken from well-known "Scopus" data base. The main and core purpose of this study is to investigate the significance and importance of consumer price index and find out about the noteworthy authors, countries, organization which have conducted their research on CPI. The software R-Studio and VOSviewer is used for all the analysis done in this study. The findings of this study are that mostly keyword "Consumer Price Index" used by the journal of Switzerland named "Our Knowledge Sustainability", the organization that published more articles is Office for National Statistics, United Kingdom and the most publication is done by author Gupta R. This research work has also some limitations and future research directions and the main suggestion is to improve the academic collaboration and contribute to the creation of theoretical and empirical literature.

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Corresponding Author's Email: [zeeshanali18101996@gmail.com](mailto:zeeshanali18101996@gmail.com)

## 1. Introduction

We measure everything when we buy things according to the commodity's price. If it is up to our liking, we purchase the commodity otherwise not purchase. All things have a price that goes up and down with the passage of time. The prices can be higher and lower with the given situation but to our knowledge, most of the time prices are higher. Society has a need for commodities which add like used for finished products, energy products, etc. (Zhang, Hu, Jiao, & Wang, 2022). To our knowledge it might take only a couple of days for a commodity price to increase but for that same commodity price to decrease it will take months or might not just decrease. So, it can also be described that there is not a hundred percent guarantee that the price for any commodity will decrease but there are higher chances that the price will always increase and keep on increasing. Inflation plays a very good role in our daily lives. Price is different when buying one thing and the same product will have a different price at night. Similarly, this point of view is also observed in significance of artificial intelligence in business and accounting where prices are changed on regular or monthly basis (Khan, Ahmad, Javed, & Nasir, 2023). We are now living in the covid-19 era, where there are many things that prices are way too high as compared to before the covid-19. If we talk about the oil prices that are rapidly changing prices drive corruption and also change consumer price index (Ashfaq, Zafar, Zahid, & Khan, 2023). The unemployment rates are not very good, and the economy is still not able to recover at this point (Jordà, Liu, Nechio, & Rivera-Reyes, 2022). It is understandable that not all countries have the same inflation rate. Many countries are different rates as compared to other countries (Jordà et al., 2022).

There are many forecasting for inflation, but they are not always correct and are subject to some change over the time period. The problem arises when the policy-making decision is not close to consumer expectations. Campos, McMain, and Pedemonte (2022) revealed that consumer expectations and price forecasting generally are coordinated (Campos et al., 2022). There are many topics related to inflation, and many researchers have done a search over these topics and compare the inflation of one country to another or compare inflation over the long period of time one country to all other countries (Jordà et al., 2022). There are many countries that are not able to control their inflation rates and prices are going up day by day which is not good for the consumers. there are differences between the consumer and forecasters, but the consumer expectation is higher compared to those of professional forecasters (Campos et al., 2022). The price of the product is rising day by day. Some consumers know what that will cost but the sellers are greedy and do not have to show the actual cost of the commodities like healthcare etc. (Vinod, 2022) but still, there are many people which are not able to live smoothly and are not able to afford good products. The supply also plays a major role in inflation because when the public demand a thing but is short in quantity the price will go up (Vinod, 2022). If the CPI is increasing then the income should also increase the same rate as CPI (Malik, Awan, & Malik, 2022). There are also many problems that arise from inflation like policies of the Govt. at the right time, sometimes the policies are good but that is not good for their already country condition, so the policies always are made to make sure that it is acceptable for the consumer. To our knowledge, there are many papers that have been published in the topic of CPI, but they have not conducted all the bibliography analyses. So, in our analysis, we try to do as much analysis as we can include the results of that analysis but the gap in our analysis is that we only collected the data for the last 23 years.

## 2. Methodology

The bibliometric analysis is very important because it helps us identify in what field how much work is done. We can easily find out how many articles are published, and which country or organization has done more compared to others. There are many Bibliometric papers that have conducted analyses of journals, years, Arthur, countries, co-citation, etc. (Leung, Sun, & Bai, 2017). To conduct the analysis, the data were collected and searched from the "Scopus" database. First, we searched the database with the keyword CPI. We got result of article showing 39,152. Afterward, we filter the years to 23 years and got 12,365 articles. Afterwards, we apply filter of language English, final document and open article and got a total of 9,471 articles. We extracted data from 1999 to 2022. Table 1. shows the criteria about the finding of our research selection.

**Table 1: Selection of from Scopus**

Serial	Search steps	Record
1	All documents with the word "CPI" in the title, abstract, and keywords	39152
2	Limit to 1999 to 2022	12365
3	English Language	9471
4	Final Documents	9471
5	Open Articles	9471

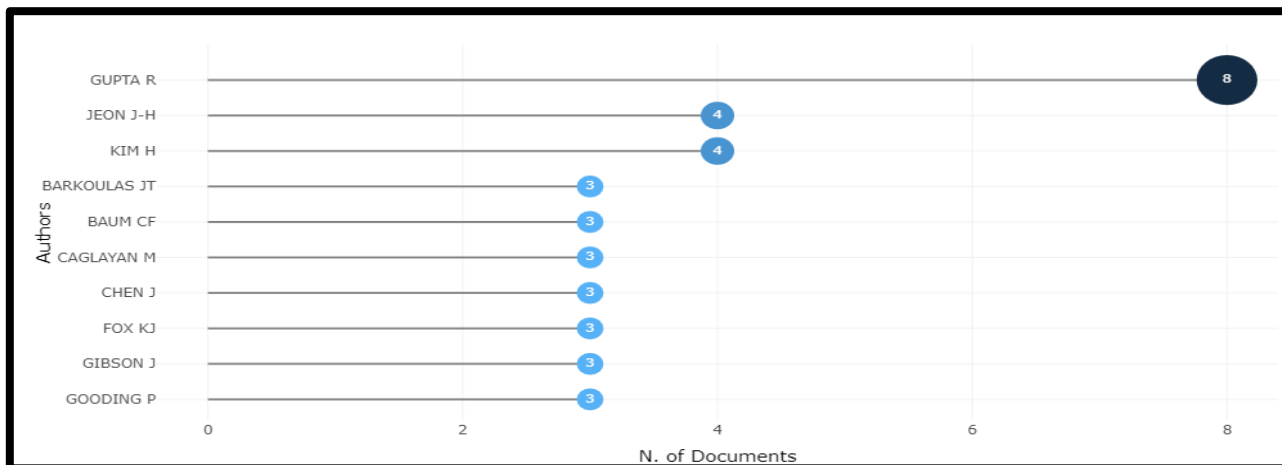
## 3. Results

### 3.1. Author Co-Citation Analysis

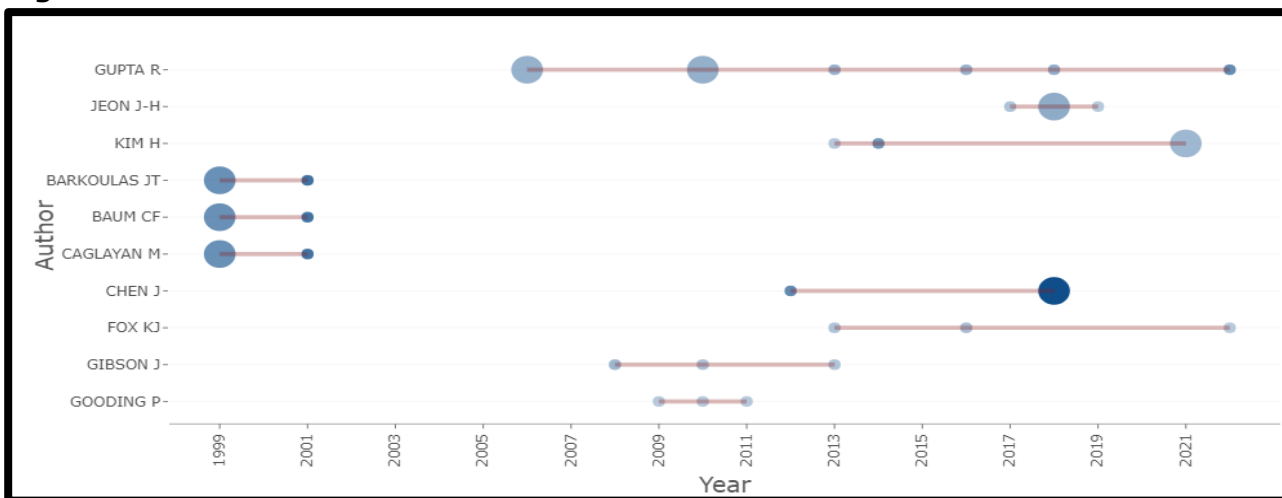
Fig 1a. shows the top leading ten authors in the field of consumer price index (CPI). All the specific detail are given at the table 2. Most article are published by Gupta R. with 8 published articles, followed by Jeon J-h and Kim H with 4 published articles and Bakoulas J.T., Baum C.F., Caglayan M., Fox K.J., Gibson J., Kang W., Kaufmann D., Mukhtarov S., Ratti R.A., Ruiz-Castillo J., Tiwari A.K., Weis J. and Gooding P. with 3 published articles. As for the citation wise Bakoulas J.T., Baum C.F. and Caglayan M. have the maximum citation of 273 and minimum 1 by Gooding p.

Fig.1 b show us the most productive authors. Gupta R have started writing about CPI from 2006 to today and still writing about it. Fox KJ have started it from 2013 but there are no published since 2022. Bakoulas J.T., Baum C.F., and Caglayan M., only published the articles regarding CPI in 1999 to 2011 afterward there are no articles regarding CPI from them.

**Figure 1a**



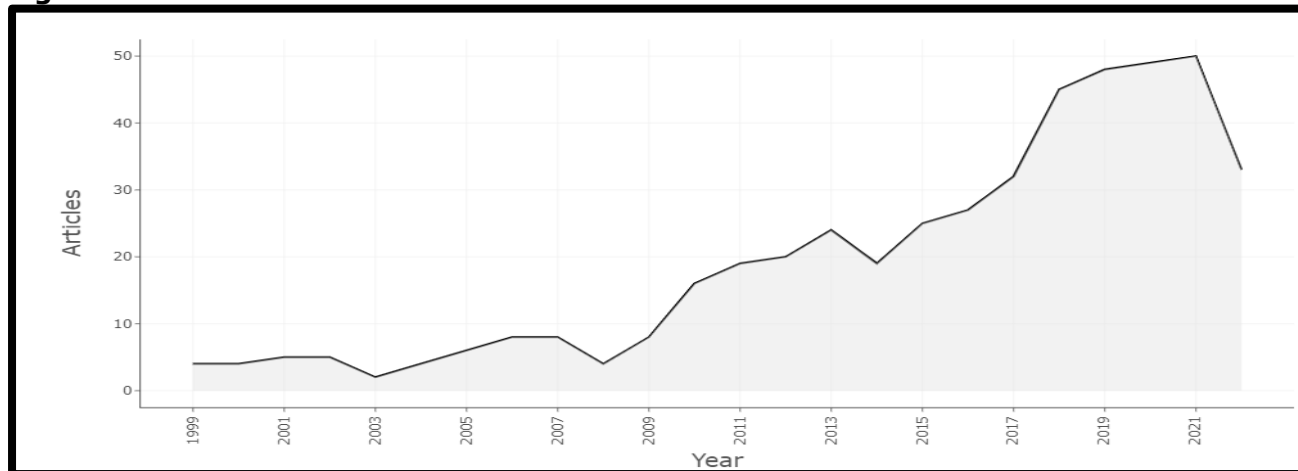
**Figure 1b**



**3.2. Data Analysis by Year**

We have collected data from 1999 to 2022. As shown in the fig. 2a, in the year of 1999 the published article regarding CPI were 2 or 3 but the number of articles after 2009 publication increase and in the year of 2021 there are 50 articles published for CPI. In the current year of 2022 to our best knowledge there are more than 30 article published.

**Figure 2a**



**3.3. Research Development**

In our study we have collected the data from 1999 to 2022 so, we have analysis the research development in these years. There are total number of sources 244 includes journal

and books, documents are 465, annual growth rate is 9.61%, documents average age is 6.33, average citations per article are 16.26, reference given are 17434, keywords are 903, author keywords are 1407, total number of authors are 1151, and single author of articles are 88.

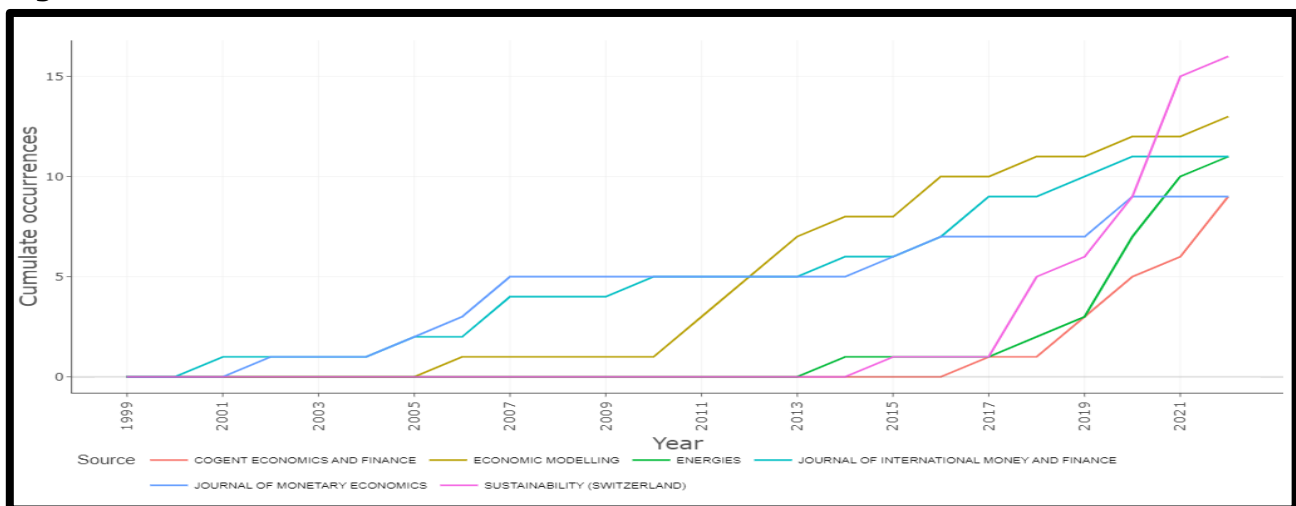
**Table 2**

Description	Results
Timespan	1999 to 2022
Sources (Journals, Books, etc.)	244
Annual Growth Rate %	9.61
Document Average Age	6.33
Average citations per doc	16.26
References	17434
Keywords Plus (ID)	903
Author's Keywords (DE)	1407
Authors	1151
Single-authored docs	88
Article	465

**3.4. Analysis by Sources**

To analysis the journal to see which journal have published more articles regarding the CPI we have conducted analysis of journal to see that issue and data is collected form scopus. As can be shown in figure 3, there were no work done to our knowledge about the CPI in 1999 but afterward they published articles in the different journal. Most journal that work on this topics and published more articles in 2021 is Journal of Monetary Economics with publication of 15 articles , in second number the Journal of Economic Modeling with publication of 12 articles, in the third place Sustainability Journal with publication of 11 articles, in fourth place Cogent Economics and finance with publication of 10 articles, in the fifth place journal of International Money & Finance with publication of 8 articles, and in sixth place Energies with publication of 6 articles enhancing the knowledge of this topics to the researcher. The density map is shown in Fig. 4 with most influential journals that publish business ethics research. The frequency of publications is depicted through the size of the node.

**Figure 3**



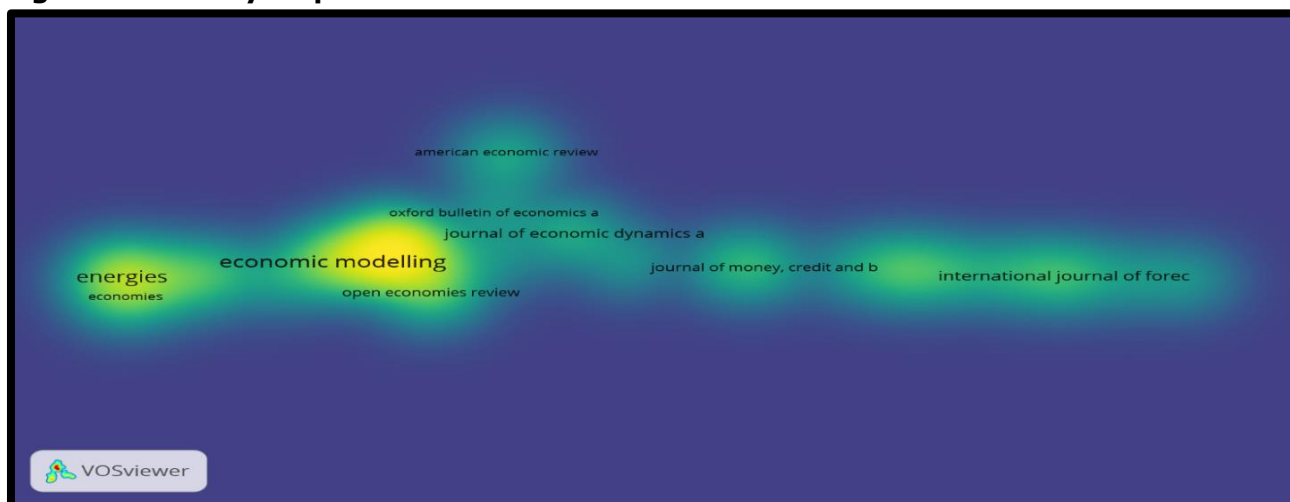
As indicated in figure 4 and table 4 the top most dynamic and significant journals in CPI are sustainability (Switzerland) with 16 publication, economic modelling with 13 publication, energies with 11 publication, journal of International Money and Finance with 11 publication, journal of Monetary Economics with 9 publication, Applied Economics with 8 publication, International Journal of Forecasting with 7 publication, Journal of International Economics with 7 publication, Empirical Economics with 5 publication, Energy Economics with 5 publication, Journal of Business and Economic Statistics with 5 publication, journal of Economic Dynamics and Control Canadian with 5 publication, Journal of Economics with 4 publication, Economic research-Ekonomska Istrazivanja with 4 publication, Egyptian journal of Petroleum with 4 publication, equilibrium. quarterly with 16 publications, journal of economics and economic policy with 4 publications, journal of macroeconomics with 4 publications, journal of money credit and banking with 4 publications, open economies review with 4 publications, and review of economics

and statistics with 4 publications. The same bibliometric data is complemented by science mapping density map figure 4 and overlay visualization map figure 5.

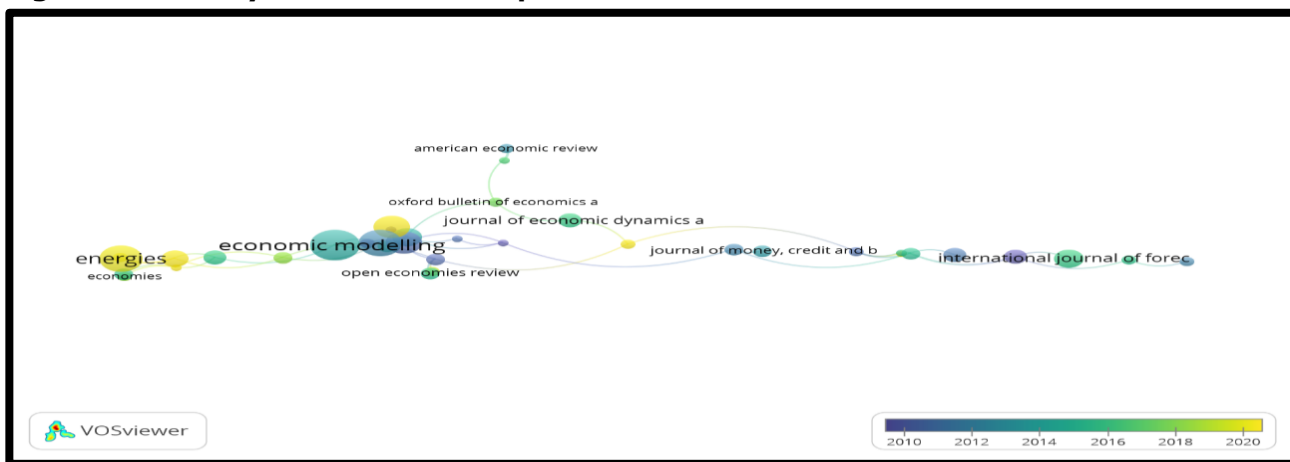
**Table 3: Top 20 Journals with most publications in research on CPI**

Source	Documents	Citations	Cit/Article
Applied economics	8	60	7.50
Canadian journal of economics	4	32	8.00
Economic modelling	13	334	25.69
Economic Research-Ekonomska Istrazivanja	4	53	13.25
Egyptian journal of petroleum	4	102	25.50
Empirical economics	5	47	9.40
Energies	11	75	6.82
Energy economics	5	276	55.20
Equilibrium. Quarterly Journal of Economics and Economic Policy	4	33	8.25
International Journal of Forecasting	7	57	8.14
Journal of Business and Economic Statistics	5	188	37.60
Journal of Economic Dynamics and Control	5	50	10.00
Journal of International Economics	7	534	76.29
Journal of International Money And Finance	11	357	32.45
Journal of Macroeconomics	4	84	21.00
Journal of Monetary Economics	9	341	37.89
Journal of Money, Credit And Banking	4	48	12.00
Open Economies Review	4	94	23.50
Review of Economics And Statistics	4	72	18.00
Sustainability (Switzerland)	16	100	6.25

**Figure 4: Density Map of Journals**



**Figure 5: Overlay Visualization Map of Journals**



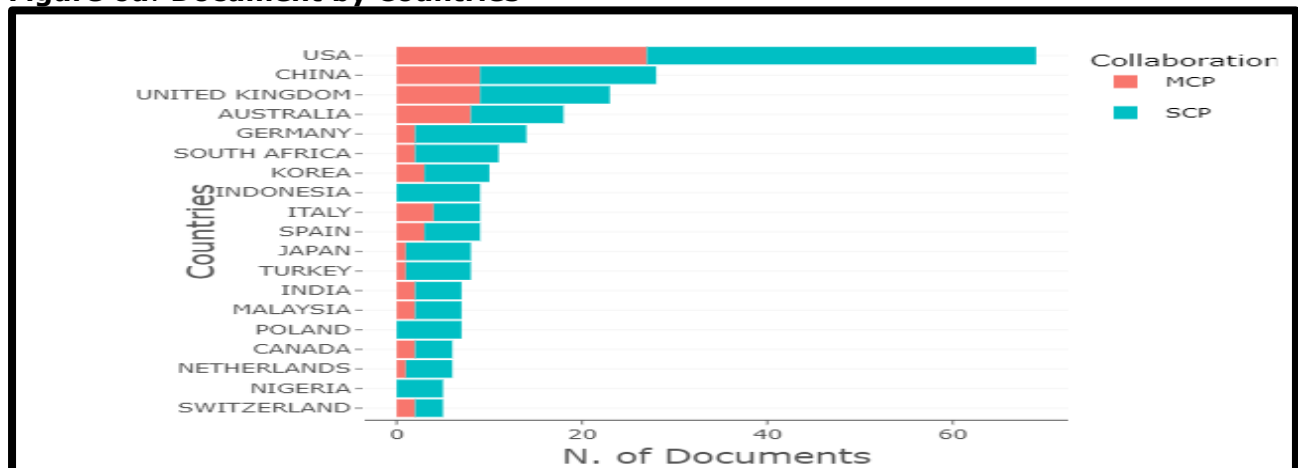
### 3.5. Analysis by Country

USA is the most productive country in research regarding CPI that has published 69 articles during 1999 to 2022. In the second place is China with publication of 28 articles. In the third place is UK with the article published of 23. In the fourth place is Australia with publication of 18 articles. In the fifth place is Germany with publication of 14 articles. In the sixth place is South Africa with publication of 11 articles. In the seventh place is Korea with publication of 10 articles. In the eighth place is Spain with publication of 9 articles. In the ninth place is Italy with publication of 9 articles. In the tenth place is Japan with publication of 8 articles. In the eleventh place is Turkey with publication of 7.99 articles. In the twelfth place is India with publication of 7 articles. In the 13th place is Netherlands with publication of 6 articles. In the 14th place is Canada with publication of 6 articles. In the 15th place is Switzerland with publication of 5 articles. In the 16th place is Sweden with publication of 4 articles. In the 17th place is France with publication of 4 articles. In the 18th place is Egypt with publication of 4 articles. In the 19th place is Austria with publication of 3 articles. In the 20th place is Greece with publication of 3 articles. In the 21st place is Israel with publication of 3 articles. In the 22nd place is Rwanda with publication of 1 article. In the 23rd place is Iraq with publication of 1 article. In the 24th place is Azerbaijan with publication of 1 article. In the 25th place is Slovakia with publication of 1 article in fig.6a and 6b The top ten countries have published articles on CPI of total 199 with the average of 19.90. Most article are published by the USA of 69 and in the 10<sup>th</sup>, place is Japan with the total number of articles 8 as shown in the table 4.

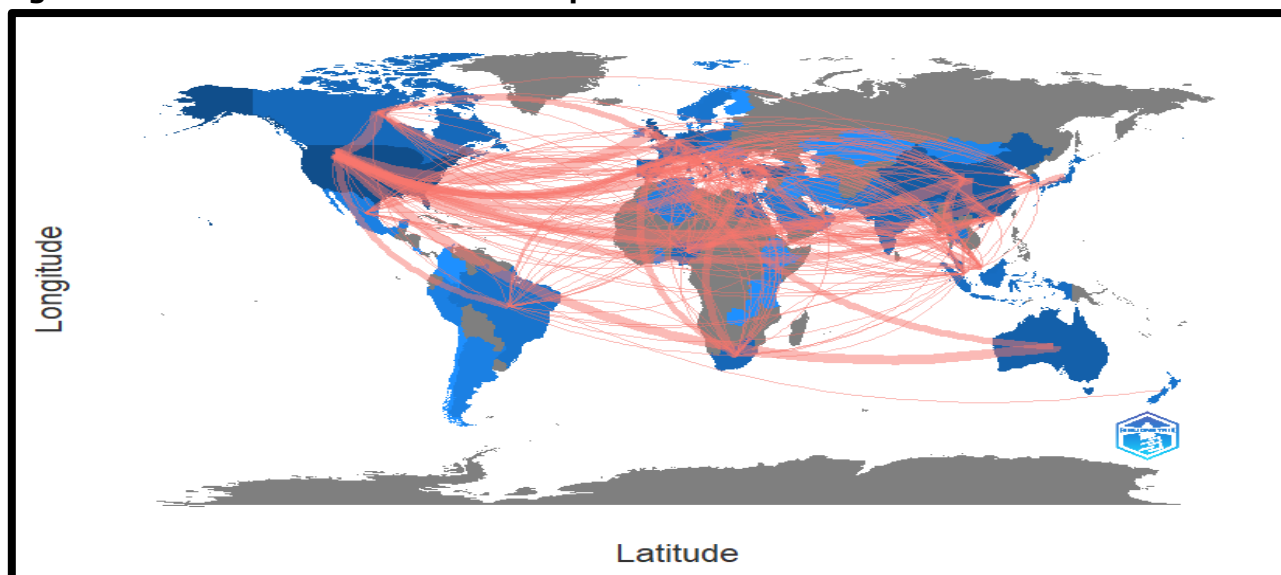
**Table 4: Top 20 countries (citation score and number of articles)**

Country	Articles	Citations	Average Article Citations
USA	69.01	1699	24.62
Spain	9.00	837	93.00
United Kingdom	23.00	637	27.70
Sweden	4.00	557	139.25
Australia	18.00	376	20.89
Germany	14.00	291	20.79
China	28.01	230	8.21
Canada	6.00	226	37.67
Japan	8.00	155	19.38
Netherlands	6.00	146	24.33
Rwanda	1.00	139	139.00
Italy	9.00	134	14.89
France	4.00	126	31.50
India	7.00	110	15.71
South Africa	11.00	106	9.64
Greece	3.00	84	28.00
Iraq	1.00	70	70.00
Austria	3.00	67	22.33
Korea	10.00	63	6.30
Israel	3.00	51	17.00
Azerbaijan	1.00	43	43.00
Switzerland	5.00	43	8.60
Egypt	4.00	30	7.50
Turkey	7.99	29	3.63
Slovakia	1.00	28	28.00

**Figure 6a: Document by Countries**



**Figure 6b: Countries Collaboration Map**



**3.6. Analysis by Organizations**

Among the CPI research, the office for National Statistics, United Kingdom is taking the lead with 7 articles. In the 2<sup>nd</sup> place is National Bureau of Economic Research (NBER), United States with 5 articles. In the 3<sup>rd</sup> place is Bank of Canada with 4 articles. In the 4<sup>th</sup> place is Centre for Economic Policy Research (CEPR), United Kingdom with 3 articles. In the fifth place is Department of Economics, University of Pretoria, Pretoria, South Africa with 3 articles. In the sixth place School of Business, Hanyang University, Seoul, South Korea with 3 articles. In the seventh place Vanderbilt University, Nashville, TN, United States with 3 articles. In the eighth place is Department of Economics, Boston College, Chestnut Hill, ma 02467, United States with 2 articles. In the ninth place is Department of Economics, University of Pretoria, Pretoria 0002, South Africa with 2 articles. In the tenth place Department of Geological Engineering, Cumhuriyet University, Sivas, 58140, Turkey with 2 articles.

In the eleventh place Fedea and Bank of Spain, Madrid, Spain with 2 articles. In the twelfth place is Icfai University, Tripura, India with 2 articles. In the 13<sup>th</sup> place is Ifo Institute, Ifo Center for Public Finance & Political Economy, Poschingerstr. 5, Munich, d-81679, Germany with 2 articles. In the 14<sup>th</sup> place is International Monetary Fund, United States with 2 articles. In the 15<sup>th</sup> place is Kent State University, Department of Economics, United States with 2 articles. In the 16<sup>th</sup> place is Massachusetts Institute of Technology, United States with 2 articles. In the 17<sup>th</sup> place is Sveriges Riksbank, Sweden with 2 articles. In the 18<sup>th</sup> place is Vilnius University, Lithuania with 2 articles and in 19<sup>th</sup> place is Western Sydney University, School of Business, Australia with 2 articles as how in table 5. If we see citation wise then Vanderbilt University, Nashville, Tn, United States is leading with 146 citations and the most less citation is for Department of Geological Engineering, Cumhuriyet University, Sivas, 58140, Turkey of 4 citations as shown in table 5.

**Table 5: Top 19 Organization**

<b>Organization</b>	<b>Documents</b>	<b>Citations</b>	<b>Citation/Article</b>
Bank of Canada	3	11	3.67
CEPR, United Kingdom	3	27	9.00
Department of Economics, Boston College, Chestnut Hill, Ma 02467, United States	2	115	57.50
Department of Economics, University of Pretoria, Pretoria 0002, South Africa	2	28	14.00
Department of Economics, University of Pretoria, Pretoria, South Africa	3	36	12.00
Department of Geological Engineering, Cumhuriyet University, Sivas, 58140, Turkey	2	4	2.00
Fedea And Bank Of Spain, Madrid, Spain	2	7	3.50
Icfai University, Tripura, India	2	35	17.50

Ifo Institute, Ifo Center for Public Finance and Political Economy, Poschingerstr. 5, Munich, D-81679, Germany	2	79	39.50
International Monetary Fund, United States	2	13	6.50
Kent State University, Department Of Economics, United States	2	90	45.00
Massachusetts Institute Of Technology, United States	2	68	34.00
Nber, United States	5	129	25.80
Office For National Statistics, United Kingdom	7	5	0.71
School Of Business, Hanyang University, Seoul, South Korea	3	37	12.33
Sveriges Riksbank, Sweden	2	14	7.00
Vanderbilt University, Nashville, Tn, United States	3	146	48.67
Vilnius University, Lithuania	2	47	23.50
Western Sydney University, School Of Business, Australia	2	90	45.00

### 3.7. Keyword Co-occurrence Analysis

In this analysis VOS-viewer software was used to conduct this analysis. In this analysis it is shown which keyword are used to search articles related to some topics. For example, in business ethics few words which are used are Corporate Governance, Social Justice and vice versa. (Jamshed and Majeed 2022) when we conducted analysis of CPI, we found out that the word which are used in keywords are purchasing power, cost, exchange rates, inflation, investment, money supply, forecasting, inflation expectations, price index etc., as shown in the Fig. 7a. In Fig. 7a showing the word which are widespread while in Fig. 7b showing the results after we apply R software and Fig.8 showing the Word tree map. The used keywords are from year 1999 to 2022.

Figure 7a: Noteworthy Keywords

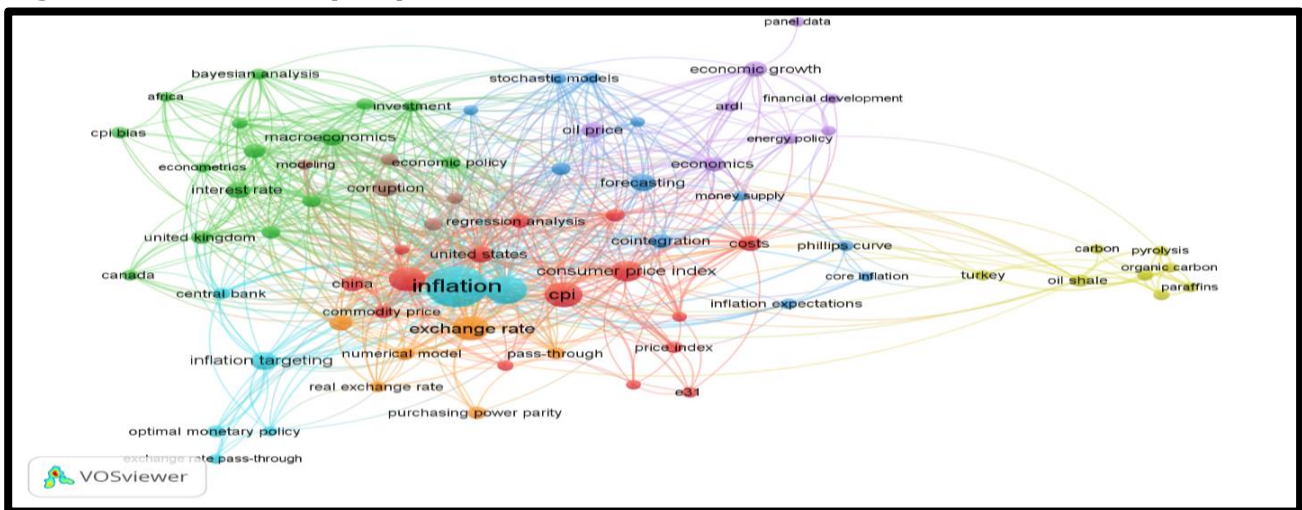
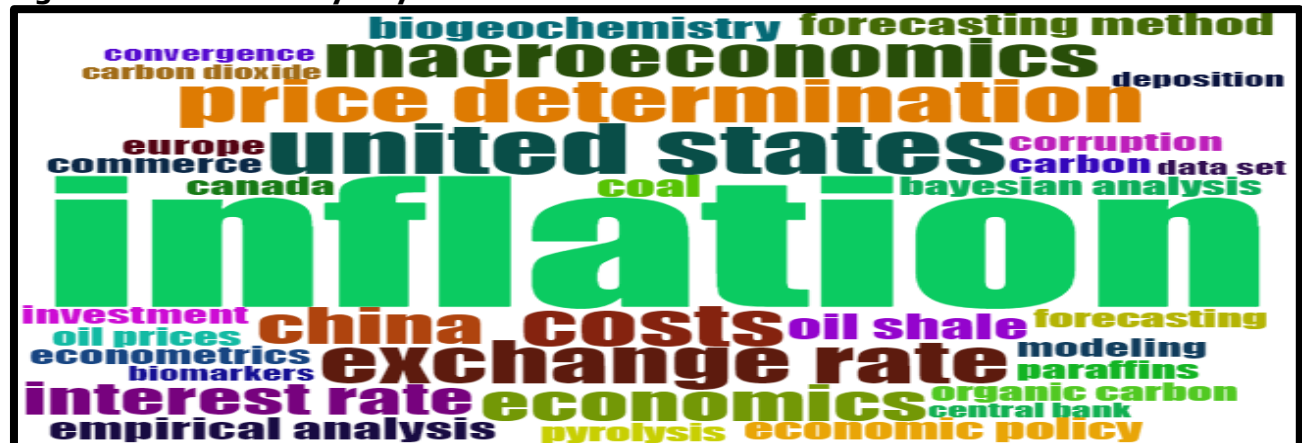


Figure 7b: Noteworthy Keywords







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