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# Research trends of sub-subjects on Economics: a bibliometric study

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## Abstract

*The paper is basically a bibliometric study based on 4993 citations from 53 PhD theses under four sub-subjects of Economics viz. Indian Economics, Rural Economics, Economic Developing and International Economics). The purpose of the study is to analyze the citation pattern of references appended to the theses of all four subjects submitted to The University of Burdwan during the period 2006-2015. To fulfill the purpose, all the relevant information has been collected from the research section of The University of Burdwan and Shodhganga (<http://shodhganga.inflibnet.ac.in/>) and finally has been analyzed against pre-defined parameters such as bibliographic forms, journal ranking, authorship pattern, authorship collaboration, degree of collaboration. All the information collected under these parameters has been presented through dBaseIII plus programmer. It was found that highest number of contribution was in Indian Economics with 26 theses (49.05%) and least number of theses was contributed by International Economics with 2 theses (3.77%). The study also revealed that journals were found to be most cited documents (50.15%), followed by books (26.57%) and single authored articles were mostly cited than multi-authored articles.*

**Keywords:** Age of references, Authorship collaboration, Bibliometrics, Citation analysis, Journal ranking.

## 1. Introduction

Economics as a subject is growing in many aspects such research outputs, size and volume of collections, publications etc. Our scientists, researchers, academicians working in different organizations are producing a good number of research outputs in different form and formats such as theses, dissertations, reports etc. But due to the enormous growth of literature of various forms, it is not possible for any library to acquire all informational sources as well as selecting relevant sources have become a challenging task to the professional librarians. Citation analysis is one such tool that helps us to select core documents on a particular area. Generally, this type of

study is conducted for evaluation of scientific output, selection of journals, ranking of authors and so on (Shashiraj & Patil 2018). The paper analyzes the citation pattern of the references used in the PhD theses under the four sub-subjects of Economics in different aspects such as bibliographic form, core journals, authorship pattern etc.

## 2. Literature Review

Several studies on bibliometrics have already been carried out in different disciplines such as Education (Iya, 1996; Veerabasavaiah & Padmavathi, 2014); History (Maharanjan & Kumar); Library and Information Science (Sam & Tackie, 2007; Kaur & Rattan, 2015); Political Science (Hirwade & Dankhade, 2002; Egberongbe, 2003) to show the overall growth and development of literature on different aspects.

Citation analysis is considered as one of the tools of bibliometrics and is used in scholarly works to establish links (i.e., authors, scholarly works, journals, countries) (Osarch, 1996). Form of literature is one of the aspects of citation analysis to know the most dominant form of documents.

Various studies were conducted on several disciplines such as Sociology (Zafrunnisha, 2012; Singh & Bebi, 2013); Botany (Banateppanvar, Biradar & Kannappanavar, 2013); Zoology (Somashekara & Kumbar, 2015) etc to show the literature use pattern. After analyzing the 310 PhD theses of Biological Sciences of two Universities viz. Lucknow University and Dr. Bhim Rao Ambedkar University, Srivastava (2016) reported that books were the most cited sources of both the universities with (44.72%) and (50.34%) and periodicals come to the next with (35.78%) and (36.97%). Padmaja (2015) has studied 268 PhD theses of Economics and concluded that book was the most in terms of total number of citations (47.03%) followed by journal (41.99%).

Ranking of journals is another important aspect of citation analysis, the objective of which is to know the selected journals of specific discipline (Haridasan, 2007). A group of studies have been conducted in different subject areas such as Engineering & Technology (Dhananjaya (2010); Horticulture (Tunga, 2014); Philosophy (Rayudu, 2015); Chemical Science (Gohain & Saikia, 2014); Mathematics (Mondal & Roy) to show the top most journals on a particular area. After analyzing 362 journals of Economics, Padmaja (2015) has proposed that “*Indian Journal of Agricultural Economics*” occupied 1<sup>st</sup> ranked (3.85%), followed by “*Indian Economic Journal*” (3.44%) and “*American Economic Journal*” (3.19%). Another author (Bhagwanrao, 2017) has prepared a rank list of journals in Mathematics and Statics and finally concluded that the journal “*Mathematical Analysis and Applications*” was on the top (5.47%) and “*Operation Research*” was in the 2<sup>nd</sup> position (4.25%). Mondal, Bandyopadhyay & Roy (2017) have studied 308 journals and proposed that ‘*Economic and Political Weekly*’ accounted highest number of citations (14.031%), followed by ‘*The Statesman*’ (10.238%) and ‘*Ananda Bazar Patrika*’ (4.342%). Another author (Aliyu, 2018) has analyzed 52 doctoral theses in Education and revealed that “*The Counsellor*” cited 77 citations (18.6%), whereas, “*Journal of Counseling Psychology*” received 57 citations (12.3%) and “*Nigerian Journal of Educational Psychology*” got 3<sup>rd</sup> position having 38 (9.2%) citations.

Authorship collaboration is also another aspect of citation analysis as it shows individual contributions of an author in any field. A large number of studies have been carried out on this area in different domains i.e., Marine Sciences (Elango & Rajendran,2012); Physics (Mondal, 2011; Bonde (2017); Public Administration (Mahajan & Kumar (2016). Thavamani (2018) studied authorship pattern on Astrobiology and reported that only 72 articles were contributed by single authored (13.872%), followed by two authors 87 (16.763%) articles and three authors 60 articles (11.560%). After analyzing the 456 journal articles of Economics, Shashiraj & Patil (2018) concluded that the maximum number of articles were contributed by single authored (79.6%) and least number of contributions were contributed by four and six authors (0.2%). Mahajan & Kumar (2017) analyzed 36 PhD theses on History and stated that single authorship study were higher both in books and journals with 4006 (87.14%) and 778 (67.59%) citations respectively, followed by two authors, which was accounted for 503 (10.94%) and 218 (18.94%) citations.

### **3. Objectives**

The objectives of the present study are to determine the following:

- To study the total number of theses and references are contributed in the sub-subjects of Economics;
- To find out bibliographic forms of literature in the sub- subjects of Economics;
- To prepare a ranked list of core journals in these subjects;
- To analyze the age of reference to know the half life period in these subjects and
- To study the pattern of authorship collaboration and degree of collaboration in sub- subjects of Economics.

### **4. Scope of the study**

The present study considers 4993 citations from 53 PhD theses of four sub-subjects (Indian Economics, Rural Economics, Economics Developing and International Economics) of Economics under The University of Burdwan during 2006-2015.

### **5. Methodology**

The present study has analyzed 4993 citations from 53 PhD theses of Economics. All the information are obtained from Shodhganga (<http://shodhganga.inflibnet.ac.in/>), a reservoir for Indian PhD theses and theses section of The University of Burdwan. Then the information relating to the citations (i.e., type of document, year, number of author, self citation) has been noted first in 12.5 x 7.5 cards and finally analyzed into two parts - i) content analysis (subject distributions, average number of references and pages and details of supervision); and ii) citation analysis (bibliographic forms, ranking of journals, geographical scattering of citations, age study, authorship pattern, average number of authors and degree of collaboration). Finally, 'dBaseIII' plus programmers has been used to analyze the references against different parameters.

## 6. Content analysis

This section has been divided into the following three sub-sections.

### 6.1 Subject wise Distributions

Subject-wise distribution of the theses is helped to know the major area of research that used by researchers. For this purpose these theses are classified in to four sub-subjects of Economics such as '*Indian Economics*', '*Rural Economics*', '*Economics Developing*' and '*International Economics*' (Table 1).

Sl no	Name	Theses		Rank	References	
		Total	%		Total	%
1	Indian Economics	26	49.05	I	2408	48.22
2	Rural Economics	19	35.84	II	1719	34.42
3	Economics Developing	6	11.32	III	654	13.09
4	International Economics	2	3.77	IV	212	4.24
Total		53	100.00		4993	100.00

Table 1: Subject wise Distributions

It is noticed that out of total 53 theses and 4993 references, '*Indian Economics*' gets 1<sup>st</sup> ranked with 26 theses (49.05%) and 2408 references (48.22%), whereas '*International Economics*' gets 4<sup>th</sup> ranked with 2 theses (3.77%) and 212 references (4.24%).

Fig. 1 and 2 shows the graphical representation of total number of theses and references

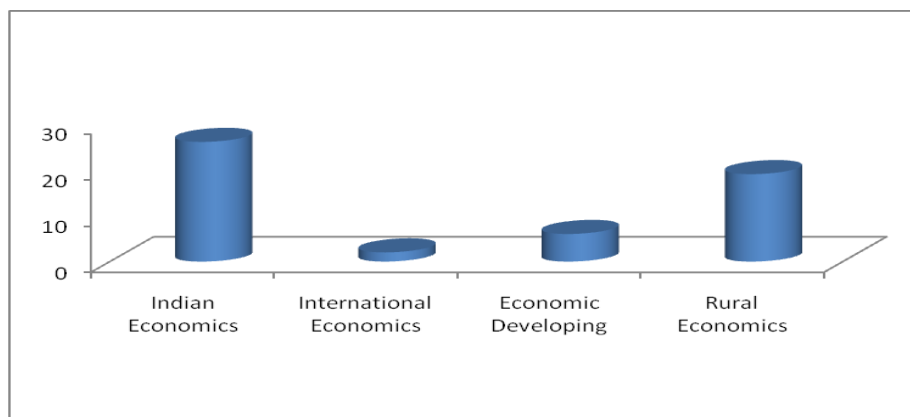


Fig. 1: Total number of theses

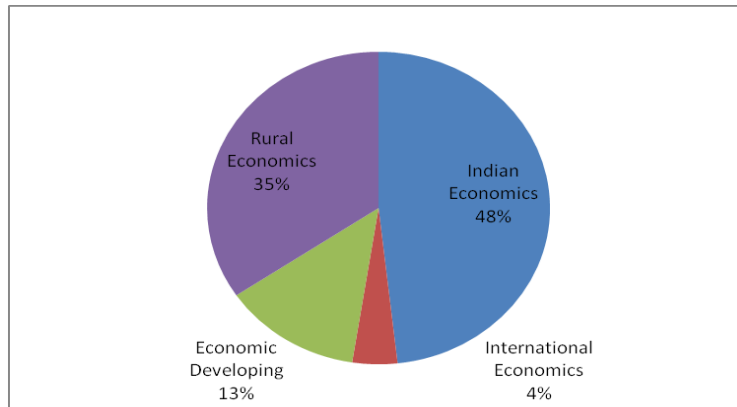


Fig. 2: Total number of references

So, it is very clear that the highest number of theses and references were accounted in ‘*Indian Economics*’ and ‘*International Economics*’ were secured least number of theses and references.

## 6.2 Average number of references and pages

Table 2 reveals the average number of references and pages per theses during the period under study. There are a total of 4993 references and 11152 pages with an average of 94.20 and 210.41 respectively.

Sl no	Name	Theses	References		Pages	
			Total	Average	Total	Average
1	Indian Economics	26	2408	92.61	5705	219.42
2	Rural Economics	19	1719	90.47	3745	197.10
3	Economics Developing	6	654	72.66	1245	207.5
4	International Economics	2	212	106	457	228.5
Total		53	4993	94.20	11152	210.41

Table 2: Average number of theses and references

It is clear that the average of total number of references is 94.20. But it may vary if we consider subject-wise and ‘*International Economics*’ ranks 1<sup>st</sup> position in terms of average number of references. It is also found that the average length of theses in terms of number of pages ranges from 197 to 228 pages (Fig. 3).

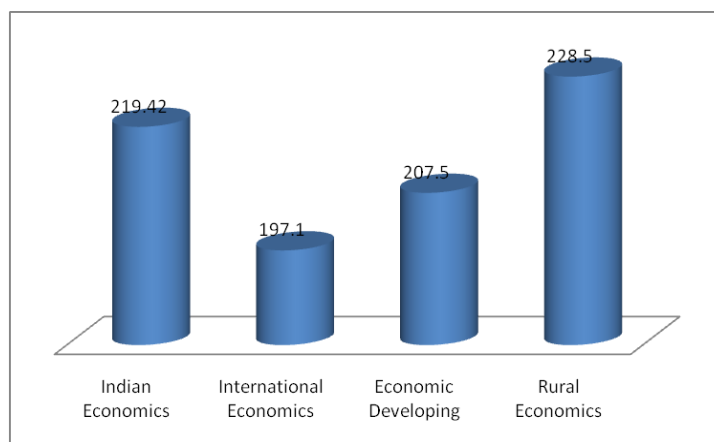


Fig. 3: Average number of pages

### 6.3 Details of Supervision

Table 3 lists all twelve supervisors (included individual and joint) who had guided 53 PhD theses during the period e.g. 2006-2015. It is observed that Dr Maniklal Adhikary had guided highest number of theses (12 theses) and ranks 1<sup>st</sup> position followed by Dr Atanu Sengupta and Dr Soumyendra Kishore Datta who had guided 10 theses each. The third place is occupied by Dr Pravat Kumar Kuri, who had guided 6 researchers.

Sl no	Name	Number of theses				Rank	Total
		Indian Economics	Rural Economics	Economics Development	International Economics		
1	Maniklal Adhikary (joint 2)	4	4	2	2	<i>I</i>	<i>12</i>
2	Atanu Sengupta (joint 4)	6	3	1	-	II	10
3	Soumyendra Kishore Datta (joint 3)	4	4	2	-	II	10
4	Pravat.Kumar.Kuri(joint 1)	4	2	-	-	III	6
5	Rajashi Majumdar (joint 1)	4	1	-	-	IV	5
6	Pinaki Chakraborty (joint 1)	2	2	-	-	V	4
7	Koushik Gupta(joint 1)	1	2	1	-	V	4
8	Kalyanbrata Bhattacharya (joint 2)	2	2	-	-	V	4
9	Asit Kumar Banerjee (joint 4)	3	1	-	-	V	4





Books	159	24.31	514	29.90	<b>585</b>	24.29	69	32.55	1327	26.57
Journals	320	48.93	823	47.88	<b>1302</b>	54.07	59	<b>27.83</b>	2504	50.15
Reports	68	10.40	130	7.56	265	11.00	40	18.87	503	10.07
Conference/ seminar etc	34	5.20	48	2.79	66	2.74	24	11.32	172	3.44
Thesis	2	0.31	12	0.70	12	0.50	-	-	26	0.52
Unpublished	1	0.15	3	0.17	10	0.42	-	-	14	0.28
Acts	-	-	10	0.58	-	-	1	0.47	11	0.22
Others	67	10.24	171	9.95	160	6.64	15	7.08	413	8.27
Online books	2	0.31	8	0.47	7	0.29	4	1.89	21	0.42
Online journals	1	0.15	-	-	1	0.04	-	-	2	0.04
<b>Total</b>	<b>654</b>		<b>1719</b>		<b>2408</b>		<b>212</b>		<b>4993</b>	

Table 4: Bibliographic form of literature

Fig. 5 shows the graphical representation of books and journals.

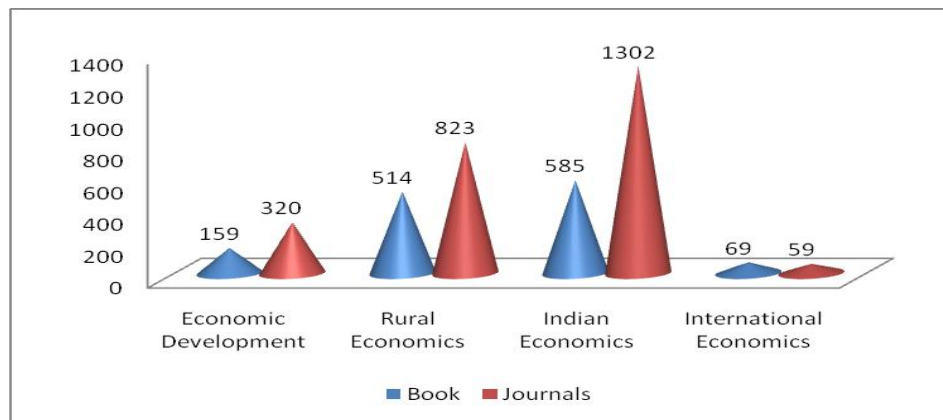


Fig. 5: Number of books and journals

So it is found that journals were mostly preferred form by the researchers compared to other sources of information.

## 7.2 Ranking of journals

It shows the core journals or top ranking journals in a particular subject. Pradhan & Ramesh (2018) stated that the higher emergence rate of periodicals in any subject field can be measure of the growth of knowledge in that field.

A total of 474 journals have been used in this study and they cover altogether 2504 citations. Table 5 lists top twenty journals having more than 15 citations.

Sl no	Broad subject			Specific subjects							
	Economics			Economic Development		Rural Economics		Indian Economics		International Economics	
	Journal Name	Rank	Citation	Rank	Citation	Rank	Citation	Rank	Citation	Rank	Citation
1	EPW	1	438	1	39	1	191	1	208	-	-
2	AM ECON REV	2	115	2	21	6	17	2	76	12	1
3	IND J AGRL ECON	3	102	-	-	2	68	5	34	-	-
4	J POLIT ECON	4	80	9	7	9	15	3	56	7	2
5	J DEV ECON	5	65	5	10	32	4	4	51	-	-
6	WORLD DEV	6	62	3	15	4	24	9	22	12	1
7	ECONOMETRICA	7	59	5	10	10	24	7	31	3	4
8	AM J AGRL ECON	8	54	28	2	3	30	10	21	12	1
9	ECON J	8	52	4	11	15	9	6	32	-	-
10	REV ECON STAT	10	39	13	5	12	11	8	23	-	-
11	J ECONOMETRICS	11	35	-	-	7	16	11	17	7	2
12	KURUKSHETRA	12	28	-	-	5	20	31	8	-	-
13	ECON DEV CULT CHANGE	13	26	45	1	12	11	14	14	-	-
14	POPUL DEV REV	14	22	7	9	24	6	31	8	-	-
15	QUART J ECON	14	23	28	2	38	3	11	17	-	-
16	J PROD ANAL	16	22	-	-	18	8	14	14	-	-
17	REV ECON STUD	17	22	10	6	32	4	19	12	-	-
18	J DEV STUD	18	22	13	5	21	7	22	10	-	-
19	WORLD BANK ECON REV	18	20	-	-	21	7	20	11	7	2
20	ECOL ECON	20	18	-	-	11	12	38	6	-	-

Table 5: Ranking of journals

It is clear from this table that 'EPW' ranks 1<sup>st</sup> position in Economics and another three specific subject's viz. 'Economic Developing', 'Rural Economics' and 'Indian Economics' but it gets no rank in International Relation. It is also found that 'American Economics Review' gets 2<sup>nd</sup> position as a whole in Economics and two specific subject in 'Economic Developing' and 'Indian Economics' but it gets 6<sup>th</sup> rank in 'Rural Economics' and 12<sup>th</sup> rank in 'International Economics'.

### 7.3 Geographical scattering of citations

This distribution lists all the countries from where journals are published and ranks all the countries as per the total number of journals cited. Out of 474 journals, the highest contribution has been made by UK with 159 (33.54%) journals and has occupied 1<sup>st</sup> position, followed by USA with 142 (29.95%) journals and Netherlands with 54 (11.39%) journals. It is also found India contributes 53 journals and gets 4<sup>th</sup> position (Fig. 6 & Fig. 7).

Sl no	Rank no	Country	Total no of journals	Percentage
1	I	UK	159	33.54
2	II	USA	142	29.95
3	III	NETHERLANDS	54	11.39
4	IV	INDIA	53	11.18
5	V	GERMANY	19	4.00
6	VI	BANGLADESH	7	1.47
7	VII	AUSTRALIA	6	1.26
8	VIII	CANADA	5	1.05
9	VIII	SWITZERLAND	5	1.05
10	VIII	PAKISTAN	5	1.05
11	IX	SWEDEN	3	0.63
12	X	PHILLIPINES	3	0.63
13	X	SINGAPORE	2	0.42
14	XI	NEW YORK	1	0.21
15	XI	NEPAL	1	0.21
16	XI	NEWZEALAND	1	0.21
17	XI	THAILAND	1	0.21
18	XI	CROATIA	1	0.21
19	XI	JAPAN	1	0.21
20	XI	TURKEY	1	0.21
21	XI	ITLY	1	0.21
22	XI	MALAYSIS	1	0.21

23	XI	IRELAND	1	0.21
24	XI	SOUTH AFRICA	1	0.21
		TOTAL	474	100.00

Table 6: Ranking of country

Fig.6 shows the graphical representation of India and Foreign Countries.

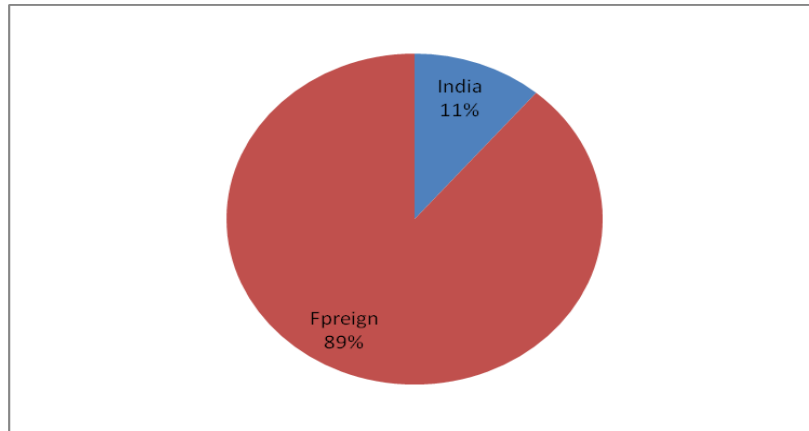


Fig.6: Distribution of Documents between India and Foreign Countries

Fig.7 shows the graphical representation of among Foreign Countries.

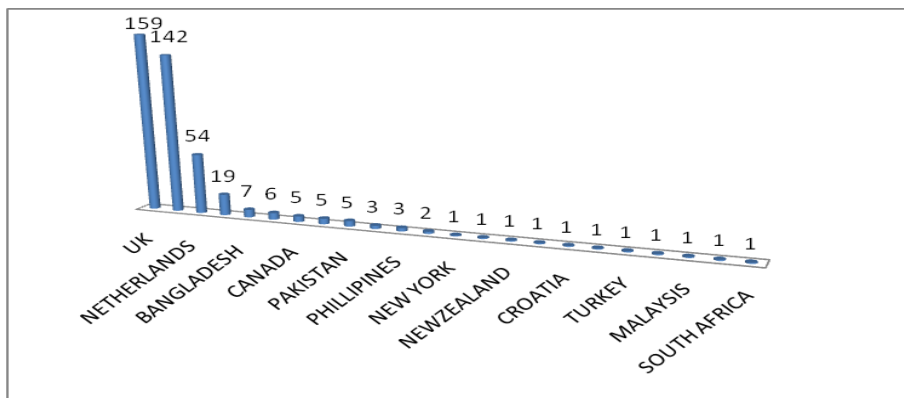


Fig.7: Distributions of journals among Foreign Countries

#### 7.4 Age study

Age study usually indicates the decline in the use of documents over time. In this context, Line & Sandison (1974) rightly said that it is “*decline overtime in validity of information*”.

It is found that ‘*Economics Developing*’ has taken 7.91 years to cover 25% of age of references, whereas ‘*International Economics*’ has taken only 5.55 years (Table 7). The half life period indicates 50% of age of citations. The study also reveals that ‘*Economics Developing*’ has taken 14.50 years to cover 50% of age of references, but only 9.19 years has been taken by ‘*International Economics*’. Same as, to cover 75% of age of references, ‘*Economics Developing*’ has taken 25.18 years whereas 13.79 years has been taken by ‘*International Economics*’. Lastly to cover 100% of age of references, ‘*Indian Economics*’ has taken 111.04 years, whereas ‘*Economics Developing*’ has taken 78.03 years.

Specific Subject	25% of References	50%	75%	100%
Indian Economics	7.71	13.56	22.20	111.04
Rural Economics	7.51	13.86	23.18	106
Economics Developing	7.91	14.50	25.18	78.03
International Economics	5.55	9.19	13.79	108.02

Table 7: Age study

### 7.5 Authorship pattern

This section shows the authorship pattern of the references cited. Authorship study mainly indicates the kind of authors, nature and degree of collaboration among them and impact of citation rate on collaborative trend of authors (Mahapatra, 2000).

It is observed that majority of citations were single authored (Table 8). The highest number of single authored was accounted in ‘*International Economics*’ (69.34%), whereas least number of single authored was accounted in ‘*Indian Economics*’ (53.65%). It is also found that the highest number of multi-authored was accounted in ‘*Indian Economics*’ (46.34%) and least number of citations was secured in ‘*International Economics*’ (30.66%).

Specific subjects	Number of authors			
	Single author	Two authors	Three authors	More than three authors
Indian Economics	53.65	38.41	6.73	1.20
Rural Economics	59.98	32.81	5.29	1.80
Economics Developing	64.83	31.80	3.36	-
International	69.34	21.70	6.13	2.83

Economics				
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Table 8: Authorship pattern

It may be concluded that researchers are in favour of single authored paper than multi-authored during the period (Fig. 8).

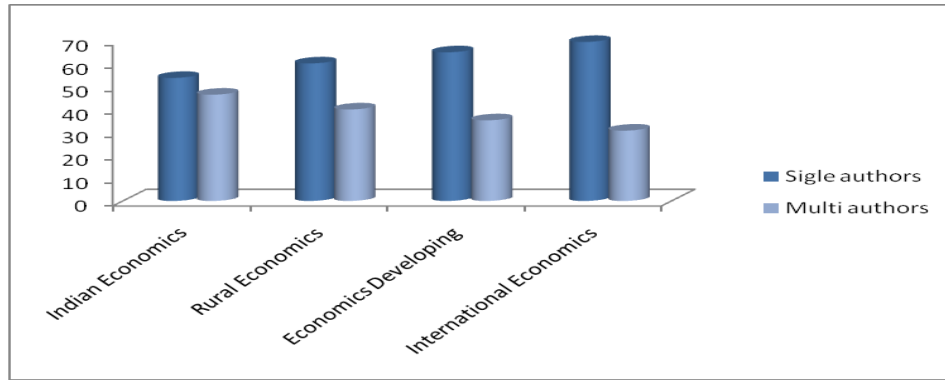


Fig. 8: Single and multi-authored pattern

### 7.5.1 Average number of authors and Degree of collaboration

The section shows the average number of authors and Degree of collaboration. It is observed that average number of authors per article varies among the four sub-subjects. The highest value is 1.54 in '*Indian Economics*' and the lowest one is in '*International Economics*' 1.43 (Table 9). In calculating the study of degree of collaboration, the following formula proposed by Subramanyam (1983) has been used.

$$C = \frac{N_m}{N_m + N_s}$$

C= Degree of collaboration, N<sub>m</sub>= Number of multi authored papers, N<sub>s</sub>= Number of single authored papers.

Subjects	Average number of Authors per Article	Degree of Authorship Collaboration
Indian Economics	1.54	0.43
Rural Economics	1.50	0.39
Economics Developing	1.35	0.32
International Economics	1.43	0.31

Table 9: Average number of authors and degree of collaboration

It is found that collaboration among the authors is highest in '*Indian Economics*' (0.43).

## 8. Conclusion

This quantitative analysis indicates that the overall growth of four subjects during the period is not equal. It is also found that the trends of using print resources are increasing and electronic resources are neglected. Most of the journals cited were from outside India and only a few Indian journals were cited. In addition, this study gives an insight in identifying the core journals of this domain. Apart from the above, it may also be concluded that trends is towards multi authorship pattern but majority of citations have been cited by single authored. This study also gives an informative preview of the development and growth of economics, but this information may vary with time and with other discipline also.

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