Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 18s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Trends in International Collaboration and Citation Impact in Life Insurance Mathematics and Economics: A Bibliometric Analysis

Pallavi Rahul Gedamkar[1], Dr. Ajit Thite[2]

[1]Assistant Professor, Dr. Vishwanath Karad MIT World Peace University, School of Business

[2]Assistant Professor in JSPM, Jayawant Institute of Management Studies

Cite this paper as: Pallavi Rahul Gedamkar, Dr. Ajit Thite, (2025) Trends in International Collaboration and Citation Impact in Life Insurance Mathematics and Economics: A Bibliometric Analysis. *Journal of Neonatal Surgery*, 14 (18s), 554-559.

ABSTRACT

This study provides a comprehensive bibliometric analysis of research trends in the field of insurance mathematics and economics from 2014 to 2023. Using data from two primary sources, Insurance: Mathematics and Economics and Geneva Papers on Risk and Insurance: Issues and Practice, we examine patterns of international collaboration, citation impact, and author productivity. The analysis reveals a decline in annual growth rate (-25.37%) but highlights significant contributions from countries such as Germany, China, and the USA. The study also identifies key authors, institutions, and documents that have shaped the field, offering insights into the dynamics of research productivity and collaboration.

Keywords: Bibliometric analysis, insurance mathematics, citation impact, research productivity, international collaboration

1. INTRODUCTION

The field of insurance mathematics and economics has seen significant growth over the past decade, driven by increasing complexity in financial markets, risk management, and regulatory frameworks. This study aims to explore the trends in research productivity, international collaboration, and citation impact within this field. By analyzing data from 216 documents published between 2014 and 2023, we provide a detailed overview of the key players, institutions, and countries contributing to the advancement of this discipline.

2. METHODOLOGY

The data for this study were extracted from two primary sources: *Insurance: Mathematics and Economics* and *Geneva Papers on Risk and Insurance: Issues and Practice*. A total of 216 documents were analyzed, covering a timespan from 2014 to 2023. The analysis includes metrics such as annual growth rate, average citations per document, international collaboration rates, and author productivity indices. Bibliometric tools were used to assess the impact of individual authors, institutions, and countries, as well as to identify the most cited documents and sources.

3. RESULTS AND DISCUSSION

3.1. Annual Production and Growth Rate

The annual production of documents shows a fluctuating trend, with the highest number of articles published in 2015 (28) and the lowest in 2020 (11). The annual growth rate is negative (-25.37%), indicating a decline in the number of publications over the years. This could be attributed to various factors, including changes in research focus, funding availability, or shifts in the priorities of academic institutions.

Table 1: Annual Production of Documents

Year	Number of Articles
2014	25
2015	28
2016	27
2017	19

Year	Number of Articles
2018	17
2019	20
2020	11
2021	25
2022	12
2023	15

Figure 1: Annual Production Trend

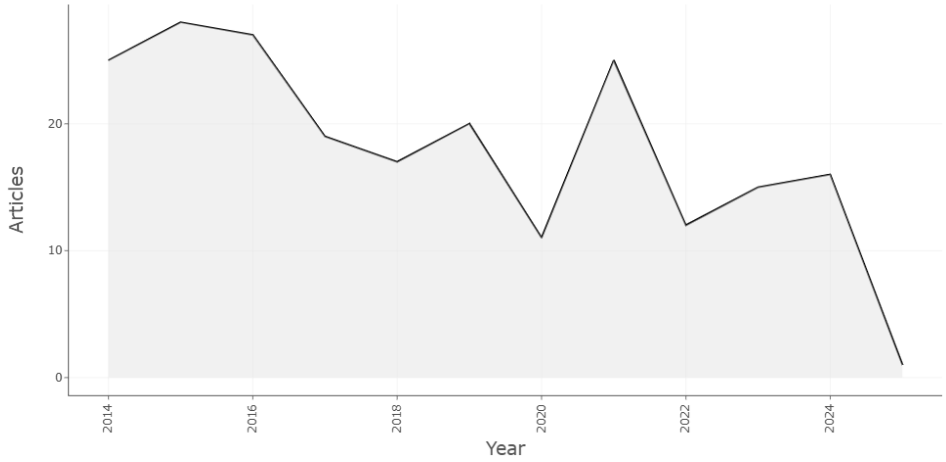

Figure 1 shows the trend in the number of articles published each year from 2014 to 2023.

3.2. Bradford's Law: Distribution of Publications

Bradford's Law is used to analyze the distribution of articles across journals. The law suggests that a small number of journals (core journals) publish the majority of articles in a field. In this study, the two primary sources, *Insurance: Mathematics and Economics* and *Geneva Papers on Risk and Insurance: Issues and Practice*, dominate the field, with 139 and 77 articles, respectively. This indicates a high concentration of research output in these two journals.

Table 2: Bradford's Law Analysis

Source	Rank	Frequency	Cumulative Frequency	Zone
Insurance: Mathematics and Economics	1	139	139	Zone 1
Geneva Papers on Risk and Insurance: Issues and Practice	2	77	216	Zone 2

3.3. Lotka's Law: Author Productivity

Lotka's Law describes the frequency of publication by authors in a given field. It states that a small proportion of authors produce the majority of publications. In this study, 83.8% of authors have written only one document, while a very small proportion (0.2%) have written nine documents. This distribution aligns with Lotka's Law, indicating a high level of specialization and a small core group of prolific authors.

Table 3: Lotka's Law Analysis

Documents Written	Number of Authors	Proportion of Authors
1	358	0.838
2	50	0.117
3	14	0.033
4	3	0.007
5	1	0.002
9	1	0.002

3.4. Thematic Focus and Geographic Distribution

The analysis of **Title Keywords (TL)**, **Author Countries (AU_CO)**, and **Author Keywords (DE)** provides insights into the thematic focus and geographic distribution of research in the field.

Table 4: 3 Plot Diagram Title Keywords, Author's Country and Author Keywords

Title Keywords (TL)	Author Countries (AU_CO)	Author Keywords (DE)
Insurance	Germany	Life Insurance
Life	China	Insurance
Consumption	USA	Government
Investment	Italy	Longevity
Activities	Australia	Variable Annuities
Evidence	Canada	Variable Annuity
Modeling	United Kingdom	Participating Life Insurance
Analysis	Denmark	Stochastic Climate Research
Optimal	France	General Financial Competition
Mortality	Spain	
Model	Hong Kong	
Risk	Belgium	
Insurers	Switzerland	
Stochastic Models	Sweden	
Market	Malaysia	
Treseizing	Social Capital	
Pricing	Geographic Channel	
Claims		

Figure 2: 3 Plot Diagram

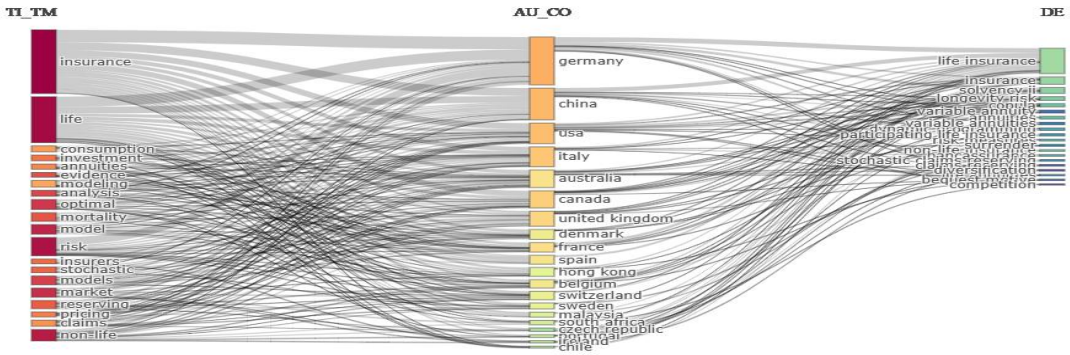

Figure 2 shows the 3 plot diagram (TL-AU_CO-DE)

Figure 3: Geographic Distribution of Authors

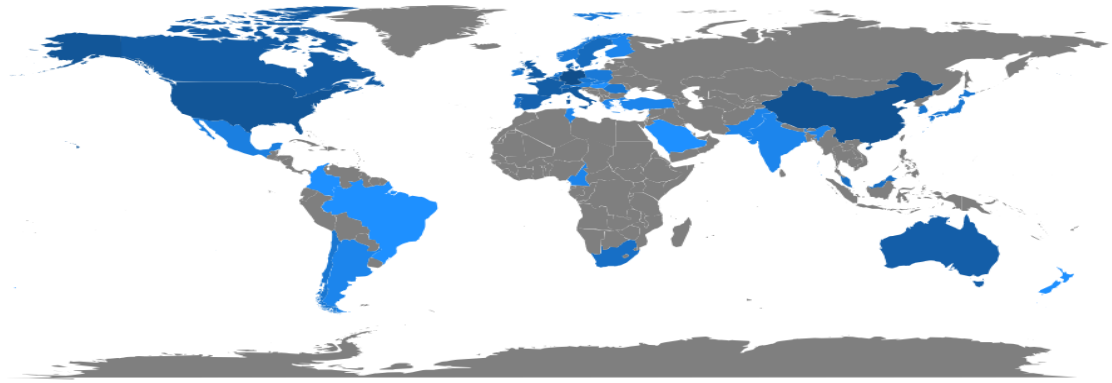

Figure 3 shows the geographic distribution of authors, highlighting the countries with the highest research output.

3.5 International Collaboration

International collaboration is a significant aspect of research in insurance mathematics and economics. The data reveal that 28.24% of documents involve international co-authorships. Key collaborating countries include Germany, China, and the USA, with Germany being the most productive country (76 documents). The collaboration map highlights strong ties between countries such as Australia, Belgium, and the Netherlands, indicating a robust network of researchers working across borders.

Table 5: Most Relevant Countries by Corresponding Author

Country	Articles	SCP	MCP	Freq	MCP_Ratio
Germany	64	56	8	0.296	0.125
China	24	17	7	0.111	0.292
USA	19	13	6	0.088	0.316
Italy	14	10	4	0.065	0.286
Canada	11	7	4	0.051	0.364
France	9	6	3	0.042	0.333
Spain	7	5	2	0.032	0.286
Denmark	7	6	1	0.032	0.143
Australia	6	3	3	0.028	0.5

Figure 4: International Collaboration Network

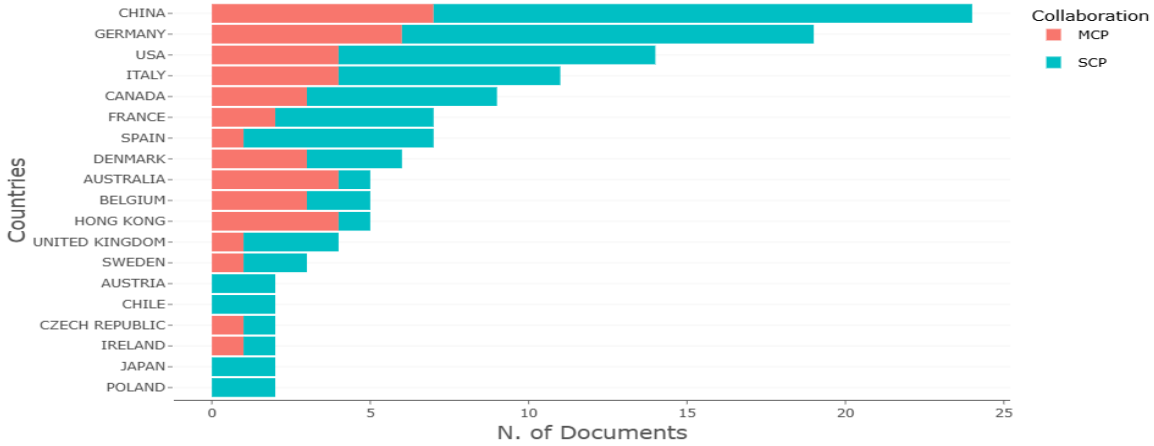

Figure 4 illustrates the international collaboration network among the top contributing countries.

3.6. Citation Impact

The average number of citations per document is 9.537, with some documents receiving exceptionally high citations. The most globally cited document is by Garrido et al. (2016), with 84 citations. Other highly cited works include Shi et al. (2015) and Cui et al. (2017). The citation analysis also reveals that Canada has the highest average article citations (14.89), followed by Australia (12.00) and Germany (8.05).

Table 6: Most Globally Cited Documents

Paper	DOI	Total Citations	TC per Year	Normalized TC
Garrido J, 2016	10.1016/j.insmatheco.2016.06.006	84	8.40	5.91
Shi P, 2015	10.1016/j.insmatheco.2015.07.006	67	6.09	4.37
Cui Z, 2017	10.1016/j.insmatheco.2017.02.010	65	7.22	4.94

Figure 5: Citation Impact Over Time

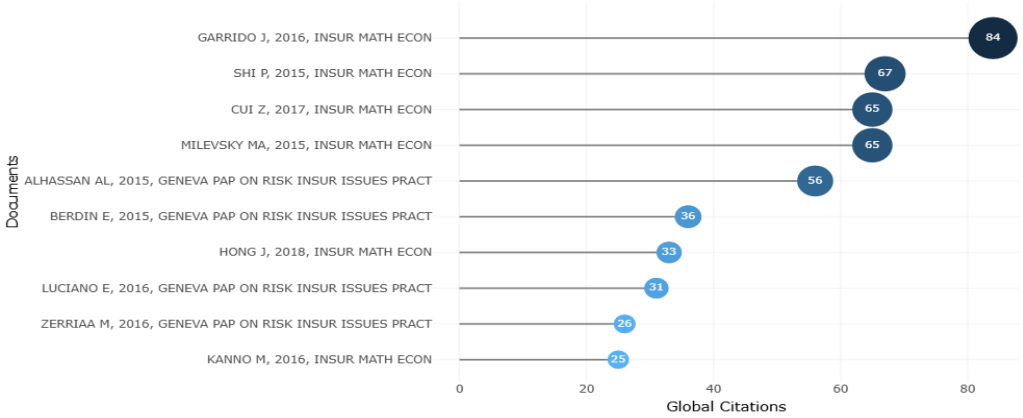

Figure 5 shows the trend in citation impact over the years, highlighting the most cited documents.

3.7. Author Productivity and Impact

Author productivity is assessed using metrics such as the h-index, g-index, and m-index. The most impactful authors in the field include Gatzert N (h-index: 6), Lu Y (h-index: 5), and Bohnert A (h-index: 4). These authors have consistently contributed to the field, with significant citation counts and collaboration networks. The Lotka Law analysis shows that 83.8% of authors have written only one document, indicating a high level of specialization and a relatively small core group of prolific authors.

Table 7: Author Impact Metrics

Author	h-index	g-index	m-index	TC	NP
Gatzert N	6	9	0.5	86	9
Lu Y	5	5	0.455	65	5
Bohnert A	4	4	0.333	45	4

Figure 6: Author Productivity Over Time

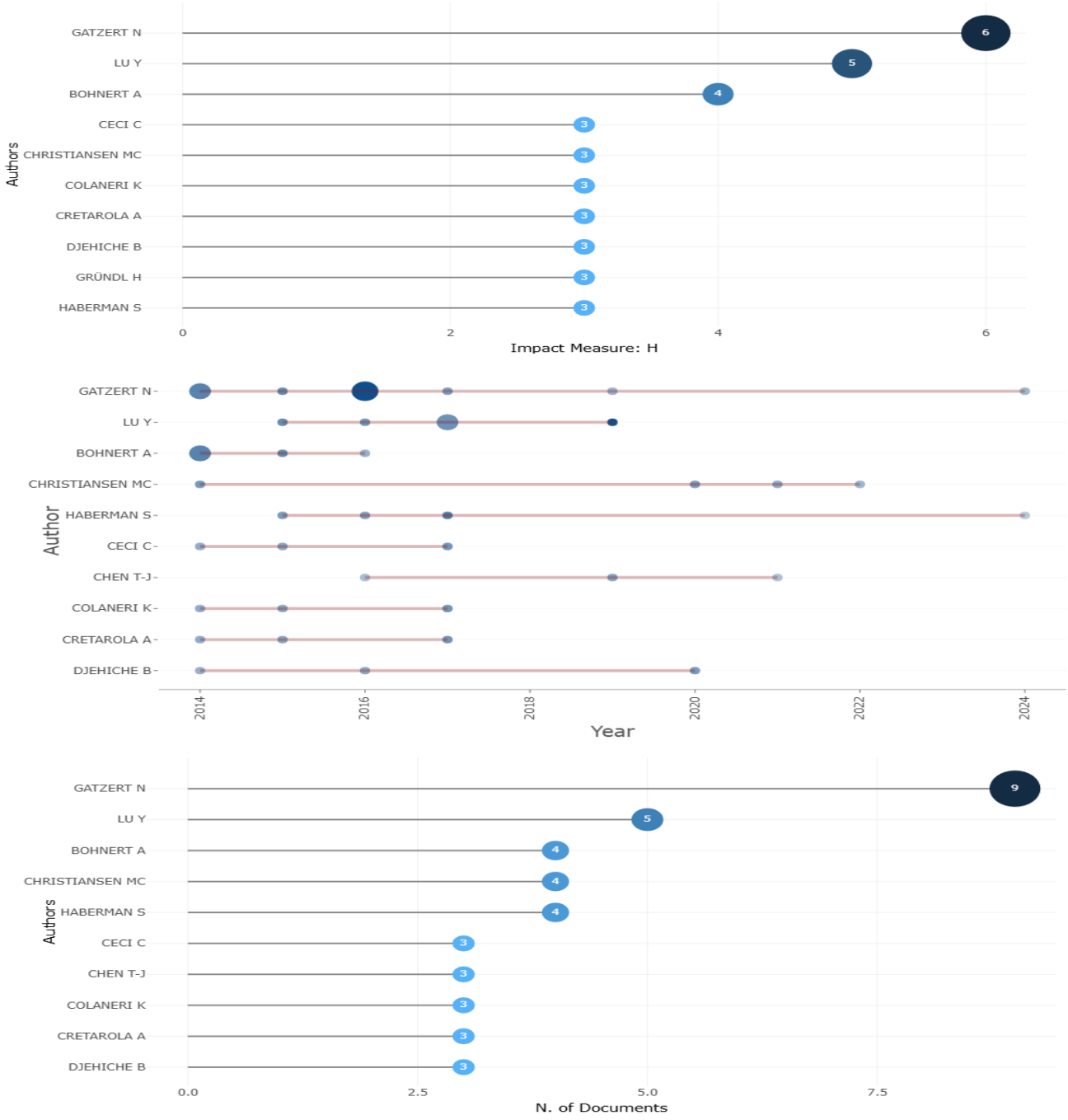

Figure 6 illustrates the productivity of the top authors over the years.

3.8. Institutional and Country Contributions

National Chengchi University, Simon Fraser University, and the University of East Anglia are among the most relevant affiliations, contributing significantly to the field. In terms of country production, Germany leads with 76 documents, followed by China (57) and the USA (45). The most cited countries include China (204 total citations), Germany (153), and Canada (134).

Table 8: Most Relevant Affiliations

Affiliation	Articles
National Chengchi University	12
Simon Fraser University	9
University of East Anglia	8

Figure 7: Country Production and Citation Impact

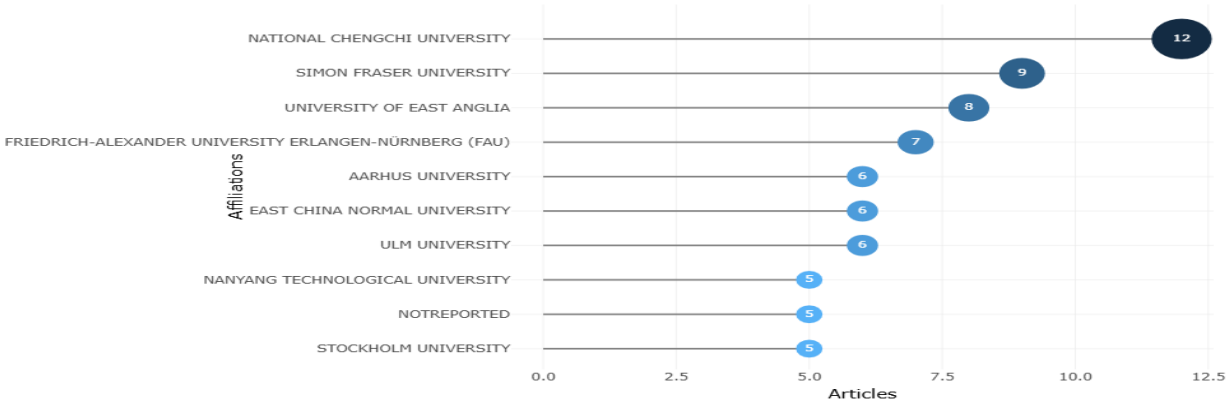

Figure 7 shows the production and citation impact of the top contributing countries.

4. CONCLUSION

This bibliometric analysis provides a comprehensive overview of research trends in insurance mathematics and economics from 2014 to 2023. Despite a decline in annual growth rate, the field remains vibrant, with significant contributions from key countries, institutions, and authors. International collaboration plays a crucial role in advancing research, and the citation impact of documents highlights the importance of high-quality research in shaping the field. Future research should focus on addressing the decline in growth rate and exploring new areas of collaboration to sustain the field's development.

REFERENCES

[1] Garrido, J., et al. (2016). Insurance: Mathematics and Economics. DOI: 10.1016/j.insmatheco.2016.06.006

[2] Shi, P., et al. (2015). Insurance: Mathematics and Economics. DOI: 10.1016/j.insmatheco.2015.07.006

[3] Cui, Z., et al. (2017). Insurance: Mathematics and Economics. DOI: 10.1016/j.insmatheco.2017.02.010

[4] Milevsky, M. A., & Salisbury, T. S. (2015). Insurance: Mathematics and Economics. DOI: 10.1016/j.insmatheco.2015.05.002

[5] Alhassan, A. L., & Biekpe, N. (2015). Geneva Papers on Risk and Insurance: Issues and Practice. DOI: 10.1057/gpp.2014.37

[6] Berdin, E., & Gründl, H. (2015). Geneva Papers on Risk and Insurance: Issues and Practice. DOI: 10.1057/gpp.2014.38

[7] Luciano, E., & Regis, L. (2016). Geneva Papers on Risk and Insurance: Issues and Practice. DOI: 10.1057/gpp.2016.7

[8] Zerriah, M., & Boukherouaa, M. (2016). Geneva Papers on Risk and Insurance: Issues and Practice. DOI: 10.1057/gpp.2016.1

[9] Kanno, M. (2016). Insurance: Mathematics and Economics. DOI: 10.1016/j.insmatheco.2015.12.004