

Country-wise Retraction Analysis from 2022-2024. Increased Publishing Leading to Higher Retraction Rates.

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Abstract

This analysis looks at country-wise retraction and publication statistics. While not all retractions are due to research misconduct, many of them are. Retractions are thus a good signal of research misconduct. We notice strong geographic localization of countries with higher retraction rates: Arab Countries, China, and the Indian Subcontinent. We also look at the correlation between increased publishing in the countries in the last 5 years and the retraction rates. We find first evidence that higher publishing is leading to higher retraction rates. Urgent steps need to be taken to stop incentivizing quantity in science if one is to stem the scientific pollution.

Introduction

Studying retraction statistics to gain insight into research misconduct is a standard practice in bibliometrics. The explosion of number of retractions in the recent years (Van Noorden R. 2023) call into question the sustainability of the current publishing rate (Mark A. Hanson 2024).

This analysis looks at retractions that happened in the last 3 years (2022-2024). We rank the countries based on their retraction rates. A clear pattern is observed that the countries with higher retraction are mostly all situated in Asia. We also discuss the caveats of such an analysis and certain pitfalls that one must avoid.

More importantly, we find that the countries with higher retraction rates have increased their publication quantity tremendously in the last 5 years. While this correlation does not imply causality, one can logically understand the intricate connection between these two statistics. More publications are leading to higher retraction rates. This is dangerous for science and all measures should to be taken to stop rewarding quantity in science and focus solely on quality.

Data and Methodology

Data Sources: For retraction statistics, we use Retraction Watch Database open sourced by crossref, as well as SCImagoJR country rankings for publication statistics.

Methodology: We only consider the countries with at least 100 retractions in the last 3 years (2022-2024). Since SCImagoJR publications data for 2024 is not yet available, we have linearly extrapolated the numbers using 2022 and 2023 data.

Retraction rates are measured as number of retractions per 1000 publications. Retraction dates are the date of retraction, not the date when the paper was published. Therefore, retraction rates defined in this paper is not the same as the common definition. We choose the retraction date for this study as it provides a more immediate signal. Retractions typically take 18 months on an average. Hence most of the problematic studies in 2024 have not yet been retracted.

Analysis

Retraction Rates

Fig 1 provides the list of 25 countries included in the analysis sorted based on their retraction rates. While looking at the retraction rates certain caveats are needed:

- Not all retractions are due to misconduct. Some retractions could happen due to honest errors. Nonetheless a good proportion of the retractions are due to some form of misconduct.
- Some countries might figure high on this list as they may have an active community of science sleuths working to weed out the bad papers. France, for example, is one of the leaders in research integrity field and the work of sleuths brought about a lot of retractions in 2024.
- There could be some bias at play as the countries known to have higher retraction rates can come under greater scrutiny, leading to more retractions.

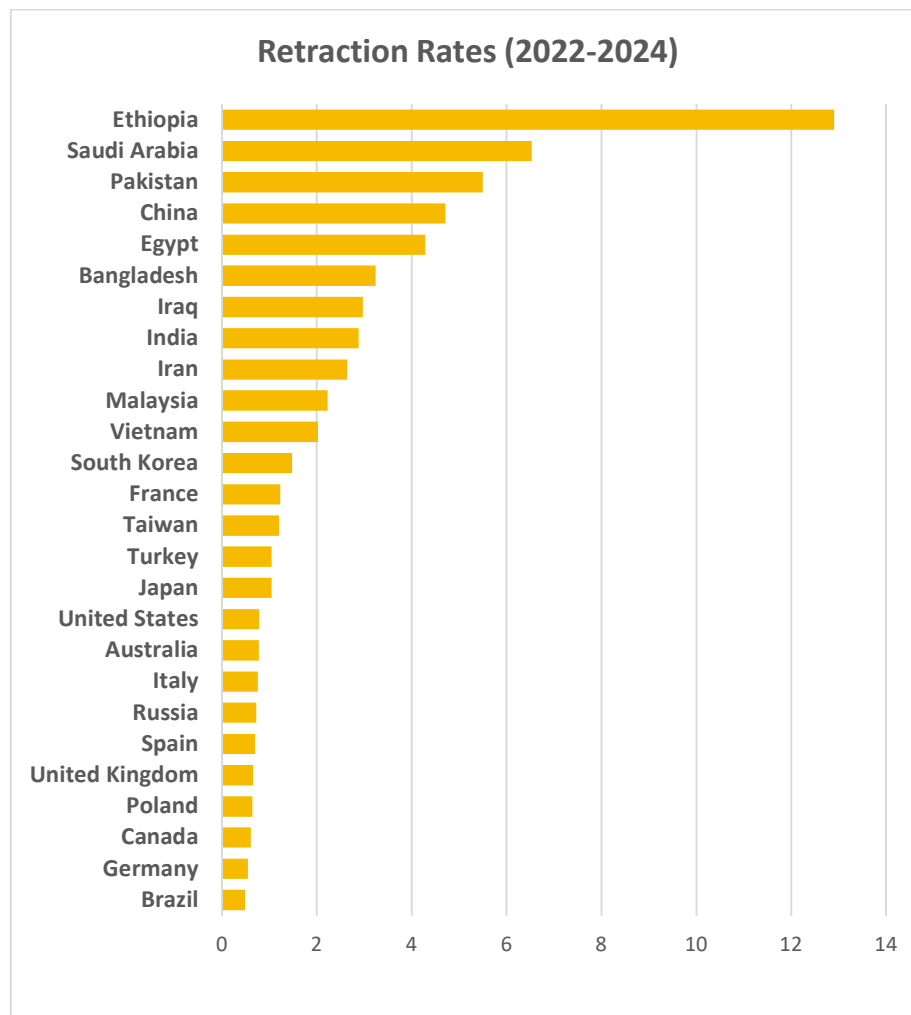


Fig 1. Countries sorted based on Retraction Rates. We see a geographical grouping of the countries with higher retraction rates.

Fig 2 shows the geographical concentration of the countries with higher retraction rates. Most of the countries with higher retraction rates are situated in Asia. This shows the need to improve the science policy in the region. There is high penalty for research misconduct in the western countries which acts as a deterrent. In developing countries, misconduct goes unnoticed and does not hamper the career growth.

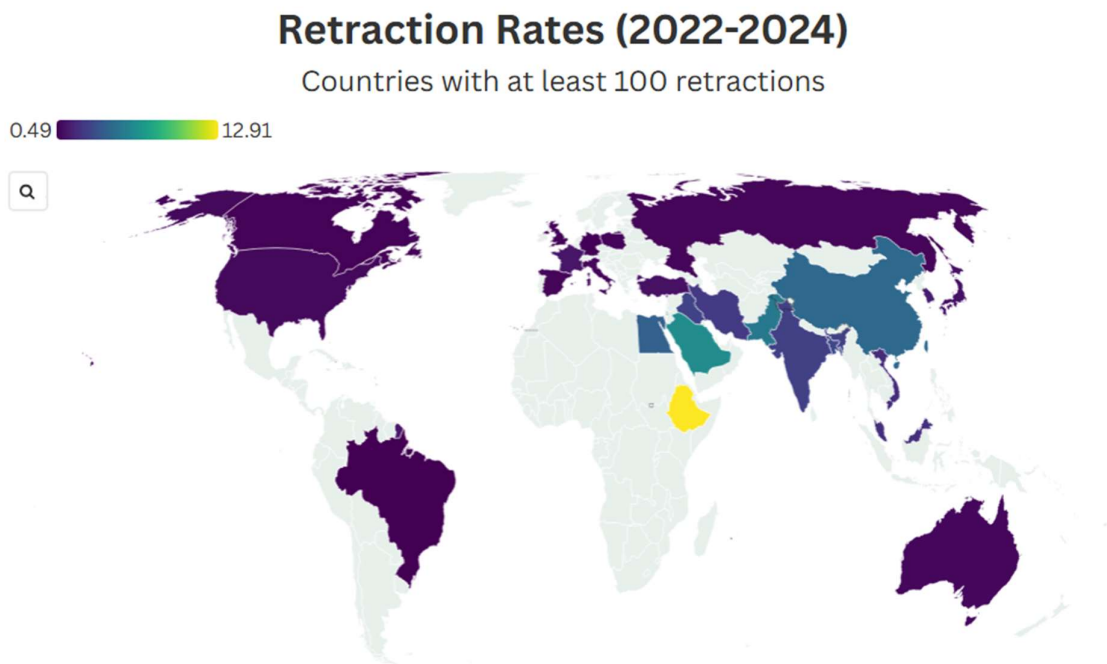


Fig 2. Geographical layout of the countries and the retraction rates. We see a higher concentration in Asia and Eastern Africa.

Correlation analysis with increased publishing

While trying to understand the reason for the distribution, the prime suspect could be an unhealthy focus on quantity of publications. In Fig. 3, we plot the percentage increase in publishing in the last 5 years against the retraction rate. Remarkably, we observe that there is a very high positive correlation (0.85).

The causal link between the parameters is quite simple to explain. If the number of publications in a country increase at very high rate, it is not usually supported by a similar growth of research infrastructure. The studies thus fake the experimental data or sometimes duplicate them across studies. This leads to more number of retractions.

As far as the author knows, this is first evidence that increased publishing is leading to higher retraction rates. It also helps ascertain the real cause for the high number of retractions: excessive focus on number of publications.

It is in the interest of everyone in science that we do not pollute the literature with low quality work. We hope this study spurs work to restore balance of quality in academia.

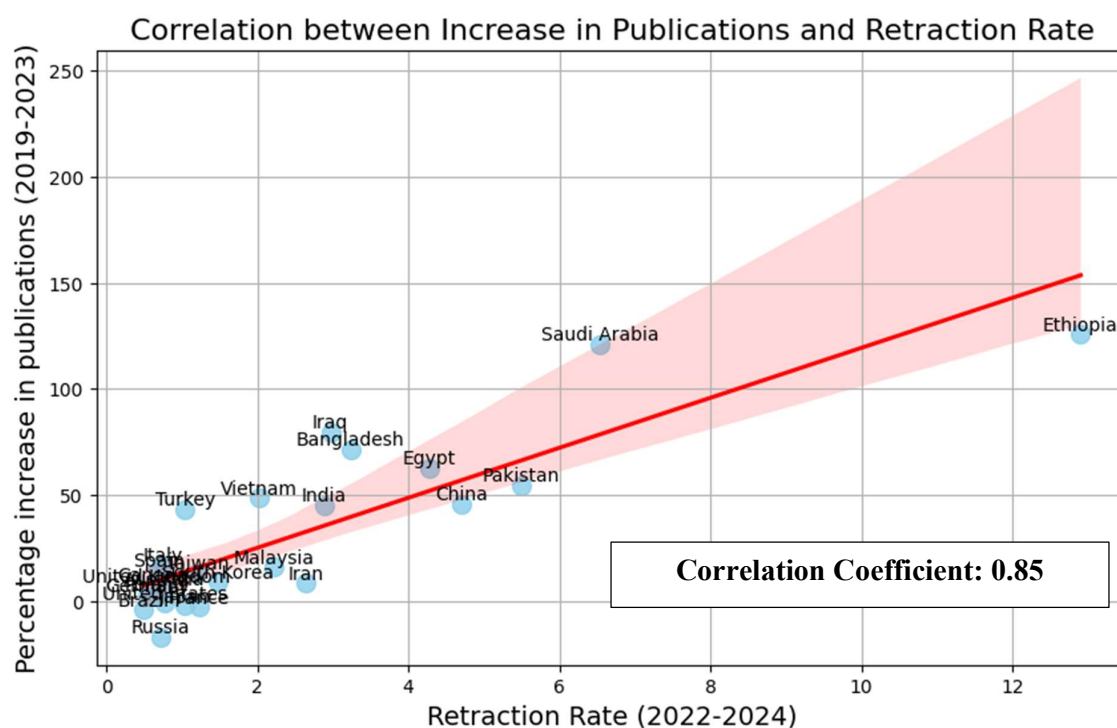


Fig 3. We see a strong correlation between increased number of publications and retraction rate. This shows the urgent need to reform policy to not incentivize quantity.

Conclusion

This analysis identifies the regions of the world with higher retraction rate in the last three years. Additionally, we also see that the retraction rate is highly correlated with the percentage increase in publications. This calls into question the current incentive system which promotes quantity over quality. There is an urgent need to change the rankings and metrics to not reward quality, thereby reducing the pollution in scientific literature and saving everyone's time and effort.

References

- Van Noorden R. (2023). More than 10,000 research papers were retracted in 2023 - a new record. *Nature*, 624(7992), 479–481. <https://doi.org/10.1038/d41586-023-03974-8>
- Mark A. Hanson, Pablo Gómez Barreiro, Paolo Crosetto, Dan Brockington (2024). The strain on scientific publishing. *Quantitative Science Studies*, 5 (4): 823–843. https://doi.org/10.1162/qss_a_00327
- Retraction Watch Database. <https://gitlab.com/crossref/retraction-watch-data>
- SCImagoJR <https://www.scimagojr.com/countryrank.php>

Appendix 1

Table 1 provides the raw data for all the analysis in this study.

Table 1. Raw Data for the analysis presented in the study.

<i>Country</i>	<i>Pubs 2019</i>	<i>Pubs 2022</i>	<i>Pubs 2023</i>	<i>Pubs 2024*</i>	<i>Retractions 2022-2024</i>
Ethiopia	4544	11163	10254	9345	397
Saudi Arabia	27088	56018	59908	63798	1174
Pakistan	24526	38582	37937	37292	626
China	698777	1005380	1018423	1031466	14381
Egypt	24781	41908	40316	38724	518
Bangladesh	7508	12862	12879	12896	125
Iraq	14322	19622	25736	31850	229
India	185439	247543	269183	290823	2325
Iran	65311	74117	70828	67539	560
Malaysia	36426	41910	42281	42652	282
Vietnam	12298	17300	18290	19280	111
South Korea	89149	98751	97487	96223	432
France	113181	114827	110009	105191	403
Taiwan	36781	44814	41654	38494	150
Turkey	48563	66400	69669	72938	218
Japan	127187	132370	124330	116290	389
USA	614312	624498	609674	594850	1424
Australia	99733	108780	105340	101900	244
Italy	117171	138331	137096	135861	311
Russia	123038	111195	102298	93401	221
Spain	97105	111374	111563	111752	231
UK	188071	203747	201255	198763	394
Poland	52277	56196	53917	51638	104
Canada	105360	116893	113461	110029	207
Germany	174524	185991	179861	173731	295
Brazil	85472	87987	82091	76195	120

*2024 data is linearly extrapolated from 2022-2023 as it is not yet available on SCImagoJR