

The probability of publishing in first-quartile journals

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Abstract As an alternative metric of journal impact factor (JIF), journal impact factor quartile is increasingly adopted to compare the research impact of journals within and across different domains. We adopt both optimistic and pessimistic approaches to illustrate the JIF distributions of journals listed in the 2015 Journal Citation Reports. We find that at least one-third of Web of Science publications are actually published in the first quartile (high impact factor journals). In comparison, at most 16.5 % of publications are published in the fourth quartile (low impact factor journals). We argue that Bornmann and Marx's (Scientometrics 98(1):487–509, 2014) claim that “One can expect that 25 % of a researcher's publications have been published in the first quartile” is not precise.

Keywords Impact factor · JIF quartile · Journal Citation Reports · Research evaluation

Dear Sir,

Journal impact factor (JIF) published by Thomson Reuters' Journal Citation Reports is a widely used indicator to evaluate the importance or visibility of a journal in its field. Due to its incomparability across different research domains, field-normalized JIFs have been introduced and increasingly adopted in research evaluation (e.g., Alvarez et al. 2014; Chinchilla-Rodriguez et al. 2015; Tang et al. 2015; Zhou and Lv 2015). Among them, JIF quartile is the most commonly utilized one. By definition, quartile 1 (Q1) means a journal's

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impact factor is within the top 25 % of the JIF distribution of a certain category, and quartile 4 (Q4) means it is within the lowest 25 % of the JIF distribution.¹

JIF quartile can be used to evaluate an entity's (e.g., a country's, institution's, research group's, or individual's) publications distribution among journals of different fields. Bornmann and Marx (2014) suggest JIF quartile as a valuable tool of normalized JIF indicator. On page 496, they further state:

For example, an interesting alternative is the % Q1 indicator. It is the ratio of publications that a researcher has published in the most influential journals. These journals are ranked in the first quartile (25 %) of their subject categories. It is an advantage of this indicator that an expected values is available: One can expect that 25 % of a researcher's publications have been published in the first quartile.

Their statement arouses our doubt: can one really expect *that 25 % of a researcher's publications have been published in the first quartile*? If not, what is the real proportion of Web of Science (WoS) indexed articles allocated to Q1? In this letter we address the above questions by investigating the quartile distribution at both journal and publication levels.

The raw data (including journal title, ISSN, journal impact factor, number of citable items,² and JIF quartile) were downloaded from the 2015 Journal Citation Reports—Science Edition. Included in our primary data set are 8659 journals. Each quartile selected is within specific Web of Science subject category. After excluding 153 journals with no information on impact factors or citable items, 8506 journals were left for analysis (Tang 2013). For a journal associated with more than one quartile, the specific journal and publications published in this journal are allocated to only one quartile to avoid the double counting problem. Two measures are introduced to allocate the journal to a quartile: the optimistic mode and the pessimistic mode. For a journal with more than one quartile, this journal is allocated to the higher quartile under the optimistic mode and allocated to the lower quartile under the pessimistic mode (Q1 is the highest quartile).

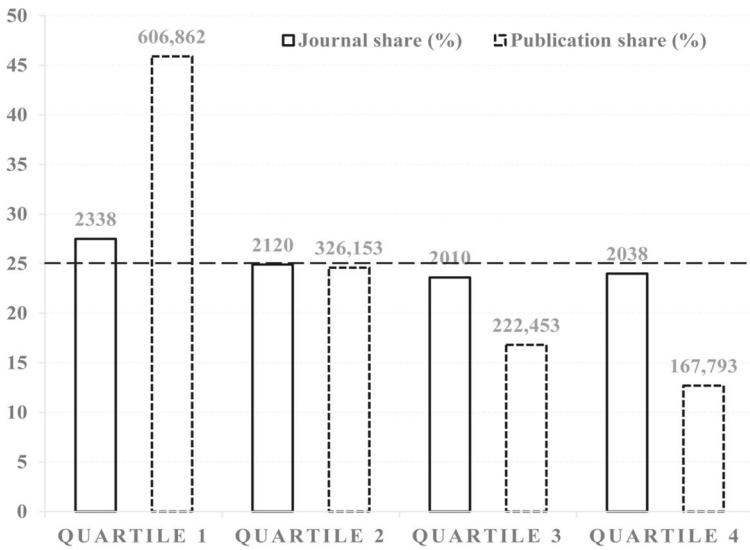
Figure 1 illustrates the journal and publication distributions among the four quartiles. Unsurprisingly, both extreme allocations of journal quartiles support JIF quartile distribution: about 28 % of journals fall into Q1 under the optimistic mode, while about 20 % fall into it under the pessimistic mode. The approximately equal distribution within the four quartiles also holds for Q2, Q3, and Q4 as well. But we also observe that at journal article level there exist huge discrepancies among the four quartile distributions. As demonstrated in Panel A of Fig. 1, under the optimistic mode, over 45 % of the total 1,323,261 publications in 2014 were published in first-quartile journals. The pessimistic mode, which allocates many journals to lower quartiles, tells a similar story, as illustrated in Panel B of Fig. 1. Still, over one-third of WoS indexed papers are allocated to Q1. In sharp comparison, only 16.8 % and 12.7 % of the total publications are allocated to Q3 and Q4, respectively. For robustness considerations, we also tested the data from Journal Citation Reports—Science Edition of 2000 and 2007, and the results are similar.

To conclude, the expectation that 25 % of a researcher's publications are published in first-quartile journals is valid under the following two conditions: (1) All journals covered in Web of Science publish the same or similar number of publications; (2) All publications of the researcher are published in different journals. Yet our analysis shows that for papers published in WoS indexed journals, on average the probability of being published in

¹ For more precise calculation of the JIF quartiles please refer to: <http://ipscience-help.thomsonreuters.com/incitesLive/9053-TRS.html>.

² Citable items denote articles and reviews. In this letter, only these two document types are considered.

Panel A: Optimistic approach



Panel B: Pessimistic approach

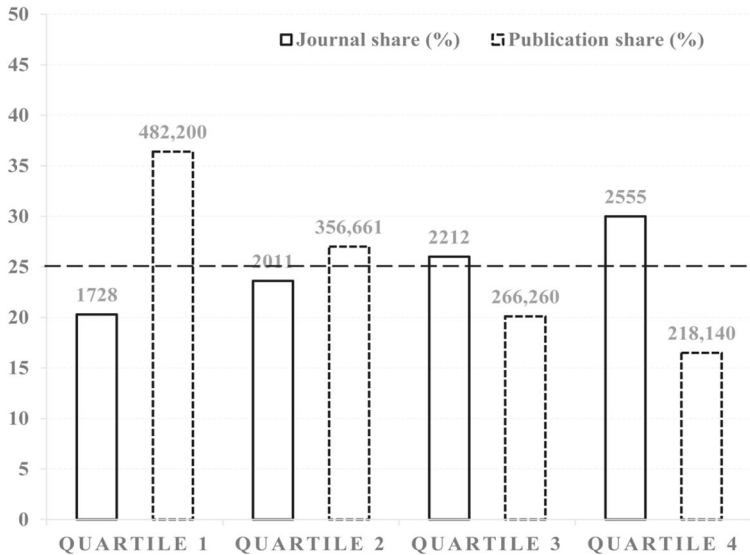


Fig. 1 Distributions of journals and publications among the four quartiles
X-axis denotes the JIF quartiles, *Y-axis* is the actual shares of journals or publications in each quartile. The numbers above each bar represent the absolute number of journals/articles in different quartiles. *Data source* 2015 Journal Citation Reports—Science Edition

journals in Q1 (high impact journals) is far above 25 %. And the reason accounting for this phenomenon is that journals in Q1 have more issues and publish more articles each year (Ibáñez et al., 2013).

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