Factors Affecting Journal Citation Scores: Evidence from Elsevier's Practices

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Article

Factors Affecting Journal Citation Scores: Evidence from Elsevier's Practices

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Abstract: Enhancing journal quality is one of the main concerns of academic journal stakeholders. This study identifies the factors affecting citation scores from various perspectives, including the review process, editorial board composition, geographic distribution of authors, and journal type. To achieve this, we analyzed 111 fully open access journals and 439 subscription journals published by Elsevier. The estimation results of citation scores using ordinary least squares show that journals with lower acceptance rates and longer review periods have higher citation scores, suggesting that rigorous peer review is essential for improving journal quality. Editorial boards with more members and greater international diversity also contribute to higher citation scores. However, these measures have already been adopted by many publishers and are not novel, implying that publishers must continue their steady efforts to enhance journal quality. Additionally, fully open access journals have higher citation scores than subscription journals after controlling for other factors. Therefore, converting subscription journals to open access journals could be an effective strategy for increasing citation scores.

Keywords: journal quality; international diversity; editorial board; citation score; acceptance rate

1. Introduction

Every member of an editorial board strives to enhance journal quality through the review process. Nevertheless, amid rising submission fees and limited budgets, university libraries must carefully evaluate the journals to which they subscribe. As journal quality is a key criterion for subscription decisions (Subaveerapandiyan & Sinha, 2024), publishers pay close attention to their journals' citation scores, which are intended to reflect journal quality. Moreover, previous studies found that publishers can set higher subscription prices and article processing charges for subscription and fully open access journals by achieving higher citation scores (Asai, 2020, 2023; Budzinski et al., 2020; Dewatripont et al., 2007; Petersen, 1992; Schönfelder, 2020). In addition to publishers, authors also hope that the journals publishing their work achieve high citation scores, as publishing in high-quality journals enhances their academic evaluations. Therefore, improving citation scores is a concern for all journal stakeholders, although few studies have empirically investigated this issue. Although using citation scores to evaluate journal quality may be problematic (Hicks et al., 2015), these scores are widely utilized as indicators of journal quality because the quality perceived by researchers is positively correlated with citation scores (Regazzi & Aytac, 2008; Saha et al., 2003; Yue et al., 2007). Accordingly, this study considers citation scores as a variable representing journal quality.

Several studies examined the relationship between editorial boards and journal citation scores. Zsindely et al. (1982) found a positive correlation between the mean number of citations of editorial board members and the journal's impact factor, suggesting that high-quality journals tend to have editorial boards composed of highly accomplished researchers. Similarly, Pagel and Hudetz (2011) demonstrated that the median h-index of all editorial board members was positively associated with the journal's impact factor. Nisonger (2002) and Petersen et al. (2017) investigated the relationship

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between international diversity in editorial boards and impact factors, assuming that international editorial boards expand journals' global networks, thereby increasing impact factors. However, both studies found that international diversity in editorial boards was not significantly associated with journal impact factors.

Some studies examined the relationships between citation scores and readership, as well as between citation scores and acceptance rates. Donohue and Fox (2000) found a negative correlation between acceptance rates and impact factors, whereas journal circulation was positively correlated with impact factors. This positive relationship suggests that university libraries select journals for subscription based on impact factors. Sugimoto et al. (2013) also found a negative correlation between acceptance rates and citation scores. Haensly et al. (2009) used ordinary least squares (OLS) regression to analyze impact factors and showed that journals with greater circulation and lower acceptance rates had higher impact factors. The conclusion that lower acceptance rates are associated with higher citation scores is consistent across these studies. However, as current circulation numbers are not publicly available (Bergstrom, 2001), investigating the relationship between citation scores and readership would be challenging.

Most previous studies have explored the relationship between citation scores and a limited number of factors, such as acceptance rates, using correlation analysis. However, correlation analysis does not control for the effects of other variables on citation scores or present a cause-and-effect relationship. This study investigates various factors that may influence journal quality, including editorial board composition, review process, geographic distribution of authors, journal type, and academic discipline, by conducting a regression analysis that accounts for the effects of these variables. Elsevier provides information about acceptance rates, review periods, and editorial boards for some journals on individual journal websites, whereas most publishers do not disclose acceptance rates. We focus on 439 subscription journals and 111 fully open access journals published by Elsevier due to the data availability. This study contributes to the discussion on enhancing scholarly communication, but does not aim to provide prescriptive knowledge on how to increase citation scores.

2. Methodology

As the targeted journals cover various academic disciplines, this study employs the source-normalized impact per paper (SNIP) for 2022 as the dependent variable, controlling for academic discipline-specific differences in citation practices. The independent variables fall into five categories: review process, editorial board composition, geographic distribution of authors, journal type, and academic discipline, based on previous studies (Donohue & Fox, 2000; Haensly et al., 2009; Nisonger, 2002; Petersen et al., 2017; Sugimoto et al., 2013). Variables representing the review process include whether a journal adopts a single- or double-blind review system, the review period, and the acceptance rate. Several studies examined whether a single-blind review system creates bias against women and other author groups (Lee et al., 2013; Primack et al., 2009). However, they did not explore the impact of the review system on citation scores. Variables signifying editorial board composition are the number of editorial board members, international diversity, and the country distribution of editors. Journal type represents whether a journal is a subscription-based or fully open access journal and whether it is published on behalf of research institutions, such as academic societies and universities, or independently by Elsevier. The study formulates the *SNIP* equation as follows:

SNIP = f (Accept, Review period, Single-blind, Editor, Diversity, Editor China, Editor UK, Editor US, Author China, Author UK, Author US, Open access, Society, Academic discipline)

The variable *Accept* denotes the acceptance rate, calculated as the number of accepted articles divided by the number of submissions in 2022 and expressed as a percentage. *Review period* is the mean number of days between manuscript submission and the final editorial decision. These data are sourced from individual journal websites. The variable *Single-blind* is set to 1 if a journal adopts a single-blind peer review system and 0 if it adopts a double-blind system. This information is available on the author guidelines pages of journal websites. *Editor* represents the number of editorial board

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members. We calculate *Diversity* as the number of editors' countries divided by the total number of editorial board members. The *US*, *China,* and the *UK* are the top three countries where editors are based. *Editor US* is set to 1 if a journal has the most board members from the US and 0 otherwise. *Editor China* and *Editor UK* are defined similarly. Data on editorial board composition are sourced from the editorial board pages of individual journal websites. *Author China* is set to 1 if a journal's authors in 2022 are mostly from Chinna and 0 otherwise. *Author UK* and *Author US* are defined similarly. The number of authors by country is available in Scopus. *Open access* is set to 1 if a journal is fully open access and 0 if it is subscription-based. *Society* is set to 1 if a journal is published on behalf of research institutions and 0 otherwise. We determine whether a journal is a fully open access or subscription journal and whether it is published on behalf of a research institution or independently by Elsevier using information provided on individual journal websites. Academic disciplines include agricultural and biological sciences, biochemistry, chemistry, engineering, mathematics, medicine, physics, social sciences, and others based on the All Science Journal Classification of Scopus. The variable *Agriculture* is set to 1 if a journal covers agricultural and biological sciences and 0 otherwise. Other variables representing academic discipline are defined similarly. As journals in other disciplines serve as the reference group when formulating the *SNIP* equation, the variable *Other* does not appear in the equation.

Data

Table 1 presents the summary statistics of the variables, excluding the binary variables. The ranges, measured by the difference between the maximum and minimum, are large for all variables. The mean and median of *Accept* for fully open access journals are higher than those for subscription journals at the 1% significance level. The mean and median of *Review period* for fully open access journals are lower than those for subscription journals at the 10% and 5% significance levels, respectively. These findings indicate that articles submitted to fully open access journals are typically reviewed more quickly than those submitted to subscription journals. Moreover, the median of *Editor* for subscription journals is higher than that for fully open access journals at the 5% significance level, indicating that subscription journals have editorial boards with more members than fully open access journals. Conversely, the null hypothesis that the means and medians of the other variables are equal between the two journal types is not rejected at the 10% significance level.

Table 1. Summary statistics of variables.

	Subscription journals (N = 439)				
	Accept	*SNIP*	*Review period*	*Editor*	*Diversity*
Mean	26.4***	1.34	131.7*	53.6	0.34
Median	24.0***	1.20	115.0**	47.0**	0.33
Maximum	100	9.87	634	275	1.00
Minimum	6.0	0.17	14	2	0.01
SD	13.9	0.83	72.1	31.6	0.15
	Fully open access journals (N = 111)				
	Accept	*SNIP*	*Review period*	*Editor*	*Diversity*
Mean	32.3	1.34	118.4	52.9	0.35
Median	31.0	1.27	101.0	41.0	0.34
Maximum	84.0	2.43	713	439	1.00
Minimum	2.0	0.20	18	8	0.04
SD	18.4	0.53	78.0	50.3	0.16

SD: standard deviation, SNIP: Source normalized impact per paper; ***, **, and * denote 1%, 5%, and 10% significance levels, respectively.

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Regarding the binary variables representing the country distribution of authors and editors, which are not presented in Table 1, 280 subscription and fully open access journals (50.9%) have editorial boards with the most US members. This finding suggests that US researchers contribute significantly to journal management. The number of subscription and fully open access journals with the most US authors is 172 (31.3%), lower than the 245 (44.5%) with the most Chinese authors. Of the total of 550 journals, 85 (15.5%) have editorial boards with the most Chinese members, and 76 of these (89.4%**)** have the largest number of Chinese authors. This indicates that Chinese researchers have a strong presence in these 76 journals in terms of both authors and editors. Conversely, 140 of the 280 journals with the most US editors have the most US authors, and the proportion is 50%. Moreover, 38 journals have the most editors from the UK, only 6 of which (15.8%) have the largest number of UK authors.

3. Results

Table 2 presents the estimation results of *SNIP* using OLS. Variables, excluding binary variables, are presented as natural logarithms. The coefficient of *Accept* is negative at the 1% significance level, suggesting that low acceptance rates owing to rigorous peer reviews enhance citation scores. These findings are consistent with those of previous studies (Donohue & Fox, 2000; Haensly et al., 2009; Runde, 2021; Sugimoto et al., 2013). The coefficient of *Review period* is positive at the 1% significance level, indicating that journals with longer review periods have higher SNIP scores. Of the 550 journals in total, 449 (81.6%) use a single-blind review system. The insignificant coefficient of *Single* suggests that whether a journal adopts a single-blind or double-blind system does not influence its citation score.

Regarding editorial board composition, internationally diverse and large editorial boards generate higher SNIPs, as indicated by the positive coefficients of *Editor* and *Diversity*. The finding that journals with more editors have higher citation scores aligns with the results of Petersen et al. (2017). Conversely, the null hypothesis that the coefficients of *Editor China* and *Editor US* are equal to 0 is not rejected at the 10% significance level. Thus, country where most editors of a journal are from does not seem to affect SNIPs. Of the 550 journals, 75.8% have mostly *Chinese* or *US authors* and relatively higher SNIPs, as indicated by the positive coefficients of *Author China* and *Author US* at the 1% and 5% significance levels, respectively. Table 1 shows that the mean *SNIP* for fully open access journals is identical to that for subscription journals. However, the coefficient of *Open access* is positive at the 1% significance level, indicating that fully open access journals have higher SNIPs than subscription journals after controlling for other factors. The coefficient of *Society* is close to 0 and is insignificant, suggesting that whether a journal is published on behalf of research institutions or independently by Elsevier does not influence its citation score. Regarding academic discipline, the null hypothesis that five of the eight coefficients are equal to 0 is not rejected at the 10% significance level. These findings reflect that SNIPs are calculated after correcting for differences in citation practices across academic disciplines.

Table 2. Estimation results.

Variables	Coefficients
Constant	–1.1227 (0.3131)***
ln Accept	–0.1707 (0.0374)***
ln Review period	0.2539 (0.0432)***
ln Editor	0.1460 (0.0335)***
ln Diversity	0.0888 (0.0418)**
Single-blind	0.0820 (0.0544)
Open access	0.1361 (0.0450)***
Society	0.0298 (0.0404)
Editor China	0.0302 (0.0616)

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Editor UK	0.1286 (0.0779)*
Editor US	–0.0003 (0.0486)
Author China	0.1504 (0.0557)***
Author UK	0.1095 (0.1226)
Author US	0.1309 (0.0570)**
Agriculture	–0.1278 (0.0962)
Biochemistry	–0.1870 (0.1063)*
Chemistry	0.1178 (0.1147)
Engineering	0.1825 (0.0878)**
Mathematics	–0.0780 (0.1124)
Medicine	–0.1952 (0.0886)**
Physics	–0.0493 (0.0982)
Social sciences	0.1037 (0.1078)
Adjusted R^2	0.3344

Standard errors are presented in parentheses. ***, **, and * denote 1%, 5%, and 10% significance levels, respectively.

4. Discussion and Conclusion

The estimation results indicate that publishers can enhance journal quality by implementing proper peer reviews and reconstituting editorial boards. However, strict peer reviews may reduce acceptance rates. Schultz (2010) stated that journals with fewer manuscript submissions had higher acceptance rates to secure the necessary number of published articles. Therefore, publishers must attract as many submissions as possible to allow for low acceptance rates owing to strict peer reviews. Moreover, the estimation results suggest that large and internationally diverse editorial boards may appoint more appropriate editors and reviewers to handle manuscripts, leading to more effective peer reviews. However, this study found that over half of Elsevier journals' editorial boards had the most US members and that some journals' editorial boards were composed entirely of members from a single country. Several studies demonstrated that the concentration of editors' countries applies to other publishers. Hodgson and Rothman (1999) found that 71% of the editors of the top 30 economics journals were located in the US, indicating the geographic concentration of editors. Wen et al. (2023) reported that 88% of the editors of seven medical journals were affiliated with high-income countries. Jia et al. (2024) obtained similar results for high-impact medical ethics journals. Moreover, Espin et al. (2017) found that international diversity remained low despite an increase in the number of editors. Nevertheless, the findings that internationally diverse editorial boards improve journal quality suggest that publishers should reconstruct their boards, although this may take time. Although this study explored the factors affecting citation scores from various perspectives, its findings regarding the positive effects of rigorous peer reviews and well-established editorial boards on citation scores are not novel. In other words, the results indicate that improving journal quality requires ongoing, consistent efforts by publishers.

Several previous studies have shown that the impact factors of fully open access journals were lower than those of subscription journals. Björk and Solomon (2012) found that fully open access journals had lower impact factors than subscription journals. Piwowar et al. (2018) reported that articles in fully open access journals received fewer citations than those in subscription journals. However, this study's findings revealed that Elsevier's fully open access journals had a citation advantage over subscription journals. These results suggest that the academic status of journals may change with the development of open access. Traditional journal publishers have launched fully open access journals and converted subscription journals into open access journals since the 2000s. Such strategies may be effective for increasing citation scores.

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This study has some limitations. First, because this study examined only Elsevier journals owing to data availability limitations, we should be cautious about generalizing the results to other publishers. Second, this study employed review process as an independent variable; however, it may be influenced by the number of reviewers and review rounds, which were unavailable. The effects of these factors on citation scores should be explored. Third, SNIP was chosen among several citation indexes to control for academic discipline-specific differences in citation practices. However, Greenwood (2007) raised concerns about the reliability of a citation index, and Vogel et al. (2017) demonstrated that factors influencing journal rankings vary among different indexes. Therefore, the robustness of this study's results should be confirmed by investigating other citation indexes.

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Abbreviations

The following abbreviations are used in this manuscript:

OLS	Ordinary least squares
SNIP	Source normalized impact per paper

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