

# Improvement and Empirical Research on Journal's First-Citation-Speed-Index

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## Introduction

The first-citation-speed is an important indicator to evaluate the quality of Journals or articles, which can reflect the speed of articles being admitted or used after publication. And non-citation rate, which is related to first-citation-speed, is another indicator reflecting articles' quality. According to Zhu Mengjiao and Wu Yishan (2013), the potential value of non-cited articles hasn't been found. So it's meaningful to study the features of non-cited rate and first-citation-speed to evaluate the quality and dig the potential value of journals and articles. Egghe, L. and Bornmann, L. (2011) use h-index to define the First-Citation-Speed-Index (FCSI).  $t_1 = t_c - t_p (t_c \geq t_p)$  is used to represent the speed of articles when receiving the first citation. FCSI is proved to be a good indicator to reflect the features of journals' first-citation-speed.

## Definition of FCSI<sub>n</sub>

FCSI (Egghe, L., Bornmann, L., 2011) of the Journal is defined as F.

$$F = \frac{1}{t_m - h + 1},$$

in which,  $t_p$  is the time when an article was published,  $t_c$  is the time when this article was cited for the first time,  $t_1 = t_c - t_p (t_c \geq t_p)$ ,  $t_m = \max\{t_1\}$ , and h is defined as there are at least h articles'  $t_m - t_1 + 1 \geq h$  (which is similar to the definition of h-index).

But FCSI has a fuzzy degree of distinction when it is used to evaluate journals. In our study, we introduce the non-citation rate ( $r_{non-citation}$ ) to the FCSI, which can correct the disadvantage of the FCSI. We define the new indicator FCSI<sub>n</sub> as  $F_n$ .

$$F_n = \frac{1}{t_m - h * (1 - r_n) + 1},$$

in which,  $r_n$  is the non-citation rate of a set of articles during a period of time.

## Data and Method

We choose three economics journals, *AM ECON REV*, *AM J AGR ECON* and *APPL ECON LETT* to take an empirical research. The citation data from 2004 to 2013 of all articles published in the three journals in the year 2004 is collected through Web of Science database.

We will analyse the FCSI<sub>n</sub> of the three journals in 3-year, 5-year and 10-year time window to see if the FCSI<sub>n</sub> has an improvement on the previous FCSI.

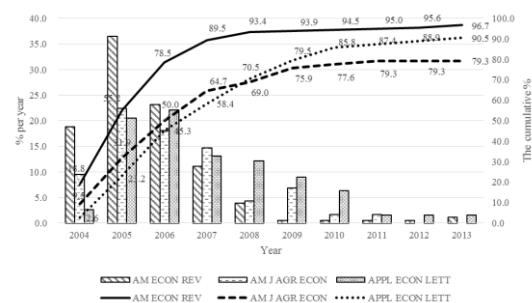
## Result and Analysis

Table 1 and Figure 1 is the first-citation-speed and non-citation performance of the three journals, in which we can generally observe the first-citation-speed of the three economics journals. And in Table 2, we can see FCSI has no degree of differentiation, and FCSI<sub>n</sub> of the three journals is superior to the previous FCSI, overcoming the fuzzy degree of distinction in FCSI and having a positive correlation

with other evaluation indicators. *AM ECON REV* has the top FCSI<sub>n</sub> value. *AM J AGR ECON*'s FCSI<sub>n</sub> is higher than *APPL ECON LETT* under 3-year and 10-year time window but lower under 5-year time window, which coincides with Table 1 and Figure 1. More detailed analysis can't be listed in the poster because of the limited space.

**Table 1 10-year first-citation-speed data of articles published in 2004**

Journal	The number of articles	Non-citation rate of 10 years (%)	First cited rate in all articles (%)									
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
AM ECON REV	181	3.3	18.8	36.5	23.2	11.0	3.9	0.6	0.6	0.6	0.6	1.1
AM J AGR ECON	116	20.7	9.5	22.4	18.1	14.7	4.3	6.9	1.7	1.7	0.0	0.0
APPL ECON LETT	190	9.5	2.6	20.5	22.1	13.2	12.1	8.9	6.3	1.6	1.6	1.6



**Figure 1 Percentage of articles which have received the first citation in 10 years.**

**Table 2 Three journal's  $r_n$ , h, F,  $F_n$  and other evaluation indicators**

Journal	Immediacy Index	Cited Half-life	H-index	Impact Factor	3-years time window				5-years time window				10-years time window			
					$r_n$	h	F	$F_n$	$r_n$	h	F	$F_n$	$r_n$	h	F	$F_n$
AM ECON REV	0.343	>100	52	1.655	21.5%	3	∞	1.547	6.2%	5	∞	3.017	3.3%	10	∞	3.017
AM J AGR ECON	0.121	9.8	21	0.622	50.0%	3	∞	0.666	31.0%	5	∞	0.644	20.7%	8	∞	0.604
APPL ECON LETT	0.026	4.9	15	0.135	54.7%	3	∞	0.609	29.5%	5	∞	0.679	9.5%	9	1	0.540

## References

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