Citation Analysis of Journal Influence
- The Ratios Explained -

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Paper Influence ~ Journal Influence

- Citation analysis is based on the idea
  - The paper influence $\approx$ the number of citations made to it
  - The more the paper has been cited, the more influential the paper is.
  - Expanding the idea to journal level, the journal influence is then the average (or sum) of the paper influence.

The “citation to article” ratio

- The journal influence relies upon a so-called “citation to article” ratio, which is defined as

$$\frac{\text{total cites in period A to articles published in period B}}{\text{number of articles published in period B} \bullet \text{duration of period A}}$$

- Period A – the *citation period*, during which the citations are made.
- Period B – the *source period*, during which all the articles are considered

The “citation to article” ratio (cont.)

- The ratio is applied to an index point (either period A or period B) to measure the journal influence of the index point, eg. the 2001 journal influence index, the journal impact factor of 2001, …
- The duration of the *citation period* A and *source period* B is flexible.
- This ratio is fundamental to all present citation analysis studies.

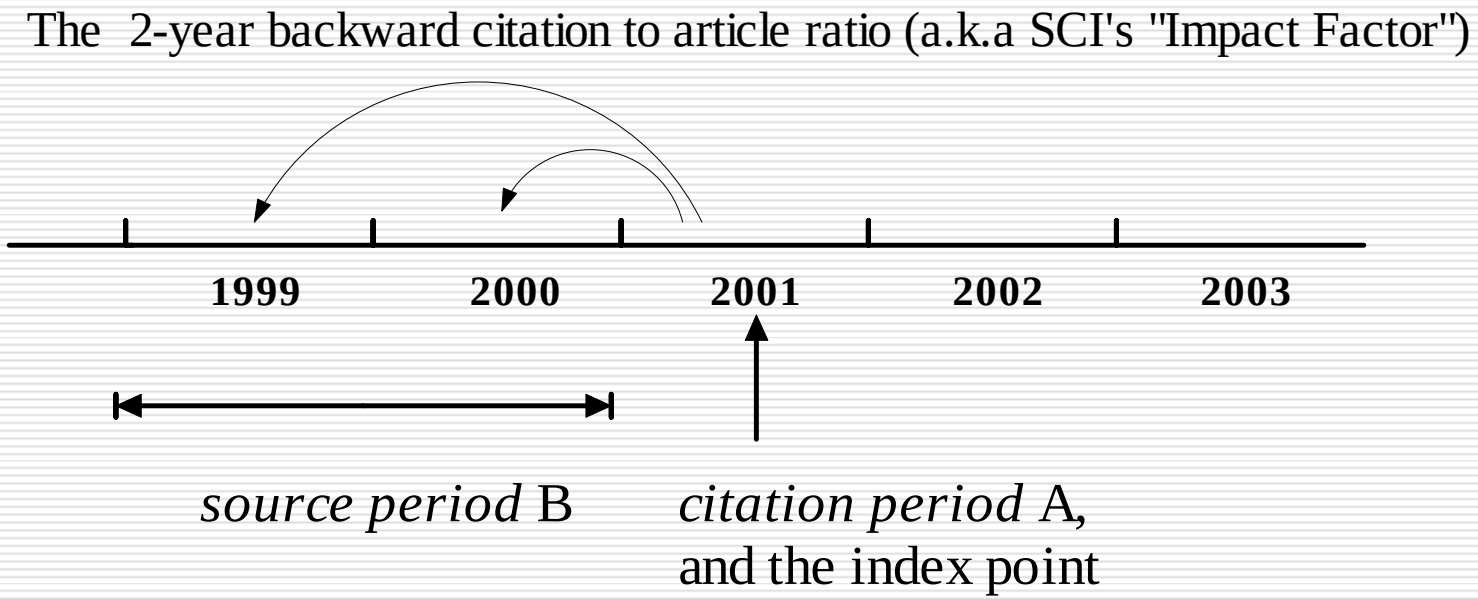
The backward ratio

- The ratio is called a "*backward ratio*" if the index point is later than the *citation period* A.
- Example:
  - We are to evaluate the journal influence of the year of 2001, so we choose an index point – year of 2001.
  - We choose a one-year span of *citation period* A, and a two-year span of *source period* B, and then the "backward ratio" is calculated as follows

$$\frac{\text{total cites in 2001 to articles published in 1999-2000}}{\text{number of articles published in period 1999-2000} \bullet \text{1 year}}$$

The backward ratio (cont.)

- An Example of the “backward ratio” at the index point of 2001



The backward ratio (cont.)

- Observation: for the index point of 2001, the *backward ratio* does not consider a *source period* of 2001, i.e. the influence of the articles published journal in 2001 (the citations to the 2001 articles) are not covered at all!

- The backward ratio is NOT a real citation statistics for the journal articles in the year of the index point.

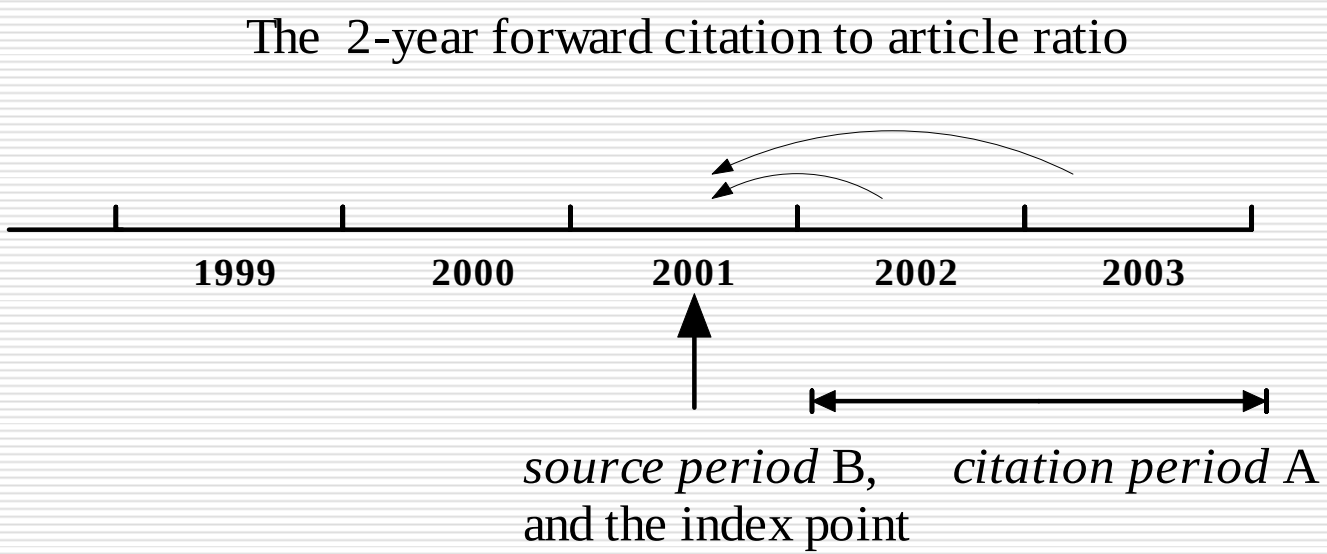
The forward ratio

- The ratio is called a "*forward ratio*" if the index point is earlier than *citation period* A.
- For example, for the index year of 2001, the 2-year span of the "*forward ratio*" is calculated as follows:

$$\frac{\text{total cites in 2002-2003 to articles published in 2001}}{\text{number of articles published in period 2001} \bullet \text{2 years}}$$

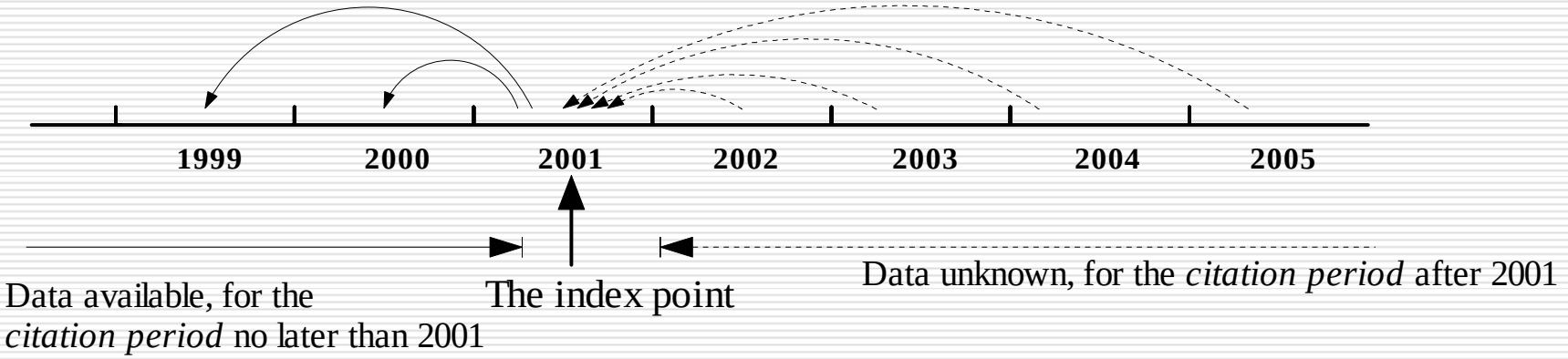
The forward ratio (cont.)

- An Example of the "*forward ratio*" for the index point of 2001



The forward ratio (cont.)

- The *forward ratio* is a more accurate reflection of the journal influence, but limited by the availability of the *citation period* data for computation on a timely basis.



The projected forward ratio

- The computation of the *forward ratio* can only be conducted at a later time to cover the *citation period*. However, it is possible derive a projected forward ratio in a timely fashion based on the available ratios in the previous years.

- For example, the real 5-year span forward ratio of 2005 is not computable until 2010, but we can “project” the ratio, by aggregating the available 5-year span ratios 2001, 2000, 1999, 1998, …

Summary: the citation to article ratios

- On ***journal-ranking.com***, a number of citation to article ratios are provided:
  - 2-bca: the 2-year span backward citation to article ratio (a.k.a SCI's "Impact Factor")
  - 5-bca: the 5-year span backward citation to article ratio
  - 5-fca: the 5-year span forward citation to article ratio (if applicable)
  - 5-pfca: the projected 5-year span forward citation to article ratio